

WORK OF THE YEAR.  
Note to Marine Observers.

THE Director wishes an expression of appreciation to be made to the Corps of Voluntary Marine Observers for their co-operation during the financial year ended March 31st, 1924, and that we should continue the practice in the "Marine Observer" of giving a brief account of your work at sea and our efforts in the Marine Division to co-ordinate Voluntary Marine Meteorological Service.

The year has been one of progress at sea and hard work in the Marine Division, while several important results have been achieved, including the establishment of this Journal, and the "Weather Shipping" Wireless Bulletin. Observation at sea has continued to improve, and the spirit of ready co-operation generally existing in the Corps of Voluntary Marine Observers is most commendable.

The number of ships whose officers regularly make returns has been maintained at about 500, the limiting maximum.

With a view to encouragement in training future Marine Observers, at the end of 1919 the Meteorological Committee approved the establishment of a special form of log, entitled the Cadets' Meteorological Log, for use in the Officers' Stationary Training Ships of the Mercantile Marine.

This log has been kept by the senior Cadets of H.M.S. *Conway*, H.M.S. *Worcester*, and the Nautical College, Pangbourne, since 1920, and all three establishments have now attained the "excellent" standard. Examination at the end of the Summer term showed that progress has also been made in the construction of Weather Charts. Thus the coming generation of Marine Observers, with this form of early training, after experience at sea, may be better equipped with knowledge of this branch of seamanship than we are.

In addition, five ships in the West Indian and Brazilian trades have taken observations and water samples for the Ministry of Agriculture and Fisheries, by arrangement through the Port Meteorological Officer, Liverpool, for which work the Director of the Fisheries Laboratory at Lowestoft has expressed appreciation.

COLLECTION OF DATA.

Meteorological Logs.

Generally the standard of the logs continues to improve. The percentage of logs classed Excellent is 31·3; last year it was 31 per cent.

Of 256 logs received, 80 were classed Excellent, 169 Very Good, 6 Good, only 1 being not classed.

The Meteorological Log is the backbone of the work, so classification is exacting. Ships contributing Excellent logs have something to be proud of. It is not given to everyone to be able to make and record observations of such high order, but all log-keepers can try. Officers frequently ask how can we bring our logs up to the Excellent standard, the answer always given is :—

By constant care, accurate observation and careful regard to the 3rd Edition of the Marine Observer's Handbook and the advice given from time to time in the "Marine Observer," but above all remember Captain TOYNBEE'S caution, "A blank space is preferable to a doubtful observation."

This year's logs show indications that there has been a great deal of care in keeping the logs. The number of ships doing this work is restricted to about 120 in the Mercantile Marine and eight in the Royal Navy. We shall say something of the reason for this restriction by-and-bye.

We hope that you will give us your further assistance by correcting your barometer readings and entering them in the new column given in the logs.

North Atlantic Wireless Telegraphy Weather Report Registers.

There has been a marked improvement in this work, which is in its infancy, as the following comparison shows :—

Classification.	1923-1924.	1922-1923.
Excellent - - - - -	155	73
Very Good - - - - -	90	150
Good - - - - -	5	3
Not classed - - - - -	—	2
Total received - - - - -	250	228

Ships' Meteorological Reports, Form 911, using Ships' Instruments.

1,785 of these written reports have been received from ships on all routes, and much useful information has been contributed by this means.

The reduction of correspondence, brought about by means of the acknowledgment of work done given in the list of voluntary observing ships published each month, has made it possible to classify these Forms since November 1923, and it is hoped that the encouragement thus given may bring about still further improvement in this useful branch of observational activity.

Of 722 Forms 911, received since November 1st, 1923 :—

116	were	classed	Excellent,
530	"	"	Very Good,
72	"	"	Good,
4	"	"	not classed.

As far as possible, vacancies for keeping Meteorological Logs will be filled by ships contributing Form 911 classed Excellent when their Commanders and officers desire to co-operate in log keeping.

#### Cross-Channel Steamers' Telegraphic Reports.

Ten steamers on the Newhaven—Dieppe, Guernsey—Weymouth, and Holyhead—Dublin services take observations at their mid-channel position on the homeward passage and report on arrival by telegram to the Meteorological Office. 820 of these reports were received during the twelve months under review. The work has been very satisfactory indeed.

#### Ice Report Form 912.

There has been a falling off in the use of these reports, and as they are still desirable it is requested that more regular use be made of them.

#### Miscellaneous Contributions.

In addition to the regular contribution of Meteorological Logs and Reports by members of the Corps of Voluntary Marine Observers, a number of useful and interesting manuscripts, sketches, weather charts and photographs have been received describing and illustrating exceptional phenomena, interesting experiences, and so on, from Commanders and officers generally. These are highly prized and are always welcome, both from regular members of the Corps and from all seafarers. A selection of these is published monthly. Many encountering Tropical Revolving Storms have completed Form 119. It is hoped that more will do so.

#### Use made of Data Received.

To those Marine Observers who have been unable to visit the Marine Division it will be interesting if we make a brief sketch of the work of the three sections of the Division.

All written contributions are received in Section A; here they are examined, classed and indexed, and here a record is kept of every Marine Observer's work, with the ship in which he serves.

Coded wireless weather reports go direct to the Forecast service, where they are immediately plotted upon the working synoptic maps, and at the end of each day these reports are passed to the Marine Division with any comments which may be considered necessary. An abridged edition is then passed by telephone to Lloyd's for the information of the shipping community. Upon receipt, the Registers are, of course, dealt with along with the other written contributions.

The classification of each log or report having been approved and noted for acknowledgment in the Marine Observer, the documents next go to Section B, where they are indexed for special phenomena, and the logs are prepared for extraction. Here researches are made, the data are compiled for averages and the necessary information is supplied for investigations; thus the amount of work which can be done by Section B is a governing factor in production.

Section C charts the data and puts together information for publication in the Marine Observer.

With a fleet of 500 observing ships arriving from, and sailing to all ports of the world, our daily work must be constant, prompt and regular. The speed of the Fleet is the speed of the slowest ship and the signal "dispatch is necessary" was frequently flown and repeated in Sections A and C until the Hollerith machine and "The Marine Observer" were adopted. Thus it will be seen that to increase the number of ships keeping the Meteorological Log or to take on more than 500 ships for all purposes would only handicap efficiency at present.

#### Data Extraction.

On the 1st April, 1920, the new system of extracting data from Meteorological Logs as received from all routes over the oceans was

commenced, and in 1921 this system was improved by means of the Hollerith electric tabulating and sorting machine. During the year 74,749 sets of observations were extracted and punched on cards; since April, 1920, 319,477 sets of observations have been extracted. MARSDEN CHART I. shows the distribution of numbers of sets of observations extracted from logs between April 1st, 1923, and March 31st, 1924, and MARSDEN CHART II. shows the distribution of numbers of sets of observations extracted since April, 1920.

During the last 12 months 66 per cent. of Meteorological Logs received, which reached the high standard required, *i.e.*, Very Good or above, have been prepared for extraction.

4,259 current observations in logs received prior to April, 1920, were also extracted.

These extracted data will be the means of working up normals and frequencies for revising and making new Meteorological Charts and provide standards upon which to base researches. The system also enables us to answer enquiries more readily.

It will be seen by the wind roses on the face of the Indian Seas Chart, that the averages there given for 5° squares may represent over 1,000 observations for any month; it will therefore be realised what an enormous amount of data is required, ready prepared, before normal and frequency charts of the Oceans can be made.

Thus the interchange of prepared data between Maritime Countries is of enormous importance to the work. We are indebted to the Air Ministry Statistical Section for punching the cards and working the Hollerith machine.

#### Exchange of Data with other Services and International Co-operation.

By means of Hollerith cards 458 sets of observations for selected squares in the North Atlantic for the period January 10th to 26th, 1923, were sent to the Geophysical Institute, Bergen. By the same means 425 sets of observations in the same area for the period February 1st to 9th, 1922, were sent to the Royal Meteorological Institute, Brussels.

By means of the Hollerith system, mean pressure, wind, air and sea temperature, and cloud amount, for all months of the year 1922, in selected areas in all oceans, have been calculated and sent to the Dutch Meteorological Institute, De Bilt.

Observations of current with generalised direction and force of wind for all months of 1921 and 1922 for the area Latitude 40° to 50° N., Longitude 10° to 50° W., were sent to the Fishery Board for Scotland.

At the International Meteorological Conference held in London in September, 1921, representatives of Marine Divisions of Foreign Services were interested in the Hollerith system. Last year the Dutch Office sent Lieutenant-Commander P. M. van RIEL, R.H.M., to obtain detailed information with a view to its adoption in Holland; the Hydrographer of the United States Navy has made enquiries as to its application for working currents, Lieutenant RUSHELDERFER, U.S. Navy, having previously paid us a visit.

Interest has also been shown in this matter by Japan, Brazil and Portugal.

The Hollerith system affords an efficient means of international exchange, the cost of which is negligible.

The value of accumulated prepared and charted data was made manifest this year when a committee of the Board of Trade sat to consider zones and seasons for Load Lines and we were enabled to prepare charts of all the oceans giving frequencies of gales and areas covered by tracks of tropical revolving storms, with seasons, for their information, in which the work inaugurated by MAURY was invaluable.

Your work has enabled us to answer a large number of enquiries as to weather, regarding missing ships, and maritime casualties in different parts of the world, in which Forms 911 have played an important part. Almost invariably when there is a loss or a serious casualty the question of weather arises, bringing home how important a "fore knowledge" of weather is to the mariner, and it is to enable you to obtain that fore knowledge that we are striving to develop Wireless Weather Telegraphy at sea.

#### Wireless Telegraphy Reports from North Atlantic Liners.

This service is restricted to 25 Ocean Greyhounds fitted for C.W. transmission. The efficiency of the service has still further improved, as is reflected in the registers before mentioned.

During the year, 3,603 weather reports were received, and plotted by the Forecasters; this information has proved invaluable to the Meteorological Office, not only for forecasting for the information of the air and land services and the general public, but it has been the means of improving gale warnings for the coasts of the British Isles and the Forecasts given in the Weather Shipping, C.W. Wireless Bulletin, and Western Seaboard, Spark Wireless Bulletin. Of 3,603 reports received, 839 were received within one hour of observation, 1,057 within two hours, 810 within four hours, while 897 were over four hours in transmission from the time of observation.

715 errors in transmission were corrected by the check system, while upon comparison with the registers when received we found that the check had only failed in 38 cases.

The code having been revised according to the latest international agreement, a reprint of the register and code tables has been made, embodying improved instructions found necessary by the experience gained since March 27th, 1921, when the first post-war report was received, and it is proposed to bring this into force on June 1st, 1924. Extending the utility of these reports for the direct information of ships at sea is now being considered.

#### Wireless and Weather as an aid to Navigation.

The Weather Shipping Bulletin broadcast by the Air Ministry Wireless Station since January 1st has been reported to have been received up to a distance of 2,400 miles to the westward, and 2,000 miles to the southward. Mr. C. H. WILLIAMS, of the Union Castle Line, has again been the first to send in Weather Charts based upon observations broadcast in this new Bulletin, and evidence has already come to hand that this Bulletin is proving of value. For example, Captain James DAWSON, of S.S. *Royal Scot*, on the regular passenger service Leith to London, reported that in February during the prevalence of fog on the East Coast he was enabled to save a tide through information received by this means.

Reciprocation of weather reports between ships at sea is slowly but surely growing, and as the custom of noting these reports sent, in the Meteorological Log, is becoming more general, a space ruled for the purpose has been provided in the last reprint of the log. There is ample evidence that, without a popular organisation, no great progress can be made, hence the endeavours to formulate a scheme commencing with the Atlantic reports, with a view to possible extension to other trades.

Bearing upon the value of self-aid amongst seamen, Captain J. WATERHOUSE, of S.S. *Clan Mackay*, now a Marine Superintendent of the Clan Line, reported an interesting experience.

In March last year, at Apia, Samoa, having observed the signs of an approaching hurricane, he put to sea and sent out by wireless the first warning.

He cruised on the outskirts of the disturbance, broadcasting throughout the position of the storm centre with weather conditions at his position. On return to harbour he found that an even worse hurricane than that of March, 1889, when H.M.S. *Calliope* escaped, had swept the island.

#### Observation.

Barometer observation has still further improved, and in the reprint of the Meteorological Log a column is provided in which observers can insert the corrected reading. If this is done it will give us great assistance and may help to speed up extraction of data.

The uncorrected reading with attached thermometer should always be entered in the log, even if the corrected reading is given.

#### Air Temperature.

The portable screen, of which a drawing was published in the February number, is considered an aid to obtaining accurate temperatures and it is hoped that in time replacement of old screens may be made by screens of this nature.

The classification of Logs, Registers and Reports given, bears testimony to the improvements you have effected generally in observation, the accuracy of which is so essential for the work.

#### Excellent Awards and Return for Work.

A list of Commanders and principal observing officers to whom the Meteorological Committee have made Excellent Awards for Meteorological Logs and Wireless Weather Registers of specially high order, contributed during the year under review is appended. The Director desires that this notification should be accepted in lieu of the personal letter he has sent to each Commander and Officer gaining

the award in previous years. The publications awarded will be forwarded as soon as possible.

#### Port Officers and Marine Agents.

The Service is indebted to these gentlemen for much useful work, and it will assist them greatly if the excellent practice in some ships of keeping all meteorological gear together in one place in the Chart House when in port can be more generally adopted.

Where work is generally well and willingly done, it is difficult to make distinction, but we think it well to mention that after London and Liverpool, where regular visiting officers are employed, Southampton heads the list for activity. Example produces efficiency, and Captain D. FORBES, the oldest Marine Agent, has set a capital pace.

Captain FORBES was first appointed Marine Agent at Southampton under Captain TOYNBEE in 1883, the first ship which he equipped being R.M.S. *Don*, Captain R. WOOLWARD, author of "Nigh on Sixty Years at Sea," an early exponent of the Laws of Storms.

#### The "Marine Observer."

We wish to acknowledge the many kind things which have been written and said with regard to our infant numbers. At birth we were told of the confidence placed in us in the Foreword with which the Director performed the launching ceremony. In order that we may fittingly uphold that confidence, Marine Observers are reminded that the establishment of this journal was made possible by their voluntary contributions in kind, and that success must largely depend upon their continued contributions.

Now additional space has been provided at the end of the Logs for "Additional Remarks," and these are the kind of contributions that will most help us.

#### Conclusion.

The data you are providing provides information which may be of direct assistance to the Sea Services, through the medium of the "Marine Observer," and many other publications which it eventually reaches, and it is assisting in the common undertaking of Meteorology.

Apart from the general economic value of the work, it tends to promote safety of life at sea and in the air.

The careful thought and systematic record which it entails must act as a stimulant in the habit of acquiring and imparting knowledge. It brightens the intelligence of the Observer, and therefore helps to uplift our profession.

The interest shown and the support given during the year are very much appreciated.

MARINE SUPERINTENDENT.

Marine Division,  
Meteorological Office,  
Air Ministry,  
London.

April, 1924.

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

Captain.	Principal Observing Officer.	Ship.
*ADAMSON, B. W. - - -	BULTEEL, C. V. S.	} <i>Oxfordshire</i> .
ASHLEY, H. - - -	WHITESIDE, W. L.	
*BARTER, H. O., Commr., R.N.R., R.D.	MADDRELL, G. D.	
	HAMMOND, S. M. -	<i>C.S. Norseman</i> .
BEADNELL, F. E., Capt., R.N.R.	THOMPSON, L. -	<i>Adriatic</i> .
*BERRY, G. - - -	DAY, H. J. C. -	<i>Megantic</i> .
BLACK, J. - - -	URE, T. - -	<i>Saturnia</i> .
BYERS, G. - - -	HUNTER, — -	<i>Changchow</i> .
CAMPOS, V., O.B.E., Lieut.-Commr., R.N.R.	MUIR, A. S. -	<i>C.S. Colonia</i> .
CARLTON, G. F., O.B.E., Commr., R.N.R.	HEGARTY, L. J.	<i>C.S. Stephan</i> .

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

Captain.	Principal Observing Officer.	Ship.	Captain.	Principal Observing Officer.	Ship.
*CARPENDALE, F. W. J.	HAND, C. H. -	<i>Nyanza.</i>	*MARSHALL, W., D.S.O.,	KAVANAGH, G. -	<i>Celtic.</i>
CARTMER, G. E., O.B.E.	CLOWSER, S. E. -	<i>Kurmark.</i>	Capt., R.N.R., R.D.		
CHAMBERS, F. W., D.S.C.	PASCOE, J. -	<i>Digby.</i>	MATHESON, C. G., D.S.O.,	WHINFIELD, N. -	<i>Orsova.</i>
CHARLES, Sir J. T. W.,	CROASDAILE, J. -	<i>Aquitania.</i>	Commr., R.N.R., R.D.		
K.B.E., C.B., Commo-			METCALFE, G. R., Lieut.-	HUGHES, E. F. -	<i>Cedric.</i>
dore, R.N.R., R.D.			Commr., R.N.R.		
COAD, A. J., Commr.,	GOODMAN, F. S. -	<i>Osterley.</i>	*NARES, J. D., D.S.O.,	EXTON TURNER, H.	<i>H.M.S. Endeavour.</i>
R.N.R.			Capt., R.N.		
CORNISH, N. P. -	BARKER, G. W. -	<i>Matheran.</i>	*O'CONNOR, E. W., D.S.C.	STUMBLES, A. M. -	<i>Wangaratta.</i>
COTTELL, S. C. -	JOHNSTON, W. R.	<i>Port Hunter.</i>	*OWENS, A. L., Lieut.-	LESTER, M. C. -	<i>Orvieto.</i>
DAVID, H. F., Capt.,	BOYCE, J. C. M. -	<i>Olympic.</i>	Commr., R.N.R., R.D.		
R.N.R., R.D.			PARKER, W. H., C.B.E.,	LEE, D. R. -	<i>Orbita.</i>
DAVIES, J. Burton -	CARPENTER, J. -	<i>Hurunui.</i>	Capt., R.N.R., R.D.		
DIGGLE, E. G., Capt.,	WOOD, J. H. -	<i>Caronia.</i>	PETERSON, H. -	WALMSLEY, W. T.	<i>Warwickshire.</i>
R.N.R., R.D.			PROTHERO, W. -	KITE, D. S. -	<i>Scythia.</i>
DOUGLAS, H. P., C.M.G.,	TENNENT, H. P. L.	} <i>H.M.S. Mutine.</i>	RANDALL, H. W., Capt.,	ABLEWHITE, J. C.	<i>Nore.</i>
Capt., R.N.	STEPHENS, R. A. -		R.N.R., R.D.		
EVANS, T. R. -	HOUGHTON, C. -		REILLY, J. V. -	GRAHAM, L. D. -	<i>Woodarra.</i>
FITZROY, F. H., Capt.,	HOLLAND, S. J. -	<i>Elpenor.</i>	RENAUT, F. A. -	FULLICK, E. G. -	<i>Port Caroline.</i>
R.N.R., R.D.		<i>Nyanza.</i>	*RENNIE, A., O.B.E. -	WILLIAMS, F. E. -	<i>Montcalm.</i>
GEARY HILL, S. A., D.S.O.,	EXTON TURNER, H.	<i>H.M.S. Endeavour.</i>	*RILEY, J. E. -	STOCKER, C. E. -	<i>Manchester</i>
Commr., R.N.					<i>Mariner.</i>
GRIFFITHS, E., Lieut. -	EVERETT, R. V. -	<i>Empress of France.</i>	ROBERTS, J., C.B.E.,	BELL, E. S. -	<i>Baltic.</i>
Commr., R.N.R.			D.S.O., Capt., R.N.R.,		
GRIFFITHS, J. N. -	PIGGOTT, A. H. -	<i>Brecon.</i>	R.D.		
*HADDY, B. H. (the late)	RADCLIFFE, A. V.	<i>City of Baroda.</i>	ROBINSON, C. A. -	BEARDSHAW, J. S. -	} <i>Port Albany.</i>
HAYES, Sir B. F., K.C.M.G.,	BUTCHER, A. F. -	<i>Majestic.</i>		CRAIG, W. B. -	
D.S.O., Commadore,			ROSTRON, A. H., C.B.E.,	HOWSON JONES, G.	<i>Mauretania.</i>
R.N.R., R.D.			Capt., R.N.R., A.d.C.,		
HEARN, G. W. -	COATE, C. F. -	<i>Port Augusta.</i>	R.D.		
HENDERSON, W. -	MACCULLUM, H. A.	<i>Metagama.</i>	*ROWE, J. P. -	ROBERTSON, L. -	<i>Maihar.</i>
*HESTER, C., Commr.,	SNOW, B. W. -	<i>Peshawur.</i>		PINKNEY, H. G. B.	<i>Port Stephens.</i>
R.N.R., R.D.			SHELFORD, W. S., Lieut.-	LESTER, M. C. -	<i>Orvieto.</i>
HIGGINS, C. J. -	YOUNG, T. G. -	<i>Clan Malcolm.</i>	Commr., R.N.R., R.D.		
HIGGS, W. G. -	STANNARD, R. S. -	<i>Port Pirie.</i>	SIBBONS, H. -	FEGAN, R. -	<i>Minnedosa.</i>
HOAD, A. C. -	TOWNSHEND, C. R.	<i>Port Nicholson.</i>	SIMNER, G. L., Commr.,	SAVAGE, N. -	} <i>Omar.</i>
HOWARTH, F. B., Commr.,	PATCHETT, F. -	<i>Homeric.</i>	R.N.R., R.D.	DODGSON, C. V. -	
R.N.R.			STANLEY, W. -	HAWKINS, P. -	<i>Herefordshire.</i>
HOWELL, T. -	GRACE, H. H. -	<i>Lapland.</i>	*WARNER, G. E., Commr.,	CARR, J. W. -	<i>Orduna.</i>
*IRVINE, W. R. D.,	MYLES, J. A. -	<i>Berengaria.</i>	R.N.R., R.D.		
Commr., R.N.R., R.D.			*WATERHOUSE, J. -	FORSTER, J. A. -	<i>Clan Mackay.</i>
*KEARNEY, F. J. -	POST, C. F. -	} <i>Port Melbourne.</i>	WEBSTER, G. S., Lieut.-	JONES, E. J. -	<i>Montclare.</i>
	LINKLATER, R. B. -		Commr., R.N.R., R.D.		
KETTLEWELL, C. R. -	ALLARD, G. W. -	<i>Surrey.</i>	*WIGHTMAN, H. G. E.,	LAWRENCE, H. -	<i>C.S. Britannia.</i>
*LATTA, R. G. -	DAVIES, H. H. -	<i>Empress of Britain.</i>	D.S.C.		
LEA, W. H. -	LOVEGROVE, F. A.	} <i>Port Sydney.</i>	WILLIS, M. -	CANNER, H. E. -	<i>Arracan.</i>
	MARTIN, A. R. -		WYLES, W. S. -	NORRIS, H. W. -	<i>Bambra.</i>
*LEARMONT, H. P., Capt.,	RAWLINGSON, W. G.	<i>Waipara.</i>			
R.N.R., R.D.					

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

## BIOGRAPHICAL NOTES OF SOME LEADERS OF MARINE METEOROLOGY.

### V. CAPTAIN HENRY TOYNBEE.

AFTER the death of Admiral FITZROY in 1865 a Royal Commission was appointed to examine the work done by the Meteorological Department of the Board of Trade and to advise whether it was of sufficient practical utility to warrant the continuation of a state service of meteorology.

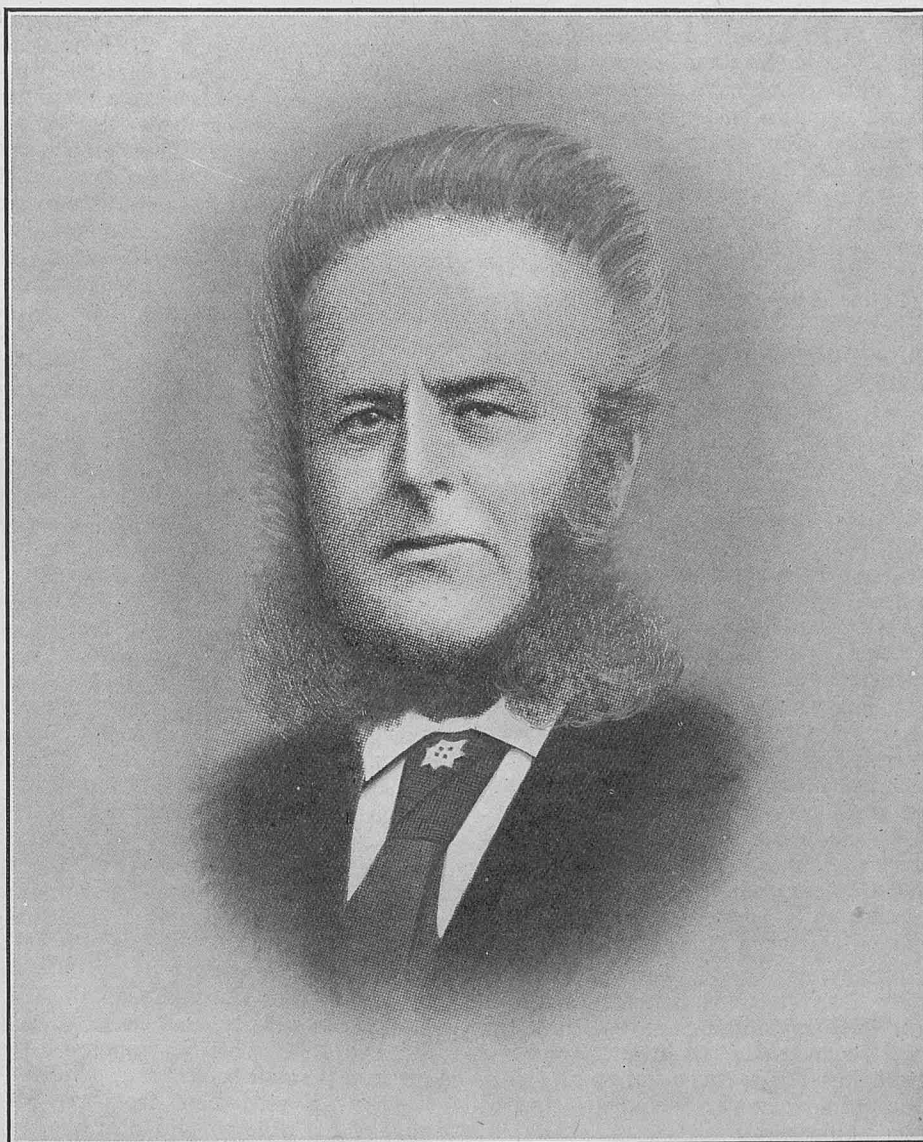
This Commission, after a detailed examination of the progress made by the Department, came to the conclusion that the work carried out, and the need for extending the service, was of such importance as to justify the formation of a Meteorological Office separate from the Board of Trade, but which was to be governed by a Committee which included representatives of the Board of Trade, the Admiralty and the Royal Society. They also recommended that the work should be divided into two sections, one dealing with sea weather work and the other dealing with telegraphic reports and observations

from land stations. The whole Office was to be administered by a Director, while a Marine Superintendent was to be appointed in charge of the Marine work, for which there was to be a Division.

This was carried into effect in 1867, Captain HENRY TOYNBEE being the first Marine Superintendent.

TOYNBEE, who was the son of a Lincolnshire gentleman farmer, was born in 1819. He went to sea at the age of fourteen as midshipman in the East India Company's *Dunvegan Castle*. The Charter of the Honourable East India Company expired, however, the next year, 1834, and TOYNBEE joined the free trade barque *Eleanor*, in which he served two years.

His next appointment was that of 3rd officer in the *Duke of Argyle*, belonging to Messrs. T. & W. Smith, whose ships were among the fleet of famous "Blackwall Frigates" which form the connecting link



The Master of the *Hotspur*.  
CAPTAIN HENRY TOYNBEE,  
Marine Superintendent of the Meteorological Office, 1867-88.

---

between the old East India Company, and the Orient, and P. & O. Lines of to-day.

TOYNBEE's first command was the *Ellenborough*, and he subsequently commanded the *Gloriana* and the *Marlborough*. His last command was, however, his most famous, namely, that of the *Hotspur*. LUBBOCK, in "Blackwall Frigates," says: "The *Hotspur*, which followed the *Blenheim* off the stocks, was one of the most popular passenger ships trading to Calcutta, and this was in great part due to her Commander, Captain TOYNBEE."

The command of a Blackwaller was considered to be the highest position a man could attain in his sea career. It was frequently worth as much as £5,000 a year to the holder, and he was allowed to use the title "Commander." TOYNBEE was recognised as being one of the foremost navigators of his day, while many of these old sailing ship masters, according to LUBBOCK, "seemed to have a quite uncanny talent for finding fair winds and for avoiding calm patches." Strict disciplinarians, these old Blackwall captains maintained rigidly the dignity of their position both afloat and ashore. The side was always piped when the Commander came aboard, and he was never seen on deck off his poop, while he wore his starched stock and tight-buttoned frock coat even in the tropics. They maintained a similar dignity ashore. It was no uncommon sight to see Captain and Mrs. TOYNBEE driving in some state along the "Course" at Calcutta, "with one of his 'mids' seated on the front seat like a diminutive aide-de-camp."

TOYNBEE was an authority on practical navigation, and his method of determining longitude at sea by lunars became known throughout the sea-faring community. He contributed many papers on navigational subjects to the *Nautical Magazine*, and it was in the course of these studies that he came into contact with Admiral SMYTH, R.N., whose daughter he married in 1854. Mrs. TOYNBEE was a great lover of the sea and an excellent sailor; she accompanied her husband on his voyages and was extremely popular.

These old sailormen seem to have been inspired with a reverent wonder for the marvels of the deep and the natural phenomena by which they were surrounded, and with the better facilities for observation which sailing ships afforded, took keen delight in exploring and recording them. Captain TOYNBEE was an enthusiastic weather worker, in co-operation with both MAURY of the U.S.A. and with the British Meteorological Department. He contributed several logs to the latter, all of excellent character, which are still preserved in the Marine Division as models of devoted interest to the work of keeping weather records at sea. In this work he was ably assisted by Mrs. TOYNBEE, who not only wrote up the abstract logs, but beautifully illustrated them with water-colour sketches of many of the denizens of the deep. MAURY, whom both Captain and Mrs. TOYNBEE held in the highest esteem for the work he was carrying out in the interests of seamen, published many of these drawings in his sailing directions.

This collection of natural history specimens also provided an interesting and educative hobby for the midshipmen, who were encouraged to examine under the microscope and classify, if possible, the minute animalculæ which were collected in the little dredger-bag which TOYNBEE had towed astern instead of the usual shark hook, with the prospect that their description might be included in one of Captain TOYNBEE's papers on the subject.

TOYNBEE took a great interest in the welfare of the midshipmen in his charge, and any boy who was appointed to his ship was sure of receiving a valuable education in all things appertaining to his profession. For, every morning at 10, some of the midshipmen had to attend navigation lessons under TOYNBEE himself, while others were given lessons in knotting, splicing and the use of palm and needle, under the bosun.

It is not surprising, therefore, in view of his scientific navigational work and his weather work, that when the post of Marine Superintendent at the newly-formed Meteorological Office was created, Captain

TOYNBEE should be offered the appointment. He accepted the appointment, and entered on his new duties in January, 1867.

