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THE MARINE OBSERVER

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

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WORK OF THE YEAR.

1st April, 1938, to 31st March, 1939.

This year has been a memorable one, with wars and rumours of wars, crisis following crisis, and terrific expenditure on armaments. For shipping it has been rather a year of extremes—freights at a highish level early on and tumbling to low records later; great improvements have been made with regard to accommodation, food, watches and general conditions of personnel, but everyone connected with the sea has been preoccupied with the gradual serious decline of our Merchant Fleet relative to world tonnage, especially serious in view of the extremely uncertain international situation. It seems, however, that some relief to shipping is now being afforded by the Government, so that we may look into the future with considerably more confidence. It is refreshing perhaps to turn our thoughts from the troubled channels of international affairs into the more peaceful one of the science of Marine Meteorology, a subject which at all times has a very considerable potential value. Meteorology plays a very important part in modern life and certain data is essential for the planning and successful carrying out of various operations. Quite apart from the necessity of having an ordinary daily forecast of visibility, cloud, wind, etc., it is important that data should be available showing the average conditions in given areas for a particular month.

As far as the general work of the year has been concerned, the Meteorological Office has cause to be grateful to the large body of Voluntary Observers at sea for their willing co-operation and for the valuable work which they have done. Synoptic Meteorology especially becomes increasingly important nowadays with the great increase in flying operations both military and civil—for it must be realized that knowledge of probable weather on his route is of absolutely vital importance to the airman. It is gratifying therefore to observe that the Voluntary Observing Fleet has been maintained at its normal level and that a total of 218 Supplementary Observing Ships has been added to the list. As will be seen from Table V, the number of Wireless Weather Reports received from British ships continues to increase by an appreciable amount. The more reports received from ships on the Atlantic, the more accurate is the result of the forecaster's work. In this connection, the importance of accuracy with regard to barometer readings cannot be over-emphasized—and observers of vessels with aneroid barometers are requested to take advantage of every opportunity of having these instruments checked.

As will be seen from the following details of this report, a start was made in January, 1939, of the analysis of data extracted from logbooks, commencing with the North Atlantic Ocean. At the same time, it was found necessary to commence work on certain data required by the Admiralty. It is hoped that the Meteorological Atlas of the North Atlantic will be completed in the year 1941. Sections will be published in THE MARINE OBSERVER from time to time. At a meeting held in January, details of procedure were discussed and certain changes in the original plan tentatively adopted, the chief difference being that temperature charts will show isotherms instead of having actual temperatures written in each 2° square, and it is felt this will make the chart easier to read. Temperatures for 2° squares will, however, be plotted for drawing in the isotherms and these former charts will be retained for scientific research and will be published separately if the demand justifies such a course.

It will be noted that we are now working on a combined Ocean Current Atlas for the North and South Atlantic Oceans. This was instigated at the request of the Hydrographer of the Navy, with whom the Marine Division works in close collaboration, through the Naval Meteorological Branch of the Hydrographic Department. The South Atlantic Atlas was not commenced before owing to sparsity of observations, especially in the middle of that ocean. Vessels are reminded that observations of currents are always particularly welcome and in this connection, it is emphasized that stellar observations frequently give more accurate results than our old friend the sun. In areas where observations are scarce, the approximate set and drift will be indicated by straight arrows.

The Observing Fleet.

Throughout the year the Regular Voluntary Observing Fleet has been maintained at 360 ships. In addition 218 Supplementary Observing Ships have been added to the list, making a total of 563 Supplementary Ships. There are, therefore, 923 ships of the British Merchant Navy co-operating with the Meteorological Office.

Meteorological Log Ships.—In view of the approaching completion of the extraction of existing data for the preparation of meteorological charts the number of full meteorological log keeping ships has been restricted to 20, which have been selected from ships whose routes take them through certain regions of the Pacific, Antarctic, Arctic, North Atlantic and Home Waters where data are still particularly required to complete the survey of the oceans for climate.

Ships' Meteorological Records (Form 911). The average number of ships making these returns throughout the year has been 330. Of these, 276 carry out the duties of Selected Ships, this being the number appropriate to Great Britain in accordance with the International agreement arrived at in Copenhagen, 1929, whereby 1,000 Selected Ships for the whole world are allocated to the different maritime nations in proportion to their total tonnage.

Supplementary Weather Reporting Ships (Form 918).—The work of Supplementary Reporting Ships has materially assisted in maintaining an adequate supply of Wireless Weather Observations in parts of the world where a sufficient number of Selected Ships are not always available. Their work has also been of especial value in the North Atlantic during summer months in reporting to British and Canadian meteorological centres, when North Atlantic flights are taking place. These ships serve as a valuable reserve from which recruitment to the Regular Observing Fleet can be made when vacancies occur, thereby ensuring the maintenance of the desired number of Selected Ships in all parts of the world.

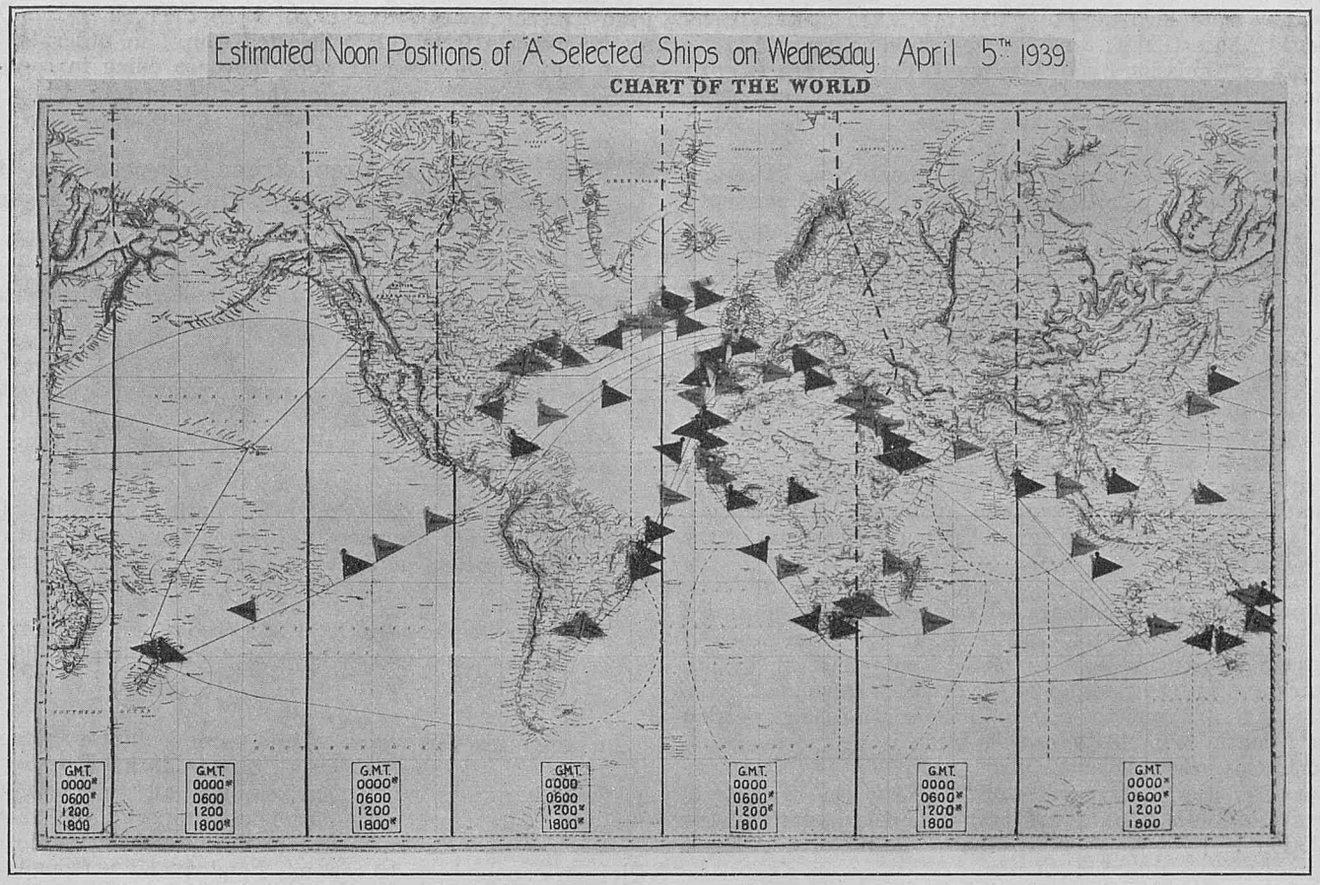
Cross Channel Steamers.—The service of weather reports from selected positions in Home Waters by cross channel steamers has been maintained by 18 vessels operating on five different routes.

Officers Training Establishments.—The cadet Meteorological Log has been kept throughout the year at Pangbourne Nautical College, H.M.S. *Conway* and H.M.S. *Worcester*.

Light Vessels and Light Houses.—Eighteen Light Vessels and Coast Stations in Home Waters and two Light Houses abroad have regularly returned observations. Since January, 1939, four of the above Light Vessels situated off the Irish coast have been transferred to the Irish Meteorological Service.

The Selected Ship Service.

The Selected Ship Service has been efficiently maintained during the year. British Selected and Supplementary Reporting Ships work with 19 meteorological centres through 67 wireless stations throughout the world specially detailed for this purpose in conformity with schedule. An examination of the position of both "A" and "B" Selected Ships on the 1st June, 1938, shows that there were 101 out of 279 or 36 per cent. in a favourable position to report to a meteorological centre. The remainder were in port or in narrow waters, see CHART I. Communication through British stations is



controlled by roll-call. The photograph of the Daily Position Chart worked in the Marine Division shows the estimated position on 6th April, 1939, of *"A" Selected Ships at sea and in ports abroad.* TABLES I and II indicate the number of reports received at Weather London from ships in the Eastern North Atlantic, North Sea, and Arctic Waters each month during the year. The reports received from northern waters are mainly made by steam trawlers when on passage to and from Arctic fishing grounds. The systematic manner in which these small craft carry out this work under most arduous conditions proclaims their keenness and ability.

TABLE III gives the number of reports received each month during the year from cross channel steamers.

The Selected Ship System of reporting to Shore W/T stations or to CQ at schedule times is now becoming more general throughout the Merchant Navy. Many ships make their own weather charts by intercepting these reports as a matter of routine. Especially is this the case in those regions where no synoptic message from a meteorological centre is available.

Port Meteorological Offices and Merchant Navy Agencies.

The Merchant Navy Agencies at Hong Kong and Sydney were closed down on 30th June, 1938. Port Meteorological Officers of London and Liverpool and Merchant Navy Agents at Southampton, Cardiff, Glasgow, Hull, Newcastle and Leith are a vital link between the Marine Division and the Voluntary Corps of Marine Observers.

Collection of Data by Written Returns during Year.

Meteorological Log (4 hourly) kept with complete official instrumental equipment by an average number of 18 observing ships.

Of a total of 46 received :—

22 classed Excellent.
24 classed Very Good.
0 classed Good.
0 not classed.

Ships' Weather Record Form 911, kept by an average number of 330 observing ships.

Of a total of 2,591 of these forms received, they were classed as follows :—

852 Excellent.
1,739 Very Good.
0 Good.
0 not classed.

The training of cadets in the officers' training ships *Conway* and *Worcester*, and the Nautical College, Pangbourne, in weather observation by means of the cadets' meteorological log, has been carried out in a highly satisfactory way, all cadets' meteorological logs received having been classed Excellent.

The Light-House Stations at Watling Island, West Indies and at Cape Pembroke, Falkland Islands, have continued to return routine observations.

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

A number of meteorological logs kept in H.M. ships together with extracts of set and drift of current recorded in the Remarks Books of H.M. Ships, have been received from the Hydrographer of the Navy, through the Naval Meteorological Branch.

The work of collecting water samples and observations of sea surface temperatures in the North Atlantic has been continued for the Fisheries Laboratory at Lowestoft by six ships. A detailed statement of all returns received in the Marine Division is shown in TABLE V.

At the request of the International Meteorological Organization special observations of swell were recorded during the week 14th–19th November, in the North Atlantic by British Observing Ships.

Use made of Data collected from Observing Fleet.

The observations contained in the meteorological logs are taken six times daily at end of watch Apparent Time Ship. They are used for the climatological survey of the oceans, and for the construction of Atlases of currents.

The observations contained on Form 911 are taken at the International standard hours G.M.T., and are coded on to Form 138 by Selected Ships for transmission by W/T to meteorological centres or to CQ as necessary. They provide information for supplementing the climatological data obtained from the logs where necessary, for general research purposes and for answering marine enquiries.

The Light-House registers are passed to the Climatological Division for use of Reseau Mondial, which provides a climatological summary of the whole world, at monthly intervals, for two selected stations in every 10° square. This information has been published annually by the British Climatological Division since 1910 and is used for research purposes.

Light-Ship returns are used for providing monthly means of sea temperatures published on the monthly Weather Report, and for the compilation of Visibility tables.

Ice Reports (Form 912) are used for keeping a complete record of ice in all oceans for the construction of a monthly ice chart of the North Atlantic, and a quarterly chart for the Southern Hemisphere. In addition, all southern reports of ice are published in tabular form for the information of the South African and Australian Meteorological Services. The reports are also used for the periodical revision of the Admiralty Ice Charts.

Observations of Ocean Currents.—Using observations recorded in Meteorological Logs, Form 911, and in H.M. Ships, an Atlas of Currents of the South Pacific was completed and published. Work has been commenced on the revision of the Atlas of Currents for the North Atlantic (M.O. 323) and the section of the south-eastern portion of the North Atlantic and Mediterranean basin is being re-charted and published in this year's MARINE OBSERVER.

At the request of the Hydrographer of the Navy the charting of the currents of the South Atlantic has been commenced with a view to its completion simultaneously with the revised North Atlantic Atlas.

During the year considerable information relating to currents has been supplied to the Hydrographer of the Navy for the revision of Admiralty Pilots and Sailing Directions.

The continued investigation of currents on completion of the charting, has added considerably to our knowledge of this subject and is enabling us to give more complete and practical information to seamen than was hitherto possible.

Preparation of Ocean Meteorological Charts.—On 1st April, 1938, there remained about 230,000 sets of observations in the North Atlantic and Pacific to be extracted from ships' meteorological logs. The extraction of these observations was completed during the year. There remained, however, some 270,000 observations mainly in the Mediterranean, Indian Ocean and South Atlantic for the years 1921–29, which were still unextracted and which it was decided to complete. In addition the current observations returned by 20 log keeping ships have been dealt with. The total number of sets of observations so extracted during the year is approximately 365,000, leaving 135,000 sets of observations still to be punched. TABLE IV shows the number of all observations extracted for the past eighteen years on to Hollerith cards. In January, 1939, authority was given to commence an analysis of the extracted data for the construction of Meteorological Atlases of the Oceans. Work was put in hand commencing with the North Atlantic data, while at the same time keeping a skeleton staff to proceed with extraction. Concurrently with the above, work is in progress for the supply of information desired by the Admiralty for the production of Handbooks of Meteorology. The Marine Division is also assisting the Climatological Division in the revision of the Meteorological sections of the Admiralty Pilots.

Publications.—THE MARINE OBSERVER has been published quarterly and circulated to all ships on the Observing Fleet List, together with the monthly supplement. "The Marine Observer's Log" which is compiled from information supplied by the Voluntary Corps of Marine Observers themselves continues to be one of the most interesting features of this journal, and provides a means by which seamen can readily pass on their experiences for the general information of the profession.

M.O. 329. Decode pamphlet was revised for the sixth edition in October, 1938, and is now supplied to all Supplementary Reporting Ships together with the MARINE OBSERVER'S HANDBOOK and reprints from THE MARINE OBSERVER of Lists of W/T stations detailed to receive reports from "B" Selected Ships, in order to assist them more fully in the splendid work they are doing in conformity with Article 35 of the Convention for the Safety of Life at Sea.

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

By means of the registers of British Selected Ships, written records of observations in code have been supplied for the purpose of weather investigation, as follows :—

To South Africa (and to neighbouring meteorological services) for the year 1937–38, in the region South of the Equator, and mainly between the meridians of 30° W. and 80° E.	11,365
To Australia (and the neighbouring meteorological services) for the year 1937–38, in the region South of the Equator, and mainly between the meridians of 80° E. and 70° W.	9,354
To India for the years 1935–38 in the region North of the Equator, and mainly between the meridians of 30° E. and 160° E.	50,648

In presenting this report whereby our Voluntary Corps of Marine Observers may learn of the work of the Marine Division we wish to acknowledge and thank them one and all, Captains, Officers and W/T Operators for their ungrudging support. We should be glad of the opportunity to welcome Marine Observers in the Marine Division should they be visiting London and personally show them the use that is being made of the observations on which they expend so much care.

With reference to the coming year, it is hoped that the excellent quality and steadily increasing number of Wireless Weather Reports will be maintained—and I may say that I feel confident that such will be the case. An increasing interest is being shown by meteorologists of all nations in observations of cloud height and upper air data, most especially in view of its value to aeroplane pilots. The coming Transatlantic Air Service makes such observations more than usually important. It is hoped that we may before long be able to enlist the help of Officers of the Voluntary Observing Fleet in obtaining heights of low cloud by balloons or cloud searchlight. Before anything can be done in this matter, however, it will be necessary to consult the ship-owners, who have always shown themselves only too willing to co-operate in any way possible with the Meteorological Office, for which we are truly grateful. As balloon observations imply the use of a gas, it will also be necessary to consult the Board of Trade from a safety point of view. Observations with balloons and searchlights are very simple to make and at the same time most interesting. Any Voluntary Observers who are interested in this subject or in weather forecasting generally in relation to air navigation are requested to communicate with the Port Meteorological Officers at London or Liverpool. It is hoped that arrangements will shortly be made by these officers for visits to be made to civil aerodromes, at the Meteorological Office's expense, where details of such work may be seen.

Observers will probably be interested to know that the question of transmitting a comprehensive synoptic message from Rugby for the benefit of North Atlantic shipping, similar to the Fleet Synoptic message already emitted from Cleethorpes, is under review.

As a special mark of appreciation, the Meteorological Committee are making awards to Commanders and Observing Officers of ships whose work has been judged of outstanding excellence throughout the past year. Their names are given in the list which follows.

MARINE SUPERINTENDENT.

London.

1*st April*, 1939.

List of Captains and Principal Observing Officers to whom the Meteorological Committee have made Excellent Awards.

Captains.	Principal Observing Officers.	Ship.
Aylen, C. E. H., R.D., Commr. R.N.R.	—	*Arundel Castle.*
Barnett, H.	Bennett, J. D.	*Rangitiki.*
Barron, A.	Wilkins, A. O.	*Capetown Castle.*
Barton, G. E., R.D., Lieut. Commr. R.N.R.	de Legh, H. L.	*Ascania.*
Bateman, A. W.	Borthwick, A. C.	*Scotia.*
Battle, W. C., D.S.O., R.D., Capt. R.N.R.	—	*Laconia.*
Berry, E. W.	—	*Glaucus.*
Biggs, J. H., R.D., Commr. R.N.R.	Thompson, B. D. H.	*Strathallan.*
Bisset, J. G. P., R.D., Commr. R.N.R.	Read, P. A.	*Scythia.*
Blacklock, G.	Newman, W.	*Geddington Court.*
Bone, D. W.	Robertson, R. L.	*Transylvania.*
Brown, A. T., R.D., Capt. R.N.R.	Nicolson, K. M. Toone, L. G.	*Britannic.*
Brown, W. S.	Granger, F. McKillop, R.	*Montclare.*
Burton, E. A.	Lindsay, J.	*Cumberland.*
Busk-wood, W. G., R.D., Commr. R.N.R.	Stanley, W. A.	*Empress of Britain.*
Cameron, E. P., R.D., Capt. R.N.R.	Craddock, R. J.	*Orford.*
Cameron, H.	Wilkinson, G. Williams, L. Johnston, A. H.	*Northern Coast.*
Carr, L. B.	—	*Tynefield.*
Carter, E. A. J. W., R.D., Capt. R.N.R.	Orton, F. H. J.	*Viceroy of India.*
Cartwright, C. W., D.S.C. ...	Reed, P. C.	*Comorin.*
Chaplin, J. K., R.D., Capt. R.N.R.	Pierce, C. W. Sutherland, J. S.	*Corfu.*
Christie, D.	Warren, E.	*Fordsdale.*
Clinton, A. W.	—	*Temple Moat.*
Collie, A.	Simpson, J. Ramage, G.	*Caledonia.*
Collie, J. A.	Hewlett, F. J.	*Robert F. Hand.*
Cotching, W. A.	Shute, M. F.	*Rajputana.*
Coyle, W. B., R.D., Commr. R.N.R.	Stanley, W.	*Duchess of Atholl.*
Davies, E. Vaughan, D.S.O. ...	Collings, L.	*Apapa.*
Dawson, W.	Hawley, G.	*Tamaroa.*
Dene, R. C.	Simms, J. James, P. V.	*Maloja.*
Dorkin-White, C. E.	Brown, W.	*Nardana.*
Draper, M. G., R.D., Commr. R.N.R.	Hill, L. A.	*Rawalpindi.*
Edkin, E., O.B.E., R.D., Capt. R.N.R.	Price, R. Potter, N. E. R.	*Georgic.*
Edwards, L. F.	Perry, R. A.	*Kaisar-i-Hind.*
Edwards, W.	Otley, C. E.	*Umtali.*
Elford, H. C.	Paine, J. W.	*Ceramic.*
Elliott, J.	—	*Rawalpindi.*
Ellis, F., D.S.C.	Sherwell, H. N.	*El Argentino.*
Ellis, J. H., Skipper	—	*St. Cathan.*
Ferguson, H. J., D.S.C. ...	Belton, C. H.	*Montrose.*
Foyster, J.	Dennison, W. F.	*Alaunia.*
Fountain, C.	Williamson, A. N.	*Cheshire.*
Freaker, R. C., Lieut. Commr. R.N.R.	Coates, G. F.	*William Soresby.*
French, F. E., R.D., Capt. R.N.R.	Pollitt, B. H.	*Strathmore.*
Galer, R. P., R.D., Capt. R.N.R.	—	*Clan Mactavish.*
Gibbings, W. H.	—	*Inkosi.*
Gibbons, G., R.D., Capt. R.N.R.	Pickersgill, R. W.	*Aquitania.*
Gilchrist, J. A.	Norton, P. E.	*British General.*
Gilling, W.	Milburn, T. B.	*Port Jackson.*
Goodacre, R. W., R.D., Commr. R.N.R.	Stephenson, G. E.	*Dunnottar Castle.*
Gordon, H. R.	Collins, J.	*Wairangi.*
Grant-Pyves, W. A.	Richardson, J. L.	*Mulbera.*
Green, E. S.	Newton, C.	*Como.*
Greig, A. C., O.B.E., R.D., Capt. R.N.R.	Warwick, W. E.	*Carinthia.*
Hall, J. B.	Mortimer, J. H.	*New Zealand Star.*
Hamling, J. W., Skipper ...	—	*Arctic Ranger.*
Harper, V.	Brown, H. S.	*Comliebank.*
Harris, F. C. P.	Sayers, L. A.	*Anselm.*
Harrison, R., R.D., Capt. R.N.R.	Gathing, A. O.	*Stratheden.*
Hartman, W. H.	Grant, R.	*Mataroa.*
Hatfield, J.	Masters, R. H.	*Aeneas.*
Higgs, W. G.	—	*Port Gisborne.*
Hill, L. C., O.B.E., Lieut. R.N.R.	Kirkwood, H. Coates, R.	*Discovery II.*
Hill, T. V.	Russell, R. R.	*Aorangi.*
Hinchliff, A.	Grunnill, H.	*Torcello.*
Hodges, J. A., R.D., Commr. R.N.R.	—	*Highland Chieftain.*
Holland, E.	—	*Rangitata*
Hopper, G. E.	Clark, P. A. P.	*Avelona Star.*
Howard, H. C.	Anson, J. L.	*Almeda Star.*
Irving, R. B., O.B.E., R.D., Capt. R.N.R.	Butcher, B. L. Davies, E. A. G.	*Queen Mary.*
James, L. V., D.S.C.	Kirkwood, J. O. H.	*Otranto.*
Jeffries, W. D.	Walker, D. M. H.	*British General.*
Johnson, J. W.	Farrell, W.	*Waipawa.*
Kelly, G. B.	Mackenzie, J. P.	*Cameronia.*
King, W. T.	Austin, A. L.	*Matheran.*
Lamb, E. B.	Jones, F. J.	*Remuera.*
Large, R. J.	Light, A.	*Isle of Jersey.*
Legg, J. M.	Melville, G. L. F. Webster, R. B.	*Ranpura.*
Longstaff, R. P.	McCulloch, W. G.	*City of London.*
Loads, A. C.	Stansfield, A. T.	*Inverbank.*
Lyndon, E. P., R.D., Lieut. Commr. R.N.R.	—	*Strathnaver.*
McGlashan, A. T.	Carnochan, R. J.	*Cape of Good Hope.*
McRostie, J.	Sheehan, T. T.	*Samaria.*
Martin, W.	—	*Niagara.*
Matheson Sir, C.G., D.S.O., R.D., Commodore R.N.R.	Fowler, H.	*Oronsay.*
Mathews, J. R.	de Gruchy, R.	*Erin.*
Meek, W. C., R.D., Lieut. Commr. R.N.R.	Newton, M. S.	*Waiwera.*
Meikle, A. R., R.D., Capt. R.N.R.	Burns, R. V. Oatridge, E. J.	*Duchess of Bedford.*
Melling, A. W.	Fairley, F. W.	*Cairnglen.*
Miles, F. R., R.D., Capt. R.N.R.	Fletcher, G. M.	*Almanzora.*
Mitchell, G. M.	Quirk, W. E.	*Manchester Citizen.*
More, H. A., R.D., Capt. R.N.R.	Falconer, F.	*Duchess of Richmond.*
Munton, C. G. G.	Smith, E. W.	*Worthing.*
Murphy, J. W.	Wilson, J. E.	*Newfoundland.*
Murchie, P. A., O.B.E., R.D., Capt. R.N.R.	—	*Samaria.*
Nightingale, W. E. (Skipper)	—	*Pentland Firth.*
Northwood, H. R.	Triggs, E.	*Stirling Castle.*
Organ, E. A.	Preston, R.	*Cairnesk.*
O'Sullivan, F. R	Brittain, R J.	*Orcades.*
Oulsnam, H. R., R.D., Commr. R.N.R.	Kent, E. W.	*Andania.*
Owen, G., R.D., Commr. R.N.R.	Watling, K. M.	*Dunedin Star.*
Owens, A. L., R.D., Capt. R.N.R.	Wilson, F. R. F.	*Orion.*
Pert, D.	Roche, J. M.	*Montcalm.*
Pettigrew, H.	—	*Beaverford.*
Phillips, J. P.	Greenwood, E. Letty, A.	*Glaucus.*
Pilcher, C. R.	Knott, J. A. Kirk, A.	*Durham.*
Pocock, W. E. L. S.	Hamilton, J. W.	*Chitral.*
Quirk, W.	Holt, R. E.	*Eastern Coast.*
Raven, F. C.	Willmott, A. E.	*Duke of Rothesay.*
Reece, H. B., R.D., Capt. R.N.R.	Hicks, E. C.	*Orduna.*
Rhodes, H. R.	—	*Cathay.*
Rice, N.	Wilson, C. C.	*Somerset.*
Richardson, C.	Sargent, T. E.	*Duchess of York.*
Richardson, L.	Thomas, T. D.	*St. Julien.*
Ridyard, A., O.B.E.	Matthews, H.	*Reino del Pacifico*
Riley, F. N.	Tallack, M. B. N.	*Brisbane Star.*
Roberts, T. V., R.D., Capt. R.N.R.	Burt, W. G.	*Arawa.*
Robinson, F. W., D.S.O., R.D., Capt. R.N.R.	Ormsby, E. J.	*Ruahine.*
Roche, C. B.	Strike, J. Darley Kerridge, E. J.	*Mooltan.*
Romyn, L. D. (Skipper) ...	—	*Rockflower.*
Sapsworth, C. H.	—	*Empress of Australia.*
Sarson, M. J.	King, P. G. A.	*Orama.*

Captains.	Principal Observing Officers.	Ship.
Shooter, J. C.	Inglis, R.	*Abosso.*
Shore, R. N.	Vigurs, J. T. C.	*Eros.*
Sinclair, J. C.	Patterson, G. W. / Brown, J.	*Benmohr.*
Small, H. J.	Marshall, W. M.	*Benwyvis.*
Smart, R. W.	Barclay, D.	*California.*
Smith, C. S.	Gale, N.	*Javanese Prince.*
Smith, J. A.	Beeham, E. B.	*Ranchi.*
Smith, W. D. C.	Marrian, P. L.	*Narkunda.*
Starling, E. H.	Edmundson, S. E.	*Strathnaver.*
Steward, J.	Watson, W. A.	*Hopestar.*
Stook, C. W. G.	Reid, R.	*British Gunner.*
Sturrock, R. G.	Clark, H. S.	*Ixion.*
Styren, J.	Alderman, J.	*Middlesex.*
Summers, W. G.	Falkiner, H. H.	*Akaroa.*
Sutton, A. P.	Allen, F. B.	*Amsterdam.*
Thorne, G. G., R.D., Capt. R.N.R.	Rhead, E. B.	*Orontes.*
Thornton, E. H., R.D., Capt. R.N.R.	Robertson, D.	*Edinburgh Castle.*
Tickell, J. M. M.	Peters, G. R.	*Strathaird.*
Townley, J. C., R.D., Capt. R.N.R.	Halcrow, J. A. S.	*Aquitania.*
Toten, A. T.	Peake, J. E.	*Niagara.*
Upton, H. L., D.S.C., R.D., Capt. R.N.R.	Brownings, H. J.	*Rangitane.*
Vernon, R.	—	*Andalucia Star.*
Webber, T.	Lutyens, W.	*Nova Scotia.*
Weller, S.	Avison, W. B.	*Highland Monarch.*
Williams, H.	Jones, P. M.	*Carthage.*
Wood, C., D.S.C.	Hamilton, R. F.	*Themistocles.*
Woodhead, T. H.	Wise, R.	*Dearne.*
Wyatt, F. N.	Griffiths, J. R.	*Essex.*
—	Bulley, M. A.	*Balmoral Castle.*
—	Locke, P.	*Beaverburn.*
—	Swallow, F. J.	*Highland Brigade.*

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

April, 1938.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan., 1939.	Feb.	March.	The Year.
489	676	672	655	648	634	575	569	554	467	439	472	6,850

TABLE II.—Number of Observations received by Weather London through Malin Head, Valentia, Humber and Wick Radio from British "B" Selected Ships, and Supplementary Weather Reporting Ships and from Steam Trawlers through Wick.

	April, 1938.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan., 1939.	Feb.	March.	The Year.
Malin Head	28	85	115	157	138	115	108	48	34	44	20	17	909
Valentia	318	426	375	426	361	376	327	235	201	187	197	205	3,634
Humber	17	19	19	20	14	15	16	17	21	15	11	12	196
Wick	44	44	38	13	14	21	55	68	64	54	37	31	483
Total	407	574	547	616	527	527	506	368	320	300	265	265	5,222

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

April, 1938.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan., 1939.	Feb.	March.	The Year.
125	133	139	136	135	130	153	135	136	133	116	137	1,588

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

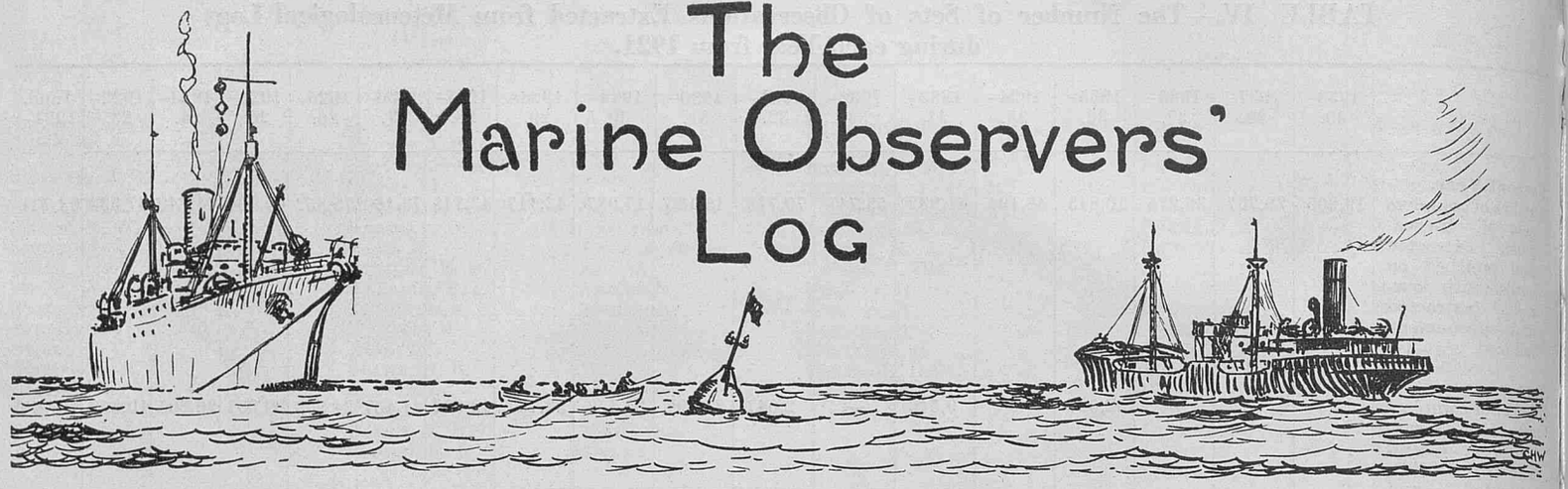
	1938–39.	1937–38.	1936–37.	1935–36.	1934–35.	1933–34.	1932–33.	1931–32.	1930–31.	1929–30.	1928–29.	1927–28.	1926–27.	1925–26.	1924–25.	1923–24.	1922–23.	June, 1921–22.
Current Year.																		
Number of complete sets of observations extracted and punched on cards with currents extracted and phenomena indexed.	19,905	29,757	36,275	16,843	48,194	41,932	58,747	70,718	19,185	17,987	43,117	43,745	78,180	75,852	65,000	74,749	97,533	63,731
Arrears.																		
Number of complete sets of observations received since 1920, extracted and punched on cards during the years 1932–38.	—	—	—	32,067	—	9,546	—	2,047	28,497	34,153	33,757	42,682	41,407	24,953	20,901	20,205	10,852	10,753
Number of part sets of observations in the Pacific and N. Atlantic received previous to 1920, extracted and punched on to cards and phenomena indexed since January 1st, 1933.	198,923	390,396	201,702	120,477	82,602	17,798	—	—	—	—	—	—	—	—	—	—	—	—
Ocean Currents.																		
Number of additional observations of current from the year 1910 extracted.	24,891	10,786	6,456	2,817	4,821	4,850	6,118	8,609	7,980	10,913	2,262	3,496	8,242	8,210	5,746	4,259	1,826	—

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

	At 31st March.											
	1939.	1938.	1937.	1936.	1935.	1934.	1933.	1932.	1931.	1930.	1929.	1928.
No. of M.L. Ships	18	22	29	41	49	50	49	65	101	120	123	123
No. of Form Ships	342	324	323	312	298	304	300	307	386	355	364	373
No. of Stationary Training Ships and Lighthouses.	5	5	5	5	5	5	10	10	10	10	10	10
Total No. of Observing Ships	365	351	357	358	352	359	359	362	497	485	497	506
No. of Form 911 Ships with whole or part Meteorological Office instrumental equipment. S.	259	231	220	200	190	183	169	126	93	31	31	32
No. of Form 911 Ships with whole or part Meteorological Office instrumental equipment. C.C.	18	18	18	17	17	9	10	10	10	10	10	10
No. of Selected Ships	276	279	281	285	287	292	299	306	312	290	289	268
No. of Ships with Instruments on Board: returns overdue	0	0	0	0	0	0	0	0	1	0	0	0
No. of Coast Stations and Light Vessels equipped with instruments for Form 914.	14	18	18	18	18	18	18	18	30	31	31	32
No. of Barometer errors ascertained or checked.	1,272	1,276	1,156	1,143	1,196	1,169	1,190	1,353	1,357	1,192	1,362	1,398
Meteorological Logs	46	78	88	102	119	122	126	221	285	266	275	279
Ships' Meteorological Records (Forms 911)...	2,591	2,585	2,544	2,429	2,377	2,352	2,169	2,660	2,686	2,375	2,290	2,261
Forms 914 (Coast Observations)	214	216	215	215	215	216	216	353	363	372	371	383
No. of Wireless Weather Reports addressed to Weather London received through:—												
Portishead	6,850	6,956	6,761	6,278	5,595	5,443	5,064	5,175	5,206†	—	—	—
Valentia	3,634	2,906	916	—	—	—	—	—	—	—	—	—
Malin Head	909	612	123	—	—	—	—	—	—	—	—	—
Humber	196	117	—	—	—	—	—	—	—	—	—	—
Wick	483	116*	—	—	—	—	—	—	—	—	—	—
Lighthouse Registers	4	4	4	4	4	13	9	17	8	18	10	12
Home Waters Telegraphic Reports	1,588	1,670	1,652	1,650	854	838	972	875	720	701	751	773
Cadets Meteorological Log	9	9	8	10	9	9	7	11	8	9	9	7
DATA EXTRACTION.												
Logs collected since 1920 extracted... ...	362	238	190	40	137	131	191	175	50	41	100	166
Logs collected before 1920 extracted ...	597	950	544	295	309	441	97	—	—	—	—	—

* Including Steam Trawlers in Arctic Waters.

† 11 months.



July, August and September.

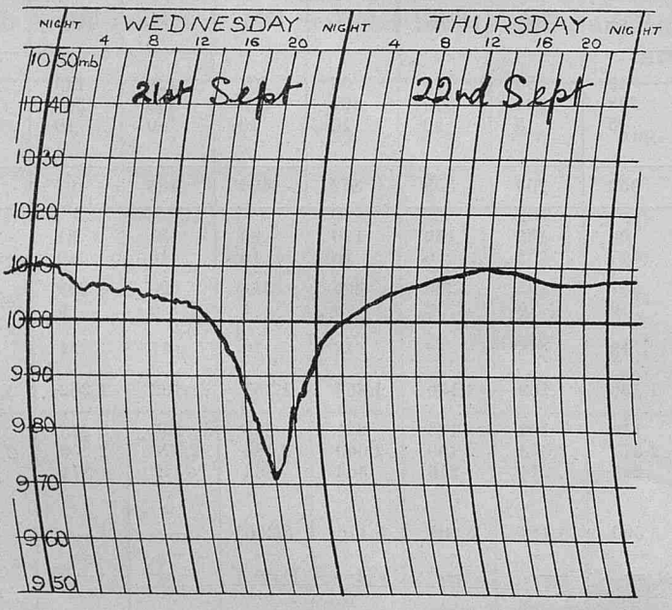
It is hoped that these pages will be filled each quarter with a selection of the contributions of Mariners in manuscript, or remarks from the Logs and Records of regular Marine Observers.
Responsibility for statements rests with the Contributor.

HURRICANE.

New York Harbour.

THE following is an extract from the Meteorological Record of S.S. *Laconia*. Captain W. C. BATTLE, D.S.C., R.D., R.N.R. Observer, Mr. S. S. PALING.

21st September, 1938. While laying in New York, the ship experienced the hurricane which swept the American Coast. There was continuous heavy rain for 42 hours before the hurricane passed. The barometer dropped steadily, the barograph record showing a distinct depression.

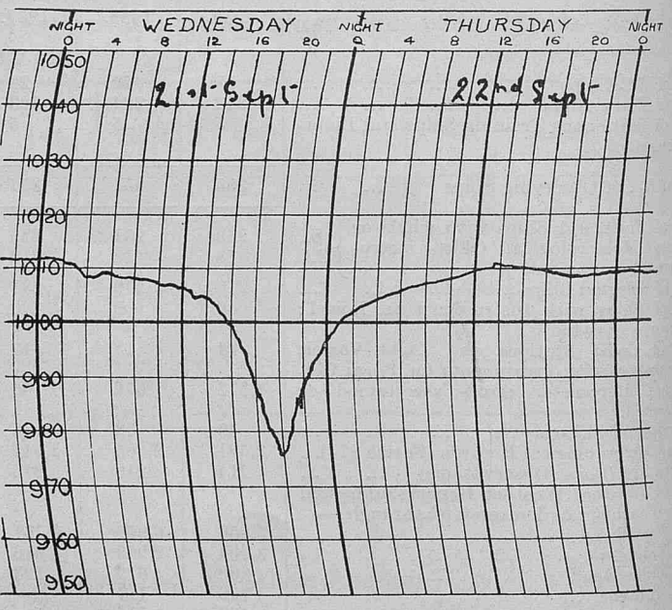


At the time there was a gale blowing at 75 miles per hour with gusty squalls, and it was noticed that the water alongside the Pier, at which the ship was moored, was higher than the usual high water line, although 3 hours 20 minutes before high water. The shifts of wind observed were from N.E. to N. and N.W., the gale blew strongest from the N.W.

The centre of the storm passed over at 2000 G.M.T. and soon afterwards water in the dock dropped and the gale began to subside. By 0400 G.M.T. on the 22nd the wind had moderated to a breeze; the weather was fine and the sky partly cloudy.

THE following is an extract from the Meteorological Record of S.S. *Hertford*. Captain G. C. TUCKETT. Observer, Mr. B. G. HOLLINGDALE.

The illustration shows the barograph record of the above-named



ship whilst stationed in New York for the week ending 26th September. On the 21st September a hurricane was experienced.

The wind at times reached such force, maximum 12 by Beaufort Scale, that it whipped granite stones half an inch in diameter off the tarmac roof of the shed alongside which we were lying, and rained them upon the ship.

PASSAGE OF HURRICANE.

West Indies.

THE following is an extract from the Meteorological Record of S.S. *Thistleglen*. Captain G. A. WHITFIELD, O.B.E. Vancouver, B.C., to Liverpool. Observer, Mr. L. H. WILLIAMS.

18th September, 1938. At 15.00 A.T.S. the trade wind, which had been blowing steadily N.E. force 4, began to freshen, accompanied by a rising swell from the eastward and a falling barometer. At 16.30 A.T.S. we received a radio warning that a severe hurricane was centred in Latitude 22° 45′ N., Longitude 63° 00′ W., moving W.N.W. at about 20 m.p.h. The probable path of the storm was plotted on the chart, and it was seen that if the direction and rate of progress were maintained, we should find ourselves involved in the centre or slightly in the dangerous semicircle, when the storm crossed our track. Course was immediately altered to S.E. in order to remain within the navigable semicircle. At 22.25 A.T.S. the wind having changed but little in direction, and being now force 7, course was again altered to the southward. The barometer was now falling quickly and the wind rapidly reached gale force, accompanied by driving rain squalls, with the ship running before a steep sea.

At 02.00 A.T.S., 19th September, the wind had reached hurricane force, lashing the sea until the spume was driving over the upper bridge. Heavy seas were now breaking on board, and visibility was reduced to zero. The engines were put at half speed, and we continued to run without damage.

The minimum reading of the barometer was reached at 03.30 A.T.S., and almost immediately the rise began; it was with the beginning of the rise that we encountered the strongest winds, coming in terrific bursts. Gradually, with the shifting wind, we were able to wear ship, and at 07.45 A.T.S. resumed our interrupted course. It was estimated on board that the storm centre passed some 20 miles north of the vessel, and the following advice was despatched to the American Weather Bureau :—

"0730 G.M.T., Latitude 23° 54′ N., Longitude 69° 15′ W. Barometer 29.06 in., wind W.N.W. hurricane force, torrential rain, high confused sea about 20 miles south of centre of tropical storm."—Subsequent reports bearing out this view.

In the later progress of the storm, it recurved off the Bahamas trending north and encountering the coast in the region of Cape Hatteras, dealing widespread destruction, resulting in the loss of some 600 lives.

Appended is a table of observations during the passage of the storm.

A.T.S.	Wind.		Barometer in Inches.	Remarks.
	Direction.	Force.		
16.00	N.E.	5	30.00	Moderate sea, easterly swell increasing.
20.00	N.N.E.	5–6	29.88	Rough sea, moderately heavy easterly swell.
22.00	N. by E.	7	29.78	Rough sea, heavy southerly swell.
23.00	N.	7	29.68	Rough sea, overcast, rain squalls.
24.00	N. by W.	7–8	29.61	Seas now breaking on deck.
01.00	N.N.W.	8–9	29.46	Heavy seas.
02.00	N.W. by N.	9–10	29.25	Driving rain, visibility zero. Half speed.
03.00	W.N.W.	10–11	29.06	Fierce squalls wind and rain.
03.30	W.	11	29.04	High sea, heavy confused swell.
04.00	W. by S.	11–12	29.10	Terrific squalls.
05.00	W.S.W.	11–10	29.22	
06.00	S.W.	11–10	29.37	Wearing ship full speed at 06.35 A.T.S.
07.00	S.S.W.	9	29.52	07.45 A.T.S. resumed course.
08.00	S.	9	29.64	High confused sea.
10.00	S. by E.	9–8	29.82	Sky clearing.
12.00	S.S.E.	8	29.88	
16.00	S.E. by S.	7–6	29.92	Sea and swell moderating.

NOTE.—This is a good example of the value of wireless to the navigator, combined with a knowledge of the laws of storms.

CHANGE OF SEA TEMPERATURE.

South Arabian Waters.

THE following is an extract from the Meteorological Record of S.S. *Narkunda*. Captain W. D. C. SMITH. London to Australia. Observer, Mr. G. L. F. MELVILLE, 4th Officer.

