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H.R.H. THE PRINCE OF WALES.

Master of the Merchant Navy and Fishing Fleets.

Admiralty 14th February, 1928.

His Majesty The KING has for some time been considering what steps can be taken to bring the British Merchant Navy and Fishing Fleets into line with the other great Services of the Empire, by having as their titular Head some Member of the Royal Family.

With this end in view, and in recognition of the splendid service which the Merchant Navy and Fishing Fleets have rendered to the Empire for many centuries, both in peace and in war, His Majesty, after taking ministerial advice, has asked H.R.H. THE PRINCE OF WALES to assume the title of “Master of the Merchant Navy and Fishing Fleets.”

(Extract from the “London Gazette.”)

MARINE METEOROLOGY, WIDER APPLICATION AT SEA.

EVER since Marine Meteorology was organized Internationally the return of observations made in ships at sea to the Meteorological Offices, Weather Bureaux, and Observatories of the Governments of Maritime Countries has proceeded. A vast amount of data has been accumulated.

In the British Marine Division alone the number of Meteorological Logs, with observations recorded every four hours, collected since 1854 exceed 14,000. In these the observations were made with tested instruments lent for the purpose. No less than 45,000 Ships' Meteorological Reports, a form ruled for two sets of observations per day made with the ships' own instruments have been received since 1901. Much of this data remains unused.

The manner of extracting and computing data, the publication of information and charts, have been dealt with from time to time in the pages of this Journal. I mention these facts to show that there is a limit to put upon the collection of data from the sea and if that limit is exceeded harm is done to the work, for when Marine Observers see insufficient return for their work in the form of information for themselves, shipping and seamen in general, and in the improved knowledge of mankind, they not unnaturally slacken their efforts.

Hence the number of regular observing ships in our list is limited to 500 so that only sufficient routine observations necessary for present and future research work shall be collected. The regular observing Fleet and the Corps of Voluntary Marine Observers provide the routine observations and perform highly skilled work which is for the good of all.

Let us see how shipping and seamen may benefit more generally from the work that has been and is being done.

There are many who cannot devote the time required, if they would, to do the work of a member of our regular corps; there are services in which the conditions do not lend themselves readily to this voluntary service, and yet every Master and Mate and Skipper and 2nd hand in every vessel afloat can not only benefit from this work but take part in it. The work does not only consist of taking, writing down and sending in observations of wind, weather, currents and ice to the Meteorological Office; that is a necessary and important part of it, but the most important of all is the intelligent consideration and use at the time, of observations and information received by means of wireless. Many examples have been published in this Journal proving how navigation is being rendered safer and more efficient through this agency, and Meteorologists now, do more generally recognise how indispensable the voluntary work of seamen is to them to unravel the mysteries of nature's laws in the atmosphere.

Suggestions.

It has recently been asked by officers not of the regular Corps of Voluntary Marine Observers—this corps consists of those Commanders and Officers whose names appear in the list published each month with this Journal—how can we benefit our ships and how can we help along the good work? Different ships different long splices, and hard and fast rules are not desirable, but here are answers which Marine Observers and Agents can give in reply to such questions.

Careful Observation and Record.

In the first place you cannot be too careful in observing correctly the state of the weather and in entering it at the end of each watch in the ship's log. Your observations may not be required for research work, as are those returned by regular Voluntary Marine Observers, but you never know. It is in the general interests of the Merchant Navy and all it serves that the ship's log should be of absolute authenticity, and accurate observation is the only sound foundation to the whole of this work. In "The Marine Observer's Handbook" will be found tables and instructions for correcting the barometer also the Beaufort Scale of wind force, Beaufort weather notation, and sea, swell and visibility scales, all Internationalized, which if used will save much space and writing.

The careful calculation and record of set and drift due to current between noon and noon and between twilight stellar fixes is an inestimably good habit. The set and drift should be logged whenever observed and D.R. positions are considered reliable. The winds, weather and currents logged in the ship's log are always valuable records for future reference when deciding upon the speed to set and the route to take at the commencement of a passage.

Remarks and reports upon special phenomena observed, abnormal currents experienced and severe cyclones encountered are most welcome at the Meteorological Office and Form 905 may be obtained by any ship on application to the Agents; it is specially designed for copying the observations of ships, which have encountered cyclones, from the ship's log. Such remarks and accounts of interesting experiences are published in "The Marine Observer's Log" in THE MARINE OBSERVER, a part of this Journal used to publish useful and interesting information received direct from any ship at sea.

Wireless and Weather an Aid to Navigation.

Selected ships on our list are invited to make routine reports daily of observations which synchronise, addressed to "all ships"; these, and the coast station observations given in "Weather Shipping" Bulletins provide the data with which the skilful seaman can make his own weather chart which enables him, with a knowledge of the Law of Storms, to anticipate or forecast coming changes in the weather, and the set and drift of current which he may experience.

The number of "selected ships" making routine weather reports to "all ships" is steadily growing and their distribution is steadily being improved.

Any ship observing signs of the development of a hurricane or very bad weather should make an urgent report to all ships and to the appropriate shore station at any time, but it is best for ships which are not "selected ships" to refrain from making routine reports. "Selected ships" have the right kind of barometers, have full information of what is required and work a definite system, so by relying upon them for routine reports to all ships we shall be steadily building up a well organised service based upon scientific principles.

In "Wireless and Weather an Aid to Navigation," navigators may find guidance in the application of weather intelligence at sea.

There have been a few cases where the Commanders and Officers of Regular Observing Ships having made a weather chart which showed them that heavy weather was coming, have broadcast Gale Warnings to shipping.

In such cases a message by wireless should be made only with the very fullest sense of responsibility. Throughout the development of Wireless and Weather an aid to Navigation we have not suggested such a procedure. We have advocated the reporting of observed facts at positions given, leaving each ship to form her own conclusions from these reports.

The broadcasting of Forecasts and Gale Hurricane Warnings is best left to the great establishments ashore where highly skilled Meteorologists have every facility and are watching the reported signs and developments night and day. If a warning is made by a ship it should only be after the Captain has satisfied himself that it is absolutely warranted and perfectly clear.

"Selected ships" by making reports to "all ships" are providing most valuable information and the officers of ships generally, fitted with wireless telegraphy and able to receive the data, who make a simple weather chart once a day and form their own conclusions as to coming weather are doing a splendid work. They are not only applying Meteorology direct to the problems which confront them daily in the navigation of their ships, but they are adding to human knowledge of the atmosphere and the sea by what they find out themselves.

Weather Bulletins, Forecasts and Gale and Hurricane Warnings.

Agents, Nautical Instructors, and Marine Observers can perform a great service to their brother seamen by bringing these to their

notice and explaining them and the Law of Storms. The smaller the vessel and the humbler her crew, the more need have they for weather intelligence.

The more a seaman knows of the Law of Storms the more useful will these forecasts for sea districts and warnings of gales or hurricanes be to him.

The man who receives a forecast of weather at sea by wireless who has not mastered the rudiments of the Law of Storms will probably ignore it, but the man who understands these will give due consideration to the information he receives. Thus, maybe, there is the master of "a little coaster" who has himself already seen the signs of a coming gale, and who has shaped a course for shelter. Upon receipt by word of mouth of a wireless telephony gale warning, giving the estimated position of the depression and its movement with the shifts of wind to be expected, in coming to an anchor he will choose a berth where he will have a weather shore when the wind shifts, while a man who has not the knowledge might anchor in a position which would give him a lee shore when the shift of wind came. Or again a drifter skipper at his nets who knows the Law of Storms, receiving a forecast indicating that the wind will increase and veer or back would probably start hauling at the right end of his nets, while the skipper who has not such knowledge would probably ignore the information and perhaps repent the loss of his gear.

The Salvage Officer, the Coxswain of the Life Boat, and the Coast-Guard all have work to do in saving life and property at sea in which a knowledge of the Law of Storms and Weather Signals help them.

The Harbour Master and Marine Superintendent find weather intelligence useful in the port management of shipping and so the more that is efficiently done by all concerned to intercept, pass on, and post "Weather Shipping" Bulletins ashore as well as afloat the better. Much is already being done by voluntary co-operation and without expense to the public funds at some ports and let us hope that others will follow.

The British "Weather Shipping" Bulletin was established after a great volume of nautical opinion had been obtained; it is suitable for coasts and narrow waters in all latitudes with slight modification and officers of many foreign going ships have asked for uniformity in Weather Signals.

Conclusion.

After 74 years' organised work of the British Corps of Marine Observers and the Marine Division and some 48 years of issuing forecasts by the British Forecast Service, it is time that there should be wider application of the work at sea.

Regular returns of routine observations from 500 ships in all oceans are as much as we can handle efficiently at present. The mechanical system of extraction, computation and printing of data makes the International exchange of observations possible without a great deal of clerical work ashore, so that ships need not keep a Meteorological Log for more than one Service.

Results may now be obtained by all at sea who will work for them with the information provided.

(1) By selected ships who provide the observations along the trade routes by wireless telegraphy to all ships and the shore.

(2) By Meteorological Offices who provide observations, forecasts and warnings for the coasts.

(3) By all who navigate ships by following the guidance given for the use of this information in the literature published for the purpose which has already been named above and may be obtained from H.M. Stationery Office through any bookseller.

As we said in a notice published with this Journal in August, 1925, "advance can only be truly attained from within"; the Corps of Marine Observers have made great advances in post-war days, now let us try to advance the wider application of the work at sea by the united efforts of seamen.

There is no selfish motive, the watchword is voluntary service for the benefit of all.

As a profession we stand to gain much and by improving the work in the general interests of seamen we shall be doing a great service to Meteorologists, Airmen, Agriculturists and all who require knowledge of weather, climate, and currents, for as a Nautical Officer of high standing in one of the Dominions said the other day "professional pride coupled with competition always leads to efficiency."

The Nautical Officers and Agents of the Meteorological Office are the consultants, the Corps of Voluntary Marine Observers are the Specialists, the remainder of the navigators of the Merchant Navy and Fishing Fleets can if they will as practitioners gain much from this service.

MARINE SUPERINTENDENT.

THE MARINE OBSERVER'S LOG.

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

Responsibility for statements rests with the Contributor.

METEORS.

South Atlantic.

THE following is an extract from the Meteorological Log of S.S. *Carnarvon Castle*, Commander J. W. HAGUE, R.N.R., Cape Town to Durban. Observer, Mr. C. G. GORRINGE, 3rd Officer:—

"April 2nd, 1927, at 10.0 p.m. G.M.T. in Latitude $27^{\circ} 20' S$. Longitude $12^{\circ} 05' E$., a very bright meteor appeared half-way between *Arcturus* and *Dubhe* bearing 022° and at an altitude of 25° . The duration of flight was 15 seconds when it disappeared below the horizon, and the magnitude was many times greater than any planet. The tail of the meteor was short and thick and the light caused by it was enough to throw a faint shadow, the sky was cloudless. At first the colour of the meteor was white changing to green then orange. After disappearing below the horizon the whole sky from zenith to horizon and including an arc of the horizon of 120° , suddenly became flame colour which lasted about 4 seconds, and then slowly died away."

The following remarks from the Meteorological Report of S.S. *Umvolosi*, Captain E. W. BARNES, London to Cape Town, observer, Mr. R. N. RYDE, 3rd Officer, when N. $28^{\circ} W$. 320 miles distant from *Carnarvon Castle*, are of great interest:—

"Vivid Light in the Sky."

"2nd April, 1927, 10.24 p.m. A.T.S., (G.M.T. 2154). Latitude, D.R., $22^{\circ} 39' S$., Longitude, D.R., $9^{\circ} 12' E$.

"Suddenly appearing from NE an intensely bright light illuminated the whole sky. The duration of the light was about 5 seconds. The three different phases were as follows:—

"First Second.—Appearing as pale chocolate colour and spreading slowly upwards and outwards then,

"Second, Third, Fourth Seconds.—Bursting into a white sheet of light over the whole sky giving daylight and making the St-Cu clouds appear white and finally in its

"Fifth Second.—Turning into a pale green colour, dying down and disappearing at its point of origin.

"There was no lightning or any other disturbance previous to or following the above phenomenon.

"Weather at 8 p.m., c., St-Cu, amount 8. Wind SE by S, force 3."

NOTE.—The chief point of interest in *Carnarvon Castle's* account of a fine fireball is the illumination of a large part of the sky after the meteor had disappeared below the horizon. There is generally a point near the end of the flight of a fireball when an outburst of light takes place, and this probably occurred just out of sight of the observer, giving light enough to illuminate the sky. Such fireball flashes may be visible from great distances owing to atmospheric refraction and dispersion and may even be seen when the meteor itself is entirely below the horizon, and so invisible.

Gulf of Mexico.

THE following is an extract from the Meteorological Report of S.S. *Reventazon*, Captain D. A. JACK, Puerto Castilla (Honduras) to Liverpool. Observer, Mr. B. R. WICKHAM TARR, 4th Officer:—

"April 30th, 1927, 5.40 a.m. Latitude 19° N. Longitude 85° W (approx.) observed exceptionally bright meteorite travelling from altitude of about 40° N to the horizon at NE by N; although daylight it was brilliant enough to cast shadows on the vessel. It was of a brilliant white and left a luminous tail visible some 5 or 6 seconds after its passage. It appeared to fall between the ship and the horizon. Wireless operators reported statics unusually severe."

NOTE.—Sunrise, apparent time 5.40 a.m. From time to time reports are received of meteors bright enough to be conspicuous in daylight, but their occurrence is very infrequent. It is probable that in most cases they are true meteorites, masses of stone or iron of sufficient size for a portion to fall on to the land or into the sea. The fact that the object seen by S.S. *Reventazon* was sufficiently brilliant to throw shadows in daylight renders the observation of particular interest.

Indian Ocean.

THE following is an extract from the Meteorological Log of S.S. *Maihar*, Captain J. P. ROWE, Fremantle to Port Soudan. Observer, Mr. C. CADWALLADER:—

"Friday, April 8th, 0.23 a.m. Ship's time (G.M.T. 1956) Latitude 0° 04' S, Longitude 69° 44' E, observed a meteor of exceptional luminosity which appeared bearing about West (true), and travelled to the Eastward at a very moderate speed. When first seen its altitude was a little less than 20° but as the meteor proceeded east its altitude increased, the maximum altitude being about 20°, whence it slowly descended to about the same altitude as that at which it appeared. When it disappeared from view it bore about N.30° W. (true). The meteor was as bright or perhaps a little brighter than the planet *Venus*, was visible for about 8 seconds, and left a bright, well-defined trail. Several small meteors were seen later in the same locality."

LUNAR HALO AND CORONA.

North Atlantic.

THE following is an extract from the Meteorological Report of S.S. *Garth Castle*, Captain C. R. JACKSON, London to Cape Town. Observer, Mr. W. S. J. ALDOUS, 3rd Officer:—

"April 18th, 1927, 11.45 p.m., A.T.S., 0.50 a.m. G.M.T., Latitude 3° 05' N., Longitude 16° 10' W. Wind W.N.W. force 2, unsteady in force and direction, barometer 29.92 in., air temperature 82°, sea temperature 81°, moon's altitude 59° 07' (lower limb). Radius of halo from moon's lower limb to inside edge of ring 22° 50'.

"At 8.0 p.m.—Sky was covered with Ci-St, and A-St clouds in zenith, and heavy Cu/Cu-Nb clouds on eastern horizon, from which proceeded thunder and lightning. Air damp without rain falling. Moon showing indistinctly.

"10.0 p.m.—Ci-St and A-St, thinning out considerably, and moon showing clear with well defined limbs. Light wisps of Ci. clouds moving from S.S.E./1.

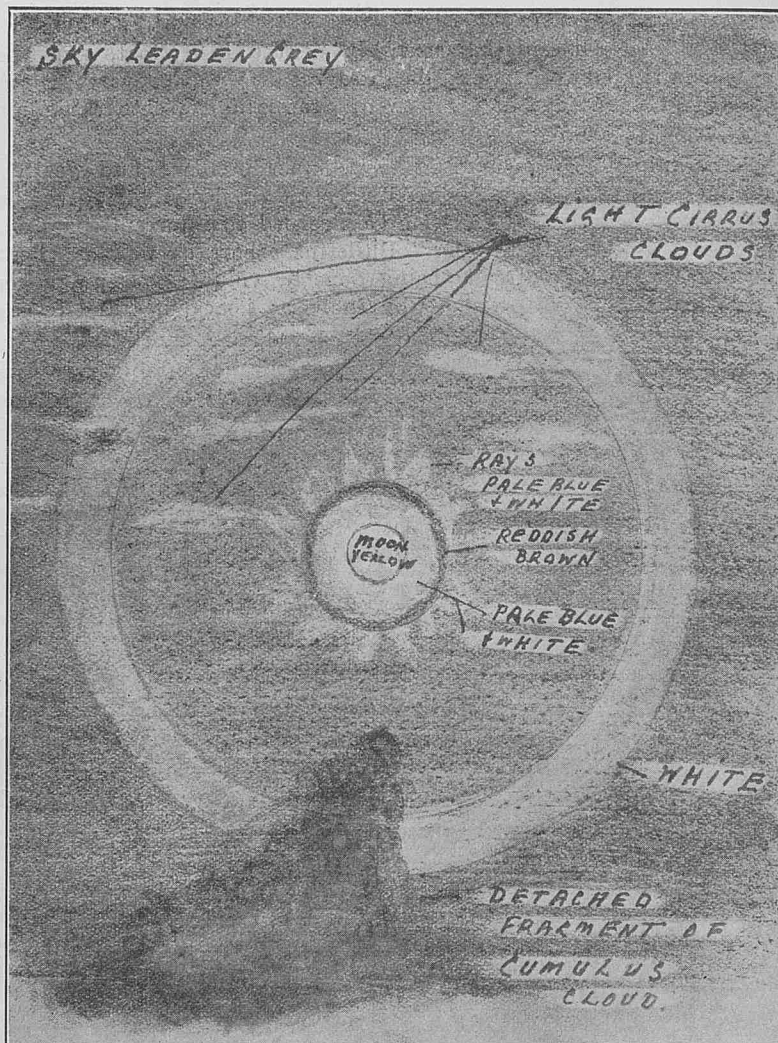
"11.0 p.m.—Halo commenced to form, top half of ring first, followed by the lower half, and ring was completely developed at

11.40 p.m., though faint in colour. Ci. clouds increasing and constantly passing over the face of the moon and top half of ring.

"11.45 p.m.—Corona formed, with the outer edge of ring of reddish-brown colour, showing clear and well defined, gradually merging into pale blue and white nearer the moon. Rays of the same colour as the inner field, extended a short distance outside the reddish-brown ring. Cirrus clouds of very light structure were at this time passing across the moon and the ring of the halo, and the formation of the corona was much more brilliant than that of the halo.

"11.55 p.m.—The corona had dispersed, coinciding with the last of the light Ci. clouds, which had given place to Cu/St-Cu, coming up from the same direction SSE/1. These clouds did not pass across the moon, but only between the moon and the lower half of the halo ring, whereas the Ci. clouds before-mentioned confined their passage across the top half of the ring only.

"The accompanying sketch was made to illustrate the conditions at 11.50 p.m., when the corona had fully developed, just before the Cumulus clouds came along, detached portion of which is shown crossing the lower half of the halo. By midnight the Halo had become very indistinct and was constantly hidden by the passage of Cu. clouds. At 12.20 a.m. the ring had disappeared and the sky had become visible in patches, but only in the zenith, and the clouds eventually developed into St-Cu formation."



ABNORMAL REFRACTION.

Approaching Cape Town.

THE following is an extract from the Meteorological Log of S.S. *Balranald*, Captain W. P. TOWNSHEND, R.D., R.N.R., Durban to Cape Town. Observer, Mr. F. WARD:—

"April 10th, 1927, Latitude 34° 40' S., Longitude 20° 40' E. During the second dog-watch the standard time of theoretical sunset was

1805. At 1810 the sun was observed to sink below the horizon which was blurred by falling rain. At 1817 a large red sun was observed of which the lower limb was about $1\frac{1}{2}^{\circ}$ above the horizon. This refracted sun finally set at 1821.

"The sky was obscured by Cu-Nb cloud; a heavy rain squall accompanied by thunder and lightning having passed across that segment of the horizon about 15 minutes previously. The lightning was very vivid and as many as three flashes were in sight simultaneously about 15° apart. This squall rose in the SW crossed ahead via west, north and east and finished about ESE."

SOUTHERN LIGHTS.

Australian Bight.

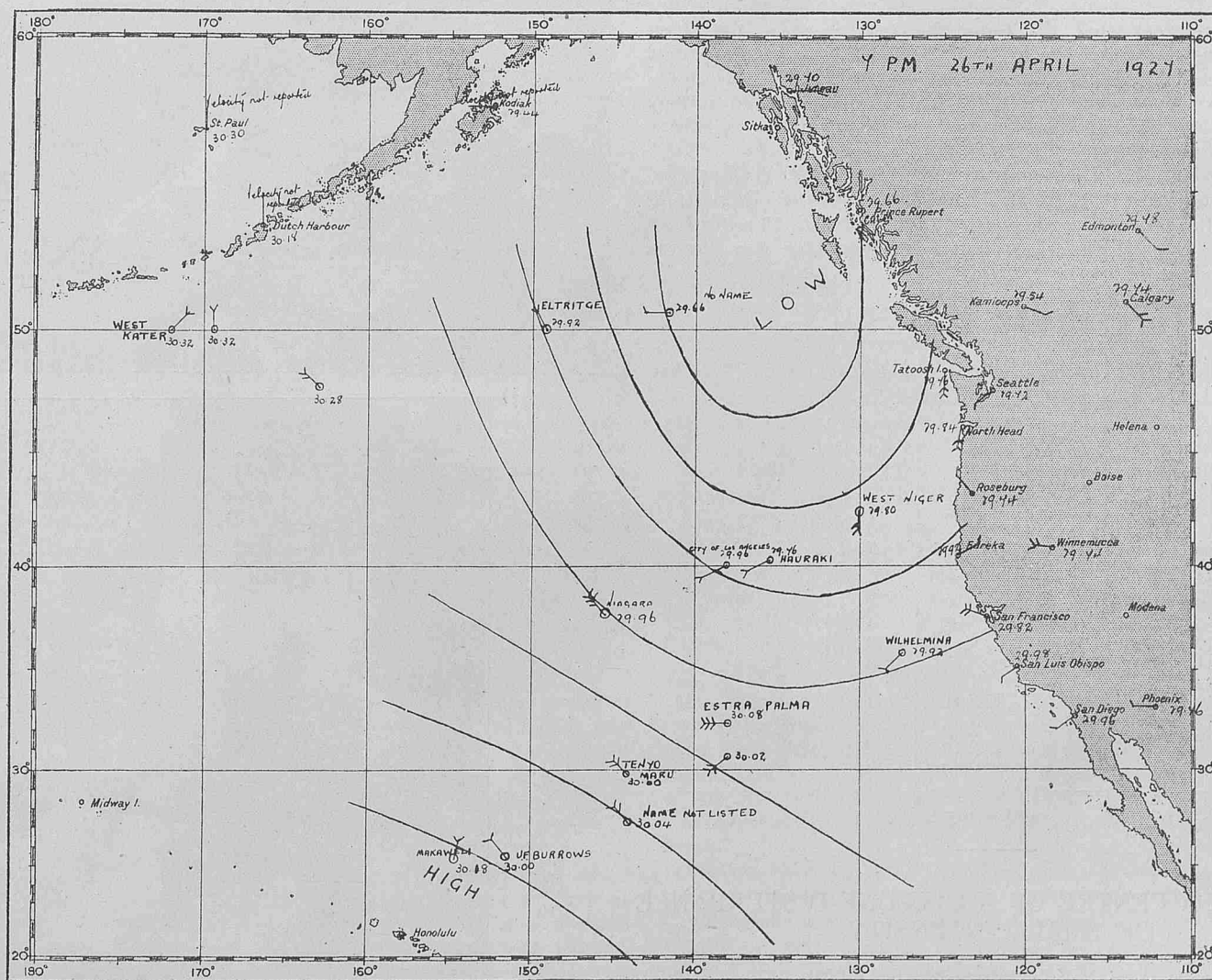
The following is an extract from the Meteorological Report of S.S. *Maloja*, Captain S. C. WARNER, Fremantle to Adelaide. Observer, Mr. C. S. COOKE, 3rd Officer:—

"April 14th, 1927, 7.45 p.m., A.T.S. (11.15 G.M.T.), Latitude $35^{\circ} 24'$ S., Longitude $122^{\circ} 38'$ E., barometer 30.237 in., air temperature $62\frac{1}{2}^{\circ}$ F. Wind N.E., force 5/6. Sea N.E., disturbance 5, swell north-easterly rather rough. Clouds Ci/Ci-St. Observed a red—almost crimson—glare in the sky to the S.W. between the altitudes of 10° – 40° . No form or definite outline distinguishable and no rays visible. This light gradually spread right across from S.W.-S.E., keeping the same altitude nearly. As it travelled, or appeared to travel, east, it gradually faded away in the S.W. quadrant and increased in brilliance in the S.E. finally disappearing in the latter quadrant at 8.15 p.m.; when clouds were passing through this (a very few Fr-Cu, visible to southward) they assumed an almost phosphorescent appearance. This light appears to have been caused by diffused auroral light, but the only colour noticed was the red glow the whole time. Ship's course at time, N. 89° E., true. Speed 16 knots."

WEATHER CHART MADE AT SEA.

In the Eastern North Pacific.

Weather Chart made on board R.M.S. *Niagara*, Captain A. C. SHOWMAN, Honolulu to Vancouver, by Mr. J. HOOD, 2nd Officer.



This Chart, as will be seen, was drawn under great difficulties, for examination of the barometer readings of many of the ships indicated on the chart inclines to show that they were not reduced to one datum and so the isobars cannot give a true indication of the pressure distribution. It reflects great credit to *Niagara* that she was able to make this chart at all and so obtain some idea of the

pressure distribution. The advantages to be gained by accurate observation and synchronization are illustrated in an article which will be found on page 67 of this Number and suggestions for the practice and development of Wireless Weather Telegraphy at sea may be found in "Wireless and Weather an Aid to Navigation," which also explains the drawing of Weather Charts.

ACCOUNT OF SQUALL.
Ladrone Islands, China Sea.

THE following is an extract from the Meteorological Log of H.M.S. *Iroquois*, Commander A. L. JACKSON, R.N. Observer, Lieutenant H. L. JENKINS, R.N. :—

“ H.M.S. *Iroquois* was anchored outside Pumice Stone Bay, Great Ladrone Island. During 20th April wind had been light from E.S.E. and S.E., weather overcast with fog and mist. Lightning began at 2000 and gradually became more vivid and incessant. At 2200 rain started and wind freshened quickly backing to N.N.W. At about 2300 it was estimated to be blowing force 9 and the ship began to drag her anchor. (Ship was anchored in 10 fms; 3 shackles of cable, mud bottom.) By 2350 ship had dragged about 3 cables to the southward. Anchor was weighed and berth shifted. The wind eased soon after midnight, veering and rain stopped at 0100. The chief points noted about the squall were as follows:—

- (1) The suddenness with which the wind rose and fell. It appears that a small cyclonic depression passed over the ship in an easterly direction, with its centre to the southward. In this connection the Meteorological record of Gap Rock might be interesting.
- (2) The localised nature of the storm. Barograph traces taken by ships in Hong Kong Harbour show no fluctuation, though very heavy rain was experienced.
- (3) Torrential rain and incessant lightning. Very little thunder.

“ It is pointed out that the Great Ladrone is some 1,400 feet high. The direction and force of the wind may have been modified by the contour of the land.

“ The phenomena were identical with those experienced during tornados, which are common in the neighbourhood of Sierra Leone in the early summer.”

By the courtesy of Lieutenant-Commander O. C. G. LEVESON-GOWER, R.N., our Agent at Hong Kong, the following observations were obtained for Gap Rock, which is situated S. 56° E. 13 miles from Great Ladrone Island, and show that a shallow Low was passing east at the time:—

Gap Rock (20–21 April, 1927).

Date.	Hours.	Barometer.	Wind.	Force.	Sea.	Weather.
20	2	29.85	E.N.E.	3	4	of
	6	29.85	E.	3	4	of
	10	29.89	S.E.	3	4	of
	11	29.88	S.S.E.	3	3	of
	12	—	S.S.E.	3	2	of
	14	29.81	S.S.E.	3	3	of
	17	29.78	S.S.E.	2	2	of
	18	29.78	S.S.E.	2	2	ccf
	22	29.83	S.	3	2	of
	2	29.84	N.N.E.	4	3	omtr
21	6	29.87	N.N.E.	4	4	o
	10	29.95	N.	3	3	o
	11	29.95	N.	3	3	o
	12	—	N.E.	3	2	omd
	14	29.95	E.N.E.	4	4	od
	17	29.93	E.N.E.	5	5	o
	18	29.94	E.N.E.	5	5	o
	22	29.99	E.N.E.	5	5	o

cc=Cloudy

LARGE CALM CENTRE OF A CYCLONE DISTURBANCE
OF SMALL INTENSITY.
In S.E. Portion of Indian Ocean.

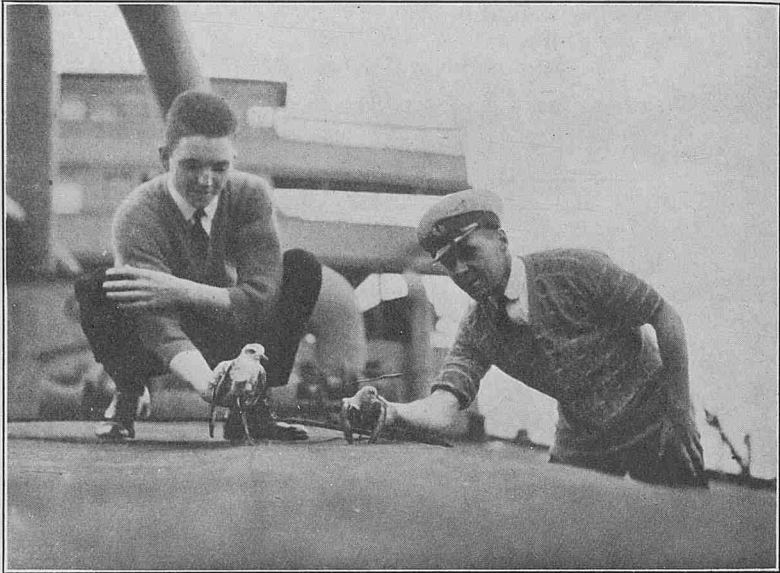
THE following are extracts of remarks and photographs accompanying the Meteorological Report of S.S. *Nardana*, Captain F. L. MOTH, from Melbourne to Suez:—

“ When 310 miles, N. 70° W., of Cape Leeuwin, on April 1st, 1927, we entered the calm area of a cyclonic disturbance at 11.45 a.m., when the wind, force 7-8, rapidly diminished and backed.

Observations.

Date.	Time.	Latitude.	Longi- tude.	Baro- meter.	Wind.		Weather.
					Direction.	Force.	
April 1st.	4 a.m.	33° 19' S.	111° 53' E.	29.79	E.S.E.	5	qtl
	8 a.m.	32° 28' S.	110° 34' E.	29.67	S.E.	6	or
	Noon	32° 35' S.	109° 50' E.	29.53	Variable.	1	d
	4 p.m.	31° 09' S.	108° 58' E.	29.49	S.S.W.	4-6	zc
	8 p.m.	31° 44' S.	108° 06' E.	29.69	S.S.W.	6	oq

“ At noon the wind was light and variable between E.N.E. and E.S.E. and then backed to N.E. later, calm and light airs. The clouds grew thin and it was much lighter, horizon very hazy. At 1.30 p.m. the sun broke through the clouds and at 3.30 p.m. sights were taken for Longitude after which hazy conditions returned and at 4 p.m. the wind came strong from the south. At 4.30 p.m. the wind was force 7 from S.S.W. and continued from that direction gradually decreasing in force.



"At 9 a.m. when approaching the centre the northerly swell was detected with difficulty through the easterly sea, but it gradually predominated until at noon in the centre it was very high, short and confused. As we proceeded through the calm area the northerly swell became masked and at 4.30 p.m. a southerly swell commenced and continued until 8 a.m. on April 2nd. About 40 land birds of three different kinds flew about and settled on the ship, three were caught in an exhausted condition. One was of the snipe variety (snippet) with long beak and snipe markings, the second was of the wader kind, but four times as large as the snippet with a short straight beak and long black legs with unwebbed feet. The third was similar to the snippet but had a shorter beak."

Copies of weather reports made to "all Ships" and to Perth Radio Station were included in the report.

LANES OF SHINING WATER.