TOYNBEE made it his first business to find a more efficient method of dealing with the observations received. Several methods of tabulating and grouping observations had been tried during FITZROY's time, but none had proved very satisfactory, especially as the number of observations received steadily mounted. TOYNBEE overcame the difficulty by introducing what was known as a "data book" for each 10° square, each square being numbered in accordance with Marsden's Chart, one book being allocated to each month of the year. This system proved to be so efficient as to warrant its retention until three years ago, 1921, when it was only superseded by a modern mechanical appliance, the Hollerith machine. He always impressed on observers the need for the utmost care being taken in recording observations, in order to avert misleading conclusions being formed from them, and his saying that "a blank space is better than a doubtful observation" has become a classic in marine meteorology.

TOYNBEE's lovable disposition, genial and breezy manner, endeared him to all observers, although he retained that brusqueness characteristic of the sea. Captain DUNCAN FORBES, the Marine Agent at Southampton and the only surviving agent who served under TOYNBEE, relates how on coming to London for an interview with TOYNBEE regarding his appointment as agent, the first words he was greeted with were: "Read that barometer, sir," which illustrates TOYNBEE's blunt directness of manner, although the remainder of the interview was most cordial in character.

During TOYNBEE's term of office, the work of the Marine Division was steadily co-ordinated and extended. A number of atlases and publications were produced, many of which are still being issued as standard works of interest and usefulness. The aim of each publication was to answer questions of immediate interest to navigators. For instance, in response to repeated inquiries from commanders who kept logs, an investigation of the best route for crossing the Equator each month was made, the results being published in "Charts and Remarks of Meteorological Data for Square 3, (Latitude 0-10° N., Longitude 20°-30° W.)" in 1873, and "Charts and Remarks of Meteorological Data for the nine 10° squares (Latitude 20° N.-10° S., Longitude 10°-40° W.)" in 1876.

He also gave considerable attention to the construction of weather charts, and it was under his supervision that "Synchronous Weather Charts of the North Atlantic, 1st August, 1882-3rd September, 1883," were published, while in his "Meteorology of the North Atlantic between the parallels of 40° and 60° N.," he laid the basis of the discussion of weather systems and their movements, afterwards so ably developed by ABERCROMBY and others.

During the summer of 1888, TOYNBEE initiated, at the request of the Meteorological Council, the practice of lecturing to seafarers at some of the principal ports. The subject of his lectures was the use of the barometer, the force and direction of the wind, and cirrus clouds as a means of forecasting by a single observer. The lectures proved of such utility that although Captain TOYNBEE retired from the position of Marine Superintendent in 1888, he was asked to continue them in 1889 and 1890, when in response to general desire he published the lecture as a small book.

After his retirement from the Meteorological Office he devoted much of his time to philanthropic work in connection with seamen. He lived to enjoy a well earned rest until his ninetieth year, his death taking place on 29th March, 1909.

Under TOYNBEE's superintendence, British Marine Meteorology was established on a sound and progressive basis and some return made to marine observers, in a practical and useful form, of the data they so assiduously collected.

Acknowledgment is made to the following:—

"Blackwall Frigates"	-	-	BASIL LUBBOCK.
"Nautical Magazine"	-	-	July, 1908.

(To be continued.)

Note.—Plates produced by Lithographic process, including Charts and other large diagrams, will be found in each number after "Weather Signals."

## THE MARINE OBSERVERS' LOG.

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

Responsibility for statements rests with the Contributor.

## VOYAGE OF TREVESSA'S BOATS.

THE following interesting extracts are taken from the log of Captain CECIL FOSTER, S.S. *Trevesa*, who with his Chief Officer, Mr. J. C. STEWART SMITH, accomplished the memorable feat of seamanship in navigating their boats from the position in which the ship sank, in Latitude  $28^{\circ}45'S$ , Longitude  $85^{\circ}42'E$ , to Rodriguez Island in the case of the Captain's boat, and to Mauritius in that of the Chief Officer, distances of 1,335 and 1,632 miles, occupying 23 and 26 days respectively. Thirty-three out of a crew of forty-four were saved, ten men having died in the boats and another shortly after landing at Mauritius.

It is regretted that sufficient space is not available to publish the logs in full, but copies may be obtained, published in pamphlet form, *price 6d.*, from The Editor, "Lloyds List and Shipping Gazette," the proceeds being devoted to Marine Charities.

"First day, June 4th. 2.15 a.m. Abandoned ship, foredeck awash level with top of bulwark rail and settling fast by the head. 2.45 a.m. Ship foundered and that was the last seen of her, standing almost on end. The lights were all burning as dynamo had been left running. We lay to at our sea anchors all day and no vessel appeared.

"Second day, June 5th. I decided to make for Mauritius taking advantage of the existing wind and westerly current and intending to make S.E. Trades. Owing to the fact that my boat had a much bigger sail and although I had it reefed down I was sailing much faster than the other.

"Noon. Latitude  $28^{\circ}38'S$ . Strong wind and rough sea.

"Third day, June 6th. To-day I had the two axes, a meat chopper and large knife sent aft. I now had the water, provisions, and weapons under personal observation.

"Fourth day, June 7th. 2.45 a.m. Boats in company, shifted tacks, and steered about, N.W. True, wind about N.N.E.

8 a.m. Instructed men to lift sea water in handkerchiefs and draw water into nostrils and blow out again and not allow any to get back into the throat.

Noon. Latitude  $27^{\circ}11'S$ , Longitude approximately  $82^{\circ}39'E$ . True Co. N.  $73^{\circ}W$ , 111 miles.

2 p.m. Informed Chief Officer amount issued and times of rationing and he agreed to do same. The rationing was as follows :—

8 a.m. One cigarette-tin lid of milk per man and one biscuit.

2 p.m. One-third of cigarette tin of water per man (half small dipper).

4 p.m. One cigarette-tin lid of milk per man.

"Fifth day, June 8th.

4 a.m. Strong wind and high sea.

8 a.m. Issued ration milk and biscuit and were treated by MCGREEN (A.B.) to following little song :—

*'I like ham and eggs,  
I like eggs and bacon,  
Anybody here says I don't like 'em,  
He is jolly well mistaken.'*

"Sixth day, June 9th. Early morning heavy rain. All hands catching rain water. Only water for immediate needs obtained. Everything saturated with salt water.

7 a.m. Lay alongside other boat and informed them of my intention to proceed alone. We were a hindrance to each other and losing too much time. With the wind strong I had the most difficulty keeping company. With the sail reefed down and goosewinged both yardarms, I was running away from him and in the necessary manœuvres I was punishing the boats gear too much.

8 a.m. Wished each other the best of luck, gave three cheers and we shook the reef out, hoisted sail and carried on.

Noon. Latitude  $26^{\circ}48'S$ .

"Seventh day, June 10th. In the evening and till late at night standing by to catch rain water. No water caught. Wind died away, boat drifting.

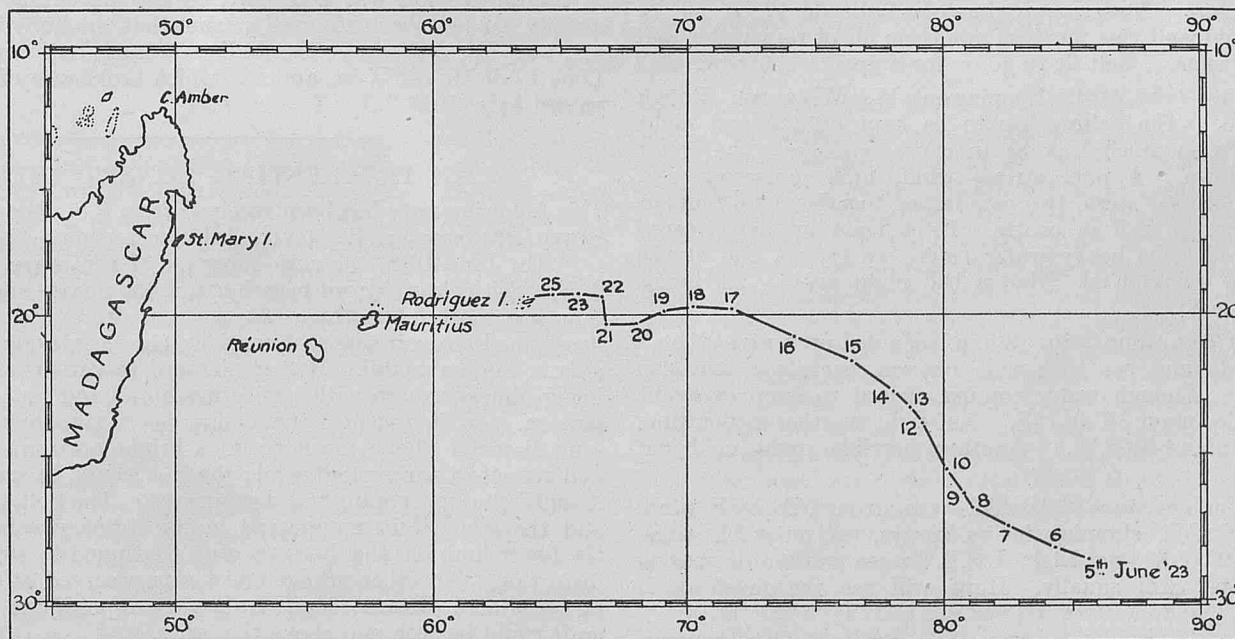
"Eighth day, June 11th. Calm, occasional light puffs of wind from southward. All recognise benefit of wetting head and neck and keeping them wet. All sucking small lumps of coal and buttons. For some days all have had a horrible taste in the mouth, and the mouth and tongue thickly coated with white slime. Some tried washing their mouths out with salt water, but I advised them not to.

"Ninth day, June 12th. Same weather and conditions. Miserable night, calm, making practically no headway. Jacob Ali (Fireman) wandering in his mind.

"Tenth day, June 13th.

6.30 a.m. Still calm, started pulling boat, two oars each side.

8 a.m. Impossible to eat dry biscuit. Some are soaking



Approximate track made by Captain Foster's boat, June, 1923.

theirs in salt water against all advice. Considering circumstances everyone is well and cheerful, but suffering severely from thirst. About 10 a.m. light Easterly breeze sprang up. Took in oars making slight headway about N.W. True.

"Eleventh day, June 14th. Still no rain and no breeze. All hands getting weak, but keeping wonderfully cheerful. They swear at each other occasionally, and that lets off a bit of steam. At 11.30 a.m. commenced to rain. Down sail, all hands catching water, caught enough for everyone to have a really good drink. Latitude to-day noon, approximately 20° 50' S. 2.30 p.m. Good S.W. breeze, increasing during night, making good headway.

"Twelfth day, June 15th. Strong wind and high seas. Making good progress. Squally light rain showers. Latitude, noon, 21° 47' S. 2 p.m. Just have to keep smiling. I reckon we have 500-600 miles to go yet but have no means of getting a longitude. I hope we are further to the westward.

"Thirteenth day, June 16th. Strong S.E. wind and high seas. Squally. Some fairly heavy showers. All hands got a good drink and feel much better for it. Latitude, noon, 20° 38' S. approx. 1 p.m. Boat broached to and half filled. Lay to during afternoon and caught some more rain. Feeling fine now. 5.10 p.m. Set sail and proceeded.

"Fourteenth day, June 17th. Latitude at noon, 19° 39' S. Shaping course West true. Managed to get clothes dry this afternoon in spite of a sousing now and again with spray.

"Fifteenth day, June 18th. Fresh S.E. trades and high sea. Latitude at noon 19° 0' 40" S. To-day had all rowlocks removed and passed aft. All hands pretty well battered. Mouths still horrible with white slime.

"Sixteenth day, June 19th. Frequent fierce short squalls. All hands catching rain water. Latitude at noon 19° 0' 56" S. Hope will make land soon. Compass is useless. All the steering has been by sun and stars.

"Seventeenth day, June 20th. Horrible night. All hands soaked to the skin and very cold. High sea running. At 3 a.m. Jacob Ali died and was buried at 7 a.m. We don't know how far we are from land. Latitude noon 20° 10' S. Strong wind and cross sea. Making good headway. No clothes dried to-day.

"Eighteenth day, June 21st. Had a fine night, all hands had a better rest. Clothes dried on us and all feeling fine this morning. 8.30 a.m. M. Naji died and was buried at 10.30 a.m. Latitude at noon 20° 11' S. Fine weather now and warm. 9 p.m. heavy rain squall from S.W. Caught quite a lot of rain water.

"Nineteenth day, June 22nd. Wind freshening in the early morning and sea rising, steering before it. 11 a.m. shipped some heavy water in a squall. A huge sea running. Dropped sail, steering before wind and sea. Noon, approximately Latitude 19° 0' 30" S. All hands last night and this morning got their fill of rain water and managed to save some. Felt fit to go on for a good while now.

"Twentieth day, June 23rd. Keeping on a W.S.W. course. Rough sea but less wind. The bailing has to be kept up day and night though there isn't so much leak as to cause anxiety. The water is easily kept down. 4 p.m. strong wind, high dangerous sea. Dropped sea anchor over stern, two oars lashed together with remains of old sea anchor, on tail in centre. Kept mast up and steered before it. Shipped some heavy water before we lay to, and at the sea anchor before we used oil. Had a bad night again. All hands wet through and cold.

"Twenty-first day, June 24th. 8 a.m. Hauled up a part of boat cover on halyards and set each side out on backstays and ran before the wind. Enough water coming aboard to keep everyone soaked. Latitude, noon, 19° 0' 1" S. 3.45 p.m. weather moderating, set sail steering about W.S.W. Another horrible night, cold and wet.

"Twenty-second day, June 25th. Till 4 a.m. strong N.E. by E. wind. Making about W.S.W., shipping heavy sprays. A miserable time. Noon, Latitude 19° 0' 30" S. Light E.S.E. breeze and sea decreasing and not so steep. Still squally. Hope will see the finish of it to-day.

"Twenty-third day, June 26th. Running with a corner of sail lifted. A nasty time of it again. 6 a.m. Shipped heavy sea over the

stern. Found the rudder head was breaking away. Got an oar out on each quarter to steer by and a couple out to help keep her stern to sea. Hard work, we aren't as strong as we might be. 8.45 a.m. Rudder repaired and shipped again. Noon, Latitude 19° 0' 35" S. Steering West running before wind and sea. 2.45 p.m. Sighted land—Carpenter first to see it. Bearing W.S.W. about 15 miles. All hands very excited and a different feeling apparent. Set sail and steering right for it and should be handy there before dark. Gave Carpenter the tin of water promised to first man to sight anything. 8 p.m. We lay alongside the landing stage and were met there by the Rev. LILARSAH, who despatched various messengers for assistance. We found we had lost the use of our legs though that wasn't apparent to us in the boat. All the men were soon comfortably housed and were receiving every attention."

### EARTHQUAKE.

THE following extract is taken from the log of the *Barque Garthgarry*, Captain D. ROBERTS, Callao, Peru, to Sydney, New South Wales.

"On June 17th, 1923, at 9 p.m. ship's time, in Latitude 20° 40' S., Longitude 171° 22' W., a violent tremor passed through the ship, lasting about two to three minutes, shaking masts and hull severely and causing all hands to rush on deck thinking the ship had struck.

"The sensation was similar to that of grinding over a reef or some submerged object.

"A cast was taken, and gave no bottom at 90 fathoms, and the ship has made no water since the occurrence.

"A light to moderate W.S.W. breeze and smooth sea at the time.

"Probably the tremor was caused by some subterranean disturbance.

"Should there be any sign on the ship's bottom when she is dry-docked, advice will be sent to the M.O."

(No notification of any marks on the ship's bottom have since been received.)

### DRIFT OF BUOY.

THE following communication has been received from the Hydrographer of the Navy.

"Buoy—Recovered—Property of the Argentina Republic. A communication has been received in this Department from the Agent General for Western Australia stating that a buoy was seen on 9th March last by the S.S. *Poona* in Latitude 36° 06' South, about 450 miles westward of Cape Leeuwin, Western Australia.

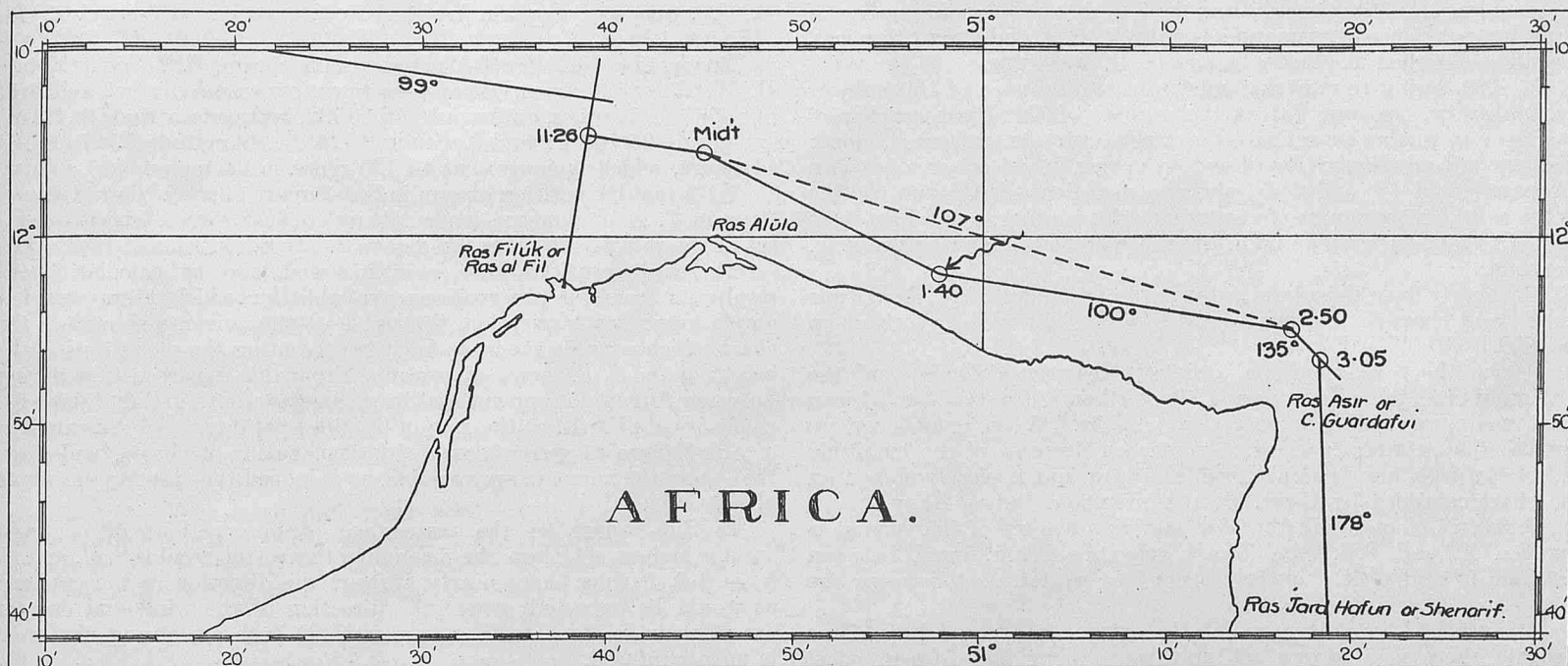
"On the 29th June last (1923) a buoy was reported to be ashore about 100 miles North of Fremantle. The buoy was marked, *M.O.P.* and numbered 173, and on enquiring from Trinity House it was gathered that the buoy was the property of the Argentina Republic. A communication was addressed to the Argentina Authorities and a reply has now been received stating that the buoy is their property, and was *No. 9 Buoy* in the Indio Channel, Latitude 35° 10' South, Longitude 56° 54' West, approx., which broke away from its moorings on 3rd July, 1918."

### AN INTERESTING SUNSET EFFECT.

THE following note has been received from S.S. *Darro*, Captain W. E. SMITH, observer Mr. H. DAVID, 3rd officer, Monte Video to Liverpool.

"On June 15th, the ship being off C. Finisterre, wind light from N.N.E. with clear sky but hazy horizon, the mirage effect on the setting Sun was most interesting. As the Sun descended to the haze belt it assumed an oval shape of considerable eccentricity, with the major axis in the horizontal. It then changed to various shapes, sometimes being almost square with projecting horns and not unlike a Chinese lantern. As it touched the denser belt (the lower limb being a semi-diameter above the horizon) a bright horizontal band appeared and remained throughout while the Sun could be seen setting within it, until the upper limb had disappeared. The belt then disappeared, and the whole Sun reappeared in its ordinary spherical form with the lower limb on the horizon and continued to set without further distortion. No other mirage effect was observed at the time, though at 10.00 a.m. distant fishing craft were reproduced twice, *i.e.*, three craft could be seen one above the other."

## SET IN OFF RAS ALULA.



The following notes have been received from S.S. *Clan Ross*, Captain W. G. M. CHRISTIAN, observer Mr. S. M. W. EASTERBROOK, 3rd officer, Suez to Durban *via* Aden:—

## SET IN OFF RAS ALULA.

3rd June 1923, Midnight to 1.40 a.m.

"The accompanying tracing illustrates an abnormal set onshore experienced on this part of the coast. S/s was steaming at 10 knots, and set was found to be in a W.S.W. direction, directly on to Ras Alula. It was a bright moonlight night and all cross and beam bearings are very reliable. Ras Filuk being observed, and cross bearings being taken as soon as the moon rose at 9.30 p.m. At 11.26 Ras Filuk was abeam, distant  $8\frac{1}{4}$ , and at midnight cross bearings were again taken, and course altered to  $107^\circ$  to pass 5 miles off Cape Guardafui. At 1.40 a.m. it was thought that s/s was rather close in shore and on cross bearings being taken it was found that a strong set was existent, which necessitated alteration of course to  $100^\circ$ . Upon determining the current it was found that in the 1 hour 40 minutes s/s had been set W.S.W. 4 miles. The wind at midnight was E.S.E. 2."

## TIDE RIPS.

5th June 1923, 5 p.m., Latitude  $3^\circ 28' N.$  Longitude  $50^\circ 15' E.$

"A line of what appeared, at first, to be breakers on a reef, was observed ahead of s/s, and an alteration in course was made to approach at a finer angle. On proceeding nearer, it was observed to be an exceptionally strong tide or current rip extending from horizon to horizon. It had the appearance of a reef, but without the discoloration of water attending it, except that the water to the S.W. of the line was of a deeper blue. The height of the waves in the overfall was observed to be between 3 and 7 feet, and the noise of the falling water was very audible to all on board, and similar to that of surf breaking on the shore. Its contour was zig-zag, but the general direction was N.W. and S.E. After passing through the rip a moderate swell was observed coming from the S.E. in addition to the S.W. swell attending the monsoon, also at 8.00 p.m. a distinct drop in water temperature was noticeable, it being  $76^\circ$  against  $82^\circ$  at 4.00 p.m."

STEAMSHIP ROUTE FROM COLOMBO, AND THE EAST, TO PERIM, DURING THE S.W. MONSOON, WITH  
A BRIEF SURVEY OF CURRENTS, WIND, CLOUD, AND CONDITIONS OF VISIBILITY, IN THE REGION  
OF SOKOTRA AND CAPE GUARDAFUI.

BY L. A. BROOKE SMITH, MARINE SUPERINTENDENT.

THE interest shown in response to the articles published under this heading on the East Indian Seas Charts for the month of June in 1921, 1922 and 1923, prompts us to reproduce the charts and summarize those articles in the first June number of the "Marine Observer," through which the matter will be brought more generally to the notice of navigators when the S.W. monsoon breaks.

As long ago as 1853, Lieutenant A. DUNDAS TAYLOR, Indian Navy, compiled a chart of the Arabian Sea showing the Winds and Currents during the South-West monsoon from upwards of 100 logs of the vessels of the Indian Navy.

Unfortunately this chart, which was originally published by JOHN WALKER, Geographer to Hon. East India Company, is now out of print.

Upon it was indicated a region, elliptical in shape, between the parallels of  $5^\circ$  and  $11^\circ$  North and the meridians  $59^\circ$  and  $71^\circ$  East, around which the following was inscribed. "In this region, and more particularly in the marked Steamer's track, the sky is generally cloudless, the wind light, water smooth and squalls seldom happen. The breezes are lightest in the Eastern half and become gradually stronger as the Western side is approached."

TAYLOR's "soft patch in the S.W. monsoon" has long been the

subject of interest to many, and it is interesting to note that the barometric gradient shown on the charts of normals for June, July, August and September indicate less wind hereabouts.

This chart indicated the presence of a whirl of current and very high confused sea some 150 miles south of Sokotra.

It gave as "the probably best track for Steamers from Bombay to Aden in that season," rhumb lines from Bombay to Latitude  $18^\circ N.$ , Longitude  $72^\circ E.$  to Latitude  $9^\circ N.$ , Longitude  $69^\circ E.$  to Latitude  $7^\circ N.$ , Longitude  $62^\circ E.$  to Latitude  $8^\circ N.$ , Longitude  $55^\circ E.$  to Latitude  $10\frac{1}{2}^\circ N.$ , Longitude  $52\frac{1}{2}^\circ E.$ , and thence to Cape Guardafui.

In June, 1891, Meteorological Charts of the Portion of the Indian Ocean adjacent to Cape Guardafui and Ras Hafun, compiled under the superintendence of Navigating Lieut. BAILLIE, R.N., then Marine Superintendent, were published. These charts only extended southward to Latitude  $10^\circ N.$  and were compiled mainly for the purpose of showing that a theory mooted that sea surface temperature could be used as a guide for rounding Cape Guardafui would be very dangerous in practice.

In the first year (1906) of the publication of the Monthly Meteorological Charts of the Indian Ocean, Captain CAMPBELL HEPWORTH, C.B., R.N.R., Marine Superintendent, drew attention to the Alternative

Route which was first adopted by Captain J. F. RUTHVEN, then commanding *R.M.S. Orontes*, and had been used for a number of years by experienced Commanders of the P. & O. and Orient Services, including Captains T. S. ANGUS and C. D. BENNETT.

In 1920, owing to remarks and frequent discussion of this subject by navigators, we were led at the request of the Hydrographer of the Navy to further investigate the winds, currents, sea, swell, cloud, haziness and mist logged by observing vessels in sub-squares between the parallels of 14° and 7° N. and the meridians of 51° and 57° E.; at the same time captains of observing ships trading to the East were invited to give their views upon the route homeward during the S.W. monsoon.

The charts have since been extended to Latitude 15° N., Longitude 60° E., and those for current amended with observations received up to 1922.

During the S.W. monsoon, generally between Colombo and the 60th meridian, there is less wind the further south; as the African coast is approached it increases and backs. When conditions are normal, the strongest part of the monsoon lies east of the longitude of Sokotra in a line bending north-eastward and is clearly shown on the chart compiled by Lieut. DUNDAS TAYLOR, Indian Navy.

Between Colombo and the 60th meridian the set of the current is between E. and S.E., the lowest velocities being found between Latitude 9° and 6° N.; in July there is a westerly set between the parallels of 1° and 2° N. latitude.

Westward of the 60th meridian the current is strong. From Cape Delgado there is a strong set northward along the African coast dividing south of Sokotra; part of this current sets N. and N.E., while a large body of water curves E. and S.E., its greatest strength being in about Latitude 9° 30' N., Longitude 54° 00' E., according to the accompanying charts.

CHARTS I, II and III show component results from the data available. Currents are determined by the difference between observed and D.R. positions and do not necessarily give the set and drift at any particular spot but rather that experienced over a distance, so that the results are necessarily very general.

On September 9th, 1920, *S.S. Rotenfels*, Captain A. TAYLOR, from Calcutta to Suez, experienced a set and drift of S. 62° E., 5 knots, in Sub-Squares 93 and 94, found by reliable stellar observations. With a moderate S.S.W. gale there was such a high confused sea, the vessel being deep laden with manganese ore, that it was found necessary to keep away and run north of Sokotra.

On July 2nd, 1906, *S.S. Ramsay*, Captain F. C. MULLAN, recorded a set between noon, Latitude 8° 43' N., Longitude 52° 10' E., and 6.40 p.m., Latitude 9° 43' N., Longitude 52° 42' E. of N. 72° E., 51 miles, which works out at the rate of 183 miles per day, or 7.6 knots. The following appears in the remark column:—"6.40 p.m., good stellar observations showing strong N.E. set, suspect this was running from a.m. sights. Very clear weather"; and the noon to noon result shows a set of N. 66° E., 66 miles. The first inclination was to reject this as impossible, but we find in the valuable set of current and wind charts for his voyages between 1894 and 1906, contributed by Captain HARRIS, of the Bibby Line, a current experienced by him in the *S.S. Worcestershire*, on July 3rd, 1906, the day following the observation of *Ramsay*, between noon, Latitude 8° 58' N., Longitude 54° 42' E., and 7 p.m., stellar position Latitude 9° 07' N., Longitude 54° 18' E., of E.S.E., 7.4 knots or 51.8 miles, equal to 177 miles for 24 hours. The noon to noon result on July 4th was S.E. 108 miles. Now the distance between the positions midway between the two observation points on these steamer tracks is 120 miles, and the interval 24 hours. It seems possible that *Worcestershire* was passing through the same water as that traversed by *Ramsay*. *Ramsay* steered N. 24° W., true, speed 7½ knots, and actually made N. 27° E. It is more than likely that part of this current attributed to the interval between noon and 6.40 p.m. was experienced between a.m. sights and noon, but there can be little doubt that the ship passed through a streak of very strong current, as did *Rotenfels* eastward of this position on September 9th, 1920.

If the current attained such a velocity it is abnormal, but the winds logged by *Worcestershire* and *Ramsay* at the spot are not. With the exception of the P. & O. *S.S. China*, who experienced a whole gale from S.W. in Latitude 12½° N., Longitude 55½° E. on June 19th, 1906, we have been unable to find records of wind which depart from the normal, anywhere in the Arabian Sea for the period immediately prior to July 2nd, 1906.

Between noon, August 12th, Latitude 8° 05' N., Longitude 53° 22'

E., and noon, August 13th, 1912, Latitude 9° 48' N., Longitude 53° 32' E., *S.S. Shadwell*, Captain W. H. KNOX, experienced a set S. 72° E., 117 miles.

During the 1922 South-West monsoon season, *S.S. Nore*, Captain H. W. RANDALL, from Colombo to Suez, experienced a set and drift of S. 58° E., 55 miles, on August 24th, 1922, between Latitude 9° 22' N., Longitude 55° 16' E., and Latitude 9° 25' N., Longitude 53° 54' E. in 11 hours, which is equivalent to 120 miles in 24 hours.

With middle position of run in Sub-Square 93, *S.S. Port Augusta*, Captain C. A. ROBINSON, from Albany to Suez direct, experienced a set at the rate of 128 miles per day to S. 71° E., on August 12th, 1922.

These observations have been included, and by calculating the resultants from all observations available for which there was not ample grounds for rejection, we arrive at the currents shown on the chart which may be taken as fairly representing the mean during the height of the S.W. monsoon season. From this it is seen that during July and August the current is at its greatest strength in Sub-Square 94, where it sets E.S.E. at the rate of 98 miles per day. An examination of Sub-Square 83 current rose, with explanation of charts, will show that there the currents are variable, as is indeed the case for the whole of this area.

In Sub-Square 94 the percentage of observations of confused swell is highest, 44; here the mean direction of the wind is S.W. and its force 6.2, it thus blows nearly athwart the direction of the current; as would be expected, where the direction of the wind and current are at their greatest divergence and where both are strong, the swell is most confused.

Further evidence of strong current in this vicinity was published on the June, 1922, U.S.A. North Pacific Pilot chart; *S.S. Pearl Shell*, Captain OSCAR LANE, having experienced a set of S. 58° E., 111 miles, in 24.1 hours on September 9th, 1921, in Sub-Square 94.