On 17th August, 1938, steaming along the South Arabian Coast between Ras Kusai'ir and Ras Al Kalb, at 05.00 A.T.S., the air and sea temperatures were equal at 79° F. A little later, at 05.25 A.T.S., it got noticeably cooler and the temperatures were read again, this time both being 74° F. By 05.45 A.T.S. the air temperature had dropped a further 2° to 72° F. At 07.30 A.T.S. a further reading was taken, showing the air to be still 72° F., whilst the sea had fallen to 66° F. By noon the air had risen again to 83° F. and the sea to 85° F. All the sea-water readings were taken at the engine room intake, which is submerged to a depth of twenty feet.

Position of ship at 05.00 A.T.S., Latitude 14° 25′ N., Longitude 49° 49′ E.

NOTE.—The position of this observation is considerably further east than those of the marked changes of sea temperature which occur in the neighbourhoods of the Strait of Bab-el-Mandeb and Aden. In THE MARINE OBSERVER, Volume XIV, 1937, page 98, the following was given as the probable explanation of the observed changes of sea temperature. The south-west monsoon draws away some of the surface water of the Gulf of Aden which is replaced by cooler water from the depths. From Perim to east of Aden the water shoals gradually to the coast over a wide area. The upwelling water would pass up this slope and come to the surface in soundings. It is possible, therefore, that the same thing occurs on parts of the Arabian coast further eastward.

ABNORMAL REFRACTION.

Irish Sea.

THE following remarks have been received from S.S. *Hibernia*. Captain J. R. BULMER. Kingstown to Holyhead.

Just after leaving Kingstown Harbour on 12th September, 1938, at about 9.20 p.m., wind W.N.W., force 3, bright moonlight, smooth sea, I observed the South Stack light; not appearing as "the loom" in the sky, but apparently quite normal, the seconds periods being easily counted. The distance would have been about 50 miles. After steaming about 20 miles directly towards it the Skerries light was also observed. It would be interesting to know if this constitutes a record in this part of the world; it certainly is in my experience of 38 years crossing the Irish Sea.

THE following is an extract from the Meteorological Record of M.S. *Robert F. Hand*. Captain J. A. COLLIE. Liverpool to Aruba. Observers: Mr. F. J. HEWLETT, 2nd Officer, and Mr. G. ROBSON, 3rd Officer.

12th September, 1938, 2022 G.M.T. Latitude 52° 43½′ N., Longitude 5° 27′ W., cross bearings were obtained of Wicklow Head, Bardsey Island, Arklow Light Vessel, Blackwater Light Vessel, and Tuskar Rock. The normal range of these lights would be 20·7, 21·2, 15, 15 and 21 miles, respectively (height of eye 50 feet), whereas on this occasion they were sighted at a distance of 25, 24, 19½, 26½ and 42 miles respectively, and appeared to be well above the horizon. Later the Barrels Light Vessel was sighted at a distance of 21 miles. Tuskar Light remained in sight for the remainder of the watch, and after rounding it, conditions were normal, lights being sighted at their normal range.

Weather at the time, fine night, with moon three days past the full, clear sky, wind S.W., force 1. Barometer 30.21 in., Air temperature 64° F., Sea 59° F.

NOTE.—A report of abnormal visibility in the English Channel from Captain C. G. G. MUNTON of S.S. *Paris*, was published in the April, 1936, MARINE OBSERVER, Vol. XIII, No. 122. On this occasion Cape Antifer in the English Channel was visible for a distance of 57 miles, but we have no means of verifying whether the above reports constitute a record for the Irish Sea.

THUNDERSTORM.

Red Sea.

THE following is an extract from the Meteorological Record of S.S. *Benwyvis*. Captain H. J. SMALL. London to Far East. Observer, Mr. W. M. MARSHALL.

13th August, 1938. 1300 G.M.T., from Latitude 18° 35′ N., Longitude 39° 57′ E., to Latitude 17° 39′ N., Longitude 40° 31′ E.

Heavy cumulonimbus clouds were observed piling up to the S.W., and by 1315 G.M.T. the sky was completely covered. Wind S.W. by W., force 6. Conditions then appeared more like the Bay of Biscay than the Red Sea; at 1330 G.M.T. vivid lightning flashes were observed to the S.W. and the storm broke.

The peals of thunder sounded like heavy artillery in action, and the rain was torrential, sweeping across the ship before a moderate S.W. gale. At 1530 G.M.T., the thunder was getting fainter to the eastward, rain still falling heavily. The wind then suddenly shifted to E., force 7, and back came the storm, if anything more intense than before.

It appeared to travel with us, remaining overhead until 1730 G.M.T., the wind in the meantime having shifted through N. to N.W. At 1830 G.M.T. the rain had ceased, but the thunder could still be heard faintly to the southward.

The barometer remained steady throughout, but the temperature fell from 91° F. to 80° F., and rose, immediately after the rain ceased, to 85° F.

Capt. SMALL remarked, that in his 22 years as Master trading to the Far East, he had never before seen such weather conditions in the Red Sea.

BEES.

English Channel.

THE following is an extract from the Meteorological Record of S.S. *Brighton*. Captain B. SHAW. Dieppe to Newhaven. Observer, Mr. H. L. SMITH, 2nd Officer.

7th July, 1938. Whilst on voyage from Dieppe to Newhaven, we were accompanied during the whole journey by large numbers of bees, flying around and inside the ship and occasionally settling. They may possibly have been blown off the land by strong offshore wind, at Dieppe the wind was south-east, force 6 to 7. Conditions in mid-Channel at 1330 G.M.T., wind south-east, force 5, weather fine, air temperature 71° F.

SQUIDS.

South Atlantic Ocean.

THE following is an extract from the Meteorological Record of S.S. *Themistocles*. Captain C. WOOD, D.S.C. Capetown to Teneriffe. Observer, Mr. R. F. HAMILTON, 3rd Officer.

On 15th August, 1938, between 22.06 A.T.S. and 22.48 A.T.S., whilst the vessel was stopped during transference of a stowaway by boat to the Company's M.S. *Coptic*, a shoal of very peculiar looking fish was noticed swimming in the glare of the arclights. These fish were seen both by officers and crew and also by many of the passengers; nobody could remember having seen anything like them before. They were about three feet long, their stomachs (as they swam about) appeared to be golden in colour, for about a foot from the tail they appeared to be transparent, their heads seemed to be something like cauliflowers with either suckers or feelers sticking out from them. The head was phosphorescent, as could be seen when they swam out of the rays cast by the lights. Weather at the time :—Moderate S.W. wind and sea, and moderate short S.S.E.'ly swell. Temperature, air 65° F., sea 65° F. Sky overcast with stratocumulus.

Position of ship, Latitude 17° 56′ S., Longitude 4° 18′ E. (D.R.).

The following note has been received from the Director of the Marine Biological Association of the United Kingdom :—

There is very little doubt that the animals referred to in the above report are pelagic Cephalopods or Squids. I have seen them myself under similar circumstances off the west coast of Ireland, in mid South Atlantic and in the Gulf of Guinea.

These animals, which are related to the bottom-living octopus, but more slender in form and with fins to suit them to a pelagic existence, are abundant in many parts of the world. They swim rapidly, moving tail-first with the tentacles at the after end, and they do this by taking water into the mantle cavity and ejecting it through a tube or funnel.

Ships making a passage will seldom or never see such animals, but if the ship is stopped at night in perfectly calm weather they can frequently be observed and they are strongly attracted by light.

Some deep-water squids possess elaborate luminous organs, but these species seldom come to the surface, and, so far as we know, are always much smaller than those seen by Captain Wood.

I am not aware of any previous record of squids with a phosphorescent head. The giant squid, *Architeuthis*, known only from a small number of stranded specimens, reaches a length of 50 ft. or more and is the largest known invertebrate.

GREEN RAY AT SUNSET.

North Atlantic Ocean.

THE following is an extract from the Meteorological Record of M.S. *Rangitata*. Captain E. HOLLAND. Colon to London. Observer, Mr. R. EYRE-WALKER, 3rd Officer.

At sunset on 21st September, 1938, a remarkably good example of the green flash was observed; the sky was cloudless at the time and the atmosphere very clear. As the sun set, the sky in the vicinity assumed a deep orange colour and as the sun's upper limb disappeared below the horizon, a green beam with clear-cut edges was clearly visible for about 2 seconds. The beam, whose width at the horizon was about that of the sun's semi-diameter, increased in width, but decreased in brilliance, up to an altitude of about 5° above which it was no longer visible. Sky cloudless.

Position of ship, Latitude 38° 38′ N., Longitude 44° 07′ W.

NOTE.—This ray of green light shooting up into the sky at the moment the sun's upper limb sets, is quite distinct from the ordinary green flash when the sun's upper limb turns green at the moment of disappearance. The ray is less frequently observed.

PHOSPHORESCENT WHEEL.

Arabian Sea.

THE following remarks have been received from S.S. *Serbino*. Karachi to Mormugao. Observer, Mr. C. B. P. BRADBURY, 2nd Officer.

During the middle watch on the 28th July, 1938, I observed a most weird phenomenon. At 1.39 a.m. (Indian Standard Time) white horizontal streaks suddenly appeared on the surface of the sea on the starboard bow. They were moving rapidly from east to west. They then assumed the form of the spokes of a great wheel, which appeared to radiate from a point on the horizon in a S.W. by S. direction. The spokes moved rapidly in an anti-clockwise direction; they resembled the beams of a lighthouse as seen on a slightly misty night, and they passed my line of sight at the rate of ninety per minute.

On the port bow the luminosity took the form of a "Catherine wheel" of about fifty feet in diameter, the further half of the wheel being ill-defined. It also moved in an anti-clockwise direction and at a speed of ninety revolutions per minute; the spokes of both wheels intermingled as they met. Abaft the beam I could see a confused mass of rapidly darting lights.

Unlike the phosphorescence commonly observed at sea the luminosity was not intensely bright, but was of a white, milky appearance. Observing the beams intently I could discern myriads of minute luminous bodies. The phenomenon faded at 1.45 a.m.

Position, Latitude 23° 56′ N., Longitude 66° 53′ E. Course 180°. Speed 10·5 knots. Fresh S.W. by W. wind, moderate sea and swell, slightly cloudy, stars very brilliant. Barometer 29.58 in. (corrected), air temperature 82° F.

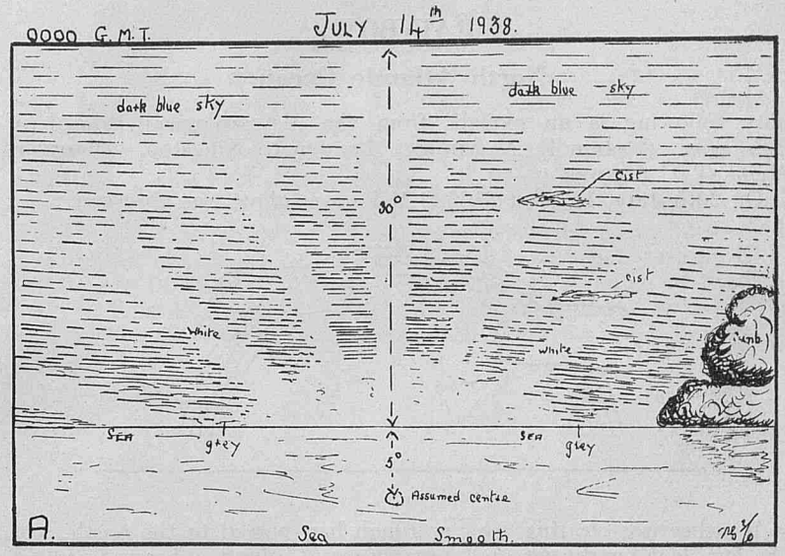
The luminosity was observed in the vicinity of the somewhat similar experience reported by Captain BRADLEY of S.S. *Ariosto*.

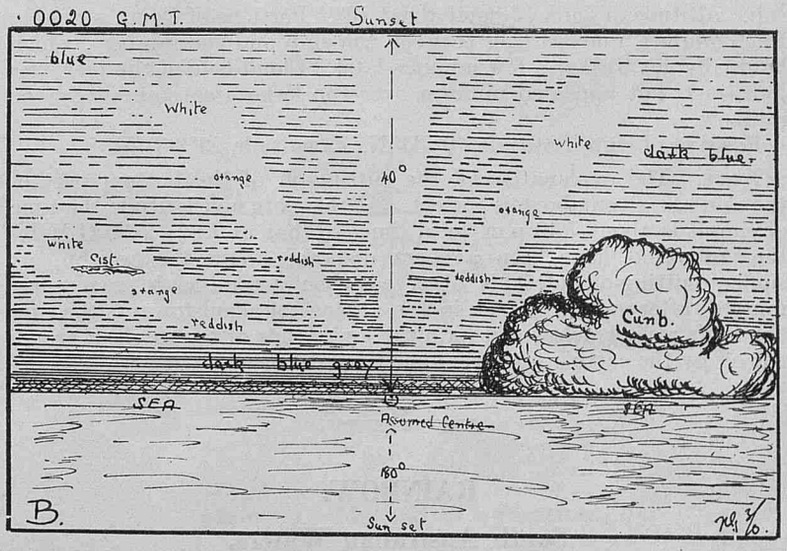
The beams travelled in the reverse direction to the wind, sea and swell, seeming to indicate that the regular motion of the waves caused the luminous sides of the organisms to be exposed in sequence, thus giving the illusion of rapidly moving beams. In this case the "Catherine wheel" effect may have been caused by the action of the waves in conjunction with the vessel's bow-wave.

The rapidly moving beams of luminosity may have been caused by the minute phosphorescent organisms turning in a certain direction. Not that they moved rapidly from place to place, but that they remained practically stationary and only altered position to expose their luminous sides.

Why did they move in such a manner as to cause this strange, regular beam effect? Perhaps they were impelled by that mysterious rhythmic impulse which seems to be so prevalent in the world of Nature. The manner in which a flock of birds in flight, or a shoal of fish, alters course in perfect synchronization without any apparent means of inter-communication are two examples of this impulse.

Whatever the cause, the phenomenon was most awe-inspiring. No wonder that the mariners of old were so prone to superstition and returned to their native shores full of weird and wonderful tales of the sea.





IRIDESCENT CLOUD.

North Atlantic Ocean.

THE following is an extract from the Meteorological Record of M.S. *San Adolpho*. Captain P. JOHNSTON. Houston to Hull. Observer, Mr. F. W. WHITE, 3rd Officer.

7th August, 1938. At 1800 G.M.T. the sun was observed covered by a very thin isolated patch of mixed cirrocumulus and cirrus cloud. The edges of this patch of cloud were very clearly coloured with two distinct bands of colour. The outer band was purple, merging into a band of green, which in turn gradually merged into the normal cloud colour. In parts the two colours were very much mixed with the cirrocumulus cloudlets, having no distinct bands. Both colours were extremely distinct, remaining visible for a period of approximately ten minutes at an altitude of 67° (approx.).

Position of ship, Latitude 34° 53′ N., Longitude 74° 52′ W. Barometer 30·18 in. Air temperature 86°. Wind S.W. by S., force 4. Sky 4/10ths clouded with cumulus, cirrocumulus, cirrus and cirrostratus.

NOTE.—The phenomenon of iridescence or irisation is occasionally seen on high cloud. The boundaries of the colours are not concentric with the sun, but are irregular and tend to follow the outlines of the cloud, as indicated by the above observation. The colours are probably produced by the refraction of light by very small waterdrops, super-cooled well below the freezing point. The phenomenon thus differs from a corona, in which the coloured bands are concentric with the sun. This is produced by waterdrops which may be of mixed sizes, but in general are larger than those which form iridescence and are not super-cooled. Iridescent clouds may be more frequently seen if the sun itself is covered by some convenient object, e.g. the ship's mast or something held in the hand, since when it occurs on clouds close to the sun it is lost in the general glare of the sunlight.

ANTI-SOLAR RAYS

North Atlantic Ocean.

THE following is an extract from the Meteorological Log of M.S. *Javanese Prince*. Captain C. S. SMITH. Savannah to Colon. Observer, Mr. N. GALE, 3rd Officer.

14th July, 1938. At 0000 G.M.T., beams of white light similar in appearance to the beam of a searchlight, were observed to the south-east.

These beams appeared to be radiating from a common centre diametrically opposite the setting sun (bearing 114° true) and approximately 5° below the horizon. As the sun set the centre appeared to rise correspondingly until at sunset it was apparently on the horizon. At first these beams of light were faint, but distinct, and reached to an altitude of approximately 30° before merging into the sky. At first they were seven in number, at 0015 G.M.T. ten, and at sunset, 0200 G.M.T. there were only four visible.

As the sun set, the beams increased in length until the centre one reached up to an altitude of about 40°, and an orange-red colour spread up them. At sunset the centre was lost in a darkening shade of blue-grey which was spreading along the eastern horizon. At this time the rays were reddish at the bottom, then pale orange, and finally white, fading into the pale blue of the upper sky. The beams of light gradually faded until they had completely disappeared at 0025 G.M.T.

Air temperature, dry 81° F., wet 76° F., sky 3/10ths clouded with Cicu., Cist., Cu. and Cunb. moving from S. by W., 2. Visibility very good.

Position of ship, Latitude 30° 00′ N., Longitude 79° 03′ W. (D.R.).

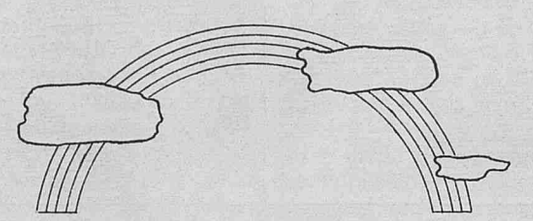
NOTE.—Congratulations are due to the observing officer for these fine sketches.

RAINBOW.

North Atlantic Ocean.

THE following is an extract from the Meteorological Record of S.S. *Eros*. Captain R. N. SHORE. London to Kingston. Observer, Mr. J. T. C. VIGURS.

On 20th July, 1938, at 2130 G.M.T., a rainbow was observed.



Weather was clearing after a trough had passed to the north, and the sun had nearly set and was obscured behind a heavy bank of cloud. The rainbow was bright and distinct, but there was no secondary bow. The arc was complete except for the two lower ends which ceased at an altitude of about 7°. This abrupt ending was no doubt caused by the " cut-off " of the bank of cloud obscuring the sun. Altitude of bank of cloud about 10°. Portions of cloud, probably fractonimbus, were passing between the ship and the rainbow, which gradually got weaker a few minutes later. Cloud behind the bow was indistinct, but appeared uniform over the large area covered by the rainbow.

Position of ship, Latitude 46° 35′ N., Longitude 29° 25′ W.

NOTE.—The explanation of the cutting-off of the bottom part of the rainbow given above is correct. At this date and latitude the time of sunset is about 7.40 p.m. local time, so that at 7.32 (2130 G.M.T.) the sun would have been a short distance above the horizon. A similar cutting-off effect is observed when a rainbow is seen a few minutes after sunset. Here, in the absence of cloud towards the sun, the sun's rays which would form the lower ends of the rainbow are all cut off by the earth's surface.

RAINBOW.

South Australian Waters.

THE following is an extract from the Meteorological Record of S.S. *City of Tokio*. Captain G. BURTON. Durban to Sydney. Observers, Mr. J. H. ALDRIDGE and Mr. R. K. WALKER.

13th July, 1938, a bank of Nbst. cloud took shape to the S.E. and increased rapidly. The bow formed approximately at 0400 G.M.T. The sun's bearing was approximately N.N.W., with an altitude of 28°. The sun was very watery and around the sun were Stcu. clouds and about 12° underneath heavy Cunb. clouds, which extended to the horizon. Between the sun and the Nbst. clouds in the S.S.E. there was also Stcu. cloud.

As the Nbst. cloud increased to the S.E., a white arc formed at the edges. No colours were perceptible at first but gradually a faint orange and yellow were definitely noticeable at the lower left. As the bow was completely formed, the colours became more outstanding in comparison to the rest of the bow, which was a dirty white. The peak of the bow to the horizon was about 25°. The peculiarity of that Nbst. cloud, which was almost jet black, was the definite blue opening at the horizon.

The bow lasted perfectly for twenty minutes then disappeared as the Nbst. cloud came closer to the vessel. A shower fell but of the fine rain type similar to " scotch mist." The breeze was south, force 2. Air temperature 55° F., sea 56° F. Barometer 1032.5 mb., steady.

Position of ship, Latitude 37° 43′ S., Longitude 135° 22′ E.

NOTE.—There being no evidence of fog in the above observation the phenomenon observed was probably a white rainbow. The colours seen were more appropriate to a white rainbow, which is orange and yellow on the upper (convex) edge. A white rainbow is formed when the raindrops falling from the cloud are 1/80th inch in diameter or less, the ordinary brilliantly coloured rainbow being formed by drops of 1/25th or more in diameter. The description of the fine rain experienced later is in accordance with this.

AURORA.

North Atlantic Ocean.

THE following is an extract from the Meteorological Record of S.S. *Beaverford*. Captain H. PETTIGREW. Antwerp to Montreal. Observer, Mr. R. WALGATE, 4th Officer.

5th August, 1938. About 0100 G.M.T. in Latitude 53° 10′ N., Longitude 45° 43′ W., diffused auroral light was observed. The display grew brighter as darkness increased, developing into arcs in rapid motion. The lower edges of these ascended to about 80° above the horizon, with summits on the magnetic meridian, and with broad ribbons and diffused light extending from the arcs to within 15° of the southern horizon.

0150 G.M.T. During the most brilliant stage of the phenomenon a bright arc of white light, in which the colour red was occasionally distinguished, extended from horizon to horizon, the lower edge being nearly in the zenith. Diffused light continued to the southward of this. Stars of minor magnitude were dimmed, but could always be discerned.

The display gradually deteriorated into faint weaving arcs, glowing bands and diffused light.

The brilliance of the aurora caused much comment on its appearance in midsummer. It was noted that the light, whilst moving in all directions, seemed to have a wave movement in an easterly direction. Aurora was seen on two subsequent nights. On 5th and 6th August the reception of London's short-wave broadcast programme was unusually poor.

AN UNUSUAL METEORIC PHENOMENON.

Caribbean Sea.

THE following is an extract from the Meteorological Record of S.S. *Inkosi*. Captain W. H. GIBBINGS. Barbados to Plymouth. Observer, Mr. G. LA HIVE, 3rd Officer.

10th August, 1938. 10.30 p.m., Barbados towards St. Lucia, observed star β Cassiopeiæ, altitude approximately 15°, become as bright as Jupiter, remaining so for about 10 seconds. Four small bright stars, then left β Cassiopeiæ and travelled at an angle of 45° earthwards, leaving no tail, and only being visible for about 10 seconds, β Cassiopeiæ then resumed its normal magnitude. Fine and clear weather.

NOTE.—It is not possible that this phenomenon had anything to do with the star itself. It was an ordinary bright meteor seen actually at its radiant point, that is the meteor's flight into the atmosphere was directed exactly towards the observer. The nearer to its radiant point a meteor appears the shorter its apparent path in the sky. At the radiant point it appears like a stationary star, blazing up and then disappearing. In this case the meteor broke up into four fragments at the end of its path. Except in great showers of meteors, when owing to the numbers visible the chance of seeing a meteor at its radiant point is greatly increased, the phenomenon is uncommon, though short trail meteors near their radiant points are not infrequent. The present observation is very unusual since not only was the meteor at its radiant point, but that point coincided with the position of a bright star, the chances against which are very great.

METEOR SHOWER.

British Columbian Waters.

THE following is an extract from the Meteorological Log of S.S. *Talthybius*. Captain P. PURKIS. Yokohama to Victoria, B.C. Observer, Mr. J. B. ANDERSON.

11th August, 1938, at 00.04 A.T.S. about fifteen meteors were observed during the middle watch, in Haro and Georgia Straits. They were observed all round the compass travelling downwards at an angle of not more than 30° from vertical, showing a diffused pale green light, about twice the size of Jupiter, through an arc of 4°, each lasting for approximately half a second.

NOTE.—This is an interesting observation; evidently the meteors observed belonged to one shower from a definite radiant point. From the description of the meteors they were not Perseids, differing in colour and other characteristics, but as we have no exact information of the position of the point in the sky from which the meteors radiated, or alternatively the position of the tracks of the meteors along the stars, we are unfortunately unable to assign the meteors to any particular shower. Normally from 10th to 13th August many Perseids are seen.

METEOR.

Mediterranean Sea.

THE following is an extract from the Meteorological Record of M.S. *Levernbank*. Captain H. A. JONES. New York to Calcutta Observer, Mr. D. ROBERTSON.

19th August, 1938. 01.07 A.T.S. (2307 G.M.T.). When Shadwan Light was bearing 286° distant 5 miles. Latitude 27° 26′ N., Longitude 34° 09′ E., a meteor was observed bearing N. by W., approximate altitude 20°, travelling slowly eastward, there being no trail attached. The meteor maintained the same altitude and when bearing N.E. was seen to burst into six distinct white stars all forming a horizontal line; it then disappeared. When first seen it appeared to be of the same brilliance as the planet Jupiter and on bursting each star was of equal brilliance.

VOITH-SCHNEIDER PROPULSION.

BY CAPTAIN E. C. GOLDSWORTHY.

IT is thought that the following brief description of the Voith-Schneider method of propulsion now fitted in certain vessels will be of interest to Marine Observers.

The Voith-Schneider propeller consists of a number of blades of aero-foil section rotating in the horizontal plane. The blade shafts are connected through arms and levers to a centre control collar. This controlling point can be moved off centre in any direction by two servomotors which are operated either by the speed lever or the wheel on the bridge. Thus, if the lever and wheel are in their amidships position, the control centre is also dead centre and the blades revolve without any feathering movement being given to them, that is to say, no thrust is given.

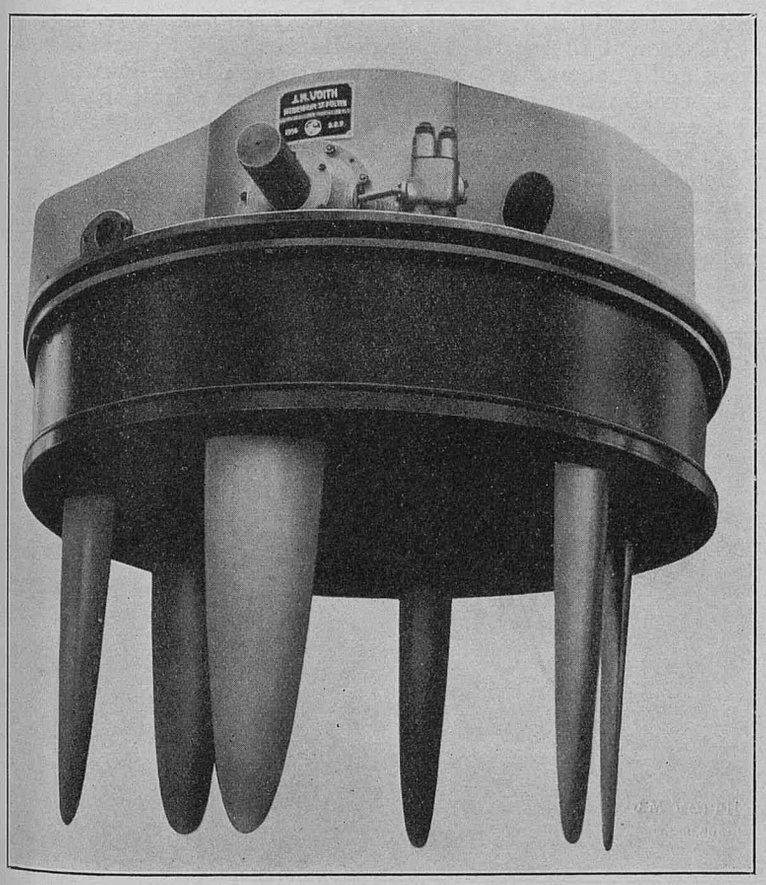


Figure 1.

If either the lever or wheel or both are moved, then the control centre is moved eccentric and as the propeller revolves, the linkage gear is brought into motion and thrust and counter-thrust are given to each blade in its revolution. The direction and force of this thrust depend upon the amount the control lever or wheel is moved.

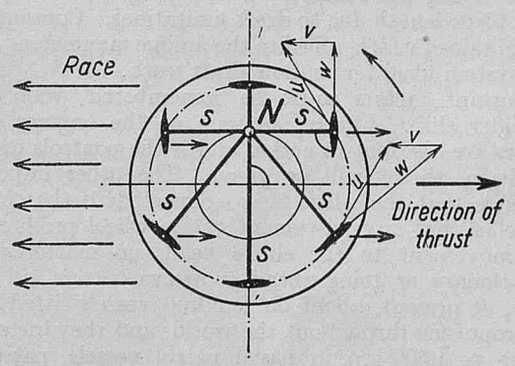


Figure 2.—Method of operation.

The law governing the blade movement is shown in FIGURE 2. The perpendiculars " s " on the blade sections must all meet in point " N "—the control centre mentioned above—which is at right angles to the thrust direction. The further point " N " is moved, the greater the pitch of the blades and consequently the thrust. By moving point " N " the ship can be propelled at varying speeds without altering the revolutions and, in tugboats, the blades can be adjusted to give the most favourable pitch.

For free running or normal tows, point " N " is moved to its maximum position, but the weight of tow tends to reduce the propeller speed and thus the output of the engines; it must be adjusted so that full output and revolutions are maintained.

Point " N " can be moved in a circle around the centre, and it will be seen, therefore, that the Voith-Schneider propeller acts not only as a propulsive unit but also as a steering force.

The thrust can be applied for going ahead, astern, for ordinary steering, or for turning the vessel on the spot. With a twin propeller installation, a purely transverse movement can be given by fitting a third control lever, which, in effect, deharnesses the two propellers, so that the thrusts of each produce a resultant thrust athwartships from about the centre of the water plane.

This change of direction and intensity of thrust is done without any alteration in the revolutions or the direction of the engine or propeller. The Voith-Schneider drive, therefore, not only does away with the reversing machinery, but also with the whole of the steering machinery and rudder.

It is clear from the above that the Voith-Schneider ship can carry out manœuvres which are not possible with the normal rudder-operated vessel and which make this system of propulsion particularly advantageous to vessels operating in crowded waters or in narrow tortuous channels.

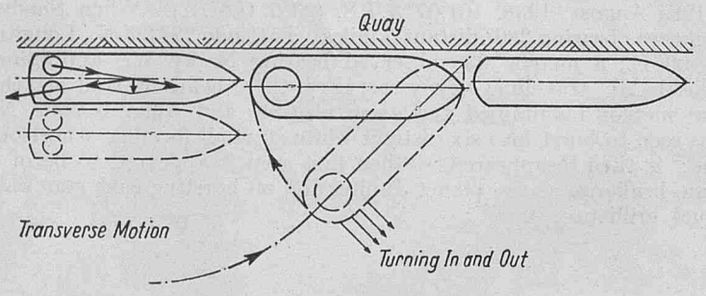


Figure 3.—Mooring manœuvres.

Another important field of application for Voith-Schneider Propulsion is in shallow draft craft where the limitations of draft make for inefficiency with screw propellers operated in tunnels and where, up to the present, paddles or stern wheels have proved most satisfactory. The problem of shallow draft craft is one of obtaining the necessary swept area of propulsion and, up to the entry of the Voith-Schneider propeller, this could only be obtained with any great degree of success by the paddle or stern wheeler.

With the Voith-Schneider propeller, the necessary swept area is given by increasing the diameter of the propeller to counteract the reduction in blade length due to draft limitations. Consequently, good efficiency is obtained which, allied to the unique manœvring capabilities, makes this system ideal for shallow draft work.

Two important factors must be remembered when handling a Voith-Schneider ship. Firstly, as soon as the engines are started, the propellers are also put in action and if the controls are not in the neutral position, thrust will be given. The other important point to remember is that the wheel is so connected to the control centre of the propeller that any movement of the wheel produces the same directional movement to the ship's head, no matter whether the vessel is stationary or going ahead or astern.

There are, at present, about on hundred vessels fitted with Voith-Schneider propulsion throughout the world, and they include all types in powers up to 4,500 h.p. in naval patrol vessels, passenger ships, tugs, floating cranes, ferries and small craft.

The following is a summary of the vessels under the British Flag :—

The *Katsena*, belonging to the United Africa Co., Ltd., and built by William Denny & Brothers, Ltd., Dumbarton, is in operation on the River Niger. She is a shallow draft vessel, having passenger accommodation, a certain amount of cargo space and also tows barges on her service of 800 miles up the Niger. She is 130 ft. in length, 24 ft. beam and has a light draft of 2 ft. 9 ins., powered by one Deutz diesel engine of 250 B.H.P. The Voith-Schneider propeller has a blade orbit diameter of 7 ft. 3 ins. and 6 blades, each 2 ft. 6 ins. in length.

The first vessel to operate in Great Britain is the *Lymington*, belonging to the Southern Railway Company, built by William Denny & Brothers of Dumbarton. This vessel is the first double ender to use Voith-Schneider propellers, and is 160 ft. in length by 36 ft. beam, and 5 ft. 8 ins. draft. She is used for carrying cars and passengers on the service between Lymington and Yarmouth, I.O.W., and has two Allen diesels each of 200 B.H.P. The two Voith-Schneider propellers have a blade orbit diameter of 4 ft., and 6 blades, each 2 ft. 8 ins. in length.

The third vessel put into service in this country was for the London Midland & Scottish Railway, and also built by William Denny & Brothers, Ltd., Dumbarton. The *Bispham* is a harbour tug operating in Fleetwood and her dimensions are 48 ft. length, 13 ft. beam and 3 ft. 9 ins. draft. She is powered by a single 120 B.H.P. Gleniffer diesel engine and her Voith-Schneider propeller has a blade orbit diameter of 3 ft. 4 ins. and 6 blades each 2 ft. 2 ins. in length.

Another vessel, which is incidentally the highest powered commercial ship fitted with Voith-Schneider propulsion, is now on the Southampton–Cowes service for the Southampton, Isle of Wight and South of England Royal Mail Steam Packet Co., Ltd., more familiarly known as the Red Funnel Line. The *Vecta*, built by John I. Thorneycroft & Co., Ltd., Southampton, is a car and passenger ferry 199 ft. in length, 27 ft. beam and 6 ft. draft. Two 650 B.H.P. diesel engines, manufactured by the English Electric Co., drive the two Voith-Schneider propellers, each having a blade orbit diameter of 6 ft. and 6 blades 4 ft. in length.

There is now under construction at Fleming & Ferguson's yard, Paisley, a car and passenger ferry for service between Dundee and Newport on the River Tay. Her dimensions are 166 ft. by 50 ft. (main deck) by 5 ft. draft, and having two Voith-Schneider propellers, 5 ft. 4 ins. in diameter driven by Brush diesel engines of 400 B.H.P. each. She will have accommodation on her car deck for forty-five vehicles, in addition to accommodation for 1,200 passengers.

A shallow draft tug for the Anglo-Iranian Oil Co.'s service on the Tigris and Euphrates is being built by Ferguson Bros., Port Glasgow. This vessel is 102 ft. in length, 22 ft. beam and has a draft of 2 ft. 8 ins. with a 200 B.H.P. Allen diesel engine driving a Voith-Schneider propeller with a blade orbit diameter of 6 ft.

More than 50 propellers for sea-going patrol vessels and other craft for various countries throughout the world are being built, from which it may be seen that Voith-Schneider Propulsion is firmly established, and as such should be of interest to all those in the marine world.

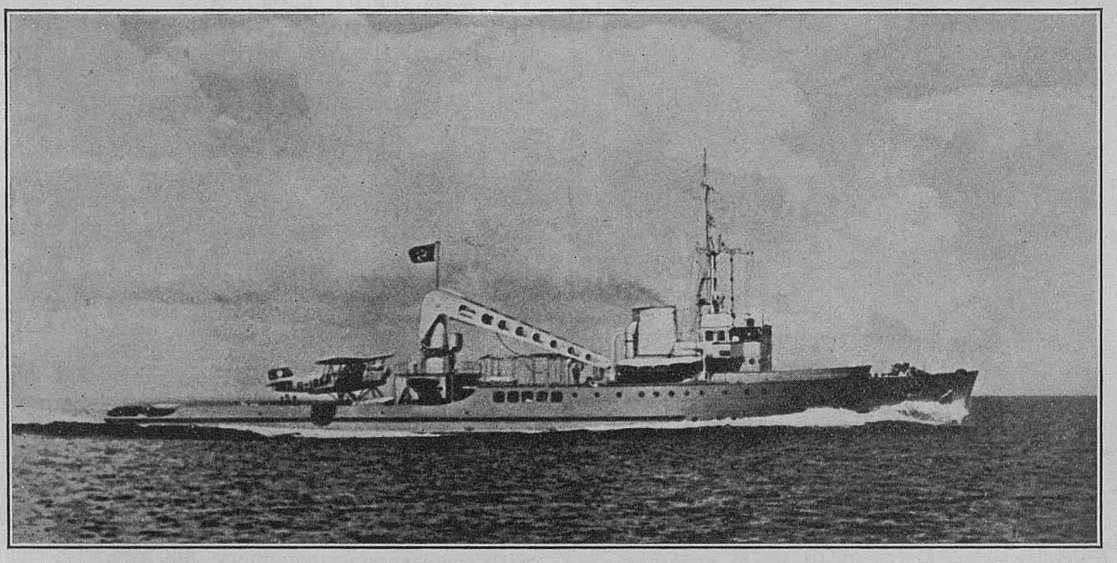


Figure 4.—A 4,400 B.H.P. twin Voith-Schneider Ship.

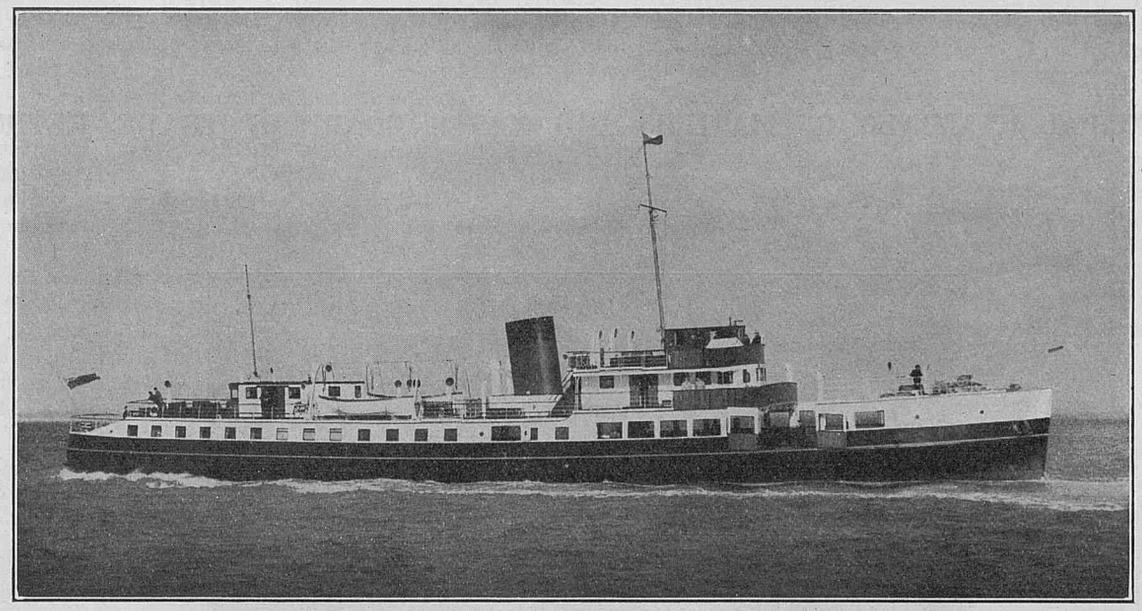
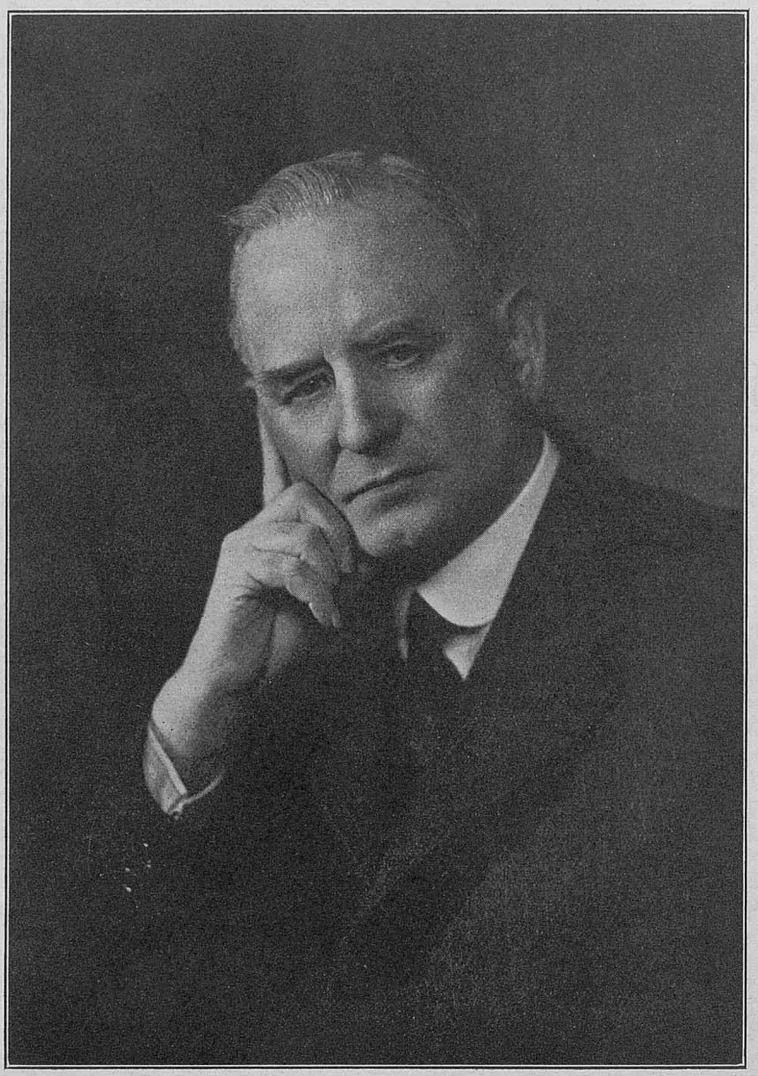


Figure 5.—M.V. "Vecta," 1,300 B.H.P. twin Voith-Schneider Ship.

PRINCIPAL EXAMINER OF MASTERS AND MATES, BOARD OF TRADE, RETIRES.



Captain W. Ellery.

Captain W. Ellery, Principal Examiner of Masters and Mates has retired after a long, distinguished, and honourable term of office. With his retirement, a veritable giant of energy, perseverance, and affection bids farewell to a life's work, well and truly done. There is no part of the globe, graced by the fluttering of the Red Ensign, where his name is not known, revered and remembered.

Of a modest, almost retiring disposition, devoid of ostentation, this genial figure moves amongst a large circle of friends who greatly respect him. There is not a Navigation School nor a single training ship throughout the Kingdom where Captain Ellery is not looked upon as a prudent adviser and an eminent example of untiring devotion to duty—this goes also for his service colleagues.

His attitude to candidates for examination was one of great consideration, and at all times his accessibility was assured. He commenced his sea career as an apprentice in the Brocklebank Line of sailing ships; first serving in the full rigged ship *Majestic*, he also served as 3rd Mate in this ship. His next ship was the four masted barque *Holkar* as 2nd Mate, thence the full rigged ship *Khyber*—in all over 10 years in sail—and served up to the rank of 1st Mate before finally taking to steam, in March, 1900, where he served as 4th, 3rd, 2nd and Chief Officer up to 1903, after which he received his first Command in the S.S. *Ameer;* he then commanded S.S. *Pindari* and S.S. *Mahratta*, the last named being also his first steamship after sail. Altogether he was in command for 7 years.

In the year 1910 (February) he was appointed Examiner of Masters and Mates and stationed at Hull, at which port he remained till October, 1916. In this port he was responsible for all the East Coast examination ports including the Fishing examinations. From Hull, he was transferred to Aberdeen, and was, in addition to being the Examiner of Masters and Mates and Fishermen, the Superintendent of the Mercantile Marine Office. A further transfer was effected in 1918 when he went to Glasgow as Examiner of Masters and Mates. In July, 1921, he succeeded Captain Fulton as Deputy Principal Examiner of Masters and Mates and in the same year was promoted to the high rank of Principal Examiner of Masters and Mates which position he has held with great distinction for nearly 18 years. Truly a wonderful record. Amongst his many supplementary activities he was a member of the Meteorological Office Committee, the Thomas Gray Memorial Trust (Royal Society of Arts); a member of the Moderating Committee (Merchant Navy Officers' Training Board); Yorkshire Education Committee; Seafarers' Education Society; and a member of the Signals Committee (International Code of Signals) and many others.

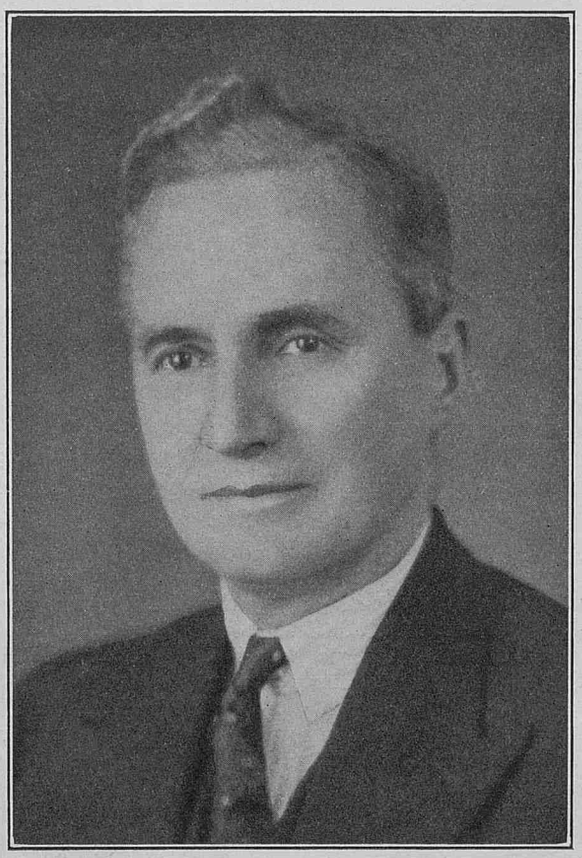
The Fishing Industry was ever uppermost in his mind, and he did much towards its educational improvement.