North Atlantic.

THE following report has also been received from S.S. *Nardana*, Captain F. L. MORR, Port Said to Dunkirk:—

"At 5.40 p.m., April, 27th, 1927, in Latitude 36° 26' N., Longitude 7° 03' W., visibility 7, Cirrus, cloud amount 1, and slight white haze on horizon. Air temperature 70°, sea 65°, barometer 30.00 in. corrected, wind S.W., force 1, 80 miles, N. 65° W. of Tarifa, the accompanying photograph of sea and sky was taken.

"Observed streaks or lanes of shining smooth water, interspersed with water ruffled by very light breeze, over an area the limit of vision. The shapes of the streaks were generally in long irregular lines with a tendency to lie parallel to one another, of about 50 feet width, but other patches were any size and shape between a sail loft and a ten acre field. Their shape remained unaltered during



an interval of ten minutes when seen first on the bow to their passage astern and becoming indistinct. The bow wave and wake of the steamer did not displace or break up the shining lanes. The sea was calm and a very light breeze agitated the surface of the sea, but not the water in those areas.

"This phenomenon was under observation from 4.0 p.m. to after nightfall at 8.0 p.m., and did not show phosphorescence.

"The above is a very common phenomenon, and the writer thinks it due to fish spawn. It may be due to oil from the ships at Gibraltar, for, in Latitude 43° 25' N., Longitude 9° 07' W., 17 miles N. 15° E. of Villano Lighthouse, a similar phenomenon was observed and the vessel twice passed through distinct traces of oil showing variegated colours, but even in this instance, the 'shining lanes' were so numerous and of such a large area (several hours of steaming) that fish spawn is thought to be the main cause. Many trawlers were fishing on this ground."

CAPTAIN H. A. YARDLEY.

BY ONE OF HIS OFFICERS.

The retirement of Captain YARDLEY was noted in the September Number of THE MARINE OBSERVER last year, but in accordance with the request for personal memoirs of Seamen who have led and taken an active part in the work of the Corps of Voluntary Marine Observers these notes may help to place on record our esteem for an old Commander.

HENRY ARTHUR YARDLEY was born at Birmingham, and served his apprenticeship with Messrs. HENRY ELLIS & SONS, of London, in their sailing ships *White Rose*, *Suffolk*, and *Oncida*, in which he made voyages to South Africa and the East Indies.

Upon passing for Second Mate he joined the Glasgow wooden barque *Ringdove*, and made one voyage to the Brazils, then to Colombo, and back home to London. She was an old vessel, and it was a case of either manning the pumps and keeping them going or the ship sinking under their feet, however she was kept afloat and completed the voyage.

His next ship was the Liverpool barque *Astracana*, in which he made a voyage to Portland, Oregon, and when homeward bound, struck a coral reef in the South Pacific. He was then acting as Mate of the ship, and the crew had to take to the two boats, the Master taking charge of one, and YARDLEY the other. For seven and a half days and nights they were drifting, during which time they suffered great privations from exposure, thirst and hunger, both boats eventually reaching the island of Tahiti within twenty-four hours of each other. Upon arrival there the shipwrecked crew were very hospitably received and treated by the natives, and later proceeded to Liverpool, via San Francisco.

A voyage in the ship *Yallaroï* followed, and he then joined Messrs. C. T. BOWRING & Co., the principal at the present time being the recent Lord Mayor of Liverpool, Mr. F. C. BOWRING, with whom he remained for about three years, serving in their barque *Viola*, and also in their steamers.

He passed for Master in September, 1888, and for extra Master in 1889, when 27 years of age, without any tuition, never having attended a navigation school for any of his examinations. In June, 1892, he joined the ELDER DEMPSTER LINE as Second Officer of the *Boma*, and in May, 1898, was appointed Master, since when he has commanded many of the Company's steamers.

During the war he had some notable experiences, among which was the splendid running fight he put up in the *Burutu*, with a German submarine off Monrovia, Liberia, West Africa. The successful outcome was a great achievement, and he was awarded the Distinguished Service Cross by the Admiralty, and made a Knight Official of the Liberian Humane Order of African Redemption, by the Liberian Government, and he also received LLOYD'S Silver Medal.

In February, 1917, when the Germans were intensifying their submarine campaign he was in command of the ill-fated *Mendi*, when that ship met a disastrous end in the English Channel, with the loss of a whole battalion of troops. There was a terrible toll of life, but throughout discipline was maintained. Captain YARDLEY was eventually recovered from the sea, and dragged into a life-boat.

For the conveyance of confidential mails overseas during the war 1914-1918, he was presented with a silver cigarette-case by the Lords Commissioners of the Admiralty.

In May, 1925, when in the *Appam* he rescued some West African natives from their overturned canoe which had capsized during a tornado. For this he was presented with the life-saving certificate of the Liverpool Shipwreck and Humane Society.

From quite early in his career Meteorology was his especial study, and his keenness led him to keep many of the Logs he contributed in his own handwriting. The intricate currents of the Bight of Biafra were carefully studied by him, and he provided much useful data from West African waters.



The Master of the *Appam*, 1924-1927.

CAPTAIN H. A. YARDLEY, D.S.C.

During his sea career, Captain YARDLEY showed, as all with whom he came in contact well know, that he lived up to the very highest traditions of the British Mercantile Marine, both as an officer and a gentleman. Of a kindly and generous disposition he was most popular, and held in the highest esteem by all who were privileged to sail with him. In his retirement he carries the

best wishes of all his shipmates for many years of health and happiness.

The Merchant Service can lay claim to having a long list of distinguished commanders, and the career of work well done by Captain YARDLEY entitles him to an honoured place on the roll of British Shipmasters.

S. J. B.

A SHORT STORM WITH THUNDER AND LIGHTNING OFF THE SOUTH COAST OF SPAIN, APRIL 12TH, 1927.

BY. L. A. BROOKE SMITH, MARINE SUPERINTENDENT.

THE additional remarks by Mr. J. C. FAIRBAIRN, 2nd Officer, in the Ship's Meteorological Report, Form 911, of S.S. *Kashmir*, Captain R. H. STRINGER, from Southampton to Port Said, drew attention to a N.E. storm and thunderstorm of considerable intensity which caused a short steep very high sea off the South Coast of Spain.

S.S. *Clan Malcolm*, Captain A. G. NEILL, from Birkenhead to Oran, also experienced the force of a whole gale and S.S. *Empress of France*, Captain E. GRIFFITHS, from Monaco to Cherbourg, had a strong gale in the same depression and after 6 p.m. she experienced lightning, thunder, dust and sand giving the appearance of yellow fog.

Kashmir and *Clan Malcolm* were both hove to, head to wind and sea, with engine speed sufficient to give steering way. *Empress of*

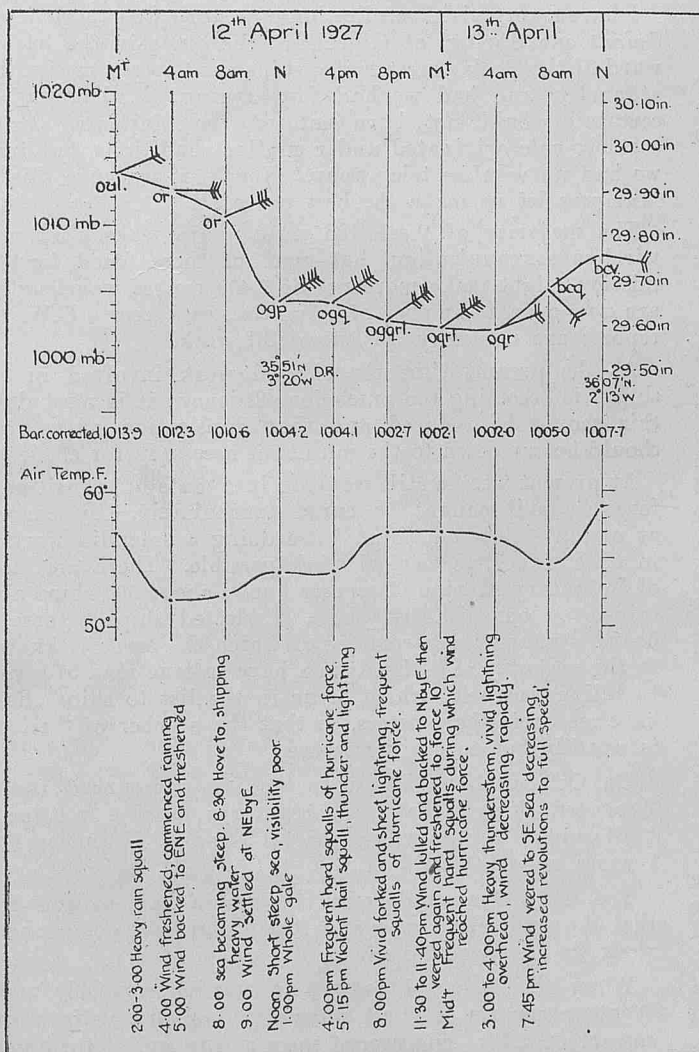
France was running at 16 knots and soon passed clear of the storm-field on her course to the westward. *Kashmir* recorded barometer down to 998 (29.47), 7 p.m., on April 12th; the visibility was very poor owing to spindrift.

S.S. *Naldera*, Captain C. DAYAS, also forwarded remarks upon this storm; she too experienced wind of storm force and hurricane force during the squalls. *Naldera* has since been added to the list of regular observing ships.

The graphs below give the observations recorded on board *Kashmir* and *Clan Malcolm* and CHARTS X to XII give the conditions on the morning before the gale, on the evening of the gale and on the following morning over the Western Mediterranean and Eastern North Atlantic in general but in particular in Southern Spanish Waters.

S.S. "Clan Malcolm," Captain G. A. Neill.

Observations recorded with M.O. Instruments.



S.S. "Kashmir," Captain R. H. Stringer.

Observations recorded with ship's instruments. Barometer mercurial.

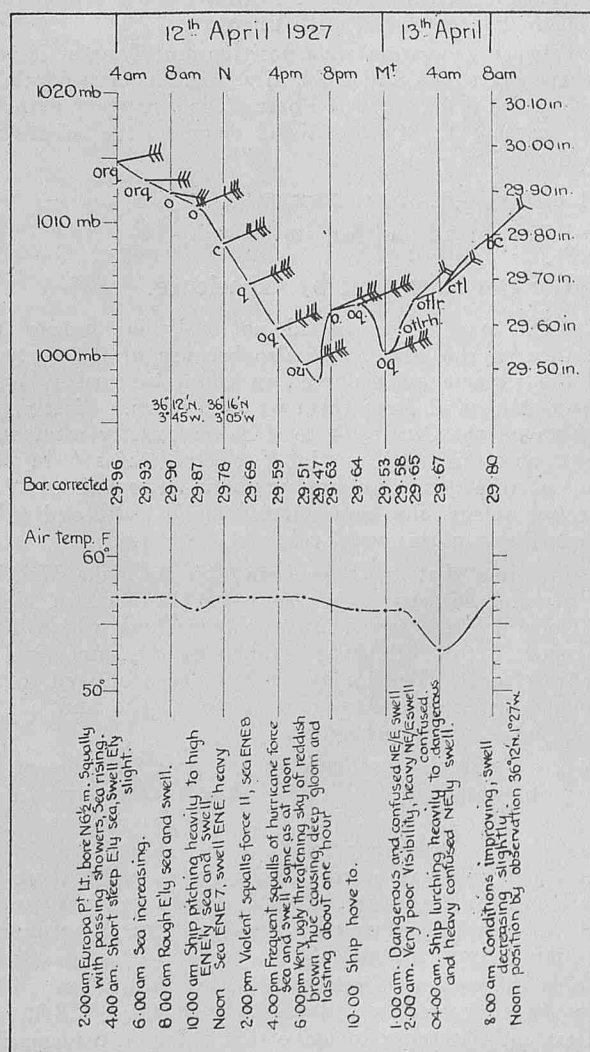


CHART No. X 0700 G.M.T. APRIL 12TH, 1927.

An anticyclone dominates the Eastern North Atlantic westward of the Peninsula and there is a depression centred to the southward of Oran probably in the vicinity of the Moorish-Algerian boundary and the Atlas Mountains.

Now it is pretty well established that Tropical Cyclones only form and develop at sea, but Cyclones form over either land or sea in middle and high Latitudes. More Cyclones form over the sea than over the land, but there are places ashore such as the Mississippi Valley where many depressions are known to originate.

Cyclonic depressions in Middle Latitudes originate under different conditions and they form where the temperature of the air is cold in comparison to that of adjacent regions as well as where the air is warm.

Our Chart shows the conditions to the northward of the depression; it probably lay to the northward of the Sahara Desert. Therefore the southerly winds due to air being drawn towards the low coming as they will from over the desert and Latitudes nearer the Sun (Sun's declination $8\frac{1}{2}^{\circ}$ N.) are likely to be warmer than the air over the Atlas Mountains and the winds shown by our Chart to have existed northward of the low.

Such conditions would make for instability of the atmosphere and the development of the depression.

The barometer falling slowly at Oran and Rabat, and in *Kashmir* steaming at 13 knots on a course N. 82° E., true, indicates that the depression is deepening or travelling N.W., or both.

CHART No. XI 1800 G.M.T. APRIL 12TH, 1927.

The anticyclone to the westward of the Peninsula holds, and the depression has developed considerably and moved to the N.W. It is probably centred very near to *Kashmir's* position because the gradient between *Kashmir* where the wind is storm force and *Empress of France* is very steep and there is much less wind or calm beyond, as indicated by the observations reported at Tangier. Unfortunately observations at this time for Oran are not available or it might be possible to fix the centre with certainty.

The gradient between *Leicestershire's* position and Tangier is very shallow; here there are calms and light airs. The moderate gale to strong breeze along the S.W. coast of Portugal is consistent with the steeper gradient to the S.E. of the anticyclone where the isobars are pinched by the deepening depression.

CHART No. XII 0700 G.M.T. APRIL 13TH, 1927.

The depression has spread and lost its intensity.

We can learn best by experience.

This storm which may be so called not only because of the general significance of the name, but also because of the force of the wind, and the experiences reported in connection with it are particularly interesting and from them we may learn. Firstly, the observations shown on the CHARTS X to XII are exactly what were recorded by the observing officers in "selected ships" in this weather system at the time as having been reported to "all ships" by wireless telegraphy and entries made on board other ships prove that the reports were received and used.

This is the first time that we have been able to make Weather Charts in the Marine Division other than in the Eastern North Atlantic and Home Waters using only observations which have actually been reported to "all ships" taken at the same time as those of the nearest coast. Previously we have been obliged to use observations logged by Ship's Apparent Time at the end of the watch which do not truly synchronize.

This example gives valuable evidence of the practicability of the system which is advocated in "Wireless and Weather an Aid to Navigation."

Now the fact that these reports to "all ships" made by "selected ships" are being received in many ships when there are not yet definite times for transmitting them, speaks volumes for the patient careful watch which Wireless Operators were keeping and their efforts are much appreciated.

The Log of the *Empress of France* indicates that when within range of Malta she addressed her report to "all ships" CQ., and Malta, GHA thus endeavouring to make this valuable information,

not only available to all ships receiving it, but to the Meteorological Office at Malta where it could be used to great advantage for local forecasting and whence it could be passed to the Royal Navy, the Air Services, and to European weather offices.

To ships approaching Gibraltar Straits from the west or to ships to the eastward of the disturbance bound to westward the value of information which such reports give is obvious to any navigator.

Apart from the inconvenience or possible danger that winds of storm force with squalls and reduced visibility within the area of the stormfield would be to aircraft, we are told by meteorologists that in thunderstorms the vertical air currents aloft are terrific. So that weather reports indicating the presence of lightning and thunder with squalls may serve as most necessary warnings to airmen.

There are times when the forecast service here in London would derive great benefit from reports of weather at sea in the Mediterranean and at such times reported observations in Northern Africa are particularly useful. I refer to the hot spells in England due to southerly winds coming right up from the Sahara which occasionally occur.

It is hoped in the course of time to publish in "Weather Signals" the names of W/T. Stations which will receive and pass on to Meteorological Offices the routine reports made by "selected" British ships to "all ships," so that this voluntary service which is proving so useful at sea may benefit the whole community.

If *Clan Malcolm* or other observing ships which call at Oran would upon their next visit to that port enquire through the Harbour Master for the observations which were missing for that place from the Daily Weather Maps of Great Britain and France for 1800 G.M.T., April 12th, 1927, they might be able to obtain the necessary information to fix the storm centre and incidentally local knowledge might be able to throw much light upon the origin, development and behaviour of storms coming out from the African land.

I have a very vivid recollection of a storm we experienced in the old *Orient* one Spring, at Gibraltar; the gusts in the harbour to leeward of the Rock were terrific, ships went to sea rather than remain at anchor and had we had forewarning of what was coming we certainly would not have entered the Harbour. Probably this easterly gale originated under similar conditions, but in those days we had no wireless telegraphy. Now that we have this blessing to Mariners let us make the best use of it.

The majority of "selected ships" are making splendid use of wireless communication, but more of those fitted for C.W. transmission might make more use of 2,400 metres wavelength, for there are now a great number of ships that can receive C.W. and distant reports are necessary for successful work.

At the present time the clerical work involved in a "selected ship" is becoming too much for efficiency; it is most desirable that this should be reduced and that duplication of recorded entries should be cut down to the minimum necessary for efficiency.

At present we are still working in a state of transition and therefore the evil cannot be cured immediately. By carrying on as at present "selected ships" are doing a splendid work which will in time make less clerical work possible. There are, as the Corps of Voluntary Marine Observers know, about 500 ships always maintained on our list. Of these, "selected ships," those having on board a mercurial barometer of which the error is known, are now in the majority and the Agents have instructions to give preference in filling vacancies which occur in the list to ships offering, which have mercurial barometers, so that the number of "selected ships" is steadily but surely increasing.

On October 1st, 1927, when we last announced the number of "selected ships" that were regularly making routine reports to "all ships," that number was 131; to-day, December 17th, 1927, as I write, it is 141.

Ten more Commanders in two and a half months have decided that the practice is good and sound and have determined to do this work for the good of all.

When all "selected ships" on our list regularly make Wireless Weather reports to "all ships" giving observations taken at the correct G.M.T's., and record them at the end of their logs or Forms

911, we shall be able to reduce the number of observations to be recorded at the end of the watch and timed Ship's Time. It will always be necessary for a certain number of ships to keep the Meteorological Log as at present, but with the information communicated by W/T. and confirmed in writing, real efficiency will be attained and with far less clerical work which is such a trial to all who work at Marine Meteorology afloat and ashore.

Lest there be those who will say, "Yes, but it happens that this example you give us happened quite near the meridian of Greenwich so that the matter of time of observation is less difficult than in other Longitudes," let me assure them that the 141 ships

regularly making reports of observations timed correctly are doing so in all longitudes.

To show how desirable it is that this matter of routine weather telegraphy reporting for the benefit of all should be carried out by "selected ships" which have mercurial barometers and suitable information and guidance, the weather chart of the Eastern North Pacific for April 26th, 1927, made at sea to the great credit of a British Voluntary Marine Observer reproduced on page 63 in "The Marine Observer's Log" may be referred to, and now that we are advocating wider application at sea those who make these reports are performing a voluntary service of ever increasing value.

ICE IN THE WESTERN NORTH ATLANTIC.

PREPARED IN THE MARINE DIVISION BY J. HENNESSY, SENIOR NAUTICAL ASSISTANT.

The greatest menace to the safe navigation of ships in the Western North Atlantic is the almost constant presence of ice in the vicinity of the Great Bank of Newfoundland. The ice acted upon by wind and current makes it very difficult to locate and the danger is greatly intensified by the prevalence of fog in these waters.

There are two main types of ice found in the Western North Atlantic constituting a danger to navigation, namely, pack or sea ice and berg or glacier ice. The following definitions correctly describe all ice derived from these two types which may be met with at sea.

Slush or Sludge.—The initial stages in the freezing of sea water when it is of gluey or soupy consistency. The term is also occasionally used for "brash ice" still further broken down.

Pancake Ice.—Small floes of new ice approximately circular and with raised rims.

Hummocking.—The results of pressure upon sea ice.

Hummocky Floes.—Floes composed wholly or partly of re-cemented pressure ice.

The Pack.—The term used to denote the main belt of derived ice which in the Antarctic girdles the Continent south of the zone of the "westerlies" and in the Arctic fills the Polar Sea and escapes southward from the outlets of the sea (French, "Banquise de derive").

The term "pack" is used more generally to mean any area of pack ice however small.

Close Pack.—Pack composed of floes mainly in contact.

Open Pack.—The floes for the most part do not touch.

Drift Ice.—Loose very open pack where water predominates over ice.

Brash.—Small fragments and rounded nodules the wreck of other kinds of ice.

Berg. A large mass of glacier ice.

Bergy Bits.—Medium sized pieces of glacier ice or of heavy floes or hummocky-pack washed clear of snow (typical bergy bits have been described as about the size of a cottage).

Growlers.—Similar pieces of ice to the above, but so small as barely to show above sea level.

Rotten Ice.—Floes which have become much honeycombed in course of melting or which appear black through saturation with water (thin sheets of newly formed very thin ice also appear black and may easily be confused with the last type when met in the pack).

Level Ice.—All unhummocked ice, no matter of what age or thickness, which has platy structure and fibrous appearance when broken.

Fast Ice.—Sea ice while remaining fast in the position of growth. True fast ice is only met along coasts where it is attached to the shore or over shoals where it may be held in position by islands or stranded icebergs.

Pack Ice.—Sea ice which has drifted from its original position.

A Floe.—An area of ice other than fast ice whose limits are within sight. Floes up to two feet in thickness may for convenience of description be termed "light floes"; floes thicker than this "heavy floes."

A Field.—An area of pack ice of such extent that its limits cannot be seen from a ship's masthead.

A Crack.—Any fracture or rift in sea ice.

A Lead or Lane.—A navigable passage through pack ice.

A Pool.—Any enclosed water area in the pack other than a crack or a lead or lane.

Water Sky.—Dark streaks on the sky due to the reflection of water spaces or the open sea in the neighbourhood of large areas of sea ice.

Ice Blink.—The white or yellowish white glare on the sky produced by the reflection of large areas of sea ice. (The antithesis of water sky).

Movement of the Pack.—The diverse character of the ice forming the pack prevents the fragments freezing together and forming a solid mass during the polar winter. It is this characteristic which permits the free movement of the pack, otherwise the ice would not be navigable and would probably become permanent by addition of snow.

Formation and Drift of Sea Ice.—Towards the end of autumn, in the Arctic Sea and on the coasts of Labrador and Newfoundland, owing to the fall in temperature, the surface cooling of the sea causes numberless small ice plates called frazil crystals to form. During calm weather these crystals collect and form a thin seam on the surface which at first has little stiffness owing to heat conduction from the water below, preventing the brine remaining between the crystals which are themselves fresh from freezing. As the season progresses the sheet of ice and brine thickens, the temperature being reduced to a sufficient extent to allow the brine to freeze, when the whole becomes a rigid sheet of ice. During the summer much of the Arctic pack ice is set free, and drifting southward, arrives off the N.E. coast of Labrador in November at the same time as sludge ice is forming there. By the end of November the waters around the whole Labrador coast have generally frozen over and the whole pack drifts south arriving off the east coast of Newfoundland about the end of January.

When clear of the Newfoundland coast the ice spreads east and west forming fields and floes which may be met with north of the 43rd parallel, between the 45th meridian and the east coast of Nova Scotia. Off the Newfoundland coast, ice fields may be met with late in summer, but further south it quickly melts, rarely existing south of Newfoundland after the early part of May.

The thickness of pack ice ranges from about 15 feet in the Arctic to about 6 feet on the coast of Newfoundland, but these thicknesses may be greatly exceeded owing to the interposals of capes in the way of moving ice-fields, and to the unequal movement between the floes exerting pressure on the ice, causing it to hummock. Navigation within the Gulf of St. Lawrence is completely suspended, usually from the beginning of December to the end of April. During the winter months the ice increases rapidly forming extensive sheets. These are, however, frequently broken across by the wind, leaving leads of open water between the separated parts. At other times the wind presses the sheets of ice together forming a close pack extending for many miles.

At the break-up of winter conditions, towards the end of April, the ice commences to move out of the Gulf sometimes causing a block between St. Paul Island and Cape Ray. This block, known

as "the Bridge," sometimes continues for three weeks completely closing the Cabot Straits to navigation. On leaving the Gulf, the movement of the ice is chiefly dependent on the prevailing winds, but if the winds are light or variable the movement is affected by current alone, and it will move in the direction of the Banquereau Bank, where it quickly melts under the influence of the sun and warm winds.

Formation of Land Ice and Calving of Icebergs.—Research on the formation of glaciers by the scientific staff of SCOTT's last Antarctic expedition, shows that ice is formed entirely by the growth and modification of snow crystals. The larger crystals grow at the expense of the smaller and tend to unite by a kind of distillation in which water molecules leave small crystals and join large crystals. The growth of the large and diminution of the small crystals permits them to pack more closely under pressure. When closely packed the crystals still remain distinct, being separated by air spaces at their boundaries. Snow in this condition is known as *nêvé*. The subsequent change from *nêvé* to ice takes place in exactly the same manner as the change from snow to *nêvé*. In the course of time the crystals grow so as to include the air cavities, which in the form of *nêvé* marked the boundaries between them.

The rate of change from snow to ice depends upon the temperature and pressure being quicker at high than at low temperatures, and when subject to great pressure the crystals come in closer contact allowing direct movement of the water molecules between them.

In the interior of Greenland, owing to the low temperature, one layer of snow cannot melt before the next falls, there is, therefore, a huge accumulation of snow which, in the course of time is changed into ice in the manner described, thus forming a massive ice sheet, known as the "Greenland ice cap." From this cap the ice, subject to enormous pressure, flows outwards in all directions but mainly where its motion is least obstructed. The chief flow is therefore down the sloping valleys towards the sea.

When the ice of a glacier reaches the coast it continues to move seawards, its weight being taken by the ocean bed until the water deepens sufficiently to make the ice buoyant, when it becomes water-borne. Such an extension of glacier ice from the shore, seaward, is termed an "Ice Tongue."

The bergs which menace the shipping lanes of the North Atlantic are huge masses of ice which are broken off from the ice tongues of the Greenland glaciers, chiefly through the undermining action of the surface sea water and the formation and development of cracks and crevices in the ice tongue, due to the strain exerted by the action of tides, heavy swell and wind pressure.

Colour of Ice.—The white light of the sky, reflected from numberless facets of the snow crystals when separated by the included air gives snow its white appearance. In the case of ice formed directly from a snow drift falling upon ice, the direction of growth of the crystals is upwards from the ice upon which the snow falls, so that the air is able to escape from between the crystals as they join up, thereby forming clear air-free ice which at great thicknesses appears blue.

Most glacier ice, however, contains air which is included in the crystals themselves in the form of small spherical bubbles, and this gives to the ice a whitish opaque appearance. Many crevices in the glaciers become filled with sand and debris blown down from the surrounding land, thus forming silt bands in the ice which greatly discolour it.

Density and Size of Bergs.—The density of ice in icebergs is variable. In some the snow is not so completely transformed into ice as in others, while some carry appreciable loads of rock material. An iceberg, if composed of pure ice only, would float with approximately one-ninth of its mass above water, the weight of a cubic foot of sea water being 64 lbs., and that of a cubic foot of ice 57 lbs. Recent research into the density of Greenland Bergs by Professor H. T. BARNES, D.Sc., F.R.S., records that from one-sixth to one-tenth of the volume of an iceberg consists of air, causing it to displace less water than ordinary ice. It was found that many bergs float with as much as one-third of their mass out of water.

Professor E. VON DRYGALSKI measured 87 bergs shortly after calving from the Greenland glaciers and found the highest to be

449 feet above the surface. He found that their height decreases rapidly with the length of time that elapses after their formation, a difference of 13 feet being noticed in one instance after an interval of one week and in another a decrease of 76 feet in about eight weeks.

The highest berg measured by the International Ice Patrol, was 248 feet above water while the longest berg measured 1,690 feet from end to end.

Drift of Icebergs.—The movements of icebergs are mainly controlled by the set of prevailing currents. The direct effect of wind upon their drift is negligible owing to the immersion of so great a proportion of their mass. The effect of the wind, however, indirectly plays an important part by its action on the retardation or acceleration of the currents which govern the movement of the bergs.

There are three currents, two cold water and one warm water, chiefly concerned in causing the ice menace to Atlantic shipping. The East Greenland and Labrador currents bring the ice south from their place of calving, while the Gulf Stream determines the southern limit of their drift, and is responsible for the disintegration and melting of the bergs.

The East Greenland current flows south from the East Greenland Sea in the vicinity of Spitzbergen. Converging towards Denmark Strait, it passes between Iceland and the mainland, whence it follows the East Greenland coast to Cape Farewell. Its course is then diverted northward by the pressure of water setting northward from the Atlantic, and, rounding Cape Farewell, it proceeds up the west coast of Greenland. In about Latitude 63° North, a branch of the main stream shoots westward across Davis Strait and joins the Labrador current flowing down the west side of the Strait.

The Labrador Current.—Ice bearing currents of polar origin setting out of Smith and Lancaster Sounds unite and set south on the western side of Baffin Bay and Davis Strait. Entering the Atlantic, it continues south along the coasts of Labrador and Newfoundland. It expands over the northern part of the Great Bank and divides into two branches. One branch setting S.W., flows through the deep water channel south-eastward of Cape Race, while the other flows south along the eastern edge of the Great Bank until it meets the northern edge of the Gulf Stream, forming what is known as the "cold wall."

The Gulf Stream, flowing out of the Straits of Florida, follows the United States coast northward, to the Latitude of Cape Hatteras, when its width rapidly expands and its course gradually inclines to the eastward. On arriving in the vicinity of the Great Bank of Newfoundland its course is east. During the winter, it flows to the southward of the Bank, but during summer, creeps north flowing over the Tail of the Bank. The "cold wall" is the line of demarcation between the cold water of the Labrador current and the warm water of the Gulf Stream.

From observations obtained by the Ice Patrol Cutters, the movement of the currents which determine the drift of bergs around the Tail of the Bank are now fairly established. Lieutenant-Commander E. H. SMITH, U.S.C.S., Oceanographer to the International Ice Patrol, states:—"The Labrador current impinges itself at the Tail of the Bank on the northern edge of the Gulf Stream. At times the push is strong enough to split the Labrador current into an east and west branch. In this case the stronger branch determines the berg drift, the relative strength of the branches probably depending to a great extent on the angle of impingement of the Labrador current, against the Gulf Stream. The conflict of the two currents, together with the position of the Bank, produces a frictional arresting of the Gulf Stream on its northern edge, which in turn swings it in sharply to the north and north-west immediately after passing the Tail. The inshore westward swirl of frictional bands of the Gulf Stream sets up an interlacing movement of the two waters." In the vicinity of the Tail the surface temperature of the Labrador current during April is 32° to 34° Fahr., in May, its temperature is 36° to 38° Fahr., and in June, its temperature rises to 40° to 44° Fahr.

At the break-up of the Arctic winter in the Spring of the year, the bergs calved from the glaciers on the east coast of Greenland drift

south in the East Greenland current, arriving off Cape Farewell in early summer. Continuing in the current, they round Cape Farewell and drift north to about the 63rd parallel, where they are caught in the westerly branch of the current and drift into the centre of the Davis Strait. In the centre of the Strait the water is comparatively warm and the majority of these bergs disintegrate, very few of them reaching the Labrador current on the western side of the Strait. The majority of the bergs which reach the Great Bank are calved from the ice tongues of the glaciers on the west coast of Greenland, north of the 68th parallel. The bergs are carried up the west coast of Greenland to the head of Baffin Bay where they are caught in the southerly drift setting out of Smith Sound down the western side of Baffin Bay.

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

The following tables compiled from the records of the United States Hydrographic Office and those of the International Ice Patrol, for the years 1900-1926, show the average number of bergs that drift south of the 48th parallel during each month of the year:—

Normal number of icebergs south of the 48th parallel (menace to the Cape Race Tracks).

Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
3	10	36	83	130	68	25	13	9	4	3	2

Normal number of icebergs south of the Great Bank (menace to the United States to Europe Tracks).

Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
0	1	4	9	18	13	3	2	1	0	0	0

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

CHART A shows the general drift of ice in the ice bearing currents, and the position of the glaciers in Greenland from which the majority of the bergs which reach the Great Bank of Newfoundland are calved. CHART B shows the actual drift of bergs in the vicinity of the Great Bank as compiled by the International Ice Patrol in the years 1914-1926.