During last South-West monsoon season, 1923, *S.S. Chindwin*, Captain G. PATERSON, experienced a set and drift of S. 84° E. 105 miles, between Latitude 8° 55' N., Longitude 54° 51' E., and Latitude 9° 59' N., Longitude 53° 5' E. between noon July 30th and noon July 31st.

CHART II shows that the mean force and direction of the wind is remarkably uniform, but the tendency for it to back as the African coast is approached from the eastward is clearly indicated.

Squalls are frequent over the whole area, but are particularly frequent and violent under the lee of Sokotra. An examination of the wind rose for Sub-Square 83 shows how the direction and force vary. The cloud amount logged is more pronounced away from the land. The neighbourhood of Ras Hafun is the worst for haze and mist; the vicinity of Ras Radressa is rather more hazy than that of Guardafui.

The percentage of cloud logged shows that the sky is favourable generally for solar or stellar sights; though the haze and mist percentage may indicate that sun sights may often be unreliable from the height of eye on a large steamer's bridge, while stellar observations may be impossible, **but if stars can be observed with suitable azimuths, the mean result may be very accurate.** The frequency of observed positions by both stellar and solar observations indicates that sights are obtained far more often than not.

**In 1921 the following conclusions and suggestions were offered; subsequent experience appears to support them.**

Steamers using the southern route should not pass N.E. of Latitude 8° 30' N., Longitude 53° E., in order to avoid the strongest part of the current setting to the southward of east, where there is frequently a confused swell.

Ras Hafun could be used in daylight and clear weather for making a landfall with advantage, it being the most easily distinguished landmark in this vicinity. If possible make the land in daylight.

At night, or by day in hazy weather, the lead is the safest and surest guide; in these circumstances steer for the bank of soundings off Ras Jard Hafun; this land is high and steep and may be seen furthest during the hours of darkness; **for instructions see "Red Sea and Gulf of Aden Pilot."**

**Track 1.—Low-power steamers from Colombo might with advantage pass through the Eight Degree Channel, skirting the Northern Maldives, edge to the southward until in Latitude 6° N., then steer west along that parallel to Longitude 60° E., whence as the wind and sea increases, course should be altered to north-westward to pass through Latitude 8° N., Longitude 52° 30' E., thence to make Ras Hafun or the Bank off Ras Jard Hafun, according to circumstances, as above.**

By going so far west, before altering course materially to the northward, the strength of the current will be abaft the port beam and the wind on the port quarter from the last position.

**Track 2.—Full-power steamers might adopt Track 1 with advantage,** but if it is desired not to so increase the distance, pass 10 to 15 miles south of Minikoi, and steer west along the parallel of 8° N. to Longitude 60° E., when a decision should be made, in which W/T reports from vessels to the westward will be of great assistance.

If certain of making land in daylight, and it is considered expedient, course should be shaped to pass through Latitude 8° 30' N., Longitude 53° E., and thence as usual to round Guardafui, though there is not much to be gained as the wind will be on the bow, and the current adverse until the last position is passed.

**Track 3.—If not certain of making the land in daylight** or for other reasons, the alternative southern route is not chosen, edge away to the north-westward, as the wind and sea increases and pass 30 to 40 miles N.E. of Ras Radressa. It is not advisable to make this land unless the weather is clear, for the lead gives little warning. There is little advantage in passing close under the lee of Sokotra, as here squalls are frequent and violent off the land.

**Track 4.—Very large high-speed steamers** find it advantageous to steer for a position south-eastward of Ras Radressa until in from Longitude 60° E. to 57° E., whence course is altered to pass at a distance N.E. of that point, keeping the wind and sea abeam.

### Observations by the Hydrographer of the Navy. (Published in 1921.)

The recommendations given, as to routes, illustrated on the appended CHART No. 4, appear to be a fair resultant of the varying opinions of navigators quoted in the preceding notes. There seems to be no doubt that both wind and sea are considerably less felt along the route indicated southward of Sokotra; but that the currents are both stronger and more uncertain in direction than those usually encountered on the northern route. As regards visibility, there seems to be little to choose between the conditions over the island of Sokotra, and those over the main land of Africa at Ras Asir, and Ras Jard Hafun. The latter, however, if sighted, is much more distinctive than Ras Radressa, the eastern point of Sokotra, owing to its greater height and surroundings.

Ras Jard Hafun, too, has the additional advantage as a "land-fall" from the fact that, if it should not be visible on account of haze, &c., it has off it an unmistakable and abruptly defined 100-fathom line, surrounding a large and safe area of about 40-fathom depths, extending about 30 miles from the coast.

Off Ras Radressa, on the other hand, the 100-fathom line has not yet been defined, and plotted soundings extend for a bare 10 miles from the point. Though this latter offers little safeguard in making the landfall in hazy weather, there is, however, unlimited, if stormy sea-room; while the straits off Ras Jard Hafun and Ras Asir are but 40 miles wide—not a great amount to "veer and haul on," with an uncertain horizon for sights, and a current of unknown set (but probably to the eastward) and of considerable strength, into dangerous waters.

The conclusions to be drawn are that while better conditions of wind and sea are undoubtedly gained by taking the southern route in the South-West monsoon, and consequent saving of coal, wear and

tear, this track should be taken only by navigators accustomed to fix the ship's position by sights frequently and at any time during day and night when opportunity offers; and also accustomed to "feeling the way" by continuous and methodical sounding. The latter is especially necessary on account of the uncertainty of the position given by sights taken with a "bad" horizon, and in haze.

It is unfortunate that there are, as yet, no D.F. W/T stations anywhere in the vicinity. With this means of fixing available, there can be no doubt as to which is the better route.

(Sgd.) F. C. LEARMONTH,  
Rear-Admiral.

23rd March, 1921.

These tracks are now recommended in "Ocean Passages for the World," compiled by Rear-Admiral BOYLE T. SOMERVILLE, C.M.G., and published in 1923 by the Hydrographic Department of the Admiralty.

Comparison was made of the winds, sea and current logged by regular observing ships approximating Recommended Tracks 1, 2, 3 and 4, during the 1921 and 1922 S.W. monsoon season, which showed that generally better conditions were experienced the more southerly the route.

Several steamers proceeding south of Sokotra steered a course which took them through the strength of the current setting E.S.E. in the vicinity of Latitude 9½° N., Longitude 54° E., and their experience appears to fully justify the recommendation not to alter course to the north-westward until to the westward of Longitude 53° E. To put the case in a nutshell, if using the Southern Route, keep well to the southward.

Last South-West monsoon season, 1923, a larger proportion of regular observing ships used the more southerly routes, i.e., they approximated Tracks 2 and 3.

Information has been received that an unwatched light is in the course of construction at Cape Guardafui, and at Ras Hafun a light is now established; details are given in March, 1924, Notice to Mariners.

It will be interesting to see to what extent these lights influence the use of Tracks I and II.

In view of local obscurity great caution will still be necessary in making a landfall.

During the discussion which took place in 1920 the most convincing proof of the advantages of the southern route was that supplied by Captain T. S. ANGUS, late Nautical Inspector, P. & O. S.N. Co.

The P. & O. S.S. *Pera*, Captain A. L. VALENTINI, left Colombo on June 28th, 1904, at noon, and, passing through 8° 34' N., 71° 10' E., 12° 34' N., 59° 15' E., 13° 07' N., 56° 12' E., 13° 30' N., 52° 20' E., passed Aden July 8th, 1904, 7 a.m. Her mean displacement was 12,023 tons; coal consumed, 544 tons, and time of passage, 235 hours.

The S.S. *Syria*, Captain D. G. GREGOR, R.N.R., of the same line, left Colombo on June 29th, 1904, at 7 a.m., and passing through 7° 31' N., 76° 00' E., 7° 28' N., 71° 45' E., 5° 45' N., 68° 00' E., 6° 00' N., 59° 50' E., 6° 33' N., 55° 25' E., 8° 30' N., 52° 00' E., 10° 32' N., 51° 50' E., 12° 02' N., 51° 25' E., 11° 10' N., 46° 40' E., passed Aden at 2 p.m. July 8th, 1904. Her mean displacement was 12,851 tons; coal consumed, 513 tons, and time of passage, 223 hours.

Thus the *Syria*, with 800 tons more displacement than *Pera*, ran from Colombo to Aden on less coal in 12 hours less time, notwithstanding her route involved 240 additional miles.

## WEATHER SIGNALS.

### II. WIRELESS WEATHER BULLETINS.

#### CANADA, NOVA SCOTIA, NEWFOUNDLAND AND LABRADOR, ETC.

THE following stations transmit the weather forecasts issued by the Canadian Meteorological Service, the wavelength used being 600 metres (spark) in all cases. Where the times of transmission are omitted, forecasts are sent on request, without charge. Stations marked with an asterisk (\*) are open during the season of navigation only.

Country.	W/T Station.	Call Sign.	Position (approx.)		Time, G.M.T.
			Lat. N.	Long. W.	
Canada (Nova Scotia).	†Lurcher Lt. Vsl.	VDR	43 49	66 32	—
	Cape Sable	VCU	43 23	65 37	0200, 1400
	Camperdown	VCS	44 31	63 33	—
	North Sydney	VCO	46 13	60 15	—
	Sable Island	VCT	43 56	60 02	—

Canada	Grindstone Island	VCN	47 23	61 54	—
	*Fame Point, Que.	VCG	49 07	64 36	0145, 1345
	*Clarke City, Que.	VCK	50 11	66 37	—
	*Father Point, Que.	VCF	48 31	68 28	—
	Grosse Island, Que.	VCD	47 02	70 40	—
	Quebec	VCC	46 48	71 12	—
	*Montreal	VCA	45 34	73 38	—
	*†Heath Point Lt.	VCI	49 03	61 30	—
	Vsl. (Anticosti I.)				
	St. John	VAR	45 14	66 03	—
Canada (New Brunswick).	Belle Isle	VCM	51 53	55 22	0230, 1430
Newfoundland and Labrador.	Cape Race	VCE	46 39	53 04	0215, 1415
	Point Amour	VCL	51 27	56 50	—
	St. Pierre and Miquelon Is.	HYS	46 46	56 10	1100, 1600, 2300.

† The station keeps watch for the first half of every odd hour from 1200 to 0000, and from 0300 to 0330, G.M.T. (civil).

## SPAIN.

Madrid (Carabanchel) W/T Station, approximate Latitude 40° 24' N., Longitude 3° 50' W., call sign EGC, transmits weather bulletins on a wavelength of 2,000 metres (spark), thrice daily, times of sending as follows:—

0930 G.M.T. (observations of 0700 G.M.T. taken at the stations given below).

1530 G.M.T. (observations of 1300 G.M.T. taken at the stations given below).

2030 G.M.T. (observations of 1800 G.M.T. taken at the stations given below).

Indicator Letters.	Station.	Position (approx.). Lat. Long.	Indicator Letters.	Station.	Position (approx.). Lat. Long.
MD	Madrid ...	40°24'N. 3°41'W.	ME	Melilla ...	35°16'N. 2°58'W.
LC	Corunna ...	43°22'N. 8°25'W.	TE	Tetuán ...	35°32'N. 5°22'W.
SF	San Fernando ...	36°27'N. 6°13'W.	IZ	Izania (Teneriffe) ...	28°15'N. 16°40'W.
BA	Barcelona ...	41°23'N. 2°09'E.	BI	Bilbao (Algorta) ...	43°15'N. 2°55'W.
SA	Santander ...	43°27'N. 3°48'W.	MG	Málaga ...	36°44'N. 4°25'W.
VD	Valladolid ...	41°39'N. 4°43'W.	VA	Valencia ...	39°28'N. 0°22'W.
ZA	Saragossa ...	41°40'N. 0°53'W.	LA	Larache ...	35°15'N. 6°09'W.
MA	Mahon ...	39°54'N. 4°18'E.	SE	Seville ...	37°23'N. 6°00'W.
BD	Badajoz ...	38°53'N. 6°56'W.	GR	Granada ...	37°11'N. 3°38'W.
CD	Cordova ...	37°51'N. 4°52'W.	TN	Santa Cruz (Teneriffe).	25°19'N. 16°30'W.
AI	Alicante ...	38°23'N. 0°25'W.			
AL	Almeria ...	36°51'N. 2°32'W.			

The bulletins commence with the letters "SME." Code used in bulletins:—Station indicator letters followed by 4 groups of five figures in each group, then a number of groups containing only 4 figures in each, relating to upper wind observations.

## Explanation of Code Figures used in the three Transmissions.

**First Group.** 1st three figures give the corrected barometer reading in millibars and tenths (initial 9 or 10 omitted). To convert to inches, see p. 23, February number.

4th and 5th figures give the wind direction true (Table IV., p. 15, January number).

**Second Group.** 1st figure gives the wind force by Beaufort scale, forces 9 and above being sent as 9.

2nd and 3rd figures give the weather at the time of observation (Table XXXI.).

4th and 5th figures give the temperature of the air in whole degrees Centigrade. (See Table VII., p. 29, February number, for conversion to Fahrenheit.)

**Third Group.** 1st figure gives the characteristic of barometric tendency (Table XXXII.).

2nd and 3rd figures give the amount of barometric tendency in millibars and tenths per three hours.

4th and 5th figures give the rainfall in millimetres, 0930 and 2030 messages only (see Note (3), and Table XXXIII. for special meanings). In the 1530 message the 4th and 5th figures give the *past weather* (Table XXXIV.).

**Fourth Group.** 1st figure gives the form of low cloud observed (Table XXXV.).

2nd figure gives the direction of motion of the low cloud, on scale 0-9; where 0 = no cloud, 1 = from N.E., 2 = from E., etc. 9 = no observation.

3rd figure gives the form of high cloud observed (Table XXXVI.).

4th figure gives the direction of motion of high cloud; on same scale as that for low cloud.

5th figure. In the case of stations SF, LC and MA, gives the sea disturbance (Table XXXVII.); for the remaining stations it gives the cloudiness of the horizon (Table XXXVIII.).

**Remaining Groups.** Generally five, containing 4 figures in each, give the direction and speed of the upper winds at various heights at each station. The 1st two figures giving the direction on the scale 01-32; where 08 = E., 16 = S., 24 = W.). The 3rd and 4th figures give the wind speed in metres per second. The five groups refer respectively to the five heights as follows:—

Station ZA.	} 500 m., 1,000 m., 2,000 m., 3,000 m., 4,000 m.
BD.	
Station MD.	} 1,000 m., 2,000 m., 3,000 m., 4,000 m., 5,000 m.
GR.	
VD.	} 3,000 m., 4,000 m., 5,000 m., 6,000 m., 7,000 m.
IZ.	
All other stations	250 m., 500 m., 1,000 m., 2,000 m., 3,000 m.

Note:—

(1) The 1530 G.M.T. transmission is followed by groups containing sea conditions and forecasts in special code.

(2) The 2030 G.M.T. transmission contains the 1800 G.M.T. observations of the first 4 stations only and is in the same form as the 0930 G.M.T. message, but it contains no observations of upper winds.

(3) For stations not reporting at 1800 G.M.T. the amount of rainfall given in the 0700 message refers to the preceding 24 hours. For stations reporting both at 0700 and 1800 G.M.T. the amount refers to the preceding 13 hours in the morning report and the preceding 11 hours in the evening report.

(4) Missing figures are replaced by the letter "X". If a complete set of observations is missing the word "falta" is transmitted after the indicator letters of the station.

## Tables used in conjunction with Spanish Bulletins from Carabanchel W/T Station.

Table XXXI.—Present Weather Table.

NOTE:—Numbers 00 to 49 refer to weather *without* precipitation.

Code	No.		
	00	Cloudless absolutely	= b
	01	Some cloud, but less than $\frac{1}{2}$	= b <sub>1</sub>
	02	Sky about $\frac{1}{2}$ clouded	= bc
	03	Sky about $\frac{3}{4}$ clouded	= c
	04	Sky overcast, but small amount of blue visible	= o
	05	Sky absolutely overcast	= o
	06	Overcast and 1f	} Haze and mist
	07	Overcast and 2f	
	08	Overcast and 3f	} Sky overcast, varying degrees of haze, mist or fog.
	09	Overcast and 4f	
	10	Overcast and 5f	
	11	Overcast and 6f	
	12	Overcast and 7f	
	13	Overcast and 8f	
	14	Haze 1f	} Varying degrees of haze or fog. Information regarding state of sky given by cloud group.
	15	Haze 2f	
	16	Fog 3f	
	17	Fog 4f	
	18	Fog 5f	
	19	Fog 6f	} Varying degrees of mist or wet fog. Information regarding state of sky given by cloud group.
	20	Fog 7f	
	21	Fog 8f	
	22	Mist 1fe	
	23	Mist 2fe	
	24	Fog 3fe	} Miscellaneous Phenomena.
	25	Fog 4fe	
	26	Fog 5fe	
	27	Fog 6fe	
	28	Fog 7fe	
	29	Fog 8fe	} Rain and Fog.
	30	e (wet air)	
	31	Exceptional visibility	
	32	Haze	
	33	Dew	
	34	Hoar Frost	} Squally conditions with rain, hail or snow.
	35	Rime	
	36	Glazed Frost	
	37	Glazed Roads	
	38	Solar halo	
	39	Lunar halo	} Squally conditions with rain, hail or snow.
	40	Solar corona	
	41	Lunar corona	
	42	Aurora	
	43	Squalls	
	44	Gale	} Squally conditions with rain, hail or snow.
	45	Gloom	
	46	Ugly, threatening	
	47	Thunder	
	48	Lightning	
	49	Thunder and lightning	} Squally conditions with rain, hail or snow.
	50	Slight rain and 2f or 3f	
	51	Moderate rain and 2f or 3f	
	52	Heavy rain and 2f or 3f	
	53	Slight rain and 4f or 5f	
	54	Moderate rain and 4f or 5f	} Squally conditions with rain, hail or snow.
	55	Heavy rain and 4f or 5f	
	56	Slight rain and 6f to 8f	
	57	Moderate rain and 6f to 8f	
	58	Heavy rain and 6f to 8f	
	59	Slight rain and squalls of wind	} Squally conditions with rain, hail or snow.
	60	Moderate rain and squalls of wind	

Code

No.		
61	Heavy rain and squalls of wind	Squally conditions with rain, hail or snow.
62	Slight rain and hail and squalls	
63	Moderate rain and hail and squalls	
64	Heavy rain and hail and squalls	
65	Slight sleet and squalls	
66	Moderate sleet and squalls	
67	Heavy sleet and squalls	
68	Slight snow and squalls	Snow lying.
69	Moderate snow and squalls	
70	Heavy snow and squalls	
71	Snow lying covering the whole country	
72	Snow lying but patches of bare ground	Snow lying.
73	Snow lying and deep drifts	
74		
75		
76		
77	Slight drizzle	Drizzle.
78	Moderate drizzle	
79	Thick drizzle	Rain without qualification.
80	Slight rain	
81	Moderate rain	
82	Heavy rain	Hail.
83	Slight hail	
84	Moderate hail	Sleet.
85	Heavy hail	
86	Slight sleet	Snow.
87	Moderate sleet	
88	Heavy sleet	Thunderstorm.
89	Slight snow	
90	Moderate snow	
91	Heavy snow	
92	Slight thunderstorm	
93	Moderate thunderstorm	without hail
94	Heavy thunderstorm	
95	Slight thunderstorm	with hail
96	Moderate thunderstorm	
97	Heavy thunderstorm	

Table XXXII.—Characteristic of Barometric Tendency Table.

Code Figure.	Code Figure.
0 Steady.	5 Falling.
1 Rising.	6 Falling then steady.
2 Rising then steady.	7 Falling then rising.
3 Rising then falling.	8 Rising or steady, then falling.
4 Falling or steady, then rising.	9 Line squall.

Table XXXIII.—Rainfall, special significance Table.

The following code figures are used with a special significance.

Code Figures.	
00 No precipitation.	
99 Precipitation has occurred, but its amount has not been measured.	
98 Precipitation exceeding 96 mm.	
97 "Trace" of precipitation, amount less than 0.5 mm.	

Amounts exceeding 96 mm. are reported in full at the end of the message, the figures 98 being inserted in the coded part.

Table XXXIV.—Past Weather Table.

NOTES:—Numbers 00 to 49 refer to past weather where there has been no precipitation.

Numbers 50 to 97 refer to past weather where there has been precipitation.

Code No.	
00 Cloudless	Without precipitation or fog.
01 Mainly b and bc; medium or high cloud	
02 Mainly b and bc; low cloud	
03 Mainly b and bc; mixed cloud	
04 Mainly bc and c; medium or high cloud	
05 Mainly bc and c; low cloud	
06 Mainly bc and c; mixed cloud	
07 Mainly c and o; medium or high cloud	
08 Mainly c and o; low cloud	
09 Mainly c and o; mixed cloud	
10 Overcast, but occasional patches of blue sky visible; medium or high cloud.	
11 Overcast, but occasional patches of blue sky visible; low cloud.	

Code

No.		
12	Overcast, but occasional patches of blue sky visible; mixed cloud.	Without precipitation or fog.
13	Completely overcast, with no blue sky at all visible; low cloud or mixed cloud.	
14	Mainly b and c; low cloud or mixed cloud	Cloud above fog, so that sun or stars not visible at all.
15	Overcast and 1f	
16	Overcast and 2f	
17	Overcast and 3f	
18	Overcast and 4f or 5f	
19	Overcast and 6f to 8f	Fog, but no precipitation.
20	Haze 1f	
21	Haze 2f	
22	Fog 3f	
23	Fog 4f or 5f	
24	Fog 6f or 8f	
25	Mist 1fe	
26	Mist 2fe	
27	Fog 3fe	
28	Fog 4fe or 5fe	
29	Fog 6fe to 8fe	Special phenomena without precipitation.
30	e (wet air)	
31	Exceptional visibility	
32	Haze	
33	Dew	
34	Hoar frost	
35	Rime	
36	Glazed frost	
37	Glazed roads	
38	Solar halo	
39	Lunar halo	
40	Solar corona	Showers.
41	Lunar corona	
42	Aurora	
43	Squalls	
44	Gale	
45	Gloom	
46	Ugly, threatening	
47	Thunder	
48	Lightning	
49	Thunder and lightning	
50	Passing showers slight	Rain
51	Passing showers moderate	
52	Passing showers heavy	Hail or rain and hail
53	Passing showers slight	
54	Passing showers moderate	Sleet or rain and sleet
55	Passing showers heavy	
56	Passing showers slight	Snow.
57	Passing showers moderate	
58	Passing showers heavy	Occasional precipitation.
59	Passing showers slight	
60	Passing showers moderate	
61	Passing showers heavy	
62	Occasional slight	Drizzle
63	Occasional moderate	
64	Occasional thick	Rain
65	Occasional slight	
66	Occasional moderate	Rain and hail
67	Occasional heavy	
68	Occasional slight	Sleet or rain and sleet
69	Occasional moderate	
70	Occasional heavy	Snow
71	Occasional slight	
72	Occasional moderate	Drizzle.
73	Occasional heavy	
74	Occasional slight	Rain.
75	Occasional moderate	
76	Occasional heavy	Rain and hail.
77	Continuous or nearly continuous slight	
78	Continuous or nearly continuous moderate	Sleet or rain and sleet.
79	Continuous or nearly continuous heavy	
80	Continuous or nearly continuous slight	Snow.
81	Continuous or nearly continuous moderate	
82	Continuous or nearly continuous heavy	Snow.
83	Continuous or nearly continuous slight	
84	Continuous or nearly continuous moderate	Snow.
85	Continuous or nearly continuous heavy	
86	Continuous or nearly continuous slight	Snow.
87	Continuous or nearly continuous moderate	
88	Continuous or nearly continuous heavy	Snow.
89	Continuous or nearly continuous slight	
90	Continuous or nearly continuous moderate	Snow.
91	Continuous or nearly continuous heavy	

Code			
No.			
92	Thunderstorm slight	} without hail	} Thunderstorm.
93	Thunderstorm moderate		
94	Thunderstorm heavy		
95	Thunderstorm slight	} with hail	
96	Thunderstorm moderate		
97	Thunderstorm heavy		

Definition of letter "f" in Tables XXXI. and XXXIV.

	Number.	Distance of most distant object visible.
Fog	8f	Less than 25 metres (22½ yards).
	7f	25 "
	6f	50 " (55 yards).
	5f	100 " (110 yards).
	4f	200 " (220 yards).
Haze or mist	3f	500 " (550 yards).
	2f	2,000 " (1¼ miles).
	1f	10,000 " (6¼ miles).
	0f	30,000 " (18¾ miles).

Table XXXV.  
Form of Low Cloud Table.

Code Figure.	
0	No low cloud.
1	Fracto-cumulus.
2	Mammato-cumulus.
3	Low strato-cumulus.
4	High strato-cumulus.
5	Nimbus.
6	Cumulus.
7	Cumulo-nimbus.
8	Stratus.
9	No observation.

Table XXXVII.  
Sea Disturbance Table.

Code Figure.	
0	Sea calm.
1	Sea very smooth.
2	Sea smooth.
3	Sea slight.
4	Sea moderate.
5	Sea rather rough.
6	Sea rough.
7	Sea high.
8	Sea very high.
9	Sea phenomenal.

Table XXXVI.  
Form of High Cloud Table.

Code Figure.	
0	No high cloud.
1	Cirrus.
2	Cirro-stratus.
3	Cirro-cumulus.
4	False cirrus.
5	Thin alto-stratus.
6	Thick alto-stratus.
7	Alto-cumulus (low).
8	Alto-cumulus (high).

Table XXXVIII.  
Cloudiness of Horizon Table.

Code Figure.	
0	All horizon without cloud.
1	Clouds in N. part of horizon.
2	Clouds in E. part of horizon.
3	Clouds in S. part of horizon.
4	Clouds in W. part of horizon.
5	All horizon covered with clouds except 1st quadrant.
6	All horizon covered with clouds except 2nd quadrant.
7	All horizon covered with clouds except 3rd quadrant.
8	All horizon covered with clouds except 4th quadrant.
9	All horizon covered with cloud.

## PORTUGAL.

Monsanto W/T station, approximate Latitude 38° 44' N., Longitude 9° 11' W., call sign CTV, broadcasts weather bulletins twice daily at the following times:—

0840 G.M.T. (containing observations of 0700 G.M.T. taken at the undermentioned stations).

1940 G.M.T. (containing observations of 1800 G.M.T. taken at the undermentioned stations).

Wavelengths used, 1000 metres (spark) for first transmission, and 2400 metres (C.W.) for second transmission, which follows 5 minutes later in each case.

Indicator Letters.	Name.	Position (approximate).	
		Latitude.	Longitude.
Name sent in full.	Lisbon	38° 42' N.	9° 08' W.
	Oporto	41° 09' N.	8° 34' W.
	Coimbra	40° 12' N.	8° 30' W.
	Funchal (Madeira)	32° 37' N.	16° 54' W.
	Angra (Azores)	38° 39' N.	27° 14' W.

The bulletins are divided into two parts, Part I., containing the land stations' observations, and Part II. those from ships. They commence with the words "Météo Portugal."

## Part I, 0840 and 1940 G.M.T. Transmissions.

Code used: Name of station in full, followed by six groups of 5 figures in each group.

**First Group.** 1st three figures give the corrected barometric pressure in millimetres and tenths (initial 7 omitted). See Table V., p. 28, February number of this Journal, for conversion to millibars and inches.

3rd and 4th figures give the wind direction true (Table IV., p. 15, January number).

**Second Group.** 1st figure gives the wind force by Beaufort scale, forces 9 and above being sent as 9. 2nd and 3rd figures give the weather at the time of observation (Table II., pp. 14 and 15, January number).

4th and 5th figures give the air temperature in whole degrees Centigrade (Table VII., p. 29, February number, for conversion to Fahrenheit).

**Third Group.** 1st figure gives the characteristic of barometric tendency during the 3 hours preceding the time of observation (Table XV., p. 44, March number).

2nd figure gives the *amount* of barometric tendency during 3 hours preceding the time of observation in half-millimetres. For tendencies 10–19 the *second* figure only is sent and 33 is added to the wind direction figures in the First Group. For tendencies 20–29 the *second* figure only is sent and 67 is added to the wind direction figures. Tendencies greater than 29 are sent as 29.

3rd figure gives the weather since the preceding time of observation—past weather—(Table X., p. 29, February number).

4th figure gives the visibility (Table XVI., p. 45, March number).

5th figure gives the relative humidity of the air (Table XVII., p. 45, March number).

**Fourth Group.** 1st figure gives the predominating cloud form, lowest in the scale of cloud forms, see Table XVIII. (p. 45, March number).

2nd figure gives the amount of sky (scale 0–10) covered by above cloud form.

3rd figure gives the *predominating cloud highest* in the scale of cloud forms, see Table XVIII. (p. 45, March number).

4th figure gives the *total amount of sky covered with cloud* (scale 0–10).

5th figure gives the height of base of lowest cloud present (Table XIX., p. 45, March number).

**Fifth Group.** 1st and 2nd figures give the rainfall (in 0700 G.M.T. observations, for preceding 13 hours and in the 1800 G.M.T. observations for preceding 11 hours, Table XX., p. 45, March number).

3rd and 4th figures, 0840 G.M.T. transmission, give the minimum temperature, Centigrade, in the interval of 13 hours, ending at 0700 G.M.T. (Table VII., p. 29, February number, for conversion to Fahrenheit). In the 1940 G.M.T. transmission these 2 figures give the *maximum* temperature, Centigrade, in the interval of 11 hours ending at 1800 G.M.T.

5th figure gives the time of commencement of rainfall (Table XXII., p. 45, March number).

**Sixth Group.** In a special code, and preceded by the word "Mar," contains 5 figures representing observations of swell, the 1st figure gives the period of swell in seconds, 0=10 seconds or more.

2nd and 3rd figures gives the direction from which swell comes (in same code as that used for wind direction).

4th figure gives the height of swell on a scale 0–9.

5th figure gives the tendency of swell at time of observation according to the following scale:—

0 No change.	7 Increasing slowly.
1 Decreasing slowly.	8 Increasing.
2 Decreasing.	9 Increasing rapidly.
3 Decreasing rapidly.	

## Part II, 0840 and 1940 G.M.T. Transmissions.

This contains ship observations, preceded by the word "Navires" and is transmitted in 4 groups of figures for each ship. The groups contain five figures in each and their meaning is as follows:—

**First Group.** 1st figure gives the day of the week, 1 = Sunday, 2=Monday, etc., G.M.T. being used.

2nd figure gives the quarter of the globe in which the ship is situated (Table XI., p. 29, February number).

3rd, 4th and 5th figures give the latitude of the ship in degrees and tenths, the tenths being obtained by dividing the number of minutes by 6 and *neglecting the remainder*.

**Second Group.** 1st three figures give the longitude of the ship in degrees and tenths. The latter being obtained in the same way as for latitude.

4th and 5th figures give the time of observation G.M.T. (01=1 a.m., 13=1 p.m., etc.).

**Third Group.** 1st and 2nd figures give the barometer reading, corrected, in whole millimetres.

3rd and 4th figures give the wind direction, true (Table IV., p. 15, January number).

5th figure gives the wind force by Beaufort scale (p. 12, January number). Forces 9 and above sent as 9.

**Fourth Group.** 1st two figures give the weather at the time of observation (Table II., pp. 14 and 15, January number).

3rd figure gives the visibility (Table III., p. 15, January number).

4th figure gives the characteristic of the swell in the open sea (Table XXIII., p. 45, March number).

5th figure gives the direction from which the swell comes, on scale (0-8), in which 2 = East, 4 = South, etc. 0 = no swell.

Monsanto W/T Station also transmits a weather message at 1245 and 2300 G.M.T. *en clair* in Portuguese and English, giving:—

(1) The general pressure distribution at 0700 and 1800 G.M.T.

