

VOL. IV. No. 45.

THE MARINE OBSERVER.

SEPTEMBER, 1927.

TABLE OF PRINCIPAL CONTENTS.

	PAGE	
Contents	167	Lithographic Illustrations after page 188.
The Marine Observer's Log (with illustrations)	167	Weather Charts I to X mornings of September 9th to 18th, 1926 , Hurricanes of the West Indies and North Atlantic, 1926.
Hurricanes of the West Indies and North Atlantic in 1926 (with illustrations)	174	Chart XI. Tracks of Hurricanes of the West Indies and North Atlantic in September, 1926 .
Stream and Drift Currents and Effect of Wind	181	Weather Charts XII to XVII mornings of October 18th to 23rd, 1926 , <i>Valerian-Eastway</i> Hurricane.
Weather Signals U.S.A. (Pacific coast, Gulf coast), West Indies and Mexico:—		Chart XVIII Track of <i>Valerian-Eastway</i> Hurricane, October 1926 .
II. Wireless Weather Signals, Bulletins	183	Charts of Currents on the Tracks to and from West Indies and Panama, Western Portion, August, September and October obser- vations of ships regularly observing for British Meteorological Office, 1910-1925.
Wireless Storm Warnings	186	Chart showing mean sea surface temperatures, South Atlantic for month of September , from observations of British Ships during the years 1855 to 1899 and 1855 to 1878.
III. Wireless Time Signals	187	
IV. Visual Storm Warnings	187	

CONTENTS.

THE greater part of this Number is devoted to a report upon the North Atlantic and West India Hurricanes of 1926, which was a very severe season. Marine Observers are asked to study this report in conjunction with Chapters IV and V of "Wireless and Weather an aid to Navigation" which dealt with the practical application of the "Laws of Storms" aided by Wireless Weather Telegraphy and self made Weather Charts. Chapter IX is held over to the October number, but this serial will be completed in the present volume.

The Corps of Marine Observers are to be congratulated upon the increase of volume and interesting matter in "The Marine Observer's Log." A short article on current giving the biologist's view will be of special interest to those engaged in taking observations, for the Fisheries Laboratory at Lowestoft and the Biological Association of Plymouth.

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.

CURRENTS ON THE WEST INDIES AND PANAMA ROUTES.

THE following is an extract from some of the replies received in answer to a circular letter requesting information of general experience of currents on the West Indies and Panama routes:—

Captain W. T. Forrester, O.B.E., S.S. "Camito."

"I have had a lengthy experience in vessels of this fleet operating on these routes and it leads me to heartily endorse your statement as to the vagaries of currents, and with possibly the exception of the Gulf Stream, one is apt to be out in estimating current course even

after the most careful consideration of the various elemental factors which have a bearing on current.

"The only circumstances under which, in my opinion, the Navigator can make confident use of his knowledge of current, are in keeping his vessel away from a danger when he expects to set towards it, and in endeavouring to make good a course with plenty of sea-room.

"Wind undoubtedly has the most important bearing on surface current and the Trades are the primary cause of it.

"A large portion of the combined Equatorial Currents flows between the Windward Islands into the Caribbean and takes up a westerly course, curving more to the northward about the 75th meridian; its direction is deflected by various causes such as islands, shoals, &c., and its velocity may be anything up to $1\frac{1}{2}$ knots generally, and $2\frac{1}{2}$ knots locally: off the Yucatan Peninsula this Current separates, a portion flowing northward towards the western end of Cuba, while some of it follows the shores of the Gulf of Mexico reuniting in the Straits of Florida and forming the highly important Gulf Stream, which is later joined by the Bahamas Current, that portion of the Equatorial Current flowing to the northward of the West Indies.

"In the Caribbean, counter current is of importance, principally along the Cuban and Central American coasts; the Cuban counter current is generally strongest off Cape Cruz where it sets about 110° at sometimes 1 knot; usually weak off Navassa Island it is joined by the customary southerly flow of the Windward Passage and continues along the southern coast of Haiti, inclining to the northward and through the Mona Passage.

"In the principal passages, current is mainly in the direction of the passage and tidal.

"The Central American counter current I have experienced most strongly between Port Limon (C.R.) and Gallinas Point (Colombia), its velocity varying from 0.2 to 1.2 knots, averaging about 0.7 knots.

"The Caribbean offers many striking instances of the unexpected where Current is concerned—in making Port Limon from Jamaica I have encountered, on several occasions, a set to the westward practically up to Grape Cay, whilst on leaving port, often within twenty-four hours of arrival, for Colon, have immediately had a favourable Current setting about 110° , at 1 knot and occasionally more; hence I should imagine the Counter Current is forced coastwards by the main flow just to the W.N.W. of Port Limon and from its confinement attains increased velocity E.S. Eastwards.

"On passage from Santa Marta to Trinidad last voyage during Mid-July the westerly set was strong, as much as 2 knots between Bonaire and Los Roques; on same route this voyage, six weeks later, the adverse Current was negligible until past Margarita Island.

"Bound for Colon from say the Mona Passage the westerly set is not usually experienced after Latitude $10^\circ 30' N.$, and from Latitude $10^\circ N.$ onwards the Counter Current sets from 90° to 65° at an average rate of 0.6 of a knot.

"Apart from the clockwise flow, about the confines of the Sargasso Sea, formed by the Gulf Stream inclining from the American coast in about $40^\circ N.$, curving to the S.E. and southward nearing the Azores, and re-curving, in about $20^\circ N.$ to the S.W. and westward, the Current on the West Indian routes is ever changing.

"Outward bound, I have usually found a slight set to the N.E. and eastward from Tidal waters to the Azores, though with a low barometer, 29.50" or less, have encountered a N.Westerly set of from five to fifteen miles per day; in the immediate vicinity of the islands an occasional westerly set may be experienced. South-west of the Azores to about Latitude $35^\circ N.$ there is as a rule, an appreciable southerly set of not more than 10 miles per day.

"The area bounded by Parallels 25° and $35^\circ N.$, and Meridians 40° and $60^\circ W.$, seems more or less devoid of Current.

"South of Latitude $25^\circ N.$, a S.W. and later westerly set of from 10 to 15 miles per day is felt; on nearing the islands, sets roughly W.N.W. at anything up to 1.5 knots, the strongest I have known in the vicinity of the land: average velocity approaching Turks Island being 0.6 of a knot, whilst on rare occasions I have found no Current."

CURRENTS.

U.S.A. to River Plate.

THE following is an extract from the Meteorological Report of S.S. *Socrates*, Captain F. C. TAYLOR, Norfolk Va. to Rio de Janeiro, Observer Mr. W. E. JORDAN, 2nd Officer:—

"I would like to draw attention to the sets experienced within the limits of the Equatorial Current. Instead of getting W.N.Westerly sets as expected, the sets we encountered were nearly all to the southward of south-west, all observations were carefully checked, and courses corrected for known errors. The patent log was found to be running one per cent. slow over the land, when off Pernambuco. Also when in the limit of the Easterly current north of the Equator, although we experienced a decidedly strong easterly set from Noon of September 10th until 6.00 p.m. of the same day, after this time the current appears to have swung to the westward to the following Noon.

"When running down to a position off Cape San Thome, between the evening of September 18th and the morning of the 19th, a strong W.N.Westerly set was experienced, a good stellar 'fix' was obtained at 6.30 p.m. on the 18th and a course shaped to pass 30 miles east of the Cape. At 5.30 a.m. 19th another fix was obtained and the vessel was found to have set N. $65^\circ W.$ 18 miles during an interval of 11 hours and was obliged to run South (true) twenty-five miles, in order to clear San Thome bank. This current is worthy of note inasmuch as it is extremely unusual in this vicinity, none of us having experienced the same before."

NOTE.—The current charts published in THE MARINE OBSERVER do not cover the region (Latitude $8^\circ N.$, Longitude $43^\circ W.$) where the easterly set was experienced on September 10th. The Admiralty "Current Charts" for this month, however, show sets varying from N.E. to S.E. through E. in this part of the Ocean with drifts up to 25 miles per day. With regard to the sets between W. and N. off Cape San Thome the current chart for the 3rd Quarter published in THE MARINE OBSERVER Vol. II No. 19, shows that while the mean current in this region is from S.W. to W., individual currents between W. and N. have been experienced between 1910 and 1923. For the direction W.N.W., drifts have been noted between 13 and 24 miles per day while the N.W. and N. drifts have not exceeded 12 miles per day. The direction N.N.W. observed by S.S. *Socrates* on September 18th-19th is, however, not represented on the current rose.

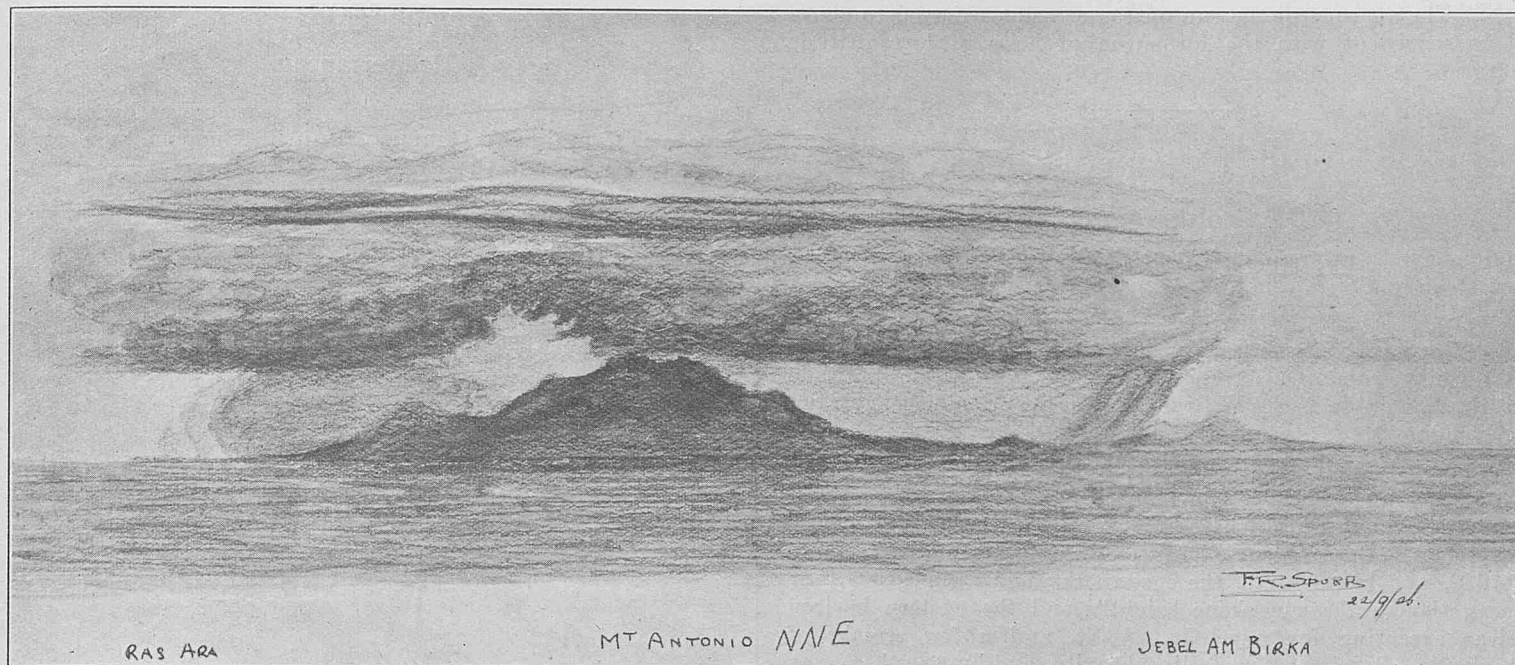
SAND STORM.