For several years he combined the duty of Editor of the publications "Notices to Mariners" and "Notices to Fishermen." His work in the cause of Education for seamen has been much appreciated—the value of which will be of great assistance to thousands and to the nation.

In parting, his colleagues made him a presentation, and I am sure we all extent to him our best wishes for a retirement well earned and comfort richly deserved.

Time marches on, but great memories remain.

T. P. M



Captain T. P. Marshall.

Captain ELLERY has been succeeded as Principal Examiner of Masters and Mates by Captain T. P. MARSHALL, who was previously Deputy Principal Examiner.

Captain MARSHALL was born in 1884 and went to sea in 1899 as an apprentice in the ship *Cambrian Hills* of Liverpool. He served four years in sail, passed for second mate and then transferred to steam where he eventually obtained command. He possesses an extra-master's squared rigged certificate.

After being in command for about three years he entered the Board of Trade in April, 1913, as a Nautical Surveyor and served in the consultative branch until 1916 when he was transferred to Hull to take charge of the East Coast examinations. In 1931 he was transferred to London as a Nautical Surveyor and was promoted in December, 1935, to Deputy Principal Examiner.

From 1913 to 1916 Captain MARSHALL was associated with Sir WILLIAM ABNEY at the College of Science, South Kensington.

We offer him our congratulations upon his appointment to this important post and we wish him every success.

C. F.

LIEUTENANT COMMANDER J. D. KEATINGE, R.N.R.

Senior Examiner of Masters and Mates, Liverpool.

Lieut. Commander J. D. Keatinge, R.N.R.

A CHAPTER in the history of the British Mercantile Marine closed with the retirement of Lieutenant Commander J. D. KEATINGE, R.N.R., the well-known Senior Examiner of Masters and Mates at Liverpool, on the 25th May last, for he was the last of the Examiners originally appointed by a Local Marine Board.

When the Merchant Shipping Act of 1854 caused the necessity for Government Supervision of the examinations for Masters and Mates the local administration of the sections respecting these examinations was allocated to the Local Marine Boards at the various ports. From that year until 1914 these Boards appointed the Examiners.

The Local Marine Boards were composed largely of local shipowners, the Examiner chosen by them was usually a local shipmaster who had passed his examinations at and sailed out of the port.

Once appointed he remained as Examiner at the one port until his retirement.

In these circumstances, each examination room assumed a characteristic individuality.

The older members of the profession tell many tales of this aspect of the examinations.

For sixty years every shipmaster and officer obtained his qualifying certificates through one or the other of these Examiners.

Their approval could not give a man a command, but their disapproval certainly did prevent his getting one, and the progress of the British Mercantile Marine during this period justified their method of sifting out the unsuitable candidates.

The present Examiners of Masters and Mates are appointed directly by the Board of Trade and are liable to be transferred from one port to another throughout the United Kingdom.

On leaving the *Conway* young KEATINGE served his apprenticeship and sailed for some time after in the sailing ships belonging to Messrs. Lewis, Davis & Co., of Fenwick Street, Liverpool. After obtaining his Extra Master certificate in 1895 he joined the Lord Line of Belfast where he served as 3rd, 2nd and Chief Officer before leaving in 1898 to undergo his Naval Training as a Royal Naval Reserve Officer.

After leaving the Navy he was for some time in command of one of Mr. R. Jones' vessels, but left, as his ship was laid up, preparatory to being sold. He then joined the Cunard Co., and served as an Officer in the *Umbria* and *Lucania*.

In 1903 he was appointed Examiner of Masters & Mates at Liverpool, and during his 36 years with the Board as Examiner and Chief Examiner, was also for some years Superintendent of a Mercantile Marine Office, Secretary of the Local Marine Board and Registrar of Naval Reserves. When at Cardiff he was appointed by the Admiralty as honorary assistant to the Commander R.N. for R.N.R. and liasion duties for the Western District.

When war was declared he was one of the first Retired R.N.R. Officers called out by Royal Proclamation, and served on board the Flag-Ship of the "I" Squadron as Prize and Boarding Officer, and boarded nearly 200 vessels in all weathers. At the termination of hostilities he returned to his duties as Examiner.

During his service as an Examiner he has conducted Examinations in every port in the British Isles, including the Orkney and Shetland Islands.

Captain KEATINGE will be attended in his retirement by the affectionate regard of the thousands of Captains and Officers whom he encouraged in the examination room to exhibit sufficient initiative to justify his "Giving them their tickets."

T. J.

THE CHARTING OF OCEAN CURRENTS.

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

Introduction.—The publication of current charts of an entirely new type was begun in 1924 in The Marine Observer, the region chosen being from Cape Blanco to Table Bay on the direct Cape route. Since that date their publication has proceeded without intermission and the sectional charts of The Marine Observer have been combined into current atlases for the North Atlantic, Indian, and South Pacific Oceans, all of which have been published. The atlas of the North Atlantic Ocean, the first one published, is now being revised to utilize the many new observations received since the date of publication and is being extended to include the South Atlantic Ocean and the Mediterranean.

These current atlases give information which is both much more accurate and much more definite than anything which had been previously produced. They are designed to be statistically accurate, the information given by them taking full account of the set and drift of every observed current used in their construction. No process of estimation of any kind enters into the computation of either the charts of arrows or roses. The mean set of current shown on the older charts was estimated by eye from a number of observations of current plotted on a chart, or in other cases was even more vague, in the form of flow lines based on the general experience of the current. The only exception to this statement is the charts of currents of the North Atlantic Ocean published by the Meteorological Office in 1872. In this work monthly charts were given showing the true mean current from the then available observations for equal areas of $2\frac{1}{2}°$ by $2\frac{1}{2}°$, but no information about the variation of current was given.

The inclusion of frequency roses in The Marine Observer charts is the feature which even more particularly differentiates the new atlases from all previous ones. The most that any other form of chart gave was the range of strength of current to be expected in any region, with no satisfactory indication of the variation of set which might be experienced. The frequency roses, as in the case of the arrows representing the mean flow of current, take into account every available observation and therefore give all possible information as to the frequency of the set of current in any direction and also the frequency of currents of various strengths in any one direction.

As the new form of current charting is now well advanced it seems desirable to give an account of the charts, their construction and use. Furthermore while there can be no question of the value to the navigator of current charts based on accurate computation, even these have certain unavoidable limitations, which should be clearly stated. These are the purposes of the present article.

The Computation of the Mean Set and Drift.—The mean set and drift is shown on the charts for each area of 4° of longitude by 2° of latitude for which observations are available. All currents observed in each of these equal areas are separated into two components at right angles to each other by use of the traverse table. Thus a current S. 31° E., 19 miles per day, becomes S., 16·3 miles and E., 9·8 miles. A current N. 53° W., 22 miles per day, becomes N., 13·2 miles and W., 17·6 miles. When all currents in one area are so treated the totals for each of the four components are obtained and the difference between the N. and S. totals found, also the difference between the E. and W. totals. Thus values remain for two components, which are recombined by the tables, giving the mean set and a figure which, when divided by the total number of observations in the area, gives the mean drift.

The Significance of Mean Set and Drift.—The chart of arrows representing mean set and drift gives information as to the general circulation of the ocean as a whole, and the trend of the circulation in any particular region. This forms a background, so to speak, for the knowledge, more important to the navigator, of what set and strength of current he is likely to experience in a particular region, obtained from the chart of frequency roses.

In general, mean values differ from most of the actual observations from which they are formed. Thus if air temperature is being recorded in temperate latitudes the bulk of the observations made in a given month will be either above or below the mean for a month. This is because the variation of temperature from day to day, and also the diurnal range of temperature, is in general considerable in such latitudes. If, however, temperature is being recorded in a tropical region, where the ranges are small, the observations will often be the same as the mean value and when they are not they will not usually differ from it very greatly.

Similar considerations apply to currents. In general, the navigator will not expect, within a given 4° by 2° area, to experience a current similar to the mean for that area, though the mean set definitely shows the predominant set. The extent, however, to which the sets and drifts actually experienced differ from the mean value varies according to the strength of the mean drift and the character of the general circulation in the region. In general, when the mean drift is strong, the greatest drifts experienced will not exceed the mean value so much as when the mean drift is weak. Thus if the mean drift is 40 to 50 miles per day the greatest drifts experienced are likely to be $3\frac{1}{2}$ knots, or 4 at the most, rather less than double the mean. If the mean drift is 1 to 3 miles per day, the greatest drifts are likely to be $\frac{1}{2}$ to 1 knot, from eight to twelve or more times the mean value. The stronger the mean drift the less likely is the set experienced to differ markedly from the mean set, while with very weak mean drifts, any or almost any set may be met with. It must be remembered, however, that whatever the strength of the mean drift, a certain percentage of sets differing markedly from, or even flowing in opposition to, the mean set will be experienced in most regions, as is shown by the roses; in a few cases of very steady current, such as parts of the South Equatorial Current of the South Pacific Ocean, there is at certain times of the year practically no chance of meeting an adverse set or even one differing greatly from the mean set.

The fact that the mean set is the predominating set may be directly useful in certain regions. A comparison of the mean sets of the 4° by 2° areas contained in one rose area will show if the information given by the rose is likely to be equally valid in all the constituent areas. For example, in regions of no well-marked general current there may be in some cases considerable variety of mean set, or even mean sets in opposition, in the smaller areas. The mean set for the area the navigator is in should, therefore, be taken into account in using the rose in such cases.

It is important to realize that the mean current is not purely a mathematical abstraction; it has a physical reality. On a chart, drawn for the quarter February to April, there is, let us say, in one area a mean drift of 6 miles per day, with a mean set due west, derived from a considerable number of observations made over a period of years. What this actually means is that during these three months there is a total transport of water, to the region lying to the westward, equivalent to that which would occur if all the water in the area moved westward at the steady rate of 6 miles per day. The mean set and drift is therefore a mean resultant flow of water. As there are 89 days in the quarter, and as the area is 120 miles wide we have $89 \times 6 \times 120$, i.e. over 64,000 square miles of surface water as the total amount transported westward during the three months.

The Choice of Area for Mean Set and Drift.—The area 4° by 2° was originally chosen for the currents on the direct track Cape Blanco to Table Bay since this track runs in a general southerly direction and the greater extent of the area in longitude than in latitude was used to ensure that observations from all available ships on or near the track should be included. The same area has been retained in all subsequent charting as it was considered that it affords the maximum amount of information from the number of current observations generally available. In a very few special regions, for example the Gulf of Aden, smaller areas have been used.

There are two considerations in this connection :—

(*a*) If the chosen area be too large the mean set and drift would have little value in those regions where two definite trends of current were included in the one area. To take an extreme instance, where two currents flow adjacent to one another in opposite directions, there would be a better chance of separating them, and hence of showing the mean set and drift of each, by using areas not larger than 4° by 2°. In such a case a larger area would only show the mean difference of the flows of the two currents, which would be valueless. The same applies to the grouping together of a region of definite current and one of variable current.

(*b*) If the chosen area be too small, there will not be sufficient observations to give a reliable mean, over very large areas of the oceans. If, for example, the mean sets and drifts were computed for areas of one square degree, there would be only one-eighth of the number of observations available for the 4° by 2° area in each of the smaller areas, assuming that the observations were well distributed in position over the entire 4° by 2° area. Usually this is not the case so that there would be no observations at all in many one-degree squares. Also the mean sets and drifts in adjacent squares would often appear to conflict owing to the fact that the numbers of observations were not large enough to be representative of the general trend of current. Thus the true facts of current trend and the general circulation would tend to be lost.

On the whole, therefore, the 4° by 2° area has proved the best in practice. In regions of well-defined coastal currents, such as the Gulf Stream, the Agulhas Current or the East Australian Coast Current, this area will, however, in general include more than the actual region of the current, since it is seldom that an area is so situated that the main body of the current passes centrally through it. Thus, in general, the inshore counter-current found in places inside the main coastal current will not have its own mean set and drift shown separately; this will merely reduce the mean drift of the main current in the 4° by 2° area nearest the coast. As will be mentioned later, however, few observations of these inshore counter-currents are received, so that the effect in reducing the mean drift of the main current on the present charts is negligible. A greater effect of the same kind will, however, occur in areas further from the coast. If, for example, part of an area contains the outer portion of a strong coastal current, the rest of the area will include weaker and more variable sets and drifts. If there are no observations of these outer sets and drifts, the true mean value of the coastal current will not be affected. If the tracks of shipping are such as to include these observations the mean drift for the area will be less than that of the coastal current and the mean set will probably also be affected. An interesting example of this is given by the area latitude 32° to 34° S., longitude 152° to 156° E. (neighbourhood of Sydney). Here the mean arrows for the quarters November to January and February to April give a much better representation of the East Australian Coast Current than those of the two remaining quarters. The mean mid-positions of the arrows for May to July and August to October lie considerably farther from the coast and therefore further away from the position of strongest current. Comparison with the regions immediately north and south will make this clear.

Mean sets and drifts can be computed in one-degree squares for regions where current is well-defined and enough observations are available. It was done in the form of supplementary charts for the region of Cape Guardafui and Sokotra during the S.W. monsoon period (see the introductory page of the INDIAN OCEAN CURRENT ATLAS or THE MARINE OBSERVER, Vol. VII, 1930, lithographic page at end of the September number), and for the region south of Ceylon (see the end of the August number of the same volume), also for the region east of Ceylon (see the end of the December number, Vol. IX, 1932). This method of showing mean set and drift may be extended in the future for areas of special interest, but even if in the course of years the number of observations increased so much as to make it feasible for large areas of an ocean, the resulting charts would have to be on a considerably larger scale than the present atlases.

The Number of Observations for Mean Set and Drift.—The accuracy of the mean current depends primarily, but not entirely, on the number of observations available for the area chosen. For the 4° by 2° area this number is extremely variable, ranging at present from no observations to over 300. As the charts are revised from time to time by the addition of observations made over a further period of years, the total numbers will increase fairly rapidly in areas traversed by frequented shipping tracks. Unfortunately in other cases they will increase much more slowly and in some parts of the oceans hardly or not at all. Thus we shall get fuller knowledge of the currents of parts of the oceans, of which good use can be made, while that of other regions will but slowly be improved.

The printing of the number of observations below each arrow gives the navigator the means of judging the value to be assigned to a particular arrow. It is not possible to give a hard and fast rule as to what number of observations will give a reliable mean value, since this depends also on other factors, such as the character of the current circulation in the region under consideration and the distribution of the observations as regards time. Starting with the revision of the North Atlantic atlas, begun this year, no mean of only two observations is given. In previous work such a mean was given in selected instances.

Means from small numbers of observations, under 8 or 10 are not necessarily unreliable, but should be regarded with caution. In this connection the means of adjacent areas should be looked at. In a region where the same general current is probable, having regard to the oceanic circulation and wind direction, the presence in an adjacent area of a similar mean set and drift, if based on a larger number of observations, will strengthen the probability that the mean of the area with few observations is not much in error. On the other hand where confirmation of this kind is not found, the mean from few observations, though not necessarily incorrect, is more likely to be s

Means from 10 to 20 observations are definitely more reliable, and with still greater numbers the reliability steadily increases. It is not however necessary to have 100 or 200 observations in a 4° by 2° are to be assured of reasonable reliability. Opportunity for seeing ho increase of observations affects the computed mean set and drift occurs in the revision of the North Atlantic work and also in the atla of the South Pacific Ocean, since a small part of the latter, the rout from Panama to Australian and New Zealand ports, had previously been computed and published in THE MARINE OBSERVER, Vol. V 1928. Though change in a mean set and drift, computed from obser vations covering different periods, naturally occurs, in no case up t the present time have these changes been found to make any rea alteration in the essential characteristics of the main currents, stil less to alter our conception of the general circulation of the ocean derived from the original charting. Some examples, taken at random from the chart for November to January of the eastern part of th North Atlantic Ocean, will be of interest and are given in the tabl below :—

Position.	Period of Observations.			
	1910 to 1925.		1910 to 1938.	
	Mean Set and Drift (miles per day).	Number of Observations.	Mean Set and Drift (miles per day).	Number of Observations.
Cape Track, latitude 0°–2° N. (Equatorial Current)	284° 10.6	47	290° 10.0	180
Cape Track, latitude 4°–6° N. (Guinea Current)	108° 8.2	45	116° 6.6	205
Latitude 31°–33° N., longitude 15°–21° W....	177° 1.7	11	192° 1.0	61
Latitude 31°–33° N., longitude 10°–15° W.	221° 2.7	72	228° 2.9	181
Latitude 20°–22° N., longitude 20°W. to African coast.	246° 3.5	62	249° 4.2	210
Latitude 20°–22° N., longitude 20°–26° W.	260° 2.7	24	262° 3.3	73

It should certainly not be assumed that further observations of current are not required, even if the mean set and drift is not greatly altered, once a certain number has been obtained. We cannot be sure that this will be so in every case. Furthermore, the mean set and drift, and the frequency rose, are by no means the only use made of the observations. Considerably larger numbers are required to obtain monthly averages, and in the general work of current investigation, which has the ultimate object of providing the navigator with the greatest possible amount of information directly useful to him, the larger the number of observations in any region the better.

Accuracy of the Observations.—The sets and drifts derived in modern navigation from the difference between the observed and D.R. positions should not, in general, be greatly in error, but, when they depend on the estimation of run between longitude sights and noon, they are subject to error. Observations of current experienced between two star fixes are not, of course, subject to this error, hence the desirability of using star sights whenever possible. There is always the possibility of error in the D.R. position, due to such factors as leeway, slip, etc., which are difficult to estimate exactly. It is, however, a well-known fact in statistical work that if a large enough number of observations are combined the accidental errors of observation will cancel out. This is obvious since the drifts, for example, observed by many different persons will in the long run be as often and as much overestimated as underestimated. The question of the accuracy of the observations, therefore, brings us back to the fact that the factor of greatest importance is the number of observations.

The Dates and Positions of the Observations.—From the statistical point of view a series of observations used for computing the mean current of any area should be well distributed over the period of years for which the chart is made. Thus 10 observations for the period 1910 to 1938, one of which was made in 1910, three in 1926, and six in 1938 would not give a good distribution. There are two reasons why the average value of such a series of observations might not give a true mean :—(1) The real strength, or the position, of a well-defined current might vary to some extent in different years. We do not know whether this is the case as sufficient observations are not yet available to study this question. It is likely that some variation does occur, apart from the ordinary seasonal variation during the year which many currents show, just in the same way that the average weather of the British Isles varies from year to year. (2) Currents are affected locally by abnormal conditions of wind and weather, especially if these are continued for a considerable time, and the mean of a small number of observations badly distributed in time might be incorrect for this reason. A case occurred recently where the mean of 25 observations for a particular coastal area was placed on the chart in preference to a mean derived from 66 observations. The 25 observations were from ships on the shipping track distributed over the period 1910 to 1938; the other 41 observations were made by one ship within a period of about three weeks and the inclusion of these completely overweighted the other observations, altering the mean set by about 90°.

In general the greater the number of observations in a 4° by 2° area the less the likelihood that the actual dates of the observations have any effect on the value of the mean current.

Each of the arrows on the charts is placed so that the middle point of the tail occupies the position of the mean of the mid-positions of all current observations in the 4° by 2° area. There are two points of view to consider with regard to this mean position :—

(*a*) It is obviously related to the main track of shipping through the area. Unless a ship is on an unusual course the mean of the observations made on or near the track, as shown on the charts, is what the navigator wants to know, whether it is the true mean for the whole of the area or not. The situation of the mean position within the area, therefore, makes little difference from the practical point of view, except that it may mask, in greater or less degree, the true oceanic circulation in the area, as evidenced by the example given above for the Sydney neighbourhood.

(*b*) From the oceanographical point of view, however, the true mean set and drift, that is the true mean resultant flow of water in the area, will not be obtained unless the mean position is in the centre of the area and, in addition, the tracks of ships, from which current observations are received, cross the area at all angles. This will very rarely or never be the case. There is also another reason why the true mean set and drift can never be exactly obtained by the present system of observing currents, even if the above conditions are fulfilled. The true mean set and drift shown for any one area on the charts must inevitably be influenced by the mean sets and drifts of one or more of the areas which are in contact with it. In the open ocean these adjacent areas will be eight in number. Excluding short-period observations derived from land fixes, in general the beginning and ending positions of the run from which a current observation is determined will not both be within one area and therefore some of the current in one, or sometimes two, of the adjacent areas is included. If, for example, the true mean drift is stronger in the area immediately to the north of that which contains the main part of the run, a certain amount of this additional strength will be represented in the observation, and therefore in the mean drift of the more southerly area. Conversely, the mean drift of the more northerly area will be reduced by those portions of ships' runs which cross the more southerly area. In the same way the mean set of any area will be affected by those of adjacent areas, if one or more of these differ from it appreciably.

The Frequency Roses.—These are computed on special forms with columns for each of the 16 directions represented on the rose. All currents with drifts between 6 and 12 miles per day are sorted into these columns and the percentages for each direction calculated. Those with drifts between 13 and 24 miles per day are similarly treated, and so on.

Some of the 4° by 2° areas within one rose area may be blank on the chart of mean arrows, indicating that less than three observations are available for each. All such observations are, however, used in computing the rose so that the total number of observations shown in the centre of the rose may slightly exceed the sum of those shown under the mean arrows.

The frequency rose gives the navigator all possible information as to variation of current over different ranges of drift. The information is completed by the tables giving particulars of the greatest drifts recorded and the percentage of drifts of less than 6 miles per day, shown by the lower figure in the centre of the rose.

The areas chosen for the roses are always larger than 4° by 2°. They were originally made so in order to have sufficient observations to construct a satisfactory rose, care however, being taken that more than one general trend of current was not included in one rose area. For this reason a rose area should not be too large; another reason being that too large a rose, even if the same general current flowed throughout the area, would mask possible differences in the character of different parts of the current. These considerations account for the different sizes of the rose areas and for many of the irregularities of shape which they show. In the regions of the permanent anticyclones and those where a current occupies a large extent of the ocean, such as the Southern Ocean Drift, the areas are rectangular and often of equal size. The " stairlike " margins of some rose areas, particularly in those charted in the earlier years, were produced by the charting being confined to frequented tracks, most of which cut the parallels of latitude obliquely.

The separation of currents by rose areas cannot of course apply to the inshore counter-currents of strong coastal currents, since it has been shown that even the 4° by 2° area of the arrow usually fails to do this. It is also obvious that the roses, the areas of which must be laid down for the charts for the first quarter, cannot be altered for subsequent quarters and thus any seasonal shift in the position of the current or change in its width cannot be allowed for. Similarly any current not present in the charts for the first quarter, and not previously known to exist, could not be allowed for in the rose areas. In spite of these difficulties it is not considered that any real error has yet been made in the assignment of rose areas. When a current atlas is revised, the opportunity occurs to make small readjustments should these be desirable.

The number of observations within a rose area varies greatly. In a very few cases it is as low as 9 or 10; the value of each of these is considered before it is placed on the chart. The roses which so far show the largest number of observations are those of the Red Sea, with from 689 to 950 observations in each rose throughout the year. With the increase in the number of years of observations available

there are now more observations in some 4° by 2° areas, on much frequented shipping tracks, than there are for many rose areas of much greater size. It would not, however, be feasible to draw roses for 4° by 2° areas, since this would still only be possible in restricted areas of the oceans and furthermore charts on a considerably larger scale would be necessary to show the details of the roses satisfactorily.

It should be noted that when all or most of the 4° by 2° areas comprised in one rose area contain only small numbers of observations, as shown by the chart of arrows, the reliability of the information given by the rose is not greater than that of any of the mean sets and drifts, even although it may, on account of the size of the rose area, be based on a moderately large total number of observations. Thus in assessing the reliability of a rose based on a small to moderate total of observations it is desirable to examine the chart of arrows for the numbers representing each 4° by 2° area. The examination of the mean sets to test the validity of the information given by the rose for all parts of the rose area has already been explained. This may be done at the same time.

Quarterly and Monthly Charts.—The charts are constructed for the quarterly periods November to January, February to April, May to July, and August to October. As it was found when charting was begun that the number of observations did not permit of monthly charts, it was necessary to choose the quarterly periods in such a way that the two opposing currents of the alternate monsoon periods of the Indian Ocean did not appear in the same quarterly chart. This being established it was considered desirable to use the same quarterly periods for all parts of all oceans. In spite of the increase in the number of observations we have not yet reached a stage where satisfactory monthly mean sets and drifts could be obtained for the 4° by 2° areas on even the most frequented shipping tracks, save in a few very limited regions. The production of monthly charts for the more frequented tracks is nevertheless a possibility in the near future if the number of current observations received each year can be considerably increased. It will, however, remain an impossibility for the oceans as a whole for a long time to come.

At present, one of the most important uses of larger numbers of observations, where these have been received, is to provide monthly values of mean set and drift to supplement the information given by the quarterly charts. Whenever monthly values can be computed it is always found that there is some monthly fluctuation in mean set or mean drift, or in both, though it is not necessarily large. On the other hand, a current in, say, a monsoonal region might change radically in the third month of the quarter. In this case if the current of the first two months was fairly strong the mean set and drift for the quarter would give no indication of the change, being indistinguishable from a weaker unchanging current throughout the quarter. This information is given in the articles on current which accompany the charts published in THE MARINE OBSERVER. In computing monthly values suitable areas are chosen for each region, usually consisting of two or more of the 4° by 2° areas grouped together.

Coastal Currents.—The representation on the charts of some of the great coastal currents, such as the Gulf Stream, Agulhas, East African Coast and East Australian Coast Currents is adequate, since shipping tracks run more or less parallel to the coast in these regions. It is not so good in other cases, for example the Peru Current, where the ships are less frequent or where the tracks are not parallel to the coast. The representation of currents still nearer the coast, such as the inshore counter-currents which flow at certain times or in some regions between the main coastal currents and the coast, is however not adequate. There are two reasons for this :—(1) It has been shown that in most cases it is impossible to separate such currents from the main coastal currents on the charts. (2) The main shipping tracks do not, in general, run near enough to the shore for a sufficiently long time to provide observations of these currents. On account of the irregularities of coastlines the mid-position of a current observation may be quite close to the shore while the greater part of the run from which the current was determined was considerably further from the shore. It is not possible, therefore, even by going back to the original observations, to find many observations of true inshore current. In attempting to do so a further difficulty arises. Some reverse sets usually occur within the body of the main coastal current. In the East Australian Coast Current, for example, they are comparatively frequent. A reverse set occurring fairly near the coast is indistinguishable from a counter-current, more particularly as we have in general no certain knowledge of the width of the main coastal currents.

It is obvious that the very reason why the main shipping tracks give a good representation of the strength and general features of a great coastal current, namely the approximate parallelism of the tracks and the coast, prevents our obtaining much information as to the width of the current, since the tracks in general do not cross the whole width. Moreover the outer edge of a coastal current is probably indefinite and variable.

Tidal Streams.—The investigation of the tidal streams of coastal and shallow waters does not fall within the scope of the work of the Marine Division. When a ship is leaving or making port a tidal stream may be superimposed on the true current for a part of the run from which the first or last current observation of the voyage is determined. From the point of view of ascertaining the true current these tidal influences may thus be regarded as errors which tend to cancel out in the mean set and drift, but not entirely in the frequency roses, when a sufficient number of observations has been obtained. In the future, when owing to the work of surveying ships or other local observations the sets and drifts of the tidal streams are more accurately known in many regions, it might be possible to apply a correction to the observed current to eliminate the tidal stream.

The course of a ship may be in soundings for a longer time, if it is more or less parallel to the coast, or if it crosses an extensive area of soundings such as exists in the Bass Strait region or the Gaspar and Carimata Straits in the East Indies. In such regions the individual observations of current, and also the frequency roses, will be affected by the tidal streams in a greater degree.

The Investigation of Ocean Currents.—Reference has already been made to the articles on current, two or more of which have appeared in every volume of THE MARINE OBSERVER. The purpose of these is to supplement the charts by giving the results of investigations, which provide information not shown on the charts, made from the original observations. In addition the general characteristics of the currents, as shown on the charts, are summarized. One of the most important investigations is that of the seasonal variation of currents, which is given quarterly for selected areas, usually not the same as those chosen for the roses. In doing this it is often found that there are appreciable and perhaps more or less steady resultant flows of current over large areas for which the mean sets and drifts shown on the charts are variable and conflicting. Monthly data are also computed where possible, and these are given when the results are found to be of practical importance. Many investigations of more local character are also made, such as the strength and frequency of onshore sets in regions near the coast. The causes of the various currents and the reasons for their variation are also explained as far as possible.

When the work of charting a whole ocean is completed a final article is written, summarizing these investigations and also giving information as to what is known from oceanographical expeditions of the circulation of the sub-surface and deep waters of the ocean. The relation of the surface circulation to that below the surface is indicated, as far as this can be done at the present time.

The more important results of the current investigation are also given in the introductory page of each current atlas, in the form of text, tables, charts and graphs.

The Forecasting of Currents.—This is wholly a dream of the future, but we need not suppose that it must always remain such a total impossibility as it is at present. The first step would be to establish whether a particular current varied in its mean strength, from year to year, also whether it showed annual variations of position, either in that of its axis or by variation of width. It has already been stated that such an investigation is not yet possible, the number of observations received for each year being quite inadequate. The accumulation of observations each year at the same rate as at present will not enable this investigation to be made; many more for each and every year would be necessary. If the investigation were made, and variation found, the next step would be to determine the periodicity

of the variations. Much more knowledge of the underwater circulation of the oceans than we at present possess would also be necessary. If any sort of forecasting became possible it would at first take the form of general information such as that in a particular year or season a certain current would probably be stronger or weaker than usual. The problem of forecasting currents must be based on the same fundamental elements as the forecasting of weather since, apart from the constant deflecting force of the earth's rotation, ocean currents, like climate and weather, ultimately depend upon the unequal heating of different latitudes of the earth's surface by the sun.

SOUTHERN ICE REPORTS.

During the year 1938.

July.

Year.	Day.	Position of Ice. Latitude.	Position of Ice. Longitude.	Description.	Remarks.	Name of Ship reporting.
1938	12	55° 34′ S.	00° 08.2′ W.	Pack ice	Light hummocky ice	R.R.S. *Discovery II.*
	12	55° 34′ S.	00° 08.2′ W.	Sludge ice	... ...	do.
	12	55° 34′ S.	00° 08.2′ W.	Berg	Small tabular, considerably larger from about 3 ft. above water line downwards.	do.
	19	From 56° 08′ S. To 55° 52′ S.	21° 21.5′ E. 21° 04′ E.	Sludge ice	Streams of heavy sludge ice beginning to pancake	do.

August.

Year.	Day.	Latitude.	Longitude.	Description.	Remarks.	Name of Ship reporting.
1938	17	55° 50′ S.	00° 14.5′ E.	Streams of sludge ice	... ...	R.R.S. *Discovery II.*
	18	57° 14′ S.	00° 15.3′ E.	Pancake ice (field)	... ...	do.
	19	55° 37′ S.	4° 34′ E.	1 berg	Small irregular—old	do.
	23	55° 36′ S.	18° 06′ E.	1 growler	Small	do.
	23	55° 48′ S.	18° 30′ E.	1 bergy bit	Small, low	do.
	24	56° 42′ S.	20° 29′ E.	Field ice (pack)	... ...	do.

September.

Year.	Day.	Latitude.	Longitude.	Description.	Remarks.	Name of Ship reporting.
1938	24	52° 42′ S.	00° 32′ E.	Berg	Small irregular—old	R.R.S. *Discovery II.*
	24	53° 27′ S.	00° 30′ E.	1 growler and 1 bergy bit	Both small	do.
	25	55° 35′ S.	00° 26′ E.	3 growlers, 1 berg and field ice	Berg, small tabular, loose pancake ice at edge of pack ...	do.
	26	54° 57′ S.	02° 00′ E.	1 bergy bit	Conical	do.
	26	54° 31′ S.	02° 51′ E.	1 berg	Large tabular	do.
	30	From 55° 00′ S. To 54° 49′ S.	18° 05′ E. 19° 00′ E.	Field ice	Newly formed sludge over large area (steamed through sludge)	do.

Reports of Ice previous to July, August and September, 1938, will be found in The Marine Observer, Volume XV, No. 131, page 108.

WATER MOVEMENTS PAST CERTAIN LIGHTVESSELS IN THE SOUTHERN NORTH SEA AND EASTERN ENGLISH CHANNEL UNDER DIFFERENT WIND CONDITIONS—EXPERIENCES OF WINTER, 1938-1939.

By J. N. Carruthers, D.Sc., F.inst.P. (Fisheries Laboratory, Lowestoft)

The accompanying small chart shows the positions of some of the lightvessels from which continuous observations on water movements are nowadays made by means of the Vertical Log Current-Meter. Using that instrument, records are obtained which give the run of the streams under all weather conditions. From the English lightvessels, the work is carried out by the officers and crew for the Lowestoft Fisheries Laboratory—by kind permission of the Elder Brethren of Trinity House. The observations made aboard the Sandettié lightship are available thanks to kind co-operation on the part of the Office Scientifique et Technique des Pêches Maritimes. At the present time, similar continuous observations are made from four Dutch lightships—the Maas, the North Hinder, the Haaks and the Terschelling Bank. A free exchange of data exists between this laboratory and Dr. J. van Veen of the Rijkswaterstaat at The Hague. In the case of the Danish lightship (Horn's Rev.) the observing is done in Winter only, and the records are made available to us by courtesy of Dr. Å. Vedel Tåning. It is expected that before very long, the work will be extended to yet more lightships—to the Belgian West Hinder for instance.

When on 12th February, 1938, there was a serious break-through of the sea at Horsey on the Norfolk coast, the nature of the tidal streams at the time was such as to warrant the publication (by the present writer) of two small papers dealing with them.* The task resolved itself into giving an account of the streams at a time when strong winds from the N.W. quadrant prevailed. The wind-induced deepening of the waters of the Southern Bight was discussed and records giving the run of the streams as observed aboard the seven lightships named on the small chart, were presented.

We propose here to deal with the streams observed during the prevalence of winds from various directions.

From long-continued observations made aboard the Varne lightship in Dover Straits, it is known that there is most usually an overall flow of water heading towards a N.N.E.'ly. point at the rate of about three miles a day. In other words :—in the course of a lunar day of two tidal periods, the run of the two flood streams (towards the North Sea) exceeds that of the two ebb streams (towards the Channel) by about three sea miles. This most usual flow of water from Channel to North

* (1) "The Horsey Floods of February, 1938—Current and Wind at the time as observed aboard certain Lightvessels."—Meteorological Magazine No. 868, Vol. 73, May, 1938.

(2) "Exceptional Tidal Streams in the southern North Sea and eastern English Channel"—The Marine Observer, No. 133, Vol. XVI, January, 1939.

TABLE I.

The Water Movements Past Five of the Lightvessels Named—As Observed by Means of Vertical Log Current-Meters Working at 1½ fathoms Depth under Wind Conditions Tabulated in Table 2.

Notes :—(1) The moon was new on 21.12.38 and 20.1.39, and full on 4.2.39.
(2) The asterisks mark two cases where a 2-day record has been halved.
(3) In computing residual currents, all water movements within the various octants were arbitrarily referred to the middle directions.
(4) Two lines are allotted to the asterisked entry for the Sandettié, because that halved 2-day record happens to relate to the two successive days bracketed together for the other four lightships—as illustrating events under certain wind conditions better than either of the two days alone.

Lightship.	Lunar Day (= 2 Tidal Cycles) covered by the record cited.	Mileage Run of Tidal Streams towards the Compass Octants centred on Magnetic :—								Sum of the foregoing	Residual Current or Overall Set in sea-miles *per* Lunar Day towards True Directions.
		N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.		
Cromer Knoll ...	24.12.38 (1930) to 25.12.38 (2020)	0.04	0.03	0.06	9.29	0.27	0.21	0.25	9.97	20.12	0.8 S. 88° W.
	17.12.38 (1340) ,, 18.12.38 (1430)	—	—	—	3.89	0.37	0.45	0.44	9.19	14.34	5.5 N. 67° W.
	14.1.39 (1210) ,, 15.1.39 (1300)	0.16	0.39	0.36	6.94	0.16	0.13	0.17	8.36	16.67	1.3 N. 39° W.
	15.1.39 (1300) ,, 16.1.39 (1350)	0.38	0.33	0.32	8.81	—	—	—	6.85	16.69	2.1 S. 79° E.
	28.1.39 (2350) ,, 30.1.39 (0040)	0.02	0.13	0.07	7.19	0.27	0.36	0.39	9.71	18.14	2.6 N. 70° W.
	12.2.39 (1130) ,, 13.2.39 (1220)	0.46	0.47	0.46	8.98	—	—	—	5.66	16.03	3.5 S. 75° E.
Galloper... ...	24.12.38 (0320) to 26.12.38 (0500)*	0.05	8.92	—	—	0.02	11.14	—	0.02	20.15	2.2 S. 36° W.
	17.12.38 (2220) ,, 18.12.38 (2310)	0.07	15.52	—	—	—	10.40	0.95	0.17	27.11	4.6 N. 24° E.
	14.1.39 (2050) ,, 15.1.39 (2140)	—	14.24	0.23	—	—	5.62	—	—	20.09	8.8 N. 36° E.
	15.1.39 (2140) ,, 16.1.39 (2230)	0.21	13.46	—	—	—	6.66	—	0.34	20.67	7.0 N. 31° E.
	29.1.39 (0830) ,, 30.1.39 (0920)	—	7.94	—	—	—	12.95	—	0.31	21.20	5.0 S. 39° W.
	12.2.39 (2010) ,, 13.2.39 (2100)	0.06	8.66	—	0.09	0.99	7.17	0.10	—	17.07	1.0 N. 77° E.
Varne	24.12.38 (0620) to 25.12.38 (0710)	—	5.87	—	—	—	11.29	—	—	17.16	5.4 S. 34° W.
	17.12.38 (0030) ,, 18.12.38 (0120)	—	12.97	—	—	—	3.53	—	—	16.50	9.4 N. 34° E.
	14.1.39 (2350) ,, 16.1.39 (0040)	—	20.57	—	—	—	2.98	—	—	23.55	17.6 N. 34° E.
	16.1.39 (0040) ,, 17.1.39 (0130)	—	14.01	—	—	—	5.17	—	—	19.18	8.8 N. 34° E.
	29.1.39 (1130) ,, 30.1.39 (1220)	—	1.81	—	—	—	8.70	—	—	10.51	6.9 S. 34° W.
	12.2.39 (2310) ,, 13.2.39 (2400)	—	1.87	—	—	—	9.07	—	—	10.94	7.2 S. 34° W.
Sandettié ...	24.12.38 (1740) to 25.12.38 (1830)	—	11.83	—	—	—	18.57	—	—	30.40	6.7 S. 35° W.
	17.12.38 (1150) ,, 18.12.38 (1240)	—	13.87	—	—	—	9.63	—	—	23.50	4.2 N. 35° E.
	14.1.39 (1020) ,, 16.1.39	—	—	—	—	—	—	—	—	—	—
	16.1.39 (1200)*	—	14.61	—	—	—	7.76	—	—	22.37	6.8 N. 35° E.
	28.1.39 (2110) ,, 29.1.39 (2200)	—	8.01	—	—	—	10.07	—	—	18.08	2.1 S. 35° W.
	13.2.39 (0850) ,, 14.2.39 (0940)	—	9.61	—	—	—	11.00	—	—	20.61	1.4 S. 35° W.
Royal Sovereign...	24.12.38 (1920) to 25.12.38 (2010)	—	—	5.47	—	—	8.74	—	—	14.21	6.2 S. 4° E.
	17.12.38 (1330) ,, 18.12.38 (1420)	—	—	6.64	—	—	4.98	—	—	11.62	4.7 S. 53° E.
	14.1.39 (1200) ,, 15.1.39 (1250)	—	—	7.71	—	—	3.40	—	—	11.11	5.8 S. 77° E.
	15.1.39 (1250) ,, 16.1.39 (1340)	—	—	10.78	—	—	3.69	—	—	14.47	8.6 S. 83° E.
	28.1.39 (2340) ,, 30.1.39 (0030)	—	—	2.80	—	—	8.31	—	—	11.11	6.6 S. 17° W.
	13.2.39 (1210) ,, 14.2.39 (1300)	—	—	2.99	—	—	5.09	—	—	8.08	3.7 S. 2° E.

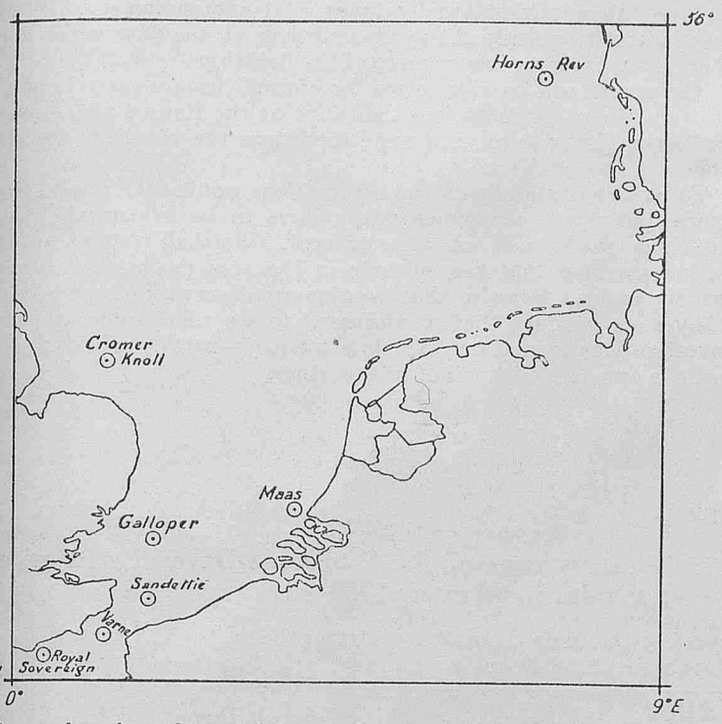


Chart showing the positions of some of the Lightvessels engaged in continuous current measuring.

Sea is strengthened by following winds, and can be impeded to the point of reversal by head winds or by winds from the N.W. quadrant.

There *can* be, however, a towards-North Sea flow through Dover Straits during strong S.E.'ly wind conditions, little different from that taking place at times of heavy S.W.'ly weather. The circulation in the Southern Bight of the North Sea is (as would be expected) very different in the two cases—and so too are the streams elsewhere than in the Straits.

The latter, being only a narrow connection between two large bodies of water, the water movements past the Varne are decided by conditions away to the N.E. and S.W.

In what follows, we shall restrict attention to the five lightships named on the left-hand side of the chart. At all of them, the depth of observation was 1½ fathoms.

At the Varne lightvessel, the water movements have been continuously observed for a much longer time than at any of the others, but observations made there by means of the Vertical Log go back only to March, 1938—and it is to such that we shall restrict attention here.

It would be a matter of considerable difficulty, and it is not necessary for the purpose in view, to say with any degree of confidence what are the average conditions as to rate and direction of flow past the various lightvessels. We have enough data to warrant the presentation of something in the nature of averages, but this is not the place to go into the degree of detail which would be necessary if we intended to give proper weight to frequency of direction. That would be essential to avoid the shortcomings of simple vector averages which would weight the values too much towards months in which there chanced to have been a very strong flow.

TABLE 2.

Wind Strength (Beaufort Numbers) and Direction as logged aboard four of the Lightvessels named on the Days considered.