(2) The state of the weather at 0700 and 1800 G.M.T. on the coasts of Portugal, Azores, Madeira, Strait of Gibraltar, and the Bay of Biscay.

(3) A forecast of the weather for the following 24 hours.

Wavelengths used for both the above transmissions 1,000 metres (spark) and a repetition, approximately 5 minutes afterwards, on 2,400 metres (C.W.).

The Azores Weather Bulletin as explained below is repeated by Monsanto at 1350 and 1850 G.M.T. on a wavelength of 1,000 metres (spark).

### AZORES.

Terceira-Faleiras W/T station, approximate Latitude 38° 40' N., Longitude 27° 08' W., call sign PQT, broadcasts weather bulletins at 1330 and 1830 G.M.T. on a wave-length of 1,000 metres (spark).

The bulletins begin with the *name* of the observation station.

Stations.	Latitude (Approximate).	Longitude (Approximate).
Angra - - - - -	38° 38' N.	27° 14' W.
Horta - - - - -	38° 32' N.	28° 38' W.
Ponta Delgada - - - - -	37° 44' N.	25° 40' W.

Code used:—At 1330 G.M.T., observations of 1300 G.M.T., usually six groups of figures containing 5 figures in each group, for each station.

### Explanation of 1330 G.M.T. Bulletin.

**First Group.** 1st two figures give the corrected barometer reading in whole millimetres, the initial 7 being omitted. (To convert to millibars and inches, *see* Table V., p. 28, February number.)

3rd and 4th figures give the wind direction, true (Table IV., p. 15, January number.)

5th figure is a check figure and is the *units* figure of the *sum* of the *first four* figures.

**Second Group.** 1st figure gives the wind force by Beaufort scale (p. 12, January number). Forces of 9 and above being sent as 9.

2nd and 3rd figures give the weather at the time of observation. (Table II., p. 15, January number.)

4th figure gives the relative humidity of the air. (Table XVII., p. 45, March number.)

5th figure is the check figure of the group.

**Third Group.** 1st figure gives the characteristic of barometer tendency during the 3 hours preceding the time of observation. (Table XV., p. 44, March number.)

2nd figure gives the *amount* of barometric tendency, in half millimetres, during the 3 hours preceding the observation. For tendencies 10-19 the *second* figure only is sent and 33 is added to the wind direction figures in First Group. For tendencies 20-29 the second figure only is reported and 67 is added to the wind direction figures. Tendencies greater than 29 are sent as 29.

3rd figure gives the weather in the interval since the preceding time of observation (Table X., p. 29, February number).

4th figure gives the visibility (Table XVI., p. 45, March number).

5th figure is the check figure of the group.

**Fourth Group.** 1st figure gives the form of predominating cloud. (Table XVIII., p. 45, March number.)

2nd figure gives the total amount of sky covered with cloud on scale 0-10.

3rd and 4th figures give the temperature of the air in whole degrees Centigrade. (*See* Table VII., p. 29, February number, for conversion to Fahrenheit.)

5th figure is the check figure of the group.

**Fifth Group.** 1st figure gives the characteristic of the swell. (Table XXIII., p. 45, March number.)

2nd figure gives the direction from which swell comes, on scale (0-8) in which 2 = East, 4 = South, etc. 0 = No swell.

3rd and 4th figures give the time of observation G.M.T., 01 = 1 a.m., 12 = Noon, 24 = Midnight.

5th figure is the check figure of the group.

**Sixth Group.** 1st figure is a check figure obtained by adding together the first figure of each of the preceding groups and taking the units figure of the sum.

2nd, 3rd, 4th and 5th figures are check figures obtained in a similar way from the 2nd, 3rd, 4th and 5th figures of the groups respectively.

The 5th figure is also a key figure, and is not only the units figure of the sum of the check figures in the message but also the units figure of the sum of the figures in the Sixth Group.

### Example of Message and use of check figures.

Angra 65078 61152 21430 10214 31138 87892.

65 = 765 mm. = 1019.9 mb. = 30.12 in.

07 = Wind E. by N. true.

8 = Check figure.

6 = Wind force 6, etc.

**Note on the check system.** The system of checks given by the 5th figure in each of the first five groups in the above *example* and the whole of the *last group* makes it possible for the recipient of the message to trace and correct any reasonable number of errors in transmission, provided the checks have been correctly made in the first place.

Taking the above *example*, first verify whether the check figure in each group is correct. If the check figure is not correct write down after it the number which must be added to bring the sum up to the check figure transmitted. Thus in the second group the sum of the first four figures is 13, giving a check figure 3. The number which must be added to this to give the correct check 2 is 9. So + 9 is written after the check figure, indicating that 9 must be added to one of the figures in the group in order to make the check work. When all the groups have been verified in this way, the columns are verified in a similar manner, the numbers which must be added to bring the sum of the first five figures in the columns up to the transmitted check being shown. It must be remembered, however, that the new sum is to be *subtracted* from the transmitted check figure and not *vice versa*. For example, in the second group the sum of the first 4 figures gives 3 (omitting the tens). This is subtracted from 2, i.e., from 12. It will not do to subtract the original check 2 from the new sum 3.

In the case considered, the error of + 9 in the second group and in the second column shows that the 2nd figure in the second group is to be corrected by adding 9. The corrected group is then 60152.

Similar methods can be employed to correct other numerical errors which may occur in the transmission of these messages.

At 1830 G.M.T., observations of 1800 G.M.T., usually 7 groups of five figures in each group for each station are sent.

### Explanation of 1830 G.M.T. Bulletin.

The First, Second and Third Groups can be decoded in a similar manner to those in the 1330 G.M.T. transmission.

**Fourth Group.** 1st and 2nd figures have the same meanings as those in the fourth group in the 1330 G.M.T. transmission.

3rd and 4th figures give the maximum air temperature, Centigrade, in the interval of 11 hours ending at 1800 G.M.T. (See Table VII., p. 29, February number, for conversion to Fahrenheit.)

5th figure is the group check figure.

**Fifth Group.** 1st and 2nd figures give the rainfall during the preceding 11 hours ending at 1800 G.M.T. (Table XX., p. 45, March number.)

3rd figure gives the state of the sea and swell at the coast. (Table XXI., p. 45, March number.)

4th figure gives the time of commencement of precipitation. (Table XXII., p. 45, March number.)

5th figure is the group check figure.

**Sixth Group.** The figures in this group have exactly the same meanings as those in the Fifth Group of the 1330 G.M.T. transmission.

**Seventh Group** contains the check and key figures as explained for those in the Sixth group of the 1330 G.M.T. transmission.

Note (1).—Both the 1330 and 1830 G.M.T. bulletins are repeated 20 minutes later respectively, and in similar form, by Monsanto—Portugal—W/T Station, call sign CTV, on a wavelength of 1,000 metres (spark).

### WIRELESS STORM SIGNALS. SPAIN.

Madrid, Carabanchel W/T Station, call sign EGC, transmits a storm warning, when necessary, after the daily weather bulletin at 1530 G.M.T. Wavelength used 2,000 metres (spark). The storm warning is preceded by the word "precaucion," followed either by the letters Ci (indicating cyclonic depression) or Gr (indicating a squall) sent as follows:—

Precaucion Ci LLGGBB; or

Precaucion Gr LLGGBBDD.

LL = Latitude.

GG = Longitude (Greenwich). { In degrees giving the position

BB = Barometer in whole millibars. { of the centre of the depression.

DD = Direction in which storm is proceeding, by Table IV.,

p. 15, January number.

### WIRELESS ICE REPORTS.

#### CANADA, NOVA SCOTIA, NEWFOUNDLAND AND LABRADOR, ETC.

Ice reports are transmitted by the following W/T stations, the wavelength used in all cases being 600 metres (spark).

*Lurcher Lt. Vsl.	-	-	-	Call Sign	VDR	transmitted on request.
Cape Sable	-	-	-	"	VCU	transmitted after the daily weather bulletins at 0200 and 1400 G.M.T.
Camperdown	-	-	-	"	VCS	transmitted on request.
North Sydney	-	-	-	"	VCO	
Sable Island	-	-	-	"	VCT	
Grindstone Island	-	-	-	"	VCN	
*†Heath Point Lt. Vsl.	-	-	-	"	VCI	transmitted after the daily weather bulletins at 0145 and 1345 G.M.T.
†Fame Point	-	-	-	"	VCG	
†Clark City, Que.	-	-	-	"	VCK	transmitted on request.
†Father Point, Que.	-	-	-	"	VCF	transmitted after the daily weather bulletins at 0200 and 1400 G.M.T.
Grosse Island, Que.	-	-	-	"	VCD	transmitted on request.
†Montreal	-	-	-	"	VCA	
Quebec	-	-	-	"	VCC	
St. John (N.B.)	-	-	-	"	VAR	
Belle Isle	-	-	-	"	VCM	after the weather bulletin at 0230 and 1430 G.M.T.
Cape Race	-	-	-	"	VCE	after the weather bulletins at 0215 and 1415 G.M.T.
Point Amour	-	-	-	"	VCL	transmitted on request.
St. Pierre and Miquelon Is.	-	-	-	"	HYS	
†Ice-breaker Mikula (Ice Patrol)	-	-	-	"	VDD	0100 and 1300 G.M.T. and on request.

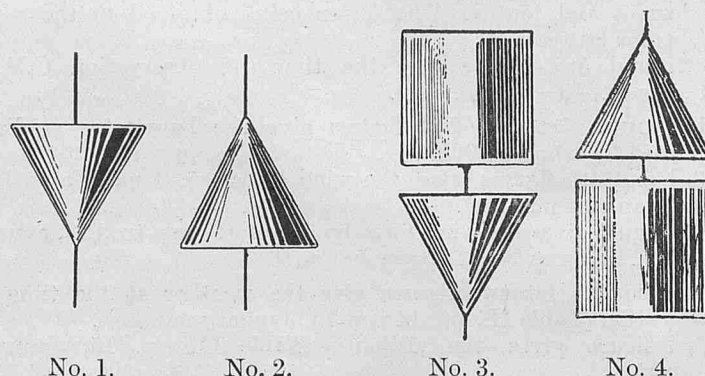
\* The station keeps watch for the 1st half of every odd hour from 1200 to 0000 and from 0300 to 0330 G.M.T. (Civil).

† The station is open during the season of navigation only

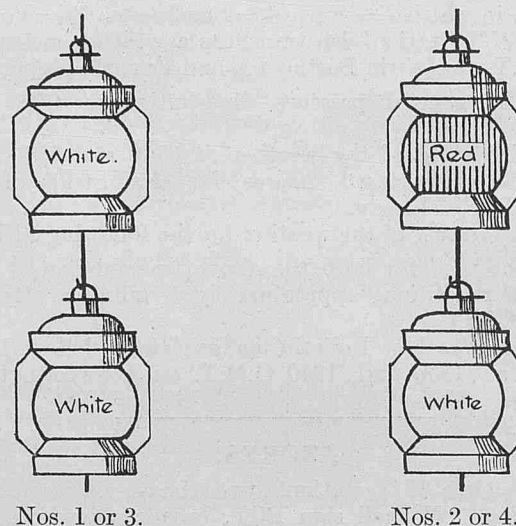
### III. VISUAL STORM WARNINGS.

#### CANADA.

##### By Day.



##### By Night.



Storm signals are hoisted at several places on the coasts of Canada, Nova Scotia, Newfoundland, etc., etc., on warning being received from the Meteorological Office, Toronto.

#### Signification, Day or Night Signals.

No. 1, hoisted to indicate the probability of a moderate gale from an Easterly direction.

No. 2, hoisted to indicate the probability of a moderate gale from a Westerly direction.

No. 3, hoisted to indicate the probability of a heavy gale from an Easterly direction.

No. 4, hoisted to indicate the probability of a heavy gale from a Westerly direction.

A moderate gale is one having a velocity of less, and a heavy gale a velocity of more, than 40 miles an hour.

It must be borne in mind that the storm signals do not necessarily mean that a storm will occur at the place where the signal is displayed, but that one is expected either there or within such a distance that vessels leaving port would be liable to be caught in it.

#### SPAIN AND PORTUGAL.

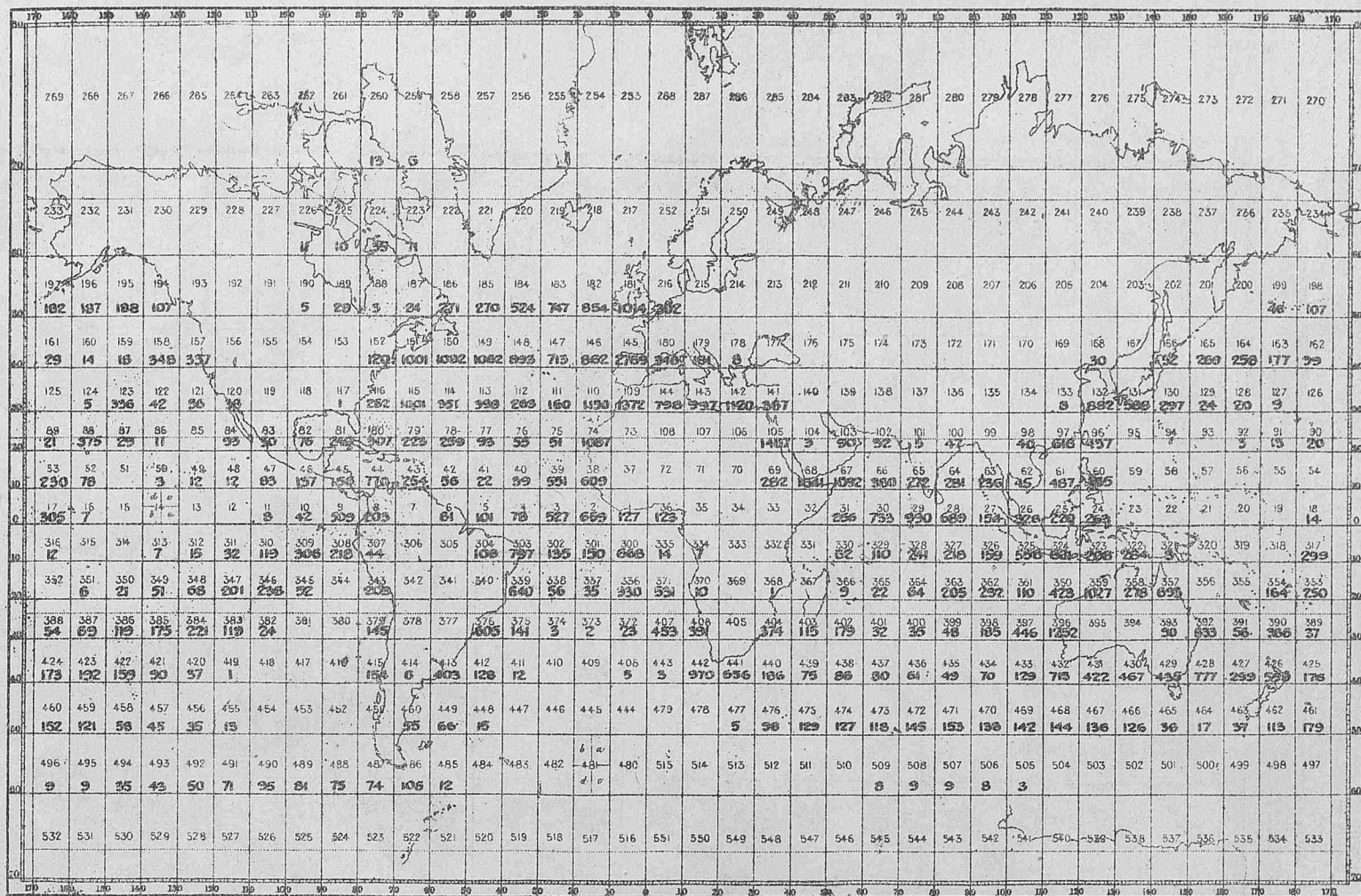
Storm signals are displayed at several Portuguese and Spanish ports. The signals and their meanings are similar to those described for France in the February number, p. 30.

It should be noted that any of these signals indicate that there is an atmospheric disturbance in existence, which will probably cause a gale from the quarter indicated by the signal used within a distance of about 50 miles of the place where the signal is hoisted. Its meaning is "Look out. Bad weather, as indicated is probably approaching you."

# WORK OF THE YEAR.

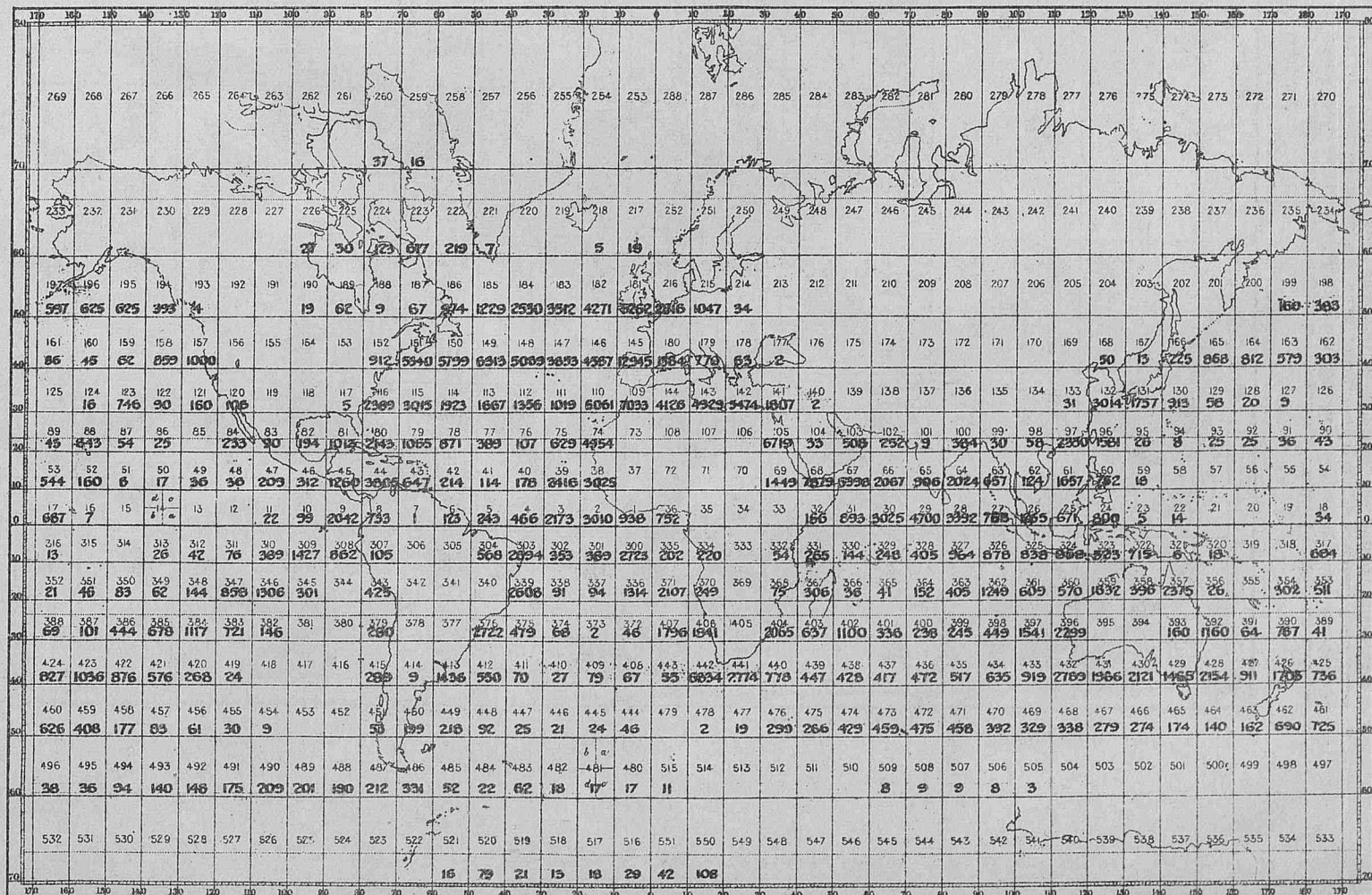
## MARSDEN CHART I.

SHOWING NUMBER OF SETS OF OBSERVATIONS EXTRACTED BETWEEN APRIL 1st. 1923 & MARCH 31st. 1924.

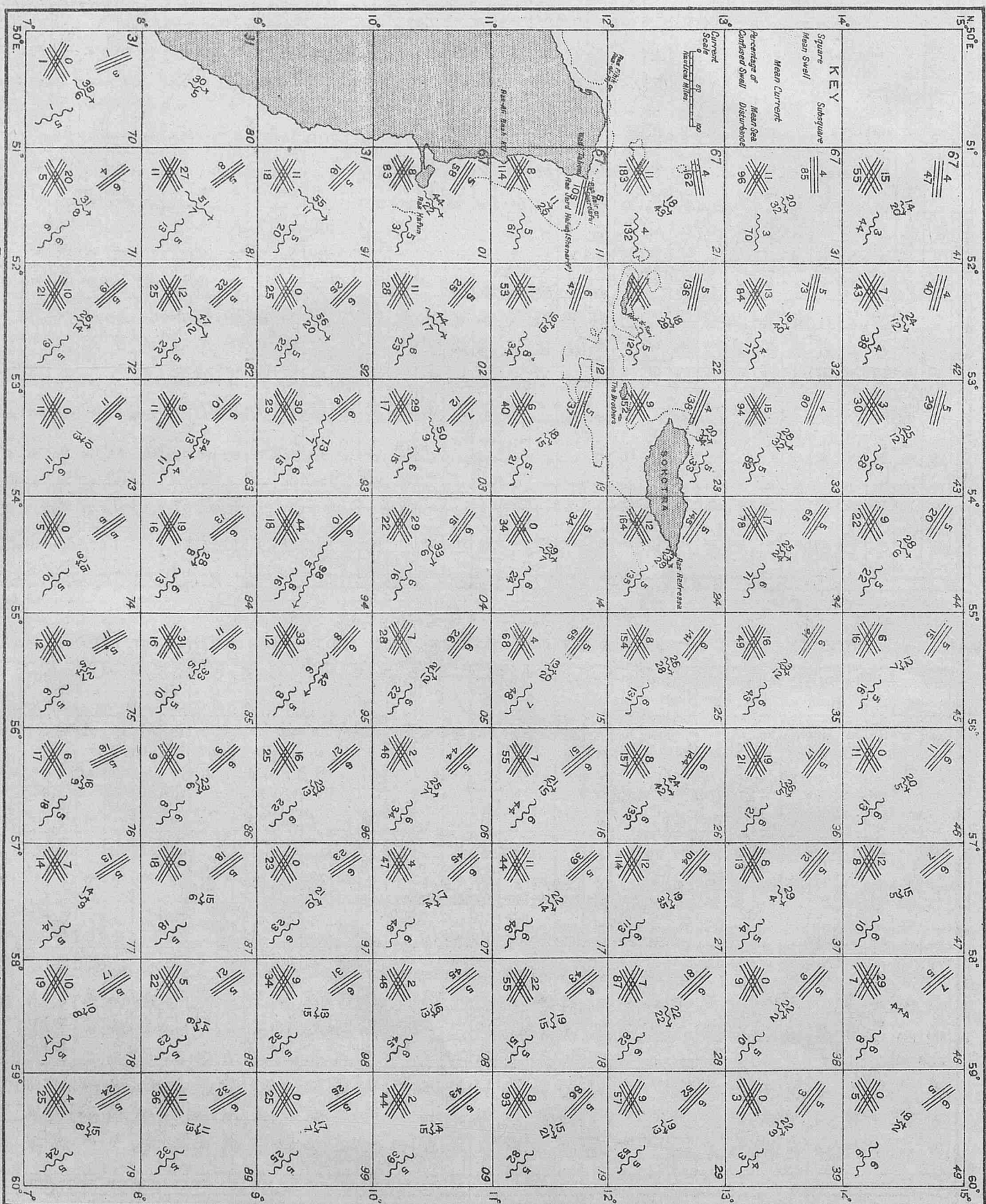


## MARSDEN CHART II.

SHOWING NUMBER OF SETS OF OBSERVATIONS EXTRACTED BETWEEN APRIL 1st. 1920 & MARCH 31st. 1924.



# REGION OF SOKOTRA & CAPE GUARDAFUI. Chart I.—MEAN CURRENT, SEA, AND SWELL, FOR JULY, AND AUGUST.



The direction of the mean current is shown by the current arrow at the centre of each one-degree square. The velocity of the mean current is given by the length of this arrow on the scale shown, and by the figure above the arrow, the number beneath it is the number of observations on which it is based.

## EXPLANATION OF CHART.

The direction of the mean current is shown by the current arrow at the centre of each one-degree square. The velocity of the mean current is given by the length of this arrow on the scale shown, and by the figure above the arrow, the number beneath it is the number of observations on which it is based.

In the upper left-hand corner is given the sign for confused swell. The number below this sign gives the number of observations in the square, while the number above gives the percentage of these observations logged as confused.

In the lower left-hand corner is given the sign for confused swell. The number below this sign gives the number of observations in the square, while the number above gives the percentage of these observations logged as confused.

Sea is shown by the sign at right angles to the direction of propagation. The figure above denoting the amount of sea, the figure below the number of observations. Each sub-square is numbered.

# REGION OF SOKOTRA & CAPE GUARDAFUI.

Chart II. MEAN WIND, CLOUD AMOUNT, AND STATE OF OBSCURITY OF THE ATMOSPHERE—JULY AND AUGUST.

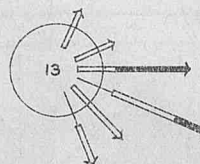
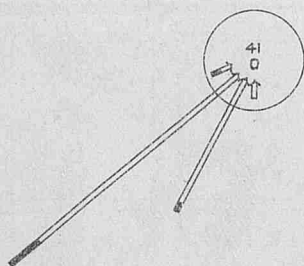


The mean direction of the wind is given by the arrow at the centre of the square, the figure above denotes the mean force of the wind by Beaufort's scale to nearest tenth, that below the number of observations. The figures on the left-hand side of the sub-squares denote the mean cloud amount and the number of observations, those on the right the percentage frequency of occasions on which the air is obscured by mist or haze.

SUBSQUARE 83.

WIND ROSE.

CURRENT ROSE.



The arrows which fly with the wind or current show by their length the frequency of the wind or current, and by their thickness the strength on the scales :-

For winds, Forces 1-3 = For currents, under 40 miles per day =   
Forces 4-7 = 40-80 miles per day =   
Forces 8-12 = over 80 miles per day =

The circles supply a scale for estimating the frequency of winds or currents in any direction. The distance measured outwards along the arrows to the circle represents 5 per cent. of the whole number of observed winds or currents (100 per cent. equals 2 1/2 in.)

The upper figures in the centre of the wind rose are the total number of observations, the percentage of calms being given underneath. The total number of observations of current is given in the centre of the current rose.

REGION OF SOKOTRA & CAPE GUARDAFUI.

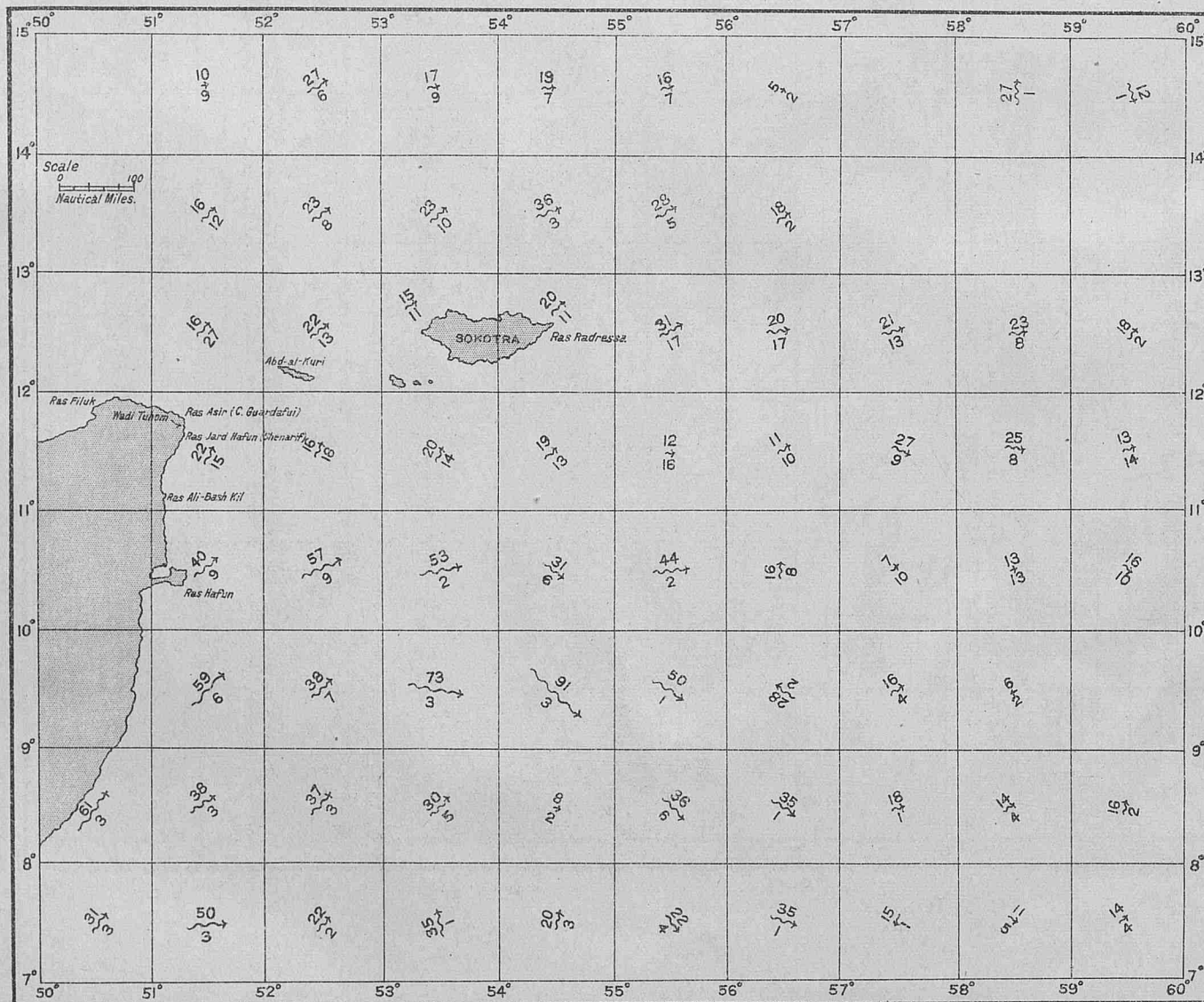
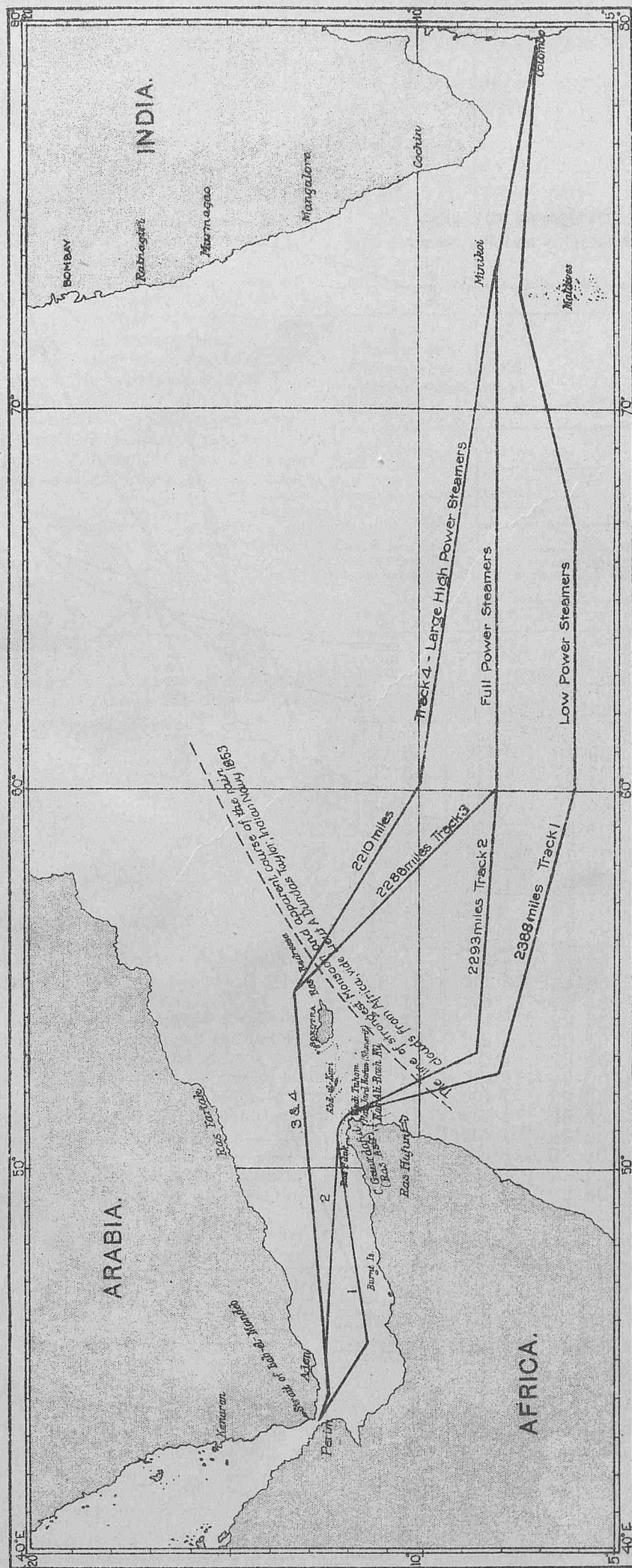