Off Perim.

THE following is an extract from the Meteorological Report of S.S. *Macedonia*, Commander H. W. POTTER, R.D., R.N.R., Aden to London, Observer Mr. F. R. SPURR, 2nd Officer:—

"Leaving Aden 11.17 a.m. September 22nd, 1926, wind light and variable, barometer 29.93 in. Temperature 88° , fine and clear, exceptionally good visibility. A bank of clouds hanging over Arabia to the northward, upper, Cumulus, lower, Nimbus. 3.0 p.m., when off Ras Ara the cloud bank had the appearance of a heavy rain squall, with a 'blanket-like' layer hanging over it. As it approached the higher land of Mt. Antonio, it seemed to rise in the middle and a yellow patch showed through, while the two extremes appeared to be travelling away from the centre.

"In the sketch I have endeavoured to show the right extreme about to pass over Jebel Am Birka and certainly had the appearance of heavy rain, while on the left over Ras Ara a yellow patch was seen moving at a high speed. The wind was still light airs, but awnings were furled, and about 3.24 p.m. the wind came away from the N.N.E. increasing to force 8. The air became thick with sand dust but there was no rain and several flashes of lightning were noticed. The air became quite cold, probably due to it having been driven to a high altitude by Mt. Antonio (2,720 feet) and also due to evaporation, as the wind which had before been very humid now became very dry. There was very little sand, visibility being reduced to about half a mile for about ten minutes, then it suddenly cleared and in the peculiar whitish light all the sandy hills and mountains looked very dark and clearly defined and appeared to be very much



closer than previously, in fact flat topped mountains on the Sudan side of the Straits could be seen far inland and to the Southward that I had never seen before. 4.0 p.m., wind N.N.E. force 8, barometer 29.88 in., temperature 88°. Rounding Perim, the wind gradually decreased and veered to N. force 3. 8.0 p.m., wind N.N.W. force 3, barometer 29.92 in., temperature 91°.

NOTE.—The original was produced in water colours; it is only possible to reproduce illustrations in black and white in THE MARINE OBSERVER.

PHOSPHORESCENT WHEEL.

Arabian Sea.

THE following is an extract from the Meteorological Report of S.S. *Chindwara*, Captain E. G. BROOKS, Calcutta to Karachi, Observer Mr. J. A. HAMMOND, 3rd Officer:—

“September 30th, 1926, Latitude 23° 55' N., Longitude 66° 55' E. During early part of watch small patches of phosphorescent sea had been passed, but at 11.40 p.m., the ship was seen to be approaching what appeared to be a long line of surf extending N.N.E.-S.S.W. direction. Upon entering it, it was found to be a large field of phosphorescent sea. The remarkable thing being that instead of one continuous field of light as is usually the case, it appeared to be a number of circular beams radiating swiftly in a counter clockwise manner round dark spots. As a stone dropped into the water sends out eddies, so these dark spots sent out eddies of light, which appeared to rotate round a central spot, much as the spokes of a wheel rotate round the hub. The water around the ship appeared to be boiling, the effect being most weird. The light illuminated the whole ship, so that the lookout on the fo'c'sle head was plainly visible. It was impossible to watch the flashes in the water long, as it turned one quite dizzy. Ship was steaming about 9 knots, dark but clear night, with light W. wind, slight sea and W.S. Westerly swell. The field of light was estimated to be about three miles by one mile and while in it nothing outside the limits could be seen, even lights of a ship that had passed five minutes before. After passing out of the field of light nothing more was seen until we arrived at Karachi at daylight on the 1st October.

“The flashes of light seen were exactly as though someone with a powerful searchlight was standing on the bottom of the sea directing the light upwards through the water. A sample of water was obtained, but there appeared to be nothing unusual in it.”

PHOSPHORESCENCE.

Sandakan Harbour, E. Indies.

THE following is an extract from the Meteorological Log of H.M.S. *Herald*, Lieut.-Commander H. V. SILK, R.N., surveying off Sandakan, Observer, Lieut. D. G. V. WILLIAMS, R.N.:—

“Phosphorescence in the harbour at Sandakan.

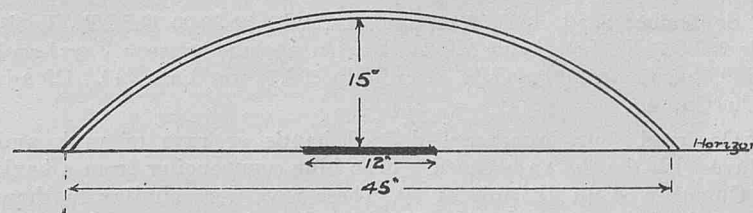
“This phenomenon was very marked during the ship's stay at Sandakan commencing September 20th. Practically every night it was observed. With the slightest breeze to ruffle the surface of the water the phosphorescence was observed over large areas of the harbour. When it was calm the phenomenon was observed only when the water was disturbed—as by the movement of boats, &c. A boat's wake and bow wave appeared as sheets of green flame.

“During the other two stays of the ship at Sandakan commencing on October 15th and November 6th respectively practically no phosphorescence was observed.”

RAINBOW.

North-East Coast of Australia.

THE following is an extract from the Meteorological Log of H.M.A.S. *Moresby*, Captain J. A. EDGELL, O.B.E., R.N., surveying off N.E. coast of Australia, Observer, Lieut. W. H. MASTER, R.A.N.:—



“September 23rd, 1926, Stonehaven (Latitude 20° 06' S., Longitude 148° 57' E.). At 0900. Most unusual rainbow effect. The true bow was almost straight and level with horizon, subtending an angle of 12°. The double image was quite distinct and was a regular curve the highest part of which was about 15° above the horizon, the whole subtending an angle of nearly 45°.”

NOTE.—When a rainbow is formed, the sun, the observer's eye and the centre of the circle of which the bow forms an arc are always in a straight line. The radius of the red (upper) part of a rainbow is 42° and hence no rainbow can be seen if the sun's altitude is more

than 42° . The altitude of the sun on the occasion referred to above would be consistent with the formation of bows of low altitude as described.

DOUBLE RAINBOW.

Off Scottish Coast.

THE following is an extract from the Meteorological Report of Fishery Cruiser *Freya*, Captain W. ANGUS, cruising east coast of Scotland, Observer Mr. T. R. NESS, 2nd Officer:—

"On Saturday, September 11th, 1926, at 6.40 p.m. B.S.T. (0540 G.M.T.) while cruising at 8 knots, course S. 72° E., in Latitude $57^{\circ} 45'$ N., Longitude $2^{\circ} 45'$ W., ran into an abnormally heavy rain-fall or cloudburst.

"The barometer fell steadily during the day from 29.74" at 4 a.m. to 29.38" at 6 p.m. when it stopped falling. The wind was S.E. force 2 to 3, and there had been intermittent rain showers during the afternoon. Dense black clouds had been gradually forming in the S.E. and by 6.30 p.m. the eastern sky had assumed an inky blackness, though the sun shone brightly and the western horizon was clear excepting for some Cu., A.-St. and a few streaks of Ci.-St. clouds. Rain was now falling heavily, and by 6.40 there was a torrential downpour which lasted for about 15 minutes, the dense black cloud apparently travelling slowly eastwards though the wind remained S.E. and increased slightly. The western sky was perfectly clear, the sun continued to shine brilliantly and for a few moments cast the shadow of the ship and her superstructure into the wall of falling water ahead.

"About 6.45 p.m. a perfect double rainbow formed ahead, embracing sky and sea, and extending from the zenith to the ship's waterline on either side. This phenomenon continued for about eight minutes in an abnormally brilliant and perfect double circle, broken only by the hull of the vessel. The colouring was exquisite and in rich pronounced tones, varying from pale yellow to deep scarlet. It gradually faded, and by 7.5 p.m. the last or northern limb of the rainbow had disappeared, rain had then practically ceased, wind hauled into the S.W. and eastern sky cleared.

"While the rainbow lasted one could imagine that the ship formed the interior setting of an enormous circular pendant, the sun being directly behind the ship and only a few degrees above the horizon."

CREPUSCULAR RAYS AND METEOR.

North Atlantic.

THE following is an extract from the Meteorological Log of C.S. *Dominia*, Captain V. CAMPOS, Fayal to Colon, Observer Mr. L. J. HEGARTY:—

"September 23rd, 1926, 6.15 p.m. A.T.S., 21-30-00 G.M.T., Latitude $25^{\circ} 05'$ N., Longitude $52^{\circ} 24'$ W. On passage between Fayal and Colon, barometer 1018.0 mb. Dry bulb $80^{\circ} 2$, wet bulb 74° . Clouds A-Cu/Cu, 4.

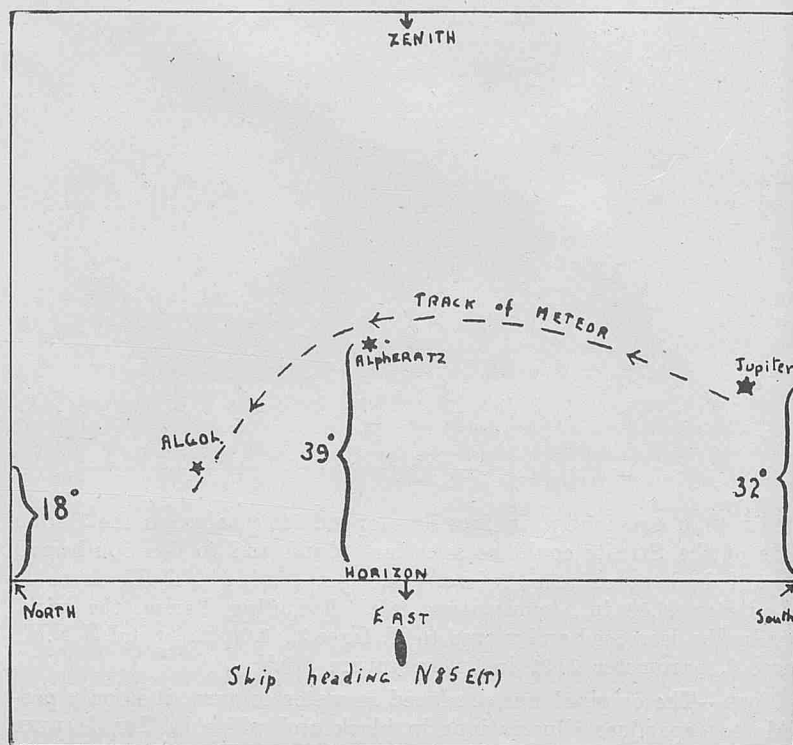
"Observed four broad well-defined bands or rays of pink and mauve with the sky in between a deep blue commencing from a bank of Cumulus of an altitude of 5° . These rays were similar to those observed by me in the Cable Ship *Stephan* in 1920 though not so numerous or grouped in the fan-shaped formation. They were brilliant for 5 minutes and lasted 10 minutes.