Lightvessel	Date.	Hour.							
		3 a.m.	6 a.m.	9 a.m.	Noon.	3 p.m.	6 p.m.	9 p.m.	Midnight.
Cromer Knoll ...	24.12.38	4–5 E.N.E.	5–6 E.N.E.	4–5 E.N.E.	3–4 E.	4–5 E.S.E.	3–4 E.	4 E.N.E.	3 E.S.E.
	25.12.38	3 E.	3 E.	3 N.E.	2 E.N.E.	1 S.E.	2 S.S.E.	2 W.S.W.	2 W.
	17.12.38	6–7 S.E.	5–6 S.E.	5–6 S.E.	5–6 E.S.E.	6–7 E.S.E.	6–7 E.S.E.	6–7 E.S.E.	6–7 E.S.E.
	18.12.38	6–7 E.S.E.	6–7 E.S.E.	6–7 E.S.E.	6–7 S.E.	7–8 E.S.E.	7 E.S.E.	6–7 E.S.E.	6–7 E.S.E.
	15.1.39	4 S.W.	4 S.S.W.	5 W.S.W.	5 W.S.W.	5 W.S.W.	4 S.S.W.	6 S.S.W.	6 S.S.W.
	16.1.39	6 S.S.W.	5–6 S.S.W.	5 S.W.	6 S.W.	5–6 S.W.	4 S.W.	5 S.W.	4 S.W.
	29.1.39	4–5 E.	4–5 E.	5–6 E.	5–6 E.	5–6 E.	5–6 E.	5 E.	5 E.
	30.1.39	5 E.	5 E.	4–5 E.	4 E.	4 E.N.E.	3–4 E.N.E.	4 E.	4 E.
	13.2.39	5–6 W.	5–6 W.N.W.	5–6 N.W.	5 W.N.W.	5 N.W.	4 N.W.	3 N.	2 N.
	14.2.39	3 N.	2 N.W.	2 W.N.W.	2 W.	3 W.S.W.	3 W.	4 W.S.W.	4 W.S.W.
Galloper	24.12.38	5 N.E.	5 N.E.	5 N.E.	5–6 N.E.	6–7 N.E.	6–7 N.E.	6–7 N.E.	6–7 N.E.
	25.12.38	6–7 N.E.	6–7 N.E.	6 N.E.	4 N.E.	4 N.E.	4 N.E.	3 N.E.	2 N.E.
	17.12.38	5 S.E.	5 S.E.	5–6 S.E.	5–6 S.E.	5–6 S.E.	6–7 S.E.	6–7 E.S.E.	6–7 E.S.E.
	18.12.38	6–7 S.E.	6–7 S.E.	6–7 E.	7–8 E.	7–8 E.S.E.	7–8 E.	7–8 E.	6–7 E.
	15.1.39	5–6 S.W.	6–7 S.W.	6–7 S.W.	6 S.W.	6 S.S.W.	6 S.	6–7 S.W.	7–8 S.W.
	16.1.39	7–8 S.W.	6–7 S.W.	6–7 S.W.	6 S.W.	6 W.S.W.	6 S.W.	4–5 S.W.	7–8 S.W.
	29.1.39	6–7 E.N.E.	6–7 E.N.E.	6–7 E.N.E.	6–7 E.N.E.	6–7 E.N.E.	6–7 E.N.E.	6–7 E.	6–7 E.
	30.1.39	6–7 E.N.E.	6–7 E.N.E.	6–7 E.	6–7 E.	6–7 E.	6–7 E.	6–7 E.	6 E.
	13.2.39	5 W.	5–6 W.	5 W.N.W.	5 W.N.W.	5 W.N.W.	5 N.W.	4 N.W.	4 N.W.
	14.2.39	4 N.W.	4 N.W.	3 N.	3 N.N.W.	3 W.S.W.	3 W.S.W.	3 W.S.W.	4 W.S.W.
Varne	24.12.38	4 N.E.	4 N.E.	4 N.E.	5 E.	5 E.S.E.	4 E.S.E.	4 E.S.E.	4 N.E.
	25.12.38	5 N.E.	5 N.E.	6 N.E.	6 N.E.	4 E.	3 E.	3 E.	3 E.
	17.12.38	3 S.S.E.	3 E.	3 E.	4 E.	4 E.	4 E.	4 E.	5 E.
	18.12.38	5 E.S.E.	5 E.S.E.	6 E.S.E.	6 E.S.E.	6 E.S.E.	6 E.S.E.	6 E.S.E.	6 E.S.E.
	15.1.39	5–6 S.	5–6 S.	6–7 S.	5–6 S.W.	4 S.W.	6–7 S.	6–7 S.	—
	16.1.39	6–7 S.W.	5–6 S.W.	5–6 W.S.W.	5–6 W.S.W.	5–6 S.W.	6–7 S.W.	6–7 S.S.W.	6–7 S.S.W.
	29.1.39	4 E.	5 N.E.	6 N.E.	6 E.	5–6 E.	5–6 E.	4–5 E.	4–5 E.
	30.1.39	6 E.	6 E.	5 E.	4 E.	4 E.	4 E.	4 E.N.E.	4 N.E.
	13.2.39	4 W.	4 W.N.W.	4 N.N.W.	4 N.N.W.	4 N.N.W.	3 N.N.W.	3 N.N.W.	3 N.N.W.
	14.2.39	3 N.	2 N.	2 N.	1 S.E.	0 Calm	2 W.	2 W.	3 W.
Royal Sovereign ...	24.12.38	4 N.E.	5 N.E.	5 N.E.	5 N.E.	5 N.E.	5 N.E.	4 N.E.	5 N.E.
	25.12.38	6 N.E.	6 N.E.	6–7 N.E.	6 E.N.E.	4 E.	4 E.	3 E.	3 E.
	17.12.38	3 S.E.	4 S.E.	4 S.E.	4 E.S.E.	4 E.S.E.	4 E.S.E.	5 S.E.	5 E.S.E.
	18.12.38	6 E.S.E.	6 E.S.E.	6 E.S.E.	7 E.S.E.	6–7 E.	6–7 E.	7 E.	8 E.
	15.1.39	6 S.W.	6 S.W.	6 S.W.	6 S.W.	5 S.W.	6 S.W.	7 S.W.	7–8 S.W.
	16.1.39	7 S.W.	6–7 S.W.	7 S.W.	7 S.W.	6–7 S.W.	6 S.W.	7 S.W.	7 S.W.
	29.1.39	5 E.	6 E.	6 S.E.	6–7 E.	6–7 E.	6 E.	6 E.	6 E.
	30.1.39	6 E.	6 E.	5 E.	5 E.	5 E.	6 S.E.	6 S.E.	6 S.E.
	13.2.39	5–6 W.N.W.	6 W.N.W.	5 W.	5 N.W.	4 N.W.	4 N.N.W.	3 N.	3 N.
	14.2.39	3 N.	3 N.	2 N.	2 N.	2 W.	2 W.	3 W.N.W.	3 W.

What is of chief interest, and what suffices here, is to contrast the streams and overall sets during the prevalence of winds from different directions. In the accompanying table certain data are given which permit this to be done. It happens that the different ships do not observe in step with each other; it is not possible to select records from the various ships day for day and centred on the same clock time. This, and other considerations, has rather limited our choice of occasions suited to display what we wanted to display. We have had to search through the records of Winter, 1938-39, to select cases which were as little apart in time as possible, and which yet relate to days when the wind conditions were most alike at all the five places. Had we been concerned primarily to compare wind and water movements at each ship individually, we could have set down greater contrasts than those presented in the first table. We have given some more striking contrasts between observed streams in Table 3—where no account was intentionally taken of contemporaneity. It would be of interest to study the wind conditions on the days which appear there as common to two or more of the lightships.

The reader will be able to see for himself (from TABLE 1) how the streams ran past the various lightships at the times stated, and will see (from TABLE 2) to what wind conditions the contrasts are ascribable.

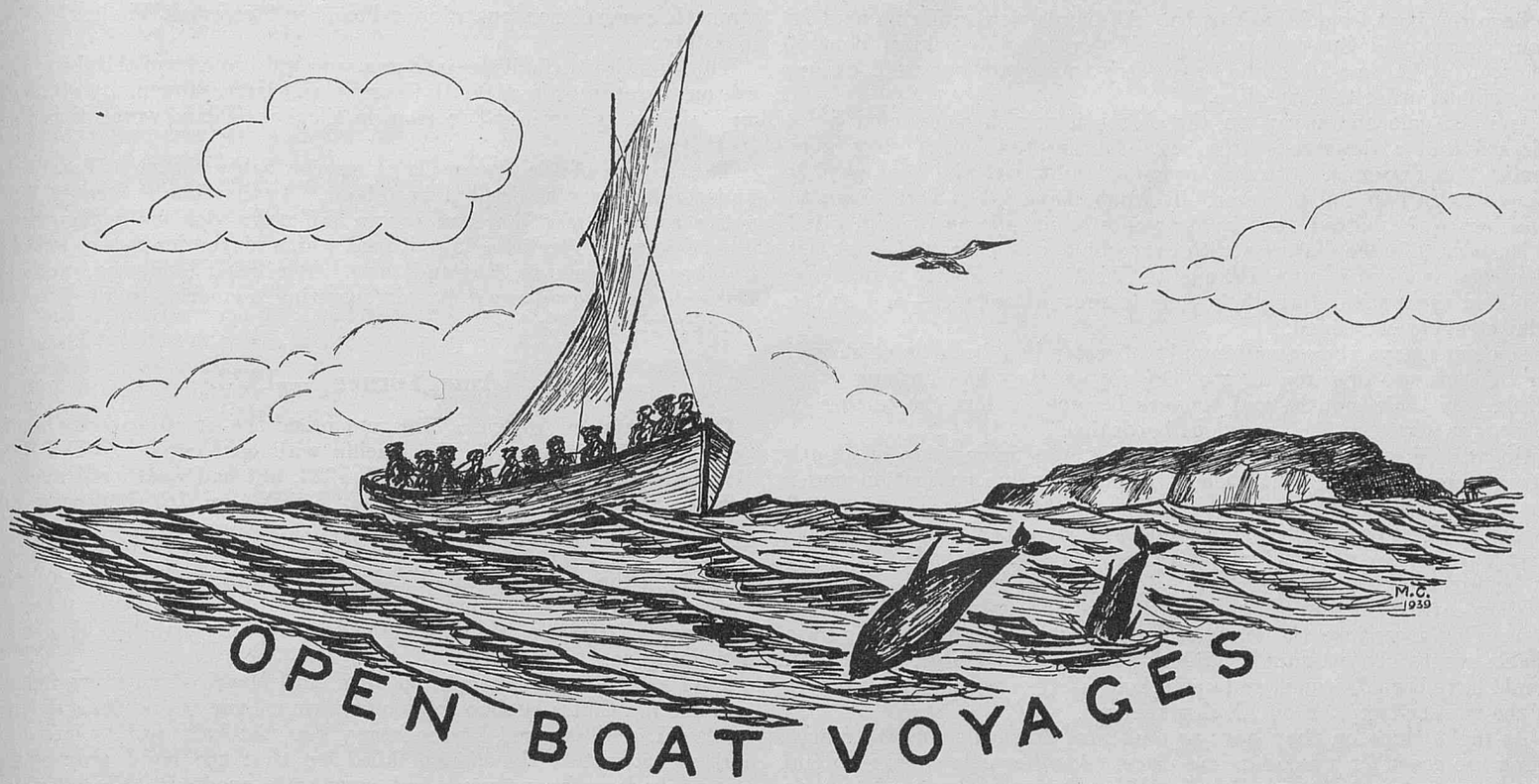
To comment usefully on the observations would take a good deal of space and much would necessarily have to be left unsaid that an interested reader will notice for himself. We shall content ourselves with remarking that the currents in the area dealt with change so greatly and so quickly, that continuous observations are essential. They vary so much that it is difficult to see what value attaches to investigations carried out over brief periods—particularly if no observations are made at times of bad weather.

TABLE 3.

Showing (in Sea-miles per Lunar Day of two tidal periods) notable excess runs of the "towards-Dover" streams over the "from-Dover" streams and *vice versa* during Winter, 1938-39.

(NOTE.—A glance at the small chart after noting the main directions concerned in Table 1, will show what is meant by towards and from Dover.)

Lightship.	Observation Day	Towards Dover Excess.	From Dover Excess.
Cromer Knoll	23.1.39 (1940) to 24.1.39 (2030)	7.09	—
	5.12.38 (0340) ,, 6.12.38 (0430)	4.22	—
	17.12.38 (1340) ,, 18.12.38 (1430)	—	5.30
	25.1.39 (2120) ,, 26.1.39 (2210)	—	3.67
Galloper	29.1.39 (0830) to 30.1.39 (0920)	5.01	—
	18.2.39 (0020) ,, 19.2.39 (0110)	4.62	—
	14.1.39 (2050) ,, 15.1.39 (2140)	—	8.62
	4.12.38 (1130) ,, 5.12.38 (1220)	—	7.68
Varne	4.12.38 (1430) to 5.12.38 (1520)	17.66	—
	14.1.39 (2350) ,, 16.1.39 (0040)	17.59	—
	27.12.38 (0850) ,, 28.12.38 (0940)	—	11.32
	12.2.39 (2310) ,, 13.2.39 (2400)	—	7.20
Sandettié	19.12.38 (1330) to 20.12.38 (1420)	12.55	—
	21.12.38 (1510) ,, 22.12.38 (1600)	7.14	—
	22.2.39 (1620) ,, 23.2.39 (1710)	—	8.49
	31.12.38 (2330) ,, 2.1.39 (0020)	—	7.62
Royal Sovereign	22.2.39 (1940) to 23.2.39 (2030)	7.38	—
	15.1.39 (1250) ,, 16.1.39 (1340)	7.09	—
	28.1.39 (2340) ,, 30.1.39 (0030)	—	5.51
	19.12.38 (1510) ,, 20.12.38 (1600)	—	4.45



OPEN BOAT VOYAGES

Prepared by Commander M. Cresswell, R.N.R.

(*Continued from page 58 of the April, 1939, number.*)

"Endurance"—1916.

It will be remembered that the *Endurance* was one of the ships of the Imperial Trans-Antarctic Expedition, commanded by Sir Ernest Shackleton, and in the Autumn of 1915 she was crushed in the ice of the Weddell Sea and had to be abandoned.

For six months the party of twenty-eight men, camped on the moving ice-floes, had to endure the greatest hardships and peril before they finally escaped from the ice pack in their three boats. They landed on 15th April, 1916, at a narrow beach on the barren rock known as Elephant Island.

Being right out of the track of any possible search-parties, with provisions running low and all hands worn out and exhausted by privation, Shackleton decided to take a picked crew and use the only seaworthy boat, the *James Caird* (so named after Sir James Caird, a generous supporter of the expedition) and make for the Norwegian Whaling Station on South Georgia, 800 miles away, and then if successful to return in a ship and rescue the men remaining on Elephant Island.

This decision was probably one of the most desperate ever undertaken and the boat was prepared for its hazardous voyage across part of the Southern Ocean by fitting a mast as a girder fore and aft, decking over with sledge runners and box sections, the whole being covered with canvas nailed down. An opening was left in this flimsy deck for the helmsman, and from which the sails on the two short masts could be worked.

The boat was ballasted with sand sewn up in blankets and stowed in the bottom with a number of heavy boulders. Shackleton with Commander Frank Worsley, R.N.R., as navigator, and four other men formed the crew, and stores sufficient for one month were taken. These consisted of biscuits, nut food, sugar, tinned milk, beef cubes and a supply of fresh water. Hot food being absolutely essential owing to the intense cold, it was necessary to include two Primus stoves and a stock of paraffin oil. Each man was warmly clad and had his sleeping bag. Worsley had his sextant, books and chart, also two chronometer watches, which fortunately, after months on the ice were still serviceable and accurate.

It was a race against time to make ready as the ice pack was creeping nearer and nearer to the island and blizzards sometimes confined them to their tents for hours on end. The voyage was at length started on 24th April and by late afternoon they were clear of the pack with open water before them, and running before the Westerly wind a course was set for South Georgia.

The discomfort of these men must have been intense for to move about in the boat they had to crawl under the thwarts in the semi-darkness. The canvas deck could not be made tight, and seawater penetrated everywhere making baling almost a continuous operation. One man would steer at the tiller for two hours and then when relieved would crawl out of the way into his sleeping bag. Tossed about on the sacks of sand and stone boulders, bruised by the boxes and packages of stores, the men's bodies in their soaking wet sleeping bags were rubbed raw in parts, yet with all this hardship the party continued to keep cheerful, and in spite of never-ending gales managed somehow to get their meals regularly.

It was found that three men were necessary to prepare a hot meal, squatting or kneeling below the deck covering. One held the Primus, while the other two hung on to the cooking pot, lifting it about as the movements of the boat demanded. As Shackleton said "a drink of hot milk or a pannikin of hot food made optimists of them all."

The formation of ice on the canvas deck was a constant source of danger as the additional top weight made the boat cranky and caused loss of buoyancy and speed. It was necessary to chip the ice away, a most dangerous and unpleasant operation.

Good progress was made until the fourth day when the gale had increased to such force that it was unsafe to continue running. The boat was accordingly hove-to and for the next forty-eight hours they rode to a sea-anchor. Then the painter by which they were riding carried away and as no more gear was available there was no choice but to resume running before the wind. A rag of sail was set and their efforts proved successful, then on the morning of the seventh day out Worsley was able to get sights and found that they were nearly half way to their destination, which news cheered everyone tremendously.

It continued to blow hard and unceasing care had to be exercised

to keep the boat from broaching to. All hands were suffering acutely from cramp and SHACKLETON himself developed a painful bout of sciatica. It became absolutely necessary to prepare hot milk during the night in order to keep alive.

Another gale sprang up on the eleventh day, accompanied by a blizzard and a dangerous cross-sea. During that night they were almost "in extremis," the seas sweeping right over the boat until it was actually half full of water. It would have taken little more to send her to the bottom, but by desperate baling she once again lifted to the seas. In the darkness with everything soaking wet they at last succeeded in drying out a Primus and heating some milk which just provided them with strength in time to prevent collapse—and so the grim struggle continued.

For some days their small supply of water had been brackish and for the last two or three days of the voyage they had nothing fit to drink. As their mouths and tongues became swollen the torture of thirst was added to their previous hardships.

On 8th May, the fourteenth day out, the mountains of South Georgia were sighted right ahead. WORSLEY'S fine navigation under almost impossible circumstances had given them as exact a landfall as could be expected in a liner under ideal conditions. But their boat voyage was not yet completed as a safe landing place had yet to be found.

They carried on towards the shore but found only forbidding cliffs descending sheer into the sea with huge waves breaking all along the visible coast. To attempt a landing here was impossible, every man would have been drowned, and upon their safety depended also the lives of the twenty-two men on Elephant Island.

As night came on they hove-to and next day continued to search along the coast for a safe landing place. Another gale sprang up and they were in great danger of being either driven ashore or blown to leeward of the island, with little if any hope of beating back again.

The pangs of thirst were forgotten in their last desperate struggle, but they won safely through as on the morning of 10th May the gale subsided and later a small indentation in the shore was noticed, which it was decided to close. This proved to be what is known as King Haakon Bay, and at dusk in sailed the little *James Caird* until her keel scraped on the beech. Being too weak to drag their boat ashore they made it fast to a rock, and in a short time the party were drinking their fill from a glacial stream close by.

Here this remarkable boat voyage of seventeen days came to an end, and the further adventures of these heroic explorers cannot be included in the present article, an account of which has already appeared in the April, 1938, number of THE MARINE OBSERVER. Sufficient here to mention that SHACKLETON and two companions after regaining their strength, crossed the mountains and reached Stromness Whaling Station in safety.

The next day a small steamer was sent and brought in the three men left on the other side of South Georgia, and later, after many attempts and failures, the twenty-two men on Elephant Island were rescued on 30th August.

The voyage of the *James Caird* was probably the most hazardous undertaking ever attempted in a boat. At the time it created little notice as the Great War was raging and news took many months to filter through. The little 22-foot boat which played its part so stoutly, was brought back to England, and, after being exhibited, went to Dulwich College, where it lies an inspiring memorial to the boys of SHACKLETON'S old school.

"Amy Turner"—1923.

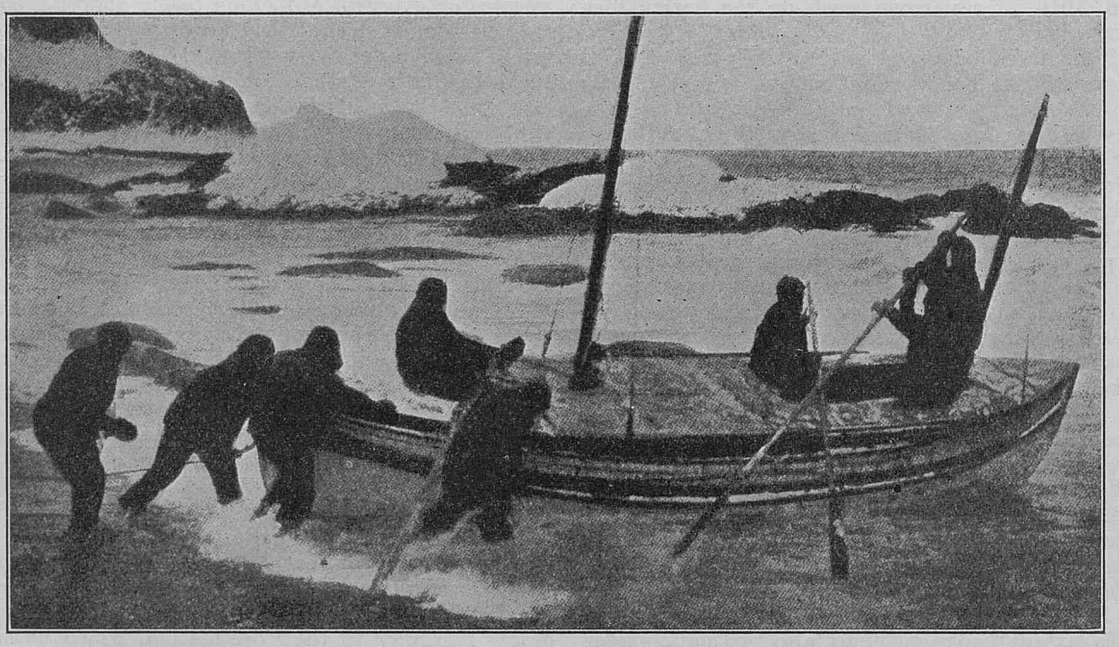
Old traders to Australia will remember the small barques which used to make voyages in the Pacific with coal cargoes. The *Amy Turner* was nearly fifty years old in 1923, but had weathered many a storm. She sailed from Newcastle, N.S.W., on 7th February, for Manila, commanded by Captain NIELSON, and carried a crew of fourteen all told. The Captain's wife also happened to be on board.

Early in the passage a small leak developed, but as this was a fairly common occurrence in these ancient craft, little notice was taken of it, as the water was easily kept under by the pumps, worked by a small petrol engine.

Fine weather was encountered until 23rd March when every indication showed that a typhoon was overtaking them. Conditions quickly worsened, and strained by the heavy seas the leak rapidly increased and unfortunately the engine failed, so that the hand gear of the pumps had to be manned and constantly worked. Realizing the difficulty of keeping his ship afloat Captain NIELSON made for that same island of Guam in the Ladrones, which has figured so many times in previous accounts of boat voyages.

The *Amy Turner* arrived off Guam on the 26th and although only about two miles from the wireless station and flying signals of distress it was not found possible to attract attention. Progress towards the harbour could not be made against the mountainous seas, which were now working havoc with the strained little barque. The after-boat was smashed out of its davits and the men at the pumps had to be lashed there to prevent them from being carried away by the huge seas sweeping over the vessel.

On the following day the two lifeboats were made ready as Captain NIELSON realized that it would not be long before his vessel filled and sank. At length he gave the order to man the boats and whilst this



Launching the "James Caird" at Elephant Island.

(Reproduced by permission of Messrs. Wm. Heinemann, Ltd.)

was being attempted he remained on the poop with his wife. Suddenly the *Amy Turner* gave a heavy lurch and commenced to settle rapidly by the head, whilst great seas swept over her, washing everyone overboard and setting the two boats adrift.

Four men only succeeded in reaching the starboard boat as it was being rapidly carried away before the wind and sea. The remainder of the ship's company, including Mrs. NIELSON were drowned and the port boat was never heard of again.

The four survivors consisted of CORNISH the boatswain, and three seamen, one of whom, WEST by name, though sailing as an A.B. happened to possess a Master's Certificate. Luckily this boat contained, in addition to its compass, a sextant, chart, nautical almanac and tables, together with the usual lifeboat's equipment, biscuits, tinned meat, a little brandy and a breaker of fresh water.

The first pressing need was to keep their boat afloat as she was nearly full of water. Constant baling was necessary and the sea anchor was quickly rigged. From the morning of 27th March when the *Amy Turner* foundered until the evening of the 29th, only continuous baling kept the boat afloat, and it was during this trying time that the brandy, used during the dark hours, kept heart in the men to carry on.

By the 30th the wind had moderated and the sun came out so that WEST got a fairly accurate latitude and estimated position. It was decided to steer for Guam which was reckoned to be within two days sailing, but by 2nd April, when WEST again got a position, he found to everyone's dismay that they had been set far to leeward of Guam.

As it was impossible to work to windward in their small boat, and with but a very vague idea as to the longitude they were in, their only option was to run before the wind in a westerly direction towards the Philippines, with the possibility of calling at Uluthi Island for provisions and water on the way.

With the previous expectation of making Guam within a few days no great care regarding the food and water in the boat had so far been observed, the result being that their supplies were now almost exhausted. These men were lucky, however, as on 7th April heavy rain fell which enabled them to drink their fill and also to replenish the water breaker.

On the following day a dolphin was caught which greatly added to their small stock of food. They also suffered a bitter disappointment on this day, 8th April, as the smoke of a steamer was sighted, but in spite of burning signal lights they were not seen and after some hours of intense excitement the smoke disappeared and once more they were forced to settle down to their miserable existence.

All were suffering acutely from the combined effects of the sun, spray and thirst, and if the large fish had not been secured starvation would also have been added to their hardships. Some relief from the heat was obtained by soaking their clothes in the sea and keeping them wet on their bodies. A further disappointment was the missing of Uluthi Island during the darkness one night, so now their only hope was to reach the Philippines before starvation or thirst overcame them.

By the seventeenth day out their water was again almost finished but two days later heavy rain once more saved them. So they sailed on and on with hope almost dead, as now their food was exhausted and starvation threatened them unless land was reached or a vessel encountered.

But WEST made a good landfall as at daybreak on 19th April Malhon Island was sighted. They steered for it but owing to a strong current it took some hours at the oars before they succeeded in beaching the boat. They were so exhausted that they just crawled up the beach and fell asleep. Upon the following day some natives discovered them and supplied welcome food and drink, later taking them by canoe to the large island of Leite, where they were most kindly treated and soon recovered their health and strength. In due course they made their way to Manila and thence to Australia.

This boat voyage of 1,600 miles in twenty-four days being considered a unique example of fine seamanship, courage and endurance, it is gratifying to know that on their return to Australia, the Commonwealth Government presented a gold watch to CHARLES WEST and a silver watch to CLIFTON CORNISH, these being the first rewards of the kind ever to be made by the Government of Australia.

"Trevessa"—1923.

A voyage in ship's boats which also occurred in the same year as that of the *Amy Turner* previously described, but which on account of wireless telegraphy attracted World-wide notice was that of the two boats of the S.S. *Trevessa*.

This vessel left Fremantle, homeward bound via the Cape, on 25th May, 1923. She was commanded by Captain CECIL FOSTER, her crew consisted of forty-four hands all told (white seamen and native firemen), and she carried a bulk cargo of zinc concentrates, a mixture of various ores in the form of half-set cement, which had been loaded at Port Pirie.

Bad weather was encountered for most of the time but by 3rd June they were about half-way across the Indian Ocean. During that night the sound of water swishing about in the forward hold was heard and it was quickly realized that a leak in the shell plating below the water line abreast of number 1 hold had developed.

It was obvious that the vessel was in a critical condition as rapid investigation showed that the water in the hold was rising rapidly, yet the tanks were dry and the pumps would fetch no water. In spite of every endeavour by all hands to locate the leak, and keep the water under, their labours were useless and Captain FOSTER was forced to consider the probability of his ship sinking by the head.

He therefore ordered the wireless operator to send out an S.O.S. message and for the two starboard lifeboats to be made ready. It was fortunate that Captain FOSTER had had previous experience in boats as he had been torpedoed in a ship during the War and spent ten days in a boat, during which time twelve of the crew died of exposure. This experience now stood him in good stead and in the short time available he had the most necessary things added to the equipment and stores already in the boats.

These additional items consisted of an extra breaker of fresh water, tins of biscuits, cases of condensed milk, cartons of cigarettes, tobacco and matches, chart, sextant and navigation books. The canvas boat covers were also taken and later proved invaluable as sleeping shelters and for catching rain-water. Unfortunately in the haste to leave the ship the chronometers were not included.

As before mentioned almost continuous bad weather had been experienced since leaving Fremantle, and at the time of the disaster a gale was blowing accompanied by a very high sea. All hands had their life-jackets on and when the vessel had submerged so far that the fore deck was awash, the hazardous operation of getting the boats clear of the ship in the darkness was safely accomplished.

The boats kept near the ship until she foundered at 2.45 a.m. on 4th June, less than three hours since the inrush of water had been detected.

Before Mr. LAMONT, the wireless operator, left his post he had the satisfaction of being able to report to Captain FOSTER that three steamers had answered his S.O.S. These were the *Runic*, *Tregenna*, and *Trevean*, the two latter being vessels of the same company as the *Trevessa*. Unfortunately the operator had no means of knowing how far off these ships were, and as it so happened considerable distances separated them. Actually the *Tregenna* and *Trevean* searched two weeks for the *Trevessa's* survivors.

Captain FOSTER took charge of number 1, and the Chief Officer, Mr. STEWART SMITH, number 3 boat. In the Captain's boat were the third officer, chief and third engineers, the wireless operator, the carpenter and fourteen others, twenty in all. Number 3 boat contained the second officer, two engineers and twenty others, twenty-four all told.

The first day in the boats was spent riding to sea-anchors but as no rescue vessel appeared it was decided to sail in company and endeavour to make the island of Rodriguez, or failing that Mauritius, distant approximately 1,700 miles.

The boats proceeded together for several days and a set routine of watches and rationing was instituted by Captain FOSTER. The rations served out in each boat were as follows :—

8 a.m.	One cigarette-tin lid of condensed milk per man and one biscuit.
2 p.m.	One-third of cigarette tin of water per man.
4 p.m.	One cigarette-tin lid of condensed milk per man.

As the compasses were found to be of little use, all steering had to be by the sun and stars, which made the keeping of a good reckoning most difficult.

It was found that number 1 boat sailed much faster than number 3, so Captain FOSTER decided to proceed alone, and on the morning of 9th June the boats separated with a parting cheer and soon lost sight

of each other. On this day some rain fell but as everything was soaked with salt water none could be caught.

As we must now consider the boats separately a description of the remainder of the voyage of the Captain's boat will first be given. Captain FOSTER wrote a full description of the happenings each day and extracts from his log have already appeared in THE MARINE OBSERVER, June, 1924, number. It was owing to his book " 1,700 Miles in Open Boats " that such a detailed account of the voyage of this boat is available.

In expectation of further rain some ingenious chutes were made from the biscuit tins by cutting pieces about ten inches square, and bending the lower corners in to form a small lip in the middle of the bottom edge. Their need for fresh water was great but it was not until 14th June that rain again fell, when heavy showers enabled them to collect quite a lot of water by sitting bareheaded with the hair pulled down over the face, the chute held under the chin with the lip on its lower edge led into a tin. Catching rain-water by means of the sail or boat cover was not resorted to in this boat as it was thought that the canvas was too saturated with salt.

Devices used to combat thirst consisted of drawing salt water into the nostrils and blowing it out again, care being taken not to allow any to get back into the throat ; wetting the head and neck with sea-water, and keeping them wet; also, sucking buttons or other small articles afforded some relief. After several days in the boat all had their mouth and tongue thickly coated with white slime, and it was found impossible to eat dry biscuit, so dry were their mouths that after chewing for a while the biscuit could be blown out like dust. Their only alternative was to soak the biscuit in salt water, this being, however, against the advice of the Captain.

The progress of the boat was eagerly followed by the men, and the announcement of the run each noon invariably had a heartening effect on the crew. Some bad weather was encountered and the sea-anchor and oil had to be used. It was found when running that two small tins of oil fastened on the quarters, and the oil allowed to drip slowly from small holes punched in the tins, worked with entire success. The supply of oil had, however, to be strictly conserved, as it was also used to rub their blistered and swollen feet.

The men slept beneath the boat cover, on lifebelts spread under the thwarts. Their physical troubles were mainly cramp and general weakness, but, notwithstanding all the hardships encountered, discipline and good temper prevailed and all kept reasonably cheerful, encouraged by Captain FOSTER and the Chief Engineer, Mr. ROBSON. Exercise of any sort, except baling, was impossible for even to stand up in the boat was dangerous. Those who took turns at steering suffered from headaches, through constantly looking in the direction of the sun.

On the thirteenth day out a high sea was running and in a heavy squall the boat broached to and half filled. It was a critical situation but all hands baled hard with every available tin and fortunately the fresh water was unharmed and the boat got safely before the wind again.

After seventeen days, on 20th June, the first death occurred, one of the Indian firemen, and the following day another, an Arab, died. It was evident that the exposure and privations were now telling upon the coloured men who did not possess the strength and endurance of the Europeans.

Without a chronometer the navigation reverted to the primitive method of continually obtaining the latitude and keeping a careful reckoning of the course and distance made good. The great danger was that Rodriguez Island in latitude 19° 41′ S., longitude 63° 23′ E. might be passed during the dark hours. Captain FOSTER offered the reward of a tin of water to the first man to sight land, as by the twenty-first day in the boat he was getting very anxious, for owing to bad weather and the necessity of keeping before the wind they had run nearly fifty miles north of the parallel on which lay Rodriguez.

Keeping the tiller himself for many hours on end, Captain FOSTER edged to the southward as far as the dangerous seas would permit, until at 2·45 p.m. on 26th June, the twenty-third day in the boat, a shout from the carpenter that he had sighted land on the port bow put all doubts at rest. The promised tin of precious water was duly given to him and every effort made to close the land, which proved to be Rodriguez Island. By 8 o'clock, with the exception of the two native firemen who had previously died, all were safely ashore and moderately fit and well, though unable to use their legs.

When land was reached they still had a week's supply of biscuit and half a breaker of water left. Under the difficult circumstances the accuracy of the navigation was remarkable as the leeway, unknown currents and absence of an efficient compass must have made the estimation of course and distance very approximate, yet the correct landfall was made exactly as anticipated.

Now to return to the Chief Officer's boat which had separated from the other on the sixth day of the voyage. Their experiences were very similar to those in number 1 boat, and Mr. SMITH also wrote a daily record, but unfortunately his small supply of paper got damaged by water, so he was unable to continue.

The same routine of rationing and the various expedients for relieving thirst, which have been previously described when dealing with the Captain's boat were also used in number 3. Rain-water catching, however, was done by using chutes into tins direct from the sail, which from the salt in the canvas resulted in brackish water being collected, and this must have had some effect in adding to the sufferings of those in this boat.

During the night of 15th June a heavy sea swept into the boat, soaking all navigation books and even getting into the sextant box. This was disastrous as it all added to the great difficulties of taking observations from the unsteady boat in the heavy seas encountered day after day.

After fifteen days out the exposure commenced to take its toll and one of the Indians died, then another on the day following. By 23rd June Rodriguez Island was believed to be near but though a sharp lookout was kept no land was sighted. Mr. SMITH, therefore, had no choice but to halve their meagre ration allowance and carry on to the westward in an endeavour to make Mauritius, known to be easily visible from a great distance on account of the lofty Pieter Both mountain.

The flagging spirits of the crew were somehow kept up by the singing of choruses and the telling of stories when their dried throats allowed them to do so. Between the 22nd and 24th June, three of the Europeans died, and, on the 24th also, the second engineer unfortunately fell overboard. He stood up to reach his rain-catching tin during one of the squalls, when the boat gave a sudden lurch and his cramped legs caused him to lose his balance. The boat was running at the time and although immediately brought up into the wind, the sail lowered and oars manned, they were unable to rescue him.

To the great joy of everyone, land was at last sighted, by the fourth engineer on the afternoon of 28th June, twenty-five days after the abandonment of the ship. It was the high peak of Mauritius, but the island could not be made that night, during which the Chinese donkey-man died. On the morning of 29th June a safe landing was made on the south shore of the island and the trials of the survivors were over, except that the cook died after being taken to hospital.

Thus concluded the most recent of long boat voyages. The boats of the *Trevessa* became World famous, and number 1 boat was later sent to the British Empire Exhibition at Wembley in 1924, where the writer of these notes had the opportunity of examining this historical craft. Captain FOSTER'S boat covered 1,556 miles in 23 days and Mr. SMITH'S boat 1,747 in 25 days. H.M.S. *Colombo* carried Captain FOSTER and his party from Rodriguez to Mauritius where the survivors of the two crews met once again, and after recuperating proceeded to England.

The findings of the inquiry into the loss of the *Trevessa* stated :—

> " The court is unable to find words adequately to express its members' admiration of the fine seamanship and resolution of the officers and the splendid discipline and courage of the crew, both European and non-European."

When they arrived home Captain FOSTER and Mr. SMITH were received by his Majesty the KING at Buckingham Palace. Medals and honours were also waiting for them and testimonials were given to all the officers and men. After all, even in modern post-war days, with the assistance of wireless telegraphy and steamers searching for them, the fact emerges that as in the past, it was seamanship, navigation, courage, endurance and good discipline that saved the lives of the crew of the *Trevessa*.

WIRELESS WEATHER SIGNALS.

1.—SHIPS' WIRELESS WEATHER SIGNALS.

Request for Information.

THE ATTENTION OF METEOROLOGICAL SERVICES IS DIRECTED TO THE INVITATION GIVEN ON PAGE 28 OF VOL XVI, NO. 133, JANUARY, 1939.

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

A full description of the world-wide system of voluntary "Selected Ships" routine weather reports with instructions was given on pp. 28-41 of the January number of this volume of THE MARINE OBSERVER.

The following list contains the latest information of stations to which "A Selected Ships" should address their reports when within range. When not within range of any of these stations their reports should be addressed to C.Q. on 2100 metres in accordance with the above-mentioned instructions.

Ocean.	Station.	Position.	Call Sign.	Frequency and Wave Length. For Station to call up "Selected Ships."	Frequency and Wave Length. For "Selected Ships" to report to Station.	Area and limits covered by Station.	Telegraphic address of Meteorological Centre.	Information required—Limit of Groups.	Notes.
Column No. 1.	*No. 2.*	*No. 3.*	*No. 4.*	*No. 5.*	*No. 6.*	*No. 7.*	*No. 8.*	*No. 9.*	*No. 10.*
North Atlantic and North Sea.	Portishead.	Lat. 51° 28′ 41″ N. Long. 2° 47′ 30″ W.	**GKU**	149 kc/s. (2013 metres) and 121 kc/s. (2479 metres) simultaneously	143 kc/s. (2100 metres).	North Sea and Eastern North Atlantic East of Longitude 40° W. but not within 300 miles of station. (*see* Chart of the World.)	Weather London.	Weather only, up to seven groups, preferably No. 3 Supplementary Groups.	"Selected Ships" chosen to report in given order during the following 24 hours are notified by station daily at 2300. This roll call is repeated at 0330, and 1030 G.M.T. Roll call thus—Weather London—call sign of chosen "Selected Ships" to report through GKU at schedule times on 2100 m. and observations for 0000 and 1800 G.M.T. as convenient. *See Note Below.*
North Atlantic and Mediterranean.	Gibraltar.	Lat. 36° 08′ 32″ N. Long. 5° 20′ 29″W.	**GYW**	125 kc/s. (2400 metres).	143 kc/s. (2100 metres).	Eastern North Atlantic, South of Lat. 37° N. and Mediterranean Sea.	Meteor Gibraltar.	Weather only. No. 3 Supplementary Groups.	All British "A Selected Ships" within area should report in accordance with Schedule.
North Atlantic.	Horta, Azores.	Lat. 38° 32′ N. Long. 28° 38′ W.	**CTG**	125 kc/s. (2400 metres).	125 kc/s. (2400 metres).	Those "A Selected Ships" not in the Roll Call for reporting to Weather London through Portishead, in the Eastern North Atlantic, east of Long. 40°W should report to this station.	Radio Horta.	Weather only, up to seven groups, preferably No. 3 Supplementary Groups.	"A Selected Ships" in the Eastern North Atlantic not on the roll call made through Portishead (described in these notes for Portishead) should report to Horta in accordance with schedule given in the instructions for British "A Selected Ships."
	Lagos.	Lat. 6° 26′ 45″ N. Long. 3° 21′ 34″ E.	**ZDN**	8840 kc/s. (33·94 metres).	143 kc/s. (2100 metres).	Between Lat. 20° N. and 10° S. and from the coast to Long. 20° W.	Meteo Lagos.	Weather only. Four universal groups and first two of No. 3 Supplementary Groups.	0600 G.M.T. observations only required Ships fitted for short-wave transmission, when unable to communicate with this station on 2100 m. (143 kc/s), are requested to transmit their message on 36·3 m. (8265 kc/s), repeating same to C.Q. on 2100 m. (143 kc/s) for the benefit of "All Ships."
	Louisburg.	Lat. 46° 09′ 16″ N. Long. 59°56′48″W.	**VAS**	143 kc/s. (2100 metres).	143 kc/s. (2100 metres).	North Atlantic West of Longitude 40° W.	Weather Toronto.	Weather only, preferably No. 3 Supplementary Groups.	All British "A Selected Ships" within area when bound to or from Newfoundland and Canadian ports or ports to the northward to report through VAS at schedule times and observations for 0000 and 0600 G.M.T. as convenient
	Chatham Mass.	Lat. 41° 43′ N. Long. 70° 47′ W.	**WCC**						All British "A Selected Ships" within area when bound to or from United States ports or ports to the southward to address their 0000 and 1200 G.M.T. observations to Observer Washington and their 1800 G.M.T. observations to CQ in accordance with schedule.
	Amagansett (Montauk).	Lat. 41° 00′ N. Long. 72° 03′ W.	**WSL**						
	Thomaston.	Lat. 44° 01′ N. Long. 69° 13′ W.	**WAG**		142·9 kc/s. (2098 metres).	North Atlantic West of Longitude 40° W.	Observer Washington	Weather only. First four groups of observations taken at 0000 and 1200 G.M.T. only required.	
	Jupiter.	Lat. 26° 56′ N. Long. 80° 06′ W.	**WMR**						
	Lake Worth.	Lat. 26° 38′ N. Long. 80° 03′ W.	**WOE**						
South Atlantic.	Slangkop (Cape Town)	Lat. 34° 08′ 46″ S. Long. 18° 19′ 18″E.	**ZSC**	—	143 kc/s. (2100 metres).	South Atlantic Westward of 25° E. and within a range of about 2,000 miles of station.	Met. Pretoria	Weather only, up to seven groups, preferably No. 3 Supplementary groups.	Only 0600 G.M.T. observation required. All British "A Selected Ships" within area should report, commencing at 0618 G.M.T.

NOTE—On and after 1st August, 1939, Portishead Radio will acknowledge Ships' Weather Reports on 2100 metres instead of 2479 metres as at present.

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

(Continued.)

Ocean.	Station.	Position.	Call Sign.	Frequency and Wavelength. For Station to call up "Selected Ships."	Frequency and Wavelength. For "Selected Ships" to report to Station.	Area and limits covered by Station.	Telegraphic address of Meteorological Centre.	Information required—Limit of Groups.	Notes.
Column No. 1.	*No. 2.*	*No. 3.*	*No. 4.*	*No. 5.*	*No. 6.*	*No. 7.*	*No. 8.*	*No. 9.*	*No. 10.*
South Atlantic (*continued*).	General Pacheco (Buenos Aires)	Lat. 34° 27′ 33″ S. Long. 58°37′35″W.	**LPD**	—	143 kc/s. (2100 metres).	Within a range of about 1,300 miles of station.	Meteoro Baires	Weather only. No. 6 Supplementary Groups.	
Red Sea and Indian Ocean.	Port Sudan.	Lat. 19° 36′ 35″ N. Long. 37°13′28″E.	**STP**	—	143 kc/s.† (2100 metres).	From Suez to Ras Fartak, Ras Hafun, and western limit of Colombo area.	Prognostic Khartoum.	Weather only. Four universal groups.	All British "A Selected Ships" within area should report in accordance with Schedule. †Alternatively see particulars on p. 114 and use wavelength and times for "B Selected Ships."
Indian Ocean.	Jacobs (Durban).	Lat. 29° 55′ 51″ S. Long. 30° 58′ 38″E.	**ZSD**	—	143 kc/s. (2100 metres).	Indian Ocean S. of 20° S. and Eastward of 25° E. and within a range of about 2,000 miles of station.	Met. Pretoria	Weather only, up to seven groups, preferably No. 3 Supplementary Groups.	Only 0600 G.M.T. observations required. All British "A Selected Ships" within area should report, commencing at 0618 G.M.T.
	Bombay.	Lat. 19° 04′ 55″ N. Long. 72° 49′ 54″E.	**VWB**	—	143 kc/s. (2100 metres).	Arabian Sea N. of line C. Comorin to Ras Fartak.	Obs. Weather.	Weather only, including No. 9 Supplementary Groups.	When settled weather conditions prevail in the Arabian Sea or Bay of Bengal, British "A Selected Ships" are requested to address their reports through these stations to "Obs. Weather" based on 0300 and 1200 G.M.T. observations only; their 0000 or 0600 G.M.T. observations being addressed to C.Q. according to schedule. During unsettled or disturbed weather conditions *All reports* should be addressed to "Obs. Weather" through these stations. (See Section (35), p. 32 of the January number.)
	Madras.	Lat. 12° 59′ 17″ N. Long. 80° 10′ 56″E.	**VWM**	—	143 kc/s. (2100 metres).	Bay of Bengal N. of line C. Comorin to Achin Head.	Obs. Weather.	Weather only including No. 9 Supplementary Groups.	
	Colombo.	Lat. 6° 55′ 14″ N. Long. 79° 52′ 46″E.	**VPB**	143 kc/s. (2100 metres).	143 kc/s. (2100 metres).	Indian Ocean South of a line Ras Fartak, C. Comorin and Achin Head, and within a range of about 1,500 miles.	Weather.	Weather only. No. 6 Supplementary Groups preferred.	All British "A Selected Ships" within area should report in accordance with Schedule. It is also desired that those ships fitted for transmission on short waves should repeat their routine messages through GYL (Kranji Singapore) on 23.16 metres (12950 kc/s) at 0030, 0830 and 1230 G.M.T. addressed to Obs. Weather Singapore.
	Mombasa.	Lat. 4° 03′ 11″ S. Long. 39° 39′ 49″E.	**VPQ**	—	125 kc/s. (2400 metres).	From Ras Hafun to Lat. 20° S. when westward of the Colombo area.	Weather Nairobi.	Weather only. No. 6 Supplementary Groups.	All British "A Selected Ships" within area should report 0600 G.M.T. observations.
	Perth.	Lat. 32° 01′ 51″ S. Long. 115° 49′31″E.	**VIP**	125 kc/s. (2400 metres).	143 kc/s. (2100 metres).	Indian Ocean and Southern Ocean between Long. 90° and 135° E.; but not within 100 miles of the coast.	Weather Melbourne and Weather Perth.	Weather only. No. 9 Supplementary Groups.	All British "A Selected Ships" within area should report in accordance with Schedule. Reports not required for observation times not starred on Chart, p. 30 of the January number.
North Pacific and China Sea.	Cape d'Aguilar, Hong Kong.	Lat. 22° 12′ 39″ N. Long. 114°15′11″E.	**VPS**	8330 kc/s. (36 metres) or 500 kc/s. (600 metres).	143 kc/s.* (2100 metres).	China Sea and North Pacific to about 1,500 miles from station.	Royal Observatory	Weather only No. 9 Supplementary Groups.	All British "A Selected Ships" within area should report in accordance with Schedule. *Alternatively see particulars on p. 115, and use wavelength and times for "B Selected Ships."
South Pacific.	Sydney.	Lat. 33° 46′ 00″ S. Long. 151° 03′09″E.	**VIS**	125 kc/s. (2400 metres).	143 kc/s. (2100 metres).	S. Pacific Coral and Tasman Seas and Southern Ocean between Long. 135° and 160° E.; but not within 100 miles of the coast.	Weather Melbourne and Weather Sydney.	Weather only. No. 9 Supplementary Groups.	All British "A Selected Ships" within area should report in accordance with Schedule. Reports not required for observation times not starred on Chart, p. 30, of the January number.