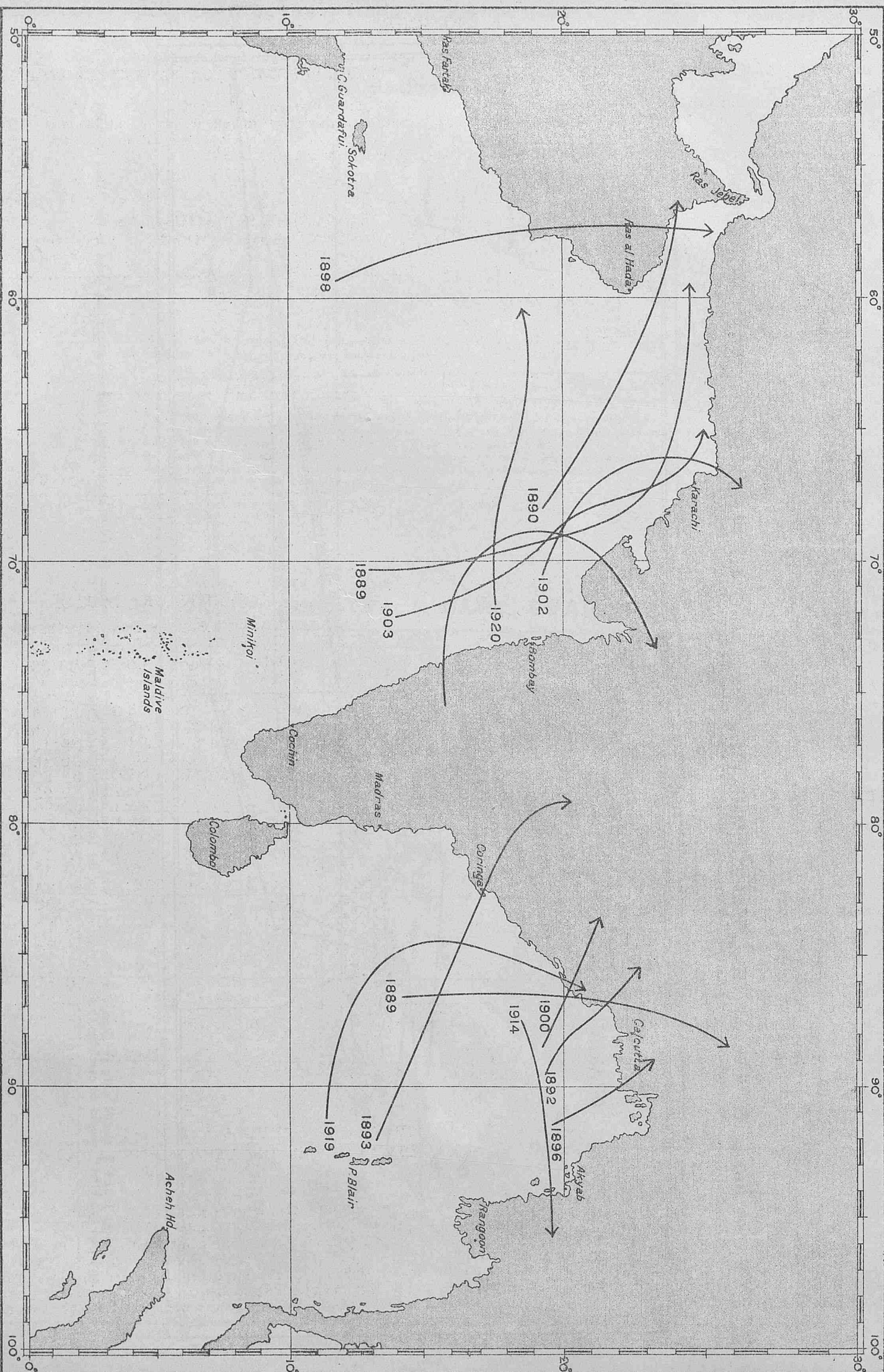
Chart III.- MEAN CURRENT FOR SEPTEMBER.

CHART IV. STEAM TRACKS RECOMMENDED—COLOMBO TO PERIM, SOUTH-WEST MONSOON.



Tracks 1 and 2 should only be adopted by Navigators who are accustomed frequently to fix the position by stellar observations: and the precautions given in the "Gulf of Aden and Red Sea Pilot" should be carefully observed when making the land and rounding Cape Guardafui.

# CYCLONE TRACKS OF THE ARABIAN SEA AND BAY OF BENGAL.



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

PS.1921/1919 W.3954 C.10194/PT.1285 1525 5/24

Tracks of cyclones which have occurred in the Arabian Sea and Bay of Bengal during the month of June. The year is indicated by the figures at commencement of track.

From "Monthly Meteorological Chart of the East Indian Seas," and "U.S. Pilot Chart of the Indian Ocean," for June 1923.

## NOTICES.

### GULF OF ST. LAWRENCE.—ICE PATROL SERVICE.

From the opening of Navigation 1924, until the route is clear of ice, an ice patrol will be maintained in the Gulf of St. Lawrence between Cape Ray and Heath Pt.

The Ice-breaker *Mikula*, call sign VDD, has been detailed for this service.

A regular message embodying ice conditions, from Cape Race to Quebec, and recommendations as to route to be followed will be prepared by the ice patrol every four hours, commencing as from midnight Eastern Standard Time (75th meridian), and kept on file for immediate transmission by W/T to ships, upon request.

This information will also be broadcast twice daily by the ice patrol at 0100 and 1300 G.M.T. (civil) on 600 metres (spark).

The coast W/T Stations at Cape Race (VCE), North Sydney (VCO) and Grindstone (VCN) will copy this message, and will be prepared to pass the same to ships requesting it. Cape Race will also include the message in his regular ice broadcast at 0215 and 1415 G.M.T. (civil) daily.

Ships requiring the latest information on the Gulf route should communicate directly with the ice patrol vessel on 600 metres.

The work of the patrol will be greatly facilitated if incoming ships will co-operate in supplying information regarding ice in their vicinity.

### ICE REPORTS.

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

These forms are supplied with the Marine Observer each month to regular observing ships in these Trades.

### ADMIRALTY LIST OF WIRELESS SIGNALS, 1924.

The 1924 edition of the Admiralty List of Wireless Signals, corrected to 31st Dec. 1923, has now been published, cancelling that for 1923.

In the new edition the introduction to the Wireless Direction Finding Section has been re-written, and now includes the latest precautionary measures for obtaining the best results when this method of determining the ship's bearing or position is employed. The list of D/F stations has been augmented by the inclusion of a number of W/T stations with their correct geographical positions, call signs, normal wave lengths, etc., for the information of ships equipped with D/F installations.

The increased use of W/T at sea is responsible for a corresponding expansion in detail of the various services dealt with in the remaining sections included in this volume.

Notices to Mariners will be issued as occasion arises notifying any important additions or amendments to the published wireless information.

### Invitation to Marine Observers.

The Marine Superintendent will be pleased to see Captains of observing ships, who may be in London, between 10 a.m. and 4 p.m., at Room 319, Adastral House, Kingsway, W.C.2. Telephone No. :—Regent 8000. Extension 421. Telegrams, "Marine Superintendent, Weather, London."

(Nearest station—Temple, District Railway.)

### BLUE POSTCARD FOR BAROMETER COMPARISON.

Marine Observers will greatly assist by obtaining comparisons with Standard instruments when at suitable ports; also regularly completing and returning the Blue Postcard whether their instruments are M.O. or Ships.

Form 913.

Barometer Error.

#### TEST CARD FOR BAROMETER ERROR.

To be forwarded with Logs or Reports to

Meteorological Office,  
Air Ministry,  
Kingsway, London.

Name of Ship				Ship
Captain				Capt.
In Port of				Port
Mercurial or Aneroid				Date
Maker's Name and No.				Bar. No.
Height above Mean Sea Level .....ft.				<div style="display: flex; align-items: center;"> <span style="font-size: 2em; margin-right: 10px;">}</span> <div> <p>Too high.</p> <p>Too low</p> </div> </div>
Date 192	Time.	Barometer readings.	Attached Therm.	At
.....	.....	.....	.....	Date
.....				This counterfoil will be returned to Ship.

In British Home Ports please take three readings at 7 a.m., or 6 p.m. G.M.T. If in a colonial or foreign port, read at 8 a.m. Local Standard Time.

### CONVERSION TABLE.

To Convert Inches into Millibars.

Inch.	mb.	Inch.	mb.	Inch.	mb.
27.50	931.2	28.65	970.2	29.85	1,010.8
27.55	932.9	28.70	971.9	29.90	1,012.5
27.60	934.6	28.75	973.6	29.95	1,014.2
27.65	936.3	28.80	975.3	30.00	1,015.9
27.70	938.0	28.85	976.9	30.05	1,017.6
27.75	939.7	28.90	978.6	30.10	1,019.3
27.80	941.4	28.95	980.3	30.15	1,021.0
27.85	943.1	29.00	982.0	30.20	1,022.7
27.90	944.8	29.05	983.7	30.25	1,024.4
27.95	946.5	29.10	985.4	30.30	1,026.1
28.00	948.2	29.15	987.1	30.35	1,027.7
28.05	949.9	29.20	988.8	30.40	1,029.4
28.10	951.6	29.25	990.5	30.45	1,031.1
28.15	953.2	29.30	992.2	30.50	1,032.8
28.20	954.9	29.35	993.9	30.55	1,034.5
28.25	956.6	29.40	995.6	30.60	1,036.2
28.30	958.3	29.45	997.3	30.65	1,037.9
28.35	960.0	29.50	999.0	30.70	1,039.6
28.40	961.7	29.55	1,000.7	30.75	1,041.3
28.45	963.4	29.60	1,002.4	30.80	1,043.0
28.50	965.1	29.65	1,004.0	30.85	1,044.7
28.55	966.8	29.70	1,005.7	30.90	1,046.4
28.60	968.5	29.75	1,007.4	30.95	1,048.1
		29.80	1,009.1		

### CHARTS OF NORMALS AND FREQUENCIES READY FOR DISTRIBUTION TO REGULAR OBSERVING SHIPS ON REQUEST.

The reprints of Meteorological Charts notified in "Aims and Objects" of the January number of this Journal are now ready.

Upon written application being made by the Commanders of Ships on the List of Regular Observers one set of these Charts for the North Atlantic and/or the East Indian Seas will be sent with the understanding that they will be preserved in the Ship.

These Charts may also be purchased from the Admiralty Chart agents.

# ICE CHART.

## WESTERN NORTH ATLANTIC.

### LETTERS OF TRANSATLANTIC TRACKS INDICATE

- (A) Westbound 1st April to 30th June, inclusive.  
Eastbound 25th March to 7th July, inclusive.
- (F) From 16th May to the opening of Belle Isle route.
- (G) From opening of Belle Isle route to 14th November.

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

### ROUTE NOTICES.

For latest information re Tracks see front page of Ice Chart published with April Marine Observer.

### SYMBOLS USED ON THE CHART.

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

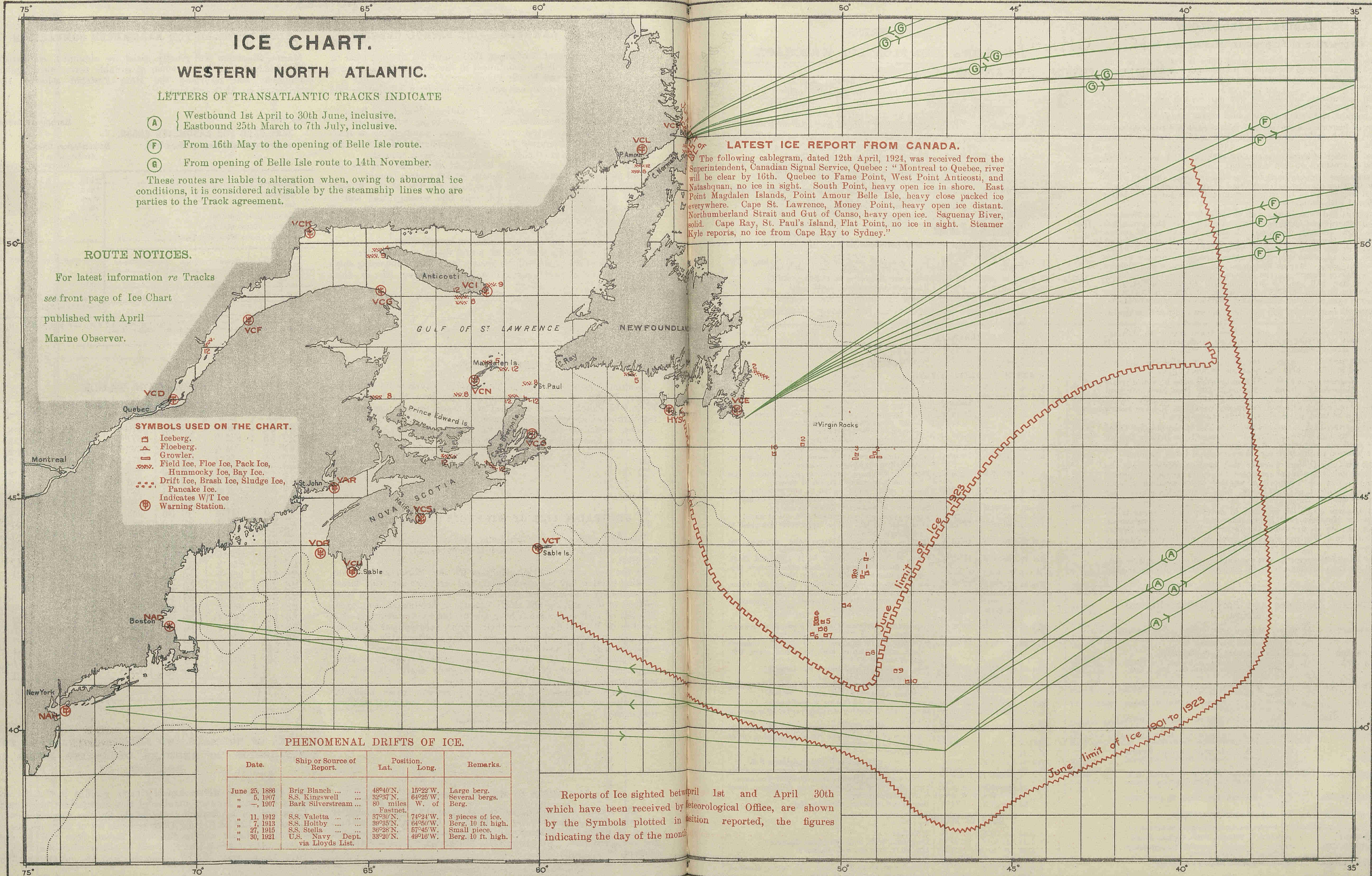
### PHENOMENAL DRIFTS OF ICE.

Date.	Ship or Source of Report.	Position. Lat.	Long.	Remarks.
June 25, 1886	Brig Blanch ...	48°40' N.	15°22' W.	Large berg.
" 5, 1907	S.S. Kingswell ...	32°37' N.	64°25' W.	Several bergs.
" —, 1907	Bark Silverstream ...	80 miles Eastnet.	W. of	Berg.
" 11, 1912	S.S. Valetta ...	37°30' N.	74°24' W.	3 pieces of ice.
" 7, 1913	S.S. Holtby ...	36°35' N.	64°50' W.	Berg, 10 ft. high.
" 27, 1915	S.S. Stella ...	36°28' N.	67°45' W.	Small piece.
" 30, 1921	U.S. Navy Dept. via Lloyds List.	38°20' N.	49°16' W.	Berg, 10 ft. high.

### LATEST ICE REPORT FROM CANADA.

The following cablegram, dated 12th April, 1924, was received from the Superintendent, Canadian Signal Service, Quebec: "Montreal to Quebec, river will be clear by 16th. Quebec to Fame Point, West Point Anticosti, and Natashquan, no ice in sight. South Point, heavy open ice in shore. East Point Magdalen Islands, Point Amour Belle Isle, heavy close packed ice everywhere. Cape St. Lawrence, Money Point, heavy open ice distant. Northumberland Strait and Gut of Canso, heavy open ice. Saguenay River, solid. Cape Ray, St. Paul's Island, Flat Point, no ice in sight. Steamer Kyle reports, no ice from Cape Ray to Sydney."

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



## MARINE METEOROLOGY.

## Co-operation of Shipowners, Masters and Mates.

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

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

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

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

Vessels observing regularly for the Meteorological Office to which office instruments are not lent, keep Form 911, Ships Meteorological Report, using the ship's instruments, the barometer being compared with Standards.

Captains and Officers who wish to co-operate with the Meteorological Office should apply *by letter* to The Director, Meteorological Office, Air Ministry, Kingsway, London, W.C.2; or *in person* between the hours of 10 a.m. and 4 p.m., to the Marine Superintendent at the same address or to any of the gentlemen whose names and addresses are given below acting as agents at the respective ports. Marine Observers (*i.e.*, Captains and Officers who regularly observe for the Meteorological Office) will greatly assist if they will send in Meteorological Logs immediately on completion through the Port Meteorological Officer or Agent, at the same time notifying him of any possible instrumental defects.

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

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

Vessels making voyages of less than two months' duration are requested to retain their logs until nearly filled up.

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

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

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

All Masters who wish to assist in developing the rapid interchange of Meteorological information and Weather Forecasting at sea can do so by using the form of W/T Weather Report suggested in "Weather Signals," given in this Journal, January Number.

The Marine Observer is sent monthly to all ships regularly contributing Logs, Forms and W/T Registers to the Meteorological Office.

## Marine Agencies and Port Meteorological Officers.

LIVERPOOL	..	(Port Meteorological Office) Commander G. H. Lloyd, R.D., R.N.R., Dock Office. Telephone No.: Bank 8959.
CARDIFF	..	Captain T. Johnston, Technical College.
LEITH	..	Captains G. Black and C. G. Bonner, V.C., D.S.C., Leith Salvage and Towage Co., Ltd., 2, Commercial Street.
THE CLYDE	..	Captain M. Corrance, Board of Trade Surveyor's Office, 73, Robertson Street, Glasgow.
HULL	..	Captain Geo. B. Sturdy, c/o Mr. W. Hakes, Commercial Road.
SOUTHAMPTON	..	Captain D. Forbes, Nautical Academy, 1, Albion Place.
TYNE	..	Commander E. S. Macleod, R.D., R.N.R., Board of Trade Surveyor's Office, North Shields.
DUBLIN	..	Captain M. H. Clarke, Chief Surveyor, Ministry of Industry and Commerce, Marine Department, 27, Eden Quay.
HONG KONG	..	Lieut.-Commander P. W. S. Henderson, R.N., Superintendent, Admiralty Chart and Chronometer Depot.
VANCOUVER	..	T. S. H. Shearman, Esq., Room 40, Post Office Building.
AUSTRALIA	..	The Commonwealth Meteorologist.

The Deputy Directors of Navigation act as sub-agents as follows:—

SYDNEY	..	Captain G. D. Williams, D.S.O., Customs House.
MELBOURNE	..	Captain L. J. Bolger, Electricity Commissioners Building, 22, William Street.
PREMANTLE	..	Captain J. J. Airey, Dalgety's Buildings.

## LATE PRESS.

## DERELICTS AND FLOATING WRECKAGE.

Date.	Position.		Description.
	Latitude.	Longitude.	
NORTH SEA.			
3.4.24	54°30'N.	3°00'E.	Capsized wooden drifter, 60 to 70 ft. long, projecting 3 ft. out of water.
5.4.24	54°24'N.	2°51'E.	Capsized vessel, probably wooden drifter, no marks, bottom, black.
5.4.24	54°24'N.	2°05'E.	Derelict, probably a wooden drifter.
11.4.24	54°13'N.	3°00'E.	Iron vessel floating bottom upward, drifting N.W.
13.4.24	53°46'N.	0°24'E.	Capsized fishing vessel, about 50 ft. long.
14.4.24	51°—'N.	1°40'E.	Large spar.
17.4.24	53°31'N.	5°03'E.	Large buoy adrift, painted green and red, danger to navigation.
21.4.24	51°27'N.	2°05'E.	Buoy—red and white, horizontal.
21.4.24	51°34'N.	2°14'E.	Buoy—marked N.S.W. 4.
ENGLISH CHANNEL.			
1.4.24	18 miles	W.S.W. Beachy Head.	Submerged wreckage.
7.4.24	49°55'N.	2°13'W.	Loose spherical white buoy, with 20 ft. long drift-wood pieces around.
13.4.24	49°48'N.	2°10'W.	White two-masted yacht <i>Alceter</i> .
16.4.24	50°54'N.	1°24'E.	Horizontal striped buoy adrift
17.4.24	7 miles S.E. by E. Dover, Admiralty Pierhead.		Conical buoy, probably adrift.
18.4.24	50°18'N.	2°11'W.	Wreckage.
MEDITERRANEAN.			
15.4.24	35°00'N.	20°13'E.	Part of fishing vessel awash.
16.4.24	33°44'N.	22°13'E.	Drifting lighter.
NORTH ATLANTIC OCEAN.			
1.4.24	18°34'N.	75°39'W.	Derelict, fore and mainmasts standing.
1.4.24	27°21'N.	64°27'W.	Schooner.
1.4.24	31°52'N.	80°29'W.	Heavy log about 20 ft. long.
2.4.24	35°30'N.	75°10'W.	Cargo boom awash, 35 ft. long, 9 ins. diameter, with blocks attached, painted buff. The boom had appearance of being attached to submerged wreckage, and at times was submerged.
3.4.24	36°40'N.	75°42'W.	Wooden vessel, projecting about 20 ft.
3.4.24	36°37'N.	75°45'W.	Square timber, projecting about 25 ft. out of water, attached to submerged wreckage.
3.4.24	37°03'N.	73°55'W.	Piece of wreckage, consisting of 3 timbers fast together, projecting 5 ft. out of water.
3.4.24	36°36'N.	75°40'W.	Vessel's mast, projecting 30 ft. out of water with several large pieces of wreckage in the vicinity.
4.4.24	42°28'N.	42°41'W.	Schooner (British), <i>Roy Bruce</i> , awash.
4.4.24	37°42'N.	69°25'W.	Upright spar, projecting about 8 ft. out of water.
4.4.24	37°28'N.	74°19'W.	Triangular-shaped timber, apparently attached to submerged wreckage.
4.4.24	40°14'N.	48°05'W.	Derelict, undoubtedly same one reported on March 13th, in 40°09'N., 55°24'W.
5.4.24	37°08'N.	73°30'W.	Piece of wreckage, about 30 ft. long and 20 ft. wide, barely awash, and with two timbers projecting about 6 ft. out of water.
5.4.24	35°55'N.	75°26'W.	Large spar, projecting about 6 ft. out of water, apparently attached to submerged wreckage.
6.4.24	5 miles from Virginia Beach	Gas Buoy.	Wreckage, apparently part of vessel's deck, projecting about 6 ft. out of water.
6.4.24	46°30'N.	32°40'W.	Barquentine, <i>Jacques Cœur</i> of Fécamp, abandoned on fire.
6.4.24	36°38'N.	75°43'W.	Wreckage, which appeared to be part of schooner's deck, with stump of mast projecting about 6 ft. out of water.
7.4.24	36°05'N.	75°05'W.	Spar, about 70 ft. long and 18 ins. diameter.
7.4.24	28°47'N.	56°48'W.	Red conical buoy, marked 2A.
8.4.24	36°03'N.	75°19'W.	Wreckage, apparently schooner or barge, with stump of mast projecting 15 ft. high.
8.4.24	53°28'N.	20°05'W.	Cylindrical buoy, 12 ft. long, 6 ft. diameter.
9.4.24	36°17'N.	75°22'W.	Large piece of floating wreckage, apparently part of a pier.
10.4.24	35°49'N.	75°24'W.	Heavy wreckage, having appearance of deck and timbers of a barge; one timber projecting out of water like a spar buoy.
10.4.24	28°13'N.	74°02'W.	Obstruction.
17.4.24	44°01'N.	2°00'W.	Light buoy, marked <i>Roche Bonne</i> , drifting S.E.
19.4.24	44°N.	55°30'W.	Spar, projecting about 2 ft. above water, apparently schooner, mast attached to submerged wreckage.
20.4.24	40°05'N.	69°08'W.	Submerged wreck, showing mast projecting about 16 ft. out of water.
20.4.24	46°20'N.	34°56'W.	Dismantled schooner, <i>Governor Parr</i> .
GULF OF MEXICO.			
1.4.24	25°03'N.	80°18'W.	Wreckage.
1.4.24	25°32'N.	84°24'W.	Log, about 30 ft. long and 14 ins. diameter.
5.4.24	15 miles from Heald Lt. Vsl.	N.N.W.	Log, 30 ft. long and 3 ft. diameter.
7.4.24	23°37'N.	82°W.	Broken spar, about 30 ft. long, with rigging attached.
7.4.24	28°57'N.	94°26'W.	Obstruction, about 100 ft. long.

## LIST OF VOLUNTARY OBSERVING SHIPS.

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

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

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

Only in special cases will individual letters be sent.

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

Ships not contributing logs or reports within a reasonable period will automatically be removed from

the list and the free issue of the "Marine Observer" discontinued; it is, therefore, earnestly requested that changes of service, probable periods of lay up or transfer of Commanders may be notified whenever possible.

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

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

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

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

No. = Keeps Ship's Meteorological Report Form 911 with ship's instruments.