North Atlantic Limits of Ice.—The southern and eastern limits of ice in the Western North Atlantic vary considerably from month to month and from year to year.

CHART C shows the monthly limits within which reports of ice have been received by the Meteorological Office during the year 1927, also the monthly limits reached by ice over the period 1901-1927. It must be understood that the limits defined on this CHART are obtained from reports of ice sighted by vessels, the majority of which are following tracks specially laid down to avoid ice; it is therefore possible that ice may exist outside these limits. The following list gives the particulars of all reported ice which has made phenomenal drifts. It is not possible to indicate even approximately, the drift followed by the ice. The position of this ice, when reported, is shown on CHART D,

Phenomenal positions of ice.

No.	Date.	Source of Report.	Position of ice.		Remarks.
			Latitude N.	Longitude W.	
1	14.1.1836	H.M.S. <i>Cove</i> ...	60° 55'	5° 50'	Two bergs.
2	9.1.1913	S.S. <i>Oriflamme</i> ...	48° 37'	34° 42'	Berg 40 ft. high, 400 ft. long.
3	27.1.1916	S.S. <i>Rio Verde</i> ...	33° 34'	70° 32'	Hummock 2 ft. high, 30 ft. in circumference.
4	3.2.1922	S.S. <i>Weehawken</i> ...	41° 42'	58° 59'	Ice (sustained bow damage).
5	24.3.1913	S.S. <i>Floride</i> ...	46° 21'	34° 05'	Berg 60 ft. high, 200 ft. long.
6	20.3.1915	S.S. <i>Wanaby</i> ...	36° 55'	48° 32'	Piece; supposed portion of a berg 5 ft. high, 60 ft. long.
7	21.3.1920	U.S. Hyd., Bulletin	38° 02'	40° 38'	3 ft. high, 30 ft. long.
8	21.3.1921	S.S. <i>Hollandia</i> ...	37° 50'	47° 23'	Berg.
9	6.4.1909	S.S. <i>Trafalgar</i> ...	35° 54'	31° 47'	Two pieces 18 ins. in diameter.
10	11.4.1914	S.S. <i>Erodiade</i> ...	32° 55'	62° 11'	Apparently river ice about the size of a lifeboat.
11	24.4.1916	S.S. <i>Communipaw</i>	49° 05'	36° 48'	4 ft. high, 50 ft. wide, and 100 ft. long.
12	4.4.1921	S.S. <i>Hollandia</i> ...	43° 35'	35° 57'	Large berg.
13	16.4.1926	Trawler <i>Orizaba</i> ...	61° 03'	10° 30'	Floating ice about 40 ft. long and 3 ft. high.
14	20.5.1907	S.S. <i>Lord Landsdowne</i> .	31° 00'	38° 00'	Two small pieces 6 ft. by 6 ft. and 12 ft. by 4 ft. out of water.
15	6.5.1908	S.S. <i>Oceano</i> ...	150-200 miles North of Bermuda.		Pieces.
16	27.5.1909	S.S. <i>Reventazon</i> ...	32° 28'	44° 10'	60 ft. long, 10 ft. high.
17	15.5.1911	S.S. <i>Camillo</i> ...	10 miles East of Nantucket Shoal L.-V.		Small berg.
18	11.5.1914	S.S. <i>Indradeo</i> ...	42° 18'	62° 43'	Large slabs of field ice and growlers 100-150 ft. long, 5 ft. out of water.
19	17.5.1915	S.S. <i>Pola</i> ...	38° 16'	61° 50'	Some field ice.
20	15.5.1920	U.S. Hyd., Bulletin	45° 11'	36° 42'	Berg.
21	25.6.1886	Brig. <i>Blanch</i> ...	48° 40'	15° 22'	Large berg.
22	5.6.1907	S.S. <i>Kingswell</i> ...	32° 37'	64° 25'	Several bergs.
23	-6.1907	Bque. <i>Silverstream</i>	80 miles West of Fastnet.		Berg.
24	11.6.1912	S.S. <i>Valetta</i> ...	37° 30'	74° 24'	Three pieces of ice.
25	7.6.1913	S.S. <i>Holtby</i> ...	39° 35'	64° 50'	Berg 10 ft. high.
26	27.6.1915	S.S. <i>Stella</i> ...	36° 28'	57° 45'	Small piece.
27	30.6.1921	U.S. Navy Dept...	33° 20'	49° 16'	Berg 10 ft. high.
28	16.6.1924	S.S. <i>West Irmo</i> ...	38° 03'	63° 20'	Growler.
29	25.6.1926	S.S. <i>Baxtergate</i> ...	30° 20'	62° 32'	Large piece about 30 ft. long and 15 ft. wide, showing about 3 ft. above water.
30	-7.1890	S.S. <i>Slavonia</i> ...	48° 53'	24° 11'	Last remnants of berg.
31	-7.1902	Two reports by fishermen.	56° 30'	6° 30'	40-50 ft. long, 15 ft. wide, 2 ft. 6 ins. out of water.
32	31.7.1909	S.S. <i>Shimosa</i> ...	36° 59'	30° 01'	25 ft. long, 3 to 8 ft. wide.
33	10.7.1913	S.S. <i>Lothian</i> ...	37° 27'	36° 48'	Piece, 6 ft. high, 50 ft. in circumference.
34	18.7.1916	U.S. Hyd., Bulletin	32° 09'	54° 26'	Piece of berg, 3 or 4 ft. out of water.
35	23.7.1916	S.S. <i>San Giorgio</i> ...	42° 09'	63° 24'	Berg 60 ft. long.
36	23.7.1918	U.S. Hyd., Bulletin	44° 25'	35° 01'	Large berg.
37	18.7.1921	" "	44° 30'	39° 26'	Small berg about 15 ft. square.
38	21.7.1921	" "	39° 09'	40° 39'	Berg.
39	31.7.1921	" "	37° 37'	27° 29'	Berg.
40	10.7.1926	S.S. <i>Chelatos</i> ...	42° 42'	36° 45'	Two pieces of ice.
41	12.8.1903	S.S. <i>Saxon Prince</i>	37° 52'	71° 30'	Piece, 3 ft. high, 40 ft. long.
42	7.8.1908	S.S. <i>Caronia</i> ...	50° 31'	18° 55'	Two pieces, 10 ft. square, and 15 ft. square.
43	2.8.1909	S.S. <i>Shimosa</i> ...	37° 16'	42° 06'	Piece, 18 ft. by 5 ft., 2 ft. out of water.
44	14.8.1912	S.S. <i>Ulstermore</i> ...	43° 55'	39° 16'	Piece.
45	27.8.1912	S.S. <i>Lux</i> ...	42° 30'	15° 26'	50 ft. square, 4 ft. out of water.
46	10.8.1915	S.S. <i>St. Louis</i> ...	41° 02'	48° 00'	Berg.
47	16.8.1915	S.S. <i>St. Leonards</i>	41° 09'	56° 43'	Berg.
48	21.8.1915	S.S. <i>Strathgarry</i> ...	40° 46'	68° 20'	Growler.
49	-8.1915	" "	39° 00'	46° 20'	Piece, 20 ft. long, 4 ft. high.
50	29.8.1920	U.S. Hyd., Bulletin	40° 30'	47° 52'	Berg.
51	2.9.1883	Bque., <i>Olivette</i> ...	35° 40'	30° 00'	Lump of ice.

No.	Date.	Source of Report.	Position of ice.		Remarks.
			Latitude N.	Longitude W.	
52	-9.1895	S.S. <i>Gulf of Taranto</i>	36° 35'	71° 36'	Two bergs 30 ft. high, 300-400 ft. long, and much field ice over two miles area.
53	19.9.1906	S.S. <i>Lord Landsdowne</i> .	54° 20'	22° 00'	Small berg 20 ft. by 6 ft.
54	10.9.1908	S.S. <i>Deutschland</i>	45° 28'	27° 18'	Two small bergs and one large.
55	6.9.1920	U.S. Hyd., Bulletin	47° 10'	38° 04'	Bergs.
56	2.9.1922	S.S. <i>Halljerd</i> ...	50° 00'	40° 05'	Berg.
57	15.9.1922	S.S. <i>Empress of Britain</i> .	52° 52'	40° 12'	Large berg.
58	3.9.1923	S.S. <i>Djambi</i> ...	40° 10'	31° 36'	Piece of ice about 30 ft. long, 1½ ft. out of water.
59	15.10.1883	S.S. <i>Elenora</i> ...	37° 00'	18° 00'	Piece ice.
60	8.10.1912	S.S. <i>Putney Bridge</i>	35° 15'	44° 50'	Small berg 35 ft. long, 6 ft. high.
61	27.10.1916	S.S. <i>Montreal</i> ...	51° 17'	41° 17'	Small berg.
62	2.10.1918	U.S. Hyd., Bulletin	50° 10'	40° 50'	Large berg.
63	19.10.1920	" "	45° 22'	40° 09'	Berg.
64	19.10.1920	" "	45° 24'	40° 07'	Berg.
65	17.10.1921	S.S. <i>Mount Vernon</i>	48° 23'	42° 19'	Berg about 70 ft. high, 400 ft. long.
66	6.10.1922	S.S. <i>Christian Krogh</i>	50° 43'	40° 42'	Berg 60 ft. high.
67	7.10.1923	S.S. <i>Eastern Dawn</i>	40° 46'	65° 54'	Large growler about 100 ft. square.
68	23.10.1927	Trawler, <i>Grecian Empire</i> .	30 miles E.S.E. of the Outer Skerries, Shetland Islands.		Piece of ice 100 ft. long, 6 ft. above water.
69	7.11.1922	Cape Race W/T Station.	47° 38'	40° 04'	Berg and growlers.
70	-12.1903	S.S. <i>Lord Antrim</i>	42° 00'	55° 00'	Ice.
71	22.12.1915	S.S. <i>Carolyn</i> ...	42° 53'	57° 39'	Large berg.
72	16.12.1920	S.S. <i>Oriana</i> ...	43° 53'	44° 39'	Berg.
73	16.12.1927	S.S. <i>Ascania</i> ...	47° 52'	40° 50'	Four large bergs. (approximate).

Detection of Ice.—Up to the present there has been no means devised whereby the presence of ice can be detected in the dark hours, or during fog. Experiments carried out by the Ice Patrol during past years have shown that seamen can depend upon no forewarning of a berg beyond the limit of their visibility. No reliance can be attached to echoes from the steam whistle or syren giving a warning of ice, nor does the presence of a berg have any appreciable effect on the temperature of the air or water, but it has been found that when navigating in the vicinity of the Great Bank, if the temperature of the sea remains at or about 60° Fahr. the chances of meeting ice are greatly reduced. The approximate temperature of the warm water abutting the cold wall is as follows: Throughout the winter and up to April, 54°, April 54°—56°, May 58°—60°, and from June throughout the summer to November, 61°—63°, when it falls to a minimum in February. On ordinary clear days the average berg can be picked up by the masthead look-out when 18 miles distant and will be seen from the bridge when between 12 to 15 miles away. On a cloudy day with good visibility deduct about 2 miles from the foregoing.

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

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

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

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

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

With a full moon at not less than 35° in altitude covered by a thin film of Cirro-Stratus clouds, a berg is visible to the naked eye

at a distance of 5 miles irrespective of the relative position of moon, berg, and ship.

International Ice Patrol.—Arising out of the loss of the R.M.S. *Titanic* through striking a berg in 1912, an International Conference for Safety of Life at sea was held in London in 1913. At this Conference it was decided to establish and maintain a regular patrol during the ice season of each year, the United States being asked to organise and manage the Service. Since 1914 the patrol has been entrusted to the United States Coast Guard, who each year detail two Coast Guard Cutters to cruise in the vicinity of the Great Bank of Newfoundland, there to locate and watch the movement of ice and ascertain its limits for the guidance of navigators.

The Patrol also carries out oceanographical and meteorological research into the conditions governing the movement of ice and drift of currents.

The practical utility of the work carried out by the Patrol has reduced the danger of ice to vessels trading between European and United States ports to a minimum, so much so that ice is rarely seen by these vessels throughout the year.

Commanders of ships are earnestly asked to co-operate in the work of the Patrol by reporting their position, course, and speed, and sea surface temperature every four hours when navigating in the area bounded by the 39th and 48th parallel of Latitude, and the 44th and 52nd meridians of Longitude. By this means the Patrol are able to keep track of all vessels within the danger zone, and are able to warn any vessel standing into danger.

Gulf of St. Lawrence Ice Patrol.—From the opening of navigation in the spring until the route is clear of ice an Ice Patrol is maintained by the Canadian Government in the Gulf of St. Lawrence between Cape Ray and Heath Point.

A regular message embodying ice conditions from Cape Race to Quebec and recommendations as to route to be followed is compiled by the Ice Patrol every four hours commencing at 0500 G.M.T. and kept for immediate transmission by W/T. to ships upon request. Similar information is also broadcast four times daily.

Commanders of incoming ships are requested to facilitate the work of the Patrol by supplying information regarding ice in their vicinity.

Descriptions of particulars of ice warning messages broadcast by the Ice Patrol Vessels are published on the back of the Ice Chart in THE MARINE OBSERVER as soon as available each year.

Ice Warnings from Shore Stations.—The following W/T shore stations issue Ice Warnings to shipping during the ice season as follows:—

Station.	Latitude N.	Longitude W.	Call Sign.	Wave length (Metres).	G.M.T. of issue.
Norfolk ...	36° 50'	76° 18'	NAM	2,883 (I.C.W.)	1545 2100 0300*
Washington (Arlington).	38° 52'	77° 05'	NAA	2,677 and 8,328 (C.W.)	1500* 2200
Washington (Annapolis).	38° 59'	76° 27'	NSS	2,677 (C.W.) 17,130 (C.W.)	1530 2200
New York ...	40° 27'	74° 00'	NAH	2,776 (C.W.)	1600 2200
Boston ...	42° 22'	71° 03'	NAD	2,939 (C.W.)	1400 0130 1330
St. John, N.B. ...	45° 14'	66° 03'	VAR	600 (Spk.)	On request.
Lurher L.-V. ...	43° 49'	66° 32'	VDR	600 (Spk.)	On request.
Yarmouth ...	43° 46'	66° 07'	VAU	600 (Spk.)	0200 1400 0130 1330
Chebucto Head ...	44° 30'	63° 31'	VAV	600 (Spk.)	On request.
Sable Island ...	43° 56'	60° 02'	VCT	600 (Spk.)	On request.
Canso ...	45° 19'	60° 58'	VAX	800 (Spk.)	On request.
North Sydney ...	46° 13'	60° 15'	VCO	600 (Spk.)	On request.
Grindstone Island	47° 24'	61° 51'	VCN	600 (Spk.)	On request.
Fame Point ...	49° 07'	64° 36'	VCG	600 (Spk.)	0145 1345 0200 1400
Father Point ...	48° 31'	68° 28'	VCF	600 (Spk.)	On request.
Heath Pt. L.-V. ...	49° 03'	61° 30'	VCI	600 (Spk.)	0215 1415
Cape Race ...	46° 39'	53° 05'	VCE	600 (Spk.)	On request.
Pt. Amour ...	51° 27'	56° 50'	VCL	600 (Spk.)	On request.
Belle Isle ...	51° 53'	55° 22'	VCM	600 (I.C.W.)	0230 1430

* Ice warning follows weather bulletin.

North Atlantic Tracks.

The principal International shipping companies engaged in the Trans North Atlantic trade have laid down and agreed to follow the prescribed routes given below. These tracks are revised from time to time as necessary and are laid down so as to avoid as far as possible the normal ice zone during the different seasons of the year.

Admiralty Route Charts showing these tracks are published in two sections.

Chart No. 2058b, showing Lane Routes, south of Ireland and English Channel.

Chart 2058c, showing Lane Routes, North of Ireland.

The section of the routes running through the ice region in operation for the month is shown on the Ice Chart, published with each Number of THE MARINE OBSERVER.

North Atlantic Lane Routes—United States.

Track "A" (extra Southern).

Track "A" will only be brought into use when necessity arises.

Westbound.

Steer from Fastnet or Bishop Rock on Great Circle Course, but nothing South to cross the meridian of $47^{\circ} 00' W.$, in Latitude $40^{\circ} 30' N.$, thence by either rhumb line or Great Circle to *Boston Light Vessel* or to a position south of *Nantucket Light Vessel*.

Eastbound.

From the position of $70^{\circ} 00' W.$, and $40^{\circ} 10' N.$, or from Boston steer by rhumb line to cross the meridian of $47^{\circ} 00' W.$, in Latitude $39^{\circ} 30' N.$, and from this last position nothing North of the Great Circle to Fastnet or Bishop Rock.

* Track "B" (Southern).

Westbound.—From February 1st to August 31st (both days inclusive).

Steer from Fastnet or Bishop Rock on Great Circle Course but nothing South, to cross the meridian of $47^{\circ} 00' W.$, in Latitude $41^{\circ} 30' N.$, thence by either rhumb line or Great Circle to *Boston Light Vessel* or to a position south of *Nantucket Light Vessel*.

Eastbound.—From February 1st to August 31st (both days inclusive).

From the position of $70^{\circ} 00' W.$, and $40^{\circ} 10' N.$, or from Boston steer by rhumb line to cross the meridian of $47^{\circ} 00' W.$, in Latitude $40^{\circ} 30' N.$, and from this last position nothing North of the Great Circle to Fastnet or Bishop Rock.

Note:—In case of necessity, owing to extreme southerly drift of ice, operative dates would be fixed for Track "A." In the event of ice not becoming a serious menace to Track "B" during the ice season, Track "A" would not therefore function.

* Track "C" (Northern).

Westbound.—From September 1st to January 31st (both days inclusive).

Steer from Fastnet or Bishop Rock on Great Circle Course, but nothing South, to cross the meridian of $50^{\circ} 00' W.$, in Latitude $43^{\circ} 00' N.$, thence by either rhumb line or Great Circle to *Boston Light Vessel* or to a position South of *Nantucket Light Vessel*.

Eastbound.—From September 1st to January 31st (both days inclusive).

From the position of $70^{\circ} 00' W.$, in $40^{\circ} 10' N.$, or from Boston, steer by rhumb line, to cross the meridian of $50^{\circ} 00' W.$, in Latitude $42^{\circ} 00' N.$, and from this last position nothing North of the Great Circle to Fastnet or Bishop Rock.

General Instructions

Vessels bound to or from United States ports calling at Halifax have the option of following either the Canadian or United States Seasonal Tracks to or from that port, passing 40 miles South of Sable Island Westbound, and 60 miles South of Sable Island Eastbound, when proceeding on United States Tracks, or 20 miles South of Sable Island Eastbound, when proceeding on Canadian Tracks.

* See Memorandum re "Tracks" overleaf.

Vessels bound direct to Portland (Maine) may follow the Canadian Seasonal Tracks.

When courses are changed at the intersections of meridians any time before or after noon, Commanders must note in their Logs both distances to and from the meridians that the ship has sailed from noon to noon, and not the distance from the position at noon the day before to the position at noon the day after the meridian is crossed.

The date on which Tracks change is to apply to the meridian of the Fastnet for Westbound steamers and the meridian of $70^{\circ} 00' W.$, for Eastbound vessels.

Communication on General Track matters between the British Lines will pass through the Cunard Line. The Holland America Line will communicate with the Continental Lines, excepting that during the Ice season the Cunard Line will communicate direct with all Lines.

With regard to proposals for changes in Tracks, owing to prevalence of ice, the Cunard and White Star Lines in Liverpool will confer and decide dates on which changes are to become operative, advising Lines by telegraph. Lines undertake to give immediate instructions to their steamers in accordance with such advices.

North Atlantic Lane Routes, Canada,

Track "D."

From 15th February to 10th April (both days inclusive).—

Westbound.—Steer from Fastnet, Inishtrahull, or 10 miles South of the Bishop Rock on Great Circle course, to cross the meridian of $47^{\circ} W.$, in Latitude $42^{\circ} N.$, thence to Halifax or other Port, passing not less than 40 miles South of Sable Island.

Eastbound.—Steer from Halifax or other port to pass 20 miles south of Sable Island to Longitude $47^{\circ} W.$, in Latitude $43^{\circ} N.$, thence on the Great Circle course to the Fastnet, Inishtrahull, or 10 miles South of the Bishop Rock.

Track "E."

From April 11th to May 15th, or until the Cape Race route clear of ice, and December 1st to February 14th.

Westbound.—Steer from the Fastnet, Inishtrahull, or 10 miles South of Bishop Rock on the Great Circle course, to the meridian of $50^{\circ} W.$, in $45^{\circ} 55' N.$, thence to Halifax or the Gulf of St. Lawrence.

NOTE.—The DONALDSON LINE reserve the right to cross Longitude 45° West in Latitude 45° North of this track.

Eastbound.—Steer for Halifax or the Gulf of St. Lawrence to cross the meridian of $50^{\circ} W.$, in Latitude $45^{\circ} 25' N.$, thence on the Great Circle Course to the Fastnet, Inishtrahull, or 10 miles South of the Bishop Rock.

Track "F."

From May 16th to the opening of Belle Isle Route, and to November 30th, when not using the Belle Isle Route.

Westbound.—Steer from Fastnet, Inishtrahull, or 10 miles south of the Bishop Rock, on a course 10 miles north of the Great Circle Track until approaching Cape Race, then steer a course to pass 10 miles South of Cape Race, thence to the St. Lawrence.

Eastbound.—Steer from position 25 miles South of Cape Race on a course 10 miles South of the Great Circle Track until approaching Fastnet, Inishtrahull, or 10 miles South of Bishop Rock.

Track "G."

Belle Isle Route.—From the opening of the Straits of Belle Isle to November 14th.

Westbound.—Steer from Fastnet, Inishtrahull, or 10 miles South of Bishop Rock, on a course 10 miles North of the Great Circle Track until approaching Belle Isle.

Eastbound.—Steer from Belle Isle on a course 10 miles South of the Great Circle Track until approaching Fastnet, Inishtrahull, or 10 miles South of the Bishop Rock.

General Instructions.

Vessels bound to or from United States Ports, from or to the North of Ireland, have the option of following the Canadian Seasonal Tracks D., E., and F., remaining on Track F., during the operative dates of Track G.

On Tracks E., and F., vessels passing 40 miles South of Sable Island, Westbound, thence to position South of Nantucket and Eastbound from position 40° 10' N., in 70° 00' W., to position 60 miles South of Sable Island.

On Track D., Westbound, proceeding by rhumb line from position 42° 00' N., in 47° 00' W., to position South of Nantucket, and Eastbound from position 40° 10' N., in 70° 00' W., to position 43° 00' N., in 47° 00' W.

Commanders, on encountering ice, have permission to deviate from these tracks, and, after the end of October, to leave the Belle Isle for the more southerly route at their discretion, according to weather conditions.

The Lines have the option of continuing the use of the Belle Isle Route after November 14th should they wish to do so.

The following memorandum to the Lines party to the North Atlantic Track Agreement dated 11th January, 1928, has been received from the Cunard Steamship Company:—

"Tracks."

"With reference to the memoranda to the Lines party under date 17th and 21st January, 1927, the question of the extension of Track C for a further period after the 31st January, has again received the consideration of the Marine Advisers of the White Star and Cunard Lines. They consider that the conditions this year will permit of a similar procedure and recommend that the following become operative:—

"Track C (at present operative) to be extended to March 31st (East and West).

"Track B to become operative on April 1st (East and West).

"In the event of circumstances necessitating Track B being brought into operation earlier than April 1st immediate notification would be sent to the Lines party.

"This alteration does not interfere with Canadian Ships changing in the ordinary course from Track E to Track D on February 15th."

Summary of Ice Conditions during 1927.

The following monthly summary of Ice conditions in the Western North Atlantic during 1927, is compiled from Ice Reports returned by ships of the Voluntary Observing Fleet, using the Trans-North Atlantic routes, from the Bulletins issued by the International Ice Patrol Service and reports received through other sources.

During this season Track "B" which normally becomes operative on February 1st was not brought into force until March 1st. This decision was arrived at by the Lines Party to the North Atlantic Track Agreement, owing to the fact that the United States Track "C" was brought down to pass south of the edge of the Newfoundland Banks in December, 1923, thereby allowing ships to follow this track for a longer period than was possible when this track crossed the Banks.

Owing to the ice not drifting so far south, throughout the season, as to menace Track "B" there was no necessity to bring Track "A" into force.

January.—No ice was reported during this month other than a berg (probably old ice) north of the Cape Race Tracks, in Latitude 48° 04' N., Longitude 51° 23' W.

February.—On February 7th, S.S. *Cydonia* was beset by ice, 5 miles from Sydney C.B., receiving damage to her plating, and on February 11th the port was closed being blocked by ice. From the second week in the month frequent reports of field ice were received over the Great Bank, north of the 45th Meridian, and north of Sable Island, between the 59th meridian and the Nova Scotia coast. On the track between St. Johns, Newfoundland, and Halifax numerous large growlers were reported and heavy close packed ice along the coast. On February 21st, Halifax Harbour was reported full of pan and slob ice, but navigation was not impeded.

On February 11th, a large berg was reported in Latitude 47° 08' N., Longitude 47° 12' W. On the 20th, a berg was reported 10 miles S.W., of Cape Race, and on the 23rd a small and large berg were sighted in Latitude 47° 55' N., Longitude 50° 23' W., and Latitude 47° 56' N., Longitude 50° 53' W., respectively.

March.—Inter-Gulf navigation opened on March 26th by the sailing of a steamer from Quebec to Anticosti Island. In the Western North Atlantic, heavy field ice was reported throughout the month on the eastern side of the Banks, between the 46th and 48th parallels and the 47th and 49th meridians. Field ice was also reported during the early part of the month, north of Sable Island, between the 59th meridian and the Nova Scotia coast.

Between March 11th and 17th, a berg, aground, was reported 12 miles S.W., of Cape Race, and throughout the month bergs were frequently reported between Latitude 43° 50' and 47° 40' North, and Longitudes 43° 40' and 49° 50' West.

On the 23rd of the month, the United States Coast Guard Cutter *Tampa* sailed from Boston to commence the 1927 Ice Patrol for the protection of the North Atlantic Lane Routes.

April.—The River and Gulf of St. Lawrence was reported clear of ice from Montreal to Heath Point, Anticosti, on the 12th. Elsewhere in the Gulf, heavy open ice existed with the exception of Belle Isle Strait which was full of heavy close packed ice. The Canadian Ice Patrol vessel reported "Good ice conditions on steamer track from Cape Ray to Heath Point." On April 22nd, navigation of the St. Lawrence by Trans-Atlantic shipping was opened by the arrival of R.M.S. *Montrose* at Quebec from Liverpool.

In the Western North Atlantic, field ice was reported throughout the month over the Great Bank north of Latitude 45° N., between the 46th and 53rd meridians, also in Cabot Straits, and over the Misaine and Banquereau Banks. Some of the fields on the northern part of the Great Bank were extensive and heavy, containing numerous bergs and growlers within them.

Reports of bergs were numerous and were freely scattered over the Great Bank, north of the 46th parallel. South of the 46th parallel, bergs were confined to the eastern and southern sides of the Bank. No ice was reported south of the 42nd parallel.

May.—On May 12th, in Belle Isle Strait, heavy close packed ice reported everywhere. Heavy open ice was also reported in the vicinity of Cape Breton coast and St. Paul Island, elsewhere the Gulf was clear of ice. By May 23rd the ice on the Cape Breton coast had opened sufficiently to allow vessels to use the port of Sydney C.B.

In the Western North Atlantic, field ice was reported during the early part of the month over the northern part of the Bank, west of the 49th meridian, between the 47th and 49th parallels.

The bergs reported south of the 45th parallel during April quickly disintegrated. During May only one report of ice, south of Latitude 45° N., was received, this was a small growler reported on the 15th, in Latitude 41° 57' N., Longitude 49° 53' W.

North of the 45th parallel and west of the 45th meridian reports of bergs were numerous. On May 6th, the Ice Patrol Cutter reported sighting about 100 bergs and several ice fields in area between Latitudes, 47° 50' and 47° 30' North, and Longitudes 50° 30' and 51° 00' West, which is just north of Cape Race Track "F." Four days later, the Patrol reported, in addition to the above, 50 bergs and 100 growlers, from Latitude 45° 30' N., Longitude 49° 30' W., to Latitude 48° 00' N., Longitude 51° 25' W. Towards the end of the month the Cape Race Tracks were prevalent with ice. On May 24th, *Meganitic* reported sighting 28 bergs and many growlers on both sides of track, west of Latitude 48° 17' N., Longitude 48° 32' W., and on the same day, the Ice Patrol Cutter reported a total of approximately 45 bergs and 60 growlers along both sides of tracks, from Latitude 48° 30' N., Longitude 48° 00' W., to Latitude 47° 15' N., Longitude 51° 00' W., also scattered bergs to Cape Race.

June.—No ice was reported in the Gulf of St. Lawrence other than in Belle Isle Straits where on the 11th the Canadian Signal Service reported numerous bergs and growlers, and at Point Amour, open ice inshore. On June 3rd, Copenhagen reported, "No ice 75 miles off Cape Farewell."

In the Western North Atlantic a small berg was observed on the 4th, in Latitude 44° 51' N., Longitude 49° 00' W., and on the 8th the

same ice was reported as a growler in Latitude $43^{\circ} 54'$ N., Longitude $48^{\circ} 22'$ W. This was the only ice reported south of the 45th parallel during the month.

North of Latitude 45° N., bergs were numerous especially on the Cape Race Tracks. On June 9th, the Ice Patrol Cutter reported 59 bergs between the 45th and 48th parallels and the 46th and 59th meridians, 33 of these bergs were situated within a radius of 20 miles of Latitude $47^{\circ} 14'$ N., Longitude $49^{\circ} 50'$ W., which is on Track "F." On June 10th, Belle Isle reported 20 bergs east of the island, ten bergs between the island and Cape Bauld, heavy scattered field ice in straits, clear to eastward, field ice drifting in and out with tide and Straits generally more open. On June 11th the first steamer for the season passed through the Straits. On June 22nd, the Ice Patrol Cutter reported a total of 15 bergs north of the 45th parallel, four of which were breaking up rapidly on the northern edge of the Gulf Stream, southward of Flemish Cap. After searching and finding no ice south of Latitude 45° North, the ice patrol was discontinued on June 25th.

July.—On July 2nd, Copenhagen reported "Ice limit 75 miles off Cape Farewell, open ice in the limit, else tight pack ice. In Davis Strait the ice goes to Frederikshaab."

No ice was reported during the month south of the 46th meridian. Three reports of bergs were received on the St. Johns route, west of the 45th meridian on the 7th and 8th of the month. Two bergs were reported on the 14th and 18th respectively off the east coast of Newfoundland between Ferryland light and Cape Race.

With the opening of the Belle Isle route, bergs were frequently reported on the northern routes during the month. On July 9th, *Regina*, when passing through the Straits eastward, reported 22 bergs some of which were on the track between Point Amour and Cape Norman, 14 bergs between Cape Norman and Belle Isle, 6 bergs between Belle Isle and Cape Bauld, 27 bergs and 7 growlers north and south of track from Belle Isle to Latitude $52^{\circ} 00'$ N., Longitude $54^{\circ} 09'$ W. No berg was reported during the month on the Belle Isle Track east of the 50th meridian.

August.—Three reports of bergs in the vicinity of Cape Race were reported during the month. All other reports referred to ice north of Latitude 51° N., and west of the 50th meridian, on the Belle Isle routes.

On August 8th, 14 bergs and several growlers were reported between Point Amour and Belle Isle, between Belle Isle and Latitude $52^{\circ} 44'$ N., Longitude $51^{\circ} 50'$ W., 4 bergs and several growlers.

September.—On September 8th, a large growler was reported in Latitude $47^{\circ} 49'$ N., Longitude $48^{\circ} 26'$ W., on the Cape Race route and on the 1st, 3 bergs and on the 16th one berg, were reported on the Belle Isle route east of the 51st meridian.

All other reports referred to ice in the Belle Isle Strait.

On September 5th, between Cape Norman and Belle Isle, 3 bergs and 5 growlers were reported.

On September 20th, Copenhagen reported, "Free of ice round Cape Farewell."

October.—On October 3rd, two bergs and several growlers were reported between Ferrole Point and Belle Isle. On the tracks east of Belle Isle, one berg and several growlers were reported during the first half of the month. During the second half of the month no reports of ice were received.

A phenomenal position for ice constituting a danger to navigation was recorded when the Trawler, *Grecian Empire*, reported a piece of ice, 100 feet long, 6 feet above water, 30 miles E.S.E. of the Outer Skerries, Shetland Islands, approximate Latitude $60^{\circ} 23'$ N., Longitude $0^{\circ} 33'$ W., at 1.30 p.m. on October 23rd. There being no record of floating ice of such dimensions so far to the eastward, Skipper DUFFIN of *Grecian Empire* was closely interrogated by the Officers of the Fishery Board of Scotland who consider the report reliable, he having been within close range of the ice.