"During this period a remarkable meteorite was observed 10° west of north at an altitude of 45° , falling through an arc of 30° to approximately 30° above the horizon—i.e., practically horizontal. This was in broad daylight and had it been during the night it would have been most exceptionally brilliant. The meteorite was of greenish lustre."

METEOR.

Mediterranean.

THE following is an extract from the Meteorological Report of S.S. *Ningchow*, Captain W. CHRISTIE, United Kingdom to Port Said, Observer, Mr. G. H. OLDRIDGE, 3rd Officer:—



"September 16th, 1926, at 8.5 p.m. A.T.S. in Latitude $37^{\circ} 39'$ N., Longitude $7^{\circ} 26'$ E., ship's position having been ascertained one hour previously by stellar observations, observed a large meteor which came into view 2° below *Jupiter* and travelled across the sky disappearing 3° below *Algol*. The time taken from when the meteor was first observed to when it disappeared was 7 seconds. The body of the meteor was blue white in colour with a long tail which was blue near the body and merged to pink at the end. Immediately after it had disappeared Mr. KENT, Chief Officer, and myself took the following observations of the principal stars which were in the meteor's track.

Jupiter S. 20° E. (T), Angular height 32° .

Alpheratz N. 80° E., Height 39° .

Algol N. 47° E., Height 18° .

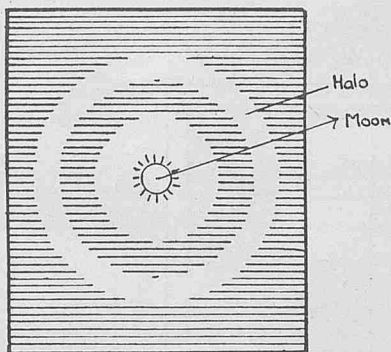
"From this data it will be seen that the meteor was first seen at an angular height of 29° , attained a height of 41° (2° above *Alpheratz*) and disappeared at a height of 15° , the path of the track being over an arc of 113° . The moon at the time was half full and was bearing S. 21° W. (T) 28° above the horizon and the weather at the time was calm with the sky cloudless. The meteor itself lit up the sky to nearly daylight intensity."

LUNAR HALO.

North Pacific.

THE following is an extract from the Meteorological Log of S.S. *Tyndareus*, Captain J. R. SCOTT, Victoria, B.C., to Yokohama, Observer, Mr. F. HOWE, 3rd Officer:—

"September 25th, 1926, Latitude 47° N., Longitude 166° E. At 11 p.m., observed an extraordinary Lunar Halo. The sky at the time was covered with a thin sheet of Ci-St, through which the brighter stars could just be discerned. The moon was surrounded by a kind of dull white corona about 12° to 15° in diameter which gradually merged into a circle of intense black about 3° wide.



"This was bounded by a white circle of exceptional brilliance 22° in diameter.

"The contrast of the black and white circles presented an interesting and rather unusual spectacle lasting about half an hour, when the sky became overcast with low Stratus."

MIRAGE.

Coast of Spain.

THE following is an extract from the Meteorological Report of C.S. *John Pender*, Captain T. W. SMYTHE, O.B.E., cable work, Gibraltar to Bay of Biscay, Observer, Mr. H. W. MILNE:—

"While in the vicinity of Cape Finisterre on the morning of the 17th September, 1926, excessive mirage was observed. Ship steaming on a S. 4° E. (T) course, speed 11.7 knots, sea smooth with slight westerly swell, sky a dull copper colour the sun being completely obscured by Stratus and banks of fog of various density round the western horizon.

"Vessels to the S.E. and east appeared to be diminutive in size, some even appeared waterlogged with decks awash and masts and funnel stunted, while to the S.W. and west they appeared to be elongated with hulls towering above the apparent horizon and masts and funnels drawn out to two or three times their normal size, the more distant vessels in this direction even had their image inverted so that the actual and reflected appeared to converge.

"The Sun broke through at about 10.00 a.m. when the mist cleared up and the weather became fine and clear with visibility about 8/9."

NOTE.—Three different kinds of mirage were seen on this occasion:—(1) vertical enlargement of the ships to the S.W. and W., a form of looming (2) inverted images of the more distant of these ships just above and in contact with the actual ships, known as superior mirage (3) vertical contraction of the ships to the S.E. and S. The formation of all these types depends on a temperature inversion in the air near the sea surface, i.e., on the presence of a layer of colder and denser air just above the sea. This condition is also shown by the presence of fog. It is infrequent to see both enlargement and contraction of objects at the same time and it implies a different state of the air in different directions, the densest stratum of air being higher above the sea surface to the S.W. and W. and lower to the S.E. and S.

SMOKE FOG.

Off East Coast North America.

THE following is an extract from the Meteorological Report of S.S. *Minnetonka*, Captain T. F. GATES, C.B.E., New York to Cherbourg, Observer, Mr. H. E. MCCARTNEY, 4th Officer:—

"September 25th, 1926, at 4 p.m. A.T.S. (2000 G.M.T.) in Latitude $40^{\circ} 23'$ N., Longitude $73^{\circ} 40'$ W. Wind, south, force 3, air 74° , sea 67° , barometer 30.03. Encountered what appeared to be a very thin fog.

"About an hour later a smell as of burning wood, with also the acrid taint of burnt cork was very noticeable.

"A search of the ship was made for fire but as nothing was found, and the burning smell continued the conclusion arrived at was that the ship was passing through a bank of smoke.

"The band was at its densest (visibility 4) about 6.0 p.m. (ship) in approximately Latitude $40^{\circ} 19'$ N., Longitude $72^{\circ} 18'$ W. when the burning smell began to fade away.

"The ship finally cleared the smoke about 8.0 p.m. (ship) in approximately Latitude $40^{\circ} 15'$ N., Longitude $71^{\circ} 30'$ W. Wind S., force 4, barometer 30.03, air 65° , sea 67° .

"It would seem possible that this smoke had been borne by upper currents of air from a forest fire on the American Continent and deposited in light winds on the sea.

"It would be interesting to know if other ships in the vicinity experienced these phenomena."

WATERSPOUT.

North Atlantic.

THE following is an extract from the Meteorological Report of S.S. *Chancellor*, Captain W. GIBBINGS, West Indies to London, Observer, Mr. L. R. BULL, 3rd Officer:—

"On September 3rd, 1926, in Latitude $26^{\circ} 31' 30''$ N., Longitude $52^{\circ} 47' 00''$ W., just after leaving the northern limit of the North-East Trade winds, a conspicuous waterspout was observed bearing S.W. and approximately 6 miles distant. Height about 1,040 feet.

Sketch of observation of Waterspout.

Spout breaking up.



"The spout was first observed at 4.45 p.m. A.T.S., issuing from a clearly defined Cumulo-Nimbus cloud about 12° above the horizon. It was seen to attain its maximum dimensions very rapidly and appeared to be moving slowly westward.

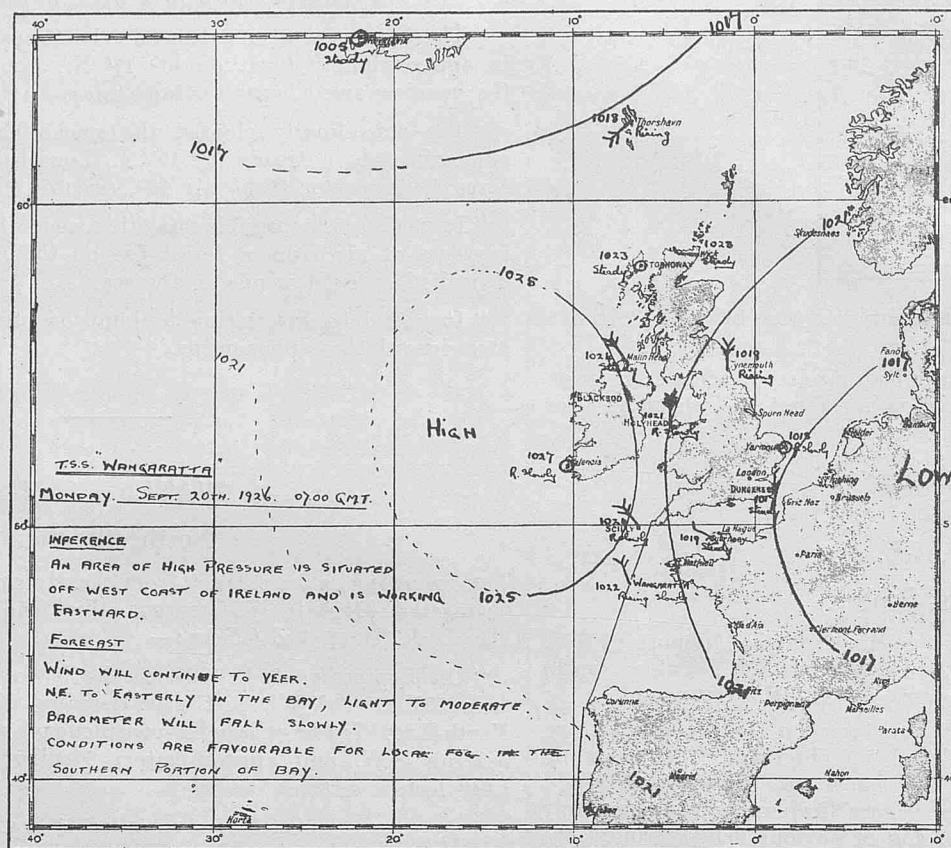
"It was also very clearly defined until about one-sixth of its height from the water's edge where it lightened considerably and resembled light rain. It stood almost vertical inclining a little from the wind, its lower end causing a strong whirlpool which could be clearly seen. The clear formation was retained until 4.55 p.m. A.T.S., 10 minutes from forming. The action of breaking up was curious inasmuch that the outer edges of the Spout ascended rapidly into the cloud leaving its centre clearly defined which ascended also but more slowly.