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

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed.	Date Received.
<i>Aba</i> ...	Hughes, J. ...	W. J. Dodd ...	No.	Elder Dempster ...	Form 911 10.1.24 to 15.2.24 ...	20.2.24.
<i>Abaris</i> ...	Rippon, A. P. ...	R. C. Jones ...	"	L. Walford ...	" 11.8.23 to 21.8.23 ...	24.8.23.
<i>Abinsi</i> ...	Wright, J. B. ...	V. Baddeley ...	"	Elder Dempster ...	" 12.12.23 to 18.1.24 ...	25.1.24.
<i>Actor</i> ...	Haylett, E. ...	G. Kent ...	"	Harrison ...	" 19.1.24 to 7.3.24 ...	1.4.24.
<i>Adda</i> ...	Tort ...	G. R. Langmaid ...	"	Elder Dempster ...	" ...	"
<i>Adriatic</i> ...	Beadnell, F. E. ...	A. E. Dyer, J. Collins, G. Howe, B. H. Shaw. ...	W.T.	White Star ...	{ W.T. Reg. 12.11.23 to 1.12.23... Form 911 12.11.23 to 1.12.23... }	6.12.23. 5.12.23.
<i>Agapenor</i> ...	Ramsay, J. ...	P. S. Atkins ...	No.	A. Holt ...	" 23.2.24 to 22.3.24 ...	26.3.24.
<i>Alban</i> ...	Whayman, W. R. ...	" ...	"	Booth ...	" 20.10.23 to 8.11.23 ...	24.11.23.
<i>Albania</i> ...	Gibbons, G. R.D., Commr., R.N.R.	H. A. W. Waterhouse ...	"	Cunard ...	" 22.10.23 to 20.11.23 ...	5.12.23.
<i>Aleppo</i> ...	Duncan, W. B. ...	H. B. Smith ...	"	Ellerman Wilson ...	" 28.4.23 to 30.6.23 ...	5.7.23.
<i>Algerian Prince</i> ...	Rowlands, D. ...	R. C. Proctor ...	"	Prince ...	" 15.12.23 to 6.2.24 ...	11.2.24.
<i>Alipore</i> ...	Gordon, L. M., R.D., Commr., R.N.R.	H. D. Case ...	"	P. and O. ...	" 17.1.24 to 20.3.24 ...	15.4.24.
<i>Almanzora</i> ...	Mackenzie, G. A. ...	H. Chamberlain ...	"	R.M.S.P. ...	" 15.2.24 to 3.4.24 ...	8.4.24.
<i>Alondra</i> ...	Prendergast, J. J. ...	H. Martin ...	"	Yeoward ...	" 9.2.24 to 3.3.24 ...	13.3.24.
<i>Ampelco</i> ...	Verstichelen, A. ...	R. Janssen ...	"	American Petroleum ...	" 27.12.23 to 10.2.24 ...	20.2.24.
<i>Anglia</i> ...	Sorge, P. ...	W. H. Hughes ...	C.C.	L.M. & S. Rly. ...	Telegraphic Report 11.4.24 ...	11.4.24.
<i>Antiochus</i> ...	Sprott, E. J. ...	J. J. Daniel ...	No.	A. Holt ...	Form 911 2.1.24 to 18.1.24 ...	11.3.24.
<i>Appam</i> ...	Yardley, H. A. ...	E. Holt, W. H. Muirhead, E. Kingan. ...	M.L.	Elder Dempster ...	Met. Log. 9.8.23 to 5.1.24 ...	10.1.24.
<i>Aquitania</i> ...	Charles, Sir J. T. W., K.B.E., C.B., R.D., Commr., R.N.R.	J. L. Croasdale, P. O. Davis, J. Locke. ...	W.T.	Cunard ...	W.T. Reg. 6.3.24 to 20.3.24 ...	25.3.24.
<i>Arafura</i> ...	Gordon, A. S. ...	H. Jeans ...	No.	Eastern and Australian ...	Form 911 17.11.23 to 1.2.24 ...	24.3.24.
<i>Araguaya</i> ...	Matthews, J. E. P. ...	F. J. Elvy ...	"	R.M.S.P. ...	" 17.12.23 to 1.2.24 ...	8.2.24.
<i>Arana</i> ...	Moir, A. G. ...	R. Jones ...	"	" ...	" ...	"
<i>Armada Castle</i> ...	George, J., O.B.E. ...	L. G. May ...	"	Union Castle ...	Form 911 11.1.24 to 2.3.24 ...	4.3.24.
<i>Arracan</i> ...	Willis, M. ...	R. MacInnes, H. Poole, D. Frame, A. Olding. ...	M.L.	P. Henderson ...	Met. Log. 6.10.23 to 25.12.23 ...	24.1.24.
<i>Arundel</i> ...	Short, H. ...	Mr. Hill ...	C.C.	Southern Rly. ...	Telegraphic Report 14.4.24 ...	14.4.24.
<i>Arundel Castle</i> ...	Hague, J. W., Capt., R.N.R.	G. Blallock, C. Williams, C. Keen. ...	M.L.	Union Castle ...	Met. Log. 3.8.23 to 2.12.23 ...	14.12.23.
<i>Assyria</i> ...	Erskine, R. ...	J. Hamilton ...	No.	Anchor ...	Form 911 1.3.24 to 26.3.24 ...	1.4.24.
<i>Astronomer</i> ...	Booth, W. M. ...	W. A. Hall, J. Jackson, S. Leyland. ...	M.L.	Harrison ...	Met. Log. 20.11.23 to 16.2.24 ...	14.3.24.
<i>Athenic</i> ...	Jones, J. L. ...	A. C. I. Anson ...	No.	White Star ...	Form 911 1.2.24 to 11.2.24 ...	13.3.24.
<i>Atsuta Maru</i> ...	Saito, B. ...	S. Mizoguchi ...	"	Nippon Yusen Kaisha ...	" 1.3.24 to 13.3.24 ...	24.3.24.
<i>Auldmuir</i> ...	Ramsay, J. D. ...	P. D. Thompson ...	"	Glen & Co. ...	" 29.3.24 to 9.4.24 ...	16.4.24.
<i>Ausonia</i> ...	Brown, F. G., R.D., Capt., R.N.R.	J. Ashcroft ...	"	Cunard ...	" 9.3.24 to 31.3.24 ...	3.4.24.
<i>Author</i> ...	Kinlock, R. ...	A. Goddard ...	"	Harrison ...	Form 911 29.8.23 to 7.10.23 ...	12.10.23.
<i>Ballena</i> ...	Pape, E. R. ...	W. Webster ...	No.	P.S.N. Co. ...	" 19.9.23 to 11.10.23 ...	15.10.23.
<i>Baltic</i> ...	Roberts, J., C.B.E., D.S.O., R.D., Capt., R.N.R.	E. S. Bell, A. E. Weller, G. D. R. Eales, C. Cochrane. ...	W.T.	White Star ...	{ W.T. Reg. 26.11.23 to 15.12.23 Form 911 20.1.24 to 10.2.24 ... }	20.12.23. 18.2.24.
<i>Bambra</i> ...	Wyles, W. S. ...	H. W. Norris, F. Humble, J. E. Turner, P. Bolton. ...	M.L.	State Service, Australia ...	Met. Log. 8.6.23 to 14.10.23 ...	11.12.23.
<i>Bampton Castle</i> ...	Swiney, W. A. ...	F. Norfolk, L. C. Chapman, H. A. Deller, E. Crocker, C. B. Hoggan. ...	M.L.	Union Castle ...	{ Met. Log. 21.2.23 to 3.5.23 ... " 2.9.23 to 9.12.23 ... }	28.1.24.
<i>Banffshire</i> ...	Wynne, R. H. ...	L. W. Evans ...	No.	Turnbull Martin ...	Form 911 17.12.23 to 29.1.24 ...	4.2.24.
<i>Barambah</i> ...	Mayne, W. ...	T. Swann ...	"	Commonwealth Govt. ...	" 4.8.23 to 5.9.23 ...	16.10.23.
<i>Baron Cawdor</i> ...	Baillie, T. ...	A. Campbell ...	"	Hogarth & Sons ...	" 16.1.24 to 28.1.24 ...	11.3.24.
<i>Beaufort</i> ...	Knowles, C. H., D.S.O., Commr., R.N.	H. L. Wheeler ...	M.L.	His Majesty's Ship ...	Met. Log. 31.7.22 to 3.10.22 ...	10.10.22.
<i>Belgenland</i> ...	Bradshaw, J. ...	" ...	M.L.	Red Star ...	" ...	"
<i>Benalder</i> ...	Cole, J. H., D.S.C. ...	A. K. Watson ...	No.	Ben Line ...	Form 911 6.9.23 to 6.10.23 ...	24.10.23.
<i>Benedict</i> ...	Aspinall, W. ...	H. R. Mackay, K. S. Monro ...	"	Booth ...	" 17.6.23 to 13.8.23 ...	27.8.23.
<i>Bengloe</i> ...	McCorquodale, A. ...	G. M. Duff ...	"	Ben Line ...	" 10.2.24 to 26.2.24 ...	7.4.24.
<i>Berengaria</i> ...	Irvine, W. R. D., R.D., Capt., R.N.R.	G. H. Jones, E. R. Taylor, R. F. Bovey, W. C. A. Robson. ...	W.T.	Cunard ...	{ W.T. Reg. 29.2.24 to 13.3.24 " 23.3.24 to 7.4.24 ... }	18.3.24. 9.4.24.

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed.	Date Received.
<i>Bernini</i> ...	Evans, W. ...	J. C. Dawson ...	No.	Lampport & Holt	Form 911 7.10.23 to 10.12.23...	30.12.23.
<i>Berrima</i> ...	Hussey Cooper, E. M., R.D., Commr., R.N.R.	J. S. Wheeler ...	,	P. & O. Branch	" 21.11.23 to 5.12.23...	28.12.23.
<i>Bolingbroke</i> ...	Landy, E., Sargent, A. H., Aikman, E.	R. Campbell, R. F. Walker, W. P. Hains.	M.L.	Canadian Pacific	Met. Log. 22.2.23 to 18.10.23...	14.11.23.
<i>Borda</i> ...	Holland, R. ...	...	No.	P. & O. Branch	Form 911 18.10.23 to 24.2.24...	29.2.24.
<i>Bosworth</i> ...	McDonald, J. ...	J. Alexander ...	M.L.	Canadian Pacific	Met. Log. 19.5.23 to 8.8.23 ...	29.8.23.
<i>Bothwell</i> ...	Dott, J. F. ...	K. Hutchings ...	No.	"	Form 911 2.3.24 to 8.4.24 ...	9.4.24.
<i>Bramar Castle</i> ...	Whitfield, G. I. ...	C. G. Dann ...	"	Union Castle	" 7.2.24 to 1.4.24 ...	7.4.24.
<i>Brandon</i> ...	Freer, A., R.D., Commr., R.N.R.	J. Mackenzie ...	"	Canadian Pacific	" 21.10.23 to 20.11.23	27.11.23.
<i>Brecon</i> ...	Griffiths, J. N. ...	...	M.L.	"	Met. Log. 9.5.23 to 29.7.23 ...	27.8.23.
<i>Brighton</i> ...	Hill, A. ...	Mr. Munton ...	C.C.	Southern Railway	Telegraphic Report 16.4.24 ...	16.4.24.
<i>British Engineer</i> ...	Piper, H. C. ...	A. Campbell ...	No.	British Tankers	Form 911 25.1.24 to 2.4.24 ...	4.4.24.
<i>British Lantern</i> ...	Taylor, R. J. ...	C. O. Tucker ...	"	"	" 5.1.24 to 23.1.24 ...	25.2.24.
<i>Bruyere</i> ...	Heasley, W. S. ...	W. S. Perry ...	"	Lampport & Holt	" 22.12.23 to 8.3.24 ...	12.3.24.
<i>Bulla</i> ...	Daniel, F. ...	...	,	Commonwealth Govt.	" 28.4.23 to 17.5.23 ...	5.6.23.
<i>Cabotia</i> ...	Lawson, P. ...	T. G. Menzies ...	No.	Anchor Donaldson	Form 911 8.3.24 to 11.4.24 ...	15.4.24.
<i>Calyso</i> ...	Brown, A. M. ...	A. Snowden, E. Ford, J. S. Landers.	M.L.	Ellerman's Wilson	Met. Log. 20.10.22 to 11.11.23	27.11.23.
<i>Cambria C.S.</i> ...	Wightman, H. G. E., D.S.C.	...	M.L.	Eastern Tel. Co.	...	...
<i>Cambria</i> ...	...	V. S. Phillips ...	C.C.	L.M. & S. Rly.	Telegraphic Report 16.4.24 ...	16.4.24.
<i>Camito</i> ...	Scudamore, J. H. H., D. S. C., R.D., Commr., R.N.R.	D. A. Jack, D. Hay, D. V. Smith.	M.L.	Elders & Fyffes	Met. Log. 23.10.23 to 23.2.24...	28.2.24.
<i>Canada</i> ...	Smith, R. S. ...	F. W. Laws ...	No.	White Star-Dominion	Form 911 3.12.23 to 22.12.23...	24.12.23.
<i>Canadian Inventor</i> ...	Roberts, R. P. ...	S. M. Holinden ...	"	Canadian Govt. Mer- chant Marine.	" 16.12.23 to 6.2.24 ...	24.3.24.
<i>Canadian Scottish</i> ...	Millar, W. H. ...	S. Fieldhouse ...	"	" " "	" 19.8.23 to 1.12.23 ...	7.1.24.
<i>Canadian Skir- misher.</i> ...	Millar, W. H. ...	G. B. Price ...	"	" " "	" 28.5.23 to 5.8.23 ...	5.9.23.
<i>Carlow Castle</i> ...	...	R. C. Longman ...	W.T.	Union Castle	...	...
<i>Carmania</i> ...	McNeil, S. G. S., R.D., Capt., R.N.R.	P. J. Robinson, J. S. Glenden- ning, H. R. Lane.	W.T.	Cunard	W.T. Reg. 25.10.23 to 18.11.23	20.11.23.
<i>Caronia</i> ...	Diggle, E. G., R.D., Capt., R.N.R.	J. H. Wood, R. Allen, G. H. Morris.	W.T.	...	W.T. Reg. 7.10.23 to 27.10.23...	30.10.23.
<i>Carpentaria</i> ...	Rowe, S. N. ...	...	M.L.	British India	Form 911 7.10.23 to 27.10.23...	31.10.23.
<i>Cassandra</i> ...	Mitchell, W. E. ...	A. Murray ...	No.	Anchor Donaldson	Met. Log. 22.4.23 to 16.10.23...	27.11.23.
<i>Cedric</i> ...	Marshall, W., D.S.O., R.D., Capt., R.N.R.	T. F. P. Pratt, W. Pearson, A. E. Harvey.	W.T.	White Star	Form 911 15.3.24 to 9.4.24 ...	14.4.24.
<i>Celtic</i> ...	Holme, A. ...	R. S. Walker, G. T. Kavanagh, D. W. Chamberlain.	W.T.	" " "	W.T. Reg. 3.8.24 to 22.3.24 ...	26.3.24.
<i>Ceramic</i> ...	Summers, A. H. ...	H. A. Billiard ...	No.	" " "	Form 911 2.3.24 to 22.3.24 ...	26.3.24.
<i>Changsha</i> ...	Frame, A. M. ...	...	M.L.	Yuill & Co.	W.T. Reg. 24.3.24 to 12.4.24 ...	15.4.24.
<i>Chinecto</i> ...	Green, J. ...	A. F. Walker ...	No.	"	Form 911 23.3.24 to 12.4.24 ...	15.4.24.
<i>China</i> ...	King, A. M., D.S.C.	E. Cox Walker ...	"	P. & O.	" 27.8.23 to 18.11.23...	18.12.23.
<i>Chindwara</i> ...	Jones, W. H. ...	C. E. Cara ...	"	British India	" 26.5.23 to 30.9.23 ...	23.1.24.
<i>Chindwin</i> ...	Esslemont, C. ...	J. Walker, J. Summers, W. Wilson, A. McCallum.	M.L.	P. Henderson	" 19.1.24 to 26.2.24 ...	7.4.24.
<i>Chinhua</i> ...	Byers, G. ...	...	"	China Nav. Co.	" 2.2.24 to 21.2.24 ...	11.3.24.
<i>City of Alexandria</i> ...	Bedford, G. B. ...	T. C. Higgins ...	No.	Ellerman	" 28.12.23 to 8.3.24 ...	8.4.24.
<i>City of Baroda</i> ...	...	A. V. Radcliffe, R. J. Witton, A. B. Carson.	M.L.	"	Met. Log. 12.1.24 to 27.3.24 ...	4.4.24.
<i>City of Batavia</i> ...	Spencer, H. ...	B. Moloney ...	No.	"	" 25.10.22 to 23.7.23...	6.9.23.
<i>City of Benares</i> ...	Macdonald, K., O.B.E.	A. A. Fullerton ...	"	"	Met. Log. 20.6.23 to 15.9.23 ...	4.10.23.
<i>City of Brisbane</i> ...	Pine, R. ...	W. Robinson ...	"	"	Form 911 23.1.24 to 22.2.24 ...	26.2.24.
<i>City of Canterbury</i> ...	Bremner, D. M. ...	A. M. Hamilton ...	"	"	" 6.2.24 to 7.3.24 ...	14.3.24.
<i>City of Chester</i> ...	Teague, R. E. ...	F. C. Wilson, ...	M.L.	"	" 23.11.23 to 14.12.23	12.2.24.
<i>City of Dunkirk</i> ...	Seaborne, F. O. ...	W. Leadbeater ...	No.	"	" 3.12.23 to 12.3.24 ...	7.4.24.
<i>City of London</i> ...	Martin, D. ...	C. Inglis ...	"	"	Met. Log. 22.12.23 to 4.4.24 ...	8.4.24.
<i>City of Marseilles</i> ...	Brown, G. ...	G. M. Womersley ...	"	"	Form 911 21.9.23 to 4.10.23 ...	17.10.23.
<i>City of Newcastle</i> ...	Oliver, R. E., D.S.C.	C. Paton ...	"	"	" 23.2.24 to 8.3.24 ...	1.4.24.
<i>City of Rangoon</i> ...	Williams, T. L. ...	W. Ibbotson, S. L. Hoare, T. A. Dexter.	M.L.	"	" 23.2.24 to 12.3.24 ...	17.3.24.
<i>City of Valencia</i> ...	Williamson, W. A., R.D., Lieut.- Commr. R.N.R.	J. J. McTigue ...	No.	"	Met. Log. 26.9.23 to 22.10.23...	31.10.23.
<i>City of Yokohama</i> ...	Jinks, J. W. ...	J. C. McWhirter ...	"	"	" 25.4.23 to 9.8.23 ...	16.8.23.
<i>Clan Buchanan</i> ...	George, L. S. ...	P. G. de Gruchy ...	"	Clan	Form 911 27.1.24 to 3.4.24 ...	7.4.24.
<i>Clan Lindsay</i> ...	Baker, C. W. ...	S. J. Shennan ...	"	"	" 23.10.23 to 12.11.23	24.11.23.
<i>Clan Macbeth</i> ...	Young, A. H. ...	D. S. Rae ...	"	"	" 11.10.23 to 10.1.24...	14.1.24.
<i>Clan Macgillivray</i> ...	West, W. F. ...	P. G. de Gruchy ...	"	"	" 19.1.24 to 15.2.24 ...	11.3.24.
<i>Clan Macindoe</i> ...	Miller, W. ...	D. A. Stark ...	"	"	" 4.1.24 to 29.1.24 ...	13.3.24.
<i>Clan Mackay</i> ...	Rayner East, H. ...	J. A. Forster, J. Steven, J. E. Gordon.	M.L.	"	" 3.2.24 to 1.3.24 ...	24.3.24.
<i>Clan Mackellar</i> ...	Cowie, J. G. ...	C. W. Banbury, W. S. Simpson	No.	"	Met. Log. 6.9.23 to 29.11.23...	30.10.23.
<i>Clan Mackenzie</i> ...	Young, G. ...	W. G. Arthur, J. M. Lorimer	"	"	Form 911 7.2.24 to 31.3.24 ...	9.4.24.
<i>Clan Mackinnon</i> ...	Thomson, W. ...	V. Wilson, W. S. Holden, T. Kay.	M.L.	"	" 18.2.24 to 15.3.24 ...	8.4.24.
<i>Clan Macnaughton</i> ...	Gray, J. N. ...	A. G. Storkey, F. Burnes ...	No.	"	Met. Log. 6.9.23 to 24.2.24 ...	27.2.24.
<i>Clan Macphee</i> ...	Gourlay, J. B. ...	P. H. Aydon, J. H. Mellor, J. Macdougall.	M.L.	"	Form 911 19.1.24 to 24.2.24 ...	26.2.24.
<i>Clan Macvicar</i> ...	Phillips, G. P. ...	J. O. Woodall ...	No.	"	Met. Log. 26.5.23 to 21.11.23...	17.1.24.
<i>Clan Malcolm</i> ...	Higgins, C. J. ...	T. G. Young, A. Cameron ...	M.L.	"	Form 911 28.11.23 to 30.12.23	2.1.24.
<i>Clan Morrison</i> ...	Porterfield, W. M. ...	D. A. Evans ...	No.	"	Met. Log. 22.12.24 to 31.3.24...	3.4.24.
<i>Clan Murdoch</i> ...	Pagan, Q. C. ...	R. E. Owen ...	"	"	Form 911 23.12.23 to 12.2.24...	18.3.24.
<i>Clan Ranald</i> ...	Henderson, C. W. ...	P. J. Green ...	"	"	" 8.12.23 to 22.1.24 ...	28.1.24.
<i>Clan Ross</i> ...	Christian, W. G. M. ...	S. M. Werrey Easterbrook ...	"	"	" 3.8.23 to 8.10.23 ...	19.10.23.
<i>Clan Sinclair</i> ...	Neill, G. A. ...	F. B. Parker ...	"	"	" 15.3.24 to 11.4.24 ...	14.4.24.
<i>Clan Urquhart</i> ...	Sharpland, C. C. ...	R. H. Law ...	"	"	" 17.1.24 to 8.2.24 ...	6.3.24.
<i>Colonia, C.S.</i> ...	Campos, V., O.B.E., Lt.-Commr. R.N.R.	S. A. Garnham, A. S. Muir, W. E. Allen, S. Hall.	M.L.	Telegraph Construction & Maintenance.	Met. Log. 27.10.23 to 22.11.23	26.11.23.
<i>Colonia</i> ...	Barrow, R. K. ...	A. V. Jones ...	No.	Harrison	Form 911 15.9.23 to 29.11.23...	20.12.23.
<i>Colonian</i> ...	Gittins, R. P. ...	J. Crangle ...	"	Leyland	" 9.3.24 to 20.3.24 ...	9.4.24.

## LIST OF VOLUNTARY OBSERVING SHIPS

iii

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed.	Date Received.
<i>Columbia</i> ...	Gemmell, W. ...	S. G. Taylor ...	No.	Anchor ...	Form 911 15.3.24 to 6.4.24 ...	15.4.24.
<i>Comino</i> ...	Nuttall, E. L. ...	A. McVicar ...	"	Furness Withy ...	" 3.1.24 to 15.2.24 ...	7.3.24.
<i>Coote</i> ...	Festa, M. ...	C. Keen, D. C. Rees ...	"	Commonwealth Govt. ...	" 29.6.23 to 16.8.23 ...	8.10.23.
<i>Copenhagen</i> ...	Kerr, J. J. ...	W. G. Rees ...	"	Glen & Co. ...	" 27.4.23 to 6.6.23 ...	23.7.23.
<i>Corinthic</i> ...	Hart, F. ...	W. T. Fitzgerald, M. Bennett, F. G. Rogers. ...	M.L.	White Star ...	Met. Log. 13.7.23 to 31.10.23... ..	21.11.23.
<i>Cornish City</i> ...	Bowen, T. S. ...	G. S. Dawes ...	No.	Reardon Smith ...	Form 911 8.1.24 to 16.2.24 ...	7.4.24.
<i>Cornwall</i> ...	Robertson, H. W. ...	W. W. Glover ...	"	Dowie, J., & Co. ...	" 5.12.23 to 26.12.23... ..	18.2.24.
<i>Cyclops</i> ...	Cosker, W. ...	J. P. Makepeace ...	"	A. Holt ...	" 13.2.24 to 17.3.24 ...	7.4.24.
<i>Dardanus</i> ...	Shaw, A. T. ...	A. Morton ...	No.	A. Holt ...	Form 911 23.11.23 to 6.2.24 ...	8.2.24.
<i>Darian</i> ...	Masters, W. ...	G. F. Parkinson ...	"	Leyland ...	" 1.3.24 to 13.3.24 ...	17.3.24.
<i>Darro</i> ...	Smith, W. E., D.S.O., R.D., Capt., R.N.R. ...	E. H. Giller ...	"	R.M.S.P. Co. ...	" 27.1.24 to 21.2.24 ...	24.3.24.
<i>Daytonian</i> ...	Walker, C. J., D.S.O. ...	W. T. Godwin ...	"	Leyland ...	" 7.3.24 to 18.3.24 ...	7.4.24.
<i>Delta</i> ...	Brooks, C., D.S.O., R.D., Commr., R.N.R. ...	J. O. V. Young ...	"	P. & O. ...	" 2.2.24 to 22.2.24 ...	3.3.24.
<i>Demerara</i> ...	Hill, T. A. ...	H. J. Holland, A. Hambly ...	"	R.M.S.P. Co. ...	" 1.1.24 to 24.2.24 ...	29.2.24.
<i>Demosthenes</i> ...	Williams, W. J. ...	R. A. Alcock, A. Alexander... ..	"	Aberdeen ...	" 22.2.24 to 1.4.24 ...	15.4.24.
<i>Desado</i> ...	Wakeman, E. C. ...	C. R. Brown, F. Collinson ...	"	R.M.S.P. Co. ...	Form 911 11.2.24 to 3.4.24 ...	9.4.24.
<i>Desna</i> ...	Adam, C., R.D., Commr., R.N.R. ...	H. D. Jackman ...	"	" ...	" 16.12.23 to 9.2.24 ...	14.2.24.
<i>Deucalion</i> ...	Batt, A. E. ...	W. G. Smith ...	"	A. Holt ...	" 5.2.24 to 19.2.24 ...	22.2.24.
<i>Devon</i> ...	Gardner, H. W. ...	" ...	"	New Zealand S.S. Co. ...	" 23.8.23 to 13.10.23... ..	19.10.23.
<i>Dieppe</i> ...	Marmery, S. ...	Mr. Parsons ...	C.C.	Southern Railway ...	Telegraphic Report. 15.4.24 ...	15.4.24.
<i>Digby</i> ...	Chambers, F. W., D.S.C. ...	J. Pascoe, J. W. Murphy, W. P. Paterson. ...	M.L.	Furness Withy ...	Met. Log. 29.3.23 to 22.9.23 ...	3.10.23.
<i>Discoverer</i> ...	King, J. T. ...	J. Stanhope ...	No.	Harrison ...	Form 911 8.1.24 to 8.4.24 ...	14.4.24.
<i>Dogra</i> ...	Blance, T. ...	H. Hardwick ...	"	Asiatic S.N. Co. ...	" 6.12.23 to 17.2.24 ...	11.3.24.
<i>Domala, M.V.</i> ...	Whittingham, W. E., O.B.E., R.D., Commr. R.N.R. ...	C. E. Merchant ...	"	British India ...	" 12.1.24 to 6.2.24 ...	18.3.24.
<i>Doric</i> ...	Davies, J. ...	A. Thompson ...	"	White Star ...	" 27.1.24 to 17.2.24 ...	21.2.24.
<i>Dorington Court</i> ...	Barcham, H. C. ...	H. Tulloch ...	"	Haldin & Co. ...	" 23.5.23 to 12.6.23 ...	19.6.23.
<i>Dorset</i> ...	Kettlewell, C. R. ...	" ...	M.L.	New Zealand S.S. Co. ...	" ... ..	" ...
<i>Dramatist</i> ...	Gibbings, W. H. ...	R. W. Roberts ...	No.	Harrison ...	Form 911 7.12.23 to 14.3.24 ...	18.3.24.
<i>Dromore Castle</i> ...	Linklater, H. ...	S. S. Smith ...	"	Union Castle ...	" 11.11.23 to 1.12.23... ..	4.2.24.
<i>Dryden</i> ...	Knight, R. A. ...	G. D. Oldfield ...	"	Lampart & Holt ...	" 28.10.23 to 2.1.24 ...	18.2.24.
<i>Dundrum Castle</i> ...	Mumford, C. E. ...	H. Bunn ...	"	Union Castle ...	" ... ..	" ...
<i>Duendes</i> ...	Pape, E. R. ...	" ...	"	Pacific S.N. Co. ...	Form 911 10.2.24 to 4.3.24 ...	6.3.24.
<i>Duquesa</i> ...	Melville, A. ...	C. Lockwood, R. Martin, D. Thornton. ...	"	Furness Withy ...	" 21.12.23 to 17.2.24... ..	28.2.24.
<i>Durenda</i> ...	Wilson, W. ...	W. Cruse, C. McFarlane ...	"	British India ...	" 17.2.24 to 11.3.24 ...	14.3.24.
<i>Eastern</i> ...	Laing, J. D. ...	J. W. Kavanagh, F. R. Miller, H. H. Litchfield. ...	M.L.	Eastern and Australian ...	Met. Log. 14.2.23 to 16.8.23 ...	8.10.23.
<i>Ebani</i> ...	Faill, — ...	W. McKeown ...	No.	Elder Dempster ...	" ... ..	" ...
<i>Edinburgh Castle</i> ...	Strong, H., R.D., Commr., R.N.R. ...	" ...	M.L.	Union Castle ...	Met. Log. 30.11.23 to 24.3.24... ..	14.4.24.
<i>Eemland</i> ...	Van Noppen, C. D. ...	G. W. Yonwen ...	No.	Holland Lloyd ...	Form 911 18.12.23 to 16.3.24... ..	14.4.24.
<i>Egori</i> ...	McDowall, J. ...	K. Redmore ...	"	Elder Dempster ...	" 25.11.23 to 10.12.23 ...	12.12.23.
<i>El Cordobes</i> ...	Noton, F. G. ...	N. H. Oldham ...	"	British & Argentine S.N. Co. ...	" 4.1.24 to 4.2.24 ...	8.2.24.
<i>Elmina</i> ...	Millson, H. E. ...	" ...	M.L.	Elder Dempster ...	Met. Log. 20.9.23 to 13.12.23... ..	4.3.24.
<i>El Paraguayo</i> ...	Ellis, F., D.C.M. ...	W. E. Williams ...	No.	Houlder Bros. ...	Form 911 30.12.23 to 29.2.24... ..	4.3.24.
<i>Elpenor</i> ...	Evans, T. R. ...	D. L. Evans, C. Houghton, L. Johnstone, C. Mock. ...	M.L.	A. Holt ...	Met. Log. 12.8.23 to 26.11.23... ..	1.12.23.
<i>Elysia</i> ...	Evans, D. L. ...	" ...	"	" ...	" ... ..	" ...
<i>Elysia</i> ...	Kinnaird, J. ...	A. Grant ...	No.	Anchor ...	Form 911 16.2.24 to 8.3.24 ...	1.4.24.
<i>Empress of Asia</i> ...	Douglas, L. D., R.D., Lt. - Commr., R.N.R. ...	F. C. Stratford ...	M.L.	Canadian Pacific ...	Met. Log. 4.10.23 to 28.1.24 ...	5.3.24.
<i>Empress of Aus- tralia.</i> ...	Robinson, S., C.B.E., R.D., Commr., R.N.R. ...	" ...	M.L.	" ...	" 1.6.23 to 9.3.24 ...	7.4.24.
<i>Empress of Britain</i> ...	Hopcraft, D. ...	" ...	"	" ...	" ... ..	" ...
<i>Empress of Britain</i> ...	Halley, A. J. ...	" ...	"	" ...	" ... ..	" ...
<i>Empress of Britain</i> ...	Latta, R. G. ...	S. C. Fox, J. B. Marriott, O. F. Pennington. ...	W.T.	" ...	W.T. Reg. 18.10.23 to 2.11.23 } Form 911	6.11.23.
<i>Empress of Canada.</i> ...	Hailey, A. J. ...	" ...	M.L.	" ...	Met. Log. 29.6.23 to 6.12.23 ...	8.1.24.
<i>Empress of France</i> ...	Robinson, S., C.B.E., R.D., Commr., R.N.R. ...	" ...	"	" ...	" ... ..	" ...
<i>Empress of France</i> ...	Griffiths, E. ...	R. V. Everett, A. S. Phillips, B. Grant, ...	M.L.	" ...	" 13.6.23 to 17.11.23... ..	21.11.23.
<i>Empress of Russia</i> ...	Hosken, A. J. ...	A. B. Smith, J. D. Vosper, J. P. Napier, C. S. Morris, J. M. H. Twibill, R. H. Graham. ...	M.L.	" ...	" 12.7.23 to 17.12.23... ..	29.1.24.
<i>Endeavour</i> ...	Geary Hill, S. A., D.S.O., Commr., R.N. ...	" ...	"	" ...	" ... ..	" ...
<i>Endeavour</i> ...	Nares, J. D., D.S.O., Capt., R.N. ...	H. Exton Turner ...	M.L.	His Majesty's Ship ...	" 3.7.22 to 8.6.23 ...	18.6.23.
<i>Essequibo</i> ...	Pearce, A. W. ...	G. Pattison ...	No.	R.M.S.P. Co. ...	Form 911 2.2.24 to 20.3.24 ...	7.4.24.
<i>Eumaeus</i> ...	Read, J. W. ...	E. R. Pritchard ...	"	A. Holt ...	" 28.2.24 to 13.3.24 ...	7.4.24.
<i>Euripides</i> ...	Collins, P. J., O.B.E. ...	H. S. Cox, A. R. Payne, F. Fuller. ...	M.L.	Aberdeen ...	Met. Log. 25.8.23 to 12.12.23... ..	27.12.23.
<i>Eurybates</i> ...	Lloyd, R. ...	J. A. Havard ...	No.	A. Holt ...	Form 911 8.3.24 to 26.3.24 ...	3.4.24.
<i>Explorer</i> ...	Lamont, A. ...	Scientific Staff ...	M.L.	Scottish Fishery Board ...	Met. Log. 9.4.23 to 30.11.23 ...	8.1.24.
<i>Fitzroy</i> ...	Woodhouse, A. F. B., Lt.-Commr., R.N. ...	C. W. Sabine ...	M.L.	His Majesty's Ship ...	" 25.7.23 to 1.11.23 ...	10.11.23.
<i>Flandria</i> ...	Veldkamp, G. J. ...	H. D. Sicherer ...	No.	Holland Lloyd ...	Form 911 6.11.23 to 19.12.23... ..	24.12.23.
<i>Flinders</i> ...	Henderson, D. A., Lt.-Commr., R.N. ...	A. B. Foulerton ...	M.L.	His Majesty's Ship ...	Met. Log. 25.7.23 to 1.11.23 ...	10.11.23.
<i>Francisco</i> ...	Wilkins, J., O.B.E. ...	J. A. Vickers ...	No.	Ellerman Wilson ...	Form 911 16.12.23 to 22.1.24... ..	26.1.24.
<i>Francol</i> ...	Gatley, E. ...	H. J. Prout ...	"	Royal Fleet Auxiliary ...	" 20.6.23 to 15.9.23 ...	27.11.23.
<i>Frankenfels</i> ...	Gardiner, J. ...	J. W. Allingham, T. Chernside, G. E. Thomas. ...	M.L.	India Office Shipping ...	Met. Log. 2.9.23 to 10.12.23 ...	18.12.23.
<i>Freienfels</i> ...	Cleugh, J. W. ...	C. F. Bennett, H. Wilson, R. Soper. ...	"	" ...	" 10.11.23 to 29.2.24... ..	10.3.24.
<i>Gallie</i> ...	Summers, F. F., R.D., Commr. R.N.R. ...	W. G. O. Jones ...	No.	White Star ...	" 14.1.24 to 23.2.24 ...	7.4.24.