November.—No ice was sighted by reporting ships during this month. The Canadian Signal Service reported on the 12th "All points report no ice in sight;" and on the same date, Copenhagen reported, "no pack ice observed 20 miles off Cape Farewell, icebergs until 42° Longitude. The Bay of Julianehabb, no ice, Angmangsalik, no ice."

December.—With the departure of two steamers from Montreal on the 6th, the St. Lawrence navigation season closed. On the 12th the Canadian Signal Service reported, "Montreal to Saguenay River, light open ice everywhere. Father Point, open ice inshore, other points no ice in sight."

In the Western North Atlantic, S.S. *Ascania* reported in the the phenomenal position, Latitude $47^{\circ} 52'$ N., Longitude $40^{\circ} 50'$ W., 4 large bergs on the 16th of the month.

WEATHER SIGNALS.

FRANCE.

II.—WIRELESS WEATHER SIGNALS.

WIRELESS WEATHER BULLETINS.

The Key and Decode Tables of the International Weather Telegraphy Code will be found on pages 20 to 23 of Volume V No. 49. (The January, 1928 Number.)

The method of decoding station weather reports made in code was described in the British "Weather Shipping" Bulletin, on pages 37 and 38 of Volume V No. 50. (The February, 1928 Number.)

The same method of decoding weather reports applies in all cases where the International Code is used.

The letters given in the descriptions which follow give the key to the tables for decoding the figures.

Where other than International code tables are used they are published along with the signals described and an explanation is given.

C.W. Issues "International Collective Reports."

Paris—Eiffel Tower W/T Station, approximate latitude $48^{\circ} 51'$ N., Longitude $2^{\circ} 18'$ E., call sign **FL**, broadcasts weather bulletins, in code, as follows:—

Times of broadcast.	Wavelength.	Observations of
0845 G.M.T.	7,200 m. (C.W.)	Ships and Land Stations.
0945 G.M.T.	{ 7,200 m. (C.W.) 2,650 m. (C.W.) }	Land Stations.
2100 G.M.T.	7,200 m. (C.W.)	do.

St. Pierre des Corps W/T Station, call sign **YG**, approximate Latitude $47^{\circ} 24'$ N., Longitude $0^{\circ} 44'$ E., also broadcasts a weather bulletin in code at:—

1600 G.M.T. Wavelength 6,000 m. (C.W.). Observations of Land Stations and Ships.

All bulletins commence with the letters "O.N.M."

0845 G.M.T. Bulletin.

This bulletin is preceded by the words "Météo Atlantique," and is divided into four parts, viz.:—

Part I.—Commencing with the words "Atlantique oriental,"

contains observations from ships. It is broadcast in International Code, represented by "Key letters" as follows:—

PQ LLL IIGG BBDDF wvvKd.

It will be noted that these symbols and their meanings are similar to those given in that part of the "Decode Form" named "International Weather," published on p. 19 of Vol. V No. 49 of this Journal.

Part II.—Commencing with the words "Atlantique occidental," contains observations from American ships in the Western North Atlantic. It is broadcast mostly in International Code represented by "Key letters" as follows:—

I_nI_n PQ' LLL IIGG BBDDF TTTw'

Q' = Quarter of the globe in which ship is (Table XXIX).

w' = Present weather (Table XXX).

Part III.—Commencing with the words "Service Jacques Cartier," contains observations from ships in the same form as Part I of this bulletin.

Part IV.—Commencing with the words "Syrie 0600," contains observations of 0600 G.M.T. taken at stations in Syria.

0945 G.M.T. Bulletin.

This bulletin is divided into two parts, viz.:—

Part I.—Preceded by the words "Météo Europe," contains observations of 0700 G.M.T. taken at the stations given in the list below. It is broadcast in International Code, represented by "Key letters" as follows:—

I_nI_nI_n BBDDF w₁TTK'R.

Observation Stations (Part I).

Index Number.	Station.	Approximate Position.	
		Latitude.	Longitude.
000	Mygbugten ...	73° 30' N.	21° 30' W.
001	Jan Mayen ...	70° 59' N.	8° 19' W.
002	Spitzbergen ...	78° 57' N.	11° 42' E.
005	Ingoy ...	71° 04' N.	24° 09' E.
013	Brönnöy ...	65° 29' N.	12° 13' E.
030	Lister ...	58° 06' N.	6° 34' E.
050	Haparanda ...	65° 52' N.	24° 09' E.
059	Stockholm ...	59° 21' N.	18° 03' E.
101	Valentia (Ireland) ...	51° 57' N.	10° 15' W.
105	Malin Head ...	55° 23' N.	7° 24' W.
110	Lerwick ...	60° 09' N.	1° 08' W.
118	Renfrew ...	55° 52' N.	4° 24' W.
126	Holyhead ...	53° 18' N.	4° 39' W.
151	London ...	51° 21' N.	0° 07' W.
170	Reykjavik ...	64° 09' N.	21° 55' W.
176	Seydisfjord ...	65° 10' N.	13° 40' W.
181	Copenhagen ...	55° 42' N.	12° 37' E.
191	Thorshavn ...	62° 03' N.	6° 45' W.
203	Bordeaux ...	44° 50' N.	0° 42' W.
209	Paris ...	48° 56' N.	2° 26' E.
210	Lyons ...	45° 45' N.	4° 55' E.
211	Brest ...	48° 23' N.	4° 31' W.
216	Perpignan ...	42° 43' N.	2° 54' E.
261	Pertusato ...	41° 22' N.	9° 11' E.
275	Brussels ...	50° 48' N.	4° 21' E.
281	Zürich ...	47° 22' N.	8° 34' E.

Observation Stations (Part I)—cont.

Index Number.	Station.	Approximate Position.	
		Latitude.	Longitude.
293	Utrecht (de Bilt) ...	52° 05' N.	5° 11' E.
306	Genoa ...	44° 23' N.	8° 55' E.
307	Florence ...	43° 47' N.	11° 14' E.
309	Ancona ...	43° 37' N.	13° 31' E.
311	Rome ...	41° 54' N.	12° 27' E.
316	Messina ...	38° 12' N.	15° 33' E.
319	Taranto ...	40° 28' N.	17° 15' E.
330	Tripoli ...	32° 54' N.	13° 12' E.
341	Malta ...	35° 53' N.	14° 31' E.
351	Corunna ...	43° 23' N.	8° 25' W.
353	Madrid ...	40° 24' N.	3° 41' W.
357	Mahon ...	39° 54' N.	4° 16' E.
358	Barcelona ...	41° 23' N.	2° 09' E.
364	Valladolid ...	41° 39' N.	4° 43' W.
366	Cordoba ...	37° 53' N.	4° 49' W.
369	San Fernando ...	36° 27' N.	6° 13' W.
384	Lisbon ...	38° 41' N.	9° 08' W.
395	Funchal ...	32° 37' N.	16° 54' W.
398	Horta ...	38° 32' N.	28° 38' W.
403	Hamburg ...	53° 33' N.	9° 58' E.
408	Magdeburg ...	52° 09' N.	11° 38' E.
414	Munich ...	48° 09' N.	11° 33' E.
481	Helsingfors ...	60° 10' N.	24° 57' E.
501	Vienna ...	48° 13' N.	16° 22' E.
520	Prague ...	50° 05' N.	14° 26' E.
524	Kosice ...	48° 43' N.	21° 14' E.
541	Budapest ...	47° 29' N.	19° 03' E.
552	Warsaw ...	52° 14' N.	21° 01' E.
558	Lemberg ...	49° 50' N.	24° 00' E.
575	Bucharest ...	44° 25' N.	26° 05' E.
601	Tangier ...	35° 45' N.	5° 47' W.
603	Rabat ...	34° 02' N.	6° 46' W.
607	Agadir ...	30° 26' N.	9° 32' W.
631	Oran ...	35° 42' N.	0° 41' W.
632	Algiers ...	36° 45' N.	3° 03' E.
661	Tunis ...	36° 46' N.	10° 10' E.
662	Bizerta ...	37° 16' N.	9° 52' E.
681	Helwan ...	29° 52' N.	31° 20' E.
695	Limassol ...	34° 41' N.	33° 04' E.
701	Belgrade ...	44° 47' N.	20° 28' E.
720	Sofia ...	42° 42' N.	23° 20' E.
730	Athens ...	37° 57' N.	23° 43' E.
733	Corfu ...	39° 35' N.	19° 55' E.
743	Constantinople ...	41° 02' N.	28° 58' E.
781	Damascus ...	33° 31' N.	36° 14' E.
782	Muslimie ...	36° 21' N.	37° 08' E.
783	Dier-es-Zoor ...	35° 20' N.	40° 11' E.
809	Vaigatch ...	70° 24' N.	58° 48' E.
815	Leningrad ...	59° 56' N.	30° 16' E.
826	Moscow ...	55° 46' N.	37° 39' E.
830	Kiev ...	50° 27' N.	30° 30' E.
840	Orenburg ...	51° 45' N.	55° 06' E.
845	Sebastopol ...	44° 37' N.	33° 31' E.
849	Astrakhan ...	46° 21' N.	48° 02' E.
861	Omsk ...	54° 59' N.	73° 22' E.
52	Port Etienne ...	20° 37' N.	17° 04' W.

Part II.—Preceded by the words "Météo Amerique," contains observations of 0100 G.M.T. taken at various stations in the United States and Canada.

1600 G.M.T. Bulletin.

This bulletin is divided into three parts, viz. :—

Part I.—Preceded by the words "Météo Europe," contains observations of 1300 G.M.T. taken at the stations given in the list above. It is broadcast in International Code, represented by "Key letters" as follows:—

$I_n I_n I_n$ BBDDF $w_1 TTK'R$

Part II.—Preceded by the words "Atlantique Oriental," contains observations from ships. It is broadcast in International Code, represented by "Key letters" as follows:—

PQLLL IIIIGG BBDDF $wwwKd.$

It will be noted that these symbols and their meanings are similar to those given in that part of the "Decode Form" named "International Weather," published on p. 19 of Vol. V No. 49 of this Journal.

The observations from ships in Part II do not necessarily synchronise with those from the land stations in Part I. Marine observers are advised to examine the date and time of observations carefully before use.

Part III.—Preceded by the words "Syrie 1200," contains observations of 1200 G.M.T. taken at stations in Syria.

2100 G.M.T. Bulletin.

This bulletin is divided into four parts, viz. :—

Part I.—Preceded by the words "Météo Europe," contains observations of 1800 G.M.T. taken at the stations given in the list on p. 76. It is broadcast in International Code, represented by "Key letters" as follows:—

$I_n I_n I_n$ BBDDF $w_1 TTK'R$

Part II.—Preceded by the words "Atlantique Oriental," contains observations from ships. It is broadcast in International Code, represented by "Key letters" as follows:—

PQLLL IIIIGG BBDDF $wwwKd.$

The observations from ships in Part II of this bulletin do not necessarily synchronise with those from the land stations in Part I. Marine observers are advised to examine the dates and times of observation carefully before use.

Part III.—Preceded by the words "Syrie 1800," contains observations of 1800 G.M.T. taken at stations in Syria.

Part IV.—Preceded by the words "Amerique du Sud 1200," contains observations of 1200 G.M.T. taken at stations in South America.

The units used in the bulletins explained above are:—Barometric readings, mbs.; temperatures, degrees centigrade. To convert mbs. to ins. see Table XXXI, and centigrade temperatures to Fahr., Table XXXII.

SPECIAL WEATHER TELEGRAPHY TABLES,
NOT INTERNATIONAL CODE.

Table XXIX.

Q"—Quarter of the Globe.

Code Figure.	Latitude.	Longitude.	
1	N.	W.	Barometer in millibars ; temperature in ° F.
2	N.	E.	
3	S.	W.	
4	S.	E.	
5	N.	W.	Barometer in millibars or millimetres ; temperature in ° C.
6	N.	E.	
7	S.	W.	
8	S.	E.	

Table XXX.

w'—Present Weather.

Code Figure.		Code Figure.	
0 =	Sky clear.	5 =	Rain.
1 =	" $\frac{1}{4}$ clouded.	6 =	Snow.
2 =	" $\frac{1}{2}$ clouded.	7 =	Mist.
3 =	" $\frac{3}{4}$ clouded.	8 =	Fog.
4 =	" Overcast.	9 =	Thunderstorm.

Table XXXI.

Conversion of Millibars to Inches.

Equivalent in Mercury Inches at 32°, and Latitude 45° of Millibars.

Mb.	In.	Mb.	In.	Mb.	In.	Mb.	In.	Mb.	In.	Mb.	In.	Mb.	In.
925	27.32	940	27.76	960	28.35	980	28.94	1000	29.53	1020	30.12	1040	30.71
926	27.35	941	27.79	961	28.38	981	28.97	1001	29.56	1021	30.15	1041	30.74
927	27.38	942	27.82	962	28.41	982	29.00	1002	29.59	1022	30.18	1042	30.77
928	27.41	943	27.85	963	28.44	983	29.03	1003	29.62	1023	30.21	1043	30.80
929	27.44	944	27.88	964	28.47	984	29.06	1004	29.65	1024	30.24	1044	30.83
930	27.46	945	27.91	965	28.50	985	29.09	1005	29.68	1025	30.27	1045	30.86
931	27.49	946	27.94	966	28.53	986	29.12	1006	29.71	1026	30.30	1046	30.89
932	27.52	947	27.97	967	28.56	987	29.15	1007	29.74	1027	30.33	1047	30.92
933	27.55	948	28.00	968	28.59	988	29.18	1008	29.77	1028	30.36	1048	30.95
934	27.58	949	28.03	969	28.62	989	29.21	1009	29.80	1029	30.39	1049	30.98
935	27.61	950	28.05	970	28.65	990	29.24	1010	29.83	1030	30.42	1050	31.01
936	27.64	951	28.08	971	28.67	991	29.26	1011	29.86	1031	30.45	1051	31.04
937	27.67	952	28.11	972	28.70	992	29.29	1012	29.89	1032	30.48	1052	31.07
938	27.70	953	28.14	973	28.73	993	29.32	1013	29.92	1033	30.51	1053	31.10
939	27.73	954	28.17	974	28.76	994	29.35	1014	29.94	1034	30.53	1054	31.13
		955	28.20	975	28.79	995	29.38	1015	29.97	1035	30.56		
		956	28.23	976	28.82	996	29.41	1016	30.00	1036	30.59		
		957	28.26	977	28.85	997	29.44	1017	30.03	1037	30.62		
		958	28.29	978	28.88	998	29.47	1018	30.06	1038	30.65		
		959	28.32	979	28.91	999	29.50	1019	30.09	1039	30.68		

Table XXXII.

Conversion of Centigrade Temperatures to Fahrenheit.

Cent.* Trans- mitted.	Fahr.	Cent. Trans- mitted.	Fahr.	Cent. Trans- mitted.	Fahr.	Cent. Trans- mitted.	Fahr.
—	—	00	32	10	50	21	70
51	30	01	34	11	52	22	72
52	28	02	36	12	54	23	73
53	27	03	37	13	55	24	75
54	25	04	39	14	57	25	77
55	23	05	41	15	59	26	79
56	21	06	43	16	61	27	81
57	19	07	45	17	63	28	82
58	18	08	46	18	64	29	84
59	16	09	48	19	66	30	86
				20	68		

* 50 is added to the amounts to indicate minus temperatures Centigrade.

WIRELESS STORM WARNINGS.

C.W. Issues.

Eiffel Tower W/T Station broadcasts wireless storm warnings immediately after the daily weather bulletins at 0220, 0820 and 1920 G.M.T. if the forecasts indicate that the wind force is likely to exceed force 7 on the Beaufort scale. Wavelength 7,300 metres (C.W.).

The signals refer to the following French coastal areas:—

"Manche"	...	Belgian frontier to St. Helier (Channel Is.).
"Bretagne"	...	St. Helier to (and including) Noirmoutiers (Bay of Biscay).
"Ocean"	...	Noirmoutiers to the Spanish frontier.
"Roussillon"	...	Spanish Frontier to Faraman.
"Provence"	...	From Faraman to the Italian Frontier, including Corsica.
"Méditerranée"	..	Only used when one message suffices for the combined areas "Roussillon" and "Provence."

Form of Message.

The warnings are sent *en clair*. They commence with the name of the day of the week and the duration for which they are valid, followed by the word "Tempête" and the probable direction from which the gale may be expected.

Example.

"Jeudi 15 heures Manche tempête, N.W. Bretagne, Ocean tempête S.W. Méditerranée tempête S.W."

Explanation.

Storms or gales are predicted (or will continue) from now until 1500 to-morrow in the areas and from the directions mentioned.

Spark Issues.

The following W/T stations broadcast storm warnings concerning the areas "Manche," "Bretagne" and "Ocean":—

Cherbourg	...	Approximate Latitude 49° 37' N., Longitude 1° 36' W., call sign FUC.
Brest	...	Approximate Latitude 48° 22' N., Longitude 4° 34' W., call sign FUE.
Lorient (Pen-Mané)	...	Approximate Latitude 47° 44' N., Longitude 3° 21' W., call sign FUN.
Rochefort	...	Approximate Latitude 45° 55' N., Longitude 0° 57' W., call sign FUR.

The following W/T stations broadcast storm warnings concerning the areas "Rousillon" and "Provence" (or Méditerranée):—

Porquerolles	...	Approximate Latitude 42° 59' N., Longitude 6° 12' E., call sign FUQ and
Ajaccio	...	Approximate Latitude 41° 56' N., Longitude 8° 46' E., call sign FUL.

The W/T stations transmit the warning on the 600 metre wave length as soon as it is received by land line or from Eiffel Tower. The International Safety Signal — — — (TTT) is first sent out, and is followed a minute later by the storm warning, which is repeated three times at intervals of ten minutes.

When the time of sending falls outside a single operator watch on board ship the message is repeated at the commencement of the succeeding watch.

III.—WIRELESS TIME SIGNALS.**C.W. Issues.**

Time signals in accordance with the New International System of W/T Time Signals proposed by the International Time Commission, held at Cambridge in July, 1925, are now broadcast from wireless stations in France, as follows:—

Paris—Eiffel Tower W/T Station.

Position, Latitude 48° 51' 30" N., Longitude 2° 17' 43" E.
Call Sign FL. Wavelengths 32·50 m. (C.W.) and 2,650 m. (I.C.W.).

New International Time-Signals.

W/T Time-Signals are transmitted automatically from the Standard Clock at Paris Observatory, Latitude 48° 50' 11" N., Longitude 2° 20' 14" E., in accordance with the New International System of W/T Time-Signals as follows:—

	h.	m.	s.	h.	m.	s.	
(1) From	7	56	00	to	8	00	00 on 32·50 metres. (C.W.)
(2) „	9	26	00	„	9	30	00 „ 2,650 „ (I.C.W.)
(3) „	19	56	00	„	20	00	00 „ 32·50 „ (C.W.)
(4) „	22	26	00	„	22	30	00 „ 2,650 „ (I.C.W.)

The transmission of each series of signals is similar in every respect, the procedure as regards (1) being:—

G.M.T.						Signal.									
h.	m.	s.		h.	m.	s.									
7	55	30					Call (— — — — —) followed by initials of the Bureau International de l'Heure (— — — — —).								
7	56	05	to	7	56	50	— — — — — every 10 sec., the third series being a single dash prolonged for 5 sec.								
	57	00	„	57	50		— — — — — etc.								
	57	55	„	58	00		{	55	56	57	58	59	60	<i>Time signal.</i>	
							{	—	—	—	—	—	—		
7	58	08	„	7	58	10	— — — — —								
	58	18	„	58	20	— — — — —									
	58	28	„	58	30	— — — — —									
	58	38	„	58	40	— — — — —									
	58	48	„	58	50	— — — — —									
	58	55	„	59	00		{	55	56	57	58	59	60	<i>Time signal.</i>	
							{	—	—	—	—	—	—		
	59	06	„	59	10	— — — — —									
	59	16	„	59	20	— — — — —									
	59	26	„	59	30	— — — — —									
	59	36	„	59	40	— — — — —									
	59	46	„	59	50	— — — — —									
7	59	55	„	8	00	00		{	55	56	57	58	59	60	<i>Time signal.</i>
								{	—	—	—	—	—	—	
— = 1 sec. ; ■ = 0·2 sec.															

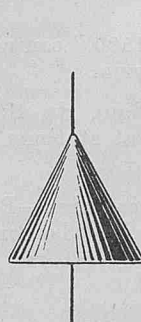
— = 1 sec.; ■ = 0·2 sec.

Bordeaux—La Fayette W/T Station.

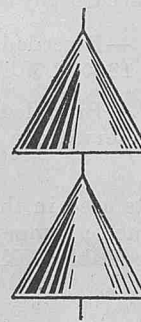
Position, Latitude 44° 42' 00" N., Longitude 0° 49' 00" W.
Call Sign LY. Wavelength 18,900 m. (C.W.).

New International Time-Signals.

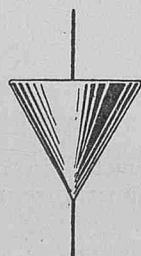
Time-Signals in accordance with the New International System of W/T Time-signals are broadcast twice daily, at 8^h. 00^m. 00^s. G.M.T. and 20^h. 00^m. 00^s. G.M.T. The signals are transmitted automatically by the Standard Clock at Paris Observatory. For procedure, see Eiffel Tower New International System of W/T Time-Signals above.

IV.—VISUAL GALE WARNINGS.**Day Signals.**

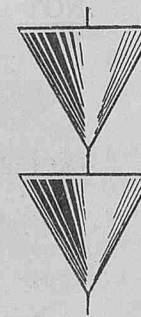
Hoisted when a gale is probable from N.W.



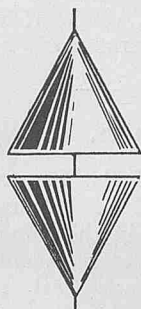
Hoisted when a gale is probable from N.E.



Hoisted when a gale is probable from S.W.



Hoisted when a gale is probable from S.E.



Hoisted when gales of hurricane force are probable.

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, and the knowledge of which is likely to be of use to seamen. Its meaning is simply "Look out! Bad weather as indicated is probably approaching you."

The signals are hoisted when necessary at the semaphore stations and port offices on the coast of France, and remain hoisted 48 hours from the time of receiving notice from the Ministry of Marine.

I. SHIPS' WIRELESS WEATHER SIGNALS.—AMENDMENT.

Page 18, Volume V, No. 49 (January 1928 Number).

(3) North Atlantic "Decode."

COLUMN 2, LINE 19 FROM TOP.

The sentence commencing "Those addressed to Weather London" should be amended to read as follows:—

"Those addressed to Weather London are made to **Devizes W/T Station**, call sign **GKU**, the ship reporting first calling Devizes on the wavelength of 2,013 metres (C.W.), unless otherwise instructed by Devizes, and passing her report on a wavelength designated by Devizes."

NOTE.—The above amendment is made in accordance with the "Provisional Regulations for the Conduct of Long C.W. Ship and Shore Commercial Communication." These regulations came into force, as far as communication with the British coast station at Devizes is concerned, on March 1st, 1928. (See Admiralty "Notices to Mariners," No. 6, for week ending February 11th, 1928, Section IV, pages 44-47.)

The position of the transmitting station at Portishead is Latitude $51^{\circ} 28' 40.7''$ N., Longitude $2^{\circ} 27' 30.3''$ W.

Special Notices Regarding Personnel.

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

Captain F. Hart.

Captain FRANK HART, Commander of the R.M.S. *Corinthic* has retired from active service afloat after 46 years' sea service.

Completing his apprenticeship in FERNIE's sailing ships trading to Calcutta, Captain HART continued to serve in sail as an Officer, and obtained command of a sailing ship at the early age of 24.

Leaving sail for steam, he entered the service of the old INMAN LINE as 4th Officer, and a little later transferred to the BEAVER LINE. In 1892 he took service as a junior Officer in the WHITE STAR

LINE, and steadily rising through the different ranks, was promoted to command of the *Bovic* in 1903.

Successively commanding the *Victorian* and *Armenian*, Captain HART transferred to the command of the *Corinthic* in 1909, which with a short war break he has held ever since, running in the New Zealand trade.

He is a Lieutenant-Commander on the retired list of the Royal Naval Reserve, and has been a regular member of the Voluntary Corps of Marine Observers since 1917. Marine Observers will join with the Marine Division in wishing Captain HART long life and happiness in his well earned retirement.

Captain P. J. Collins, O.B.E.

Captain P. J. COLLINS of S.S. *Euripides* retired in February 1928, after 43 years' sea service, the whole of which was spent in Messrs. GEO. THOMPSON & Co's. ships of the ABERDEEN WHITE STAR LINE.

He was apprenticed on his 14th birthday, 3rd March, 1885, and like so many who served their time in GEORGE THOMPSON's beautiful green painted clipper ships, passed to their steamers as a junior officer; first in S.S. *Aberdeen* as fourth, next in S.S. *Thermopylae* as third and second, and in 1894 was appointed Chief Officer of S.S. *Aberdeen*. He was Chief Officer of the S.S. *Salamis* and S.S. *Pericles*; in the latter ship he served with Captain ALEXANDER SIMPSON who contributed more meteorological logs than any other Commander to the British Meteorological Office.

In 1910 he gained his first command in S.S. *Marathon*, remaining in her for nearly 5 years, when he transferred to *Themistocles*. In July, 1918, he was appointed to the command of *Euripides* and continued in her up to retirement.

Captain COLLINS has contributed many meteorological logs, and like his old commander, Captain SIMPSON, sent in the fair copy in his own handwriting. His name has appeared in the annual list of "excellent" awards on several occasions.

The Marine Division and corps of voluntary marine observers join in wishing Captain COLLINS every happiness in his retirement.

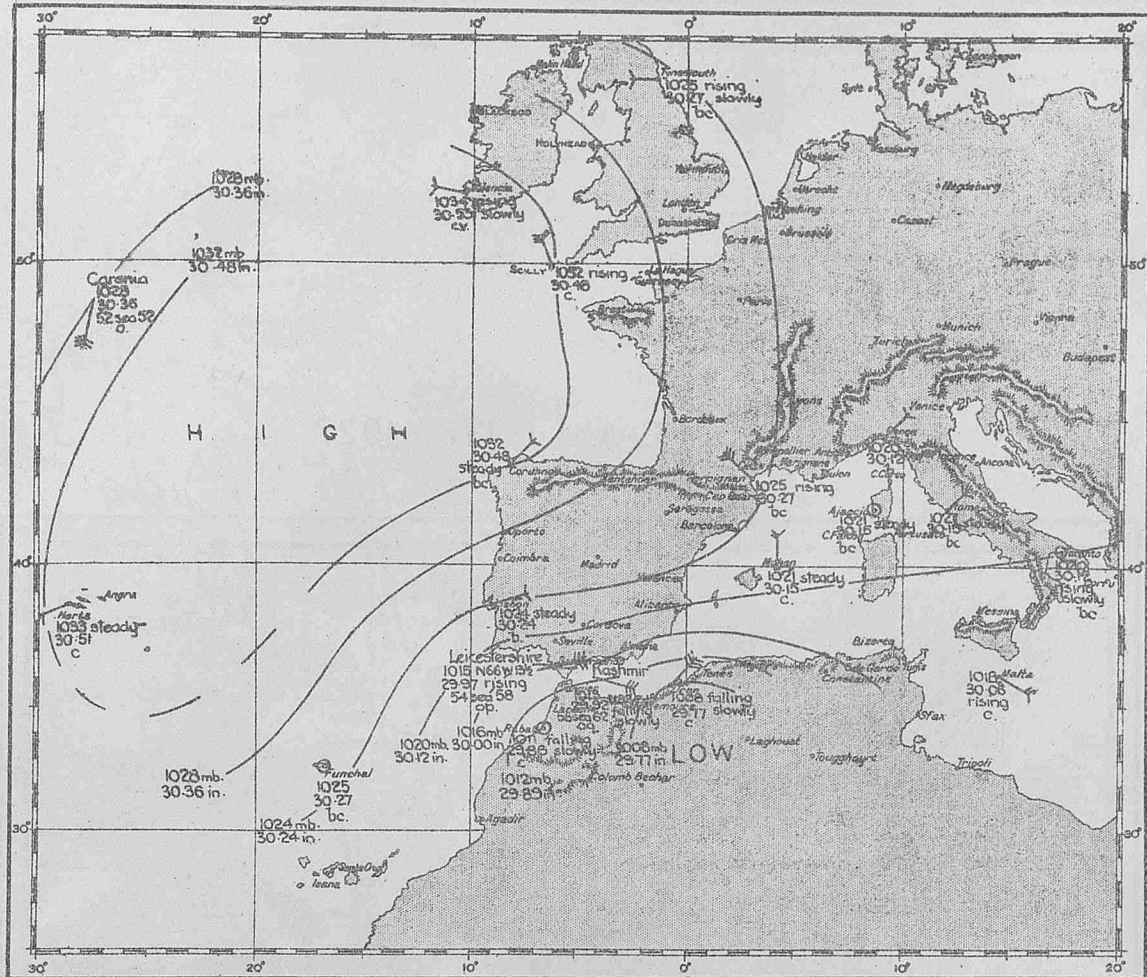
Captain S. C. Warner.

Captain S. C. WARNER of the PENINSULAR and ORIENTAL STEAM NAVIGATION COMPANY retired in February last after 42 years' sea service. He served his time in the famous clipper ship *Tweed*, and the ship *Cairnbulg*, which latter, those who served their time in the Australian wool trade under sail, will remember for the handsome brass sheathed topgallant rail running fore and aft the ship. He joined the PENINSULAR and ORIENTAL COMPANY's service as a junior officer at the age of 23, and his first command was S.S. *Poona* in 1916. In this ship he had the experience of being mined when 12 miles S.W. of Beachy Head on December 6th, and received LLOYD's certificate for saving this ship and her valuable cargo.

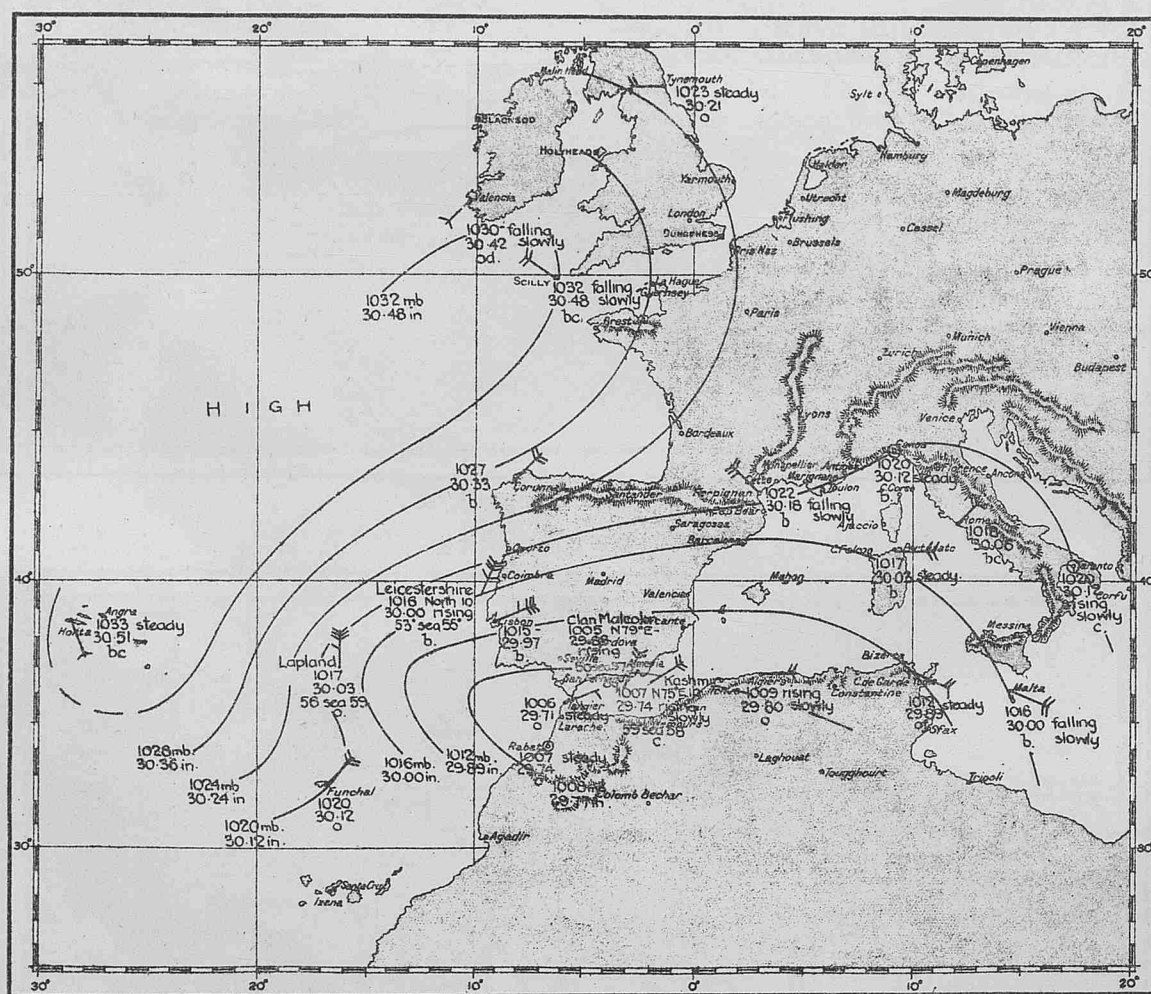
Captain WARNER joined the corps of voluntary marine observers at the latter end of his career, R.M.S. *Maloja* during 1927, being the first and last ship under his command to regularly contribute recorded observations to the Meteorological Office.