"From the same Cumulo-Nimbus cloud about 12° to the southward another spout was observed to be forming but it did not materialise. Further south still, moderate rain was falling.

"Barometer 30.10 ins., thermometer 83° ; wind, east, force 2; sea calm 0; swell E.N.E. 3; clouds $\frac{\text{Cu-Nb.}}{\text{E.}}$ 3; weather b.c.p."

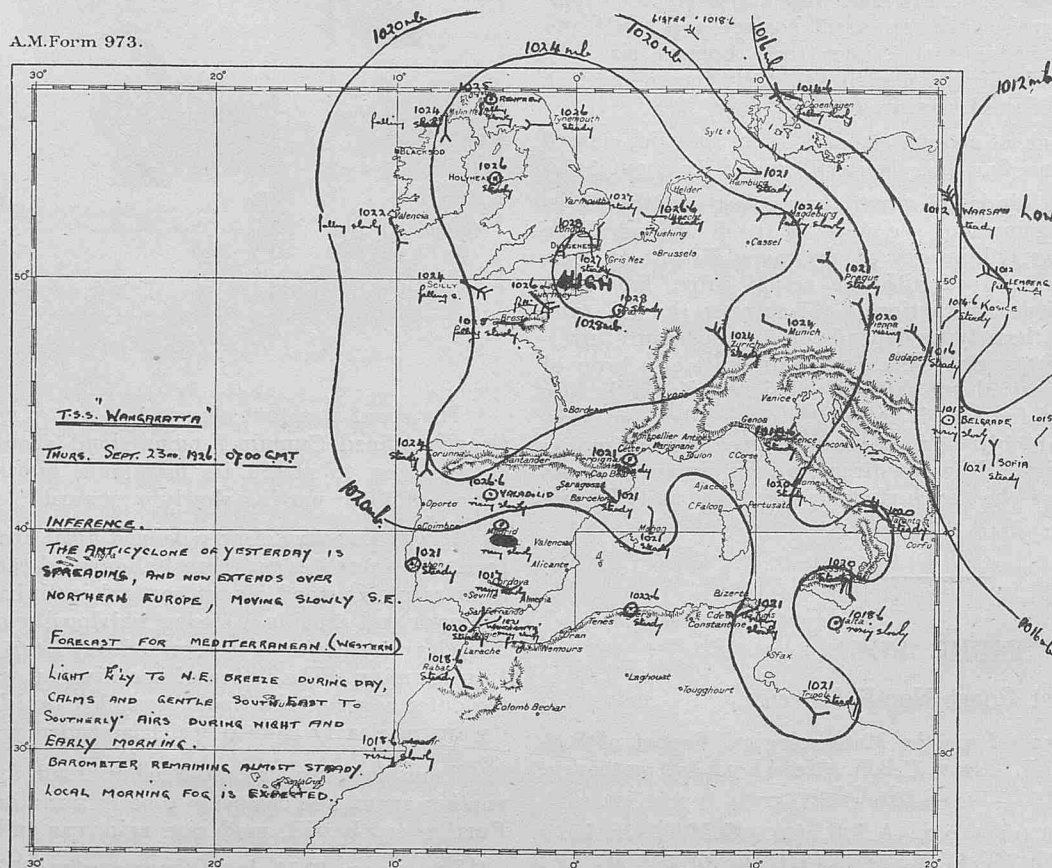
WEATHER CHARTS MADE AT SEA.

Weather Charts (two of a series) made on board S.S. "Wangaratta," Captain W. Scutt, by Mr. S. R. Millard, 2nd Officer.



According to the Meteorological Log of S.S. Wangaratta the wind veered during September 20th, 1926, becoming E.S.E. force 5 at midnight, barometer slowly falling until 4 a.m. of the 21st.

A.M. Form 973.



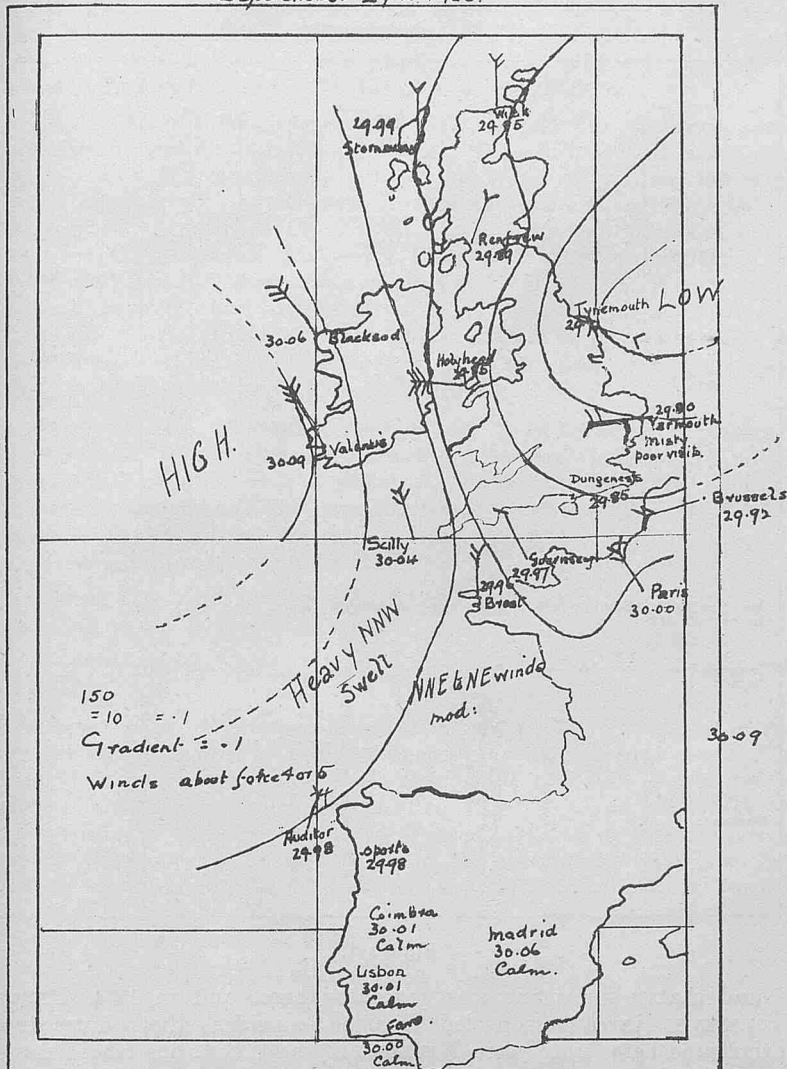
According to the Meteorological Log of S.S. Wangaratta the wind remained between East and E.N.E. force 1-2 until 4 p.m. September 23rd, 1926, when it veered to E.S.E., and S.E. by E. Mist was experienced between 4 a.m. and 8 a.m. of the 24th.

WEATHER CHARTS MADE AT SEA.

Weather Chart (one of a series) made on board S.S. "Auditor,"
Captain W. T. Owen, by Mr. T. E. Steel, 3rd Officer.

Weather Chart (one of a series) made on board S.S. "Khyber,"
Commander C. W. Hester, R.D., R.N.R., by Mr. C. B. Roche,
Chief Officer, September 29th, 1926.

September 27th 1926.



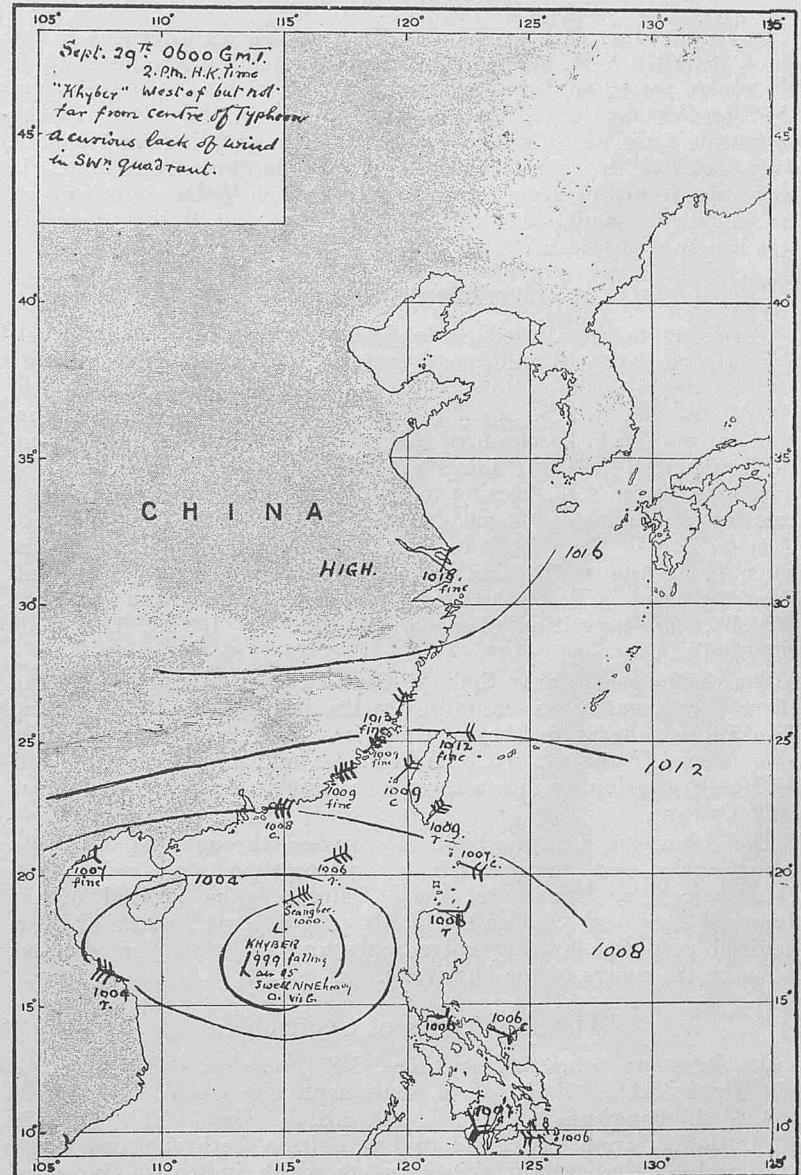
" SEPTEMBER 27TH, 1926, FOR 24 HOURS.

" FORECAST.

" Moderate N.N.E. or N.E. winds and sea, fine. Visibility excellent. Confused swell. Barometer rising slowly to about 30.25, corrected, temperature falling about 10° to 60° F.

" N.B.—If the depression over E. of England and North Sea persists, thereby causing a steeper gradient, and the anti-cyclone is moving eastwards—this will cause the wind for the ship to be fresh or strong (N.E. or N.N.E.)."