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

A full description of the world-wide system of voluntary "Selected Ships" routine weather reports with instructions was given on pp. 28–41 of the January number of this volume of THE MARINE OBSERVER. This information is also contained in Pamphlet M.O. 329. "Decode for use with the International Code for Wireless Weather Messages from ships." The list which follows contains the latest information of stations to which "B Selected Ships" should address their reports when within range. When not within range of any of these stations their reports should be addressed to C.Q. on 600 metres in accordance with the above-mentioned instructions.

Supplementary Reporting Ships are also requested to co-operate by transmitting W/T weather messages through these stations at schedule times as convenient.

Ocean.	Station.	Position.	Call Sign.	Telegraphic address of Meteoro-logical Centre desiring information.	Information desired.	Notes.
Column No. 1.	*No. 2.*	*No. 3.*	*No. 4.*	*No. 5.*	*No. 6.*	*No. 7.*
Norwegian Sea.	Wick.	Lat. 58° 26′ 16″ N. Long. 3° 05′ 53″ W.	GKR	Weather London.	Weather in four universal groups.	No roll call. British "B Selected Ships" should report at routine times when North of Lat. 60°N. and eastward of Long. 7°W., and when more than 20 miles from the coasts.
North Sea.	Humber.	Lat. 53° 19′ 43″ N. Long. 0° 16′ 34″ E.	GKZ	Weather London.	Weather in four universal groups, optional No. 3 Supplementary Groups.	No roll call. British "B Selected Ships" should report at routine times when more than 20 miles from the coasts.
North Atlantic.	Malin Head.	Lat. 55° 21′ 45″ N. Long. 7° 20′ 30″ W.	GMH	Weather London.	Weather in four universal groups, optional No. 3 Supplementary Groups.	Station will indicate at 0805 and 1205 G.M.T. with ordinary traffic calls the names of British "B Selected Ships" and other British ships situated north of Lat. 54° N., and west of Long. 7° W., who are desired to transmit at 1230 and 1730 G.M.T., observations taken at 1200 and 1700 G.M.T. respectively. When additional reports of 2100 G.M.T. observations for transmission at 2130 G.M.T. are desired (usually during summer months) station will indicate the names of ships at 2005 G.M.T. with ordinary traffic calls.
	Valentia.	Lat. 51° 55′ 48″ N. Long. 10° 20′ 54″ W.	GCK	Weather London.	Weather in four universal groups, optional No. 3 Supplementary Groups.	Station will indicate at 0825 and 1225 G.M.T. with ordinary traffic calls the names of British "B Selected Ships" and other British ships situated south of Lat. 54° N. and west of Long. 7° W., who are desired to transmit at 1230 and 1730 G.M.T. observations taken at 1200 and 1700 G.M.T. respectively. When additional reports of 2100 G.M.T. observations for transmission at 2130 G.M.T. are desired (usually during summer months) station will indicate the names of ships at 2025 G.M.T. with ordinary traffic calls.
	Lagos *	Lat. 6° 26′ 45″ N. Long. 3° 21′ 34″ E.	ZJX	Meteo Lagos.	Weather only, four universal groups and first two of No. 3 Supplementary Groups.	0600 G.M.T. observations only required. [Reports will be acknowledged on 333 kc/s (900 metres)]
	Point Amour	Lat. 51° 27′ 28″ N. Long. 56° 51′ 31″ W.	VCL	Weather Toronto.	Weather only (No. 3 Supplementary Groups when convenient).	* For use during the season when Belle Isle route is open to navigation.
	St. John's N.F.	Lat. 47° 34′ 09″ N. Long. 52° 41′ 04″ W.	VON			
	Cape Race.	Lat. 46° 39′ 25″ N. Long. 53° 04′ 15″ W.	VCE			
North Atlantic and Mediterranean.	Gibraltar.	Lat. 36° 08′ 32″ N. Long. 5° 20′ 29″ W.	GYW	Meteor Gibraltar.	Weather in four universal groups only.	
Mediterranean.	Alexandria.	Lat. 31° 11′ 53″ N. Long. 29° 51′ 46″ E.	SUH	Meteor Heliopolis.	Weather in four universal groups, optional Supplementary Groups.	

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

(Continued.)

Ocean.	Station.	Position.	Call Sign.	Telegraphic address of Meteorological Centre desiring information.	Information desired.	Notes.
Column No. 1.	*No. 2.*	*No. 3.*	*No. 4.*	*No. 5.*	*No. 6.*	*No. 7.*
South Atlantic.	Walvis Bay	Lat. 22° 57′ 53″ S. Long. 14° 30′ 08″ E.	ZSV	Met Pretoria	Weather only, preferably No. 9 Supplementary Groups.	
	Slangkop (Cape Town)	Lat. 34° 08′ 46″ S. Long. 18° 19′ 18″ E.	ZSC			
	Salinas.	Lat. 0° 37′ 00″ S. Long. 47° 23′ 00″ W.	PPL	Meteoro Rio.	Weather only, including Supplementary Groups.	
	S. Luiz.	Lat. 2° 31′ 28″ S. Long. 44° 16′ 30″ W.	PXM			
	Fortaleza.	Lat. 3° 42′ 49″ S. Long. 38° 30′ 56″ W.	PPC			
	Natal.	Lat. 5° 45′ 27″ S. Long. 35° 11′ 42″ W.	PXN			
	Olinda.	Lat. 8° 00′ 55″ S. Long. 34° 50′ 40″ W.	PPO			
	Amaralina.	Lat. 13° 00′ 50″ S. Long. 38° 28′ 27″ W.	PPA			
	Abrolhos.	Lat. 17° 57′ 35″ S. Long. 38° 42′ 00″ W.	PXH			
	Victoria.	Lat. 20° 18′ 52″ S. Long. 40° 19′ 06″ W.	PPT			
	Rio.	Lat. 22° 59′ 19″ S. Long. 43° 11′ 26″ W.	PPR			
	Santos.	Lat. 23° 59′ 22″ S. Long. 46° 18′ 18″ W.	PPS			
	Floriano-polis.	Lat. 27° 35′ 22″ S. Long. 48° 34′ 17″ W.	PPF			
	Juncçao.	Lat. 32° 03′ 22″ S. Long. 52° 08′ 13″ W.	PPJ			
	General Pacheco (Buenos Aires).	Lat. 34° 27′ 33″ S. Long. 58° 37′ 35″ W.	LPD	Meteoro Baires.	Weather only, four universal and No. 6 Supplementary Groups.	
	Comodoro Rivadavia.	Lat. 45° 50′ 38″ S. Long. 67° 28′ 17″ W.	LOX			
Red Sea and Indian Ocean.	Port Sudan.	Lat. 19° 36′ 35″ N. Long. 37° 13′ 28″ E.	STP	Prognostic Khartoum.	Weather only, four universal groups.	
Persian Gulf.	Basra.	Lat. 30° 32′ 39″ N. Long. 47° 47′ 04″ E.	YIB	Meteor Basrah.	Weather only, four universal groups.	
Indian Ocean.	Jacobs (Durban).	Lat. 29° 55′ 51″ S. Long. 30° 58′ 38″ E.	ZSD	Met Pretoria	Weather only, preferably No. 9 Supplementary Groups.	
	Algoa Bay (Port Elizabeth).	Lat. 33° 57′ 16″ S. Long. 25° 35′ 30″ E.	ZSQ			
	Calcutta.	Lat. 22° 33′ 31″ N. Long. 88° 20′ 16″ E.	VWC	Obs Weather.	Weather only, including No. 9 Supplementary Groups.	When settled weather conditions prevail in the Arabian Sea or Bay of Bengal, British "B Selected Ships" are requested to address their reports through these stations to "Obs Weather" based on 0300 and 1200 G.M.T. observations only; their 0000 or 0600 G.M.T. observations being addressed to C.Q. according to schedule. During unsettled or disturbed weather conditions *All reports* should be addressed to "Obs Weather" through these stations. (See Section (35), p. 32 of the January number.)
	Rangoon.	Lat. 16° 45′ 57″ N. Long. 96° 11′ 51″ E.	VTR			
	Madras.	Lat. 12° 59′ 17″ N. Long. 80° 10′ 56″ E.	VWM			
	Bombay.	Lat. 19° 04′ 55″ N. Long. 72° 49′ 54″ E.	VWB			
	Karachi.	Lat. 24° 51′ 05″ N. Long. 67° 02′ 32″ E.	VWK			

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

(Continued.)

Ocean.	Station.	Position.	Call Sign.	Telegraphic address of Meteorological Centre desiring information.	Information desired.	Notes.
Column No. 1.	*No. 2.*	*No. 3.*	*No. 4.*	*No. 5.*	*No. 6.*	*No. 7.*
Indian Ocean (*continued*).	Matara. (Ceylon)	Lat. 6° 01′ 07″ N. Long. 80° 35′ 39″ E.	GZP	Weather.	Weather only, including No. 6 Supplementary Groups.	Ships fitted for short wave transmission are requested to repeat their routine messages according to schedule through GYL. (Kranji Singapore) on 23.16 metres (12950 kc/s.) addressed to Obs. Weather Singapore.
	Mombasa.	Lat. 4° 03′ 11″ S. Long. 39° 39′ 49″ E.	VPQ	Weather Nairobi.	Weather only, including No. 6 Supplementary Groups.	
	Dar-es-Salaam.	Lat. 6° 50′ 38″ S. Long. 39° 17′ 24″ E.	ZBZ			
	Mauritius.	Lat. 20° 23′ 41″ S. Long. 57° 35′ 25″ E.	VRS	Observatory Mauritius.	Weather only, four universal groups and first of No. 6 Supplementary Groups.	
	Geraldton.	Lat. 28° 47′ 15″ S. Long. 114° 36′ 24″E.	VIN	Weather Melbourne and Weather Perth.	Weather only, preferably No. 9 Supplementary Groups.	When east of Long 90° E., but not within 100 miles of the coast.
	Esperance.	Lat. 33° 52′ 40″ S. Long.121° 53′ 34″ E.	VIE			
Indian Ocean and China Sea.	Penaga (Penang). Paya Lebar (Singapore).	Lat. 5° 32′ 02″ N. Long. 100° 22′ 51″E. Lat. 1° 20′ 26″ N. Long. 103° 53′ 20″E.	VPX VPW	Obs Weather Singapore.	Weather only, preferably No. 9 Supplementary Groups.	Ships fitted for short wave transmission when East of Long. 100° E. and South of a line joining Cape Padaran and Balabak who are unable to communicate with these stations on 600 metres are requested to send their weather messages through GYL (Kranji Singapore) on 23.16 metres (12950 kc/s) according to schedule, repeating to CQ. on 600 metres for the benefit of all ships.
North Pacific and China Sea.	Cape d'Aguilar, Hong Kong.	Lat. 22° 12′ 39″ N. Long. 114° 15′ 11″ E.	VPS	Royal Observatory.	Weather only, preferably No. 9 Supplementary Groups.	
South Pacific.	Auckland.	Lat. 36° 50′ 37″ S. Long.174° 46′ 08″ E.	ZLD	Weather Wellington.	Weather only, preferably No. 9 Supplementary Groups	
	Wellington.	Lat. 41° 16′ 26″ S. Long.174° 45′ 55″ E.	ZLW			
	Awarua.	Lat. 46° 30′ 27″ S. Long.168° 22′ 21″ E.	ZLB			
	Chatham Island.	Lat. 43° 57′ 28″ S. Long.176° 34′25″W.	ZLC			
	Rarotonga.	Lat. 21° 11′ 52″ S. Long.159° 48′52″W.	ZKR			
	Apia.	Lat. 13° 49′ 46″ S. Long.171° 45′20″W.	ZMA			
	Suva.	Lat. 18° 08′ 43″ S. Long. 178°27′48″E.	VRP	Weather Suva.	Weather in four universal groups, optional Supplementary Groups.	See Section (35), p. 32 of the January number.
	Thursday I.	Lat. 10° 35′ 14″ S. Long.142° 12′ 37″ E.	VII	Weather Melbourne and Weather Brisbane.	Weather only, preferably No. 9 Supplementary Groups.	When west of Long. 160° E., but not within 100 miles of the coast.
	Townsville.	Lat. 19° 16′ 09″ S. Long.146° 49′ 47″ E.	VIT		Weather only, preferably No. 9 Supplementary Groups.	
	Brisbane.	Lat. 27° 25′ 34″ S. Long.153° 07′ 19″ E.	VIB		Weather only, preferably No. 9 Supplementary Groups.	
	Melbourne.	Lat. 37° 46′ 56″ S. Long.144° 52′ 09″ E.	VIM	Weather Melbourne.	Weather only, preferably No. 9 Supplementary Groups.	When between Long. 90° E. and 160° E., but not within 100 miles of the coast.
	Adelaide.	Lat. 34° 51′ 14″ S. Long.138° 31′ 55″ E.	VIA	Weather Melbourne and Weather Adelaide.	Weather only, preferably No. 9 Supplementary Groups.	

II. WIRELESS WEATHER SIGNALS.

Bulletins.

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

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

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

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

Coasts of S. and E. Africa, Asia, Australia, and New Zealand, and the Islands of the Indian and Pacific Oceans.

In this number will be found a selection of the most useful Weather Bulletins for shipping, broadcast from stations in the above areas:

This information is compiled from The Admiralty List of Wireless Signals and is corrected by Weekly Notices to Mariners up to the week ending

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SOUTH WEST AFRICA AND UNION OF SOUTH AFRICA.

Weather Shipping Bulletins.

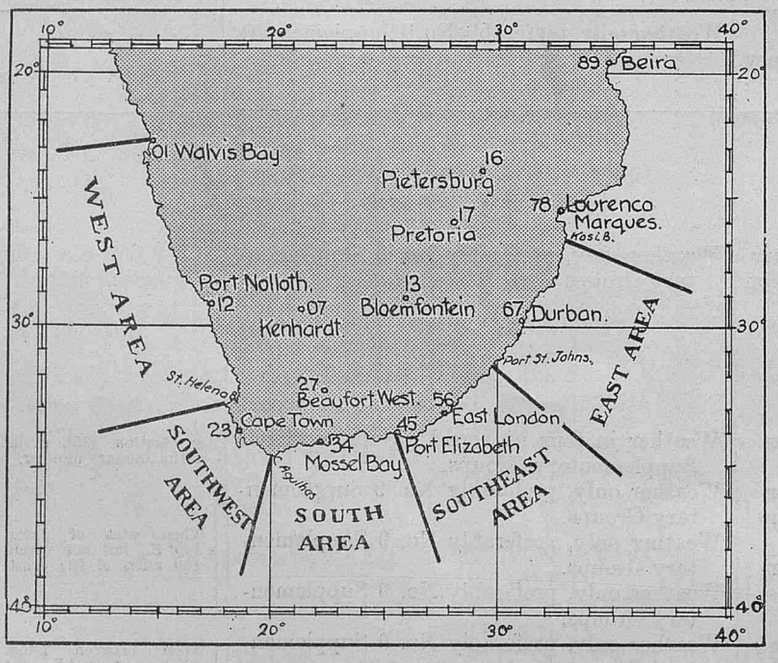
The following W/T stations transmit weather Reports in code giving actual observations at 0630 G.M.T. at coast stations and Forecasts of Weather in plain language for coastal areas indicated on the Chart below.

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

Instructions for decoding.

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

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



The Key letters are fully described on p. 38 of the January, 1939, number, and in M.O. 329, with the exception of symbol II. II = the distinguishing figures of the coast stations, which are given on the chart.

Key letters—IICAK DDFww PPVTT.

Explanation of Chart.

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

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

W/T Station and Position approx.		Call Sign.	Wave-length. Metres.	Times of Transmission.		Station distinguishing figures (*see* Chart).
Latitude.	Longitude.			Station reports. G.M.T.	Forecasts. G.M.T.	
Walvis Bay ... ... 22° 58′ S.	14° 30′ E.	ZSV	625	0850	1250	23, 12, 01, 550*
Capetown (Slangkop) 34° 09′ S.	18° 19′ E.	ZSC	600	0930	1220	56, 45, 34, 23, 12, 01.
			2100	0935	—	01, 07, 12, 13, 16, 17, 23, 27, 34, 45, 56, 67, 78, 89.
Port Elizabeth (Algoa Bay). 33° 57′ S.	25° 35′ E.	ZSQ	600	0820	1230	67, 56, 45, 34, 23.
Durban (Jacobs) 29° 56′ S.	30° 59′ E.	ZSD	600	0850	1205	89, 78, 67, 56, 45.
			2100 and 35·5	0900	—	01, 07, 12, 13, 16, 17, 23, 27, 34, 45, 56, 67, 78, 89.

* 550, Loanda, Lat. 8° 49′ S., Long. 13° 13′ E.

Wireless Storm Warnings.

Storm warnings are issued from the following stations on receipt and repeated during the watch period 1600–1800 G.M.T. on 600 metres, commencing with the signal **TTT**.

Cape Town (Slangkop) call sign **ZSC.**
Durban (Jacobs) call sign **ZSD.**

III.—Wireless Time Signals.

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

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

G.M.T.

H. M. S. H. M. S.

20 56 05 to 20 56 50 — — — repeated 5 times at 10 second intervals.

G.M.T.

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

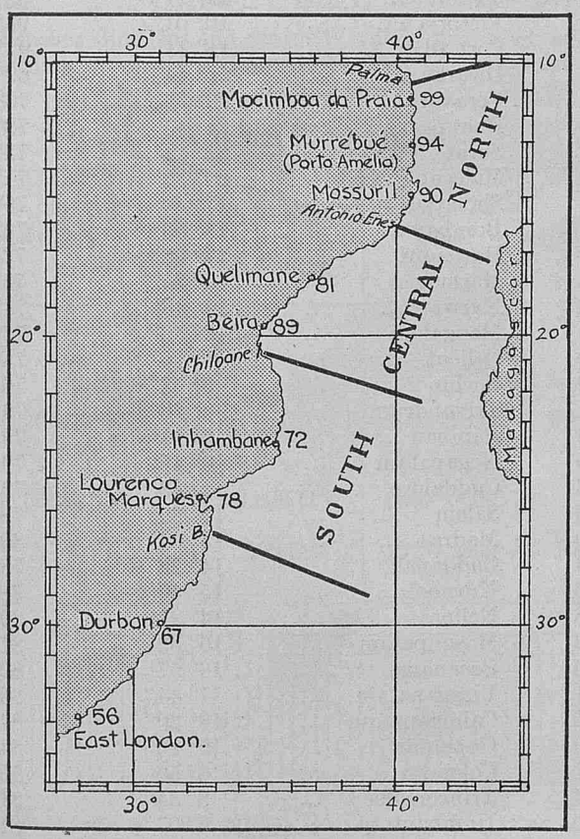
PORTUGUESE EAST AFRICA.

II.—Weather Shipping Bulletins.

The following W/T Stations transmit Weather Reports giving actual observations at 0700 G.M.T. at coast stations, in the same way as those given for South West Africa and Union of South Africa. For key and explanation *see* page 116.

W/T Station and Position approx.	Call Sign.	Wavelength metres.	Times of Transmission. Station reports. G.M.T.	Times of Transmission. Forecasts. G.M.T.	Station distinguishing figures (*see* Chart).
Lourenço Marques 25° 58′ S., 32° 36′ E.	CRL	600	0910	1310	56, 67, 72, 78, 89.
Mozambique 15° 02′ S., 40° 45′ E.	CRQ	2100	0920	1320	
		600	0900	None.	72, 78, 81, 89, 90, 94, 99.

Chart showing Stations and Forecast Areas for Weather Shipping Bulletin, Portuguese East Africa.



III.—Wireless Time Signals.

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

The transmitting times are :—

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

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

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

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

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

MADAGASCAR.

II.—Wireless Storm Warnings.

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

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

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

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

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

The warning will be broadcast at every even hour, in addition to the above times, during the probable passage of the cyclone when within the range of the W/T Stations, by Majunga W/T station and Tulear W/T station, alternately, in the case of a cyclone affecting the Mozambique Channel (*ie.* Majunga at 0000,0400 G.M.T., etc., etc., and Tulear at 0200,0600 G.M.T., etc., etc.), and alternately by Diégo Suarez and

Tamatave W/T stations in the case of a cyclone affecting the area north-east and east of Madagascar (*ie.* Diégo Suarez at 0000,0400 G.M.T. etc., etc. and Tamatave at 0200,0600 G.M.T. etc., etc.

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

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

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

MAURITIUS.

II.—Wireless Weather Bulletins.

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

Call sign **VRS.**

Wavelength 600 metres.

Time of transmission (during cyclone season 1st November to 15th May).

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

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

To decode these reports the tables given in M.O. 329 are required. The Key Letters are fully described on p. 38 of the January, 1939, number, and in M.O. 329.

Key letters—DDFww PPVTT.

Observation stations :—

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

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

INDIA, CEYLON AND BURMA.

II.—Wireless Weather Bulletins.

Bombay Fort W/T Station approx. position Latitude 19° 05′ N., Longitude 72° 50′ E.

Call sign **VWF.**

Times of transmission and wavelengths :

0600 G.M.T., 2000 metres (C.W.), 23·17 metres, 17·32 metres (I.C.W.)

1610 G.M.T., 2000 metres (C.W.), 44·12 metres (I.C.W.)

Transmits a weather bulletin containing reports in code, giving actual observations at 8 a.m. local time from Indian and Ceylon stations; 0400 G.M.T. from Gulf of Oman and Mekran coast stations and 7 a.m. local time for Aden, followed by observations from about 5 ships in Arabian Sea Area, 5 in Bay of Bengal Area and 2 in Ceylon Area, in the four universal groups.

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

To decode these reports the tables given in M.O. 329 are required The Key letters are fully described on p. 38 of the January, 1939 number, and in M.O. 329, with the exception of II. II = index figure of coast station, the last two figures of the three international index figures of the station being used. The stations with their index figures are given below.

Key letters—IICKW DDFww PPVTT.

Distinguishing Figures.	*Station.*	*Position approx.* *Latitude N.*	*Longitude E.*
303	Aden	12° 46′	45° 03′
306	Baitul Falaj ...	23° 37′	58° 35′
307	Sharjah	25° 21′	55° 24′
318	Jask	25° 45′	57° 45′
319	Charbar	25° 17′	60° 37′
341	Pasni	25° 16′	63° 33′
342	Ormora	25° 15′	64° 39′
343	Gwador	25° 07′	62° 19′
380	Karachi	24° 51′	67° 04′
416	Indore	22° 44′	75° 50′
432	Chanda	19° 56′	79° 21′
437	Chandbali	—	—
439	Sambalpur ...	21° 28′	84° 01′
456	Mymensingh ...	24° 46′	90° 27′
457	Berhampur ...	24° 06′	88° 23′
460	Calcutta	22° 32′	88° 24′
461	Saugor I. ...	21° 40′	88° 10′
462	Barisal	20° 42′	90° 24′
463	Cox's Bazar ...	21° 26′	92° 01′
464	Chittagong ...	22° 21′	91° 50′
483	Akyab	20° 07′	92° 57′
484	Kyaukpyu ...	19° 22′	93° 30′
487	Gwa	17° 35′	94° 37′
488	Diamond I. ...	15° 52′	94° 19′
489	Bassein	16° 44′	94° 50′
490	Rangoon ...	16° 47′	96° 13′
491	Amherst	16° 04′	97° 35′
492	Tavoy	14° 07′	98° 18′
493	Mergui	12° 27′	98° 35′
494	Victoria Pt. ...	10° 01′	98° 33′
498	Port Blair ...	11° 41′	92° 45′
502	Dwarka	22° 14′	69° 05′
504	Veraval	20° 53′	70° 26′
505	Bhavnagar ...	21° 45′	72° 12′
510	Surat	21° 12′	72° 52′
511	Malegaon ...	20° 32′	74° 37′
514	Sholapur ...	17° 40′	75° 57′
520	Bombay	18° 55′	72° 54′
521	Ratnagiri ...	17° 08′	73° 19′
522	Marmagao ...	15° 25′	73° 50′
523	Karwar	14° 48′	74° 11′
528	Mangalore ...	12° 52′	74° 53′
529	Calicut	11° 15′	75° 49′
530	Cochin	9° 58′	76° 17′
531	Trivandrum ...	8° 20′	76′ 59°
533	Pamban	9° 17′	79° 15′
535	Negapatam ...	10° 46′	79° 53′
536	Cuddalore ...	11° 43′	79° 49′
538	Salem	11° 39′	78° 12′
540	Madras	13° 04′	80° 15′
544	Cuddapah ...	14° 28′	78° 52′
546	Kurnool	15° 50′	78° 05′
548	Nellore	14° 27′	80° 01′
549	Masulipatam ...	16° 09′	81° 12′
550	Cocanada ...	16° 57′	82° 15′
551	Vizagapatam ...	17° 44′	83° 23′
552	Calingapatam ...	18° 20′	84° 09′
553	Gopalpur ...	19° 16′	84° 57′
571	Colombo	6° 56′	79° 56′
574	Trincomalee ...	8° 34′	81° 08′
576	Hambantota ...	6° 07′	81° 07′

A brief summary of weather conditions is broadcast daily from stations below at the following times :—

Time G.M.T.	Station.	Position (approx.). Latitude.	Position (approx.). Longitude.	Call Sign.	Wavelength, metres.
0830 and 1630	Karachi...	24° 51′ N	67° 03′ E.	VWK	1,546 (C.W.)
	Calcutta*	22° 34′ N.	88° 20′ E.	VWC	2,000 (C.W.)
0800 and 1600	Bombay...	19° 05′ N.	72° 50′ E.	VWB	1,000 (I.C.W.)
0750	Bombay Fort	19° 05′ N.	72° 50′ E.	VWF	2727 (C.W.) 17 (I.C.W.) 24 (I.C.W.)
0900 and 1700	Madras ...	12° 59′ N.	80° 11′ E.	VWM	1,000 (I.C.W.)
	Rangoon	16° 46′ N.	96° 12′ E.	XYR	1,200 ,,
0800 and 1610	Aden ...	12° 49′ N.	45° 02′ E.	GZQ	600 (C.W.)
0954 and 1754	Colombo	6° 55′ N.	79° 53′ E.	VPB	600 (I.C.W.)

* After the time signal.

Wireless Storm Warnings.

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

Karachi	call sign VWK	at 0030, 0430, 1230 and 2030 G.M.T. Wavelength 600 m. I.C.W.
Calcutta	,, ,, VWC	
Bombay	call sign VWB	at 0000, 0400, 1200 and 2000 G.M.T. Wavelength 600 m. Spk.
Bombay Fort	call sign VWF	at 1600 G.M.T. Wavelengths 2727m.(C.W.) and 45·94 m.(I.C.W.)
Madras	call sign VWM	at 0100, 0500, 1300 and 2100 G.M.T. Wavelength 600 m. I.C.W.
Rangoon	,, ,, XYR	
Aden	call sign GZQ	at 0148, 0548, 1348 and 2148 G.M.T. Wavelength 600 m. I.C.W.
Colombo	,, ,, VPB	

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

III.—Wireless Time Signals.

Station.	Call Sign.	Wavelength, metres.	G.M.T. of Time Signal.	System.
Calcutta. Lat. 22° 33′ 31″ N. Long. 88° 20′ 16″ E.	VWC	2,000 C.W.	0827–0830 1627–1630	See Figure 1.
Colombo. Lat. 6° 55′ 14″ N. Long. 79° 52′ 46″ E.	VPB	2,300 C.W. 600 C.W.	0557–0600 1327–1330	See Figure 1.

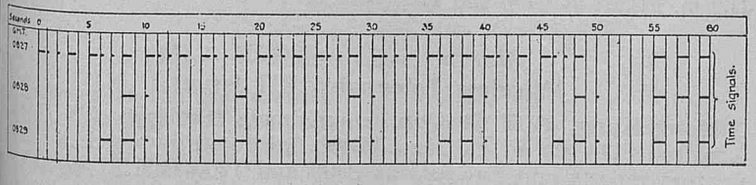


Figure 1.

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

(2) Signals automatically controlled from Alipore Observatory.

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

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

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

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

PERSIAN GULF.

II.—Wireless Weather Bulletin.

Basra W/T Station, approximate Latitude 30° 32′ 39″ N., Longitude 47° 47′ 04″ E., call sign **YIB.**

Wavelength 600 m.

Time of transmission 1600 G.M.T.

Broadcasts a 24-hour forecast of weather, wind, visibility and state of sea for the Persian Gulf, Eastern and Western areas lying respectively east and west of longitude 55° E. A general situation and further outlook may be added.

STRAITS SETTLEMENTS.

II.—Wireless Weather Bulletins.

Singapore W/T Station, Latitude 1° 23′ 28″ N., Longitude 103° 51′ 44″ E., call sign **GYL.**

Wavelengths 3,400 m., 78.2 m., and 35.8 m. simultaneously.

Times of transmission 0418 and 1518 G.M.T.

Weather report in code giving actual observations of 0000 and 1200 G.M.T. respectively at the stations below.

Weather reports in code from ships.

General statement of weather conditions and forecast for the area Latitude 10° N., to 5° S., Longitude 95° E. to 120° E.

The international Ships Wireless Weather Telegraphy Code is used. To decode these reports the tables given in M.O. 329 are required (Decode for use with International Code for Wireless Weather messages from ships (fifth edition), obtainable from His Majesty's Stationery Office, price 6d.).

The Key letters are fully described on page 38 of the January, 1939, number and in M.O. 329, with the exception of symbol III meaning the distinguishing figures of the coast stations.

Key letters IIIAC, DDFww, PPVTT.

Distinguishing Figures.	*Station.*	*Position approx. Latitude.*	*Longitude.*
*494	Victoria Point ...	10° 01′ N.	98° 33′ E.
*588	Phuket	7° 52′ N.	98° 24′ E.
580	Bangkok ...	13° 45′ N.	100° 30′ E.
583	Maesord	16° 40′ N.	98° 33′ E.
586	Bandon	9° 07′ N.	99° 17′ E.
594	Sandakan ...	5° 50′ N.	118° 07′ E.
595	Labuan	5° 15′ N.	115° 08′ E.
596	Kuching	1° 35′ N.	110° 20′ E.
601	Ipoh	4° 34′ N.	101° 06′ E.
603	Singapore ...	1° 19′ N.	103° 52′ E.
605	Kota Bahru ...	6° 08′ N.	102° 15′ E.
618	Christmas I. ...	10° 25′ S.	105° 43′ E.
620	Cape St. Jacques	10° 20′ N.	107° 05′ E.
639	Padaran	11° 21′ N.	109° 01′ E.
862	Manila	14° 35′ N.	120° 59′ E.
882	Iloilo	10° 42′ N.	122° 34′ E.
888	Zamboanga ...	6° 54′ N.	122° 05′ E.
900	Terempa ...	3° 12′ N.	106° 15′ E.
901	Kutaradja ...	5° 32′ N.	95° 20′ E.
906	Muntok	2° 05′ S.	105° 13′ E.
916	Batavia	6° 11′ S.	106° 50′ E.
929	Surabaja ...	7° 16′ S.	112° 45′ E.
955	Bandjermasin ...	3° 20′ S.	114° 40′ E.
964	Kupang	10° 10′ S.	123° 34′ E.
993	Hatien	10° 23′ N.	104° 29′ E.

* 588 will be included if observations of 494 are not available.

FRENCH INDO-CHINA.

II.—Wireless Weather Bulletins.

The following W/T Stations broadcast a weather bulletin on a wavelength of 600 metres spark. This bulletin is sent *en clair* and gives the general barometric situation in the area off the coasts of Indo-China and China Sea, and a weather forecast which is valid until 0900 G.M.T. the following day.

W/T Station.	Call Sign.	Position (approx.). Latitude. N.	Position (approx.). Longitude. E.	Times of Transmission. G.M.T.
Mitho	**FRM**	10° 22′	103° 22′	1220
Padaran	**FRR**	11° 22′	109° 01′	1350
Tourane	**FRT**	16° 05′	108° 13′	1320
Kien an	**FRK**	20° 48′	106° 37′	1250
Fu Lien	**FRK3**	20° 48′	106° 37′	1120
Fort Bayard ...	**FRF**	21° 12′	110° 24′	1350

FORMOSA.

II.—Wireless Weather Bulletins.

Keelung W/T Station, approximate Latitude 25° 08′ N., Longitude 121° 45′ E., call sign **JFK,** wavelength 600 metres, broadcasts a weather forecast, issued by Taihoku Meteorological Observatory, *en clair,* in English, at 0230 and 1920 G.M.T. The message is preceded by the signal CQ CQ CQ and contains the direction and force of the wind (Beaufort) and general weather conditions for the following day for the N. and E. coasts of Formosa and the Formosa Channel.

Tainan W/T Station, approx. Latitude 21° 55′ N., Longitude 120° 51′ E., call sign **JFG** repeats the above forecast on 600 m. I.C.W. at 0300 and 2020 G.M.T.

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

Wireless Storm Warnings.

Keelung W/T Station, call sign **JFK,** wavelength 600 metres, at 0230 and 1920 G.M.T., broadcasts storm warnings *en clair* in English commencing CQ CQ CQ, giving date and hour of observation, type of storm, position of centre, direction of motion and brief remarks. The message may also contain information concerning strong winter monsoons whenever a sudden threatening change is anticipated off the N. and E. coast of Formosa or in the Formosa Channel.

HONG KONG.

II.—Wireless Weather Bulletins.

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

Call signs **GYP,** wavelength 2098 m. C.W.
GZO 6, wavelength 35.8 m. C.W.
GZO 7, wavelength 26.5 m. C.W.
} simultaneously.

Times of transmission :—

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

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

Station reports in International Ships Wireless Weather Telegraphy Code. To decode these reports the tables given in the Decode M.O. 329 are required. The Key letters are fully described on p. 38 of the January, 1939, number and in M.O. 329 with the exception of III.

III = station distinguishing figures.

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

Observation Stations.

Code No.	Station.	Position. Latitude.	Position. Longitude.
695	Zinsen	37° 29′ N.	126° 38′ E.
734	Tientsin	39° 09′ N.	117° 09′ E.
739	Chefoo	37° 33′ N.	121° 30′ E.
671	Nagasaki	32° 44′ N.	129° 52′ E.
769	Gutzlaff	30° 48′ N.	122° 10′ E.
772	Hankow	30° 36′ N.	114° 20′ E.
660	Titizima	27° 05′ N.	142° 11′ E.
645	Isigakizima ...	24° 20′ N.	124° 10′ E.
781	Changsha	28° 12′ N.	112° 47′ E.
803	Amoy	24° 28′ N.	118° 05′ E.
642	Taihoku	25° 02′ N.	121° 31′ E.
641	Hoko	23° 32′ N.	119° 33′ E.
812	Gap Rock	21° 49′ N.	113° 56′ E.
814	Pratas I.	20° 40′ N.	116° 47′ E.
621	Fu Lien	20° 48′ N.	106° 38′ E.
625	Tourane	16° 05′ N.	108° 13′ E.
620	Cape St. Jacques ...	10° 20′ N.	107° 05′ E.
850	Basco	20° 28′ N.	121° 59′ E.
862	Manila	14° 35′ N.	120° 59′ E.
885	Surigao	9° 48′ N.	125° 29′ E.
699	Oensan	39° 11′ N.	127° 26′ E.
744	Tsingtao	36° 03′ N.	120° 20′ E.
692	Saisyu	33° 31′ N.	126° 23′ E.
652	Kagoshima ...	31° 34′ N.	130° 33′ E.
763	Nanking	32° 07′ N.	118° 47′ E.
770	Ichang	30° 42′ N.	111° 16′ E.
894	Saipan	15° 14′ N.	145° 46′ E.
647	Naha	26° 12′ N.	127° 39′ E.
777	Kiukiang	29° 44′ N.	116° 08′ E.
801	Foochow	26° 03′ N.	119° 39′ E.
640	Kosyun	22° 00′ N.	120° 45′ E.
810	Hong Kong ...	22° 18′ N.	114° 10′ E.
989	Fort Bayard ...	21° 03′ N.	110° 28′ E.
638	Dong Hoi	17° 29′ N.	106° 36′ E.
639	Padaran	11° 21′ N.	109° 01′ E.
851	Aparri	18° 22′ N.	121° 38′ E.
882	Iloilo	10° 42′ N.	122° 34′ E.
807	Canton	23° 08′ N.	113° 27′ E.
811	Macao	22° 11′ N.	113° 33′ E.
806	Swatow	23° 20′ N.	116° 43′ E.
870	Legaspi	13° 09′ N.	123° 45′ E.
892	Guam	13° 24′ N.	144° 38′ E.
893	Yap. (Caroline Is.)...	9° 29′ N.	138° 08′ E.
650	Naze	28° 23′ N.	129° 30′ E.

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

Wireless Telephony, R/T Issues.

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

Wireless Storm Warnings.

Stonecutters I. W/T Station call signs **GZP** on 2,098 metres C.W. and **GZO 6** on 26·5 metres I.C.W. broadcasts Typhoon warnings with the weather bulletins sent out at 0300 and 1200 G.M.T.

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

Wireless Telephony R/T Issues.

Hong Kong W/T Station, approximate Latitude 22° 17′ N., Longitude 114° 09′ E., call sign **ZBW,** wavelength 355 m. R/T, broadcasts by word of mouth typhoon warnings on receipt and at the two subsequent hours. When a typhoon is definitely threatening Hong Kong the warnings are sent usually at the 60th minute of any hour.

III.—Wireless Time Signals.

Wireless time signals controlled by the Royal Observatory, Hong Kong, are broadcast from **Cape d'Aguilar W/T Station,** Latitude 22° 12′ 39″ N., Longitude 114° 15′ 11″ E., call sign **VPS,** on wavelengths of 600 m. I.C.W. and 36 m. C.W. at the following times :—

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

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

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

CHINA.

II.—Wireless Weather Bulletins.

Shanghai W/T Station, approximate Latitude 31° 13′ N., Longitude 121° 28′ E., call sign **FFZ,** broadcasts weather forecasts *en clair,* for China and the China Seas, on a wavelength of 600 metres and 36m. C.W. simultaneously, repeated immediately on 2100 metres (C.W.), at 0300, 0900, 1400 and 2000 G.M.T.

Wireless Storm Warnings.

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

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

The warnings are also broadcast at 0945 G.M.T. call sign **FFZ2** on a wavelength of 30·5 m. C.W.

III.—Wireless Time Signals.

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

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

— = 1 sec.; • = 0·2 sec.

JAPAN.

II.—Wireless Storm Warnings.

The **Central Meteorological Observatory, Tokyo, W/T Station,** Latitude 35° 39′ N., Longitude 139° 45′ E., call sign, **JGA,** Okinawa Meteorological Observatory W/T Station, Latitude 26° 12′ N., Longitude 127° 39′ E., call sign, **JGH,** and Kobe Marine Observatory W/T Station, Latitude 34° 41′ N., Longitude 135° 11′ E., call sign **JTJ,** broadcast storm warnings *en clair,* in English, after the weather bulletins. The warnings contain the following information :—approximate position of typhoon (or cyclone), the direction in which it is moving, or expected movement, or information concerning severe gales, or duration of monsoon, over Japan and the neighbouring seas.

Tokyo, JGA.
Time 0450, 1100 and 2300 G.M.T.
Okinawa, JGH.
Time 0020, 0620 and 1150 G.M.T.
Kobe, JTJ.
Time 0530, 1130 and 2330 G.M.T.
} Wavelength 4000 metres (C.W.).

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

AUSTRALIA.

II.—Wireless Weather Bulletins.

Weather reports and forecasts issued by the Commonwealth Meteorological Bureau are broadcast *en clair* by Australian W/T stations as follows, special reports and warnings being broadcast on 600 metres by the W/T Stations serving the area affected, when dangerous weather prevails or is expected.

Perth W/T Station.

Approximate, Latitude 32° 02′ S. Longitude 115° 50′ E.
Call sign **VIP.**
At 0448 and 1300 G.M.T., on a wavelength 600 metres (I.C.W.).
At 0030 G.M.T., on 2,400 metres (C.W.).

Broome W/T Station.

Approximate, Latitude 17° 58′ S. Longitude 122° 14′ E.
Call sign **VIO,** wavelength 600 metres.
Times of transmission 0300 and 1400 G.M.T. (Monday to Friday).

Darwin W/T Station.

Approximate, Latitude 12° 27′ S. Longitude 130° 50′ E.
Call sign **VID,** wavelength 600 metres.
Time of transmission, 0500 G.M.T. (Sundays excepted).

Townsville W/T Station.

Approximate, Latitude 19° 16′ S. Longitude 146° 50′ E.
Call sign **VIT,** wavelength 600 metres (I.C.W.).
Time of transmission, 1100 G.M.T. (Sundays excepted from April 16th to December 16th).

Brisbane W/T Station.

Approximate, Latitude 27° 26′ S. Longitude 153° 07′ E.
Call sign **VIB,** wavelength 600 metres (I.C.W.).
Times of transmission, 0200 G.M.T.; and 1200 G.M.T. (Sundays excepted, April 16th to December 16th).

Sydney, W/T Station.

Approximate, Latitude 33° 46′ S. Longitude 151° 03′ E.
Call sign **VIS.**
Times of transmission, 0050, 0420 G.M.T.; 0650 G.M.T. (Sundays excepted); and 1035 G.M.T. on a wavelength of 600 metres and at 0200 G.M.T. on a wavelength of 2,400 metres (C.W.).

Richmond W/T Station.

Approximate, Latitude 33° 36′ S. Longitude 150° 46′ E.
Call sign **VJT,** wavelength 2,308 metres (C.W.)
Times of transmissions, 0120 G.M.T. (except Sundays) giving a forecast for waters adjacent to the S.E. coast of the continent; 0320 G.M.T. giving forecast for Australian waters.

Melbourne W/T Station.

Approximate, Latitude 37° 47′ S. Longitude 144° 52′ E.
Call sign **VIM,** wavelength 600 metres (I.C.W.).
Times of transmission, 0200 and 1100 G.M.T.

Point Cook W/T Station.

Approximate, Latitude 37° 55′ S. Longitude 144° 45′ E.
Call sign **VJS,** wavelength 2,308 metres (C.W.).
Times of transmissions, 0050 and 0720 G.M.T. (except Sundays) giving forecast for the waters adjacent to the South-east coast of the continent; 0250 and 0720 G.M.T. giving forecast for Australian waters.

Hobart W/T Station.

Approximate, Latitude 42° 52′ S. Longitude 147° 19′ E.
Call sign **VIH,** wavelength 600 metres (I.C.W.)
Time of transmission, 0600 G.M.T. (except Sundays).

Adelaide W/T Station.

Approximate, Latitude 34° 51′ S. Longitude 138° 32′ E.
Call sign **VIA,** wavelength 600 metres (I.C.W.).
Times of transmission, 1130 and 1330 G.M.T.

Esperance W/T Station.

Approximate, Latitude 33° 52′ S. Longitude 121° 54′ E.
Call sign **VIE,** wavelength 680 metres.
Times of transmission, 0300 and 1300 G.M.T., Mondays to Fridays nclusive; Saturdays at 0300 only.

Wireless Storm Warnings.

Storm Warnings are broadcast *en clair,* immediately on receipt by any of the above Australian W/T Stations which are in the area affected. Wavelength 600 m.

III.—Wireless Time Signals.

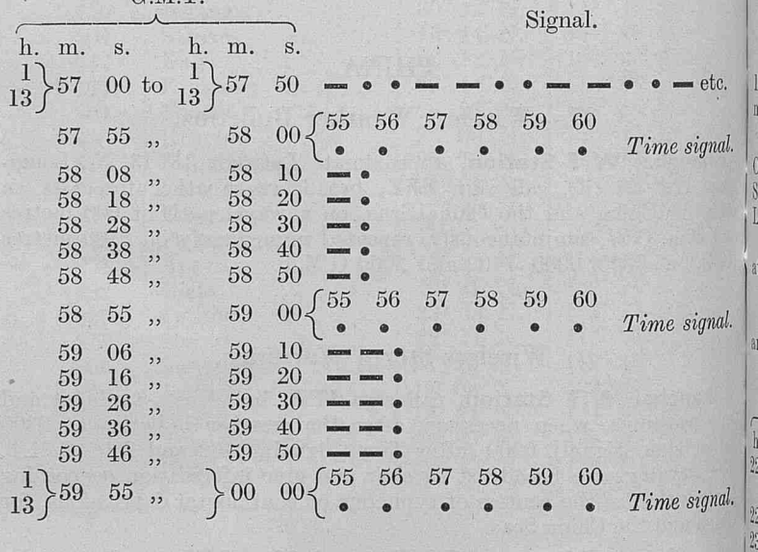
Station.	Call Sign.	Wavelength (metres).	G.M.T.	System.
Perth Lat. 32° 01′ 51″ S. Long. 115° 49′ 31″ E.	VIP	600 (I.C.W.)	0057–0100 1257–1300	(*See* Time Signal Figure, p. 119.) Controlled by Perth Observatory.
Adelaide Lat. 34° 51′ 14″ S. Long. 138° 31′ 55″ E.	VIA	600 (I.C.W.)	0027–0030 1227–1230	(*See* Figure as above.) Transmitted automatically by the standard clock of the Adelaide Observatory.