The Marine Division and corps of voluntary observers join in wishing Captain WARNER a happy and useful retirement.

0700 G.M.T., APRIL 12TH. 1927.



0700 G.M.T., APRIL 13TH. 1927.

Weather Chart XII.

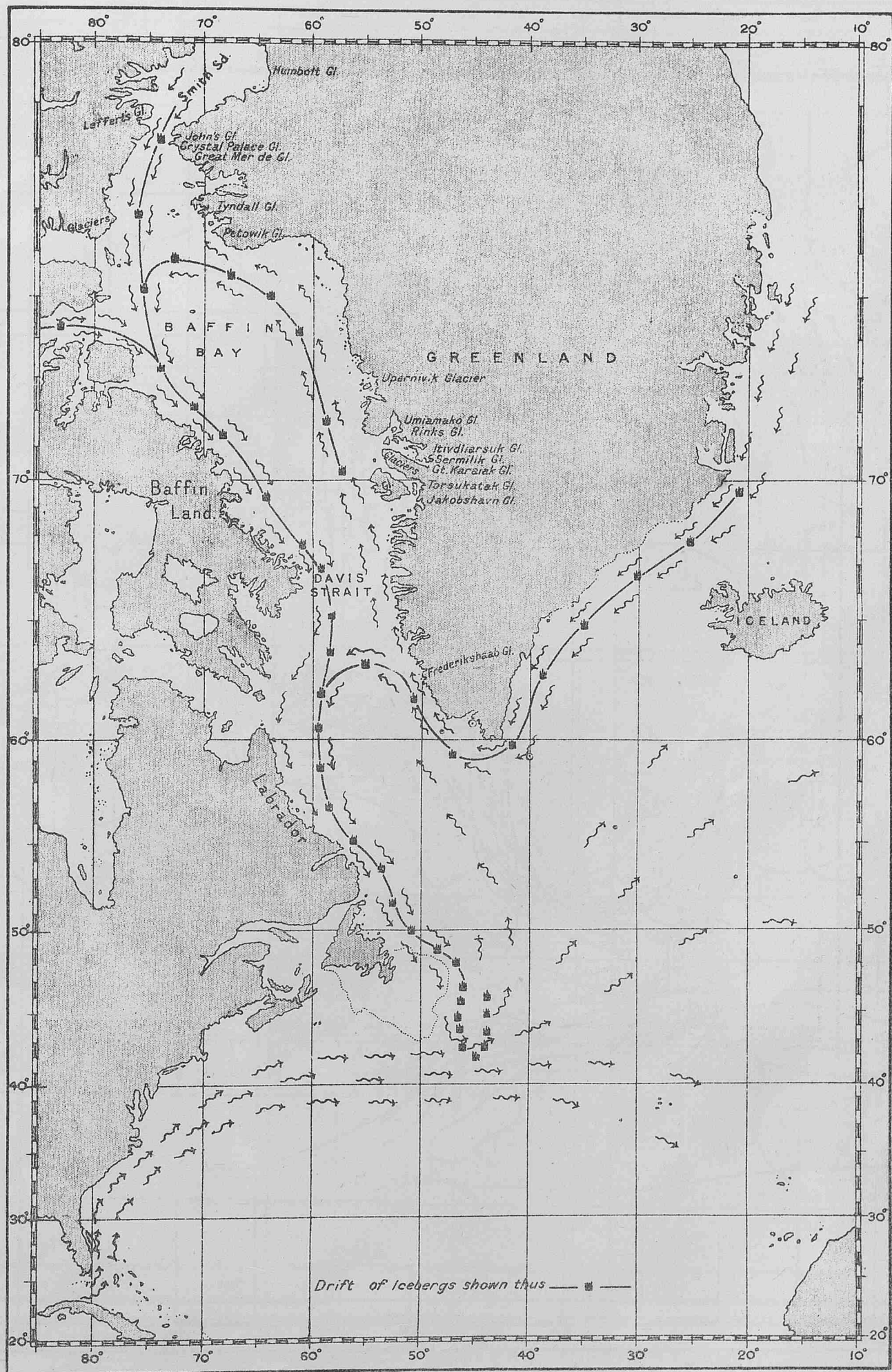


Chart A.—GENERAL DRIFT OF ICEBERGS.

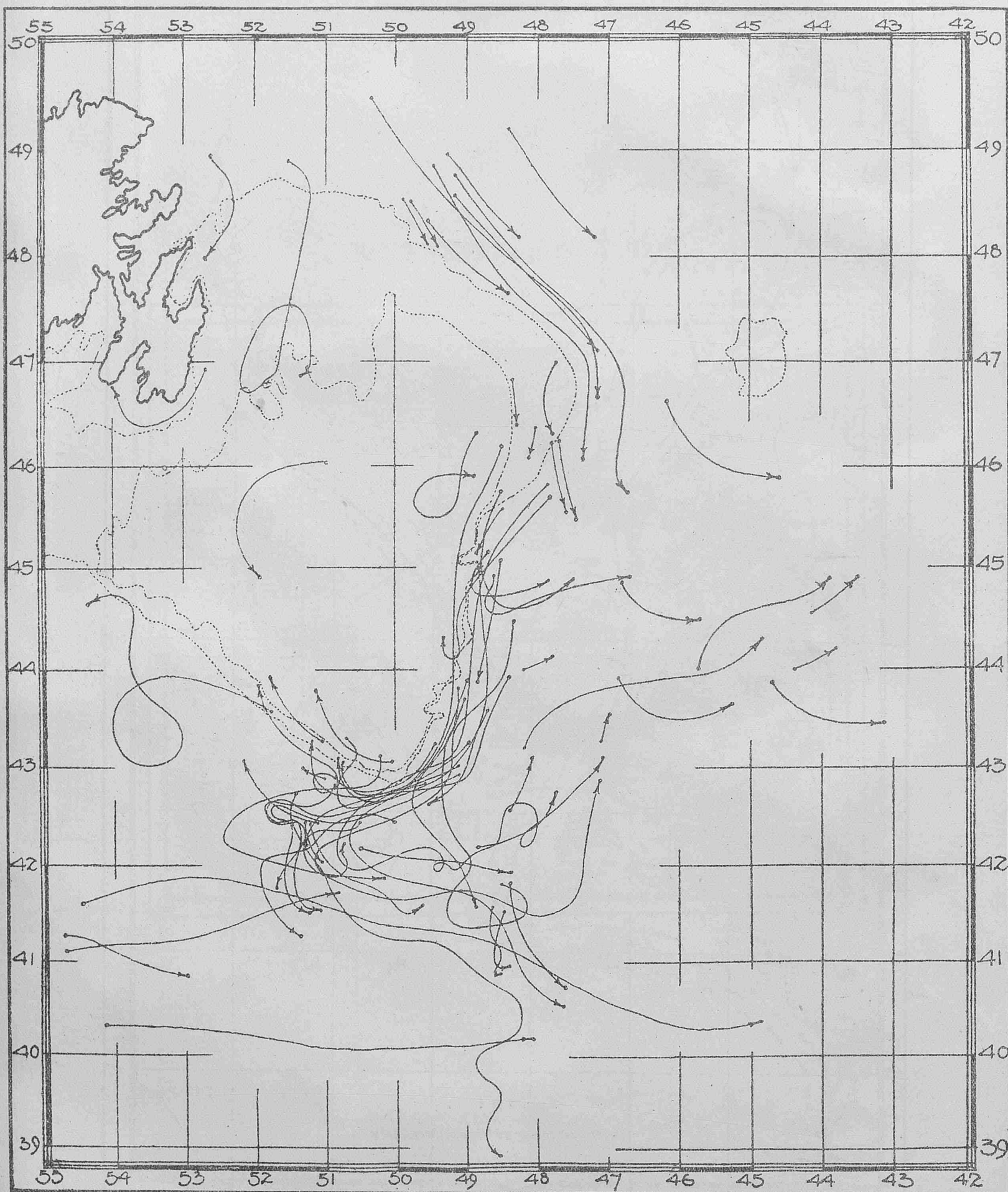


Chart B.- COMPILED DRIFTS OF ICEBERGS, 1914-1926.

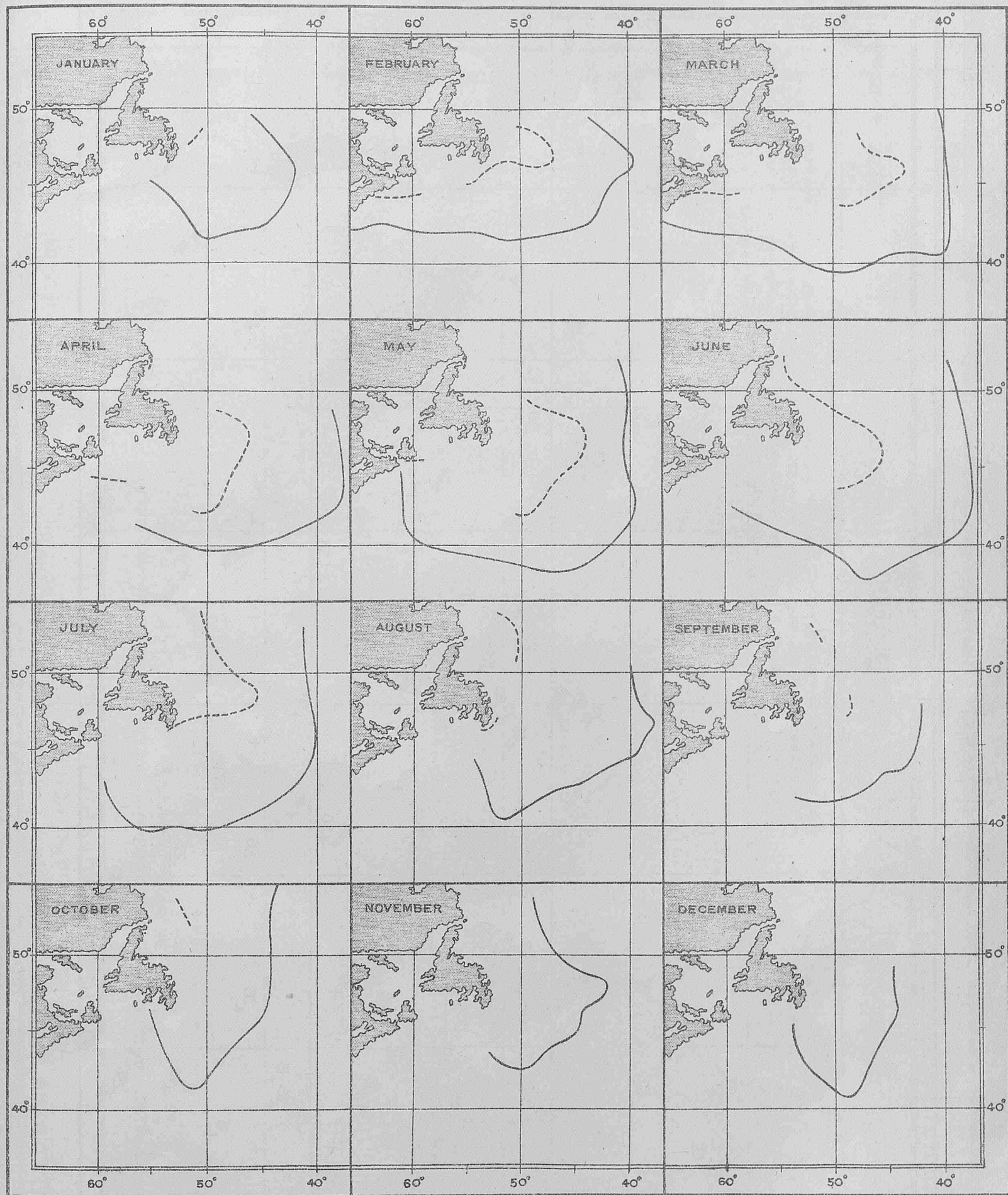


Chart C.—LIMITS OF ICE, WESTERN NORTH ATLANTIC.

Limit from 1901 to 1927 shown thus —————

Limit for 1927 shown thus - - - - -

PHENOMENAL POSITIONS OF ICE.

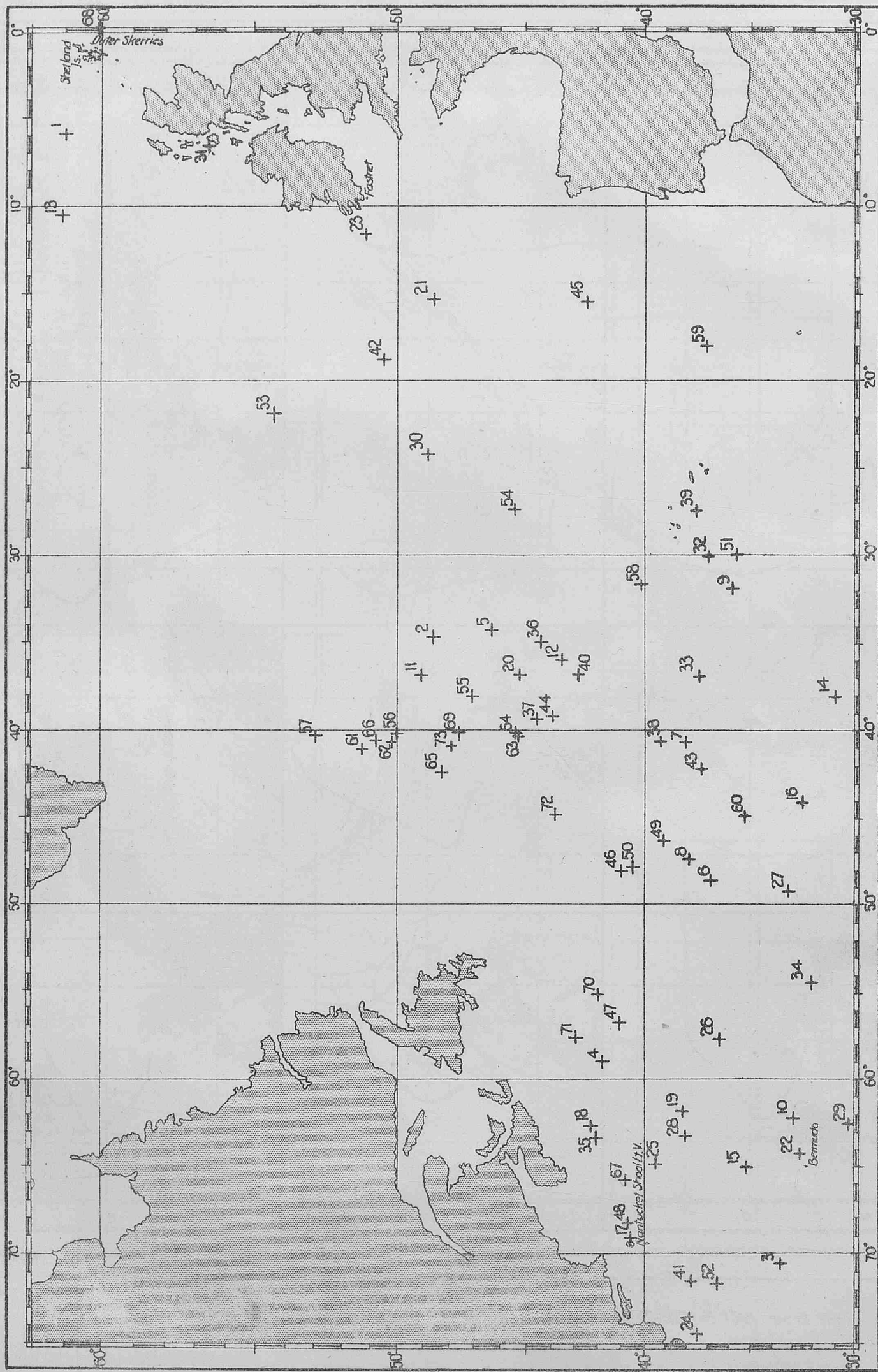


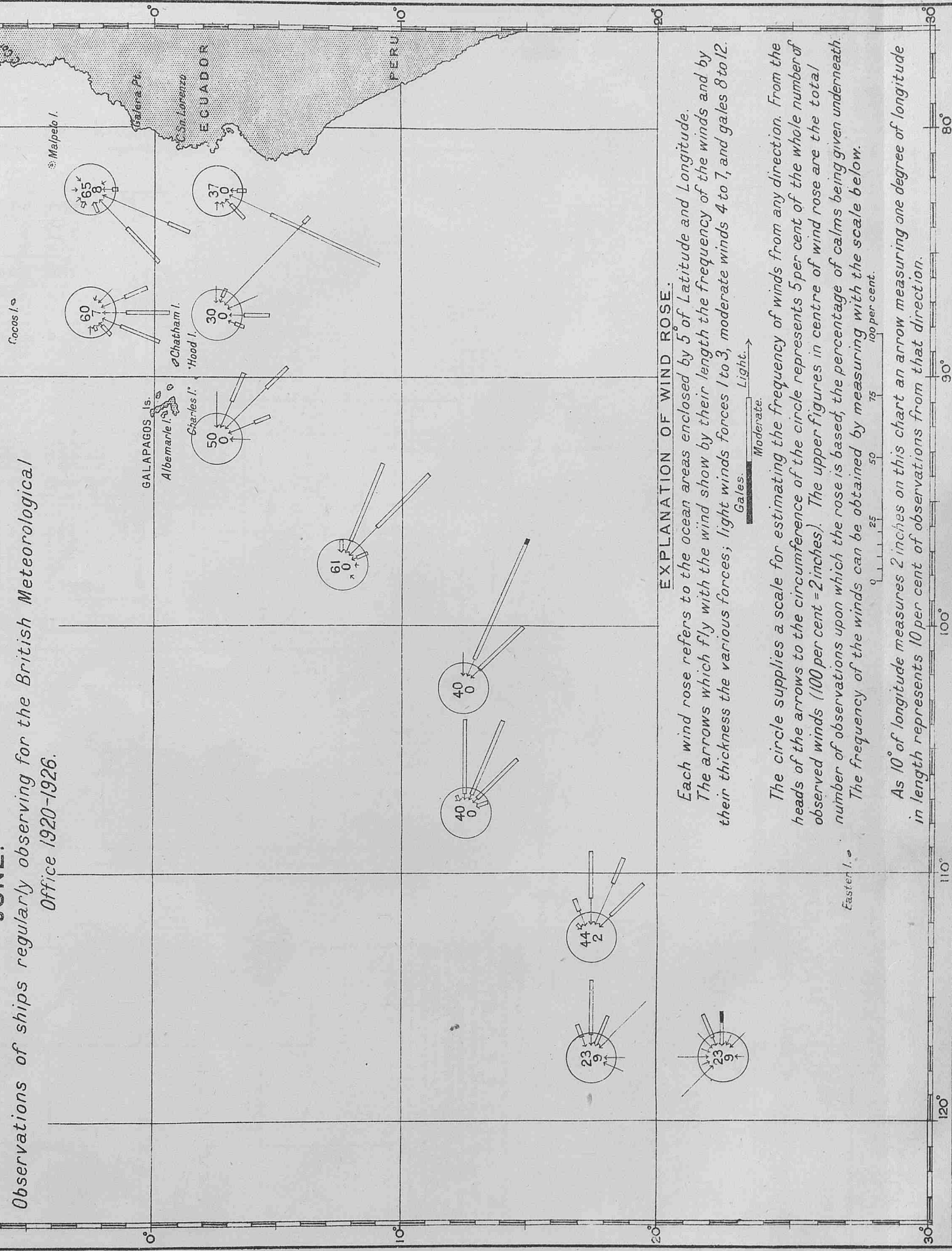
Chart D.

SOUTH PACIFIC.

WINDS ON THE TRACKS FROM PANAMA TO AUSTRALIAN
AND NEW ZEALAND PORTS.
(EASTERN PORTION.)

JUNE.

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



SOUTH PACIFIC.

CURRENTS ON THE TRACKS FROM PANAMA TO AUSTRALIAN AND NEW ZEALAND PORTS. (EASTERN PORTION.)

MAY, JUNE AND JULY.

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

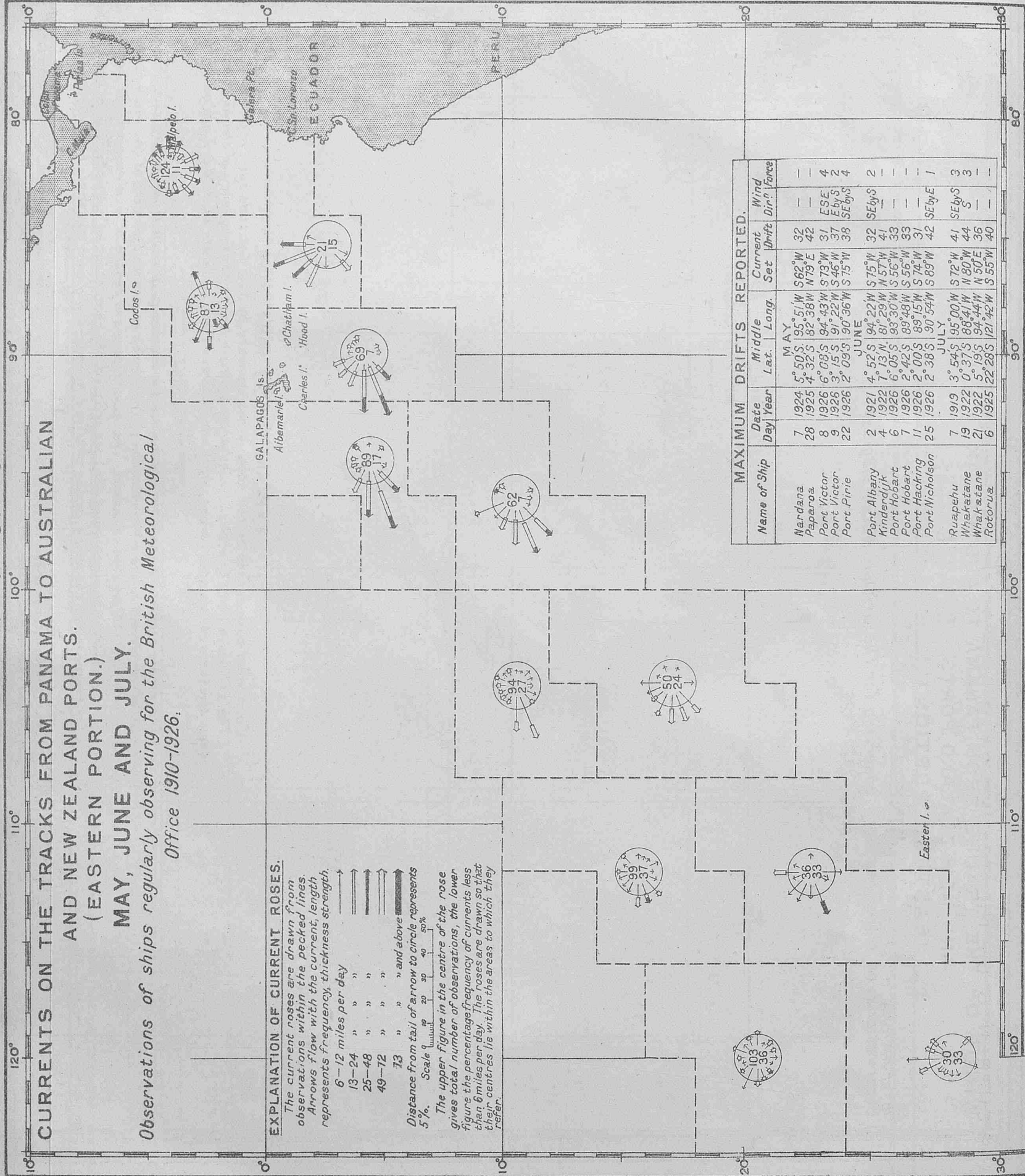
EXPLANATION OF CURRENT ROSES.

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

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

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

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

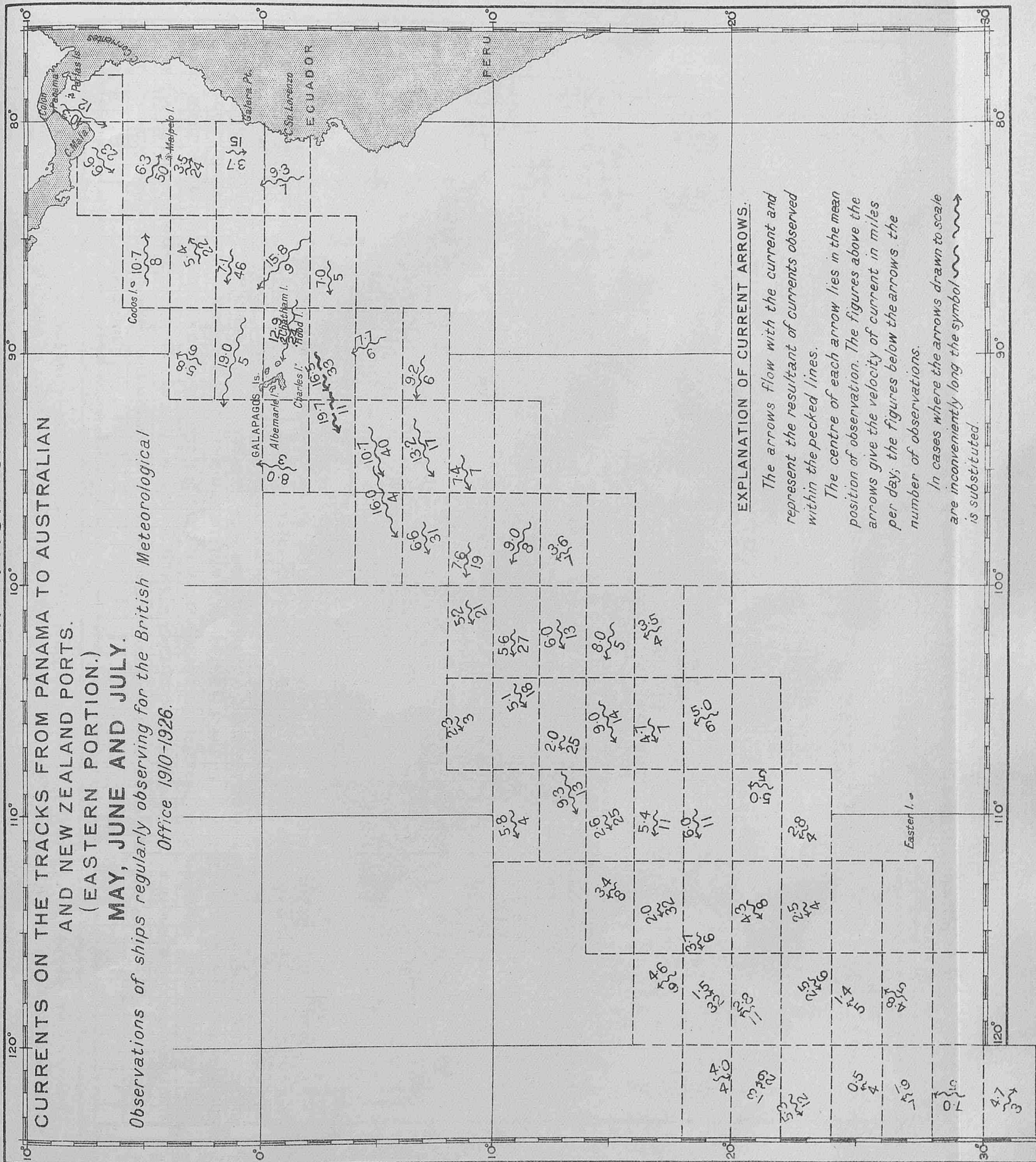


MAXIMUM DRIFTS REPORTED.						
Name of Ship	Date Day Year	Middle Lat.	Long.	Current Set	Drift Dir. Force	Wind
MAY						
Nardana	7 1924	5° 50'S	195° 5'W	S 62° W	32	—
Paparoa	28 1925	4° 32'S	82° 38'W	N 79° E	42	—
Port Victor	8 1926	6° 08'S	94° 43'W	S 73° W	31	ESE
Port Victor	9 1926	3° 15'S	91° 22'W	S 46° W	37	E by S
Port Pirie	22 1926	2° 09'S	90° 36'W	S 75° W	38	SE by S
JUNE						
Port Albany	2 1921	4° 52'S	94° 22'W	S 75° W	32	SE by S
Kindersdijk	4 1922	7° 13'N	81° 29'W	N 57° W	41	—
Port Hobart	6 1926	6° 05'S	93° 30'W	S 56° W	33	—
Port Hobart	7 1926	2° 42'S	89° 48'W	S 55° W	33	—
Port Hacking	11 1926	2° 00'S	89° 15'W	S 74° W	31	—
Port Nicholson	25 1926	2° 38'S	90° 54'W	S 89° W	42	SE by E
JULY						
Ruapehu	7 1919	3° 54'S	95° 00'W	S 72° W	41	SE by S
Whakatane	19 1922	0° 37'S	88° 41'W	N 80° W	44	S
Whakatane	21 1922	5° 19'S	94° 44'W	N 50° E	36	—
Rotorua	6 1925	22° 28'S	121° 42'W	S 55° W	40	—

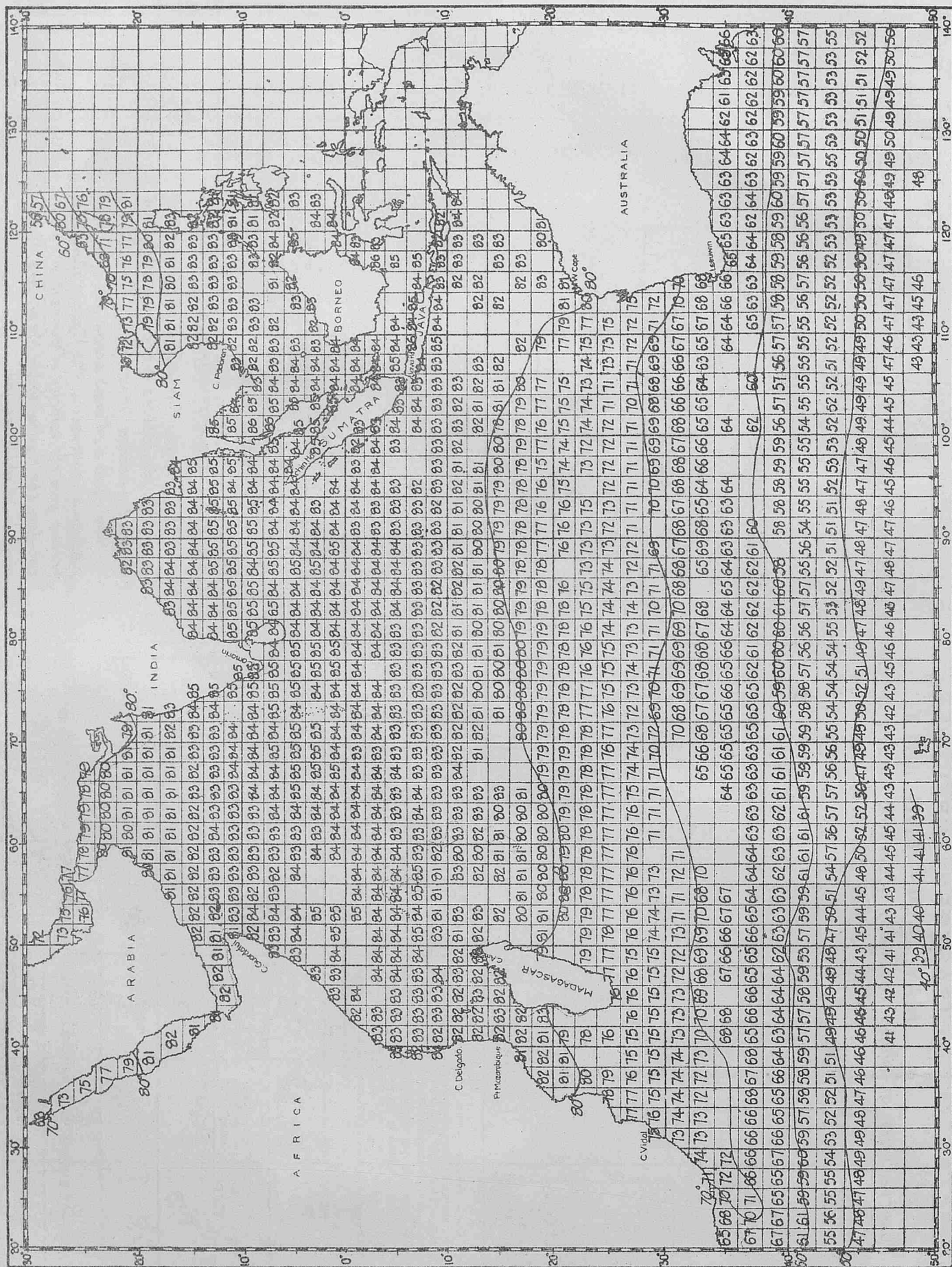
SOUTH PACIFIC.