According to the Meteorological Report of S.S. Auditor, the wind was N.E. force 4—5 at 8 p.m. of the 27th, barometer 30.15 in., weather b.v., air temperature 63° F.



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

THE HURRICANES OF THE WEST INDIES AND NORTH ATLANTIC IN 1926.

By L. A. BROOKE SMITH, MARINE SUPERINTENDENT.

The Hurricane Season of 1926 was of exceptional severity no less than 8 depressions developing into Hurricanes.

Hurricane in July.

In July a Hurricane passed over St. Lucia on the afternoon of the 22nd, travelled N.W. by W. to the East Coast of Florida along which the centre passed on July 27th whence it went inland. According to the observations logged at Inagua Lighthouse the wind reached hurricane force on July 24th at that station. During the night of July 25th-26th this hurricane wrought terrible havoc at Nassau. It was when returning from relief duty occasioned by this hurricane at Nassau, to Bermuda, some three months later that H.M.S. *Valerian* was lost in a hurricane.

Hurricanes in August.

According to the United States Weather Bureau, on August 1st, a hurricane about 500 miles north-east of St. Kitts travelled W.N.W. and northerly, passing to the westward of Bermuda on the 6th. On August 7th, R.M.S. *Scythia*, Captain W. PROTHERO, from Liverpool to New York, encountered this hurricane and hove to at 5 p.m. in Latitude $41^{\circ} 25' N.$, Longitude $62^{\circ} 03' W.$ She had wind of hurricane force, S.E., veering to south and S.W. with mountainous sea, lowest barometer 978 mb. (28.88). R.M.S. *Ohio*, Commander E. CLARKE, R.N.R., New York to Southampton, after dense fog on the morning of August 7th also encountered this hurricane. The wind commencing at N.E. reached hurricane force at noon and veered to W.S.W., ship's position at noon, Latitude $40^{\circ} 13' N.$, Longitude $66^{\circ} 04' W.$

The centre passed near Sydney, Cape Breton, on August 8th and there were a number of casualties in the fishing fleets on the Grand Banks due to heavy weather at this time. On August 23rd a depression formed in the western Caribbean Sea and passed into the Gulf of Mexico developing into a hurricane which crossed the coast near New Orleans.

The American S.S. *West Quechee* passed through the centre in which there were many birds. A photograph appeared in the December, 1926, Number of the "Dolphin," the journal of the Imperial Merchant Service Guild, showing a great number of birds perched upon the awning ridge ropes and rails of *West Quechee* when in the centre of the hurricane.

The Hurricanes of September.

ON SEPTEMBER 5TH, 1926, at 8 a.m., S.S. *Ruapehu*, Captain A. W. McKELLAR, R.D., R.N.R., from Southampton to Colon, in Latitude $26^{\circ} 08' N.$, Longitude $57^{\circ} 00' W.$, and S.S. *Highland Piper*, Captain D. COLLINGS, from The Plate to Las Palmas, both recorded observations by tested mercurial barometers which indicated that pressure was 2 mb. below normal.

S.S. *Socrates*, Captain F. C. TAYLOR, from Norfolk Va., to Rio de Janeiro, was at this time some 300 miles to the S.E. of *Ruapehu*. She observed Cirrus clouds, a freshening N.E. trade and heavy swell from E.S.E. Later, on September 5th, the barometer fell; there was a significant vivid sunset with after-glow in the western sky; towards midnight the wind veered to E.S.E. and reached gale force, there were rain squalls with lightning and they estimated the centre of the storm to be in Latitude $19^{\circ} 25' N.$, Longitude $53^{\circ} 17' W.$, at midnight.

SEPTEMBER 6TH, 1926. At 8 a.m. on this day, *Highland Piper* in Latitude $12^{\circ} 49' N.$, Longitude $25^{\circ} 57' W.$, had wind, north, force 5, and her barometer was 3.9 mbs. below normal; at this time S.S. *Highland Laddie*, Captain C. ALFORD, from Vigo to Montevideo, 150 miles to the E. of *Highland Piper*, had a fresh S.E. breeze. The shifts of wind, weather, and swell, experienced by both ships indicate the presence of a cyclone which was centred in Latitude $12^{\circ} N.$, Longitude $25^{\circ} W.$

FIGURE 1 gives the barometer pressures, wind and weather, logged by *Highland Piper*, with the normal barometer.

This vicinity south of the Cape Verde Islands has long been supposed to be the breeding ground of hurricanes. In 1853, REDFIELD

S.S. "Highland Piper," Captain D. Collings.

The Plate to Las Palmas.

Constructed from observations recorded in Meteorological Log with M.O. instruments.

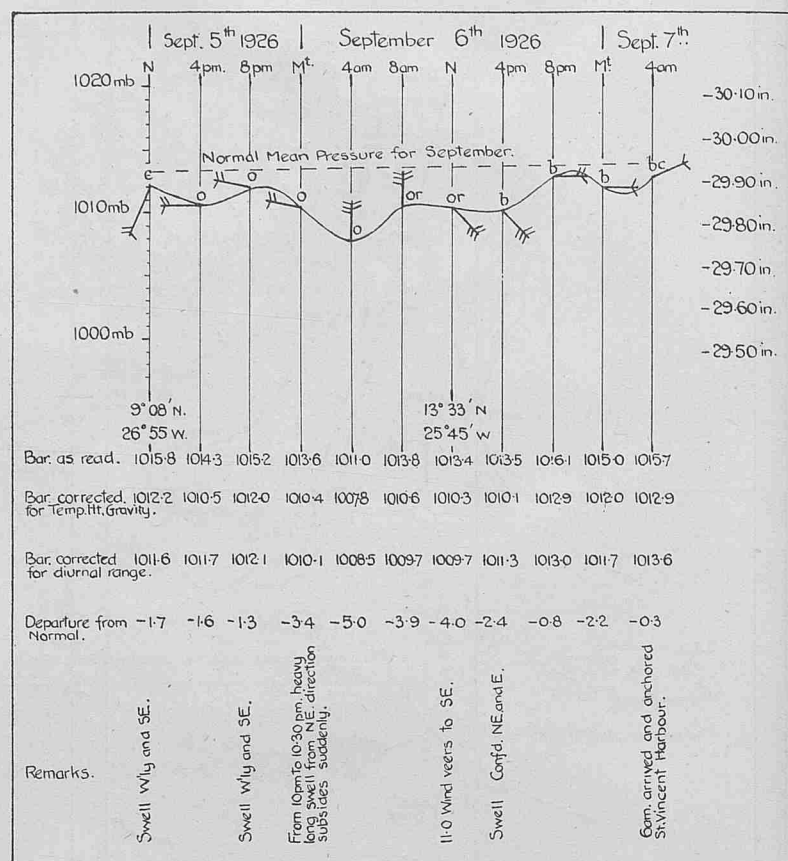


Figure 1.

found that a hurricane was generated here, and in 1874, HENRY TOYNBEE's investigation led him to consider that hurricanes originated here, since when MITCHELL of the U.S.A. has traced many from this source.

Socrates was hove to in Latitude $20^{\circ} 52' N.$, Longitude $52^{\circ} 26' W.$, wind a gale from S.E. by S., with improving weather. Hurricane No. I was now centred in about Latitude $20\frac{1}{2}^{\circ} N.$, Longitude $54\frac{1}{2}^{\circ} W.$

SEPTEMBER 7TH AND 8TH. S.S. *Huntingdon*, Captain T. ASHWORTH, from Liverpool to Colon, encountered No. I Hurricane, and by 8 a.m. on September 7th she had a gale from E. by S., the centre then being in about Latitude $22^{\circ} N.$, Longitude $58^{\circ} W.$ She was hove to from 9.45 a.m. to 9.30 p.m. when the wind had veered to S.E. by S. and decreased in force. Judged by this ship's observation the centre was probably in the vicinity of Latitude $23^{\circ} N.$, Longitude $61^{\circ} W.$, at 8 a.m. on September 8th.

CHART No. I indicates that at 8 a.m. on September 9th, No. I Hurricane was centred in about Latitude $24\frac{1}{2}^{\circ} N.$, Longitude $65^{\circ} W.$

At 1 a.m. S.S. *Harmonides*, Captain W. F. HUGHES, from New York to Montevideo, when in Latitude $29^{\circ} N.$, Longitude $59^{\circ} 49' W.$, observed during squally weather an isolated Nimbus cloud bearing down upon the ship at a moderate speed from an easterly direction. From time sighted till directly overhead, the cloud seemed to be expanding and when astern, form itself into an arc stretching from horizon to horizon. No precipitation took place until the arc became well defined and then only at extreme ends.

SEPTEMBER 10TH, CHART No. II, ships' observations indicate that No. I Hurricane was centred in approximate Latitude $27^{\circ} N.$, Longitude $65\frac{1}{2}^{\circ} W.$

S.S. *Aidan*, Captain F. C. P. HARRIS, from Norfolk Va. to Para., experienced a heavy N.E. gale which increased to hurricane force and backed to North.

There is evidence of another storm with centre some 550 miles to the E.S.E. of No I. *Harmonides* recorded a strong E.N.E. breeze at 8 a.m. and wind S.W. force 6 at 8 p.m., her aneroid indicating a reduction of pressure

CHART No. III, SEPTEMBER 11TH, 8 A.M., shows No. I Hurricane centred in approximate Latitude $28\frac{1}{4}^{\circ}$ N., Longitude $65\frac{1}{2}^{\circ}$ W., while a cyclone which for the sake of clearness we will call No. III is centred in Latitude $27\frac{3}{4}^{\circ}$ N., Longitude $55\frac{1}{2}^{\circ}$ W.

Aidan passed through the centre of No. I at 9 a.m. when the barometer, an aneroid, was at its lowest, 28.90 inches, and there were openings in the clouds, the sea confused and very high, the wind came from S.S.W. at 10 a.m., increasing to hurricane force which moderated by midnight to a fresh breeze. S.S. *Lochkatrine*, Commander B. SHILLITOE, R.D., R.N.R., from Colon to Liverpool, experienced No. III, having the wind first from N.N.W. force 6 which backed to S.W. and increased to a strong gale. S.S. *Hororata*, Captain E. A. HOLLAND, from Southampton to Panama, also encountered No. III and was hove to from 4.9 a.m. to 8 p.m., wind S.E., a whole gale, veering to S.W. by S.

CHART No. IV., SEPTEMBER 12TH, 8 A.M. A Ridge of High Pressure now extends to the eastward from the American Coast to the northward of Bermuda. No. I Hurricane has been deflected from its northerly course to the westward, and has travelled slowly being centred in about Latitude 28° N., Longitude 67° W. No. III is now centred in approximately Latitude 30° N., Longitude 55° W.

Aidan, the wind increased to force 8 at 2 a.m., veering to S.W., backing again to South at 6 a.m.

Lochkatrine by 6 a.m., the wind had backed to S.E. and still blew a gale.