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

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

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

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



NEW ZEALAND.

II.—Wireless Weather Bulletin.

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

Wavelength 779 m. I.C.W. (385 kc/s.). Time of transmission 0930 G.M.T.

General statement of weather conditions for New Zealand waters.

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

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

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

The Key letters are fully described on page 38 of the January, 1939, number and in M.O. 329, with the exception of symbol III meaning the distinguishing figures of the coast stations.

Key letters IIIAS, DDFww, PPVTT.

Distinguishing Figures.	*Station.*	*Position approx. Latitude.*	*Longitude.*
495	Norfolk Island ...	29° 04′ S.	167° 58′ E.
505	C. Maria Van Diemen	34° 29′ S.	172° 39′ E.
510	Auckland	36° 51′ S.	174° 47′ E.
515	East Cape	37° 41′ S.	178° 33′ E.
520	Cape Egmont... ...	39° 17′ S.	173° 45′ E.
524	Napier	39° 29′ S.	176° 56′ E.
525	Wanganui	39° 52′ S.	175° 05′ E.
532	Farewell Spit ...	40° 33′ S.	173° 01′ E.
534	Stephens I.	40° 41′ S.	174° 01′ E.
537	Wellington	41° 16′ S.	174° 46′ E.
540	Cape Campbell ...	41° 43′ S.	174° 17′ E.
542	Westport	41° 27′ S.	171° 37′ E.
545	Greymouth	42° 27′ S.	171° 12′ E.
550	Akaroa Lt. Ho. ...	43° 48′ S.	172° 59′ E.
558	Nugget Pt.	46° 26′ S.	169° 50′ E.
565	Puysegur Pt. ...	46° 10′ S.	166° 38′ E.
570	Chatham Is.	43° 52′ S.	176° 42′ E.
326	Sydney	33° 51′ S.	151° 13′ E.
394	Hobart	42° 53′ S.	147° 20′ E.
560	Bluff*	46° 37′ S.	168° 21′ E.
506	Russell*	35° 15′ S.	174° 07′ E.

* Stations may be added.

III.—Wireless Time Signals.

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

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

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

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

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

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

G.M.T. h. m. s.		G.M.T. h. m. s.	
23 02 00	to	23 02 03	——— Time signal.
23 02 14	,,	23 03 50	— — — — — — — — etc.
23 04 00	,,	23 04 03	——— Time signal.
23 04 09	,,	23 04 50	— — — — — — — — — etc.
23 05 00	,,	23 05 03	——— Time signal.

AR ZMO VA.

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

NEW BRITAIN.

II.—Wireless Weather Bulletins.

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

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

At 0600 G.M.T., daily, broadcasts a weather report and an ocean forecast. Ships may also obtain this information on application to the W/T Station. From 16th April to 16th December, no forecast is broadcast on Sundays.

Wireless Storm Warnings.

Rabaul, call sign **VJZ,** wavelength 2,400 metres (C.W.), broadcasts special warnings of disturbances immediately on receipt.

SOUTH PACIFIC OCEAN ISLANDS.

II.—Wireless Weather Bulletins.

Western Area.

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

Wavelengths and Times of transmission ;

0005 G.M.T. on 800 and 23 metres (I.C.W.)
0830 G.M.T. on 800 and 37·5 metres (I.C.W.)

The 0005 G.M.T. transmission contains observations taken at 2000 G.M.T. and the 0830 G.M.T. transmission contains observations taken at 0200 G.M.T.

Weather report in code giving actual observations at the stations numbered 425, 426*, 431, 435, 443, 446, 450, 451, 452*, 453*, 454, 455, 456*, 457, 458, 459, 460, 461, 462 and 495 on the chart overleaf.

The International Ships Wireless Telegraphy Code is used.

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

The Key letters are fully described on page 38 of the January, 1939, number and in M.O. 329, with the exception of the symbol III which means the distinguishing figures of the coast stations.

Key letters IIICW DDFww PPVTT.

Barometer tendency is added *en clair* when necessary.

Central and Eastern Areas.

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

Times of transmission : 0100 G.M.T. ; wavelengths, 800 m. and 26 m. I.C.W.
0920 G.M.T. ; wavelengths, 800 m. and 52 m. I.C.W.

The 0100 G.M.T. transmission contains observations taken at 1900 to 2000 G.M.T. and the 0920 G.M.T. transmission contains observations taken at 0200 to 0320 G.M.T.

Weather report in code giving actual observations at the stations numbered 438, 467, 473, 477 and 478 on the chart overleaf.

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

* Added when available.

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

Eastern Area.

Papeete (Mahina) W/T station, approximate position Latitude 17° 29′ S., Longitude 149° 29′ W.

Call sign **FPB.** Wavelength 600 and 40 metres (C.W.) and 600 metres (I.C.W.)

Time of transmission, 0515 G.M.T.

Observations of 0200 G.M.T. taken at the stations numbered 485*, 484, 480, 481, 491, 483, on the chart below.

The observations are sent in international code IIIAW, DDFww, PPVTT.

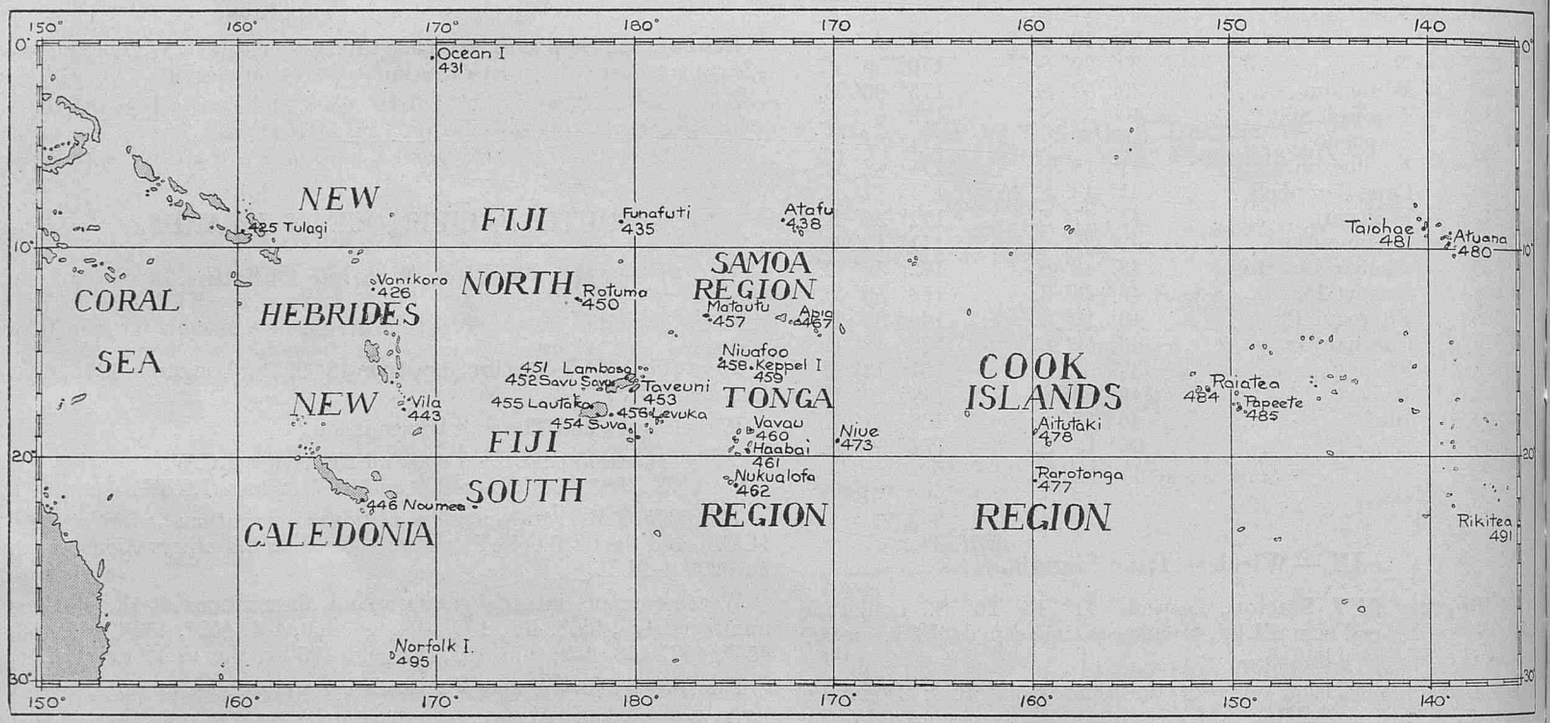
* Observations of 2000 G.M.T. on weekdays only.

Wireless Storm Warnings.

Suva W/T Station, call sign **VRP,** and **Apia W/T Station,** call sign **ZMA,** broadcast storm warnings when necessary immediately after the Weather reports explained above.

French Oceania.

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



PERSONNEL.

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

AWARD.

Captain A. R. Meikle, R.D., R.N.R.—His Majesty the KING has been pleased to confer on Captain ARCHIBALD ROBERT MEIKLE the insignia of Commander of the Royal Victorian Order on the occasion of their Majesties' Voyage to Canada in the *Empress of Australia* under Captain MEIKLE's command.

J. H.

APPOINTMENT.

Captain J. H. Gaskell.—Shaw Savill and Albion Co. Ltd., have appointed Captain J. H. GASKELL, late commander of the R.M.S. *Mataroa*, Marine Superintendent for South Island, New Zealand.

Captain GASKELL joined the company as a junior officer in 1907 and attained his first command in 1913. He has since commanded several units of the Shaw Savill and Albion Fleet, his last ship being the *Mataroa*.

J. H.

RETIREMENTS.

Captain L. Evans. — Captain Lewis Evans, Commodore of the Booth Line and Commander of the R.M.S. *Hilary*, has retired after 48 years service afloat, 35 of which being spent in the Booth Line.

After completing his apprenticeship in sail Captain Evans continued to serve as an officer in square-rigged ships before transferring to steam. He joined the Booth Line as a junior officer in 1903 and was given his first command, the S.S. *Dunstan*, in 1922. Since then he has commanded several units of the Booth Line Fleet, including the *Justin*, *Hubert*, *Aidan*, *Alban*, *Anselm* and *Hilary*.

J. H.

Captain J. McRostie, Commander of the R.M.S. *Samaria*, has retired after 45 years at sea, 29 of which were spent in command.

A native of Stranraer, Scotland, Captain McRostie commenced his sea career as an apprentice in the square-rigged ships of the Shire Line. He continued to serve in sail until he had obtained his Master's Certificate. He joined the White Star Line as a junior officer and rising through the different grades was appointed to command in 1910.

On the amalgamation of the White Star and Cunard Lines he was in charge of the *Doric*, since then he has held command of the *Alaunia* and *Samaria*.

J.H.

OBITUARY.

Mr. Bernard Brumby.—The death of Mr. Bernard Brumby, Chief Officer of the S.S. *Comliebank* and a member of our voluntary corps of Marine Observers, is noted with deep regret. Mr. Brumby died in hospital at Calcutta following a fall from a ship's ladder.

Sir Frank Dyson, K.B.E., F.R.S., LL.D. — The death of Sir Frank Dyson on 25th May last on board S.S. *Ascanius*, during the voyage home after a visit to Australia, is noted with regret. He was born in 1868 and was educated at Bradford Grammar School, later becoming a fellow of Trinity College, Cambridge. In 1894 he was selected to fill the post of Chief Assistant at the Royal Observatory, Greenwich. In 1910 he became Astronomer Royal, which post he held until his retirement in 1933. He made many notable contributions to astronomical science, chiefly in connection with the motions of the stars and their distribution in space and the phenomena observed during total solar eclipses. His work was commemorated by the presentation of the 36-inch reflecting telescope to the Observatory by Mr. W. Johnston Yapp in 1933. Sir Frank was also interested in time-keeping and the craft of clock-making and was responsible for the distribution through the B.B.C. of the "six-pip" time signal, direct from Greenwich. He received many scientific distinctions. A knighthood was conferred on him in 1915 and he was again honoured in 1926 as a Knight of the British Empire.

E. W. B.

The death of **Captain G. F. Gardner, O.B.E.,** late Commodore of the Union-Castle Mail Steamship Company, Limited, is noted with regret. George Frederick Gardner was born in 1869 and went to sea in the sailing ships of Messrs. Fisher and Sprott in 1883. On passing the examination for Master in 1894 he joined the Castle Line as fourth officer of the *Doune Castle*.

By 1902 he was a chief officer in the Company, and was appointed to his first command in 1913.

During the war of 1914–1918 he was in command of ships employed in transport service.

After the war he commanded intermediate steamers, being in the *Llanstephan Castle* from 1924 to 1927, when he was appointed to the *Saxon* in the mail service.

He then commanded in turn the *Edinburgh Castle*, *Armadale Castle*, and *Winchester Castle* and was made Commodore in 1930, retiring in 1932.

Captain Gardner was a Lieutenant Commander R.N.R. (retired).

C. H. W.

Dr. E. Kidson.—The death of Dr. Edward Kidson, Director of the Meteorological Office in the Department of Scientific and Industrial Research, New Zealand, which took place at Wellington is noted with regret.

Born at Bilston, Staffordshire, in 1882, Dr. Kidson went to New Zealand at an early age. In 1908 he was appointed a magnetic observer at the Carnegie Institute of Washington, and at the outbreak of the Great War relinquished this work to join the meteorological section of the Royal Engineers. On demobilisation he returned to the Carnegie Institute until 1921 when he was appointed Assistant Director of the Australian Meteorological Bureau, in which capacity he served for six years prior to becoming Director of the New Zealand Meteorological Services.

Dr. Kidson was well known to, and held in great regard by, many of our Corps of Marine Observers in the New Zealand Trade.

J. H.

Captain A. Lee. — The death of Captain Arthur Lee, Commodore Captain of the Ellerman and Bucknall Steamship Lines, which took place at sea, on board his ship the *City of Benares*, is noted with regret.

Captain Lee commenced his sea career in 1889 as an apprentice in the ship *Torridon*. On obtaining his Master's Certificate in 1897 he joined the Bucknall Line as third officer of the steamer *Buluwayo* and was given his first command, the *Afrikander*, in 1902. Since then he has commanded several ships of the Bucknall and other associated Ellerman Lines and has been in charge of the *City of Benares* since she was put into commission in 1936.

J. H.

Commander S. W. Moughtin, R.D., R.N.R.—The death of Commander S. W. Moughtin, Chief Officer of the R.M.S. *Aquitania*, which took place suddenly on board his ship at Southampton on 21st March last is noted with regret.

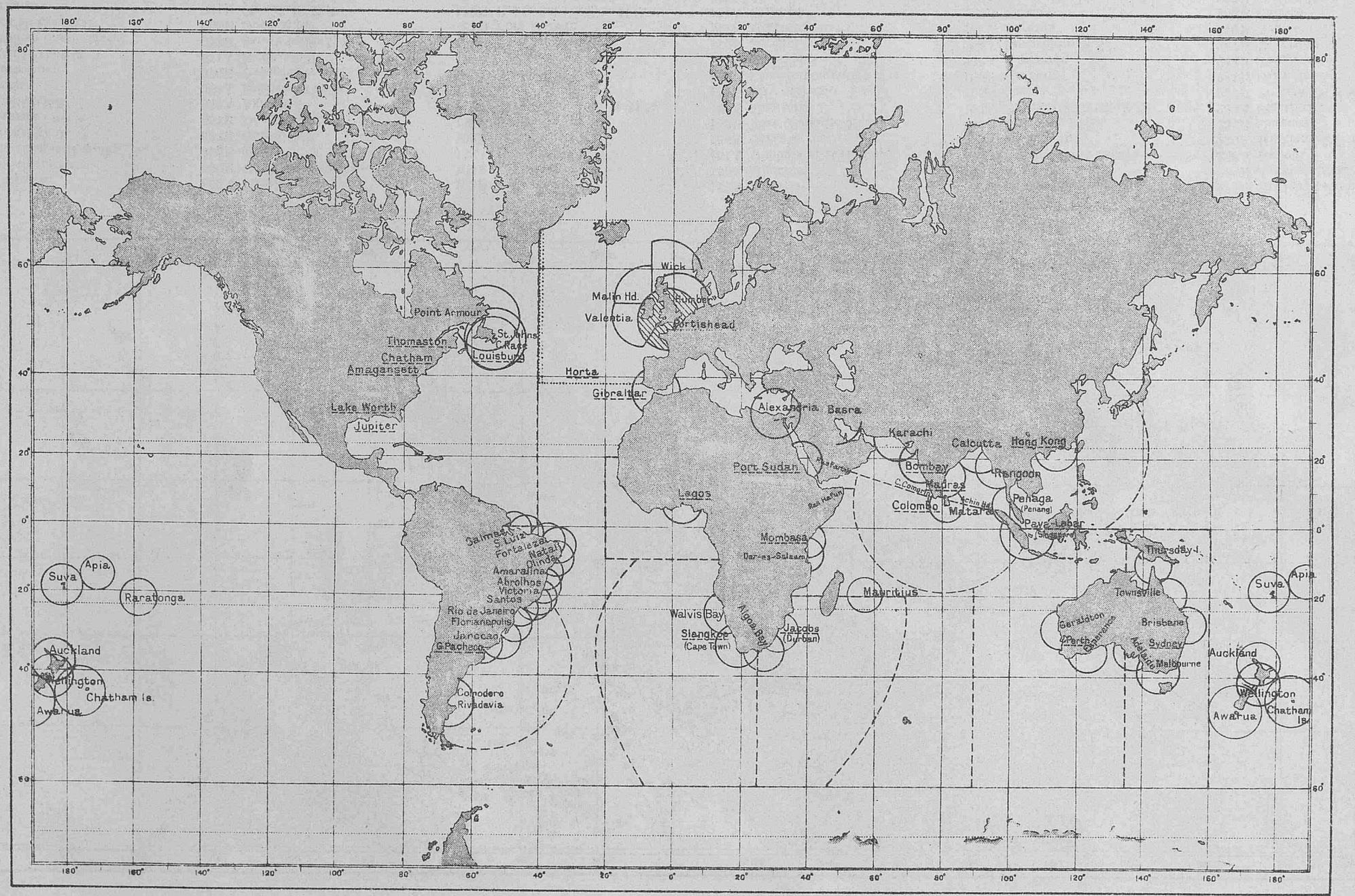
Serving for some years in sail he joined the Cunard Line as fourth officer of the *Carmania* in 1913. On the outbreak of hostilities in 1914 he was called up for service in the Royal Navy, and remained there until after the Armistice when he rejoined the Cunard Line as senior second officer of the *Aquitania*. Since then he has served in several units of the Cunard Fleet, and was for a time chief officer and staff-captain of the *Lancastria* before his reappointment to the *Aquitania* as chief officer.

J. H.

SHIPS' WIRELESS WEATHER SIGNALS.

CHART OF THE WORLD.

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



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

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

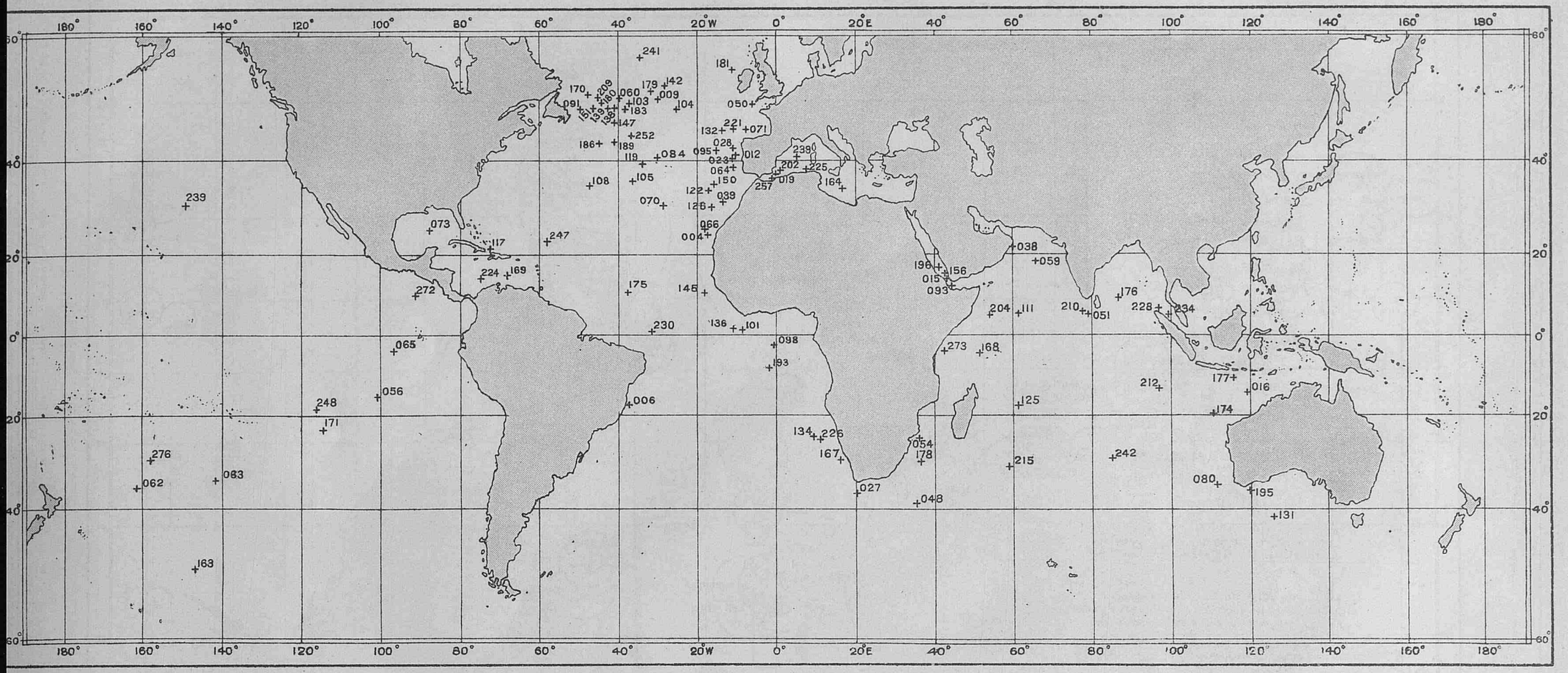
The small shaded areas round stations detailed to receive reports from "A Selected Ships" indicate where these ships should not report on account of congestion

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

WORK OF THE YEAR.

CHART I.

CHART OF THE WORLD SHOWING POSITION OF BRITISH SELECTED SHIPS AT SEA ON JUNE 1ST., 1938.

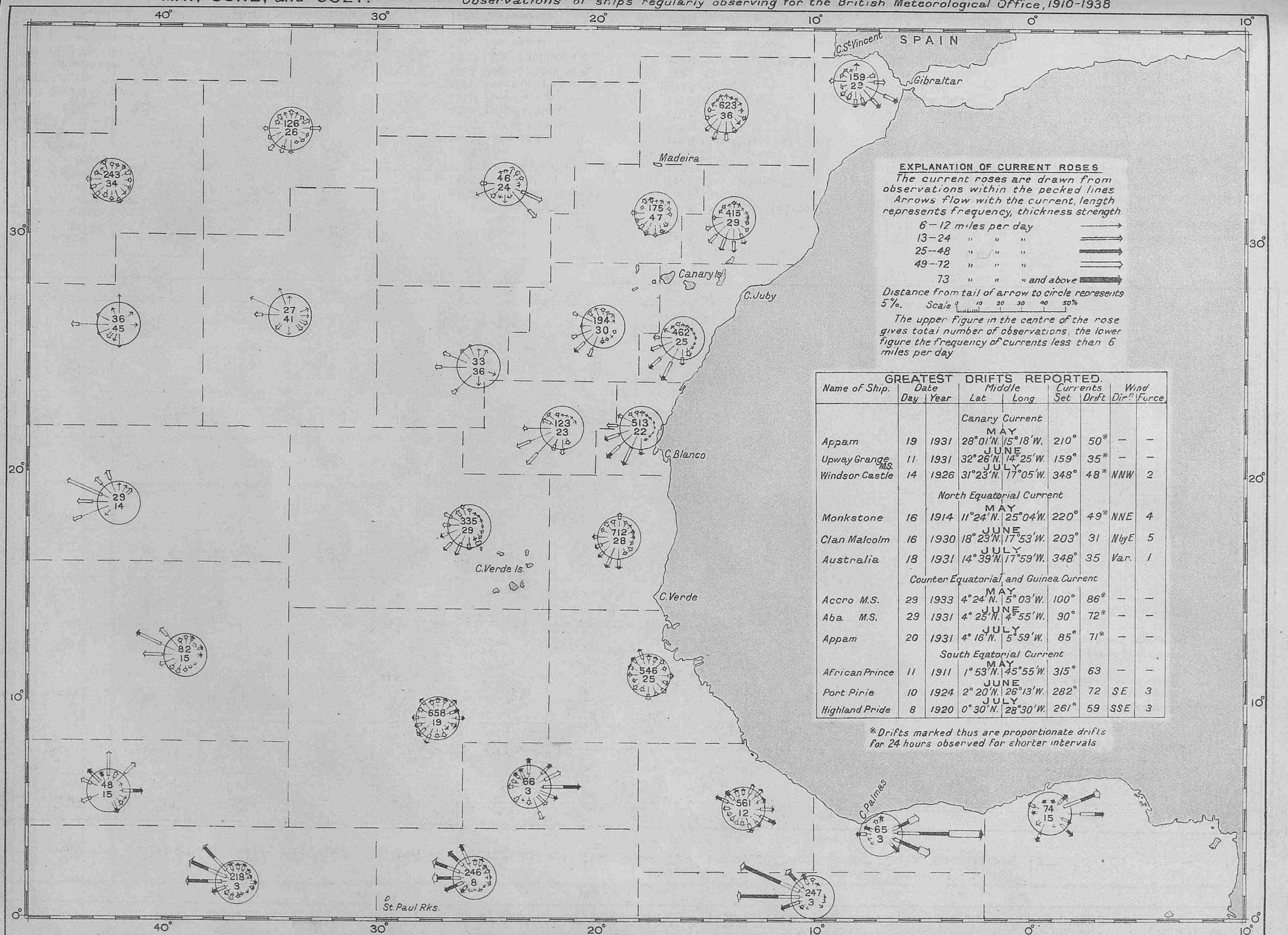


004A Waipawa
006A Andalucia Star
009B Manchester Brigade
012B Yorkshire
015B Mahsud
016B Comliebank
019A Orion
023B Matheran
027B Clan Farquhar
028A Athlone Castle M.S.
038B British Corporal
039A Arlanza
048A Themistocles
050B Clan Macalister
051B City of Auckland
054B British General
056B Westmoreland
059A Strathnaver
060B Manchester Citizen
062B Mahia
063B Queen City
064B Durham M.S.
065A Akaroa
068A Balmoral Castle
070B Oxfordshire
071A Rawalpindi
073B San Arcadio M.S.
080B Orari M.S.
084B Clydefield M.S.
091A Athenia
098B Llandaff Castle
095B Oropesa
098A Dunbar Castle M.S.
101B Clan Macfarlane
103B Ausonia
104A Tuscania
105A Rangitiki M.S.
108B San Alberto M.S.
111B Benwyvis
117B Cape of Good Hope M.S.
119A Erin
122A Accra M.S.
125B City of Windsor
128B Port Auckland
131B Port Darwin
132B Reina del Pacifico M.S.
134A Stirling Castle M.S.
136B City of Winchester
138B Beaverdale
139A California
145B Berwickshire
147A Laconia
150A Montrose
151A Duchess of Richmond
156A Otranto
163B Port Gisborne M.S.
164A Mooltan
167B City of Tokio
168B Clan Mactaggart
169B Essex M.S.
170A Scythia
171B Hertford
174A Ormonde
175A Almanzora
176B Staffordshire M.S.
177B Port Wellington
178B Imperial Star M.S.
179B Manchester Port
180B Beaverbrae
181B Nova Scotia
183A Empress of Australia
186A Georgic M.S.
189A Britannic M.S.
193A Dunnottar Castle M.S.
195A Maloja
196B Mulbera
202A Narkunda
204A Derbyshire M.S.
208B Aurania
209B Bassano
210A Strathallan
212A Waiwera M.S.
215B City of Canberra
221A Tynefield M.S.
224A Rangitane M.S.
225B British Statesman
226B Javanese Prince M.S.
228A Ranchi
230A Highland Patriot M.S.
234B Glaucus
238A Stratheden
239B Foylebank M.S.
241B Cairnglen
242B Tongariro
247B Recorder
248B Arawa
252B Camito
257B British Hussar
272B City of Singapore
273B British Strength M.S.
276A Remuera

101 ships out of 279 in favourable positions to report with 178 in port or narrow waters. This is typical and represents a fair average. 36 per cent. in position to report.

CURRENTS IN THE NORTH ATLANTIC, SOUTHEASTERN PORTION

MAY, JUNE, and JULY. *Observations of ships regularly observing for the British Meteorological Office, 1910-1938*



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 frequency of currents less than 6 miles per day

GREATEST DRIFTS REPORTED.

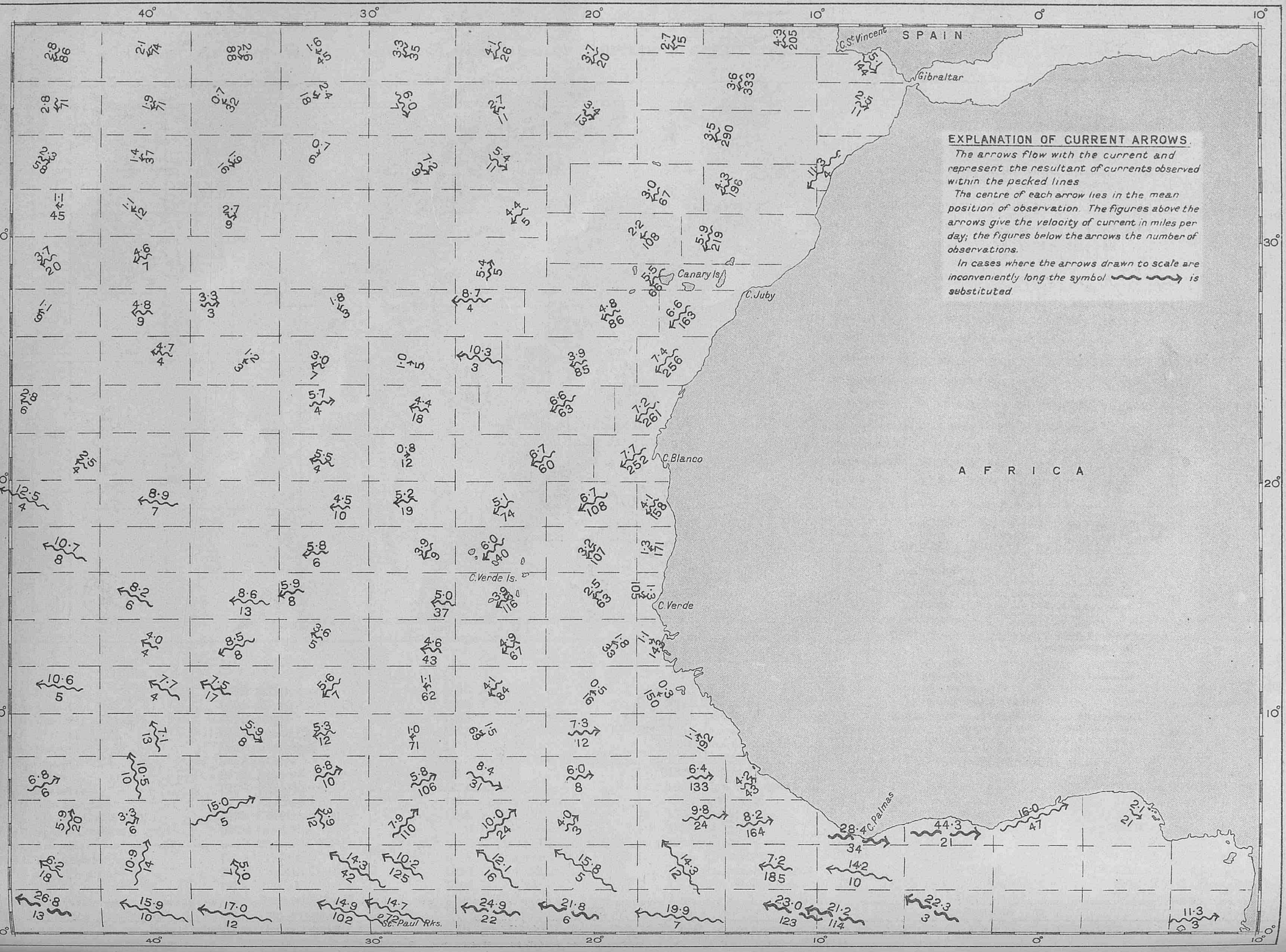
Name of Ship.	Date Day	Date Year	Middle Lat	Middle Long	Currents Set	Currents Drift	Wind Dir^{n}	Wind Force
			Canary Current					
			MAY					
Appam	19	1931	28°01'N.	15°18'W.	210°	50*	—	—
			JUNE					
Upway Grange M.S.	11	1931	32°26'N.	14°25'W.	159°	35*	—	—
			JULY					
Windsor Castle	14	1926	31°23'N.	17°05'W.	348°	48*	NNW	2
			North Equatorial Current					
			MAY					
Monkstone	16	1914	11°24'N.	25°04'W.	220°	49*	NNE	4
			JUNE					
Clan Malcolm	16	1930	18°23'N.	17°53'W.	203°	31	NbyE	5
			JULY					
Australia	18	1931	14°39'N.	17°59'W.	348°	35	Var.	1
			Counter Equatorial and Guinea Current					
			MAY					
Accro M.S.	29	1933	4°24'N.	5°03'W.	100°	86*	—	—
			JUNE					
Aba M.S.	29	1931	4°25'N.	4°55'W.	90°	72*	—	—
			JULY					
Appam	20	1931	4°16'N.	5°59'W.	85°	71*	—	—
			South Equatorial Current					
			MAY					
African Prince	11	1911	1°53'N.	45°55'W.	315°	63	—	—
			JUNE					
Port Pirie	10	1924	2°20'N.	26°13'W.	282°	72	SE	3
			JULY					
Highland Pride	8	1920	0°30'N.	28°30'W.	261°	59	SSE	3

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

CURRENTS IN THE NORTH ATLANTIC, SOUTHEASTERN PORTION

MAY, JUNE, and JULY.

Observations of ships regularly observing for the British Meteorological Office, 1910-1938



CURRENTS IN THE MEDITERRANEAN SEA.

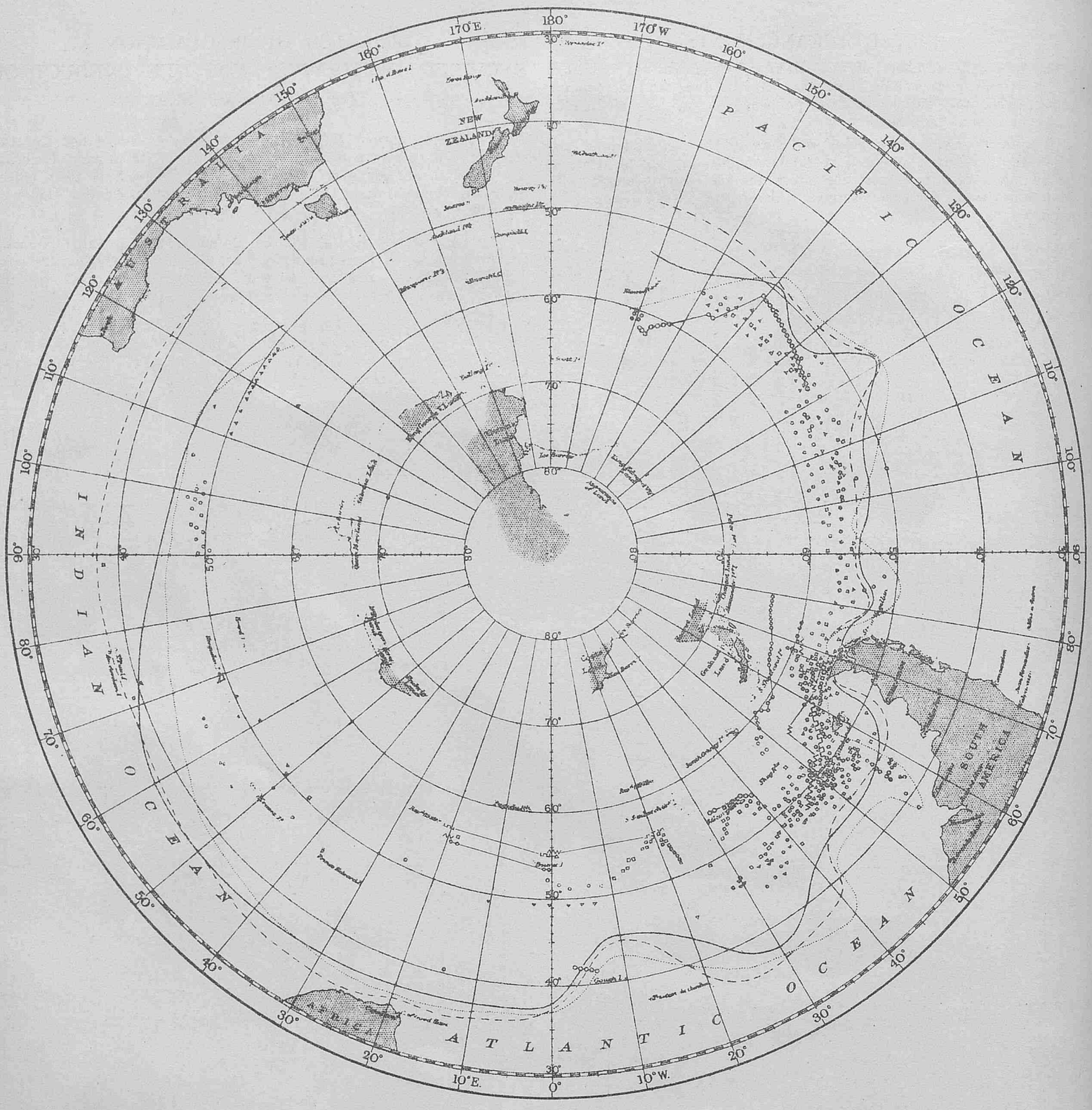
MAY, JUNE, and JULY.

Observations of ships regularly observing for the British Meteorological Office, 1910-1938

GREATEST DRIFTS REPORTED.

Name of Ship.	Date		Middle		Currents		Wind	
	Day	Year	Lat	Long	Set	Drift	Dir^n	Force
			MAY					
Titan	27	1935	35°59'N.	5°38'W.	81°	60*	—	—
			JUNE					
Clan Macindoe	26	1933	36°03N.	5°41'W.	90°	72*	—	—
			JULY					
City of Sydney	4	1937	34°37'N	22°26E	104°	46*	—	—

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



ICE CHART OF THE SOUTHERN HEMISPHERE,

JULY AUGUST and SEPTEMBER

EXPLANATION

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

	Bergs, 1902-1938.	Position of northernmost pack ice actually observed 1885-1938	Extreme limit of all ice, 1772-1938.
July.	△	~~~~~~~~~~	————
August	□	⊓⊓⊓⊓⊓⊓⊓⊓⊓⊓	— — — — — →
September	○	○-○-○-○-○-○-○	.....

NOTE – The symbols for pack ice are joined by hair line where desirable

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

H.M.S.O.Press, Cornwall House S.E.I.

Ps. 185/3691. We. 21A. D.20.6p.948. 1350.6/38

NOTICES TO MARINE OBSERVERS.

POSTAL ARRANGEMENTS.

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

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

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

Port of Call.....

Date of Homeward Departure.....

Postal Address.....

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

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

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

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

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

ICE OBSERVATION.

Drifting ice, derelicts, and other floating dangers to navigation are reported by all the means of communication at the disposal of the master.

See Appendix III, pages 106 to 108 of the MARINE OBSERVER'S HANDBOOK, Sixth Edition.

It is also desirable that more detailed information than can be given in a TTT wireless message should be available to the Meteorological Office for the purpose of research, and for the Admiralty Charts and Sailing Directions.

Marine observers will greatly assist by noting the conditions of ice, either drifting or fast.

For this purpose Form 912 is supplied direct to all regular observing ships using regions where ice may be encountered and this Form may be supplied to the Captain of any British ship on application to the Port Meteorological Officers and Merchant Navy Agents.

Regular observing ships using the Trans-North Atlantic tracks are requested to send in these Forms, not only when ice is encountered, but also when they have passed through the ice region during the ice season without encountering ice. In this case a "nil" report should be made; since it is desirable as far as possible to determine when tracks have been clear of ice.

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

LONDON ... ... Captain C. E. N. FRANKCOM, Marine Superintendent.
Commander J. HENNESSY, R.D., R.N.R., Senior Nautical Assistant.
Room 206, Victory House, Kingsway, W.C.2.
(*Telephone No.: Holborn 3434 Extension 421.*)
Nearest station, Temple, District Railway.

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

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

Agents.

BRISTOL CHANNEL. Captain EDWARD HALL, 21, Dowlais Buildings, West Bute Street, Cardiff. (*Telephone No.: Cardiff 1268. Telegraphic Address: Topmast, Cardiff.*)

CLYDE ... ... Captain W. HENDERSON, 80, Buchanan Street, Glasgow, C.1. (*Telephone No.: Central 3775.*)

FORTH ... ... Captain G. MORE, Chief Dock Master's Office, Leith. (*Telephone No.: Leith 35481.*)

HUMBER ... W. H. CARR, Esq., Master Mariner, Ferensway Chambers, Ferensway, Hull. (*Telephone No.: Hull 16063.*)

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

TYNE ... ... Captain F. B. WEST, Customs House Chambers, Quayside, Newcastle upon Tyne, 1. (*Telephone No.: Newcastle 23203.*)

DERELICTS AND FLOATING WRECKAGE.

Date.	Position.		Description.	Date.	Position.		Description.
	Latitude.	Longitude.			Latitude.	Longitude.	
	NORTH SEA				**NORTH ATLANTIC**		
16.6.39	53°48′N.	0°22′E.	Buoy.	5.6.39	40°23′N.	72°23′W.	Capsized buoy, 6 ft. diameter, covered marine growth.
	ENGLISH CHANNEL			6.6.39	39°45′N.	54°40′W.	Red whistle buoy.
8.6.39	49°35′N.	3°07′W.	Conical buoy, white and black with letters HMSC.	14.6.39	49°16′N.	16°38′W.	Log.
	MEDITERRANEAN			16.6.39	48°10′N.	5°32′W.	2 red conical buoys, one marked No. 3.
15.6.39	41°16′N.	3°03′E.	Big iron cylinder.				

CHART OF THE WESTERN NORTH ATLANTIC.

Showing the North Atlantic Lane Routes in force during JULY as laid down by the Trans-Atlantic Track Convention. If at any time, owing to abnormal ice conditions, any alteration to the usual tracks is considered advisable by the track convention, particulars will be published on this chart. For full information concerning the North Atlantic Lane Routes see pages 61 and 62 of the April, 1939 number.

The periodic boundary within which ice has been observed is shown and a list of exceptional positions of ice observed in the North Atlantic during JULY is given. Ice sighted between JUNE 1st and 23rd, 1939, is indicated by symbol in the position reported, the figure giving the day of the month in JUNE. Information regarding ice conditions in Greenland waters and the Gulf of St. Lawrence will be published when available. Coastal wireless stations, with their call signs, which transmit ice signals are indicated by the symbol (W)

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

LANE ROUTES IN FORCE DURING JULY.

(See "Notice" at foot of chart.)

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

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

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

Steamers keep 10'N. of this track Westbound / 10'S. of this track Eastbound

Boundary within which Ice has been reported to the Meteorological Office JULY 1901 to 1938.

EXCEPTIONAL POSITIONS OF ICE.

Date.	Ship or Source of Report.	Position. Lat.	Position. Long.	Remarks.
June —, 1890	S.S. Slavonia ...	48°53'N.	24°11.W.	Last remnants of berg.
,, —, 1902	2 reports by Fishermen.	56°30'N. approx.	6°30'W.	40 to 50 ft. long, 15 ft. wide, 2 ft. 6 in. out of water.
,, 31, 1909	S.S. Shimosa ...	36°59'N.	30°01'W.	25 ft. long, 3 to 8 ft. wide.
July 10, 1913	S.S. Lothian ...	37°27'N.	36°48'W.	Piece 6 ft. high, 50 ft. in cir.
,, 18, 1916	U.S. Hydrographic Bulletin.	32°09'N.	54°26'W.	Piece of berg 3 or 4 ft. out of water.
,, 23, 1916	S.S. San Giorgio ...	42°09'N.	63°24'W.	Berg, 60 ft. long.
,, 23, 1918	U.S. Hyd. Bulletin...	44°25'N.	35°01'W.	Large berg.
,, 18, 1921	Do. ...	41°30'N.	39°26'W.	Small berg about 15 ft. sq.
,, 21, 1921	Do. ...	39°09'N.	40°39'W.	Berg.
,, 31, 1921	Do. ...	37°37'N.	27°29'W.	Berg.
,, 10, 1926	S.S. Chelatros ...	42°42'N.	36°45'W.	2 pieces of ice.
,, 16, 1933	S.S. Rein ...	52°32'N.	22°—'W.	Small piece of ice about 25 ft. long, 12 ft. wide.