CURRENTS ON THE TRACKS FROM PANAMA TO AUSTRALIAN
AND NEW ZEALAND PORTS.
(EASTERN PORTION.)

MAY, JUNE AND JULY.

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

INDIAN OCEAN. MEAN SEA SURFACE TEMPERATURES FOR MONTH OF APRIL.



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

IMPORTANT.

Selected ships, i.e., those regular observing ships with the letters M.L., M. or W.T. after their names in the Fleet List in this Journal are urged to record their routine reports made to "All ships" in the space provided at the end of the Meteorological Log and in Form 911.

Special attention is directed to pages 16 to 18 of the January 1928 Number, for times of observation and form of report, etc.

Times of transmission are not fixed. Transmission should be made as convenient.

Great importance is attached to the observation of tendency of the barometer, with course and speed in these reports; also to set and drift of current observed.

Information as to the best manner of using these reports is given in "Wireless and Weather an aid to Navigation," and marine observers will greatly assist by drawing the attention, to this, of the officers of ships who are not regular observers to the Meteorological Office.

VOLUNTARY OBSERVING FLEET LIST.

Constant attention to this list which is published every month in this Journal is requested of all marine observers, agents, and those interested in British organized marine meteorology.

This list gives acknowledgment to the regular corps of marine observers for work done.

This list only contains the names of the 500 ships which have undertaken to make routine observations and make regular returns.

It indicates the branch or branches of the work done by each ship.

It does not contain the names of ships other than those regularly performing this routine voluntary work.

It is necessary with the limitation of 500 ships—made on account of the size of the staff available to assist the Marine Superintendent to organize and co-ordinate the work, and disseminate the information—that these 500 ships should be as regular in making returns, and as well distributed along all the ocean routes, as possible.

In filling vacancies which occur in the list, preference is given to ships commanded and officered by old marine observers, those which have mercurial barometers in their outfits, and those running on ocean routes where observations are most needed to complete a network over all oceans.

Attention is invited to the notice headed "Marine Meteorology, Co-operation of Shipowners, Masters and Mates" which appears every month overleaf.

When commanders are transferred from one ship to another, or their ships are laid up, they are requested to notify the appropriate agent for ports other than London; for London ships, the Marine Superintendent. If this is not done disappointment will often ensue because there is a continuous waiting list and the numbers are completed monthly.

Ships which are not on the list or have not been notified that they are being placed on the list, should not keep and return Form 911.

Remarks on specially interesting phenomena, unusual set and drift of current, and any interesting experience at sea which has any connection with marine meteorology, are welcome from the commanders of any British ship afloat.

Marine Observers will give great assistance if they will show this notice

to the commanders and officers of ships who are not on the list, but who show interest in marine meteorology.

They may with advantage bring to general notice the note "Marine Meteorology, Wider Application at Sea" which appears in this Number.

PARTICULARS FOR APPLICATION BY INTENDING MARINE OBSERVERS.

Commanders and Officers who wish to have their names placed on the list of regular observing ships, or Commanders on transfer who wish to continue will greatly assist by furnishing the following particulars to the Agents at the ports, or at ports where Agencies do not exist, to the Marine Superintendent, Meteorological Office, London.

Name of Ship

Steam, Motor or Sail, with Rig

Gross Tonnage

Name of Captain

Owners

Address

Trade in which usually employed,
naming route and principal
ports.

The name and rank of the Officer
whom it is intended shall act as
principal observer.

If Captain and principal observing
officer are old marine observers,
state name of last ship from
which returns were made.

Description of Barometer carried,
stating whether Mercurial or
Aneroid, height above water
line, and, if possible, giving
three recent readings taken in
port at 0100 G.M.T., 0700 G.M.T.,
1300 G.M.T., and 1800 G.M.T.,;
giving dates and times, for
comparison.

When a Commander on transfer wishes to take the place of his ship in the fleet list to his new Command, in sending notification it should be made clear whether his relief wishes to carry on or not.

For list of Agents and their addresses, see overleaf.

POSTAL ARRANGEMENTS.

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

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

S.S..... Captain.....

Port of Call.....

Date of Homeward Departure.....

Postal Address.....

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

ICE CHART. WESTERN NORTH ATLANTIC.

LETTERS OF TRANSATLANTIC TRACKS INDICATE.

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

- (B) From 1st April to 31st August, inclusive.
- (D) From 15th February to 10th April, inclusive.
- (E) From 11th April to 15th May, or until the Cape Race route clear of ice.

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 copy of Memorandum dated 11th January, 1928, from Cunard S.S. Co., on page 74 of this Number.

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 POSITIONS OF ICE.

Date.	Ship or Source of Report.	Position. Lat. Long.	Remarks.
April 6, 1909	S.S. Trafalgar	35°54'N. 31°47'W.	2 pieces 18 in. in diameter.
" 11, 1914	S.S. Erodade	32°55'N. 62°11'W.	Apparently river ice about the size of a lifeboat.
" 24, 1916	S.S. Communipaw	49°05'N. 36°48'W.	4 ft. high 50 ft. wide, and 100 ft. long.
" 4, 1921	S.S. Hollandia	43°35'N. 35°57'W.	Large berg.
" 16, 1923	Trawler Orizaba	61°03'N. 10°30'W.	Floating ice, about 40ft. long, and 3 ft. high.

Reports of Ice sighted between February 1st and February 29th, 1928, which have been received by the Meteorological Office, are shown by the Symbols plotted in the position reported, the figures indicating the day of the month.

Limit of ice reported to Meteorological Office APRIL 1901-1927

MARINE METEOROLOGY.**Co-operation of Shipowners, Masters and Mates.**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

LATE PRESS.**DERELICTS AND FLOATING WRECKAGE.**

Date.	Position.		Description.
	Latitude.	Longitude.	
NORTH SEA.			
3.2.28	55°50'N.	2°36'E.	Submerged wreckage.
ENGLISH CHANNEL.			
1.2.28	4 miles W. of Hayre Lt. V.		Green conical buoy adrift, dangerous to navigation.
9.2.28	49°40'N.	1°22'W.	Bedack buoy with staff, adrift.
10.2.28	49°42'N.	2°40'W.	Floating wreck.
23.2.28	49°33'N.	3°16'W.	Ship's lifeboat painted black.
24.2.28	50°49'N.	0°54'E.	Floating wreckage, very dangerous to navigation.
25.2.28	49°50'N.	4°40'W.	Wooden ketch <i>Georges Raymonde</i> abandoned, will sink to water's edge and be dangerous to navigation.
BRISTOL CHANNEL.			
23.2.28	51°17'N.	3°58'W.	Ship's lifeboat painted white, waterlogged.
NORTH ATLANTIC.			
1.2.28	4°10'N.	12°20'W.	Submerged object.
1.2.28	40°22'N.	73°47'W.	Large piece of wood about 13 ft. square, dangerous to navigation.
1.2.28	52°07'N.	6°52'W.	Obstruction.
1.2.28	40°18'N.	73°55'W.	Derelict, bottom up.
2.2.28	38°49'N.	9°35'W.	Large floating spar about 50 ft. long, apparently vessel's lower-mast, dangerous to navigation.
5.2.28	38°49'N.	74°05'W.	Derelict barge with white cabin-house showing out of water.
5.2.28	41°53'N.	52°45'W.	Log about 25 ft. long, 3 ft. diameter, drift-wood in vicinity.
11.2.28	51°05'N.	11°00'W.	Trawler.
19.2.28	50°10'N.	10°32'W.	Large dark coloured buoy, light extinguished.
MEDITERRANEAN.			
4.2.28	Off Mahon Hbr.		Italian schooner, abandoned, drifting.
20.2.28	38°09'N.	6°55'E.	Capsized schooner, painted green, about 25 metres long, dangerous to navigation.
GULF OF MEXICO.			
1.2.28	28°40'N.	93°00'W.	3 logs about 30 ft. long, 1½ ft. diameter, apparently lashed together.
5.2.28	26°35'N.	85°20'W.	Derelict schooner bottom up, no name visible.
7.2.28	26°00'N.	87°30'W.	Raft.

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LIST OF VOLUNTARY OBSERVING SHIPS

i

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

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

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

Only in special cases will individual letters be sent.

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

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

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

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

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

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

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

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

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

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

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

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 17.2.28.	Date Received.
<i>Aba</i> ...	Yardley, H. A., D.S.O.	S. J. Bristowe, O. E. Jones, E. E. Roberts.	M.L.	Elder Dempster	Met. Log. 30.3.27 to 26.8.27 ...	15.9.27
<i>Abinsi</i> ...	Williams, T. E.	Millson, H. E.	No. A.	"	Form 911 30.11.27 to 7.1.28 ...	11.1.28
<i>Achilles</i> ...	Wilson, C. A.	J. Powell, L. Hutchinson, F. B. Allen.	M.L.	A. Holt	Met. Log. 24.5.27 to 18.10.27...	23.11.27
<i>Actor</i> ...	Dodds, R.	Haylett, E.	"	Harrison	" 10.9.27 to 20.12.27...	6.1.28
<i>Adda</i> ...	Toft, J. T.	A. E. Longlen, J. S. Turner, A. Kay.	M.L.	Elder Dempster	Form 911 6.7.27 to 3.11.27 ...	14.12.27
50 <i>Adriatic</i> ...	Hickson, V. W., Lieut.-Commr. R.N.R.	R. G. Roberts, O. V. Lucas	W.T.	White Star	W.T. Reg. 26.12.27 to 14.1.28...	23.1.28
<i>Aeneas</i> ...	Wallace, W. K.	E. R. Owen	No. A.	A. Holt	Form 911 8.1.28 to 17.1.28 ...	25.1.28
<i>Agapenor</i> ...	Ramsay, J.	S. G. Ellams	" A.	"	" 7.1.28 to 3.2.28 ...	13.2.28
<i>Aidan</i> ...	Pym, J.	J. S. Thompson	" A.	Booth	" 29.12.27 to 13.1.28...	26.1.28
<i>Alban</i> ...	Barlow, F. P.	E. M. Lyons	" A.	"	" 4.11.27 to 23.12.27...	11.1.28
<i>Aleppo</i> ...	Leggott, —	"	No.	Ellerman Wilson	"	"
<i>Alipore</i> ...	Smith, H. E., R.D., Lt.-Commr. R.N.R.	D. A. C. Butler, C. H. Stokes	" M.	P. and O.	" 24.8.27 to 24.10.27...	14.11.27
<i>Almanzora</i> ...	Clarke, E. C.	D. O. Llewellyn	" A.	R.M.S.P.	" 14.5.27 to 27.6.27 ...	29.6.27
63 <i>Albertic</i> ...	Summers, F. F., R.D., Commr. R.N.R.	R. Hawkins, J. W. Paine, A. E. Dyer, — Smith.	W.T.	White Star	" 5.11.27 to 21.11.27...	1.12.27
<i>Alondra</i> ...	Scott, L. S.	H. Peters	No. A.	Yeoward	Form 911 19.11.27 to 8.1.28 ...	11.1.28
<i>Alynbank</i> ...	Clayton, W. E.	R. Ardley	" A.	A. Weir & Co.	W.T. Reg. 7.11.27 to 14.12.27...	16.1.28
<i>Ampelco</i> ...	Vandenkerckhove, A.	J. Abicht	" A.	American Petroleum	Form 911 11.12.27 to 27.1.28...	9.2.28
<i>Andalucia</i> ...	Thomas, R. J.	C. W. Vaughan, B. May	" M.	Blue Star	" 11.12.27 to 27.12.27...	9.2.28
<i>Anchises</i> ...	Woodgett, R. J.	"	" A.	A. Holt	" 1.10.27 to 21.10.27...	14.11.27
<i>Andes</i> ...	Smith, W. E., D.S.O., R.D., Capt. R.N.R.	A. S. Nicholls	M.L.	R.M.S.P. Co.	" 19.11.27 to 3.1.28 ...	6.1.28
<i>Antiochus</i> ...	Salter, G. H.	O. P. H. Wynne	No. A.	A. Holt	" 10.12.27 to 29.12.27 ...	23.1.28
<i>Aorangi</i> ...	Crawford, R.	G. H. Kime, E. Anderson, E. V. Bilger, W. J. Weber.	M.L.	Canadian-Australasian	Met. Log. 21.9.27 to 5.1.28 ...	7.2.28
30 <i>Aquitania</i> ...	Charles, Sir J. T. W., K.B.E., C.B., R.D., Commr. R.N.R.	J. L. Croasdaile, J. Locke, D. MacLean.	W.T.	Cunard	W.T. Reg. 30.12.27 to 12.1.28...	16.1.28
62 <i>Arabic</i> ...	Bulman, J. B.	J. M. Appleby, W. Jackman, W. N. Jenkins.	"	White Star	" 9.1.28 to 28.1.28 ...	30.1.27
<i>Arafura</i> ...	Gordon, A. S.	F. O. Colvin, F. R. Miller, C. Stratford.	M.L.	Eastern and Australian	Met. Log. 29.7.27 to 25.10.27...	17.12.27
<i>Arawa</i> ...	Diamond, S. L.	D. Aitchison, A. C. Jones, J. Jackson.	"	Shaw, Savill and Albion	" 30.3.27 to 28.7.27 ...	11.8.27
<i>Archimedes</i> ...	Downs, E. B.	"	No. A.	Lamport & Holt	Form 911 10.10.27 to 5.1.28 ...	18.1.28
<i>Argyllshire</i> ...	Wallace, J.	J. M. Crone	" M.	Federal	" 26.9.27 to 14.10.27...	15.11.27
<i>Ariaguani</i> ...	Scudamore, J. H., D.S.O., R.D., Commr. R.N.R.	G. McKee, J. L. Owen, S. K. Scott, A. J. J. Moar.	M.L.	Elders & Fyffes	Met. Log. 26.9.27 to 4.2.28 ...	8.2.28
<i>Ariosto</i> ...	Biggins, R. L.	F. E. Whitfield	No. A.	Ellerman Wilson	Form 911 25.12.27 to 21.1.28...	13.2.28
<i>Armada Castle</i> ...	Imlah, C. B.	A. B. Cannon, G. D. Pennick, J. Lecky, H. Bunn.	M.L.	Union Castle	Met. Log. 7.5.27 to 30.10.27 ...	17.11.27
<i>Arracan</i> ...	Duncan, S. S.	J. Summers, J. Henderson, C. C. Weir.	"	P. Henderson	" 5.5.27 to 19.9.27 ...	29.9.27
<i>Arundel</i> ...	Short, H.	Mr. Hill	C.C.	Southern Rly.	Telegraphic Report 17.2.28 ...	17.2.28
<i>Arundel Castle</i> ...	Knight, A.	R. May	No. A.	Union Castle	Form 911 30.12.27 to 15.1.28...	18.1.28
<i>Astronomer</i> ...	Richards, J.	A. Browne, C. C. Heaton, H. M. Fitz-Simons.	M.L.	Harrison	Met. Log. 28.10.27 to 7.1.28 ...	13.1.28
<i>Ascanius</i> ...	Agnew, J.	C. Houghton, R. Singleton, J. B. Marshall.	"	A. Holt	" 22.5.27 to 26.9.27 ...	3.10.27
<i>Athenic</i> ...	Binks, J. W.	W. Hill	No. A.	White Star	Form 911 20.10.27 to 3.11.27...	24.11.27
<i>Atrous</i> ...	Rundle, R. R.	H. Nicholas	" A.	A. Holt	" 30.12.27 to 15.1.28...	25.1.28

THE MARINE OBSERVER

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line	Last Log, Register, or Report Contributed. Received up to 17.2.28.	Date Received.
<i>Atsuta Maru</i> ...	Narui, N. ...	K. Fuse ...	No. A.	Nippon Yusen Kaisha	Form 911 16.7.27 to 15.8.27 ...	19.11.27
<i>Auditor</i> ...	Owen, W. T. ...	L. A. Bennett ...	" M.	Harrison ...	" 13.9.27 to 13.12.27 ...	17.12.27
<i>Autolycus</i> ...	Dunlop, J. K. ...	T. Bell ...	" A.	A. Holt ...	" 21.9.27 to 24.1.28 ...	1.2.28
<i>Ausonia</i> ...	Stafford, W., D.S.C., R.D., Lt.-Commr., R.N.R.	J. J. Wiseman ...	" A.	Cunard ...	" 21.8.27 to 8.10.27 ...	11.10.27
<i>Avon</i> ...	Spriddell, F. G., R.D., Commr., R.N.R.	R. H. East, J. E. P. Matthews	" M.	R.M.S.P. ...	" 25.12.27 to 5.2.28 ...	8.2.28
<i>Balmoral Castle</i> ...	Chave, Sir B., K.B.E.	C. S. Keen ...	" A.	Union Castle ...	" 30.12.27 to 16.1.28 ...	6.2.28
<i>Balranald</i> ...	Townshend, W. P., Commr., R.N.R.	C. Hannen, F. Ward, R. E., Cowell, J. C. Davis, L. S. Bailey.	M.L.	P. & O. Branch ...	Met. Log. 9.6.27 to 13.10.27 ...	22.11.27
<i>51 Baltic</i> ...	White, E. R., R.D., Commr., R.N.R.	J. Law, N. E. Banks, N. L. Mackie.	W.T.	White Star ...	W.T. Reg. 29.11.27 to 18.12.27 ...	29.12.27
<i>Bampton Castle</i> ...	Hutchings, A. H. ...	" ...	No. A.	Union Castle ...	Form 911 27.11.27 to 21.12.27 ...	29.12.27
<i>Banbury Castle</i> ...	Swiney, W. A. ...	C. G. Cuthbertson ...	" A.	" ...	" 17.9.27 to 14.10.27 ...	24.10.27
<i>Barfshire</i> ...	Wynne, R. H. ...	W. F. Lockhead ...	" A.	Turnbull Martin ...	" 21.4.27 to 9.5.27 ...	9.6.27
<i>Baradine</i> ...	Rollo, W. ...	B. H. Pollitt, E. Bolton-Smith, G. C. Case, C. B. Roche.	M.L.	P. & O. Branch ...	Met. Log. 30.10.27 to 2.12.27 ...	8.12.27
<i>Barpeta</i> ...	Strachan, J. ...	B. R. Faithfull ...	No. M.	British India ...	Form 911 7.12.27 to 7.1.28 ...	26.1.28
<i>Barrabool</i> ...	Rhodes, H. R. ...	G. S. B. Collard ...	" M.	P. & O. Branch ...	" 24.12.27 to 12.1.28 ...	30.1.28
<i>Baychimo</i> ...	Cornwall, S. A. ...	W. H. Deans ...	" A.	Hudson's Bay Co. ...	" 7.7.27 to 14.9.27 ...	13.10.27
<i>59 Belgenland</i> ...	Morehouse, W. A. ...	F. Good, W. E. Hesketh ...	W.T.	Red Star ...	W.T. Reg. 5.12.27 to 11.12.27 ...	30.12.27
<i>Beltana</i> ...	Allin, C. H. C. ...	D. M. Stafford ...	No. M.	P. & O. Branch ...	Form 911 4.12.27 to 11.12.27 ...	30.12.27
<i>Benalder</i> ...	Fairweather, J. J. ...	A. J. Leckie ...	" A.	Ben Line ...	" 18.12.27 to 1.1.28 ...	30.1.28
<i>Benalla</i> ...	Sheepwash, J. ...	S. W. Du Fosse ...	" M.	P. & O. Branch ...	" ...	11.1.28
<i>Bendigo</i> ...	Nicholl, R. N. C. ...	R. M. Richardson ...	" M.	" ...	" 26.11.27 to 14.12.27 ...	6.2.28
<i>Benefactor</i> ...	Jones, C. W. ...	A. Watson ...	" M.	Harrison ...	" 15.12.27 to 29.1.28 ...	7.2.28
<i>Bengloe</i> ...	McCorquodale, A. ...	J. Davidson ...	" A.	Ben Line ...	" 14.1.28 to 27.1.28 ...	6.2.28
<i>31 Berengaria</i> ...	Rostron, Sir A. H., K.B.E., R.D., Capt. R.N.R.	J. A. Myles, W. C. A. Robson, S. A. T. Bullock.	W.T.	Cunard ...	W.T. Reg. 8.12.27 to 20.12.27 ...	22.12.27
<i>Berrima</i> ...	Short, C. E. ...	A. Hughes ...	No. M.	P. & O. Branch ...	Form 911 7.10.27 to 12.11.27 ...	16.11.27
<i>Bervyn</i> ...	McCombie, G. ...	D. Dunn ...	" A.	Canadian Pacific ...	" 23.1.27 to 19.3.27 ...	24.3.27
<i>Bogota</i> ...	Pape, E. R. ...	" ...	" M.	R.M.S.P. Co. ...	" 23.12.27 to 12.1.28 ...	6.2.28
<i>Borda</i> ...	Holland, R. ...	" ...	" M.	P. & O. Branch ...	" 18.2.27 to 28.6.27 ...	7.7.27
<i>Bothwell</i> ...	Rothwell, A. J. ...	— Biggs ...	" A.	Canadian Pacific ...	" 6.3.27 to 14.4.27 ...	20.4.27
<i>Brecon</i> ...	Rothwell, A. ...	E. H. Coleman ...	" A.	" ...	" 5.5.27 to 6.6.27 ...	14.6.27
<i>Brenda</i> ...	Lamont, A. ...	N. Ross ...	" A.	Scottish Fishery Board.	" 4.1.28 to 17.1.28 ...	2.2.28
<i>Brighton</i> ...	Hill, A. ...	Mr. Munton ...	C.C.	Southern Railway ...	Telegraphic Report 16.2.28 ...	16.2.28
<i>British Colonel</i> ...	Taylor, R. J. ...	" ...	No. M.	British Tankers ...	Form 911 3.1.28 to 25.1.28 ...	2.2.28
<i>British Engineer</i> ...	Joures, F. W. ...	W. Evans ...	" M.	" ...	" 11.2.27 to 26.2.27 ...	25.5.27
<i>British Progress</i> ...	Putt, R. O. ...	W. Johnston ...	" M.	" ...	" 12.1.28 to 28.1.28 ...	14.2.28
<i>Bronte</i> ...	Crappier, J. S. ...	J. B. Scott ...	" A.	Lamport & Holt ...	" 25.11.27 to 21.12.27 ...	29.12.27
<i>Bruyere</i> ...	Birch, A. ...	J. C. Turner ...	" A.	" ...	" ...	"
<i>Buylsses M.V.</i> ...	Carey, J. ...	A. J. Clatworthy ...	" M.	Anglo-Saxon Petroleum Co.	" 15.12.27 to 14.1.28 ...	21.1.28
<i>Cambria</i> ...	Copland, C. P. ...	O. W. Ll. Jones ...	C.C.	L.M. & S. Rly ...	Telegraphic Report 4.2.28 ...	4.2.28
<i>Cameronia</i> ...	Gemmell, W. ...	" ...	No. A.	Anchor ...	Form 911 22.1.28 to 11.2.28 ...	15.2.28
<i>Camito</i> ...	Forrester, W. T., O.B.E.	H. H. Dunning, J. McIntyre, C. M. Schofield.	M.L.	Elders & Fyffes ...	Met. Log. 2.8.27 to 26.11.27 ...	15.2.28
<i>Canadian Importer</i> ...	Forson, A. ...	G. R. Randall ...	No. A.	Canadian Gov. Mercantile Marine.	Form 911 21.10.27 to 9.11.27 ...	12.12.27
<i>Canadian Inventor</i> ...	Boulton, F. W. ...	O. D. Alcorn ...	" A.	" ...	" 17.9.27 to 30.10.27 ...	19.11.27
<i>Canadian Scottish</i> ...	Wallace, C. ...	" ...	" A.	" ...	" 26.5.27 to 11.7.27 ...	19.8.27
<i>Canadian Winner</i> ...	Hocking, N. P. ...	R. J. Watson ...	" M.	" ...	" 13.11.27 to 30.11.27 ...	11.1.28
<i>Canonesa</i> ...	Brodie, W. H. ...	F. W. Kent ...	" M.	Furness Houder ...	" 20.12.27 to 12.1.28 ...	13.1.28
<i>Cape of Good Hope</i> ...	Lamont, J. ...	" ...	No.	Lyle S.S. Co. ...	" ...	"
<i>35 Carmania</i> ...	Brown, F. G., R.D., Capt., R.N.R.	W. M. Stewart, P. L. Williams, D. E. Sibson.	W.T.	Cunard ...	W.T. Reg. 30.10.27 to 19.11.27 ...	21.11.27
<i>Carnarvon Castle</i> ...	Hague, J. W., Commr., R.N.R.	B. Simpson, H. A. Causton, G. Gorrington, H. A. Deller.	M.L.	Union Castle ...	Form 911 7.8.27 to 26.8.27 ...	30.8.27
<i>34 Caronia</i> ...	Hossack, W. H., R.D., Capt., R.N.R.	P. F. Collins, H. G. Hayward.	W.T.	Cunard ...	W.T. Reg. 23.9.27 to 4.11.27 ...	17.11.27
<i>Casanare</i> ...	Steidelmann, H. ...	R. O. Jones ...	No. A.	Elders & Fyffes ...	Form 911 24.9.27 to 4.11.27 ...	17.11.27
<i>Cavina</i> ...	Riseley, A. D. ...	W. J. Dodd ...	" A.	" ...	" 25.6.27 to 11.9.27 ...	16.9.27
<i>52 Cedric</i> ...	Smith, R. G. ...	S. S. Fieldwood, D. W. Chamberlain, J. Smith.	W.T.	White Star ...	W.T. Reg. 17.12.27 to 20.1.28 ...	26.1.28
<i>53 Celtic</i> ...	Berry, G. ...	A. Thompson, D. K. Crawford, N. L. Mackie.	"	" ...	W.T. Reg. 5.12.27 to 25.12.27 ...	29.12.27
<i>Centaur</i> ...	Rose, A. F. ...	L. Johnstone, E. D. Potts, N. L. Thompson.	M.L.	A. Holt & Co. ...	Form 911 4.12.27 to 25.12.27 ...	29.12.27
<i>Ceramic</i> ...	Roberts, J., C.B.E., D.S.O., R.D., Capt., R.N.R.	" ...	No. A.	White Star ...	W.T. Reg. 9.1.28 to 29.1.28 ...	31.1.28
<i>Change</i> ...	Gambrill, F. C. ...	— Thomas, A. Johnston, — Baigent.	M.L.	Yuill & Co. ...	Form 911 9.1.28 to 29.1.28 ...	31.1.28
<i>Changuinola</i> ...	Thorburn, R. A., R.D., Commr., R.N.R.	W. G. Chanter ...	No. A.	Elders & Fyffes ...	" 11.3.27 to 20.8.27 ...	11.1.28
<i>China</i> ...	Sudell, F., R.D., Commr., R.N.R.	L. Porter ...	" M.	P. & O. ...	Met. Log. 16.8.27 to 9.12.27 ...	1.2.28
<i>Chindwin</i> ...	Eslemont, C. ...	" ...	" A.	Henderson ...	Form 911 13.12.27 to 14.1.28 ...	18.1.28
<i>Chirripo</i> ...	McColm, F. ...	H. Rawston, R. Laycock ...	" A.	Elders & Fyffes ...	" 25.7.27 to 11.8.27 ...	8.10.27
<i>City of Baroda</i> ...	McMillan, J. ...	A. Beaton, — Hodgkinson, W. A. Lambert.	M.L.	Ellerman ...	" 4.9.27 to 16.11.27 ...	5.12.27
<i>City of Benares</i> ...	Anderson, W. W. ...	F. Forsyth ...	No. A.	" ...	Met. Log. 24.10.27 to 8.1.28 ...	17.1.28
<i>City of Brisbane</i> ...	Seaborne, F. O., D.S.C.	D. W. F. Reilly ...	" A.	" ...	" 17.11.27 to 1.2.28 ...	8.2.28
<i>City of Canterbury</i> ...	Bremner, D. M. ...	R. H. Hodgson ...	" A.	" ...	Form 911 2.10.27 to 18.1.28 ...	6.2.28
<i>City of Carlisle</i> ...	Mordue, J. A. ...	" ...	" A.	" ...	" 28.9.27 to 30.10.27 ...	4.11.27
<i>City of Chester</i> ...	Letton, F. W. ...	C. C. Duncan, A. J. Barnett, R. Mowbray.	M.L.	" ...	" 25.11.27 to 30.12.27 ...	6.2.28
<i>City of Edinburgh</i> ...	Wyper, J. ...	G. Hummell ...	No. M.	" ...	Met. Log. 20.12.27 to 12.1.28 ...	16.1.28
<i>City of Hong Kong</i> ...	Walton, H. L., O.B.E., R.D., Commr., R.N.R.	" ...	" A.	" ...	Form 911 28.4.27 to 22.9.27 ...	28.10.27
					Form 911 25.11.27 to 18.12.27 ...	9.1.28
					" 6.10.27 to 4.11.27 ...	29.12.27