CHART No. V, SEPTEMBER 13TH.—The high pressure ridge no longer blocks the path of No. I to the northward which is now centred in the vicinity of Latitude 30° N., Longitude 67° W. The centre of No. III lies in approximately Latitude 32° N., Longitude $54\frac{1}{2}^{\circ}$ W. According to the United States Weather Bureau a disturbance of slight intensity had formed in the N.W. part of the Caribbean Sea which we designate No. IV. S.S. *Cadillac*, Captain J. A. COLLIE, from Hull to Baton Rouge, experienced a S.E. gale at 4 a.m., which veered through South to W. by S.

CHART No. VI, SEPTEMBER 14TH.—An anti-cyclone is now extending seaward from the United States near the Latitude of New York. No. I is centred in Latitude $31\frac{1}{2}^{\circ}$ N., Longitude 69° W. No. III, in about Latitude 34° N., Longitude 53° W., and No. IV is near Cay Lobos. No. II so indicated because it is probably the cyclone which was first known to be centred south of the Cape Verde Islands on September 6th, and the second to occur in September, is now centred in the vicinity of Latitude 19° N., Longitude 61° W.

The existence of this hurricane between September 7th and 12th cannot be proved by the observations returned by ships navigating the routes from Europe and North America across the Equator, no ship returning logs or reports being in a vicinity at which No. II could have been at the time, but these observations do indicate that the general atmospheric conditions were unsettled and probably consistent with the passage of a hurricane.

All that we can prove is that there was a cyclonic system in Latitude 12° N., Longitude 25° W., on September 6th, and that a hurricane arrived in Latitude 19° N., Longitude 61° W., on September 14th, the bearing and distance between these positions being approximately W. by N. 2,000 miles, so that the distance would be traversed at the rate of 250 miles per day which is about the average to be expected in this region.

The following table shows the Barometer readings recorded at Sombrero Lighthouse, with the departure from the normal and the bearing and distance of the centre of the nearest hurricane proved by observations to be in existence at 8 a.m., each day from September 7 to 14th, from Sombrero.

Barometer readings recorded at Sombrero Lighthouse at 8 a.m. with departure from normal and position of the centre of the nearest

hurricane, proved by observation to be in existence at the time. (Normal for September 1013.3 mbs.)

Date 1926.	Barometer corrected for Height, Latitude and Temperature and Diurnal Range.	Departure from Normal.	Bearing and Distance from Sombrero Light House.
	Mbs.	Mbs.	
Sept. 7th	1010.1	-3.2	No. I. N.E. by E. 380 miles.
" 8th	1009.8	-3.5	No. I. N.E. by N. $\frac{1}{2}$ N. 290 miles.
" 9th	1010.5	-2.8	No. I. N. by W. 360 miles.
" 10th	1011.3	-2.0	No. I. N. by W. 520 miles.
" 11th	1012.1	-1.2	No. I. N. by W. 600 miles.
" 12th	1011.9	-1.4	No. I. N.N.W. 600 miles.
" 13th	1010.4	-2.9	No. I. N.N.W. 720 miles.
" 14th	1008.1	-5.2	No. II. E. by N. 145 miles.

It will be noted that except on September 13th the departure from the Normal did not exceed 2 mb. when a hurricane shown to be in existence was more than 400 miles from Sombrero Lighthouse. The departure of -2.9 mb. on September 13th probably had no connection with No. I which had passed well to the northward of the Tropic of Cancer on that day; it heralded the approach of No. II which passed to the northward of the Island at midnight on September 14th when the mercury stood at 13.3 mb. below normal.

Aidan having cleared No. I hurricane on September 13th encountered No. II on this day. At 2 a.m. she experienced a high south-easterly swell and fresh E.S.E. wind on the northern edge of the storm field. They altered course to the eastward and at Noon were in Latitude $21^{\circ} 37'$ N., Longitude $59^{\circ} 42'$ W., wind E.S.E. a strong breeze; the ship was now hove to until the hurricane had passed clear to the westward.

S.S. *Laguna*, Captain J. H. KIRKWOOD, from Colon to Havre, having received information that No. II Hurricane was centred near St. Kitts travelling N.W., and observing a threatening appearance and vivid lightning, turned the ship in Latitude $18^{\circ} 40'$ N., Longitude $66^{\circ} 30'$ W., and did not approach the vortex.

CHART No. VII, SEPTEMBER 15TH.—The anti-cyclone dominates in the region of Eastport. No. I is now centred in about Latitude 34° N., Longitude 69° W. No. II in approximately Latitude 20° N., Longitude 65° W., and No. III which has now passed beyond the limits of our chart was in Latitude 40° N., Longitude 47° W. No. IV still a shallow depression is centred in Latitude 23° N., Longitude 77° W.

CHART No. VIII, SEPTEMBER 16TH.—The anti-cyclone moved east and is centred over the Trans-North Atlantic tracks to the southward of Newfoundland. No. I is centred in Latitude 36° N., Longitude 72° W., No. II, in Latitude 21° N., Longitude 69° W., and No. IV in Latitude 24° N., Longitude 78° W., and seeming to indicate the probable course of No. II.

CHART No. IX, SEPTEMBER 17TH.—No. I Hurricane centred in Latitude 39° N., Longitude 64° W., and No. II, Latitude $21\frac{1}{2}^{\circ}$ N. Longitude 73° W. The Lighthouse Keeper at Inagua recorded wind N.W. force 12, with lowest barometer 991 mb. (29.26) at 8 a.m., the wind veering to S.W. during the forenoon.

S.S. *Sylvafield*, Captain E. BIDDICK, from Barrow to Baytown, hove to in Latitude $27^{\circ} 30'$ N., Longitude $73^{\circ} 45'$ W., having received information of hurricane, experienced a S.S.E. wind which backed to E.S.E. and did not exceed force 7.

At Abaco the wind was hurricane force from 4 p.m. to midnight, E. by N. to E.S.E.

CHART No. X, SEPTEMBER 18TH.—No. I is now centred in approximately Latitude 40° N., Longitude 60° W., and appears to have remained in that vicinity until September 21st, losing its intensity. At 8 a.m. on September 22nd, it had moved N.W. to approximately Latitude 43° N., Longitude 56° W. S.S. *Marengo*, Commander J. C. WILLIAMS, R.D., R.N.R., from Aberdeen to New York, was near the centre at 4 a.m. when the wind was at gale force from East, backing at 4.15 to N.E.

S.S. *Mississippi*, Captain J. T. J. WYLIE, from London to Hampton Roads, was also near the centre but to the eastward of it on the morning of September 22nd, experiencing a strong W.S.W. gale. No. II was centred at 8 a.m. on September 18th close to the westward of Miami having passed over the Weather Bureau Office at that place between 6.15 and 6.50 a.m. when the centre was estimated to be $10\frac{1}{2}$ miles in diameter.

FIGURE 2 is a graph showing the pressure registered at Miami during the passage of the hurricane taken from the October, 1926, U.S.A. "Monthly Weather Review" in which a full account of the hurricane will be found.

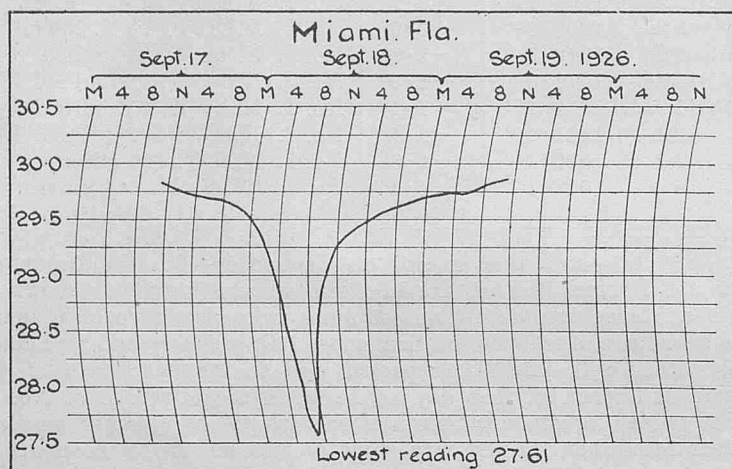


Figure 2.

The Miami Hurricane, as No. II is best named, travelled about 450 miles between 8 a.m. on September 17th, and 7 a.m. on September 18th, or at an **average** speed of 19 knots, which is very rapid indeed for this Latitude. It crossed the Gulf Stream near its narrowest and strongest part.

At Miami the hurricane commenced with the wind at N.E. lulling at 6.15 a.m. for 35 minutes and shifting to S.E. and later to S.W.; the velocity of the wind at Miami Beach is said to have reached 150 miles per hour for short intervals.

Here follows an extract from a report by Mr. R. W. GRAY who was in charge of the Weather Station at Miami.

"The storm tide on the Miami side of Biscayne Bay was approximately eight feet, and reports indicate a similar tide at Miami Beach. The water front of Miami was flooded for two to three blocks back from the bay, and low parts of the city near the Miami River were also flooded. After the storm, the entire bay front section of Miami was strewn with boats ranging in size from small pleasure craft to large schooners. Some of the boats had been carried more than two blocks from the bay. Water rose in hotels and residences near the bay to a depth of three to five feet. Miami Beach was entirely inundated, and, at the height of the tide, the ocean extended to Miami, three and one-half miles across Biscayne Bay. All streets near the Ocean at Miami Beach were covered with sand to a depth of several feet, and in some places automobiles were entirely covered. The foundations of some buildings were washed out, allowing the buildings to collapse. The storm tide occurred with the shift of the wind to the east and south-east, following the arrival of the centre of the storm. In the Miami River, the tide came in the form of a bore that left a mass of wreckage from the boats that had sought safe anchorage.

"The intensity of the storm and the wreckage that it left cannot be adequately described. The continuous roar of the wind; the crash of falling buildings, flying debris, and plate glass; the shriek of fire apparatus and ambulances that rendered assistance until the streets became impassable; the terrifically driven rain that came in sheets as dense as fog; the electric flashes from live wires have left the memory of a fearful night in the minds of the many thousands that were in the storm area.

"The known loss of life in the Miami district is 114. Many more are missing. Several thousand persons were injured, and 25,000 were without shelter after the storm.

"The property loss in the greater Miami area has been estimated at 76,000,000 dollars. This does not include damage to

house, office, and store furnishings. Approximately 4,725 homes were destroyed and 9,100 damaged in the area extending from Fort Lauderdale to Miami."

After passing Miami the centre crossed Florida and on the 19th was centred in the north-eastern part of the Gulf of Mexico reaching the coast again at Perdido Beach on September 20th, thence passing close to the southward of Mobile at 9.30 p.m. and at 8 a.m. on September 21st it was centred over Biloxi passing some distance to the N.W. of New Orleans on September 22nd; it died out in Eastern Texas.