ICE IN GREENLAND WATERS.

Information received by cablegram from Danish Meteorological Institute, Copenhagen.

6th June, 1939 "Ice edge 10 miles off Cape Farewell, consisting compact ice with bergs outside. Free of ice 20 miles off Cape Farewell. Julianehaab Bay free of ice."

NOTICE

UNITED STATES TRACKS.

Information was received from the Cunard White Star Line that in consequence of ice conditions, it was found necessary to make a temporary change in track to further south as from 30th May.

Eastbound—to cross the meridian of 47°W in Lat. 38°45'N.

Westbound—to cross the same meridian in Lat. 40°00'N until 4th June then cross in Lat. 39°30'N.

Track "A" was again reverted to both Eastbound and Westbound on 6th June. A further change was made to revert to normal Track "B" for vessels sailing Westbound on and after 20th June and Eastbound on and after 26th June.

H.M.S.O. Press, Cornwall House, S.E.1

JULY, M.O., 1939.

Ps 185/3691 Wt 21A. D.20. Gp.548. 1050. 6/39.

ROYAL SOCIETY OF ARTS

JOHN STREET, ADELPHI, LONDON, W.C.2

Thomas Gray Memorial Trust

PRIZES OFFERED IN 1939 FOR THE IMPROVEMENT AND ENCOURAGEMENT OF NAVIGATION

The Council of the Royal Society of Arts offer the following Prizes under the Thomas Gray Memorial Trust, which was established under the will of the late Thomas L. Gray for the purpose of founding a memorial to his father, Thomas Gray, C.B., who was for many years Assistant Secretary to the Board of Trade (Marine Department).

The objects of the Trust are " The advancement of the Science of Navigation and the Scientific and Educational interests of the British Mercantile Marine."

PRIZE FOR AN INVENTION

A Prize of £25 to any person who may bring to their notice an invention, publication, diagram, etc., which, in the opinion of the Judges is considered to be an advancement in the Science or Practice of Navigation, proposed or invented by himself in the period 1st January, 1934, to 31st December, 1939. Entries which have already been considered by the Judges in the years 1934–38 are not eligible for further consideration unless they have since been materially modified.

In the event of more than one such improvement being approved, the Council reserve the right of dividing the amount into two or more prizes at their discretion. Competitors must forward their proofs of claim on or before 31st December, 1939, to the Secretary, Royal Society of Arts, at the above address.

PRIZE FOR AN ESSAY

A Prize of £25 for an essay on the following subject :—

THE CARRIAGE OF DANGEROUS GOODS BY SEA

How should goods of this nature be stowed, and in the event of leakage or other dangerous conditions arising, what action should be taken ? (Apart from formal regulations, any ideas you may have, or ideas based on cases which have come under your notice, are desired.)

For the guidance of competitors some articles of commerce which require special care or which may become a serious danger to shipping are given as follows :—

Explosives ; Compressed " permanent," liquefied and dissolved gases ; Substances which become dangerous by interaction with water or air ; Substances giving off inflammable vapours ; Corrosive substances ; Poisonous substances ; Miscellaneous.

Competitors must send in their essays not later than 31st December, 1939, to the Secretary, Royal Society of Arts, at the above address.

The essays must be typed in English. They must be sent in under a motto, accompanied by an envelope enclosing the author's name, which must on no account be written on the essay. A breach of this regulation will result in disqualification.

Both competitions are open to persons of any nationality, but, in the case of the Essay Competition only, competitors must be past or present members of the seafaring profession.

The Judges will be appointed by the Council.

The Council reserve the right of withholding a Prize or of awarding a smaller Prize or Prizes, if in the opinion of the Judges no suitable invention or essay is submitted.

The Council also reserve an option on the copyright of the successful essay or essays, but do not claim any rights in respect of any invention to which a prize may be awarded.

K. W. LUCKHURST,
Secretary.

APRIL, 1939.

FLEET LIST.

VOLUNTARY OBSERVING SHIPS.

The following is a complete list of British observing ships regularly co-operating with the Marine Division of the Meteorological Office.

The names of the Captains, Observing Officers, and, in the case of Selected ships, Wireless Operators, are given as ascertained from the last written return received. Meteorological Logs, Records, and W/T Weather Registers received up to the date specified at the head of the seventh column are referred to by Form number, with commencing and ending dates of period covered by the returns; the date of receipt of the last return received is given in the eighth column.

All returns received from observing ships will be acknowledged, direct to the ship by the Marine Superintendent. The Port Meteorological Officers and Merchant Navy Agents at the ports will make personal calls on the Captains and Observing Officers as opportunity offers, or on notification from the ship at any time when their services are desired.

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

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

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

The number of voluntary observing ships is limited to a maximum total of 360.

The number of Selected Ships detailed to carry out the voluntary service provided for in Clause (C) of Article 35 of the Convention for Safety of Life at Sea, Merchant Shipping (Safety and Load Line Conventions) Act, 1932, is determined by the British proportion of the world's tonnage; and is at present 276.

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

Explanation of Abbreviations.

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

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

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

M.S. = Motor Ship.

(t-e) = Turbo-electric.

S.T. = Steam Trawler.

(tank) = Tanker.

Ships having no such letters after their names are steamships.

Abbreviations in Equipment Column.

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

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

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

M.-S. = Ship having her own mercurial barometer, but partly equipped with other tested Meteorological Office instruments.

A. = Ships' own aneroid.

Name of Vessel.	Captain.	Observing Officers.	Senior Wireless Operator.	Meteorological Instrument Equipment.	Owners.	Logs, Registers, or Records Contributed up to 7.6.39		Date Last Return Received.
275 †† *Abosso*, M.S. ...	J. C. Shooter	A. C. Large, R. Gray ...	G. Arrowsmith	M.-S.	Elder Dempster Lines, Ld.	Fms. 911 & 138	9.2.39 to 4.5.39	8.5.39
122 †† *Accra*, M.S. ...	P. Sola, D.S.O., Lieut. Commr., R.N.R.	F. Lomax, S. V. Wallace, B. W. Chapman.	R. J. Dowling ...	,,	,, ,,	,, ,,	24.2.39 to 19.5.39	30.5.39
123 †† *Adda*, M.S. ...	C. C. Cave	C. H. Rhodes, H. Pattison ...	A. J. H. Edwards	,,	,, ,,	,, ,,	3.3.39 to 28.5.39	5.6.39
090 *† *Aeneas*	T. B. Marsham... ...	J. H. Kirk, J. W. Patterson, I. H. Laing.	A. J. Dart ...	S.	A. Holt & Co. ...	,, ,,	20.3.39 to 11.4.39	8.5.39
166 *† *Agamemnon*, M.S.	J. O'Connor	J. H. Finch, J. R. Cheetham, W. C. McGuigan.	A. C. Nevin ...	,,	,, ,, ...	,, ,,	14.11.38 to 28.2.39	4.3.39
065 †† *Akaroa* ...	W. G. Summers ...	H. H. Falkiner, A. G. Mackenzie, J. G. Fairgrieve.	R. T. Soames ...	,,	Shaw, Savill & Albion Co., Ld.	,, ,,	30.10.38 to 1.2.39	4.2.39
245 †† *Alaunia*	R. Spencer, R.D., Capt., R.N.R.	F. J. Storey, H. F. Denison, R. O. Price.	M. Boome ...	,,	Cunard White Star Ld.	,, ,, Fm. 912	9.4.39 to 29.5.39 7.5.39 to 29.5.39	2.6.39 2.6.39
*† *Albion Star* ...	H. Palmer	... ...	... ...	M.	Blue Star Line, Ld.	... ...	... ...	...
129 †† *Alcantara* ...	T. J. C. Buret, D.S.C.	T. B. Bolland, G. W. Medlycott, T. W. Stevens.	W. Smith ...	M.-S.	Royal Mail Lines, Ld.	Fms. 911 & 138	14.3.39 to 16.4.39	18.4.39
175 †† *Almanzora* ...	H. P. Womersley ...	G. S. Grant, R. Shinn, R. S. Holland.	J. Caldwell ...	S.	,, ,, ,,	,, ,,	4.2.39 to 15.5.39	17.5.39
086 †† *Almeda Star* ...	H. C. Howard	J. L. Anson, C. C. Parsons, G. Simpson.	P. Norwood ...	M.-S.	Blue Star Line, Ld.	,, ,,	19.2.39 to 12.4.39	15.4.39
022 *† *Alynbank*, M.S.	B. H. Bulman	J. Murray, D. H. Morris ...	J. W. Hunter ...	S.	A. Weir & Co. ...	,, ,,	24.12.38 to 22.2.39	3.4.39
160 *† *Amarapoora* ...	S. Sinclair-Duncan ...	K. I. McLeod	A. M. Douglas...	,,	P. Henderson & Co.	,, ,,	19.2.39 to 28.4.39	4.5.39
*† *Amsterdam* ...	A. P. Sutton	F. B. Allen, E. J. Gould ...	D. T. Wright ...	,,	L. & N. E. Rly....	,, ,,	1.3.39 to 31.5.39	5.6.39
006 †† *Andalucia Star*	R. Vernon	J. A. Elliott, D. P. Shippobotham, C. C. Parsons.	R. Gregory ...	M.-S.	Blue Star Line, Ld.	,, ,,	6.2.39 to 29.5.39	1.6.39
113 *† *Andania* ...	H. R. Oulsnam, R.D., Commr., R.N.R.	J. H. Walker, K. M. Nicholson, A. Thompson.	J. Doyle ...	S.	Cunard White Star, Ld.	,, ,, Fm. 912	26.2.39 to 29.4.39 11.4.39 to 13.5.39	16.5.39 16.5.39
040 *† *Anselm*	F. C. P. Harris ...	J. W. Layman, R. Richardson, R. Heybrun.	J. O'Sullivan ...	,,	Booth S.S. Co., Ld.	Fms. 911 & 138	17.1.39 to 19.5.39	30.5.39
259 *† *Antonia* ...	R. Sharp, R.D., Commr., R.N.R.	J. E. Wolfender, L. K. Goodier, G. T. Kavanagh.	A. F. L. Crosby...		Cunard White Star, Ld.	,, ,, Fm. 912	12.3.39 to 26.5.39 27.4.39 to 26.5.39	30.5.39 30.5.39

Name of Vessel.	Captain.	Observing Officers.	Senior Wireless Operator.	Meteorological Instrument Equipment.	Owners.	Logs, Registers, or Records Contributed up to 7.6.39.		Date Last Return Received.
120 †† *Apapa*, M.S. ...	E. Vaughan Davies ...	W. J. Holt, G. H. Drinkwater	J. Rea	M.-S.	Elder Dempster Lines, Ld.	Fms. 911 & 138	27.1.39 to 21.4.39	25.4.39
017 †† *Aquitania* ...	J. C. Townley, R.D., Capt., R.N.R.	J. W. Tone, J. D. Armstrong, J. A. Halcrow	S. W. Brown ...	S.	Cunard White Star, Ld.	„ „	26.2.38 to 4.5.39	6.5.39
						Fm. 912	26.2.38 to 4.5.39	6.5.39
201 †† *Arandora Star* ...	E. W. Moulton ...	F. S. Hambridge, P. Toynbee L. Donoghue.	S. T. Williams ...	M.-S.	Blue Star Line, Ld.	Fms. 911 & 138	22.1.39 to 4.5.39	10.5.39
248 *† *Arawa*	T. V. Roberts, R.D., Capt., R.N.R.	W. G. Burt, E. Snaith, B. H. Forgham.	H. Tanner ...	,,	Shaw, Savill & Albion Co., Ld.	„ „	29.1.39 to 8.5.39	20.5.39
114 *† *Ariguani* ...	R. A. Thorburn, R.D., Commr., R.N.R.	T. C. Crane, J. Hughes ...	B. M. Evans ...	S.	Elders & Fyffes, Ld.	„ „	25.3.39 to 20.5.39	6.6.39
092 †† *Arundel Castle* ...	C. E. H. Aylen, R.D., Commr., R.N.R.	R. M. Wright	W. Townsend ...	,,	Union-Castle Mail S.S. Co., Ld.	„ „	4.2.39 to 11.5.39	13.5.39
233 †† *Ascania* ...	E. M. Fall, D.S.C., R.D., Capt. R.N.R.	T. Johnston, H. L. Pryse ...	J. W. Haynes ...	,,	Cunard White Star, Ld.	„ „	27.3.39 to 12.5.39	16.5.39
013 †† *Asturias* ...	F. R. Miles, R.D., Capt., R.N.R.	R. J. Finch, C. J. Webster, F. O. Plunkett.	T. Bradfield ...	,,	Royal Mail Lines, Ld.	„ „	22.2.39 to 19.5.39	30.5.39
115 †† *Athenia*	J. Cook	J. J. Emery, K. G. Crockett, C. Porteous.	D. Don	,,	Donaldson Line...	„ „	15.4.39 to 6.5.39	10.5.39
028 †† *Athlone Castle*, M.S.	E. S. Vincent, R.D., Commr., R.N.R.	J. Tait	J. Hodgson ...	,,	Union-Castle Mail S.S. Co., Ld.	„ „	17.2.39 to 24.5.39	30.5.39
197 †† *Atlantis*	A. Cocks, D.S.C., R.D., Capt., R.N.R. ...	E. A. C. Littlewood, T. B. Gray.	W. H. Chick ...	M.-S.	Royal Mail Lines, Ld.	„ „	26.1.39 to 3.5.39	8.5.39
208 *† *Aurania* ...	A. R. Macdonald ...	G. E. Newey, H. Morgan ...	A. F. L. Crosby ...	S.	Cunard White Star, Ld.	„ „	21.2.39 to 3.6.39	5.6.39
						Fm. 912	18.4.39 to 3.6.39	5.6.39
103 *† *Ausonia* ...	C. H. Bate, R.D., Capt. R.N.R.	H. A. Stonehouse, A. H. Young, W. J. Law.	... ...	,,	,, ,,	Fms. 911 & 138	7.3.39 to 20.5.39	24.5.39
						Fm. 912	30.4.39 to 18.5.39	24.5.39
046 *† *Australia Star*, M.S.	J. Fisher	J. Davis, C. Munday, G. G. Case.	W. Rollason ...	M.-S.	Blue Star Line, Ld.	Fms. 911 & 138	19.10.38 to 24.1.39	28.1.39
133 †† *Avelona Star* ...	G. E. Hopper	J. E. Taylor, L. V. Seymour, J. J. Redden.	F. Annett ...	,,	,, ,,	„ „	26.12.38 to 16.4.39	22.4.39
045 †† *Avila Star* ...	R. J. Thomas	S. Dickens	H. Varley ...	,,	,, ,,	„ „	12.3.39 to 29.4.39	12.5.39
110 *† *Balmoralwood* ...	O. Stoker - Johnson, D.S.C.	K. D. Castling, G. Norton, A. A. Alexander.	W. B. Charlton	S.	Constantine Steamships, Ld.	„ „	21.1.39 to 28.5.39	31.5.39
						Fm. 912	19.4.39 to 28.5.39	30.5.39
*† *Baronesa* ...	G. Brien	S. Howard, C. Lyndon, P. Boothy.	F. W. Miller ...	M.	Furness Lines ...	Fms. 911 & 138	26.1.39 to 17.3.39	22.3.39
209 *† *Bassano*... ...	A. H. Best	J. E. Stott, S. G. Poskitt ...	C. G. O'Keeffe	S.	Ellerman's Wilson Line, Ld.	„ „	1.3.39 to 19.5.39	23.5.39
						Fm. 912	15.4.39 to 25.4.39	23.5.39
180 *† *Beaverbrae* ...	H. J. Ferguson ...	G. M. Ball, D. Ewing, R. Walgate.	T. A. Evans ...	M.-S.	Canadian Pacific Steamships, Ld.	Fms. 911 & 138	26.2.39 to 23.5.39	2.6.39
						Fm. 912	26.2.39 to 23.5.39	2.6.39
130 *† *Beaverburn* ...	W. Stanfield	S. P. Berna, D. H. Coughlin, F. H. Stell.	S. J. Taylor ...	,,	,, ,,	Fms. 911 & 138	18.3.39 to 14.5.39	17.5.39
						Fm. 912	23.4.39 to 14.5.39	17.5.39
138 *† *Beaverdale* ...	H. Pettigrew	E. H. Smith, B. R. Russell, J. Shearer.	J. Ormiston ...	,,	,, ,,	Fms. 911 & 138	19.2.39 to 29.5.39	5.6.39
						Fm. 912	6.5.39 to 29.5.39	5.6.39
232 *† *Beaverford* ...	E. J. Jones	B. Charles, G. W. Barr, P. Locke.	J. J. Frazer ...	,,	,, ,,	Fms. 911 & 138	11.3.39 to 12.5.39	18.5.39
						Fm. 912	11.3.39 to 12.5.39	18.5.39
*† *Benarty*... ...	J. Watt	A. Ramsay, F. Tait, N. Crowe	E. J. Hathway...	M.	W. Thomson & Co.	Fm. 911	19.2.39 to 18.5.39	26.5.39
*† *Benledi*	J. H. Patterson ...	G. Naysmith, J. Brighty, R. Pew.	D. Glen... ...	,,	,, ,,	„ „	30.1.39 to 21.5.39	6.6.39
*† *Benmohr* ...	J. C. Sinclair	J. Brown, A. Griffiths, G. W. Patterson.	A. G. Bulmer ...	M.L.	,, ,,	Fm. 915	14.8.38 to 22.12.38	3.1.39
111 *† *Benwyvis* ...	H. J. Small	W. M. Marshall, W. P. Gollan, N. Fraser.	D. H. Walker ...	M.	,, ,,	Fms. 911 & 138	19.2.39 to 3.5.39	8.5.39
145 *† *Berwickshire* ...	A. R. Cossar	H. W. Chadd, G. Stronach, E. Roberts.	W. G. Peddie ...	S.	Turnbull, Martin & Co., Ld.	„ „	14.3.39 to 2.4.39	29.4.39
007 *† *Bradfyne* ...	R. G. Banner	D. Marks, P. Evans, R. Jones	J. N. Collins ...	,,	Sir Wm. Reardon Smith & Partners, Ld.	„ „	15.12.38 to 15.3.39	11.4.39
*† *Brighton* ...	B. Shaw	H. L. Smith	... ...		Southern Rly. ...	„ „	4.4.39 to 17.5.39	22.5.39
*† *Brisbane Star*, M.S.	F. N. Riley	M. B. N. Tallack, C. Horton, G. Goodman.	M. F. Guiny ...	M.-S.	Blue Star Line ..	„ „	22.11.38 to 1.3.39	11.3.39
189 †† *Britannic*, M.S.	G. Gibbons, R.D., Capt. R.N.R.	W. G. Fitzgerald, W. G. Robinson.	A. G. Hill ...	S.	Cunard White Star, Ld.	„ „	26.3.39 to 12.5.39	16.5.39
106 *† *British Colonel* (tank)	E. Miller	W. Dick, W. Forsyth, A. G. Max.	J. W. Ryder ...	M.	British Tanker Co., Ld.	„ „	17.10.38 to 22.1.39	31.1.39
038 *† *British Corporal* (tank)	J. Cunningham ...	S. Wilkinson, H. G. Wood ...	C. Hutchings ...	,,	,, ,,	„ „	3.1.39 to 10.4.39	15.4.39
153 *† *British Endurance*, M.S. (tank)	R. O. Putt	M. Hutchinson, J. D. Johnston	H. D. Johnston	,,	,, ,,	„ „	23.2.39 to 10.5.39	15.5.39
054 *† *British General* (tank)	W. D. Jefferies... ...	D. M. H. Walker, R. S. Hughes. W. D. Cayton.	W. A. Gillies ...	,,	,, ,,	„ „	11.3.39 to 5.5.39	10.5.39
249 *† *British Grenadier* (tank)	J. A. Ferrier	E. J. Simpson, D. L. O. Smith, C. H. Humphries.	T. Gledhill ...	,,	,, ,,	„ „	2.3.38 to 28.5.38	2.6.38
*† *British Gunner* (tank)	C. W. G. Stook ...	R. A. Harrison, H. A. Scott, E. W. Shingler.	T. H. Knill ...	,,	,, ,,	Fm. 911	19.3.39 to 8.5.39	10.5.39
257 *† *British Hussar* (tank)	F. O. Armstrong ...	R. L. Campbell, G. R. Mackillican, B. W. Hope.	R. W. Mortimer	,,	,, ,,	Fms. 911 & 138	26.2.39 to 21.5.39	31.5.39
076 *† *British Officer* (tank)	R. H. Guswell	R. M. Anderson, K. Johnson, L. Homline.	R. P. Allen ...	,,	,, ,,	„ „	20.2.39 to 28.4.39	8.5.39
*† *British Power* (tank)	E. G. Dobson	N. Walton, G. Bayless ...	J. Ward ...	,,	,, ,,	„ „	28.2.39 to 15.4.39	2.5.39
*† *British Premier* (tank)	B. M. Naylor	P. Taylor, C. Forster, D. Turney.	A. J. Locke ...	,,	,, ,,	„ „	16.2.39 to 10.5.39	5.6.39
*† *British Resolution* M.S. (tank)	J. C. Leybourne ...	A. G. Davidson, J. S. Weddle, H. J. Wire.	L. G. Sparks ...	,,	,, ,,	Fm. 911	1.1.39 to 14.5.39	5.6.39
225 *† *British Statesman* (tank)	T. Gaffney	H. Evans, B. Samuel, H. S. Munn.	W. R. Dunderdale	,,	,, ,,	Fms. 911 & 138	5.3.39 to 30.5.39	5.6.39
273 *† *British Strength*, M.S. (tank)	R. G. Mott	T. W. Cuffley, S. A. Cave, E. G. Basley.	J. Cunningham	,,	,, ,,	Fm. 911	30.1.39 to 15.5.39	31.5.39
*† *British Workman* (tank)	S. D. Bumstead ...	R. Basilhewis, J. P. M. Samson, J. Mason.	J. M. Mullin ...	,,	,, ,,	Fms. 911 & 138	19.2.39 to 13.5.39	30.5.39
200 *† *Cairnesk* ...	E. A. Organ	W. L. Canney, S. W. Parks, J. Henderson.	R. A. Penny ...	S.	Cairns, Noble & Co., Ld.	„ „	9.4.39 to 15.5.39	18.5.39
						Fm. 912	9.4.39 to 14.5.39	18.5.39
241 *† *Cairnglen* ...	A. W. Melling	F. W. Fairley	R. A. Penny ...	,,	,, ,,	Fms. 911 & 138	13.2.39 to 14.3.39	17.3.39
						Fm. 912	13.2.39 to 14.3.39	17.3.39
072 *† *Cairnmona* ...	A. C. Dickson	A. L. S. Wapp, J. C. Anderson, J. R. S. Preston.	J. Jackson ...	,,	,, ,,	Fms. 911 & 138	23.4.39 to 22.5.39	24.5.39
						Fm. 912	23.4.39 to 13.5.39	24.5.39
112 *† *Cairnross* ...	T. J. Baker	D. Easson, A. J. Dunn, F. Usher.	H. Jardine ...	,,	,, ,,	Fms. 911 & 138	8.1.39 to 28.5.39	31.5.39
						Fm. 912	18.3.39 to 28.5.39	30.5.39
075 *† *Cairnvalona* ...	A. C. Dickson	R. Armstrong, A. Molineux, E. Cairns.	J. Sargent ...	,,	,, ,,	Fms. 911 & 138	8.11.38 to 5.12.38	8.12.38
031 †† *Caledonia* ...	A. Collie	G. Ramage, G. Howson, H. L. P. King.	J. F. Reid ...	,,	Anchor Line, Ld.	„ „	24.3.39 to 24.5.39	26.5.39
						Fm. 912	5.3.39 to 24.5.39	26.5.39
077 †† *California* ...	R. W. Smart	H. D. Campsie, J. D. Mackenzie, R. T. Caldwell.	D. Thompson ...	,,	,, ,,	Fms. 911 & 138	19.2.39 to 11.5.39	13.5.39
						Fm. 912	19.2.39 to 11.5.39	13.5.39

	Name of Vessel.	Captain	Observing Officers.	Senior Wireless Operator.	Meteorological Instrument Equipment.	Owners.	Logs, Registers, or Records Contributed up to 7.6.39		Date Last Return Received.
	*† *Cambria* ...	A. Marsh	S. P. Pritchard	J. Pritchard ...	S.	L.M. & S. Rly. ...	Fms. 911 & 138	6.2.39 to 19.5.39	1.6.39
223	*† *Cambridge* ...	A. Angell	G. E. Mason, J. B. Rose, A. M. Ducat.	P. McConnachie	,,	Federal S.N. Co., Ld.	,, ,,	15.1.39 to 7.5.39	12.5.38
042	†† *Cameronia* ...	G. B. Kelly	D. Barclay, R. Crawford, J. Baxter.	W. Ness ...	,,	Anchor Line, Ld.	,, ,,	9.4.39 to 29.4.39	3.5.39
							Fm. 912	21.4.39 to 29.4.39	3.5.39
252	*† *Camito*	R. J. Bostock	A. MacCallum	R. E. Blizzard ...	,,	Elders & Fyffes, Ld.	Fms. 911 & 138	14.2.39 to 21.5.39	23.5.39
037	††*Canton*	H. M. Jack	... ...	... ...	M.-S.	P. & O. S.N. Co.	... ...	... ...	...
117	*† *Cape of Good Hope* M.S.	A. T. McGlashan ...	J. S. Binnie, P. A. Wallace, A. W. J. Justen.	S. E. Cowling ...	S.	Lyle Shipping Co., Ld.	Fms. 911 & 138	12.11.38 to 29.11.38	7.2.39
188	†† *Capetown Castle*, M.S.	E. J. Thornton, R.D., Capt., R.N.R.	A. O. Wilkins...	H. Oliver ...	,,	Union Castle Mail SS. Co. Ld.	,, ,,	3.3.39 to 14.4.39	15.4.39
266	†† *Carinthia* ...	A. C. Greig, O.B.E., R.D., Capt., R.N.R....	T. T. Sheehan, J. C. Bryce, W. J. Foster.	A. F. Porter ...	,,	Cunard White Star, Ld.	,, ,,	22.4.39 to 13.5.39	16.5.39
264	†† *Carnarvon Castle*, M.S.	A. H. Blackman ...	A. O. White	A. G. Blow ...	,,	Union Castle Mail S.S. Co., Ld.	,, ,,	10.3.39 to 19.4.39	22.4.39
155	†† *Carthage* ...	H. Williams	P. M. Jones, A. E. Clay, A. A. Terry.	F. Rose ...	M.-S.	P. & O. S.N. Co.	,, ,,	20.11.38 to 22.2.39	25.2.39
184	†† *Cathay*	H. R. Rhodes	W. W. Crow, H. N. Simms, H. M. Askin.	E. L. Boyce ...	,,	,, ,, ,,	,, ,,	4.3.39 to 22.3.39	28.3.39
127	*† *Cavina*	W. T. Forrester, O.B.E.	J. A. Duff	A. N. Taylor ...	S.	Elders & Fyffes, Ld.	,, ,,	7.3.39 to 7.5.39	9.5.39
	*† *Celtic Monarch*...	G. C. Winchester ...	J. T. Craigie, H. Downie, E. Lascelle.	... ...	M.L.	MonarchS.S.Co.Ld.	Fm. 915	9.8.38 to 18.12.38	18.4.39
011	†† *Ceramic* ...	H. C. Elford	V. H. Vizer, W. Dickson, W. J. Strange.	W. M Ross ...	S.	Shaw, Savill & Albion Co., Ld.	Fms. 911 & 138	20.2.39 to 17.5.39	22.5.39
029	*† *Cheshire*, M.S. ...	C. Fountain	A. N. Williamson, W. Depledge, C. Tose.	F. W. Greaves ...	,,	Bibby Bros. & Co.	,, ,,	9.2.39 to 4.5.39	5.6.39
067	*† *Chinese Prince*, M.S.	W. Irvine	D. G. P. Tait, A. H. Kent, E. J. Roberts, D. George.	D. T. de Witt ...	M.L.	Furness Lines Ld.	Fm. 915	13.9.38 to 23.12.38	18.1.39
192	†† *Chitral*	W. E. L. S. Pocock ...	F. E. French, J. A. Cotching, H. G. Ball.	W B. Goodsell	M.-S.	P. & O. S.N. Co.	Fms. 911 & 138	26.2.39 to 2.5.39	10.5.39
051	*† *City of Auckland*	H. G. Jenkins, O.B.E.	J. C. Storey, R. G. Jones, T. V. Birkett.	P. J. Cummings	S.	Ellerman Lines, Ld.	,, ,,	26.3.39 to 19.4.39	1.5.39
135	*† *City of Barcelona*	E. J. Myles	H. G. Williams, A. N. Field ...	J. J. Bunbury ...	M.	,, ,, ,,	,, ,,	17.1.39 to 20.5.39	30.5.39
265	*† *City of Baroda*	G. P. M. O'Halloran ...	N. S. P. Bradbury, R. H. Radley, R. S. Steel.	L. D. Hooper ...	S.	,, ,, ,,	,, ,,	13.3.38 to 28.5.39	31.5.39
057	††*City of Benares* ...	A. Lee	H. H. Asher, I. S. Tough ...	A. B. Fairweather	M.-S.	,, ,, ,,	,, ,,	27.3.39 to 11.5.39	18.5.39
	*† *City of Bombay*...	O. Cheverton-Brown ...	G. R. Jackson, J. A. Beynon, O. G. Williams.	J. C. Scott ...	,,	,, ,, ,,	,, ,,	27.3.39 to 17.4.39	28.4.39
158	*† *City of Cairo* ...	A. J. Phillip	F. Nuttall, H. N. Jones, C. G. Parry.	G. S. Creighton	M.	,, ,, ,,	,, ,,	27.2.39 to 4.5.39	9.5.39
215	*† *City of Canberra*	H. R. Jackson ...	D. W. Penberthy, H. Ward, J. Sapp.	C. Kerridge ...	,,	,, ,, ,,	,, ,,	27.2.39 to 19.4.39	5.6.39
033	*† *City of Canton* ...	E. Scrymgeour... ...	R. W. Tyrrell, W. A. Lambert, E. Routledge.	T. J. C. Manson	,,	,, ,, ,,	,, ,,	1.2.39 to 3.4.39	11.4.39
157	*† *City of Delhi* ...	F. W. Penberthy ...	H. A. Rose, P. C. Arthur, D. Thorsen.	T. A. Walker ...	S.	,, ,, ,,	,, ,,	11.3.39 to 11.4.39	28.4.39
030	*† *City of Dieppe*	W. J. Merchant ...	E. A. Chapman, J. F. Mitchell, E. N. Colville.	A. Emslie ...	,,	,, ,, ,,	,, ,,	21.1.39 to 10.5.39	17.5.39
049	*† *City of Evansville*	G. Vickers	P. Winship, B. M. Postlethwaite, R. H. Broadbent.	C. W. Manley ...	M.	,, ,, ,,	,, ,,	20.1.39 to 6.5.39	16.5.39
220	†† *City of Exeter* ...	A. V. Radcliffe ...	P. C. Wilson, V. H. Lewis, O. J. Inglis.	L. Hugo ...	S.	,, ,, ,,	,, ,,	12.12.38 to 18.2.39	18.4.39
089	*† *City of Hereford*	R. A. Grove	T. F. Symons, I. M. McBeath, A. J. Tyrell.	J. R. Birch ...	M.	,, ,, ,,	,, ,,	17.2.39 to 4.5.39	22.5.39
237	†† *City of London*...	R. P. Longstaff ...	W. G. McCulloch, G. Stewart.	O. A. Read ...	S.	,, ,, ,,	,, ,,	1.3.39 to 18.5.39	30.5.39
							,, ,,	21.3.39 to 21.4.39	9.5.39
256	*† *City of Lyons* ...	T. Cooper	A. Spence, G. H. Hatkins, A. J. Bushell.	H. E. Kendall ...	M.	,, ,, ,,	Fm. 912	14.4.39 to 21.4.39	9.5.39
066	†† *City of Nagpur*...	D. L. Lloyd	J. Stuart, J. G. Makin ...	A. E. Dove ...	S.	,, ,, ,,	Fms. 911 & 138	6.2.39 to 15.4.39	18.4.39
074	†† *City of Paris* ...	L. Nicol	W. G. Stubbs, A. J. Barnett, C. Clark.	G. Fenton ...	,,	,, ,, ,,	,, ,,	14.12.37 to 13.2.38	21.2.38
271	*† *City of Roubaix*	H. G. T. Booth ...	T. M. Williams, C. G. E. Griffith, F. C. O'Neill.	V. H. Davis ...	M	,, ,, ,,	,, ,,	20.2.39 to 13.4.39	5.6.39
272	*† *City of Singapore*	T. R. Watkins	L. E. Brook, S. G. Hider, J. M. Hatherley.	H. Cant... ...	,,	,, ,, ,,	,, ,,	5.2.39 to 23.4.39	8.5.39
035	*† *City of Sydney* ...	W. Hill	R. Clark.	B. M. Wills ...	,,	,, ,, ,,	,, ,,	12.2.39 to 9.3.39	1.4.39
167	*† *City of Tokio* ...	G. Burton	J. H. Aldridge, R. K. Walker, M. L. Hernan.	J. C. Creighton	S.	,, ,, ,,	,, ,,	19.3.39 to 29.3.39	21.4.39
136	*† *City of Winchester*	W. S. Coughlan ...	H. Laird, W. Scott-Craig, H. Lewis.	M. J. Farrelly ...	,,	,, ,, ,,	,, ,,	22.2.39 to 17.3.39	11.5.30
125	*† *City of Windsor*	E. E. Bulkeley ...	J. Vizer, N. Bradley, H. G. White.	P. T. McKinlay	,,	,, ,, ,,	,, ,,	19.4.39 to 7.5.39	20.5.39
027	*† *Clan Farquhar* ...	C. E. O'Byrne	F. Sherratt, C. J. Harris, J. Browne.	A. Maclennon ...	M.	Clan Line Steamers, Ld.	,, ,,	19.2.39 to 28.3.39	3.4.39
050	*† *Clan Macalister*	R. W. Mackie... ...	P. Philip, E. G. G. Mobbs, K. Banks.	C. J. Andrews ...	S.	,, ,, ,,	,, ,,	10.1.39 to 28.3.39	3.4.38
222	*† *Clan Macdougall*, M.S.	C. C. Parfitt	G. Matheson, K. W. Davies, S. Brett.	H. A. Croft ...	,,	,, ,, ,,	,, ,,	10.2.39 to 10.4.39	21.4.39
101	*† *Clan Macfarlane*	H. Andrews	A. Macdonald, R. G. Gardener	W. G. Ellison ...	,,	,, ,, ,,	,, ,,	1.3.39 to 22.5.39	30.5.39
118	*† *Clan Macindoe*...	A. G. Macpherson ...	A. T. May, K. Simson, W. R. Williamson.	J. Badcock ...	,,	,, ,, ,,	,, ,,	8.3.38 to 24.4.39	29.4.39
082	*† *Clan Macnair* ...	R. J. W. Bennet ...	R. W. Crawford	N. G. N. ...	,,	,, ,, ,,	,, ,,	6.2.39 to 29.3.39	5.4.39
255	*† *Clan Macneil* ...	H. E. G. Scott Smith, O.B.E., R.D., Lieut.-Commr., R.N.R.	J. C. Matheson, D. Devall, H. Whitehead.	W. Hayes ...	,,	,, ,, ,,	,, ,,	7.3.39 to 23.5.39	1.6.39
001	*† *Clan Macphee* ...	H. C. Simpson ...	R. C. Steel, T. Gillies, R. Lumsden.	W. Scott ...	,,	,, ,, ,,	,, ,,	4.2.39 to 23.4.39	1.5.39
188	*† *Clan Mactaggart*	F. W. Last	F. Chisholm	J. G. Wood ...	,,	,, ,, ,,	,, ,,	13.12.38 to 21.2.39	25.2.39
261	*† *Clan Mactavish*	R. P. Galer, R.D., Capt., R.N.R.	A. Clark, S. R. Woods, J. E. Clayton.	A. M. Forbes ...	,,	,, ,, ,,	,, ,,	8.2.39 to 23.3.39	11.4.39
002	*† *Clan Macwhirter*	E. E. Arthur	W. P. Creak, A. Woodall, R. G. Bagnell.	J. Martin ...	,,	,, ,, ,,	,, ,,	16.3.39 to 30.5.39	2.6.39
109	*† *Clan Morrison* ...	B. A. Hardinge ...	J. H. Holman, D. Carmichael	—. Glen ...	,,	,, ,, ,,	,, ,,	11.2.39 to 28.5.39	6.6.3
214	*† *Clement* ...	R. B. Furneaux ...	H. Sapsworth, H. J. Gill ...	T. P. Jones ...	,,	BoothS.S. Co., Ld.	,, ,,	8.3.39 to 11.5.39	16.5.39

Name of Vessel.	Captain.	Observing Officers	Senior Wireless Operator.	Meteorological Instrument Equipment.	Owners.	Logs, Registers, or Records Contributed up to 7.6.39		Date Last Return Received.
041 *† *Clydebank*, M.S.	W. Broome	E. F. Brownlee, J. Body, E. W. Dibble.	N. W. Goodman	S.	A. Weir & Co. ...	Fms. 911 & 138	2.2.39 to 22.4.39	5.6.39
084 *† *Clydefield*, M.S. (tank)	D. A. Law	M. H. Hooker, H. L. Humphries, W. C. Moore.	M. J. Little ...	,,	Hunting & Son, Ld.	,, ,,	27.3.39 to 26.4.39	29.4.39
016 *† *Comliebank*, M.S.	R. C. Jones	M. Maugham, W. Thompson, B. Brumby.	A. S. G. Broadbent.	,,	A. Weir & Co. ...	,, ,,	2.3.39 to 15.5.39	30.5.39
Como	E. S. Green	C. Newton	... ...	M.L.	Ellerman's Wilson Line	Fm. 915	17.12.38 to 12.5.39	25.5.39
185 †† *Comorin* ...	W. L. Pope, R.D., Capt., R.N.R.	P. C. Reid, E. J. Spurling, D. A. W. Bell.	E. Howard ...	M.-S	P. & O. S.N. Co.	Fms. 911 & 138	27.11.38 to 1.3.39	6.3.39
069 *† *Consuelo* ...	J. L. Sibree, R.D., Capt., R.N.R.	C. E. Holland, J. B. Dunkley, F. Ellison.	J. Greer ...	S.	Ellerman's Wilson Line, Ld.	,, ,,	9.2.39 to 2.6.39	6.6.39
198 *† *Contractor* ...	H. Collins	A. Moreton, W. H. Allen, R. Ledger.	G. Camm ...	M.-S.	T. & J. Harrison	,, ,,	13.2.39 to 17.4.39	19.4.39
258 †† *Corfu*	J. K. Chaplin, R.D., Capt., R.N.R.	N. W. Eade, C. W. Pierce, J. T. Sheffield.	R. V. McCreath	,,	P. & O. S.N. Co.	,, ,,	12.2.39 to 18.5.39	23.5.39
*† *Corrientes* ...	J. McBrown	H. Parrish	J. Limpitlaw ...	S.	Donaldson Line ...	,, ,,	15.4.39 to 15.5.39	30.5.39
191 *† *Crispin*	S. N. White, R.D., Capt. R.N.R.	A. A. Gerrard, S. Pollock, G. G. Roberts.	J. Moran ...	,,	Booth S.S. Co., Ld.	,, ,,	2.2.39 to 30.4.39	9.5.39
036 *† *Cumberland* ...	E. A. Burton	J. Lindsay, N. L. Warren, L. G. Hollis.	A. C. Taylor ...	,,	Federal S.N. Co., Ld.	,, ,,	11.10.38 to 6.3.39	11.3.39
274 *† *Custodian* ...	D. A. McCallum ...	W. G., J. R. C.	G. Roberts ...	,,	T. & J. Harrison	,, ,,	21.3.39 to 12.5.39	30.5.39
240 *† *Dalryan*... ...	D. J. Jones	E. C. A. Robson, C. S. Cleminson, J. Thompson.	W. L. T. Ellison	,,	Campbell Bros. & Co.	,, ,,	24.11.38 to 14.1.39	31.1.39
219 *† *Dearne*	R. H. Sherwood ...	R. Wise, G. W. Thompson,	R. D. Akers ...	,,	L.M. & S. Rly. ...	,, ,,	25.2.39 to 12.5.39	20.5.39
194 *† *Deebank* ...	G. S. Reed	B. Beavis, Finlayson, S. Forsyth.	M. McGowan ...	,,	A. Weir & Co. ...	,, ,,	5.1.39 to 26.2.39	13.3.39
204 †† *Derbyshire*, M.S.	G. L. English	A. Young, H. Davis, G. Allen.	D. McLellan ...	,,	Bibby Bros. & Co.	,, ,,	29.1.39 to 5.4.39	17.4.39
*† *Deucalion*, M.S.	W. Beswick, D.S.C., Commr., R.N.R.	H. J. Summers, A. R. Davidson, J. J. W. Johnston.	N. F. Brearley ...	,,	A. Holt & Co. ...	,, ,,	26.2.39 to 29.3.39	3.4.39
061 *† *Devon*	H. Goater	H. C. Turner, D. Bunn, G. Usher.	H. Ridgeway ...	M.-S.	British India S.N. Co., Ld.	,, ,,	21.11.38 to 30.12.38	4.1.39
*† *Diplomat* ...	J. J. Egerton	W. Rowland-Jones, W. P. Baker.	J. Hammond ...	M.	T. & J. Harrison	,, ,,	13.2.39 to 13.4.39	18.4.39
216 †† *Dominion Monarch*, M.S.	... ...	... ...	... ...	S.	Shaw Savill & Albion Ld.	... ...		...
096 *† *Don*	C. E. Tree	... ...	... ...	,,	Associated Humber Lines.	Fms. 911 & 138	1.4.39 to 21.5.39	24.5.39
058 *† *Dorset*, M.S. ...	C. Matthews	J. R. Vincent, H. J. Brownings, C. B. Poole.	M. G. Horlett ...	M.	Federal S.N. Co., Ld.	,, ,,	15.11.38 to 13.12.38	21.1.39
142 †† *Duchess of Atholl*	W. B. Coyle, R.D., Commr., R.N.R.	C. H. Belton, N. W. Whitfield, A. Mackie.	E. Murphy ...	M.-S.	Canadian Pacific Steamships, Ld.	,, ,,	4.3.39 to 2.6.39	5.6.39
						Fm. 912	16.4.39 to 2.6.39	5.6.39
152 †† *Duchess of Bedford.*	W. G. Busk-Wood, R.D., Commr. R.N.R.	E. J. Oatridge, E. Glennie, E. Moir.	A. O'Sullivan ...	,,	,, ,,	Fms. 911 & 138	5.3.39 to 18.5.39	23.5.39
						Fm. 912	5.3.39 to 18.5.39	23.5.39
151 †† *Duchess of Richmond.*	H. A. Moore, R.D., Capt., R.N.R.	R. McKillop, W. Ascroft, L. L. Thorton.	I. F. Yorston ...	,,	,, ,,	Fms. 911 & 138	26.2.39 to 12.5.39	15.5.39
						Fm. 912	26.2.39 to 12.5.39	15.5.39
143 †† *Duchess of York*	C. Richardson ...	W. A. Stanley, A. D. Morrison, F. W. Roberts.	J. W. Potts ...	,,	,, ,,	Fms. 911 & 138	19.2.39 to 25.5.39	1.6.39
						Fm. 912	19.2.39 to 25.5.39	1.6.39
*† *Duke of Argyll* ...	J. W. Richmond ...	W. Bleakley, S. Green ...	G. Poulton ...	S.	L.M. & S. Rly. ...	Fms. 911 & 138	2.2.39 to 8.5.39	15.5.39
*† *Duke of Lancaster*	E. B. Sergeant ...	J. Irwin, W. N. Greenwood ...	A. N. Davies ...	,,	,, ,, ...	,, ,,	24.2.39 to 5.6.39	6.6.39
*† *Duke of Rothesay*	F. C. Raven	A. E. Willmott, J. Abram ...	G. Pilling ...	,,	,, ,, ...	,, ,,	18.2.39 to 7.5.39	11.5.39
*† *Dunaff Head* ...	A. Niblick	J. McCllelard	T. Frazer ...	,,	G. Heyn & Son ...	,, ,,	8.4.39 to 22.5.39	25.5.39
						Fm. 912	8.4.39 to 23.5.39	25.5.39
098 †† *Dunbar Castle*, M.S.	H. A. Causton	J. J. Smith, R. H. Pope, G. W. Laurenson.	H. G. Liggins ...	,,	Union-Castle Mail S.S. Co., Ld.	Fms. 911 & 138	13.3.39 to 13.5.39	15.5.39
193 †† *Dunnottar Castle*, M.S.	R. Harris	D. Robertson, R. S. Davies	R. Brew ...	,,	,, ,, ...	,, ,,	26.2.39 to 23.4.39	25.4.39
043 †† *Dunvegan Castle*, M.S.	S. F. Newdigate ...	C. W. Armstrong	G. J. Owen ...	,,	,, ,, ...	,, ,,	15.12.38 to 3.1.39	7.1.39
093 †† *Durban Castle*, M.S.	E. E. Spradbrow ...	R. G. Pargitez	... ...	,,	,, ,, ...	,, ,,	14.1.39 to 26.2.39	6.3.39
064 *† *Durham*, M.S. ...	C. R. Pilcher	E. Porter, H. H. Mackillican, M. D. Hutby.	F. Shaw ...	M.-S.	Federal S.N. Co., Ld.	,, ,,	22.11.38 to 1.4.39	11.4.39
*† *Eastern Coast* ...	W. Quirk	R. E. Holt, E. Greenall ...	... ...	M.L.	Coast Lines, Ld.	Fm. 915	18.3.38 to 17.10.38	25.3.39
107 *† *El Argentino*, M.S.	W. Findlay	H. N. Sherwell, R. Faulkner, A. M. Lackie	J. Hynes ...	M.-S.	Furness Lines ...	Fms. 911 & 138	2.4.39 to 24.5.39	25.5.39
091 †† *Empress of Australia.*	A. R. Meikle, C.V.O., R.D., Capt. R.N.R.	W. Roberts, D. E. Newell, J. Findlayson.	J. Butler ...	S.	Canadian Pacific Steamships, Ld.	,, ,,	4.3.39 to 24.5.39	30.5.39
						Fm. 912	21.5.39 to 24.5.39	30.5.39
034 †† *Empress of Britain.*	C. H. Sapsworth ...	R. J. Barlow, W. S. Main, B. Ford	G. Potts ...	,,	,, ,,	Fms. 911 & 138	17.5.39 to 22.5.39	31.5.39
119 †† *Erin*	R. C. Vigurs	R. De Gruchy, M. N. Faichney, V. Hill.	T. Bruce ...	,,	Erin S.S. Co., Ld.	,, ,,	21.3.39 to 27.5.39	30.5.39
010 *† *Eros* (t-e) ...	R. N. Shore	J. T. C. Vigurs, H. T. Green, J. Matthews.	W. J. Burnett ...	,,	,, ,,	,, ,,	3.3.39 to 14.5.39	17.5.39
169 *† *Essex*, M.S. ...	F. N. Wyatt	H. P. Williamson, I. R. Griffiths, B. H. C. Crowhurst.	F. W. Ward ...	M.	Federal S.N. Co., Ld.	,, ,,	18.10 38 to 21.1.39	1.2.39
199 *† *Ettrickbank* ...	T. Watkins	E. G. Stevenson, J. Charlesworth, O. Brown.	F. V. Harford ...	S.	A. Weir & Co., Ld.	,, ,,	8.2.39 to 11.3.39	22.5.39
Explorer ...	D. C. Sandison ...	A. E. Bruce, J. Craig. ...	... ...	M.L.	Scottish Fishery Board	Fm. 915	19.7.38 to 22.12.38	29.12.38
*† *Explorer* ...	A. J. Meek	C. V. Watts, R. E. Harvey ...	G. A. Waring ...	M.	T. & J. Harrison	Fm. 911	8.3.39 to 14.5.39	23.5.39
*† *Fordsdale* ...	D. Christie	E. Warren, C. Harvey, W. Stott.	R. Jones ...	,,	Shaw, Savill & Albion	,, ,,	29.9.38 to 11.1.39	19.1.39
239 *† *Foylebank*, M.S.	S. J. Smith	E. E. Thomas, J. W. Hart, J. W. Greig.	R. O'Shea ...	S.	A. Weir & Co. ...	Fms. 911 & 138	14.1.39 to 18.2.39	17.3.39
173 †† *Franconia* ...	E. Edkin, O.B.E., R.D., Capt., R.N.R. ...	F. Foster, J. Evans, D. W. Austen.	J. Harvey ...	,,	Cunard White Star, Ld.	,, ,,	26.12.38 to 1.1.39	12.1.39
*† *Geddington Court*	G. Blacklock	W. Newman	L. W. Jameson	,,	United British S.S. Co., Ld.	,, ,,	23.2.39 to 5.4.39	17.4.39
186 †† *Georgic*, M.S. ...	G. R. Dolphin, R.D., Commr., R.N.R.	W. R. Hunter, E. Davies ...	A. Schofield ...	,,	Cunard White Star Co., Ld.	,, ,,	19.4.39 to 19.5.39	24.5.39
						Fm. 912	19.4.39 to 19.5.39	24.5.39
234 *† *Glaucus* ...	E. W. Berry	A. Letty, J. C. Thomas, I. R. Phillips.	J. F. Denson ...	,,	A. Holt & Co. ...	Fms. 911 & 138	11.1.39 to 30.4.39	15.5.39
026 *† *Glenbank*, M.S....	J. Macdonald	W. J. H. Pearce, D. S. Morrison, A. T. Dickinson.	A. C. Chamberlain	,,	A. Weir & Co. ...	,, ,,	20.2.39 to 23.5.39	31.5.39
203 †† *Gretafield* (tank)	E. Derricks	J. M. Waters, D. Dallas, J. Mallaburn.	J. Taylor ...	,,	Hunting & Son ...	,, ,,	27.2.39 to 19.5.39	26.5.39
218 *† *Harmonides* ...	H. Evans	J. K. Gorrie, J. L. Jones, L. P. Brabank.	C. S. Sinclair ...	,,	Houston Line, Ld.	,, ,,	12.3.39 to 3.4.39	11.4.39