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log Register, or Report Contributed.	Date Received.
<i>Galtymore</i> ...	Ledsome, J. S. ...	D. Wilson ...	No.	Furness Withy ...	Form 911 9.3.24 to 22.3.24 ...	26.3.24.
<i>Garret</i> ...	Visser, C. W. ...	S. de Boo ...	"	Rotterdam Lloyd ...	26.2.24 to 18.3.24 ...	24.3.24.
<i>Garthgarry, Ship</i> ...	Roberts, D. ...	W. Wylie, J. Pearce, H. Bento ...	M.L.	Marine Nav. Co. ...	Met. Log. 15.7.22 to 27.7.23 ...	4.10.23.
<i>Gascoyne</i> ...	Mills, A. ...	P. G. Collins ...	No.	Dalgaty & Co. ...	Form 911 20.1.24 to 29.2.24 ...	7.4.24.
<i>Gelria</i> ...	Kolkman, J. M. ...	" ...	"	Holland Lloyd ...	" 25.1.24 to 14.3.24 ...	17.3.24.
<i>Gladiator</i> ...	Ruffell, — ...	D. H. Bryant, W. E. Shotton ...	"	Harrison ...	" 7.1.24 to 8.3.24 ...	12.3.24.
<i>Glenamoy, M.V.</i> ...	Angier, J. ...	L. C. Riggs ...	"	Glen Line ...	Form 911 6.11.23 to 25.1.24 ...	11.2.24.
<i>Glenapp, M.V.</i> ...	Griffiths, J. E. ...	F. Poate ...	"	" ...	" 8.1.24 to 27.1.24 ...	4.2.24.
<i>Glenluce, M.V.</i> ...	Kennett, W. H. ...	A. Hodd ...	"	" ...	" 24.1.24 to 12.2.24 ...	27.3.24.
<i>Gloucestershire</i> ...	Robin, E. ...	T. E. Field ...	"	Bibby ...	" 8.12.23 to 17.2.24 ...	19.2.24.
<i>Gorala</i> ...	D'Cruz, A. B. ...	A. R. H. Barton ...	"	British India ...	" 2.11.23 to 13.11.23 ...	27.12.23.
<i>Gorgon</i> ...	Hughes, J. W. ...	J. E. Cooper ...	"	Dalgaty & Co. ...	" 13.1.24 to 23.2.24 ...	7.4.24.
<i>Governor Musgrave</i> ...	Coastlad, C. ...	C. B. Odman, E. W. Hughes ...	"	Commonwealth Light-house Service.	" 20.7.23 to 11.10.23 ...	5.12.23.
<i>Graciana</i> ...	Clark, J. ...	M. C. Turner, E. Minshull ...	M.L.	Furness Withy ...	Met. Log. 15.12.22 to 31.8.23 ...	1.4.24.
<i>Haliartus</i> ...	Marsh, L. V. ...	W. H. Upton ...	No.	R. P. Houston ...	" 16.8.23 to 3.10.23 ...	20.11.23.
<i>Harmonides</i> ...	Hughes, W. J. ...	R. P. Davies ...	"	" ...	" 31.1.24 to 6.2.24 ...	25.2.24.
<i>Harmony, Auxy.</i> ...	Jackson, J. C. ...	A. W. Bush ...	"	Moravian Mission ...	" 15.11.23 to 3.12.23 ...	19.12.23.
<i>Hatarana</i> ...	Cutbush, H. M. ...	J. L. Durkee, F. Wells, E. B. Heath.	M.L.	British India ...	Met. Log. 28.4.23 to 25.7.23 ...	8.8.23.
<i>Hauraki, M.V.</i> ...	Thompson, R. F. ...	D. McLeish ...	No.	Union S.S. Co., N.Z. ...	Form 911 27.10.23 to 4.1.24 ...	11.2.24.
<i>Hazel Branch</i> ...	Barnet, P. K. ...	R. S. Young ...	"	Nautilus ...	" 16.3.23 to 18.6.23 ...	23.6.23.
<i>Henry Holmes, C.S.</i> ...	Bicker-Caarten, A. ...	E. Hislop Tucker ...	"	W. I. & Panama Telegraph Co.	" 29.1.24 to 11.3.24 ...	7.4.24.
<i>Herald</i> ...	Harvey, J. R., Commr., R.N.	" ...	M.L.	His Majesty's Ship ...	" ...	"
<i>Herefordshire</i> ...	Stanley, W. ...	P. Flood, G. Whitworth, P. S. Cooper, H. Moore.	"	Bibby ...	Met. Log. 18.8.23 to 30.1.24 ...	22.2.24.
<i>Herschel</i> ...	Carey, W. J. ...	S. C. Smith ...	No.	Lampert & Holt ...	Form 911 8.12.23 to 14.2.24 ...	16.2.24.
<i>Hibernia</i> ...	Tanner ...	R. Woodall ...	C.C.	L.M. & S. Rly. ...	Telegraphic Report. 21.3.24 ...	21.3.24.
<i>Highland Enterprise</i> ...	Pond, R. H. ...	D. R. S. Webster ...	No.	Nelson ...	Form 911 22.12.23 to 5.3.24 ...	11.3.24.
<i>" Glen</i> ...	Jones, T. J. ...	H. H. Thomas ...	"	" ...	" 17.12.23 to 9.2.24 ...	25.2.24.
<i>" Heather</i> ...	Powell, G. A. ...	G. Watson, R. Sinclair Davies, J. C. Morton.	M.L.	" ...	Met. Log. 23.12.22 to 22.3.23 ...	28.3.23.
<i>" Laddie</i> ...	Alford, C. ...	S. E. Jackson ...	No.	" ...	Form 911 1.1.24 to 24.2.24 ...	28.2.24.
<i>" Laird</i> ...	Davis, G. O. ...	" ...	"	" ...	" ...	"
<i>" Piper</i> ...	Collings, D. ...	A. S. Jones, J. S. Collins, J. H. Cables.	M.L.	" ...	Met. Log. 1.9.23 to 14.1.24 ...	16.1.24.
<i>" Pride</i> ...	Robinson, R. H. ...	H. McKinnon, H. Devlin, R. R. Soanes.	"	" ...	" 18.1.24 to 19.3.24 ...	8.4.24.
<i>" Rover</i> ...	Ashby Graves, F. ...	W. Watson, S. G. King, F. Abbott.	"	" ...	" 14.6.23 to 7.11.23 ...	16.11.23.
<i>" Warrior</i> ...	Brooke, W. ...	W. T. Breen ...	No.	" ...	Form 911 1.1.24 to 22.2.24 ...	27.2.24.
<i>Hobsons Bay</i> ...	Ogilvie, F. J. ...	J. E. Williams, E. Ballie, Kydd, O. J. Mr. Edwards.	M.L.	Commonwealth Govt.	Met. Log. 27.11.23 to 29.2.24 ...	12.3.24.
<i>Holbein</i> ...	Gough, W. A. ...	G. P. Kitto ...	No.	Lampert & Holt ...	Form 911 12.1.24 to 10.3.24 ...	17.3.24.
<i>Homerie</i> ...	Howarth, F. B., Commr., R.N.R.	W. Hill, F. Patchett ...	W.T.	White Star ...	W.T. Reg. 27.9.23 to 13.10.23 ...	16.10.23.
<i>Honorius</i> ...	Samuels, C. ...	J. E. Martin ...	No.	R. P. Houston ...	Form 911 14.2.24 to 11.3.24 ...	8.4.24.
<i>Huanchaco</i> ...	Redyard, A. ...	H. G. Cruickshank, J. Aldhouse.	"	Pacific S.N. Co. ...	Form 911 4.11.23 to 16.2.24 ...	5.3.24.
<i>Hubert</i> ...	Evans, T. G. ...	C. C. Beal ...	"	Booth ...	" 29.1.24 to 21.2.24 ...	17.3.24.
<i>Hurumui</i> ...	Burton Davies, J. ...	Mr. Oxnard, J. Carpenter, Mr. Newington.	M.L.	New Zealand S.S. Co.	Met. Log. 31.8.23 to 8.3.24 ...	15.3.24.
<i>Iber</i> ...	Langdon, C. ...	E. Lightfoot ...	C.C.	G.W. Railway ...	Telegraphic Report. 15.4.24 ...	15.4.24.
<i>Ikala</i> ...	Meetham, J. T. ...	J. Richardson ...	No.	Welsford, J. H. ...	Form 911 9.6.23 to 19.6.23 ...	26.7.23.
<i>Intombi</i> ...	Worthington, B. ...	J. Sinclair ...	"	Harrison ...	" 22.2.24 to 23.3.24 ...	26.3.24.
<i>Ionie Star</i> ...	Wilson, G. ...	R. H. Lucy, C. R. Brent, G. A. R. J. Leslie, E. E. Addis.	M.L.	Blue Star ...	" 29.1.24 to 26.3.24 ...	29.3.24.
<i>Iroquois</i> ...	Tinson, C. W., O.B.E., Commr., R.N.	" ...	"	His Majesty's Ship ...	Met. Log. 1.8.23 to 28.11.23 ...	10.1.24.
<i>Ixion</i> ...	Baetens, F. ...	A. K. Sanderson ...	No.	A. Holt ...	Form 911 4.3.24 to 4.4.24 ...	14.4.24.
<i>John Pender, C.S.</i> ...	Smythe, T. W., O.B.E.	B. C. Farrow ...	No.	Eastern Tel. Co. ...	" 18.1.24 to 7.2.24 ...	19.2.24.
<i>Junin</i> ...	Benson, C. W. ...	R. D. Eckford ...	"	Pacific S.N. Co. ...	" 22.11.23 to 30.12.23 ...	4.1.24.
<i>Kaikoura</i> ...	Downton, M. ...	H. Emmett, C. Pilcher, N. Anderson, J. Hopkins.	M.L.	New Zealand S.S. Co.	Met. Log. 19.6.22 to 23.6.23 ...	26.6.23.
<i>Kaisar-i-Hind</i> ...	Manley, G. ...	H. J. M. Perry ...	No.	P. & O. ...	Form 911 25.10.23 to 19.1.24 ...	19.2.24.
<i>Kamo Maru</i> ...	Okano, Y. ...	S. Matsumura ...	"	Nippon Yusen Kaisha	" 4.2.24 to 4.3.24 ...	7.4.24.
<i>Kangaroo</i> ...	Norris, H. C. ...	G. Buckeridge, R. J. Sinclair, F. Humble.	M.L.	State Service Australia	Met. Log. 4.6.23 to 1.11.23 ...	20.12.23.
<i>Karoo</i> ...	Robinson, T. ...	S. J. Nash ...	No.	Ellerman Bucknall ...	Form 911 30.6.23 to 11.7.23 ...	27.7.23.
<i>Kashima Maru</i> ...	Shinomiya, T. ...	M. Takada ...	"	Nippon Yusen Kaisha	" 2.1.24 to 9.2.24 ...	14.3.24.
<i>Kashmir</i> ...	Bartlett, E. B., O.B.E.	F. Hopkins ...	"	P. & O. ...	" 1.3.24 to 11.3.24 ...	20.3.24.
<i>Kellett</i> ...	Haselfoot, F. E. B., D.S.O., Commr., R.N.	E. H. B. Baker, W. C. Jenks ...	M.L.	His Majesty's Ship ...	Met. Log. 28.10.23 to 15.11.23 ...	5.12.23.
<i>Kenilworth Castle</i> ...	Millard ...	" ...	M.L.	Union Castle ...	" ...	"
<i>Khiva</i> ...	Redhead, C. M., D.S.O., R.D., Capt., R.N.R.	J. Maxwell, L. Fraser, A. L. Hill.	M.L.	P. & O. ...	Met. Log. 26.10.23 to 19.2.24 ...	22.2.24.
<i>Khyber</i> ...	Pinckney, L. D., O.B.E.	J. B. Livingstone ...	No.	" ...	" 8.11.23 to 23.12.23 ...	29.12.23.
<i>Kia Ora</i> ...	Thurston, H. P. ...	A. E. Lockhart ...	"	Shaw Savill & Albion	" 20.12.23 to 30.1.24 ...	11.3.24.
<i>Kinderdijk</i> ...	Jochems, A. B. ...	A. Stenger ...	"	Holland America ...	" 18.1.24 to 26.2.24 ...	24.3.24.
<i>Kitano Maru</i> ...	Kamada, N. ...	G. Chilara ...	"	Nippon Yusen Kaisha	" 6.1.24 to 31.1.24 ...	11.3.24.
<i>Knight Companion</i> ...	Beale, H. E. ...	E. H. Powell ...	"	A. Holt ...	" 29.9.23 to 11.10.23 ...	16.10.23.
<i>Kovno</i> ...	Casson, D. H., R.D., Commr., R.N.R.	E. R. Massam, G. H. Duncan, L. Griffiths	M.L.	Ellerman Wilson ...	Met. Log. 5.5.23 to 27.11.23 ...	3.12.23.
<i>Lady Brenda</i> ...	Young, W. J. ...	B. L. Brind ...	No.	Dawson ...	Form 911 25.9.23 to 4.10.23 ...	13.10.23.
<i>Lady Denison Pen-der C.S.</i> ...	West, G. W. ...	A. G. Watts ...	"	Eastern Tel. Co. ...	" 11.2.24 to 2.3.24 ...	24.3.24.
<i>Laguna</i> ...	Mander, F. ...	F. W. Parker ...	"	Pacific S.N. Co. ...	Form 911 14.12.23 to 7.1.24 ...	4.2.24.
<i>Lalande</i> ...	Bambra, W. A. ...	N. Webster ...	"	Lampert & Holt ...	" 26.12.23 to 19.1.24 ...	4.2.24.
<i>Lancashire</i> ...	Beckett, F. W. ...	T. L. Owen ...	"	Bibby ...	" 5.1.24 to 14.3.24 ...	24.3.24.
<i>Laomedon</i> ...	Smith, A. H. ...	A. J. Barclay ...	"	A. Holt ...	" 18.11.23 to 27.2.24 ...	4.3.24.
<i>La Paz M.V.</i> ...	Ross, J. ...	R. Collister ...	"	Pacific S.N. Co. ...	" 11.2.24 to 29.2.24 ...	24.3.24.

## LIST OF VOLUNTARY OBSERVING SHIPS

V

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed.	Date Received.
<i>Laplace</i> ...	Davies, G. W. ...	A. Hughes I. O. Jones ...	No.	Lampport & Holt ...	Form 911 20.1.24 to 27.3.24 ...	7.4.24.
<i>Lapland</i> ...	Howell, T. ...	B. T. Harris, H. H. Grace, J. M. Appleby.	W.T.	Red Star ...	W.T. Reg. 5.10.23 to 24.10.23 ...	2.11.23.
<i>Lassell, M.V.</i> ...	Turner, J. E. ...	A. T. Crilly ...	No.	Lampport & Holt ...	Form 911 5.10.23 to 24.10.23 ...	27.11.23.
<i>Leicestershire</i> ...	De Legh, P. ...	R. Cuming ...	M.L.	Bibby ...	" 5.8.23 to 24.10.23 ...	18.10.23.
<i>Leitrim</i> ...	Robertson, A. ...	H. C. Roberts ...	No.	Dowie, J., & Co. ...	" 2.10.23 to 12.10.23 ...	26.1.24.
<i>Levant C.S.</i> ...	West, G. W. ...	Adams S. E. ...	M.L.	Eastern Tel. Co. ...	" 8.12.23 to 17.1.24 ...	30.12.23.
<i>Lexington</i> ...	Westgarth, W. A. ...	Coverdale, Meyrick, W. Corlett.	M.L.	Furness Withy ...	Met. Log. 26.11.23 to 16.12.23 ...	17.12.23.
<i>Ling Nam</i> ...	Wilford, T. H. ...	W. F. Malden ...	No.	Chunghwa Nav. Co. ...	" 14.9.22 to 5.12.23 ...	
<i>Llanstephan Castle</i> ...	Matthews, G. P. ...	A. E. Jones ...	"	Union Castle ...	Form 911 1.2.24 to 21.2.24 ...	18.3.24.
<i>Loch Katrine</i> ...	Young, H. J., D.S.O. ...	E. A. Bennett ...	"	R.M.S.P. Co. ...	" 22.2.24 to 23.3.24 ...	1.4.24.
<i>London Commerce</i> ...	Barkley, E. ...	F. Binnion ...	"	Furness Withy ...	" 3.2.24 to 9.3.24 ...	12.3.24.
<i>Loreto, M.V.</i> ...	Meldrum, G. W. ...	A. H. Turner ...	"	Pacific S.N. Co. ...	" 17.2.24 to 8.3.24 ...	14.4.24.
<i>Losada M.V.</i> ...			"	"	" 21.2.24 to 10.3.24 ...	1.4.24.
<i>Macedonia</i> ...	Potter, H. W., R.D., Commr., R.N.R. ...	G. Readman ...	No.	P. & O. ...	"	
<i>Macharda</i> ...	Cochran, G. ...	W. Moore ...	"	Brocklebank ...	Form 911 12.12.23 to 8.3.24 ...	14.3.24.
<i>Mahana</i> ...	Kershaw, W. A. R. ...	F. M. Smith ...	"	Shaw Savill & Albion ...	" 10.2.24 to 24.2.24 ...	17.3.24.
<i>Maharaja</i> ...	Hartock, L. ...	C. B. Miller ...	"	Asiatic S.N. Co. ...	" 16.1.24 to 5.3.24 ...	1.4.24.
<i>Mahopac</i> ...	Puttick, J. ...	F. J. Mummery ...	"	Atlantic Transport ...	" 23.4.23 to 3.8.23 ...	27.8.23.
<i>Maihar</i> ...	Rowe J. P. ...	C. Straw L. Robertson, R. G. Widdon.	M.L.	Brocklebank ...	Met. Log. 22.9.23 to 10.12.23 ...	26.1.24.
<i>Maimyo</i> ...	Hamilton, G. ...	R. A. L. Williams ...	No.	Atlantic Transport ...	Form 911 24.2.24 to 19.3.24 ...	14.4.24.
<i>Maine</i> ...	Seymour, A. ...	J. W. Prier ...	"	White Star ...	" 29.5.23 to 8.6.23 ...	18.6.23.
<i>Majestic</i> ...	Hayes, Sir B. F., K.C.M.G., D.S.O., R.D., Commodore R.N.R. ...	A. F. Butcher ...	W.T.	"	W.T. Reg. 4.1.24 to 17.1.24 ...	21.1.24.
					" 24.1.24 to 7.2.24 ...	11.2.24.
<i>Makambo</i> ...	Williams, G. E. ...	A. Brown, W. R. Robertson, F. C. Ree, D. Wilson.	M.L.	Burns Philp ...	Met. Log. 28.3.23 to 10.9.23 ...	4.12.23.
<i>Makura</i> ...	Brown, T. M. ...					
	Griffiths, G. I. ...					
<i>Malancha</i> ...	Crawford, R. ...	H. Knaggs ...	M.L.	Canadian-Australasian ...	" 3.11.23 to 1.3.24 ...	25.3.24.
<i>Malda</i> ...	Barlow, A. E. ...	J. Robertson ...	No.	Brocklebank ...	Form 911 13.12.23 to 12.1.24 ...	23.1.24.
<i>Manchester Corporation.</i> ...	Whitham, F. ...	J. Hayward ...	"	British India ...	" 6.12.23 to 12.1.24 ...	16.1.24.
<i>Manchester Mariner</i> ...	Gray, T. N. ...	F. H. Moorhouse ...	"	Manchester Liners ...	" 20.1.24 to 23.2.24 ...	28.2.24.
	Everest J. E. ...					
	Riley, J. E. ...	C. E. Stocker, J. F. Fisher, F. Stockton.	M.L.	"	Met. Log. 28.7.23 to 29.2.24 ...	19.3.24.
<i>Manchester Merchant.</i> ...	Barclay, J. ...	A. H. Boyd, A. E. Ricketts...	No.	"	Form 911 7.3.24 to 23.3.24 ...	29.3.24.
<i>Mandasor</i> ...	Kershaw, R. W. ...	W. Baxter ...	"	Brocklebank ...	" 1.12.23 to 7.1.24 ...	28.1.24.
<i>Manipur</i> ...	Scurr, T. W. ...	G. W. Barker ...	"	"	" 3.10.23 to 25.12.23 ...	28.12.23.
<i>Manistee</i> ...	Isaacson, J. M. ...	F. McCollm, A. M. Houghton, L. C. Bach, H. C. Slater.	M.L.	Elders & Fyffes ...	Met. Log. 10.11.23 to 16.3.24 ...	24.3.24.
		A. M. Watt, W. R. Reid, S. Keay.	M.L.	Canadian Pacific ...	" 27.10.23 to 2.3.24 ...	4.4.24.
<i>Marburn</i> ...	Clews, A. H. ...					
	Hamilton, G. ...					
<i>Marella</i> ...	Hall, J. ...	Burdie, Pemberton, Thompson	M.L.	Burns Philp ...	" 12.7.23 to 22.11.23 ...	3.3.24.
<i>Margha</i> ...	Mortimer, S. ...	J. Strachan, R. W. Cooper, H. Watkins, H. M. Maguire.	M.L.	British India ...	" 27.10.23 to 8.1.24 ...	17.1.24.
	Milne, R. A. ...					
<i>Marglen</i> ...	Griffiths, J. N. ...	A. Pennington ...	No.	Canadian Pacific ...	Form 911 16.2.24 to 7.3.24 ...	11.3.24.
<i>Maryland</i> ...	Pollard, F. W., D.S.O., R.D., Commr., R.N.R. ...	F. T. Good ...	"	Atlantic Transport ...	" 21.1.24 to 28.2.24 ...	11.3.24.
<i>Mashobra</i> ...	Gallie, E. ...	M. W. K. Bishop ...	"	British India ...	"	
<i>Masirah</i> ...	Thowless, E. ...	R. C. Baker ...	"	Brocklebank ...	Form 911 24.11.23 to 3.4.24 ...	14.4.24.
<i>Massilia</i> ...	Caithness, J. B. ...	E. Richardson ...	"	Anchor ...	" 23.1.24 to 24.2.24 ...	10.3.24.
<i>Matakana</i> ...	Bosdet, V. J. ...	H. C. Mont, S. Oswald ...	"	Shaw, Savill & Albion ...	" 20.6.23 to 31.7.23 ...	11.8.23.
<i>Matheran</i> ...	Cornish, N. P. ...	H. H. Armstrong ...	M.L.	Brocklebank ...	Met. Log. 14.10.23 to 9.1.24 ...	5.2.24.
<i>Mathura</i> ...	Hanna, R. G. ...	W. G. E. D. Rawlingson ...	No.	British India ...	Form 911 26.1.24 to 25.2.24 ...	13.3.24.
<i>Matiana</i> ...	Langlands, D. H. ...	J. W. Parsons, H. Carden, N. A. Moore.	M.L.	Elders & Fyffes ...	Met. Log. 28.12.23 to 21.1.24 ...	1.2.24.
<i>Matina</i> ...	Henderson, J. ...				" 9.9.22 to 24.3.23 ...	26.4.23.
<i>Mauretania</i> ...	Rostron, A. H., C.B.E., R.D., A.-d.-C., Capt., R.N.R. ...	G. H. Jones, P. O. Davis, W. C. A. Robson.	W.T.	Cunard ...	W.T. Reg. 21.10.23 to 4.11.23 ...	8.11.23.
					Form 911 29.9.23 to 14.10.23 ...	23.10.23.
<i>Megantic</i> ...	Berry, G. ...	L. Thompson, H. J. C. Day, R. Conway.	W.T.	White Star ...	W.T. Reg. 14.1.24 to 5.4.24 ...	9.4.24.
<i>Melita</i> ...	Clews, A. H. ...	Mr. Blair, C. Draper, A. M. Watt, A. K. Benham.	W.T.	Canadian Pacific ...	" 3.2.24 to 21.2.24 ...	1.4.24.
					" 7.3.24 to 26.3.24 ...	29.3.24.
<i>Memnon</i> ...	Salter, G. H. ...	P. L. Pallot ...	No.	A. Holt ...	Form 911 28.1.24 to 17.2.24 ...	17.3.24.
<i>Menominee</i> ...	Finch, E. ...	H. F. McCartney ...	"	Atlantic Transport ...	" 19.8.23 to 17.9.23 ...	21.9.23.
<i>Mercian</i> ...	Carnon, J. R. ...	A. T. Holloway ...	"	Leyland ...	" 11.2.24 to 15.3.24 ...	21.3.24.
<i>Mesaba</i> ...	Claret, F. H. ...	L. A. Williams ...	"	"	" 2.7.23 to 11.7.23 ...	27.8.23.
<i>Metagama</i> ...	Henderson, W. ...	B. Leslie, R. Fegan, R. Jackson, A. Mansey.	W.T.	Canadian Pacific ...	W.T. Reg. 24.2.24 to 15.3.24 ...	20.3.24.
					" 22.3.24 to 13.4.24 ...	15.4.24.
<i>Miami</i> ...	Maxwell Brown, W. E. ...	E. Lowndes ...	No.	Elders & Fyffes ...	Form 911 29.2.24 to 4.4.24 ...	8.4.24.
<i>Michigan</i> ...	Tribe, A. E. ...	L. A. Williams ...	"	Atlantic Transport ...	" 25.1.24 to 9.2.24 ...	25.2.24.
<i>Minderoo</i> ...	Richardson, E. ...	B. J. Bennie, W. J. McPhedron, J. H. Oxtan.	M.L.	West Australia Nav. Co. ...	Met. Log. 11.7.23 to 13.12.23 ...	14.4.24.
<i>Minnedosa</i> ...	Sibbons, H. ...	R. Fegan, R. Walker, J. Soames.	W.T.	Canadian Pacific ...	W.T. Reg. 19.1.24 to 7.2.24 ...	11.2.24.
					Form 911 18.1.24 to 8.2.24 ...	11.2.24.
<i>Minnetonka</i> ...	Gates, T. F. ...	N. Mills ...	No.	Atlantic Transport ...	"	
<i>Minnewaska</i> ...	Claret, F. ...	W. Robison ...	"	"	"	
<i>Mirror, C.S.</i> ...	Sherwood, C. A. ...	C. E. F. St. John ...	No.	Eastern Tel. Co. ...	" 25.2.24 to 5.4.24 ...	16.4.24.
<i>Mississippi, M.V.</i> ...	Wylie, J. T. J. ...	A. H. Middleton ...	"	Atlantic Transport ...	" 31.1.24 to 9.2.24 ...	19.2.24.
<i>Missouri</i> ...	Hutchison, J. G. ...	W. W. Howard ...	"	"	" 30.7.23 to 2.9.23 ...	6.9.23.
<i>Moena</i> ...	Morzer Bruyns, M. F. ...	J. H. Nieboer ...	"	Nederland ...	" 6.2.24 to 27.2.24 ...	7.4.24.
<i>Moltavia</i> ...	Burleigh, C. W., D.S.O., R.D., Capt., R.N.R. ...	E. T. Ferraby ...	"	P. & O. ...	" 8.3.24 to 14.3.24 ...	18.3.24.
<i>Mongolian Prince</i> ...	Chilvers, J. ...	H. A. Shaw ...	No.	Prince ...	Form 911 6.1.24 to 29.1.24 ...	11.2.24.
<i>Monkbarns, Ship</i> ...	Davies, W. ...	M. B. Glasier ...	"	J. Stewart & Co. ...	" 13.10.23 to 20.11.23 ...	21.1.24.
<i>Montcalm</i> ...	Rennie, A., O.B.E. ...	H. McFadyen, S. W. Keay ...	W.T.	Canadian Pacific ...	W.T. Reg. 23.3.24 to 10.4.24 ...	14.4.24.
					Form 911 22.3.24 to 11.4.24 ...	14.4.24.
<i>Montclare</i> ...	Webster, G. S., R.D., Commr., R.N.R. ...	E. J. Jones, A. R. E. Coleman, G. F. Hutchings, G. Mowatt.	W.T.	"	W.T. Reg. 16.3.24 to 3.4.24 ...	7.4.24.
<i>Montlaurier</i> ...	Turnbull, J., C.B.E., R.D., Capt., R.N.R. ...	H. H. Davies ...	No.	"	Form 911 8.3.24 to 28.3.24 ...	4.4.24.