LIST OF VOLUNTARY OBSERVING SHIPS

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Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log. Register, or Report Contributed. Received up to 17.2.28.	Date Received.
<i>City of London</i> ...	Parker, F. W., R.D., Commr., R.N.R.	H. D. Asher	No. A.	Ellerman	Form 911 28.9.27 to 22.12.27... ..	29.12.27
<i>City of Rangoon</i> ...	Jones, P.	E. R. Wildermath, R. W. May, R. H. Stewart.	M.L.	"	Met. Log. 4.7.27 to 5.1.28	1.2.28
<i>City of Venice</i> ...	Lee, A.	"	No. A.	"	Form 911 2.3.27 to 17.3.27	4.5.27
<i>City of Yokohama</i> ...	Singleton, J. G.	"	" A.	"	" 13.11.27 to 10.12.27	1.2.28
<i>Clan Alpine</i> ...	Lyall, A. B.	K. M. Banks	" A.	Clan "	" 27.11.27 to 24.12.27	16.1.28
<i>Clan Lamont</i> ...	Urquhart, P., D.S.C.	P. de Gruchy	" A.	"	" 19.11.27 to 26.12.27	16.1.28
<i>Clan Lindsay</i> ...	Giles, H. J., R.D., Commr., R.N.R.	E. P. Smith	" A.	"	" 8.11.27 to 24.11.27... ..	17.12.27
<i>Clan MacBean</i> ...	Worthington, J. H. ...	"	No.	"	"	"
<i>Clan Macbeth</i> ...	Pagan, Q. C.	T. A. Watkinson	" A.	"	" 17.10.27 to 26.11.27	20.12.27
<i>Clan Macfadyen</i> ...	Stenson, F. J., R.D., Capt. R.N.R.	C. M. B. Cumberlege ...	" A.	"	" 7.9.27 to 23.12.27	4.1.28
<i>Clan Macfarlane</i> ...	Redford, —	"	" A.	"	"	"
<i>Clan Macgillivray</i> ...	West, W. F.	R. W. Roberts	" A.	"	" 27.4.27 to 24.5.27	20.6.27
<i>Clan Macindoe</i> ...	West, W. F.	D. McAllister	" A.	"	" 20.11.27 to 20.12.27	2.1.28
<i>Clan Mackellar</i> ...	Smith, W. P.	G. A. A. Grant	" A.	"	" 24.12.27 to 23.1.28	13.2.28
<i>Clan Macphie</i> ...	Gourlay, J. B.	D. S. Rae, A. F. Martin, W. A. Shewan.	M.L.	"	Met. Log. 14.5.26 to 2.5.27	9.6.27
<i>Clan Macnaughton</i> ...	Simpson, A. W.	D. D. Ingram	No. A.	"	Form 911 11.12.27 to 12.2.28... ..	14.2.28
<i>Clan Macnaggart</i> ...	Mee, F. T.	E. A. Hewson	" A.	"	" 18.10.27 to 22.11.27	28.11.27
<i>Clan Macwhirter</i> ...	Waterhouse, J.	W. A. Robbie, E. A. Brown, D. Timms.	M.L.	"	Met. Log. 11.2.27 to 15.8.27... ..	23.8.27
<i>Clan Malcolm</i> ...	Neill, G. A.	D. A. Stark, H. V. Wightman, M. Carlton.	"	"	" 28.8.27 to 24.12.27... ..	11.2.28
<i>Clan Morrison</i> ...	Porterfield, W. M. ...	"	No. A.	"	Form 911 2.1.28 to 13.1.28	23.1.28
<i>Clan Murdoch</i> ...	Miller, W.	H. F. M. Preston	" A.	"	" 18.12.27 to 12.1.28... ..	15.2.28
<i>Clan Randal</i> ...	Laird, C.	F. D. Bonney	" A.	"	" 26.11.27 to 8.12.27... ..	29.12.27
<i>Clan Ross</i> ...	Openshaw, L. G. ...	J. R. Elliott	" A.	"	" 28.12.27 to 22.1.28	26.1.28
<i>Clan Sinclair</i> ...	George, L. S.	N. Macleod	" A.	"	" 20.12.27 to 13.1.28	21.1.28
<i>Clan Urquhart</i> ...	Baker, E. W.	W. A. Shewan	" A.	"	" 24.11.27 to 20.12.27	9.1.28
<i>Comorin</i> ...	Borland, J. McL., C.B., D.S.O., R.D., Capt., R.N.R.	E. C. White, R. V. Alexander	No M.	P. & O.	Form 911 30.11.27 to 12.1.28... ..	18.1.28
<i>Concordia</i> ...	Telfer, J. H.	W. Law, L. H. Hobson, A. Bankes, J. H. Blackwood.	M.L.	Anchor Donaldson ...	Met. Log. 27.7.27 to 4.1.28	16.1.28
<i>Corinthic</i> ...	Hart, F.	I. A. Macnaughton	"	White Star	" 17.9.27 to 8.1.28	10.1.28
<i>Cornwall</i> ...	Wilde, H. J.	H. M. Knight	No. A.	Federal	Form 911 11.12.27 to 11.1.28	13.2.28
<i>Crawford Castle</i> ...	Morgan, A. O., R.D., Commr., R.N.R.	J. A. Wilson	" A.	Union Castle	" 30.10.27 to 1.12.27... ..	15.12.27
<i>Culebra</i> ...	Rathkins C.E.	P. Cooper, R. N. Fletcher, W. S. Thomas.	M.L.	R.M.S.P. Co.	Met. Log. 5.11.27 to 12.1.28	24.1.28
<i>Cumberland</i> ...	Macmillan, D.	"	No. A.	Federal... ..	Form 911 31.10.27 to 8.12.27... ..	6.2.28
<i>Cuthbert</i> ...	Barlow, F. P.	"	" A.	Booth	" 25.8.27 to 18.9.27	22.9.27
<i>Cyclops</i> ...	Cosker, W.	"	" A.	A. Holt	" 1.11.27 to 23.12.27... ..	27.1.28
<i>Dardanus</i> ...	Williams, D. T.	"	" A.	"	" 20.11.27 to 14.12.27	21.12.27
<i>Darian</i> ...	Masters, W.	"	" A.	Leyland	" 12.11.27 to 24.11.27	5.12.27
<i>Darro</i> ...	Matthews, G. P.	"	" A.	R.M.S.P. Co.	" 21.10.27 to 6.12.27... ..	15.12.27
<i>Demerara</i> ...	Willan, F. G. L., R.D., Capt., R.N.R.	F. Jeyes	" A.	"	" 13.12.27 to 4.2.28	7.2.28
<i>Demosthenes</i> ...	Ogilvy, A.	J. Cruickshank	" M.	Aberdeen	" 12.7.27 to 31.10.27... ..	2.11.27
<i>Desado</i> ...	Hammam, F. S.	L. D. Jennings, A. Barff ...	" M.	R.M.S.P. Co.	" 20.8.27 to 14.10.27... ..	25.10.27
<i>Desna</i> ...	Green, J.	L. G. Peterson	" M.	"	" 15.11.27 to 5.1.28	11.1.28
<i>Deucalion</i> ...	Melling, C. F.	R. Wilson... ..	" A.	A. Holt... ..	" 8.12.27 to 2.2.28	13.2.28
<i>Dieppe</i> ...	Marmery, S.	Mr. Parsons	C.C.	Southern Railway ...	Telegraphic Report 6.2.28	6.2.28
<i>Dimboola</i> ...	Roy, C. M.	"	No. A.	Melbourne S.S. Co. ...	Form 911 23.11.27 to 20.12.27	23.1.28
<i>Discoverer</i> ...	Ling, J. T.	H. W. Gostage	" M.	Harrison	" 8.4.27 to 9.7.27	12.7.27
<i>Donala, M.V.</i> ...	Kitson, A. G.	J. G. Wallace	" M.	British India	" 8.7.27 to 18.9.27	10.10.27
<i>Dominia, C.S.</i> ...	Campos, V., O.B.E., Lt.-Commr., R.N.R.	S. A. Garnham, C. Bullock, L. J. Hegarty, R. Johnson.	M.L.	Telegraph Construction & Maintenance.	"	"
<i>Dominic</i> ...	Harris, F. C. P.	C. C. Beal... ..	No. A.	Booth	Form 911 22.7.27 to 5.8.27	5.9.27
<i>61 Doric</i> ...	Bolton, S., D.S.C., R.D., Commr., R.N.R.	B. Harrison, A. E. Dyer, G. T. Kavanagh.	W.T.	White Star	W.T.Reg. 30.10.27 to 19.11.27	24.11.27
<i>Dorington Court</i> ...	Clarke, E. J.	P. Jones	No. A.	Haldin & Co.	Form 911 19.6.27 to 29.9.27	11.10.27
<i>Dromore Castle</i> ...	MacMahon, J.	D. P. Klasen	" A.	Union Castle	" 8.10.27 to 20.10.27... ..	12.11.27
<i>Dryden</i> ...	Major, T. W.	"	" M.	Lampert & Holt	" 1.11.27 to 5.1.28	9.1.28
<i>Dunaff Head</i> ...	Milner, T. F., R.D., Lt.-Commr., R.N.R.	S. Duff	" A.	Ulster S.S. Co.	" 6.12.27 to 14.1.28	13.2.28
<i>Dundrum Castle</i> ...	Weller, H. E.	H. H. F. Trew	" A.	Union Castle	" 21.8.27 to 23.9.27	24.10.27
<i>Dunluce Castle</i> ...	Gardner, G. F.	F. O. Wilbraham	" A.	"	" 6.1.28 to 25.1.28	27.1.28
<i>Dunrobin</i> ...	Ramsay, J. D.	C. H. Kendall	" A.	Glen & Co.	" 2.12.27 to 1.1.28	27.1.28
<i>Duquesa</i> ...	Ellis, F., D.S.C.	E. W. Denman	" M.	Furness Withy	" 7.11.27 to 4.1.28	9.1.28
<i>Durenda</i> ...	Beeching, P. H.	"	" M.	British India	" 19.10.27 to 17.11.27	8.12.27
<i>Edinburgh Castle</i> ...	Owen, S.	T. N. McAllen	" A.	Union Castle	" 5.8.27 to 25.9.27	3.10.27
<i>Egori</i> ...	Sola, P., D.S.O.	F. J. Croft	" A.	Elder Dempster	" 6.1.28 to 26.1.28	13.2.28
<i>Egyptian Prince</i> ...	Ord, T.	"	" A.	Prince	" 13.1.27 to 7.3.27	31.3.27
<i>El Paraguayo</i> ...	Fletcher, G.	F. F. Feint, D. Murray ...	" M.	Houlder Bros.	" 23.10.27 to 15.12.27	20.12.27
<i>Elpenor</i> ...	Gordon, A. L.	M. Robertson, C. Kavanagh	M.L.	A. Holt	Met. Log. 8.9.27 to 23.12.27	4.1.28
<i>Elysia</i> ...	Duncan, A. R.	A. Laidlaw, H. C. Fry, D. F. White.	"	Anchor	" 11.11.27 to 14.1.28... ..	25.1.28
<i>Empress of Asia</i> ...	Douglas, L. D., R.D., Lt.-Commr., R.N.R.	R. H. Foley, L. C. Hogg, T. M. W. Golby, M. Fawcett.	"	Canadian Pacific	" 9.6.27 to 1.10.27	4.11.27
<i>Empress of Canada</i> ...	Hailey, A. J.	A. G. Simmons	"	"	" 30.6.27 to 22.10.27... ..	28.11.27
<i>Empress of France</i> ...	Griffiths, E.	O. F. Pennington, E. Roberts, W. Ewens.	"	"	" 30.4.27 to 18.10.27... ..	31.10.27
<i>Empress of Russia</i> ...	Hosken, A. J.	L. C. Barry, R. A. Leicester, J. S. Clarke, J. H. Reich.	"	"	" 19.5.27 to 9.11.27	16.12.27
<i>Endeavour</i> ...	Commr. S. A. Geary-Hill, D.S.O., R.N.	C. S. E. Lansdown	"	His Majesty's Ship ...	" 14.3.27 to 11.7.27	19.7.27
<i>Essequibo</i> ...	Kite, E.	J. H. Lowe	No. M.	R.M.S.P. Co.	Form 911 6.10.27 to 15.11.27... ..	5.12.27
<i>Eumaeus</i> ...	Read, J. W.	"	" A.	A. Holt	" 3.6.27 to 1.12.27	8.12.27
<i>Euripides</i> ...	Collins, P. J., O.B.E.	K. D. Fisher, P. Congdon, A. J. Parry.	M.L.	Aberdeen	Met. Log. 17.9.27 to 24.1.28	2.2.28

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 17.2.28.	Date Received.
<i>Euryades</i> ...	Stewart, J. R. ...	W. K. Hole ...	No. A.	A. Holt ...	Form 911 15.11.27 to 4.2.28 ...	13.2.28
<i>Explorer</i> ...	Ling, J. T. ...	A. M. Hughes ...	" M.	Harrison ...	" 6.8.27 to 4.11.27 ...	15.11.27
<i>Explorer</i> ...	Allan, J. ...	A. Stout ...	" A.	Scottish Fishery Board.	" 2.12.27 to 17.12.27 ...	2.1.28
<i>Ferndale</i> ...	Daniel, F. ...	D. Jones, A. Kneen ...	" M.	Commonwealth Govt.	" 3.11.27 to 1.12.27 ...	17.12.27
<i>Flandria</i> ...	Maars, L. ...	T. Doornbosch ...	" M.	Holland Lloyd ...	" 15.4.27 to 2.6.27 ...	9.6.27
<i>Francisco</i> ...	Scales, H. ...	F. Elgin ...	" A.	Ellerman Wilson ...	" 12.11.27 to 23.12.27 ...	2.1.28
<i>Freja</i> ...	Angus, W. ...	W. Pirrie ...	" A.	Scottish Fishery Board.	" 1.1.28 to 31.1.28 ...	6.2.28
<i>Gaika</i> ...	Jackson, C. R. ...	L. G. May ...	" A.	Union Castle ...	" 11.9.27 to 4.11.27 ...	7.11.27
<i>Galtymore</i> ...	Yeoman, J. T. ...	C. J. Vandenoorn ...	" M.	Furness Withy ...	" 25.9.27 to 24.11.27 ...	1.12.27
<i>Garcoet</i> ...	Visser, C. W. ...	C. J. Vandenoorn ...	" M.	Rotterdam Lloyd ...	" 26.6.27 to 15.7.27 ...	25.7.27
<i>Garth Castle</i> ...	Jackson, C. R. ...	W. S. J. Aldous ...	" A.	Union Castle ...	" 28.5.27 to 18.6.27 ...	22.6.27
<i>Gascoyne</i> ...	Johnson, L. ...	J. Doornbosch ...	M.L.	A. Holt & Co. ...	" 16.9.27 to 3.11.27 ...	7.11.27
<i>Gelria</i> ...	Veldkamp, C. J. ...	J. Doornbosch ...	No. M.	Holland Lloyd ...	Form 911 16.9.27 to 3.11.27 ...	7.11.27
<i>Geranium</i> ...	Bennett, H. T., D.S.O., Commr. R.N.R.	" ...	" M.	His Majesty's Australian Ship.	" ...	"
<i>Glamorganshire</i> ...	Spriddell, F. G., R.D., Commr. R.N.R.	T. G. S. Cairns ...	" M.	R.M.S.P. Co. ...	Form 911 21.10.27 to 27.11.27 ...	8.12.27
<i>Glenamoy, M.V.</i> ...	Homan, C. E. ...	R. H. Bishop ...	M.L.	Glen Line ...	" 17.8.27 to 22.10.27 ...	4.11.27
<i>Glengarry</i> ...	Angier, J. ...	C. S. Brewer ...	No. M.	" ...	" 6.9.27 to 30.10.27 ...	2.11.27
<i>Glenluce</i> ...	Kennett, W. H. ...	H. B. Porter ...	" A.	" ...	" 11.1.28 to 24.1.28 ...	2.2.28
<i>Glenshane</i> ...	Beer, E. ...	" ...	" A.	" ...	" 26.11.27 to 19.12.27 ...	16.1.28
<i>Gloucestershire</i> ...	Robin, E. ...	C. F. Hicks ...	" A.	Bibby ...	" 8.10.27 to 16.12.27 ...	20.12.27
<i>Gloxinia</i> ...	Pool, F. G. ...	" ...	" A.	Stag Line ...	" 7.1.28 to 31.1.28 ...	13.2.28
<i>Grantully Castle</i> ...	Whitfield, G. T. ...	R. Wren ...	" A.	Union Castle ...	" 3.6.27 to 14.8.27 ...	17.8.27
<i>Greenbrier</i> ...	McColm, F. ...	J. B. Wooley ...	" A.	Elders & Fyffes ...	" 24.7.27 to 28.8.27 ...	5.9.27
<i>Halesius</i> ...	Samuels, C. ...	R. W. Cook, J. Kelly ...	" A.	R. P. Houston ...	" 15.11.27 to 2.1.28 ...	27.1.28
<i>Hallartius</i> ...	Marsh, L. V. ...	" ...	" A.	" ...	" 25.6.27 to 19.7.27 ...	15.8.27
<i>Harmonides</i> ...	Hughes, W. F. ...	S. S. Davidson ...	" A.	" ...	" 10.4.27 to 2.5.27 ...	16.5.27
<i>Hatimura</i> ...	Lane, S. R., R.D., Capt. R.N.R.	" ...	" M.	British India ...	" 27.11.27 to 6.1.28 ...	6.2.28
<i>Hauraki, M.V.</i> ...	Hannafor, J. ...	" ...	" M.	" ...	" ...	"
<i>Henry Holmes, C.S.</i> ...	Frew, J. D. ...	T. Marshall ...	M.L.	Union S.S. Co., N.Z. ...	Met. Log. 25.3.27 to 1.11.27 ...	21.1.28
<i>Herald</i> ...	Bicker Caarten, A. ...	M. A. Green ...	No. M.	W.I. & Panama Telegraph Co.	Form 911 13.12.27 to 20.1.28 ...	13.2.28
<i>Herefordshire</i> ...	Haselfoot, F.E.B., Capt. R.N.	D. G. V. Williams ...	M.L.	His Majesty's Ship ...	Met. Log. 18.10.27 to 19.11.27 ...	31.1.28
<i>Herminius</i> ...	Mann, R. P. ...	M. D. Louttill ...	No. A.	Bibby ...	Form 911 1.10.27 to 9.12.27 ...	12.12.27
<i>Herschel</i> ...	Roberts, T. V. ...	O. C. Hayles ...	" A.	Shaw, Savill & Albion	" 24.2.27 to 10.4.27 ...	15.8.27
<i>Hertford</i> ...	Watson, W. W. ...	J. F. Maurey ...	" A.	Lampart & Holt ...	" 24.7.27 to 11.1.28 ...	20.1.28
<i>Hibernia</i> ...	Urquhart, D. ...	" ...	" A.	Federal ...	" 13.12.27 to 3.1.28 ...	13.2.28
<i>Highland Laddie</i> ...	Roberts, W. Ivor, M.B.E.	R. Woodall, A. Marsh ...	C.C.	L.M. & S. Railway ...	Telegraphic Report 16.2.28 ...	16.2.28
<i>" Piper</i> ...	Jones, T. J. ...	N. F. Seaton ...	No. A.	Nelson ...	Form 911 24.10.27 to 11.12.27 ...	23.12.27
<i>" Prince</i> ...	Collings, D. ...	S. E. Jackson, R. G. Owen, A. Southgate.	M.L.	" ...	Met. Log. 13.5.27 to 4.11.27 ...	1.12.27
<i>" Rover</i> ...	Robinson, R. H. ...	" ...	No. A.	Prince ...	Form 911 16.12.27 to 11.2.28 ...	14.2.28
<i>Hildebrand</i> ...	Marshall, J. ...	" ...	" A.	" ...	" 5.12.27 to 17.12.27 ...	2.1.28
<i>Hobson's Bay</i> ...	Ashby Graves, F. ...	C. O. Legg ...	" A.	Nelson ...	" 17.7.27 to 3.9.27 ...	22.9.27
<i>Holbein</i> ...	Maddrell, J. ...	A. G. Malcolm ...	" A.	Booth ...	" 16.11.27 to 30.12.27 ...	2.1.28
<i>54 Homerie</i> ...	Kydd, O. J. ...	R. Pearce, H. Benson, K. McKenzie.	M.L.	Commonwealth Govt.	Met. Log. 4.10.27 to 7.1.28 ...	13.1.28
<i>Hororata</i> ...	Leicester, F. S. ...	C. E. Legg, A. J. Corney ...	No. A.	Lampart & Holt ...	Form 911 27.10.27 to 15.1.28 ...	18.1.28
<i>Hubert</i> ...	Parker, W. H., C.B.E., R.D., Capt. R.N.R.	H. G. Morgan, S. B. Morfee, W. T. Poustie.	W.T.	White Star ...	W.T. Reg. 12.1.28 to 25.1.28 ...	8.2.28
<i>Huntingdon</i> ...	Holland, E. ...	" ...	No. A.	New Zealand S.S. Co.	Form 911 4.6.27 to 6.10.27 ...	17.10.27
<i>Huntsman</i> ...	Evans, L. ...	W. H. Cross ...	" A.	Booth ...	" 23.12.27 to 11.1.28 ...	13.1.28
<i>Huramai</i> ...	Ashworth, W. ...	H. G. Letts ...	" A.	Federal ...	" 29.11.27 to 21.12.27 ...	6.2.28
<i>Hydaspes</i> ...	Ruppel, H. ...	J. Richardson ...	" M.	Harrison ...	" 15.11.27 to 5.12.27 ...	20.12.27
<i>Ingoma</i> ...	Upton, E. C. S. ...	J. Oxnard, F. Longheed, G. R. Hogg, K. Goldsworthy.	M.L.	New Zealand S.S. Co.	Met. Log. 12.8.27 to 5.2.28 ...	10.2.28
<i>Inkam</i> ...	Williams, — ...	" ...	No. M.	R. P. Houston ...	" ...	"
<i>Iris, C.S.</i> ...	Barrow, R. K. ...	D. G. Russell ...	" M.	Harrison ...	Form 911 16.12.27 to 2.2.28 ...	6.2.28
<i>Iroquois</i> ...	Meetham, J. T. ...	H. Johnson ...	" A.	J. H. Welsford ...	" 7.1.28 to 21.1.28 ...	24.1.28
<i>Jaxon</i> ...	Hughes, H. R. ...	W. Oliver, D. Bruce, D. MacDonald, T. Vickers.	M.L.	Pacific Cable Board ...	Met. Log. 17.11.26 to 24.3.27 ...	11.10.27
<i>Javanese Prince</i> ...	Jackson, A. L., Commr. R.N.R.	H. L. Jenkins ...	"	His Majesty's Ship ...	" 2.8.27 to 21.11.27 ...	31.1.28
<i>Jervis Bay</i> ...	Reed, G. C. ...	" ...	No. A.	A. Holt ...	Form 911 20.11.27 to 2.1.28 ...	7.2.28
<i>Justin</i> ...	Naylor, E. ...	W. Venn ...	" A.	Prince ...	" 20.11.27 to 21.11.27 ...	13.2.28
<i>Kaiser-i-Hind</i> ...	Chaplin, W. R. ...	R. W. Laycock ...	" M.	Commonwealth Govt.	" 10.12.27 to 19.12.27 ...	9.1.28
<i>Kalyan</i> ...	Bush, H. ...	A. Blewett ...	" A.	Booth ...	" 4.1.28 to 20.1.28 ...	25.1.28
<i>Kamo Maru</i> ...	Manley, G. ...	R. H. Hand ...	" M.	P. & O. ...	" 27.11.27 to 17.1.28 ...	20.1.28
<i>Kangaroo</i> ...	Cornwall Jones, B. ...	S. Kenans ...	" M.	P. & O. ...	" 26.11.27 to 13.1.28 ...	13.2.28
<i>Karapara</i> ...	Enya, S. ...	" ...	" A.	Nippon Yusen Kaisha	" 19.11.27 to 22.12.27 ...	8.2.28
<i>Kashmir</i> ...	Buckeridge, G. ...	E. Hutchinson, J. Kavanagh, H. Brackenridge.	M.L.	State Service Australia.	Met. Log. 4.5.27 to 5.9.27 ...	25.10.27
<i>Kenilworth Castle</i> ...	Turner, J. E. ...	J. Ruddiman ...	No. M.	British India ...	Form 911 21.12.27 to 10.1.28 ...	30.1.28
<i>Kent</i> ...	Miller, A. C. ...	A. J. McHattie ...	" M.	P. & O. ...	" 17.9.27 to 29.11.27 ...	8.12.27
<i>Khiva</i> ...	Mallalae, R., R.D., Lt.-Commr. R.N.R.	R. C. Longman, L. A. J. Keeble, W. Dryden, W. Wyeth.	M.L.	Union Castle ...	Met. Log. 18.4.27 to 8.8.27 ...	19.10.27
<i>Khyber</i> ...	Chave, Sir B., K.B.E.	" ...	"	" ...	" ...	"
<i>Knight Companion</i> ...	Matthews, C. ...	W. C. Wilkinson ...	No. A.	Federal ...	Form 911 21.12.27 to 24.1.28 ...	31.1.28
<i>Koolinda, M.V.</i> ...	Cooper, C. P., O.B.E., R.D., Capt. R.N.R.	G. W. Wood, D. Meakle, E. Allen, V. A. Nicolls.	M.L.	P. & O. ...	Met. Log. 8.6.27 to 14.8.27 ...	19.8.27
<i>Kovno</i> ...	Hester, C. W., R.D., Commr. R.N.R.	C. S. Pirie, J. D. Hornidge, H. T. Toon.	"	P. & O. ...	" 29.7.27 to 6.11.27 ...	16.11.27
<i>37 Laconia</i> ...	Cox, B. T., D.S.O.	J. H. Isherwood ...	No. M.	A. Holt ...	Form 911 23.8.27 to 26.1.28 ...	31.1.28
	Buckeridge, J. ...	" ...	" M.	State Service, Australia.	" 2.12.27 to 20.12.27 ...	23.1.28
	Dossor, W. A. ...	A. Snowden, S. N. Stokes, N. W. Glendenning, S. Butcher.	M.L.	Ellerman Wilson ...	Met. Log. 18.6.27 to 20.12.27 ...	6.1.28
	Britten, E. T., R.D., Commr. R.N.R.	J. Ashcroft, E. W. Connell, J. O. Chambers.	W.T.	Cunard ...	W.T. Reg. 2.1.28 to 8.1.28 ...	25.1.28
					Form 911 1.1.28 to 7.1.28 ...	26.1.28

LIST OF VOLUNTARY OBSERVING SHIPS

V

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 17.2.28.	Date Received.
Laguna ...	Mander, T. ...	R. H. A. Clark ...	No. A.	Pacific S.N. Co. ...	Form 911 29.11.27 to 14.12.27 ...	2.1.28
Lahore ...	Pigott, L. D. ...	E. B. Elcoate ...	" M.	P. & O. ...	" 10.12.27 to 22.12.27 ...	2.1.28
Lalande ...	Hamill, H. ...	A. E. Warburton ...	" A.	Lampport & Holt ...	" 18.7.27 to 18.10.27 ...	3.11.27
Lancashire ...	Crumplin, W. E. ...	R. Allen ...	" A.	Bibby ...	" 6.11.27 to 12.1.28 ...	17.1.28
36 Lancastria ...	R. G. Malin ...	R. P. Cambell, L. R. Sharp, F. G. Russell.	W.T.	Cunard ...	W.T. Reg. 16.12.27 to 7.1.28 ...	13.1.28
Laomedon ...	Beswick, W., D.S.C., Lt.-Commr. R.N.R.	H. A. Standfield ...	No. A.	A. Holt ...	Form 911 15.12.27 to 9.1.28 ...	13.1.28
La Paz, M.V. ...	Benson, C. W. ...	D. Beamer ...	" M.	Pacific S.N. Co. ...	" 18.12.27 to 17.1.28 ...	23.1.28
Laplace ...	Hickman, V. G. ...	A. L. Murray, R. D. Cottam	" A.	Lampport & Holt ...	" 30.11.27 to 19.12.27 ...	4.1.28
55 Lapland ...	Thomas, A. J. ...	B. Harries, F. Wills, L. A. Williams.	W.T.	Red Star ...	W.T. Reg. 26.12.27 to 10.2.28 ...	30.8.27
64 Laurentic ...	Trant, E. L., R.D., Commr. R.N.R.	" " " " " "	"	White Star ...	Form 911 22.1.28 to 10.2.28 ...	15.2.28
Lautaro, M.V. ...	Dunn, R. E., O.B.E., de Legh, P. ...	E. Sandon ...	No. M.	Pacific S.N. Co. ...	" 15.4.26 to 28.6.27 ...	13.2.28
Leicestershire ...	" " " " " "	R. S. Evans, H. G. Walton, J. K. Gemmell, G. W. Hunter.	M.L.	Bibby ...	Met. Log. 10.9.27 to 18.11.27 ...	8.9.27
Leighton, M.V. ...	Lindesay, J. M. ...	R. L. Hagley ...	No. A.	Lampport & Holt ...	Form 911 4.1.28 to 21.1.28 ...	24.11.27
Leitrim ...	Kemp, E. R. ...	C. R. Brown ...	" A.	Dowie, J., & Co. ...	" 2.11.27 to 17.11.27 ...	9.2.28
Leprito ...	Williams, J. C. ...	G. W. Revell ...	" A.	Ellerman Wilson ...	" 4.2.28 to 16.2.28 ...	23.11.27
Llandaff Castle ...	Morton Betts, W. ...	R. Bayer ...	" A.	Union Castle ...	" 29.12.27 to 15.1.28 ...	23.2.28
Llandoverly Castle ...	Kerby, C. H. ...	C. H. Williams, G. Moon, E. M. Betts.	M.L.	" " " " " "	Met. Log. 25.8.27 to 9.11.27 ...	14.2.28
Loch Katrine ...	Buret, T. J. C. ...	R. A. Stenhouse ...	No. A.	R.M.S.P. Co. ...	Form 911 11.11.27 to 3.2.28 ...	11.11.27
London Commerce ...	Young, H. J., D.S.C.	W. Edmonds ...	" A.	Furness Withy ...	" 19.8.27 to 19.9.27 ...	16.2.28
London Importer ...	Frost, C. R. ...	H. J. Anstice, J. H. Metcalfe, J. G. Freeman.	M.L.	" " " " " "	Met. Log. 8.9.27 to 3.12.27 ...	26.9.27
Lori Antrim ...	Jarvis, F. E. ...	L. G. Kirwan ...	No. A.	Ulster S.S. Co. ...	Form 911 27.4.27 to 10.5.27 ...	13.12.27
Loriga, M.V. ...	Clapham, E. C. ...	R. W. Gill ...	" A.	Pacific S.N. Co. ...	" 18.11.27 to 22.12.27 ...	23.5.27
Losada, M.V. ...	Ross, J. ...	J. T. Denley ...	" M.	" " " " " "	" 29.6.27 to 1.10.27 ...	23.1.28
Macedonia ...	Potter, H. W., R.D., Commr. R.N.R.	C. J. L. Hayward ...	" M.	P. & O. ...	" 29.6.27 to 1.10.27 ...	13.10.27
Macharda ...	Tyers, W. O. ...	W. Spencer ...	" M.	Brocklebank ...	" 31.12.27 to 21.1.28 ...	13.2.28
Maharani ...	Elliott, G. F. ...	M. Haslett ...	" M.	Asiatic S.N. Co. ...	" 10.11.27 to 6.12.27 ...	12.12.27
Mahia ...	McIntosh, A. ...	C. Shaw, C. Cadwallader, S. S. Slade.	M.L.	Shaw, Savill & Albion	" 14.10.27 to 23.12.27 ...	16.1.28
Maihar ...	Charlton, W. L. ...	H. M. Drummond ...	M.L.	Brocklebank ...	Met. Log. 1.10.27 to 25.12.27 ...	2.1.28
Maimyo ...	Smith, G. C. ...	Blain, A. W. ...	No. A.	Burns Philp ...	Form 911 16.7.27 to 8.10.27 ...	11.10.27
Maivara ...	Metcalfe, G. R. ...	W. W. Pearson, L. Thompson, W. T. Fitz Gerald.	M.L.	White Star ...	" 12.12.27 to 16.1.28 ...	13.2.27
58 Majestic ...	" " " " " "	F. C. Vogelmann, R. W. Holmes, T. MacRae.	W.T.	" " " " " "	W.T. Reg. 5.1.28 to 19.1.28 ...	13.2.27
Makambo ...	Brown, T. M. ...	A. Champion, D. Burgess.	M.L.	Burns Philp ...	Met. Log. 15.3.27 to 15.8.27 ...	21.1.28
Makura ...	Mawson, J. ...	W. J. Weber, A. Gell.	"	Canadian- Australasian	" 16.6.27 to 30.9.27 ...	11.10.27
Malabar ...	Hillman, E. J. ...	R. Morris ...	No. M.	Burns Philp & Co. ...	Met. Log. 6.1.27 to 9.5.27 ...	11.10.27
Malakuta ...	Adamson, F. L. ...	N. Grayson ...	" M.	Brocklebank ...	Form 911 12.12.27 to 16.1.28 ...	13.2.27
Malancha ...	Whitham, F. ...	R. Humble ...	" M.	" " " " " "	" 22.12.27 to 6.1.28 ...	13.2.27
Malda ...	Gray, T. N. ...	S. G. James ...	" M.	British India ...	" 20.10.27 to 25.11.27 ...	5.12.27
Maloja ...	Warner, S. C. ...	A. D. Dennis ...	" M.	P. & O. ...	" 22.12.27 to 26.1.28 ...	31.1.28
Mamari ...	Falconer, H. ...	P. Campbell ...	" A.	Shaw, Savill & Albion	" 19.7.27 to 22.9.27 ...	27.9.27
Manchester Brigade ...	Stott, C. H. ...	W. S. Eustance ...	" A.	Manchester Liners ...	" 20.11.27 to 23.12.27 ...	2.1.28
Manchester Corporation ...	Williams, H. ...	H. J. P. Nelson ...	" A.	" " " " " "	" 18.9.27 to 30.10.27 ...	8.11.27
Manchester Hero ...	Riley, J. E. ...	H. Anderton ...	M.L.	" " " " " "	Met. Log. 16.2.27 to 27.6.27 ...	7.7.27
Manchester Regiment ...	Foale, J. R. ...	P. D. Barr ...	No. A.	" " " " " "	Form 911 1.10.27 to 29.10.27 ...	4.11.27
Manchester Shipper ...	Raper, E. W. ...	C. A. Walker, A. Ricketts, L. Southern.	M.L.	" " " " " "	Met. Log. 25.6.27 to 30.11.27 ...	6.12.27
Manipur ...	Cochran, G. N. ...	R. Penston, G. B. Falconer ...	No. M.	Brocklebank ...	Form 911 7.12.27 to 23.12.27 ...	23.1.28
Mani-tee ...	Steidemann, H. ...	" " " " " "	M.L.	Elders & Fyffes ...	" " " " " "	" " " " " "
Manora ...	Hudson, H. T., R.D., Commr. R.N.R.	" " " " " "	No. M.	British India ...	Form 911 4.11.27 to 28.11.27 ...	6.1.28
Mantua ...	Randell, G. G. ...	D. B. Leader, H. Tee	" M.	P. & O. ...	Form 911 6.8.27 to 29.9.27 ...	3.10.27
Marella ...	Mortimer, S. ...	A. G. Hill, R. Duddell, A. G. Thomas.	M.L.	Burns Philp ...	Met. Log. 4.5.27 to 28.9.27 ...	28.11.27
Marengo ...	Procter, A. ...	F. Barnard, H. Bryon, J. Ford	"	Ellerman Wilson ...	" 18.6.27 to 14.11.27 ...	17.11.27
Maresfield ...	Jones, T. E. ...	T. Conolly ...	No. A.	Woods, Tyler & Brown	Form 911 13.11.27 to 7.12.27 ...	9.1.28
Margha ...	Baird, S. K. ...	P. Wright, H. E. Evans, C. C. Hughes, C. G. ...	M.L.	British India ...	Met. Log. 6.11.27 to 4.2.28 ...	15.2.28
Marquesa ...	Smiles, R. S. ...	J. Hart, J. Dickson, C. E. Mayer.	No. M.	Furness Houlder ...	Form 911 13.11.27 to 12.1.28 ...	17.1.28
Matakana ...	Thurston, H. P. ...	V. V. Edmonds ...	M.L.	Shaw, Savill & Albion	Met. Log. 15.4.27 to 1.9.27 ...	5.9.27
Mataram ...	Voy, W. ...	T. T. Oliver, J. J. Nicoll, J. Worrall.	No. A.	Burns Philp & Co. ...	Form 911 26.12.26 to 20.1.27 ...	28.2.27
Matara ...	Kershaw, W. A. R. ...	L. Jeans, H. Simpson, J. Richardson	M.L.	Shaw, Savill & Albion	Met. Log. 19.8.27 to 5.12.27 ...	10.12.27
Matheran ...	Ison, W. A. ...	" " " " " "	No. M.	Brocklebank ...	" 7.6.27 to 4.1.28 ...	10.1.28
Matiana ...	Green, F. V. ...	" " " " " "	No. M.	British India ...	Form 911 8.9.27 to 26.10.27 ...	5.12.27
Matra ...	Cornish, N. P. ...	" " " " " "	" M.	Brocklebank ...	" " " " " "	" " " " " "
Maungani ...	Davey, A. H. ...	F. Gibson, V. Knight, H. Kemp.	" M.	Union S.S. Co. of N.Z.	" 29.4.27 to 22.7.27 ...	5.9.27
32 Mauretania ...	Diggie, E. G., R.D., Capt. R.N.R.	J. A. Quarrie, G. Duguid, C. B. Osborne.	W.T.	Cunard ...	W.T. Reg. 22.12.27 to 5.1.28 ...	10.1.28
Medic ...	Jones, W. H. ...	W. Nicoll ...	No. A.	White Star ...	Form 911 10.3.27 to 18.4.27 ...	21.4.27
Megantic ...	Trant, E. L., R.D., Commr. R.N.R.	" " " " " "	" A.	" " " " " "	" 30.7.27 to 20.8.27 ...	24.8.27
22 Melita ...	Stewart, A. ...	J. Shearer ...	W.T.	Canadian Pacific ...	W.T. Reg. 11.12.27 to 28.12.27 ...	9.1.28
Mennon ...	Dougall, W. T. ...	J. A. C. MacGregor ...	No. A.	A. Holt ...	Form 911 29.11.27 to 8.2.28 ...	16.2.28
21 Metagama ...	Freer, A., Capt. R.N.R.	R. Walker, T. Gillette, G. Mowatt.	W.T.	Canadian Pacific ...	W.T. Reg. 16.10.27 to 5.11.27 ...	8.11.27
Middlesex ...	MacRae, A., D.S.C., Lt.-Commr. R.N.R.	C. Roberts ...	No. M.	Federal ...	Form 911 10.11.27 to 26.11.27 ...	1.12.27
Minna ...	Mackenzie, G. G. ...	A. M. Campbell ...	" A.	Scottish Fishery Board.	Form 911 23.12.27 to 22.1.28 ...	25.1.28
Minnesota ...	Finch, E. ...	R. Everard ...	No. M.	Atlantic Transport ...	" 12.12.27 to 31.12.27 ...	4.1.28
Minnetonka ...	Gates, T. F., C.B.E. ...	H. E. Macartney ...	" M.	" " " " " "	" 18.12.27 to 25.12.27 ...	16.1.28
Minnewaska ...	Claret, F. H., C.B.E., Commr. R.N.R.	F. J. Mummery ...	" M.	" " " " " "	" 5.12.27 to 21.1.28 ...	26.1.28
Mirror, C.S. ...	Seymour, A. ...	A. G. Watts ...	" M.	Eastern Tel. Co. ...	" 8.3.27 to 17.3.27 ...	8.4.27
Mississippi ...	Gibson, L. ...	" " " " " "	" A.	Atlantic Transport ...	" 6.11.27 to 15.11.27 ...	26.11.27
Modasa ...	Wylie, J. T. J. ...	R. E. T. Parsons ...	" M.	British India ...	" " " " " "	" " " " " "