Its proved distance covered was 2,000 miles from September 14th in the vicinity of Sombrero to September 22nd, N.W. of New Orleans; it is probable that its total distance traversed covered not less than 4,000 miles.

It will be remembered as one of the severest hurricanes ever experienced at a town of wealth and importance. There have probably been many as severe at places of less importance and at sea which are not so well known.

Working charts of the North Atlantic show that a cyclonic system No. V was centred in Latitude 29° N., Longitude 47° W., on the morning of September 22nd. *Laguna* entered this system on September 21st, and passed in rear of the centre during the night. On the morning of September 22nd she was in the dangerous quadrant with a moderate gale from S.E., near the trough, and probably not less than 100 miles E.N.E. of the centre. Cable Ship *Dominia*, Captain V. CAMPOS, O.B.E., from Fayal to Colon, also encountered this disturbance experiencing a gale commencing at S.W. which veered to W. by S. and increased to a whole gale at midnight. At 8 a.m. on September 22nd in Latitude $29^{\circ} 03'$ N., Longitude $47^{\circ} 45'$ W., she had the wind N.W. by N. force 9, after which the weather moderated.

No. V appears to have taken an irregular course and was centred close to the Azores on September 28th; it does not appear to have ever been of hurricane intensity.

According to the U.S.A. Weather Bureau a hurricane, No. VI, coming from the Gulf of Mexico, crossed the coast near Vera Cruz on September 28th, and according to reports received at Lloyd's a crane was wrecked at that port and some hundreds of trees were uprooted in the neighbourhood.

October.

"Valerian"—"Eastway" Hurricane.

R.M.S. *Orcoma*, Captain R. H. DOMINY, C.B.E., from Valparaiso to Liverpool via Panama and Ports, had gentle south-westerly winds, with much cloud and rain, during the day before arriving at Balboa on the night of October 15th. She left Colon at 8 p.m. on October 16th for Havana and after clearing the breakwater experienced a heavy N.W. swell and light N.N.W. wind, sky completely overcast with signs of rain.

Observations were recorded in the Meteorological Log every four hours from midnight after leaving Colon and these are graphically represented in FIGURE 3, from midnight October 16th to noon October 19th; they are of considerable value but the air temperature and humidity must be considered with due allowance to the fact that *Orcoma* had not been provided with a portable screen; she had an Old Pattern Fixed Screen fixed on the bridge amidships.

Orcoma steered N. 30° W. True, up to noon on the 17th, after which course was altered about 2 points to the westward. The barometer, $3\frac{1}{2}$ mb. below normal at midnight on the 16th, indicated the probability of the formation or possible existence in the vicinity of a Tropical Revolving Storm. The heavy N.W. swell on leaving Colon up to midnight, after which it was lost, indicated that there had been a N.W. wind to the N.W.

At midnight with wind S.S.W. the low barometer lay N.W. from *Orcoma*. At about this time she lost the heavy N.W. swell which, though we are not given the period and length, must have been short because the fetch was not more than 250 miles.

This points to this disturbance having formed in the Mosquito Gulf to the westward of *Orcoma*'s route and that she entered the wind circulation in its rear at midnight on October 16th. There can be no doubt that a Tropical Revolving Storm was developed at 8 a.m. on October 17th when its centre bore to the northward of west from *Orcoma* and was probably in about Latitude $13\frac{1}{2}^{\circ}$ N.,

R.M.S. "Orcoma," Captain R. H. Dominy, Colon to Havana.

Constructed from observations recorded in Meteorological Log with M.O. instruments.

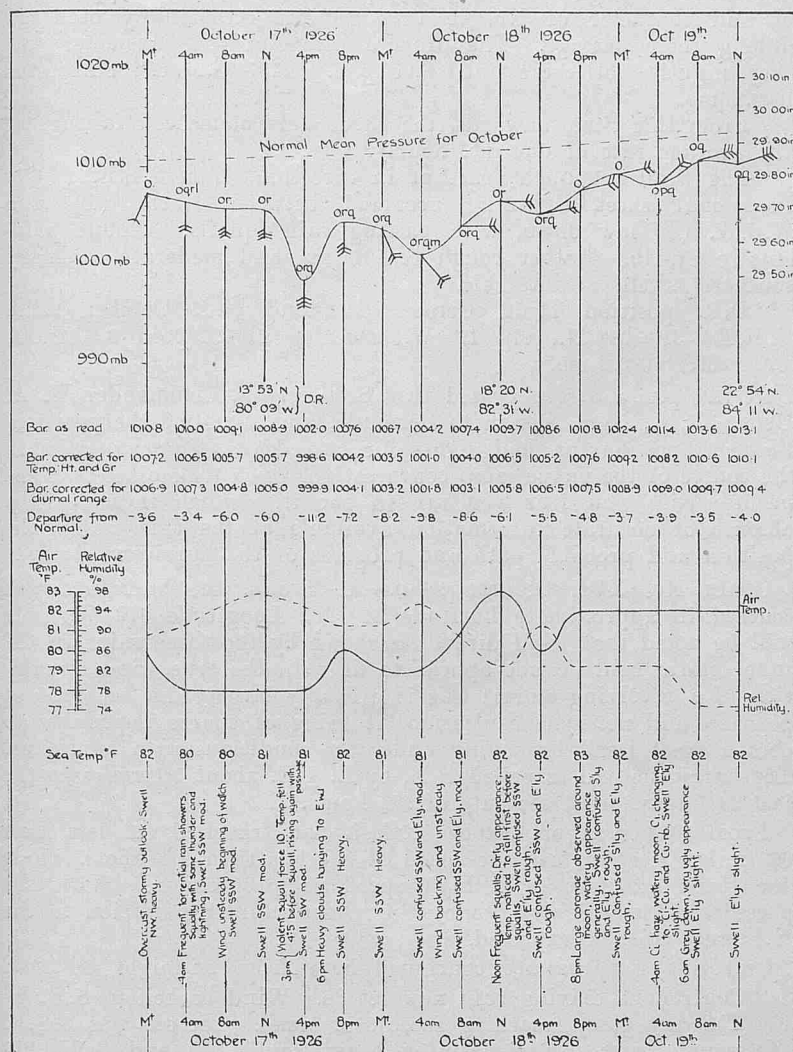


Figure 3.

Longitude $81\frac{1}{2}^{\circ}$ W., very close to the Island of Old Providence. Her course to the N.N.W. after noon on the 17th converged with that of the centre, which deepened, causing the large fall indicated on the barometer trace at 4 p.m.

Orcoma probably drew ahead of the trough (the system travelling northward) during the night of October 17th and 18th when the wind backed to S.E. From 8 a.m. on October 18th the centre was to the south of her latitude and she kept ahead of the storm field, arriving at Havana at 7.20 p.m. on October 19th, when the hurricane was to the southward of that port.

CHART No. XII, OCTOBER 18TH.—At 8 a.m. the centre of the hurricane was in approximate Latitude 16° N., Longitude $82\frac{1}{2}^{\circ}$ W., when this chart indicates that pressure was probably comparatively low along a line to the N.N.E. terminating in a depression centred over the Gulf of St. Lawrence.

CHART No. XIII, OCTOBER 19TH.—At 8 a.m. on this day the centre was in the vicinity of Latitude 19° N., Longitude 84° W.

CHART No. XIV, OCTOBER 20TH.—The hurricane was probably centred close to Batabano on the northern shore of Broa Bay in approximate Latitude $22^{\circ} 40'$ N., Longitude $82^{\circ} 10'$ W., at 8 a.m. on this day.

The following is an extract from the remarks accompanying *Orcoma's* Meteorological Log:—

"Havana Harbour, 20th October, 1926.

"Fresh wind and squally. At midnight 19th wind increasing with fierce squalls and continuous heavy rain. Barometer falling steadily from 29.71 (corrected) at midnight, to 29.424 (corrected) at 4 p.m., wind having backed from E.N.E. force 5 to N.E. by E. force 7, remaining steady in N.E. by E.; wind becoming stronger

with fierce squalls of wind and rain, barometer falling to 29.063 (corrected) by 8 a.m. Atmosphere full of salt spray with driving rain, vessels dragging their anchors and drifting before the gale; small craft capsizing, wind having backed to N.E. force 10-11, sky completely overcast, visibility of half-mile; wind gradually backing and barometer falling rapidly after 8 a.m.; having backed to N. by E., by 10.30 a.m. when the wind was of hurricane force and barometer 28.17 (corrected), temperature remaining steady at 79° F.; visibility at this time being only about 100 feet, sky overcast with driving scud, driving rain and salt spray, the height of the hurricane was reached at this time; for at 11 a.m. a slight break was observed, with an upward movement of the barometer, now reading 28.358 inches (corrected) with wind backing to N.N.W. with frequent squalls of wind and rain, barometer rising, atmosphere clearing, barometer reading at Noon being 28.584 (corrected), wind N.W. force 6-7. By 2 p.m. weather had improved, blue sky between Cumulus clouds, barometer 29.153 (corrected), wind N.W., weather improving rapidly with clear sky; moon and stars bright and clear after sunset, wind remaining steady in N.W. by W. Barometer rising gradually reading 29.62 (corrected) at 8 p.m. when weather was normal with wind force 4 and decreasing.

"Reports were received from vessels outside the port (Hove to) encountering high seas, wind of hurricane force. In this hurricane many lives were lost and practically every vessel dragged their anchors, large steamers and many sailing vessels sunk. Houses blown down; the harbour being full of wrecks after storm had passed.

"In local papers the following day 21st October, a report on the storm was given with a map of its path over Cuba, &c., and it appears from it that the centre passed west of Havana, but from the observations on board this vessel, *Orcoma*, we were near the line of progression and in left-hand semicircle wind having backed from E.N.E. to N. by E. where it remained steady until the line of low pressure was reached. It was evident that this storm had recurved to the eastward previous to reaching Havana and was travelling N.E. towards Florida and Bermuda; force of the wind was given at 98 miles per hour and the storm centre travelling about 250 miles per day. Not enough information was received to determine its field and area."

The centre passed close to the eastward of Havana at about 10.30 a.m.

The observations recorded in the Meteorological Register at Double Headed Shot Lighthouse indicate that it passed to the westward of that place at about 6 p.m. The wind increased to gale force at noon from S.S.E. veering to S.W. and W.S.W. at hurricane force; lowest barometer recorded 970 mb. (28.65) at 6 p.m. There was much rain and great seas, the Cays being completely under water. At 8 p.m. the wind was N.W., storm force.

The Lighthouse Keeper at Abaco recorded a moderate gale from S.E. at 10 p.m. and at 4.15 a.m. on the 21st, the wind had veered to S.W. and was hurricane force, barometer 967 mb. (28.56) after which observations were not recorded at this station.

The centre had travelled from the vicinity of Havana to that of Double Headed Shot at a speed of about 10 knots.