	Name of Vessel.	Captain.	Observing Officers.	Senior Wireless Operator.	Meteorological Instrument Equipment.	Owners.	Logs, Registers, or Records Contributed up to 7.6.39.		Date Last Return Received.
171	*† *Hertford* ...	T. J. C. Tuckett ...	R. W. Corn, R. T. Birkin, R. G. Hollingdale.	W. Iveson ...	S.	Federal S.N. Co., Ld.	Fms. 911 & 138	31.8.38 to 21.1.39	31.1.39
	*† *Hibernia* ...	J. R. Bulmer, M.B.E....	W. Crawford	D. T. Rockey ...	,,	L.M. & S. Railway	,, ,,	20.2.39 to 12.5.39	23.5.39
182	†† *Highland Brigade*, M.S.	R. G. Clayton, R.D., Capt., R.N.R.	F. J. Swallow, E. Card, K. Reid, T. Frazer.	E. A. Reynolds...	M.-S.	Royal Mail Lines, Ld.	,, ,,	27.2.39 to 18.4.39	21.4.39
116	†† *Highland Chieftain*, M.S.	J. Hodges, R.D., Commr. R.N.R.	J. D. E. Lewis, J. Green, Q. H. Ballarde.	T. Desboro ...	,,	,, ,, ,,	,, ,,	30.1.39 to 30.5.39	2.6.39
099	†† *Highland Monarch*, M.S.	S. Weller	H. Cormick, H. D. Bowler, W. C. Homlyn.	E. F. Weather-head.	,,	,, ,, ,,	,, ,,	16.1.39 to 13.5.39	19.5.39
230	†† *Highland Patriot*, M.S.	R. H. Robinson ...	G. E. Leech, —. Melbrum, —. Dodd.	M. Carpenter ...	,,	,, ,, ,,	,, ,,	15.3.39 to 1.5.39	4.5.39
250	†† *Highland Princess*, M.S.	A. R. Murley	W. E. Gelling, J. M. Phillips, W. A. Weeks.	L. P. Thayne ...	,,	,, ,, ,,	,, ,,	16.2.39 to 30.3.39	13.4.39
	*† *Hopecrown*, M.S.	R. W. D. Gilbertson ...	W. A. Hall, J. Aylwin, W. Georgeson.	C. Walsh ...	S.	A. Stott & Co., Ld.	,, ,,	26.10.38 to 22.2.39	4,3.39
	*† *Hopepeak*, M.S.	J. Hardy	J. Marshall, R. Atkinson, E. G. Painter.	W. L. Cowan ...	,,	,, ,, ,,	,, ,,	24.12.38 to 13.5.39	30.5.39
	*† *Hopestar* ...	J. Steward	E. Denham	... ...	,,	,, ,, ,,	,, ,,	20.3.39 to 20.4.39	8.5.39
260	*† *Inanda*	W. A. Short	B. H. Band, E. P. Simmons, D. N. Mathews.	E. J. Cook ...	,,	T. & J. Harrison	,, ,,	30.1.39 to 3.5.39	9.5.39
	*† *Inkosi*	W. H. Gibbings ...	W. L. Ashton, D. Kerr, J. Steward.	T. Fleetwood ...	M.-S.	,, ,,	,, ,,	27.2.39 to 28.5.39	31.5.39
144	*† *Inverbank*, M.S.	A. C. Loads	F. H. Cummings, A. T. Stansfield, B. G. Gale.	G. Cavage ...	S.	A. Weir & Co. ...	,, ,,	1.3.39 to 22.4.39	16.5.39
	*† *Isle of Guernsey*	R. J. Large	H. Willow	T. Barron ...	,,	Southern Rly. ...	,, ,,	6.2.39 to 29.3.39	4.4.39
	*† *Isle of Jersey* ...	H. N. Golding	A. Light, —. Gleave... ...	W. L. Starr ...	,,	,, ,, ...	,, ,,	27.2.39 to 8.5.39	9.5.39
	*† *Isle of Sark* ...	R. J. Large	C. C. Durley	T. Stubbs ...	,,	,, ,, ...	,, ,,	12.4.39 to 15.5.39	5.6.39
269	*† *Ixion*	R. G. Sturrock ...	J. J. Williams, H. S. Clark, J. G. Sibley.	S. Smalley ...	M.L.	A. Holt & Co. ...	Fm. 915	15.9.38 to 20.12.38	28.3.39
226	*† *Javanese Prince*, M.S.	C. S. Smith	N. Gale, C. J. P. Martin, C. N. Clare.	T. V. Goodman	,,	Furness Lines ...	,, ,,	13.10.38 to 5.2.39	4.4.39
262	*† *Kemmendine* ...	R. B. Reid	P. McCabe, W. D. Tulloch, R. R. Simpson.	W. Clark ...	M.	P. Henderson & Co., Ld.	Fms. 911 & 138	24.1.39 to 3.4.39	17.4.39
190	*† *Kenbane Head* ...	J. R. Moore	R. J. Kidd, J. Greene ...	W. J. Neville ...	S.	G. Heyn & Sons	,, , Fm. 912	31.3.39 to 28.5.39 22.5.39 to 28.5.39	31.5.39 1.6.39
	*† *Kingswood* ...	F. Chiltern	W. B. Thompson, W. J. Wilson.	J. Duncan ...	,,	Joseph Constantine Line, Ld.	Fms. 911 & 138 Fm. 912	10.4.39 to 21.5.39 10.4.39 to 21.5.39	31.5.39 30.5.39
	*† *Kyno*	J. W. Grimston ...	... ...	... ...	,,	Ellerman's Wilson Line.	... ...	... ...	...
147	†† *Laconia* ...	J. G. P. Bisset, R.D., Commr., R.N.R.	R. Conway, J. G. Bradley, H. L. de Legh.	W. M. McArdley	,,	Cunard White Star, Ld.	Fms. 911 & 138 Fm. 912	3.4.39 to 21.5.39 2.4.39 to 21.5.39	24.5.39 24.5.39
150	†† *Lancastria* ...	C. G. Illingworth, R.D., Capt., R.N.R.	... ...	... ...	,,	,, ,, ,,	... ...	... ...	...
267	*† *Lassell*, M.S. ...	G. Scott	E. Dickinson, T. J. Sweeney, C. E. Legg.	T. S. Allen ...	,,	Lamport & Holt Line, Ld.	Fms. 911 & 138	6.12.38 to 7.3.39	14.3.39
083	*† *Lautaro*, M.S. ...	C. Stowe	S. Armitage	C. R. Pill ...	M.	Pacific S.N. Co....	,, ,,	25.10.38 to 28.2.39	6.3.39
251	*† *Levernbank*, M.S.	H. A. Jones	D. Robertson, D. Harrison ...	P. L. O'Byrne ...	S.	A. Weir & Co. ...	,, ,,	5.12.38 to 28.1.39	20.3.39
	†† *Llandaff Castle*...	M. Hart	... ...	... ...	,,	Union Castle Mail S.S. Co., Ltd.	... ...	... ...	...
140	†† *Llandovery Castle*	R. T. Smailes	... ...	... ...	,,	,, ,, ,,	... ...	... ...	...
097	†† *Llangibby Castle*, M.S.	F. A. Smythe, R.D., Lt.-Commr., R.N.R.	W. A. D. Ramsay	R. Batchelor ...	,,	,, ,, ,,	Fms. 911 & 138	24.2.39 to 16.3.39	20.3.39
	*† *Lochavon*, M.S....	F. Cook	... ...	... ...	M.	Royal Mail Lines, Ld.	... ...	... ...	...
137	*† *Logician* ...	W. Jones	W.S. Eustance, G. H. Howard, D. V. Jones.	E. G. Carver ...	,,	T. & J. Harrison	Fms. 911 & 138	19.11.38 to 26.2.39	2.3.39
	*† *Lord Austin*, S.T.	G. Arnason	G. Arnason	D. Leonard ...	S.	Pickering & Haldane Steam Fishing Co., Ld.	,, ,,	5.3.39 to 21.5.39	26.5.39
	*† *Lord Snowden*, S.T.	L. D. Romyn	L. D. Romyn	P. R. Grogan ...	,,	,, ,,	,, , Fm. 912	2.3.39 to 22.4.39 17.2.39 to 23.4.39	28.4.39 28.4.39
008	*† *Losada*, M.S. ...	J. V. Langford... ...	J. H. Allenby, J. Williams, R. T. Goodwin.	S. Johnston ...	,,	Pacific S.N. Co. Ld.	Fms. 911 & 138	27.3.39 to 9.4.39	27.4.39
062	*† *Mahia*	W. T. Thompson ...	D. Ashley, J. Jackson, E. Vaughan.	T. Murphy ...	S.	Shaw, Savill & Albion Co., Ld.	,, ,,	13.8.38 to 20.12.38	3.1.39
014	*† *Mahronda* ...	A. Anderson	I. A. McLaren, J. B. Newman, H. Fosbrooke.	W. H. Ritch ...	,,	T. & J. Brocklebank, Ld.	,, ,,	6.4.39 to 2.5.39	30.5.39
015	*† *Mahsud* ...	D. Ison	P. D. McKenzie, H. Simpson, M. R. Melville.	R. Burton ...	,,	,, ,, ,,	,, ,,	21.5.38 to 13.8.38	20.8.38
018	*† *Makalla* ...	J. Greenall	L. J. Unsworth, H. Gillespie, G. Reid.	H. C. Norman ...	,,	,, ,, ,,	,, ,,	27.2.39 to 21.3.39	24.4.39
236	*† *Malayan Prince*, M.S.	J. Smith	J. A. Reeves, W. R. Harries, B. M. Collard.	K. B. Harris ...	M.L.	Furness Lines ...	Fm. 915	13.1.39 to 21.4.39	18.5.39
195	†† *Maloja*	R. C. Dene	W. N. Swan, L. J. Brown, A. G. Stansfield.	A. Macbeth ...	M.-S.	P. & O. S.N. Co.	Fms. 911 & 138	8.2.39 to 14.4.39	18.4.39
060	*† *Manchester Citizen*	G. M. Mitchell ...	N. C. Donovan, W. E. Todd, A. A. Meyer.	W. H. Critchley	S.	Manchester Liners, Ld.	,, ,,	26.2.39 to 27.5.39	31.5.39
179	*† *Manchester Commerce*	J. E. Riley	A. Hutton, W. H. Downing, M. Barnes.	W. Freeman ...	,,	,, ,,	,, ,,	12.3.39 to 10.4.39	15.4.39
187	*† *Manchester Division*	E. E. Bonnand ...	A. Starmer, W. W. King, —. Moore.	E. R. Gledhill ...	,,	,, ,,	,, ,,	3.9.38 to 30.4.39	8.5.38
009	*† *Manchester Progress*	P. Linton	G. S. Swales, H. Dobson, A. H. Rigby.	W. H. Critchley	,,	,, ,,	,, ,,	25.3.39 to 23.4.39	28.4.39
253	*† *Manchester Regiment*	E. W. Raper	H. Boyce, G. B. Harrington, M. G. Stevens.	J. J. Hand ...	,,	,, ,,	,, ,,	16.4.39 to 15.5.39	20.5.39
146	*† *Mandasor* ...	A. S. Bain	D. M. Edwards, J. B. Lee, W. Robertson.	J. Duffy ...	M.-S.	T. & J. Brocklebank, Ld.	Fms. 911 & 138	10.2.39 to 16.4.39	26.4.39
213	*† *Mashobra* ...	P. Taylor	A. R. Gimblett, J. A. Bell, L. H. White.	R. L. Salway ...	,,	British India S.N. Co., Ld.	,, ,,	1.3.39 to 15.5.39	19.5.39
235	†† *Mataroa* ...	J. H. Gaskell	R. Grant, O. Binfield ...	—. Blyth ...	S.	Shaw, Savill & Albion Co., Ld.	,, ,,	21.1.39 to 28.4.39	1.5.39

	Name of Vessel.	Captain.	Observing Officers.	Senior Wireless Operator.	Meteorological Instrument Equipment.	Owners.	Logs, Registers, or Records Contributed up to 7.6.39.		Date Last Return Received.
023	*† *Matheran* ...	W. T. King	J. P. Hewitt, L. E. Jeans, W. Cowley.	J. S. Wilson ...	M.-S.	T. & J. Brocklebank, Ld.	Fms. 911 & 138	21.2.39 to 2.5.39	6.5.39
024	*† *Matra*	J. F. Butterworth ...	E. L. Jones, F. Moore, N. B. Exley.	E. R. Capps ...	M.	,, ,,	,, ,,	7.3.39 to 20.5.39	6.6.39
	†† *Mauretania* ...	A. T. Brown, R.D., R.N.R.	... ...	... ...	S.	Cunard White Star, Ld.	... ...	... ...	...
126	*† *Melmore Head* ...	E. W. Black	W. J. Lenster, R. Boyd, J. M. Holmes.	P. C. Cahill ...	,,	G. Heyn & Son ...	Fms. 911 & 138	1.3.39 to 14.3.39	12.4.39
124	*† *Middlesex* ...	J. Styren	S. W. Andrews, G. Sinclair, J. Alderman.	S. H. Jones ...	,,	Federal S.N. Co., Ld.	,, ,,	15.8.38 to 22.1.39	27.1.39
	*† *Modavia* ...	W. MacMillan	... ...	... ...	,,	Donaldson Line ...	,, ,,	19.3.39 to 31.3.39	2.5.39
131	†† *Montcalm* ...	... ...	... ...	... ...	M. S.	Canadian Pacific Steamships, Ld.	... ...	... ...	...
149	†† *Montclare* ...	W. S. Brown	T. E. Sergent, E. F. Aikman, R. W. Barker.	W. Davies ...	S.	,, ,,	,, ,,	12.3.39 to 4.6.39	6.6.39
268	†† *Montrose* ...	H. J. Ferguson, D.S.C.	... ...	... ...	,,	,, ,,	Fm. 912	12.3.39 to 31.3.39	5.4.39
							... ...	... ...	...
164	†† *Mooltan*... ...	C. B. Roche	W. H. C. Wood-Roe, F. F. Irons, S. O. Godden.	H. Williamson	M.-S.	P. & O. S.N. Co.	Fms. 911 & 138	5.2.39 to 10.5.39	20.5.39
196	*† *Mulbera*... ...	W. A. Grant-Pyves ...	J. L. Richardson	T. Todd ...	,,	British India S.N. Co., Ld.	,, ,,	22.1.39 to 24.2.39	17.3.39
078	*† *Myrtlebank*, M.S.	E. T. Evans	A. Brown, E. Craig, F. H. Main.	J. A. Browne ...	S.	A. Weir & Co. ...	,, ,,	30.12.38 to 6.3.39	24.4.39
	*† *Nairnbank*, M.S.	J. Edward	... ...	... ...	,,	,, ,,	,, ,,	2.2.39 to 9.4.39	8.5.39
227	*† *Nardana* ...	C. E. Dorkin-White ...	W. Brown, T. Braidwood, L. Osborne.	S. V. Knight ...	M.	British India S.N. Co., Ld.	,, ,,	1.1.39 to 27.3.39	27.4.39
202	†† *Narkunda* ...	W. D. C. Smith ...	P. L. Marian, E. R. Physick, H. Strike.	C. W. Herbert ...	M.-S.	P. & O. S.N. Co.	,, ,,	13.12.38 to 15.2.39	18.2.39
	†† *Nascopie* ...	T. F. Smellie	J. C. M. Cotton	... ...	S.	Hudson's Bay Co.	Fm. 911	26.3.39 to 5.4.39	11.4.39
162	*† *Nestor*	J. J. Power	H. Haines, W. Auger, R. T. Spinks.	J. Nightingale ...	,,	A. Holt & Co. ...	Fms. 911 & 138	29.3.39 to 13.4.39	4.5.39
154	*† *Newfoundland* ...	J. W. Murphy	W. Lutyens, C. H. Kenyon, G. W. Howe.	... ...	,,	Furness Lines ...	,, ,,	10.2.39 to 18.5.39	20.5.39
							Fm. 912	10.2.39 to 18.5.39	20.5.39
	*† *Northern Coast*...	H. Cameron, W. Quirk.	A. H. Johnston, L. Williams...	... ...	M.L.	Coast Lines, Ld.	Fm. 915	2.9.38 to 17.1.39	20.1.39
181	*† *Nova Scotia* ...	T. Webber	W. Lutyens, J. Warren, R. Crangle.	W. Breck ...	S.	Furness Lines ...	Fms. 911 & 138	3.3.39 to 30.3.39	1.4.39
							Fm. 912	3.3.39 to 30.3.39	1.4.39
243	*† *Opawa*, M.S. ...	F. S. Hamilton ...	G. H. Goldsbrough, F. E. Mitchell, N. A. Thomas.	H. W. Jackson		New Zealand Shipping Co., Ld.	Fms. 911 & 138	5.7.38 to 21.11.38	29.11.38
172	†† *Orama*	H. J. Sarson	P. G. A. King, R. S. Mortimer,	M. W. Helman...	S.	Orient S.N. Co., Ld.	,, ,,	24.10.38 to 24.1.39	9.2.39
080	*† *Orari*, M.S. ...	J. G. Almond	F. W. Newman, O. Chadwick, A. C. Gale.	A. J. King ...	M.-S.	New Zealand Shipping Co., Ld.	,, ,,	12.2.39 to 15.3.39	28.3.39
246	*† *Orbita*	E. H. Large, R.D., Commr., R.N.R.	F. J. Leicester, J. E. Evans, J. D. Richmond.	C. Coleman ...	,,	Pacific S.N. Co.	,, ,,	14.3.39 to 31.3.39	4.4.39
081	†† *Orcades*	F. R. O'Sullevan ...	S. C. Blair, E. P. Wathen, S. B. Hickman.	T. Edwards ...	,,	Orient S.N. Co. ...	,, ,,	2.1.39 to 11.5.39	13.5.39
087	*† *Orduna*	H. B. Reece, R.D., Capt., R.N.R.	E. C. Hicks, B. H. Morgan, J. T. Naylor.	W. G. Sutherland	S.	Pacific S.N. Co.	,, ,,	19.2.39 to 28.4.39	2.5.39
148	†† *Orford*	N. Savage	J. E. Purvess, J. R. Grandage	G. Macdonald ...	M.-S.	Orient S.N. Co. ...	,, ,,	27.2.39 to 1.6.39	5.6.39
019	†† *Orion*	A. L. Owens, R.D., Capt. R.N.R.	F. R. F. Wilson, H. Barker, T. Williams.	N. A. Boon ...	,,	,, ,,	,, ,,	30.1.39 to 2.5.39	4.5.39
174	†† *Ormonde* ...	C. Fox	D. G. Charlton, T. S. Hardy, A. Kidner.	C. F. Seaton ...	S.	,, ,,	,, ,,	3.2.39 to 8.3.39	13.3.39
055	†† *Oronsay* ...	H. E. Niccols	E. Wathen, J. Dixon, E. N. McKay.	P. Darby ...	,,	, ,,	,, ,,	19.12.38 to 22.3.39	4.4.39
085	†† *Orontes*	G. G. Thorne, R.D., Capt., R.N.R.	A. F. G. Gram, E. G. Riddelsdell.	M. J. Murphy ...	,,	,,	,, ,,	15.1.39 to 18.4.39	24.4.39
095	*† *Oropesa* ...	R. E. Dunn, O.B.E. ...	G. Gerritty, A. Lyall, B. Butterworth.	G. Penketh ...	,,	Pacific S.N. Co.	,, ,,	13.3.39 to 13.5.3	17.5.39
104	*† *Otaio*, M.S. ...	H. J. Wilde	R. G. Hollingdale, J. A. C. Shalcross, P. A. Underwood.	R. Sangster ...	M.	New Zealand Shipping Co., Ld.	,, ,,	2.3.39 to 8.4.39	26.5.39
156	†† *Otranto*	L. V. James, D.S.C. ...	J. O. H. Kirkwood, W. J. Rice, J. N. Hulse.	J. L. Curry ...	S.	Orient S.N. Co. ...	,, ,,	21.11.38 to 22.2.39	24.2.39
070	*† *Oxfordshire* ...	P. S. Cooper	R. H. Jameson, N. Fitch, A. Allerston.	W. Fletcher ...	,,	Bibby Bros. & Co.	,, ,,	13.3.39 to 17.5.39	24.5.39
044	*† *Pacific Exporter*, M.S.	J. S. Williamson ...	A. Bailey, J. Anthony, C. Denhorst.	A. W. Hearnden	,,	Furness Lines ...	,, ,,	14.2.39 to 8.5.39	15.5.39
	*† *Paris*	E. A. Biles	V. G. English	C. Kelley ...	,,	Southern Rly. ...	,, ,,	1.2.39 to 19.3.39	22.3.39
	*† *Pentland Firth* S.T.	W. E. Nightingale ...	W. E. Nightingale	... ...	,,	Firth Steam Trawling Co. Ld.	,, ,,	22.2.39 to 29.4.39	22.5.39
128	*† *Port Auckland*	C. A. Robinson ...	R. A. Finch, T. A. Sutton, E. C. Read.	A. B. Cole ...	,,	Port Line, Ld. ...	,, ,,	14.12.38 to 1.3.39	7.3.39
	*† *Port Chalmers*, M.S.	W. G. Higgs	... ...	... ...	,,	,, ,, ,,	... ...	... ...	...
	*† *Port Dunedin* ...	A. H. Brown	E. N. Howard, O. N. Harries, F. R. Gorman.	P. T. McKinlay	,,	,, ,, ,,	Fms. 911 & 138	9.12.38 to 29.3.39	4.4.39
							Fm. 912	9.12.38 to 29.3.39	4.4.39
163	*† *Port Gisborne*, M.S.	W. G. Higgs	R. E. Garner, J. G. Thom, D. A. Pascoe.	E. Mooney ...	,,	,, ,, ,,	Fms. 911 & 138	16.9.38 to 31.12.38	10.1.39
	*† *Port Hunter* ...	R. Williams	... ...	... ...	M.L.	,, ,, ,,	Fm. 915	17.12.38 to 21.4.39	26.4.39
	*† *Port Jackson*, M.S.	W. Gilling	... ...	... ...	S.	,, ,, ,,	Fms. 911 & 138	6.1.39 to 22.4.39	3.5.39
	† *Port Townsville*...	S. C. Cottell	A. G. Russel, R. G. Sharp, H. Clinon.	H. Reeves ...	,,	,, ,, ,,	Fm. 911	6.2.39 to 29.5.39	5.6.39
							Fm. 912	29.4.39 to 10.5.39	5.6.39

	Name of Vessel.	Captain.	Observing Officers.	Senior Wireless Operator.	Meteorological Instrument Equipment.	Owners.	Logs, Registers, or Records Contributed up to 7.6.39.		Date Last Return Received.
177	*† *Port Wellington*	R. Needham	R. W. Niccol, L. E. Ring, E. Dalzick.	T. S. Johnstone	S.	Port Line Ld. ...	Fms. 911 & 138	15.10.38 to 21.1.39	16.2.39
003	*† *Port Wyndham*, M.S.	W. J. Enright, R.D., Capt., R.N.R.	L. J. Brice, R. W. Nicholl, J. R. Reek.	J. V. Kininmouth	,,	,, ,, ,,	,, ,,	17.2.39 to 20.3.39	8.5.39
	*† *Prague*	C. Baxter	R. H. Wright	A. C. Potter ...	,,	L. & N.E. Rly. ...	,, ,,	6.3.39 to 30.5.39	5.6.39
206	†† *Pretoria Castle*, M.S.	A. E. Castle	... ...	... ...		Union-Castle Mail S.S. Co., Ld.	... ...	... ...	...
063	*† *Queen City* ...	R. V. Arkwright ...	D. Williams, K. Germany, V. Smith.	P. Owen ...	,,	Sir Wm. Reardon Smith & Partners, Ld.	Fms. 911 & 138	4.11.38 to 26.3.39	2.5.39
263	†† *Queen Mary* ...	R. B. Irving, O.B.E., R.D., Capt., R.N.R.	A. C. Hanson, H. Taggart, G. T. Marr.	A. H. Farman ...	,,	Cunard White Star, Ld.	,, ,, Fm. 912	5.3.39 to 28.5.39 5.3.39 to 15.3.39	31.5.39 18.3.39
205	†† *Rajputana* ...	W. A. Cotching ...	M. F. Shute, Dunkley, Farmiloe, Bush.	J. A. Skinner ...	M.-S.	P. & O. S.N. Co.	Fms. 911 & 138	2.12.38 to 7.3.39	10.3.39
228	†† *Ranchi*	J. Sparkes	J. Johnston	... ...	,,	,, ,, ,,	,, ,,	7.2.39 to 21.3.39	11.4.39
224	†† *Rangitane*, M.S.	H. L. Upton	G. C. Mather, J. R. Vincent, C. D. Pool.	N. J. Hallet ...	,,	New Zealand Shipping Co., Ld.	,, ,,	24.7.38 to 18.2.39	1.3.39
217	†† *Rangitata*, M.S.	E. Holland	F. J. Jones, H. Hill, D. Tanner	H. Leedman ...	,,	,, ,, ,,	,, ,,	16.2.39 to 2.6.39	5.6.39
105	†† *Rangitiki*, M.S.	H. Barnett	G. Goldsborough, L. W. Fulcher, T. Crossley.	L. Horn ...	,,	,, ,, ,,	,, ,,	9.12.38 to 10.4.39	15.4.39
207	†† *Ranpura* ...	Parfitt	R. B. Webster, K. Richardson, G. Randall.	J. R. C. Johnson	,,	P. & O. S.N. Co.	,, ,,	1.1.39 to 4.3.39	11.4.39
071	†† *Rawalpindi* ...	M. G. Draper, R.D., Commr., R.N.R.	A. P. Godfrey, C. C. Gardner, H. J. Collett.	S. W. Sharp ...	,,	,, ,, ,,	,, ,,	8.2.39 to 19.4.39	25.4.39
247	*† *Recorder* ...	W. Baird	F. G. La Hive, G. H. Jolly ...	R. Starling ...	M.	T. & J. Harrison	,, ,,	2.12.38 to 20.2.39	4.4.39
132	*† *Reina del Pacifico*, M.S.	A. Ridyard, O.B.E. ...	F. B. Jones, M. Chapman, G. H. Rice.	J. B. Stone ...	M.-S.	Pacific S.N. Co. ...	,, ,,	14.1.39 to 31.5.39	6.6.39
276	†† *Remuera* ...	F. W. Robinson ...	F. J. Jones, T. N. Devitt, S. Crossley.	J. B. Stockman	S.	New Zealand Shipping Co., Ld.	,, ,,	24.8.39 to 7.12.38	5.1.39
094	†† *Rimutaka* ...	C. B. Lamb	E. J. Ormsby, J. Trotter, E. Halls.	T. Owen ...	M.-S.	,, ,, ,,	,, ,,	12.12.38 to 14.3.39	11.4.39
139	*† *Robert F. Hand* (tank).	J. A. Collie	F. J. Hewlett, G. Robson, T. Lloyd Jones	S. C. Baldwin ...	S.	Anglo - American Oil Co., Ld.	,, ,,	15.2.39 to 31.3.39	3.4.39
032	*† *Rotorua* ...	A. E. Lettington, D.S.C.	R. H. Chapman, C. A. T. Shallcross, O. Farmer.	E. G. Stride ...	M.	New Zealand Shipping Co., Ld.	,, ,,	29.8.38 to 7.1.39	10.1.39
	*† *Royal Sceptre* ...	G. Joures	P. M. Williams, M. Dodds ...	W. Cameron ...	S.	Hall Bros. ...	Fm. 911	6.3.39 to 25.4.39	3.5.39
231	*† *Ruahine* ...	G. Kinnell	K. A. Vasey, C. W. Roberts, D. B. Brittain.	W. Fordham ...	,,	New Zealand Shipping Co., Ld.	Fms. 911 & 138	4.7 38 to 1.11.38	12.11.38
	*† *St. Cathan*, S.T.	J. H. Ellis	J. H. Ellis	O. J. Martin ...	,,	Thos. Hamling & Co. Ld.	,, ,, Fm. 912	26.2.39 to 23.5.39 24.2.39 to 23.5.39	30.5.39 30.5.39
	*† *St. Helier* ...	R. Pitman	T. E. Martin	R. E. Littell ...	,,	G.W. Railway ...	Fms. 911 & 138	2.2.39 to 25.4.39	26.4.39
	*† *St. Julien* ...	L. Richardson	G. Cartwright...	E. Trapnell ...	,,	,, ,,	,, ,,	27.4.39 to 27.5.39	1.6.39
	*† *St. Patrick* ...	H. C. Bond	E. Hawkyard, B. E. Williams	H. B. Dyer ...	,,	,, ,,	,, ,,	23.7.38 to 11.8.38	3.9.38
100	†† *Samaria* ...	J. McRostie	A. Letty, R. W. Pickersgill ...	R. A. J. Owlett	,,	Cunard White Star, Ld.	,, ,, Fm. 912	19.2.39 to 27.5.39 10.4.39 to 29.4.39	30.5.39 3.5.39
	*† *San Adolfo*, M.S. (tank)	A. Hulbert	W. Macleod, E. McCreadie, E. W. Taggart.	H. Gent ...	M.-S.	Eagle Oil & Shipping Co., Ld.	Fm. 911	12.1.39 to 10.5.39	23.5.39
108	*† *San Alberto*, M.S. (tank)	C. Vidot	J. B. Harrison, J. A. Shaw, G. O. Pritchard.	R. S. Evans ...	M.	,, ,,	Fms. 911 & 138	4.3.39 to 19.4.39	24.4.39
	*† *San Alvaro*, M.S. (tank)	F. A. Kennett	D. B. Young, J. Taylor ...	W. H. Rees ...	M.-S.	,, ,,	Fm. 911	26.1.39 to 1.5.39	9.5.39
073	*† *San Arcadio*, M.S. (tank)	S. Perry	A. P. Shaw, D. A. Robb ...	G. W. Watson ...	M.	,, ,,	Fms. 911 & 138	4.2.39 to 14.4.39	5.6.39
159	*† *San Casimiro* M.S. (tank)	L. G. Emmott	K. E. Spencer, C. H. Emmerson.	E. B. Haynes ...	,,	,, ,,	,, ,,	19.11.38 to 28.2.39	8.3.39
	*† *San Cirilo* M.S. (tank)	F. S. Bailey	H. J. McKilligan, S. Smith, F. Dellow.	W. Moorehouse	M.-S.	,, ,,	Fm. 911	28.1.39 to 25.5.39	30.5.39
	*† *Scotia*	A. W. Bateman ...	A. C. Borthwick	J. H. Rockey ...	S.	L.M. & S. Railway	Fms. 911 & 138	13.3.39 to 21.4.39	25.4.39
170	†† *Scythia*	W. C. Battle, R.D., Commr., R.N.R.	M. R. Thompson, J. Law, S. A. Jones.	R. Greenall ...	,,	Cunard White Star, Ld.	,, ,, Fm. 912	19.3.39 to 6.5.39 19.3.39 to 8.5.39	10.5.39 10.5.39
211	*† *Shropshire*, M.S.	R. S. Evans, O.B.E. ...	W. Collins, J. Wright, R. Gagley.	G. C. Talbot ...	,,	Bibby Bros. & Co.	Fms. 911 & 138	14.2.39 to 18.4.39	28.4.39
121	*† *Siamese Prince*, M.S.	E. J. Jones	E. A. Parfitt, F. R. Elliott, S. A. Heaton.	A. S. Fraser ...	M.L.	Furness Lines ...	Fm. 915	10.12.38 to 11.5.39	1.6.39
	*† *Silversandal*, M.S.	J. Harrison Leask ...	R. W. Cherry, A. Boniwell, T. H. Whiston, R. Fielding.	... ...	,,	S. & J. Thompson, Ld.	,,	29.3.38 to 5.7.38	3.9.38
	*† *Silverwalnut*, M.S.	T. S. Morgan	A. Nicholson, J. Eccleston, N. Peter.	R. H. V. Gillibrand.	,,	,, ,,	,,	17.12.38 to 5.5.39	1.6.39
	Silvio	F. A. Richardson. ...	E. Whislay	... ...	,,	Ellerman's Wilson Line, Ld.	,,	2.11.38 to 18.2.39	19.4.39
141	*† *Somerset* ...	N. Rice	R. M. Roberts, J. A. Marieff...	S. G. Riley ...	S.	Federal S.N. Co., Ld.	Fms. 911 & 138	14.12.38 to 18.4.39	2.5.39
052	*† *Spero*	W. A. Dossor	W. S. Hepton, J. R. Atkinson	B. R. Davy ...	,,	Ellerman's Wilson Line, Ld.	,, ,,	15.4.39 to 7.5.39	10.5.39
176	*† *Staffordshire*, M.S.	W .Logan-Foster ...	G. Mordaunt, A. A. Mackenzie.	R. C. Wilde ...	,,	Bibby Bros. & Co.	,, ,,	26.2.39 to 3.5.39	6.5.39
134	†† *Stirling Castle*, M.S.	H. R. Northwood ...	E. Triggs	W. A. Brown ...	,,	Union-Castle Mail S.S. Co., Ld.	,, ,,	27.1.39 to 3.5.39	6.5.39
020	*† *Stirlingshire*, M.S.	A. Mackinlay	A. M. Kennedy, H. Lockyer, A. J. Thompson.	W. D. Gooderidge	,,	Turnbull, Martin & Co., Ld.	,, ,,	1.1.39 to 30.4.39	9.5.39
047	*† *Stockport* ...	H. S. Brown	J. Davidson, T. Ainshaw ...	J. P. Edmondson	,,	Associated Humber Lines.	,, ,,	16.2.39 to 26.3.39	4.4.39
270	†† *Strathaird* (t-e)...	J. M. M. Tickell ...	G. R. Peters, K. Renshaw, H. Torens.	A. Morris ...	M.-S.	P. & O. S.N. Co.	,, ,,	10.12.38 to 30.4.39	2.5.39
210	†† *Strathallan* ...	J. H. Biggs, R.D., Commr., R.N.R. ...	A. D. Seabrook, L. J. Cork, E. C. Hopkins.	W. Banbury ...	,,	,, ,, ,,	,, ,,	28.1.39 to 29.5.39	31.5.39
238	†† *Stratheden* ...	R. Harrison, D.S.O., R.D., Capt., R.N.R.	G. C. Forester, R. C. Cowell, A. O. Gething.	H. S. Horne ...	,,	,, ,, ,,	,, ,,	13.1.39 to 13.5.39	16.5.39
039	†† *Strathmore* ...	F. E. French, R.D., Capt., R.N.R.	W. R. Noall	S. W. Mitchell ...	,,	,, ,, ,,	,, ,,	26.2.39 to 2.4.39	6.4.39
059	†† *Strathnaver* (t-e)	E. P. Lyndon, R.D., Lt.-Commr., R.N.R.	A. L. E. Bishop, M. A. Trenfield, N. H. Thompson.	P. R. Hobbs ...	,,	,, ,, ,,	,, ,,	19.2.39 to 25.5.39	30.5.39
229	*† *Tactician* ...	A. G. Peterkin ...	J. Davies, L. Harriman, R. Myles.	W. C. Cocks ...	M.	T. &. J. Harrison	,, ,,	19.1.39 to 12.2.39	2.4.39
	*† *Talthybius* ...	P. Purkis	J. B. Anderson, D. J. R. Davis, J. P. Brown.	... ...	M.L.	A. Holt & Co. ...	Fm. 915	12.7.38 to 6.12.38	3.1.39
021	†† *Tamaroa* ...	W. Dawson	G. Hawley, A. N. Loud, R. Petersen.	P. Moloney ...	M.-S.	Shaw Savill & Albion Co., Ld.	Fms. 911 & 138	24.12.38 to 29.3.39	5.4.39
165	*† *Tantalus*, M.S....	T. G. Nivison	T. R. Walker, N. O. Freeland, T. W. Craig.	W. W. Bee ...	S.	A. Holt & Co. ...	Fms. 911 & 138	11.2.39 to 28.3.39	27.4.39
	*† *Taranaki*, M.S....	W. G. West	E. L. Haysen, M. Forster, H. Wynyard.	J. Byrne ...	,,	Shaw Savill & Albion Co., Ld.	,, ,,	24.10.38 to 26.2.39	4.3.39

Name of Vessel.	Captain.	Observing Officers.	Senior Wireless Operator.	Meteorological Instrument Equipment.	Owners.	Logs, Registers, or Records Contributed up to 7.6.39.		Date Last Return Received.
*† *Temple Moat* ...	A. W. Clinton	A. Smith, T. K. Suttie, G. C. Ball.	J. C. Mcneill ...	S.	Lambert Bros., Ld.	Fms. 911 & 138	15.2.39 to 7.4.39	5.6.39
048 †† *Themistocles* ...	C. Wood, D.S.C. ...	R. F. Hamilton, J. H. Lindhardt, H. Evans.	V. Murphy ...	M.-S.	Shaw, Savill & Albion Co., Ld.	„ „	11.10.38 to 6.2.39	9.2.39
*† *Thistleglen* ...	G. A. Whitfield, O.B.E.	L. H. Williams, G. E. Dobson	R. Fraser ...	M.	Allan, Black & Co.	Fm. 911	27.12.38 to 20.5.39	31.5.39
161 *† *Titan*	W. F. Dark	R. Simon, A. Pope, R. H. Carruthers.	M. Burke ...	S.	A. Holt & Co. ...	Fms. 911 & 138	9.1.39 to 6.5.39	30.5.39
242 *† *Tongariro* ...	P. B. Clarke, D.S.C. ...	R. A. Coombes, A. Kirk, R. A. C. Henderson.	J. F. McNeill ...	„	New Zealand Shipping Co., Ld.	„ „	1.11.38 to 6.4.39	17.4.39
102 *† *Torr Head* ...	T. M. Heddles	C. W. Harper, R. Browne ...	L. C. Jeffcott ...	„	Ulster S.S. Co. ...	„ „	20.1.39 to 21.4.39	8.5.39
025 †† *Transylvania* ...	J. B. Caithness ...	R. L. Robertson, A. Colquhoun, W. P. Young.	J. McDonald ...	„	Anchor Line, Ld.	„ „ Fm. 912	28.4.39 to 1.6.39 28.4.39 to 1.6.39	5.6.39 5.6.39
*† *Tribesman* ...	T. J. Lacey	... ...	... ...	M.-S.	Harrison Line ...	Fm. 911	28.11.38 to 14.2.39	23.2.39
*† *Tyndareus* ...	D. Hey	... ...	... ...	M.L.	A. Holt & Co., Ld.	... ...	... ...	...
221 †† *Tynefield*, M.S. (tank)	L. B. Carr	R. Lowes, A. D. Lombard, W. C. Muir.	G. Binch ...	S.	Hunting & Son, Ld.	Fms. 911 & 138	14.2.39 to 18.3.39	22.3.39
*† *Umtali*	F. E. J. O'Hea	W. M. Baird, D. Reid, P. Shallcross.	R. O'Patrick ...	„	Bullard King & Co.	Fm. 911	5.3.39 to 27.3.39	4.4.39
088 *† *Vandyck* ...	P. Symons	D. L. Woods, G. E. R. Rawsthorne, R. L. Callagan.	N. J. Ryan ...	„	Lamport & Holt, Ld.	Fms. 911 & 138	14.5.39 to 26.5.39	31.5.39
079 †† *Viceroy of India* (t-e)	E. A. J. W. Carter, R.D., Capt., R.N.R.	G. W. Sadlow, C. Tartram, R. S. Mann.	J. R. S. Kidson	M.-S.	P. & O. S.N. Co.	„ „	12.3.39 to 27.5.39	31.5.39
*† *Vienna*	H. Pickering	D. A. Williams, R. Greenfield	F. Messenger ...	S.	L. & N.E. Rly. ...	„ „	2.3.39 to 25.5.39	2.6.39
*† *Voltaire* ...	V. E. Gore-Hickman ...	B. O. Metcalf, W. R. Bevin, M. L. Knight.	W. C. Burnett ...	„	Lamport & Holt, Ld.	„ „	8.4.39 to 22.4.39	26.4.39
*† *Waimarama*, M.S.	J. Avern, Commr., R.N.R.	... ...	... ...	„	Shaw, Savill & Albion Co., Ld.	Fm. 911	23.2.39 to 18.5.39	24.5.39
004 †† *Waipawa*, M.S.	J. W. Johnson ...	W. Farrell, G. Houchen.	B. A. Long ...	„	„ „ „	Fms. 911 & 138	5.12.38 to 13.3.39	13.4.39
254 †† *Wairangi*, M.S.	M. R. Gordon	J. Collins, C. Beck, G. Haywood.	H. V. Littlecott.	„	„ „ „	„ „	28.12.38 to 6.4.39	11.4.39
212 †† *Waiwera*, M.S.	W. C. Meek, R.D., Lt.-Commr., R.N.R.	V. H. Vizer, R. G. James, A. M. Whiteford.	P. Rowley ...	„	„ „ „	„ „	29.11.38 to 28.12.38	2.1.39
*† *Warkworth* ...	T. Wilson	A. Macall, L. Donelly, M. Burne.	J. Taylor ...	„	R. S. Dalgliesh & Co. Ld.	„ „	11.2.39 to 13.4.39	28.4.39
183 †† *Warwick Castle*, M.S.	O. Pitts...	J. E. Halton	G. J. Gilbart ...	„	Union Castle Mail S.S. Co., Ld.	„ „	22.3.39 to 17.5.39	30.5.39
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