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 17.2.28.	Date Received.
Moldavia ...	Burleigh, C. W., D.S.O., R.D., Capt., R.N.R.	W. L. Dobbin ...	No. M.	P. & O. ...	Form 911 27.11.27 to 9.2.28 ...	15.2.28
Mongolia ...	Furlong, G. H. S., R.D., Capt., R.N.R.	... ..	" M.	" " " " " "	" " " " " "	" " " "
Mongolian Prince	Edwards, W. ...	V. E. Palmer ...	" A.	Prince ...	Form 911 24.12.27 to 19.1.28...	7.2.28
24 Montcalm	Hamilton, G. ...	H. McFadyen ...	W.T.	Canadian Pacific ...	W.T. Reg. 1.1.28 to 20.1.28 ...	24.1.28
25 Montclare	Griffiths, J. N. ...	A. Mansey, F. E. Bevis, C. Draper.	"	" " " " " "	" " " " " "	15.2.28
27 Montnairn	Notley, A. H., R.D., Commr., R.N.R.	N. A. Goater, J. Roche, K. Hutchings, E. A. Shergold.	W.T.	Canadian Pacific {	W.T. Reg. 3.12.27 to 25.1.28 ...	28.1.28
Montoro	Williams, D. J. ...	R. M. Blunt ...	No. A.	Burns, Philp & Co. ...	Form 911 19.1.28 to 26.1.28 ...	27.1.28
26 Montrose	Landy, E. ...	A. Watt ...	W.T.	Canadian Pacific ...	Form 911 3.11.27 to 6.12.27 ...	21.1.28
20 Montroyal	Sibbons, H. ...	R. Antrobus ...	"	" " " " " "	W.T. Reg. 25.12.27 to 12.1.28...	17.1.28
Moresby	Edgell, J. A., O.B.E., Capt., R.N.	W. H. Martin ...	M.L.	His Majesty's Australian Ship.	Met. Log. 27.9.27 to 8.11.27 ...	12.11.27
	Henderson, D. A., Commr., R.N.	...			29.8.27 to 15.12.27...	23.1.28
Morvada	Mills, T. L., O.B.E., R.D., Commr., R.N.R.	D. S. Johnston ...	No. M.	British India ...	Form 911 20.7.27 to 16.10.27...	24.10.27
Mulbera	Steadman, W. R. ...	N. Clarkson ...	" M.	" " " " " "	" " " " " "	13.2.28
Nagara	Foster, E. ...	C. K. Brown ...	" M.	R.M.S.P. Co. ...	" " " " " "	26.1.28
Nagoya	Bedwell, L. A. ...	T. A. Sergeant ...	" M.	P. & O. ...	" " " " " "	9.1.28
Naldera	Dayas, C. ...	C. H. Hand, W. T. Banks, H. M. Askin.	M.L.	" " " " " "	Met. Log. 21.9.27 to 3.11.27 ...	7.11.27
Nardana	Moth, F. L. ...	J. N. McMillan ...	No. M.	British India ...	Form 911 9.9.27 to 18.10.27 ...	17.12.27
Nellore	Hignett, A. H., R.D., Lt.-Commr., R.N.R.	A. J. Brown ...	" M.	P. & O. ...	" " " " " "	16.1.28
Nerbuada	Williams, B. N. ...	P. Harrison ...	" M.	British India ...	" " " " " "	29.12.27
Nestor	Houghton, G. K. ...	J. Milhench, G. Shennan, N. Anderson.	M.L.	A. Holt ...	Met. Log. 16.7.27 to 5.11.27 ...	10.11.27
Newby Hall	Storey, J. K. ...	" " " " " "	"	Ellerman ...	" " " " " "	1.12.27
Newfoundland	Westgarth, W. A., D.S.C.	R. F. Handley, E. Sainty, S. Moore, E. B. Burke.	"	Furness Withy ...	" " " " " "	5.10.27
Niagara	A. C. Showman, T. V. Hill.	R. N. Turner, D. Rollo, V. Knight.	"	Canadian-Australasian	" " " " " "	10.1.28
Ningchow	Beale, H. E. ...	M. H. Vincent ...	No. A.	A. Holt ...	Form 911 24.12.27 to 4.1.28 ...	12.1.28
Norfolk	Robinson, F. W. ...	J. W. Thompson, A. M. Downan.	" A.	Federal ...	" " " " " "	7.11.27
Norna	Wright, J. W. ...	T. R. Ness ...	" A.	Scottish Fishery Board	" " " " " "	13.2.28
Norseman, C.S.	Barter, H. O., R.D., Commr., R.N.R.	R. W. Greenfield ...	" M.	Western Tel. Co. ...	" " " " " "	21.1.28
Northumberland	Upton, H. L. ...	" " " " " "	M.L.	Federal	" " " " " "	1.2.28
Nova Scotia	Furneaux, S. ...	" " " " " "	No. A.	Furness Withy ...	Form 911 2.11.27 to 30.1.28 ...	1.2.28
Nowshera	Schleicher, J. W. ...	W. D. L. Reeves ...	" M.	British India ...	" " " " " "	8.12.27
Nubian	Wamough, T. M. ...	" " " " " "	" A.	Leyland ...	" " " " " "	11.11.27
Nuddea	Morrison, N. C. ...	" " " " " "	" M.	British India...	" " " " " "	"
Oaklands Grange	St. Clair, C., D.S.C. ...	C. F. Foxwell ...	" A.	Houlder Bros. ...	Form 911 13.12.27 to 11.1.28...	13.1.28
57 Olympic	Marshall, W., C.B., D.S.O., A.D.C., R.D., Commadore, R.N.R.	A. Fisher, H. J. C. Day, A. E. Weller.	W.T.	White Star ...	W.T. Reg. 26.1.28 to 9.2.28 ...	13.2.28
	Matheson, C. G., D.S.O., R.D., Capt., R.N.R.	W. Elliot, C. K. Blake, H. Tanner.	M.L.	Orient ...	Form 911 26.1.28 to 9.2.28 ...	1.11.27
Orania	Hoskins, W. ...	" " " " " "	No. A.	Leyland	" " " " " "	15.2.28
Orbita	Dominy, R. H., C.B.E., Commr., R.N.R.	J. Lloyd Jones ...	" M.	R.M.S.P. Co. ...	" " " " " "	25.1.28
Orcoma	Pearse, A. W. ...	T. Naylor, G. Gerety, R. T. Hales.	M.L.	Pacific S.N. Co. ...	Met. Log. 17.2.27 to 4.5.27 ...	24.8.27
Orduna	Daniel, T. ...	R. D. Eckford ...	No. M.	R.M.S.P. Co. ...	Form 911 11.10.27 to 22.12.27 ...	29.12.27
Orestes	Flynn, G. A. ...	" " " " " "	" A.	A. Holt ...	" " " " " "	14.11.27
Orita	Duncan, E. E. ...	D. W. Hutchinson, F. Carter, H. D. Griffiths.	M.L.	Pacific S.N. Co. ...	Met. Log. 20.6.27 to 1.12.27 ...	8.12.27
Ormonde	Rice, W. V., D.S.O., D.S.C., Commr., R.N.	H. P. Price ...	"	His Majesty's Ship ...	" " " " " "	28.11.27
Ormonde	Sarson, M. J. ...	" " " " " "	No. M.	Orient ...	Form 911 8.10.27 to 30.10.27...	5.12.27
Oronsay	Shelford, W. S., Lt.-Commr., R.N.R.	Burnand, C., R. S. Hawker, J. D. Archer.	M.L.	" " " " " "	Met. Log. 16.10.27 to 17.1.28...	21.1.28
Oroya	Ridyard, A. ...	C. H. Ray ...	No. M.	Pacific S.N. Co. ...	Form 911 22.11.27 to 31.1.28...	9.2.28
Orsova	Cameron, E. P., R.D., Commr., R.N.R.	H. Schofield, L. J. Vesty, A. Croft Cohen, H. A. Whittle, A. Addison.	M.L.	Orient ...	Met. Log. 21.8.27 to 23.11.27...	26.11.27
Orvieto	O'Sullivan, F. R. ...	G. L. Carter, T. Fox Russell, R. C. Warner.	"	" " " " " "	" " " " " "	29.12.27
Osterley	McRitchie, W. M., O.B.E., R.D., Lt.-Commr., R.N.R.	R. J. Galpin ...	No. A.	" " " " " "	Form 911 3.1.28 to 1.2.28 ...	7.2.28
Otaki	McNish, R. ...	J. McBullock ...	" A.	New Zealand S.S. Co.	" " " " " "	13.2.28
Otira	Wood, C., D.S.C. ...	S. Winton ...	" M.	Shaw, Savill & Albion	" " " " " "	30.1.28
Otranto	Staunton, H. G., C.B.E., R.D., Commr., R.N.R.	O. C. Davies ...	" M.	Orient ...	" " " " " "	23.12.27
Oxfordshire	Foster, W. L. ...	" " " " " "	" A.	Bibby Bros. ...	" " " " " "	12.1.28
Pacific Shipper, M.V.	Campbell, H. ...	" " " " " "	" A.	Furness Withy ...	" " " " " "	5.12.27
Pacure	Sapsworth, S. A. ...	V. R. Watkins ...	" A.	Elders & Fyffes	" " " " " "	24.1.28
Pakeha	W. P. Clifton Mogg ...	E. T. Baker, R. E. Nicholson, G. Lindsay	M.L.	Shaw, Savill & Albion	Met. Log. 17.12.27 to 20.1.28...	23.12.27
Panaras	Peregrine D. ...	" " " " " "	M.L.	Booth ...	" " " " " "	15.9.27
Pareora	Evans, J. O. ...	A. J. Ellis ...	No. A.	Hain S.S. Co. ...	Form 911 6.7.27 to 2.8.27 ...	31.7.27
Paris	Cook, C. L. ...	Mr. Biles ...	C.C.	Southern Ry. ...	Telegraphic Report. 31.7.27	3.8.27
Patia	Makepeace, S. ...	J. Kinsley ...	No. A.	Elders & Fyffes	Form 911 19.6.27 to 23.7.27 ...	29.12.27
Peisander	Slater, H. ...	D. L. Hoare ...	" A.	A. Holt ...	" " " " " "	11.1.28
65 Pennland	Harvey, H. ...	C. J. Murray, E. Cornellie ...	W.T.	Red Star ...	" " " " " "	5.10.27
Peshawur	Wilding, H. G. ...	J. C. Mellonie, J. K. Crone, R. G. Wood.	M.L.	P. & O. ...	Met. Log. 27.4.27 to 28.9.27 ...	5.10.27

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Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 17.2.28.	Date Received.
<i>Piako</i>	Kettlewell, C. R. ...	P. J. Connolly, T. K. McDonald, H. N. Lawson.	M.L.	New Zealand S.S. Co.	Met. Log. 3.7.27 to 5.12.27	12.12.27
<i>Polycarp</i>	Jackson, T. H. ...	C. W. Smethurst	No. A.	Booth	Form 911 27.11.27 to 8.12.27...	29.12.27
<i>Port Adelaide</i>	Swan, L. H. ...	E. N. Rogerson, F. J. Lavers, L. H. Potter.	M.L.	Commonwealth & Dominion.	Met. Log. 20.8.27 to 17.12.27...	28.1.28
<i>Fort Albany</i>	Needham, R. ...	G. W. Horton	"	" " " "	" 1.6.27 to 25.11.27	8.12.27
<i>" Auckland</i>	Durham, R. S. ...	G. L. Hazlewood, C. F. Post, J. H. Sloan, H. E. Braine.	"	" " " "	" 10.9.27 to 25.1.28	15.2.28
<i>" Bowen</i>	Hearn, G. W. ...	W. R. Johnston	No. A.	" " " "	Form 911 28.10.27 to 15.12.27	6.1.28
<i>" Campbell</i>	Reynolds, P. J. ...	G. T. C. Harris	"	" " " "	" 21.8.27 to 13.12.27...	2.1.28
<i>" Caroline</i>	Hoad, A. C. ...	A. E. Fishwick, C. A. Hodson, J. Stannard.	M.L.	" " " "	Met. Log. 6.7.27 to 5.11.27	10.11.27
<i>" Darwin</i>	Sawbridge, I. R. ...	S. Hearn, E. M. Fenton, J. S. Moore.	"	" " " "	" 13.8.27 to 9.1.28	13.1.28
<i>" Denison</i>	Ferris, J. ...	P. J. Howe	"	" " " "	Form 911 25.5.27 to 7.7.27	9.7.27
<i>" Dunedin</i>	Farmer, F. ...	E. G. Jones, H. M. Post, N. M. Muzzell.	"	" " " "	Met. Log. 20.5.27 to 25.9.27	28.9.27
<i>" Fremantle</i>	Kearney, F. J. ...	A. G. Rhind	No. A.	" " " "	Form 911 31.12.27 to 2.2.28	7.2.28
<i>" Gisborne</i>	Hutchinson, T. ...	" " " "	" A.	" " " "	" 21.8.27 to 13.12.27...	2.1.28
<i>" Hobart</i>	Craven, R. ...	R. Carter, L. Copeland, G. G. Langford, C. L. Webb.	M.L.	" " " "	Met. Log. 22.7.27 to 6.11.27	14.11.27
<i>" Hunter</i>	Cottell, S. C. ...	A. Cooper, A. McClounan, J. T. Weldin.	"	" " " "	" 22.6.27 to 6.10.27	11.11.27
<i>" Huon</i>	Compton, J. ...	J. A. Fairbairn	No. A.	" " " "	" " " "	" " " "
<i>" Melbourne</i>	Brown, A. H. ...	D. G. H. Bradley, L. H. B. Bloye, P. H. Pedrick, C. J. Gale.	M.L.	" " " "	Met. Log. 31.3.27 to 12.10.27...	19.10.27
<i>" Napier</i>	Jones, C. N. ...	" " " "	No. A.	" " " "	Form 911 25.2.27 to 12.4.27	21.4.27
<i>" Nicholson</i>	Jack, J. ...	J. G. Lewis, G. L. H. Dean, A. G. Newbury, W. B. Hopkins.	M.L.	" " " "	Met. Log. 17.9.27 to 17.1.28	6.2.28
<i>" Pirie</i>	Kippins, T. ...	" " " "	"	" " " "	" 26.3.27 to 2.9.27	13.9.27
<i>" Sydney</i>	Higgs, W. G. ...	H. G. Boys Smith, E. E. Roswell, K. D. Morgan.	"	" " " "	" 1.4.27 to 17.8.27	1.9.27
<i>" Victor</i>	Williams, R. ...	R. Stannard, J. B. Watson, A. Brown.	"	" " " "	" 16.7.27 to 28.11.27...	15.12.27
<i>" Wellington</i>	Jones, C. ...	D. F. Morgan	No. A.	" " " "	Form 911 19.10.27 to 22.11.27	9.1.28
<i>President Jackson</i>	Griffith, J. ...	J. A. Cartwright	" A.	Pacific Mail S.S. Co...	" 15.10.27 to 15.12.27	23.1.28
<i>President Jefferson</i>	Nichols, F. R. ...	C. H. Moen	" A.	Admiral Oriental Line	" 10.12.27 to 3.1.28	15.2.28
<i>Protea, H.M.S.A.S.</i>	Woodhouse, A. F. B., Lt.-Commr., R.N.	R. J. Whitley	M.L.	South African Naval Service.	" 30.7.27 to 7.11.27	20.12.27
<i>Protesilaus</i>	Nelson, T. B. ...	" " " "	"	A. Holt	Met. Log. 8.4.27 to 7.9.27	11.10.27
<i>Pyrrihus</i>	Elford, W. J. ...	R. E. Wilks	No. A.	" " " "	Form 911 5.12.27 to 16.1.28	14.2.28
<i>Rancher</i>	Gibbings, W. ...	" " " "	No.	Harrison	" " " "	" " " "
<i>Ranpura</i>	King, A. M., D.S.C.	E. J. Spurling	" M.	P. & O.	" 10.12.27 to 1.2.28	2.2.28
<i>60 Regina</i>	Davies, E. ...	F. W. Laws, V. Evans, R. C. Cochran.	W.T.	White Star - Do- minion {	" 13.11.27 to 3.12.27...	7.12.27
<i>Reindeer</i>	Langdon, C. ...	" " " "	C.O.	G.W. Railway	Telegraphic Report 16.2.28	16.2.28
<i>Remuera</i>	Cameron, J. J. ...	D. Hughes	No. A.	New Zealand S.S. Co.	Form 911 30.9.27 to 19.1.28	24.1.28
<i>Rhezenor</i>	Stout, G. I. ...	A. Yarwood	" A.	A. Holt... ..	" 15.12.27 to 28.12.27	23.1.28
<i>Rhodesian Trans- port.</i>	Bullock, F. W. H. ...	F. D. Betts	" A.	Houlder Bros.	" 16.7.27 to 29.10.27...	3.11.27
<i>Rimutaka</i>	Hemming, F. A. ...	H. A. Fryer, M. A. D. Stewart, G. O. Saul, H. Vernon.	M.L.	New Zealand S.S. Co.	Met. Log. 10.6.27 to 19.10.27...	25.10.27
<i>Risaldar</i>	Matthews, E. G. ...	R. H. Friedlander	No. M.	Asiatic S.N. Co. ...	Form 911 4.11.27 to 19.11.27...	12.12.27
<i>Rother</i>	Woodhead, T. H. ...	" " " "	" A.	Goole Steam Shipping	" 29.12.27 to 12.1.28	30.1.28
<i>Rotorua</i>	Hunter, J. L. B. ...	E. Lawrence, F. Cooke, H. Cockerill.	M.L.	New Zealand S.S. Co.	Met. Log. 3.9.27 to 15.12.27	19.12.27
<i>Royal Fusilier</i>	Dawson, J. ...	J. Fraser	No. A.	London & Edinburgh S.S. Co.	Form 911 19.5.27 to 7.7.27	11.7.27

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log. Register, or Report Contributed. Received up to 17.2.28.	Date Received.
<i>Telestas</i> ...	Wilkinson, W. H. ...	...	No. A.	A. Holt & Co. ...	10.9.27 to 1.1.28 ...	6.1.28
<i>Tekoa</i> ...	Barnett, H. ...	D. J. Murray ...	" M.	New Zealand S.S. Co. ...	18.11.27 to 7.12.27 ...	9.1.28
<i>Telamon</i> ...	Willcox, J. H. ...	...	" A.	A. Holt ...	4.8.27 to 16.8.27 ...	23.11.27
<i>Tetela</i> ...	Bostock, R. J. ...	F. L. Brealy ...	" A.	Elders & Fyffes ...	13.11.27 to 19.12.27 ...	29.12.27
<i>Teucer</i> ...	Hodgson, R. N. ...	R. N. Inkster ...	" A.	A. Holt ...	24.8.27 to 12.11.27 ...	14.11.27
<i>Themistocles</i> ...	Young, A. D. ...	H. C. Howe ...	" M.	Aberdeen ...	31.7.27 to 9.9.27 ...	21.11.27
<i>Theseus</i> ...	Jones, E. ...	W. A. Fyffe ...	" A.	A. Holt ...	27.11.27 to 15.12.27 ...	30.12.27
<i>Titan</i> ...	Power, J. ...	D. Hey, D. MacTavish, G. W. Best, C. F. Bailey.	M.L.	" ...	Met. Log. 17.9.27 to 6.1.28 ...	18.1.28
<i>Tongariro</i> ...	Burton, Davies J. ...	F. C. Pretty, A. E. Williams, E. A. Quick, D. Baldwin.	"	New Zealand S.S. Co. ...	Form 911 18.9.27 to 28.1.28 ...	22.28
<i>Transylvania</i> ...	Bone, D. W. ...	P. Middleton ...	No. A	Anchor ...	14.1.28 to 22.1.28 ...	7.2.28
<i>Traveller</i> ...	Worthington, B. ...	E. L. Stockley, R. L. Williams	" M.	T. & J. Harrison ...	31.7.27 to 29.10.27 ...	1.11.27
<i>Trematon</i> ...	Evans, B. ...	J. Jenkyn, C. Warren, L. Griffin.	M.L.	Hain S.S. Co. ...	Met. Log. 16.9.27 to 20.12.27 ...	13.1.28
<i>Turakina</i> ...	Hamilton, E. S. ...	A. W. Marshall ...	No. M.	New Zealand S.S. Co. ...	Form 911 19.12.27 to 8.1.28 ...	27.1.28
<i>Il Tuscania</i> ...	Smart, R. W. ...	J. Hamilton ...	W.T.	Anchor ...	24.9.27 to 15.10.27 ...	19.10.27
<i>Tyndareus</i> ...	Williams, D. H. ...	A. G. Phillips, T. R. Phillips, F. H. Gray.	M.L.	A. Holt ...	Met. Log. 14.6.27 to 7.11.27 ...	16.12.27
<i>Ulimaroa</i> ...	Wylie, W. J. ...	A. N. Robertson ...	No. M.	Huddart Parker, Ltd. ...	Form 911 4.11.27 to 25.12.27 ...	13.2.28
<i>Ulysses</i> ...	Owen, R. D. O.B.E. ...	R. Blakey ...	" A.	A. Holt ...	22.12.27 to 9.1.28 ...	13.1.28
<i>Umcolosi</i> ...	Barnes, E. W. ...	R. A. Dyns ...	" A.	Bullard King ...	3.11.27 to 15.12.27 ...	9.1.28
<i>Valacia</i> ...	Inch, F. ...	G. Meggitt ...	" M.	Cunard ...	31.5.27 to 2.12.27 ...	6.2.28
<i>Vardulla</i> ...	Bond, H. A. L. ...	W. H. Barker ...	" A.	" ...	20.12.27 to 8.1.28 ...	31.1.28
<i>Vigilant</i> ...	Simpson, E. S. S. ...	J. Hunter ...	" A.	Scottish Fishery Board.	1.1.28 to 31.1.28 ...	2.2.28
<i>Waioapu</i> ...	Todd, D. ...	...	" M.	Canadian - Australasian.	2.11.27 to 11.12.27 ...	2.1.28
<i>Wairuna</i> ...	Ryan, J. ...	C. C. Waters, G. H. George, L. B. Ehler.	M.L.	Union S.S. Co. of N.Z.	Met. Log. 24.4.27 to 13.9.27 ...	28.11.27
<i>Walmer Castle</i> ...	Lang, T. W. Stuart, C.B.	A. E. Denn ...	No. A.	Union Castle ...	Form 911 30.9.27 to 20.11.27 ...	22.11.27
<i>Wangaratta</i> ...	Scutt, W. ...	T. W. Wordingham, S. R. Millard, A. G. Brooks, J. K. Riden.	M.L.	British India ...	Met. Log. 3.4.27 to 27.8.27 ...	3.9.27
<i>Warfield</i> ...	Steel, R. ...	C. M. Quick ...	No. A.	British Tankers ...	Form 911 9.9.27 to 23.9.27 ...	3.10.27
<i>War Nizam</i> ...	Moncrieff, T. ...	B. Kieran ...	" M.	Federal ...	23.12.27 to 1.2.28 ...	14.2.28
<i>Westmoreland</i> ...	Gardner, H. W. ...	C. P. Jackson, A. L. Warren, G. A. Shepherd.	M.L.	" ...	Met. Log. 11.7.27 to 16.11.27 ...	22.11.27
<i>William Scoresby, R.S.S.</i> ...	De la Motte, J. B. B., Lieut. R.N.	...	"	Falkland Islands Government.	...	...
<i>Windsor Castle</i> ...	Chave, Sir B., K.B.E.	A. J. Tweddell, J. Montgomery, P. G. McIver, A. G. Bedwell.	"	Union Castle ...	15.10.27 to 5.2.28 ...	15.2.28
<i>Winifredian</i> ...	Harrocks, W. ...	A. Crone ...	No. M.	Leyland ...	Form 911 30.10.27 to 22.12.27 ...	6.1.28
<i>Wonganelia</i> ...	Suffern, H. ...	G. F. Phillips ...	"	W. Crossby & Sons ...	26.9.27 to 8.11.27 ...	20.12.27
<i>Woodarra</i> ...	Reilly, J. V. ...	H. Goater, B. W. Smith, D. B. Lattin, G. F. Alexander.	M.L.	British India ...	Met. Log. 26.6.27 to 18.11.27 ...	24.11.27
<i>Yorkshire</i> ...	Millson, G. E. ...	W. M. C. Higginson, R. Allen	No. A.	Bibby ...	Form 911 23.4.27 to 4.7.27 ...	9.7.27
<i>Zent</i> ...	Roberts, —	...	"	Elders & Fyffes ...	...	...
<i>Conway, H.M.S.</i> ...	Richardson, F. A., D.S.C., Commr., R.N.	The Senior Cadets ...	Cadets' M.L.	...	Cadets' Met. Log. 18.9.27 to 10.12.27	17.12.27
<i>Pangbourne Nautical College</i> ...	Tracy, A. F. G., Commr., R.N.	"	"	...	Cadets' Met. Log. 28.9.27 to 15.12.27	23.12.27
<i>Worcester, H.M.S.</i> ...	Sayer, M.B., C.B.E., R.D., Capt., R.N.R.	"	"	...	Cadets' Met. Log. 23.9.27 to 14.12.27	19.12.27
<i>Abaco</i> ...	...	The Keepers ...	Lighthouse Register.	...	Lighthouse Register 1.7.26 to 20.10.26	20.4.27
<i>Cay Lobos</i> ...	...	...	"	...	Lighthouse Register 1.1.27 to 11.7.27	29.9.27
<i>Double Headed Shot</i> ...	...	...	"	...	Lighthouse Register 1.7.26 to 31.12.26	20.4.27
<i>Inagua</i> ...	...	...	"	...	Lighthouse Register 24.1.27 to 3.7.27	29.9.27
<i>Sombrero</i> ...	...	...	"	...	Lighthouse Register 1.7.27 to 31.12.27	7.2.28
<i>Watling Island</i> ...	...	...	"	...	Lighthouse Register 10.9.26 to 30.6.27	29.9.27
<i>Cape Pembroke (Falkland Is.)</i> ...	...	...	"	...	Lighthouse Register 1.1.27 to 30.6.27	18.10.27

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 up to 31.1.28.	Date Received.
<i>Casanare</i> ...	Steidelman, H. ...	R. O. Jones ...	Elders & Fyffes ...	Water Samples ...	28.1.28
<i>Chirripo</i> ...	McColm, F. ...	...	"	"	...
<i>Darro</i> ...	Matthews, G. P. ...	W. F. Walker ...	R.M.S.P. Co. ...	"	16.12.27
<i>Desado</i> ...	Hannon, F. S. ...	J. N. Duncan ...	"	"	2.1.28
<i>Hildebrand</i> ...	Maddrell, J. ...	A. Allan ...	Booth ...	"	7.1.28
<i>Zent</i> ...	Roberts, —	...	Elders & Fyffes ...	"	...

April, M.O., 1928.

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

MARINE METEOROLOGY, ATLASES AND MEMOIRS.

CHARTS:—

ATLANTIC:—

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

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

ATLANTIC (NORTH):—

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

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

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

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

ATLANTIC (SOUTH):—

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

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

BAFFIN BAY AND DAVIS STRAIT:—

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

INDIAN OCEAN:—

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

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

CHARTS:—continued.

MEDITERRANEAN SEA:—

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

PACIFIC OCEAN:—

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

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

RED SEA:—

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

SOUTHERN OCEAN:—

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

GEOPHYSICAL MEMOIRS (4to.):—

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

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

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

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

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

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

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

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

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