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed.	Date Received.
Montrose ...	Landy, E. ...	A. M. Watt, D. Loram, J. Soame.	W.T.	Canadian Pacific ...	W.T. Reg. 2.3.24 to 20.3.24 ...	28.3.24.
Morvada ...	Mills, T. L., O.B.E., R.D., Commr., R.N.R.	J. Norris, D. Lonie, F. Dyson	M.L.	British India ...	Form 911 4.2.24 to 21.2.24 ...	27.2.24.
Mulbera ...	Steadman, W. R. ...	R. L. Burridge, E. Holland...	No.	British India ...	Met. Log. 15.9.23 to 27.11.23...	29.11.23.
Musican ...	Egerton, J. J. ...	O. Stanhope ...	"	Harrison ...	" 5.4.23 to 17.6.23 ...	2.8.23.
Nagara ...	Turner, E. A. ...	C. E. Mason ...	"	R.M.S.P. Co. ...	" 11.12.23 to 3.2.24 ...	6.2.24.
Napierian ...	Kerruish, W. ...	T. Griffiths ...	"	Leyland ...	" 14.2.24 to 26.2.24 ...	14.3.24.
Nardana ...	Brown, H. ...	K. C. Le Breton ...	"	British India ...	" 15.9.23 to 18.2.24 ...	28.2.24.
Nariva ...	Buret, T. J. C. ...	J. E. Atkins, B. C. Dodds, S. H. Butler.	M.L.	R.M.S.P. Co. ...	Met. Log. 23.1.24 to 13.3.24 ...	18.3.24.
Nascopie ...	Smellie, T. F. ...	P. Lloyd, R. J. Summers, R. S. Mott.	M.L.	Hudson's Bay Co. ...	" 15.6.23 to 24.10.23...	31.10.23.
Navarino ...	Crichton, J. S. ...	J. Annam ...	No.	Glen & Co. ...	Form 911 13.12.23 to 12.1.24...	22.1.24.
Navasota ...	Willan, F. G. L., R.D., Commr., R.N.R.	W. A. Delap ...	"	R.M.S.P. Co. ...	" 19.1.24 to 9.3.24 ...	17.3.24.
Navigator ...	Mowat, J. ...	" ...	"	Harrison ...	" 29.4.23 to 26.6.23 ...	11.7.23.
Nawab ...	Smith, J. F. ...	" ...	"	Asiatic S.N. Co. ...	" 7.12.23 to 4.2.24 ...	25.2.24.
Nebraska ...	Collins, A. R. D. ...	J. Vivian ...	"	R.M.S.P. Co. ...	" 20.6.23 to 31.8.23 ...	24.9.23.
Nellore ...	Murray, F. S., R.D., Lt. Commr., R.N.R.	G. Aspinall ...	"	P. & O. ...	" 24.10.23 to 18.12.23	27.12.23.
Nestor ...	Owen, R. D., O.B.E.	W. J. Eyson ...	"	A. Holt ...	" 1.2.24 to 13.3.24 ...	17.3.24.
Nevasa ...	Swanson, C. J. ...	E. C. T. West ...	"	British India ...	" 12.10.23 to 21.12.23	4.1.24.
Newby Hall ...	Kendall, J. W. ...	E. J. Myles, C. H. Webb, T. A. Dexter.	M.L.	Ellerman ...	Met. Log. 4.7.23 to 24.1.24 ...	4.3.24.
Niagara ...	Rolls, J. T. ...	R. M. Scott, N. G. Buxton, O. C. Bray.	M.L.	Canadian-Australian...	" 2.6.23 to 28.9.23 ...	29.10.23.
Ningchow ...	Wilson, C. A. ...	R. A. Hannay ...	No.	A. Holt ...	Form 911 7.1.24 to 15.2.24 ...	20.2.24.
Nizam ...	Park, G. ...	" ...	"	Asiatic S.N. Co. ...	" 21.4.23 to 1.5.23 ...	29.5.23.
Nore ...	Randall, H. W., R.D., Capt., R.N.R.	J. C. Ablewhite, R. W. Mackie, H. C. Slinn.	M.L.	P. & O. ...	Met. Log. 3.11.23 to 22.1.24 ...	26.1.24.
Norman ...	Morton Betts, W. ...	D. A. Hodgson ...	No.	Union Castle ...	Form 911 24.12.23 to 11.1.24...	11.3.24.
Norseman, C.S. ...	Barter, H. O., R.D., Commr., R.N.R.	S. M. Hammond, E. R. Duffey, L. M. Cooper.	M.L.	Western Tel. Co. ...	Met. Log. 12.2.23 to 21.8.23 ...	24.9.23.
Northumberland ...	Haines, F. P. ...	" ...	No.	Federal ...	Form 911 16.6.23 to 28.7.23 ...	31.7.23.
Nortonian ...	McCormick, J. ...	C. R. Stevens ...	"	Leyland ...	" 20.2.24 to 31.3.24 ...	7.4.24.
Nubian ...	Watmough, T. M. ...	W. J. Wright ...	"	" ...	" 7.3.24 to 21.3.24 ...	10.4.24.
Nyanza ...	Carpendale, F. W. J.	F. Aheir, C. H. Hand, F. Ardern.	M.L.	P. & O. ...	Met. Log. 17.9.23 to 7.1.24 ...	12.1.24.
Odland I. ...	Villiamsen ...	H. Svendgaard ...	No.	Hannevig Bros. ...	Form 911 19.12.23 to 2.1.24 ...	4.1.24.
Ohio ...	Lainson, W. H. ...	W. Paine, C. K. Brown, G. C. Clairmonte.	M.L.	R.M.S.P. Co. ...	Met. Log. 18.5.23 to 2.12.23 ...	13.12.23.
Olympia ...	Duncan, A. R. ...	D. R. Urquhart, G. Lynas, F. McIntyre.	M.L.	Anchor ...	" 12.1.24 to 23.3.24 ...	2.4.24.
Olympic ...	Howarth, F. B., Commr., R.N.R.	J. C. M. Boyce, C. W. Couch, C. J. Warltire.	W.T.	White Star ...	W.T. Reg. 13.3.24 to 27.3.24 ...	31.3.24.
Omar ...	Simner, G. L., R.D., Commr., R.N.R.	W. M. McRitchie, C. V. Dodgson, L. E. Fordham, H. S. Schofield, T. J. Jones.	M.L.	Orient ...	Form 911 12.3.24 to 28.3.24 ...	1.4.24.
Onitsha ...	Williams, T. E. ...	D. Rollo ...	No.	Elder Dempster ...	Met. Log. 22.9.23 to 6.1.24 ...	16.1.24.
Oranvan ...	Hoskins, W. ...	T. Miller ...	"	Leyland ...	Form 911 1.9.23 to 21.9.23 ...	20.11.23.
Orari ...	Robinson, F. W. ...	C. H. Denton, C. F. Hicks, E. Mills.	M.L.	New Zealand S.S. Co. ...	" 4.2.24 to 29.3.24 ...	2.4.24.
Orator ...	Flynn, D. ...	J. C. Sinclair ...	No.	Harrison ...	Met. Log. 3.2.23 to 19.7.23 ...	25.7.23.
Orbita ...	Parker, W. H., C.B.E., R.D., Capt., R.N.R.	D. R. Lee, H. H. Lancaster...	W.T.	R.M.S.P. Co. ...	Form 911 2.7.23 to 22.7.23 ...	22.8.23.
Oreoma ...	Pleignier, H. T. S. ...	G. B. Wardall, J. J. Buckley, C. H. Wenton.	M.L.	Pacific S.N. Co. ...	W.T. Reg. 23.11.23 to 13.12.23	17.12.23.
Orduna ...	Warner, G. E., R.D., Commr., R.N.R.	J. W. Carr, J. Vivian, A. A. Martin.	W.T.	R.M.S.P. Co. ...	Form 911 17.2.24 to 4.3.24 ...	7.3.24.
Oriana ...	Christian, G. H. ...	G. Pattison, Mason, G. F. Nicholson, Cruikshank.	M.L.	Pacific S.N. Co. ...	Met. Log. 23.11.23 to 8.2.24 ...	14.2.24.
Orila ...	Dominy, R. H., C.B.E., Commr., R.N.R.	F. W. Hockey, H. S. Roberts, — Gale.	M.L.	" ...	W.T. Reg. 2.3.24 to 23.3.24 ...	27.3.24.
Ormonde ...	Douglas, H. P., C.M.G., Capt., R.N.	" ...	M.L.	His Majesty's Ship ...	Form 911 1.3.24 to 24.3.24 ...	28.3.24.
Ormonde ...	Staunton, H. G., C.B.E., R.D., Commr., R.N.R.	T. G. McGregor, H. MacLean, F. J. L. Butler.	M.L.	Orient ...	Met. Log. 26.1.23 to 14.8.23 ...	18.8.23.
Ormuz ...	James, L. V., D.S.C.	J. S. Metcalf, A. J. Croft-Cohen, I. E. G. Goldsworthy, L. A. Keeble.	M.L.	" ...	Met. Log. 15.8.23 to 9.12.23 ...	12.12.23.
Oroya ...	Chittenden, A. ...	S. Lewis ...	No.	Pacific S.N. Co. ...	" ...	" ...
Orsova ...	Matheson, C. G., D.S.O., R.D., Commr., R.N.R.	C. Fox, J. C. K. Dowding, N. Whinfield, J. C. Jackson.	M.L.	Orient ...	Form 911 30.1.24 to 10.4.24 ...	16.4.24.
Ortega ...	Christian, C. H. ...	D. W. Hutchinson...	No.	Pacific S.N. Co. ...	Met. Log. 20.9.23 to 3.1.24 ...	31.1.24.
Orvieto ...	Shelford, W. S., Lt.-Commr., R.N.R.	G. H. Wylie, A. J. Baxter, G. E. Martin, A. O. H. O'Brien, M. C. Lester.	M.L.	Orient ...	Form 911 14.12.23 to 14.2.24...	28.2.24.
Osterley ...	Coad, A. J., R.D., Commr., R.N.R.	A. E. Nicholls, F. G. Goodman, T. B. Grainger-Grieve, E. Hatch.	M.L.	" ...	Met. Log. 11.11.23 to 26.2.24...	3.3.24.
Othello ...	Pearson, Z. C. ...	A. J. Walker ...	No.	Ellerman Wilson ...	" 9.12.23 to 26.3.24 ...	7.4.24.
Otira ...	Elford, H. E. ...	V. R. Bowling ...	"	Shaw, Savill & Albion	Form 911 31.1.24 to 6.3.24 ...	13.3.24.
Oxfordshire ...	Adamson, B. W. ...	W. L. Whiteside, C. J. Blyten-Beesley, H. J. Jarrett.	M.L.	Bibby ...	" 24.11.23 to 13.12.23	1.1.24.
Pakeha ...	Hartman, W. H. ...	W. L. P. Cox ...	No.	Shaw, Savill & Albion	Met. Log. 22.12.23 to 1.3.24 ...	5.3.24.
Paparoa ...	Ashworth, F. ...	A. E. Lettington ...	"	New Zealand S.S. Co. ...	Form 911 23.12.23 to 2.2.24 ...	11.2.24.
Paris ...	Cook, C. L. ...	Mr. Biles...	C.C.	Southern Rly. ...	" ...	" ...
Patia ...	Bostock, R. J. ...	W. McIlwain ...	No.	Elders & Fyffes ...	Telegraphic Report. 19.2.24 ...	19.2.24.
Patrol, C.S. ...	Bredenberg, F. ...	Gardiner, Albrecht, Morrell...	M.L.	Eastern Extension (A. & C.) Telegraph Co.	Form 911 22.3.24 to 7.4.24 ...	14.4.24.
Persic ...	Davies, E. ...	N. E. Banks ...	No.	White Star ...	Met. Log. 1.7.23 to 14.9.23 ...	25.2.24.
Peshavur ...	Hester, C. W., R.D., Commr., R.N.R.	B. W. Snow, T. C. Fairburn, J. Tickell, J. D. Parker.	M.L.	P. & O. ...	Form 911 20.12.23 to 29.1.24...	31.1.24.
Philadelphum ...	Baker, J. A. ...	G. W. B. Lloyd ...	No.	Leyland ...	Met. Log. 30.8.23 to 9.2.24 ...	18.2.24.
Polyphemus ...	Hatfield, J. ...	F. Silva ...	"	A. Holt ...	Form 911 13.1.24 to 6.2.24 ...	18.3.24.
Poona ...	Cherry, W. G. W. ...	F. J. Ablewhite ...	"	P. & O. ...	" 27.2.24 to 16.3.24 ...	18.3.24.
					Form 911 20.3.24 to 5.4.24 ...	14.4.24.

## LIST OF VOLUNTARY OBSERVING SHIPS

vii

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed.	Date Received.
<i>Port Albany</i> ...	Robinson, C. A. ...	G. L. Hazlewood, W. B. Craig, A. G. Newbury, W. Eastoe.	M.L.	Commonwealth & Dominion.	Met. Log. 18.10.23 to 19.3.24...	1.4.24.
„ <i>Augusta</i> ...	Brown, A. H. Harris, G. T. C. Sawbridge, I. R. Renaut, F. A. ...	R. C. Carter, C. F. Coate, H. Stone.	M.L.	„ „ „	„ 13.10.23 to 24.3.24...	7.4.24.
„ <i>Caroline</i> ...	Van den Bergh, C. ...	E. G. Fullick, P. H. Pedrick, T. Palmer.	M.L.	„ „ „	„ 18.7.23 to 19.11.23...	24.11.23.
„ <i>Curtis</i> ...	Jack, J. ...	A. G. Rhind ...	No.	„ „ „	„ „ „ „ „	„
„ <i>Darwin</i> ...	Stickland, A. E. ...	E. T. N. Lawrey, E. W. R. Young.	„	„ „ „	Form 911 30.1.24 to 6.4.24 ...	9.4.24.
„ <i>Hacking Hunter</i> ...	Cottell, S. C. ...	Rowland Hill ... A. Cooper, C. F. Post, J. H. Bower.	M.L.	„ „ „	Met. Log. 25.1.24 to 11.3.24 ... 16.11.23 to 18.3.24...	18.3.24. 21.3.24.
„ <i>Lyttelton</i> ...	Ferris, J....	W. L. Lynd, E. Leavett, G. Fergusson, G. H. Harvey.	M.L.	„ „ „	„ 24.2.23 to 16.8.23 ...	18.8.23.
„ <i>Melbourne</i> ...	Kearney, F. J. ...	D. G. H. Bradley, R. B. Linklater, T. L. Kidwell.	M.L.	„ „ „	„ 11.9.23 to 17.1.24 ...	28.1.24.
„ <i>Nicholson</i> ...	Hoad, A. C. ...	W. G. Jones, C. R. Townshend, G. G. Langford.	M.L.	„ „ „	„ 5.10.23 to 4.2.24 ...	11.2.24.
„ <i>Piris</i> ...	Higgs, W. G. ...	H. C. Jeffery, E. E. Roswell, R. S. Stannard, E. N. Rogerson.	M.L.	„ „ „	„ 25.8.23 to 26.12.23...	30.12.23.
„ <i>Sydney</i> ...	Lea, W. H. ...	H. E. Higgs, A. W. Sams, A. R. Martin, J. Fishwick.	M.L.	„ „ „	„ 15.6.23 to 16.10.23...	20.10.23.
„ <i>Victor</i> ...	Swan, L. H. ...	R. T. R. Tomsett, W. Pickup, G. Jones.	M.L.	„ „ „	„ 23.10.23 to 17.3.24...	19.3.24.
<i>President Jackson Protea</i> , H.M.S.A.S.	Griffith, J. Dagleish...	E. Walker ... H. McMaster ...	No.	Pacific S.S. Co. ... South African Naval Service.	Form 911 21.12.23 to 20.1.24... „ 14.5.23 to 29.6.23 ...	11.3.24. 31.7.23.
<i>Protesilaus</i> ...	Wilkinson, H. ...	E. P. Gault, T. Miners, A. Woolfenden, F. Smith.	M.L.	A. Holt ...	Met. Log. 3.1.24 to 10.3.24 ...	7.4.24.
<i>Pyrrhus</i> ...	Elford, W. J. ...	W. Owen ...	No.	„ „ „	Form 911 31.3.24 to 9.4.24 ...	14.4.24.
<i>Rajah</i> ...	Park, G. ...	„ „ „	No.	Asiatic S.N. Co. ...	Form 911 17.6.23 to 10.7.23 ...	15.8.23.
<i>Regina</i> ...	Smith, R. G. ...	A. Hulme ...	„	White Star-Dominion ...	„ 7.3.24 to 29.3.24 ...	1.4.24.
<i>Reindeer</i> ...	Mulhall, W. ...	„ „ „	C.C.	G.W. Railway ...	Telegraphic Report 14.2.24 ...	14.2.24.
<i>Rhodesian Transport</i> ...	Fowler, W. H. ...	E. A. Insley ...	No.	Houlder Bros. ...	Form 911 19.9.23 to 9.1.24 ...	2.2.24.
<i>Rialto</i> ...	Mordue, J. A. ...	„ „ „	„	Ellerman Bucknall ...	„ 4.2.24 to 6.3.24 ...	2.4.24.
<i>Rimutaka</i> ...	Hemming, F. A. ...	E. W. Smith, H. Horwood, R. S. Cox.	M.L.	New Zealand S.S. Co. ...	Met. Log. 22.9.23 to 6.2.24 ...	11.2.24.
<i>Risaldur</i> ...	Park, G. ...	„ „ „	„	Asiatic S.N. Co. ...	„ „ „	„
<i>Romney</i> ...	Leicester, F. S. ...	E. S. Phillips, E. King ...	No.	Lampert & Holt ...	Form 911 3.2.24 to 1.3.24 ...	10.3.24.
<i>Royal Fusilier</i> ...	Dawson, J. ...	„ „ „	„	London & Edinburgh S.S. Co. ...	„ „ „	„
<i>Royal Transport</i> ...	Dove, J. ...	R. Martin ...	„	Houlder Bros. ...	Form 911 6.2.24 to 4.3.24 ...	3.4.24.
<i>Ruaphu</i> ...	Holland, E. A. ...	J. D. Tooms, G. Kinnett, P. J. Connolly, F. Cooke.	M.L.	New Zealand S.S. Co. ...	Met. Log. 6.11.23 to 7.3.24 ...	13.3.24.
<i>Sachem</i> ...	Furieux, S. ...	C. Waldron, E. Sainty ...	No.	Furness Withy ...	Form 911 3.2.24 to 13.3.24 ...	17.3.24.
<i>Samaria</i> ...	Horsburgh, G. ...	E. Esson ...	„	Cunard ...	„ 24.9.23 to 10.10.23...	16.10.23.
<i>Sandown Castle</i> ...	Jackson, C. R. ...	G. Mayhew ...	„	Union Castle ...	„ 3.2.24 to 1.3.24 ...	25.3.24.
<i>Saoirse, Yacht</i> ...	O'Brien, C. ...	H. S. Hodges ...	„	C. O'Brien ...	„ 1.9.23 to 6.10.23 ...	7.11.23.
<i>Sardinia</i> ...	Cadiz, F. G., D.S.C.	A. F. Wiles ...	„	P. & O. ...	„ 1.1.24 to 21.1.24 ...	4.2.24.
<i>Saturnia</i> ...	Black, J. ...	T. Ure ...	W.T.	Anchor Donaldson ...	W.T. Reg. 24.11.23 to 16.12.23 ...	27.12.23.
<i>Saxoleine</i> ...	Biddick, E. ...	S. Wood ...	No.	Hunting & Son ...	Form 911 23.11.23 to 17.12.23 ...	27.12.23.
<i>Saxon</i> ...	Stanley, W. F., R.D. Commr., R.N.R.	R. S. W. Harris ...	„	Union Castle ...	„ 25.2.24 to 30.3.24 ...	9.4.24.
<i>Saxonia</i> ...	McNeil, S. G. S., R.D., Capt., R.N.R.	H. A. D. Waterhouse ...	„	Cunard ...	„ 18.1.24 to 10.3.24 ...	11.3.24.
<i>Scholar</i> ...	O'Connor, T. ...	H. Hall ...	„	Harrison ...	„ 22.3.24 to 1.4.24 ...	8.4.24.
<i>Scientist</i> ...	Hansen, W. A. ...	D. G. Russell ...	„	„ „ „	„ 28.12.23 to 22.2.24...	5.3.24.
<i>Scindia</i> ...	Matthews, W. ...	H. D. Campsie ...	„	Anchor ...	„ 19.10.23 to 1.1.24 ...	7.1.24.
<i>Scotia</i> ...	Telfer ...	O. W. L. Jones ...	C.C.	L.M. & S. Rly. ...	„ 31.10.23 to 24.1.24...	28.1.24.
<i>Scottish Bard</i> ...	McDonnell, S. ...	W. H. Campbell ...	No.	Tankers, Ltd. ...	Telegraphic Report 24.12.23 ...	24.12.23.
<i>Scottish Borderer</i> ...	Thompson, F. ...	G. F. Widger ...	„	„ „ „	Form 911 25.8.23 to 14.9.23 ...	1.10.23.
<i>Seythia</i> ...	Prothero, W. ...	T. Parry, D. S. Kite, R. Allen.	W.T.	Cunard ...	Form 911 29.2.24 to 22.3.24 ...	8.4.24.
<i>Sheaf Mount</i> ...	Groves, C. V. ...	J. L. Forster ...	No.	Souter, W. A. ...	W.T. Reg. 20.1.24 to 22.1.24 ...	18.2.24.
<i>Sheaf Spear</i> ...	Whitfield, G. A., O.B.E.	A. E. Harvey, W. H. Grise-wood.	M.L.	„ „ „	Form 911 30.1.24 to 8.2.24 ...	16.2.24.
<i>Sicilia</i> ...	Miller, E. C., R.D., Commr., R.N.R.	H. Sanders ...	No.	P. & O. ...	Met. Log. 4.12.23 to 31.12.23...	21.1.24.
<i>Socrates</i> ...	James, F. R. ...	E. R. Hartley ...	„	„ „ „	„ 21.8.23 to 27.1.24 ...	15.3.24.
<i>Soekaboemi</i> ...	Ruhaak, G. H. ...	W. N. de Wijn ...	„	Lampert & Holt ...	Form 911 23.12.23 to 5.1.24 ...	25.2.24.
<i>Somerset</i> ...	Barnett, H. ...	C. H. Landfield ...	M.L.	Rotterdam Lloyd ...	„ 19.1.24 to 6.2.24 ...	25.2.24.
<i>Somme</i> ...	Miles, F. R., Commr., R.N.R.	B. K. Berry, C. C. Prosser, D. P. Larham.	M.L.	New Zealand S.S. Co. ...	„ 28.12.23 to 15.1.24...	8.2.24.
<i>Songster</i> ...	Thompson, W. ...	W. F. O'Neill ...	M.L.	R.M.S.P. Co. ...	Met. Log. 17.11.23 to 1.1.24 ...	4.1.24.
<i>Spectator</i> ...	Owen, W. F. ...	L. Seddon ...	No.	Harrison ...	„ 24.4.23 to 28.11.23...	17.12.23.
<i>Spero</i> ...	French, H. E. ...	E. A. Gould, G. Mussared ...	M.L.	„ „ „	„ 13.10.23 to 5.11.23...	19.2.24.
<i>Stephan, C.S.</i> ...	Carlton, G. F., O.B.E., Commr., R.N.R.	L. J. Hegarty, J. Matthews, F. B. Bolingbroke.	M.L.	Ellerman Wilson ...	Form 911 25.10.23 to 14.11.23 ...	5.12.23.
<i>Surrey</i> ...	Kettlewell, C. R. ...	G. W. Allard, S. E. Hobbin, D. McIntyre.	M.L.	Telegraph Construction & Maintenance.	Met. Log. 8.6.23 to 17.2.24 ...	13.3.24.
<i>Sussex</i> ...	Upton, E. C. S. ...	W. A. Ewington ...	No.	Federal ...	„ 5.5.23 to 3.10.23 ...	10.10.23.
<i>St. Albans</i> ...	Blair, D., O.B.E., R.D., Commr., R.N.R.	„ „ „	M.L.	„ „ „	„ 27.5.23 to 3.11.23 ...	7.11.23.
<i>St. George</i> ...	Bearpark, E. W. ...	W. P. Baker ...	No.	„ „ „	Form 911 11.2.24 to 10.3.24 ...	14.4.24.
<i>St. Patrick</i> ...	Charman, A. J. ...	P. S. Horwood ...	M.L.	Eastern and Australian Scientific Expeditionary Research Assocn.	„ „ „	„
<i>Taiwan</i> ...	Hamilton, H. E. ...	R. D. Thomas, W. Bailey, D. D. Tyer.	M.L.	„ „ „	Form 911 19.2.24 to 8.3.24 ...	24.3.24.
<i>Talthybius</i> ...	Beswick, W. ...	D. Rees ...	No.	„ „ „	„ 19.1.24 to 25.2.24 ...	7.4.24.
<i>Tambora</i> ...	Huisman, N. ...	H. Van Manen ...	„	Shaw, Savill & Albion	Met. Log. 30.4.23 to 5.10.23 ...	20.11.23.
<i>Tetresias</i> ...	Reynard, J. G. ...	W. F. Dark ...	„	Yull & Co. ...	„ „ „	„
<i>Teucer</i> ...	Hannay, T. W. ...	J. C. Norton ...	„	„ „ „	Form 911 4.3.24 to 11.4.24 ...	14.4.24.
<i>Themistocles</i> ...	Jermyn, W. M. ...	R. H. Harrison ...	„	„ „ „	„ 23.11.23 to 12.1.24...	20.1.24.
<i>Theseus</i> ...	Williams, D. T. ...	W. Cowperthwaite ...	„	„ „ „	„ 23.7.23 to 2.8.23 ...	14.8.23.
					„ 20.9.23 to 18.1.24 ...	4.2.24.
					„ 8.11.23 to 5.3.24 ...	11.3.24.
					„ 1.12.23 to 8.2.24 ...	15.2.24.

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log. Register, or Report Contributed.	Date Received.
<i>Titan</i> ...	Ireland, T. R. ...	J. P. Williams, A. C. H. Jones, D. J. Davies, C. Taylor.	M.L.	A. Holt ...	Met. Log. 2.11.23 to 8.3.24 ...	12.3.24.
<i>Tottori Maru</i> ...	Mataukura, B. ...	K. H. Kubota ...	No.	Nippon Yusen Kaisha	Form 911 7.2.24 to 14.3.24 ...	17.3.24.
<i>Transmitter, C.S.</i> ...	Jones, L. T., M.B.E.	S. P. Sheldon ...	"	Eastern Tel. Co. ...	" 7.12.23 to 2.2.24 ...	18.2.24.
<i>Traveller</i> ...	Jones, E. W. ...	" ...	"	Harrison ...	" 4.8.23 to 8.10.23 ...	18.10.23.
<i>Tredenham</i> ...	Evans, J. O. ...	C. Warren ...	"	Hain S.S. Co. ...	" 10.2.24 to 7.3.24 ...	1.4.24.
<i>Trematon</i> ...	Hicks, F. H. ...	J. Christopher, D. Thomas, F. J. Webb.	M.L.	"	Met. Log. 28.8.22 to 30.3.23 ...	18.4.23.
<i>Tuscania</i> ...	Bone, D. W. ...	J. McGill Brown ...	No.	Anchor ...	Form 911 16.2.24 to 9.3.24 ...	24.3.24.
<i>Tuscanstar</i> ...	Thomas, R. J. ...	W. H. Webster ...	"	Blue Star ...	" 29.5.23 to 3.7.23 ...	11.7.23.
<i>Tyndareus</i> ...	Adcock, F. ...	F. Robinson ...	"	A. Holt ...	" 14.12.23 to 21.2.24 ...	17.3.24.
<i>Ulysses</i> ...	Hazeland, J. H. D.	W. J. Peard ...	No.	A. Holt ...	Form 911 2.11.23 to 17.11.23 ...	11.12.23.
<i>Valacia</i> ...	Doyle, M. ...	J. W. Caunce ...	"	Cunard ...	" 17.2.24 to 28.2.24 ...	18.3.24.
<i>Valdura</i> ...	Mitchell, A. ...	J. Campbell, J. Anderson, A. M. S. Well.	M.L.	Gow Harrison ...	Met. Log. 19.4.23 to 20.10.23 ...	20.12.23.
<i>Valemore</i> ...	Griffiths, J. ...	H. Miller ...	No.	Furness Withy ...	Form 911 22.11.23 to 20.12.23 ...	30.12.23.
<i>Vardulia</i> ...	Townley, J. C. ...	W. L. Hughes ...	"	Cunard ...	" 19.2.24 to 23.3.24 ...	2.4.24.
<i>Vasconia</i> ...	Inch, F. ...	W. P. Armour ...	"	" ...	" 29.1.24 to 27.2.24 ...	3.3.24.
<i>Vellavia</i> ...	Birnie H. C., D.S.O., R.D., Commr., R.N.R.	" ...	"	" ...	" 4.11.23 to 16.11.23 ...	24.11.23.
<i>Ventura de Larrinaga</i> ...	Keay, W. S. ...	H. J. Kay ...	"	Larrinaga ...	" 2.3.24 to 4.4.24 ...	10.4.24.
<i>Verbania</i> ...	Hatcher, W. H., R.D., Commr., R.N.R.	A. Bridgwater ...	"	Cunard ...	" 4.2.24 to 10.3.24 ...	12.3.2.
<i>Verentia</i> ...	Stafford, W., D.S.C., R.D., Lt.-Commr., R.N.R.	D. E. Sibson ...	"	" ...	" 8.2.24 to 14.3.24 ...	18.3.24.
<i>Victoria</i> ...	Fisher, F. T. ...	J. Males, E. Peacock, J. Archer	M.L.	China-Australia	Met. Log. 29.3.23 to 29.8.23 ...	6.10.23.
<i>Vittoria</i> ...	Jackson, G. W. ...	F. Galbraith ...	No.	Vittoria S.S. Co. ...	Form 911 10.5.23 to 20.6.23 ...	26.6.23.
<i>Waihemu</i> ...	Showman, A. C. ...	G. Atwood ...	No.	Union S.S. Co., N.Z....	Form 911 23.2.23 to 16.5.23 ...	20.6.23.
<i>Waiotapu</i> ...	Ruxton, G. M. ...	F. A. Wilson ...	"	Canadian-Australasian	" 8.5.23 to 3.6.23 ...	26.6.23.
<i>Walmer Castle</i> ...	Chave, Sir B., K.B.E.	C. Aylen ...	"	Union Castle ...	" 8.2.24 to 30.3.24 ...	4.4.24.
<i>Wangaratta</i> ...	O'Connor, E. W., D.S.C.	T. W. Wordingham, M. Chant, W. Hunt.	M.L.	British India ...	Met. Log. 1.6.23 to 10.11.23 ...	1.12.23.
<i>Warfela</i> ...	Steel, R. ...	W. A. Hughes ...	No.	" ...	Form 911 1.3.24 to 25.3.24 ...	8.4.24.
<i>War Nizam</i> ...	Putt, R. O. ...	E. R. Clark ...	"	British Tankers ...	" 31.1.24 to 23.3.24 ...	26.3.24.
<i>Welshman</i> ...	Rollerson, W. ...	J. F. Spears ...	"	White Star-Dominion	" 17.2.24 to 20.3.24 ...	26.3.24.
<i>Winifredian</i> ...	Harrocks, W. ...	W. R. C. Baker ...	"	Leyland ...	" 5.1.24 to 4.2.24 ...	11.2.24.
<i>Woodarra</i> ...	Reilly, J. V. ...	L. D. Graham, A. V. Fisher, L. C. Comber, J. Wallace.	M.L.	British India ...	Met. Log. 7.10.23 to 9.3.24 ...	26.3.24.
<i>Yorkshire</i> ...	Millson, G. C. ...	E. Jones ...	No.	Bibby ...	Form 911 19.1.24 to 27.3.24 ...	1.4.24.
<i>Zeeland</i> ...	Thomas, A. J. ...	W. Jackman ... Unless otherwise stated,	No. vessels on t	Red Star ... the above list are S.S.	Form 911 31.1.24 to 24.2.24 ...	26.2.24.
<i>Conway, H.M.S.</i>	Broadbent, H. W., R.D. Capt., R.N.R.	The Senior Cadets...	Cadets' M.L.	...	Cadets' Met. Log. 20.1.24 to 29.3.24 ...	5.4.24.
<i>Pangbourne Nautical College.</i>	Tracy, A. F. G., Commr., R.N.	" " ...	"	...	Cadets' Met. Log. 21.1.24 to 5.4.24 ...	10.4.24.
<i>Worcester, H.M.S.</i>	Sayer, M. B., O.B.E., R.D., Capt., R.N.R.	" " ...	"	...	Cadets' Met. Log. 25.1.24 to 12.4.24 ...	17.4.24.
<i>Abaco</i> ...	...	The Keepers ...	Lighthouse Register.	...	Lighthouse Register 1.7.23 to 1.1.24 ...	3.3.24.
<i>Cay Lobos</i> ...	...	" ...	"	...	Lighthouse Register 1.7.23 to 31.12.23 ...	3.3.24.
<i>Double Headed Shot</i> ...	...	" ...	"	...	Lighthouse Register 1.7.23 to 31.12.23 ...	3.3.24.
<i>Inagua</i> ...	...	" ...	"	...	Lighthouse Register 1.7.23 to 31.12.23 ...	3.3.24.
<i>Sombrero</i> ...	...	" ...	"	...	Lighthouse Register 1.7.23 to 31.12.23 ...	25.2.24.
<i>Watling Island</i> ...	...	" ...	"	...	Lighthouse Register 1.8.23 to 31.12.23 ...	3.3.24.
<i>Cape Pembroke (Falkland Is.).</i>	...	" ...	"	...	Lighthouse Register 1.7.23 to 31.12.23 ...	3.3.24.

LIST OF SHIPS CO-OPERATING THROUGH THE METEOROLOGICAL OFFICE WITH THE  
MINISTRY OF AGRICULTURE AND FISHERIES (FISHERIES LABORATORY, LOWESTOFT)  
IN THE COLLECTION OF WATER SAMPLES, ETC.

Name of Vessel.	Captain.	Observing Officer.	Line.	Last Case of Water Samples, Reports, etc., Received.	Date Received.
<i>Alban</i> ...	Whayman, W. R. ...	R. Griffiths ...	Booth ...	Water Samples ...	5.12.23.
<i>Hildebrand</i> ...	Maddrell ...	Mr. Allan ...	" ...	" ...	9.1.24.
<i>Patia</i> ...	Bostock, R. J. ...	S. A. Sapsworth ...	Elder & Fyffes ...	" ...	7.3.24.
<i>Portuguero</i> ...	Martin ...	H. H. Dunning ...	" " ...	" ...	29.3.24.