CHART No. XV, OCTOBER 21ST.—No ship returning observations on this day was sufficiently near the centre to provide information for fixing its position with any degree of accuracy.

The United States Weather Bureau estimated it to be in Latitude 27° N., Longitude $76^{\circ} 30'$ W., at 8 a.m.

When the Lighthouse Keeper at Abaco recorded his last observation at 4.15 a.m., wind S.W. 12, barometer 967 mb. (28.56), orq, it is probable that the trough of the system was very near and the speed made from abreast of Double Headed Shot at 6 p.m. October 20th would be approximately 20 knots. Working on with this speed towards the position fixed next day would put the centre in Latitude $26^{\circ} 40'$ N., Longitude $76^{\circ} 00'$ W. The pressure distribution shown by this chart clearly indicates the probability of a north-easterly course.

S.S. *Culebra*, Commander A. S. MACKAY, R.D., R.N.R., sailed from Bermuda for Nassau at 5.49 a.m. on this day. FIGURE 4 gives a graphic representation of the observations recorded in her Meteorological Log from 8 a.m., on October 21st, to midnight on October 22nd. The departure from the normal barometer is not given in this figure as the latitude is too high for a small departure to be of value as a precursory sign.

The humidity is not given, for though the temperature observations were made with tested thermometers in one of the new modified screens, under such conditions it is impossible to obtain exact measurements of humidity on account of salt water spray.

S.S. "Culebra," Commander A. S. Mackay, R.D., R.N.R., Bermuda to Nassau.

Constructed from observations recorded in Meteorological Log with M.O. instruments.

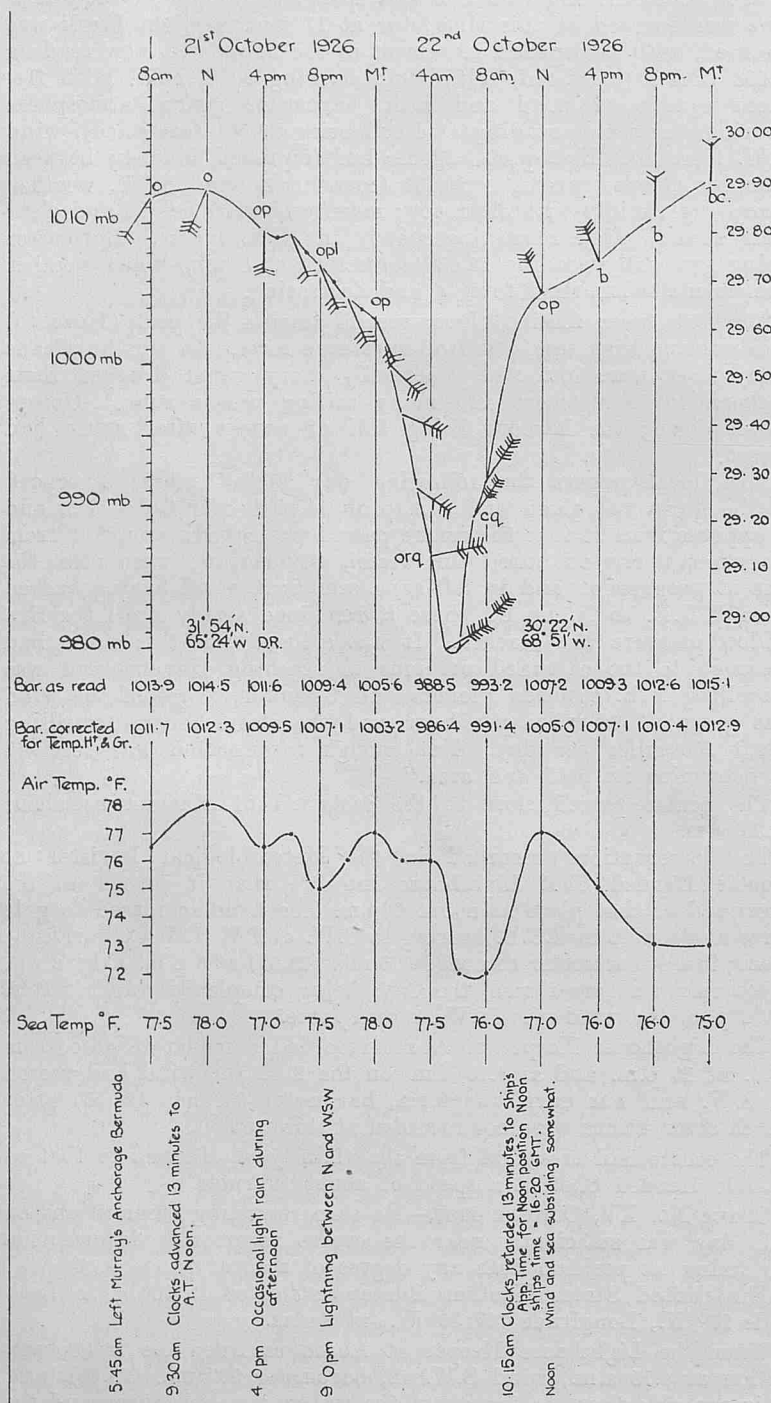


Figure 4.

The following is an extract from the remarks accompanying *Culebra's* log:—

"*Culebra* left Murray's Anchorage, Bermuda, on October 21st, 1926, 5.49 a.m. (10.09, G.M.T.); wind S.W. by S. (T), 4, barometer 1011.7 mb. Sky completely covered with Ci, Ci-Cu, and Ci-St. Fine weather prevailed until noon; barometer 1012.3 mb.

"From 10.00 a.m. A.T.S. (14.07 G.M.T.) until 6.00 p.m. (22.07 G.M.T.) the wind slowly backed, through south (T) to S.S.E. (T) 4.

"During the whole of this period, sky was overcast, with occasional light showers. Throughout the afternoon, Alt-St pre-

dominated, the lower clouds containing, latterly, remarkable superimposed rolls, which did not, apparently, fill any recognised classification, as, whilst having the appearance of St-Cu (they were not massive enough for St-Cu) they partook, also, of the appearance of and character of Nb, in that showers occasionally occurred during their passage. The diurnal range of the barometer was very slightly noticeable until 6.00 p.m. (22.07 G.M.T.), barometer 1009.2 mb.

"From this time, onwards, the barometer commenced falling, at the average rate of one mb. hourly.

"The wind remained constant in direction, from S.S.E. (T) 5. Occasional sheet lightning occurred between North (T) and W.S.W. (T) low down, with passing rain squalls. Clouds principally Cu-Nb. Rather rough S.S.E. sea and moderate to heavy southerly swell, at intervals.

"D.R. position Midt. October 21st-22nd (4.07 October 22nd, G.M.T.) 31° 02' N., 67° 12' W., steering 240°, speed 8.5 knots. Barometer 1003.2 mb."

At 7.20 p.m. *Culebra* passed H.M.S. *Valerian*, Commander W. A. USHER, R.N., from Nassau to Bermuda, and signalled the position, *Valerian* not having had sights for two days. *Valerian* said in the course of the morse lamp conversation which took place, "Sympathise with you fear you are in for it," which indicates the absence of accurate information available at the time as to the position and probable path and progress of the hurricane.

CHART NO. XVI, OCTOBER 22ND.—At 8 a.m. the hurricane was centred in approximate Latitude 31° N., Longitude 67° W. It will be noted that wind directions shown by the three ships in the inner storm field do not appear to fit with the true wind circulation of a revolving storm; this is probably largely due to error of position and non-synchronisation, it being of course impossible to obtain exact Dead Reckoning under the conditions in a hurricane. The hurricane had travelled N.E. by E. $\frac{1}{2}$ E. about 540 miles in the last 24 hours, or at the rate of 22½ knots.

From 10.30 a.m. on October 20th it had travelled not less than 960 miles or at an average speed of not less than 20½ knots, which for these latitudes is a high speed of progression. With the pressure distribution shown by this chart rapid progression to the N.E. may still be expected.

Culebra's remarks are continued here from midnight on 21st.

"Continuous driving rain now set in. Wind backed to S.E. by E. (T), very gusty, reaching force 8 at times. The sea was S.S.E. (T) rough, with, occasionally, a heavy south (T) and S.W. (T) swell coming through. This intermittent swell was particularly noticeable.

"At 1.50 a.m., October 22nd (5.57 G.M.T.) a single vivid flash of forked lightning, overhead, followed by a moderate peal of thunder, five seconds afterwards. Previous to this, lightning had been in Westward, low down, behind clouds, and of a sheet nature as far as could be ascertained. After this, lightning became sheet, and from a S.E. direction. The atmosphere now became very oppressive and warm. This feature had been noticed prior to this period, but was now more marked.

"At 2.28 a.m. (6.35 G.M.T.), stopped ship for an hour, in order to determine position of centre. Barometer 994.0 mb. falling very rapidly (5.2 mb. per hour). D.R., position 30° 55' N., 67° 30' W.

"The wind remaining practically constant in direction, squalls increasing in severity and duration, led to the conclusion, previously assumed, that *Culebra* was in direct path of storm, or just clear on the left side, storm tending to curve more easterly than previous reports showed.

"At 3.35 a.m. (7.42 G.M.T.), proceeded at full speed, bringing the wind about two points on the starboard quarter, steering N.W. by N. (T).

"3.43 a.m. (7.50 G.M.T.) wind backed to E. by S. (T), force 9, and increasing in strength. Course was altered to N.W. (T).

"3.55 a.m. (8.02 G.M.T.) the wind backed to E. by N. (T), force 10, course being altered to N.W. by W. (T) Wind now howling and shrieking in fierce gusts, continuous driving rain and thick spray whipped from sea-surface.

"At 4.00 a.m. (8.07 G.M.T.) barometer 986.1 mb. By 4.30 a.m. (8.37 G.M.T.) wind from E.N.E. (T) hurricane force, barometer 982.6 mb. and falling; sea E.N.E. (T) disturbance 8. Course altered to W.N.W. (T). Densely overcast and thick spray blowing over ship.

"By 5.00 a.m. (9.07 G.M.T.) wind backed to N.E. by E. (T) with terrific force, course being altered to W. by N. (T), barometer 979.9 mb., air temperature 77° F.

"Until 6.00 a.m. (10.07 G.M.T.) the barometer remained practically steady, during which time the wind backed to N.E. (T), the first break of blue sky being at about 6.30. The ship was practically unmanageable, although proceeding at full speed, heading between W.S.W. (T) and S.W. (T) paying off to S.W. (T) during comparative lulls. Terrific squalls passed over ship, force of wind undoubtedly reaching well over 100 miles per hour. During the squalls vessel would not steer and would only pay off (starboard helm) during the lulls, when a comparative smooth in the sea permitted.

"Spray was blown across the vessel to such an extent that visibility was reduced to half a ship's length. One squall followed another at quick intervals.

"The sea, in the meantime, was rising to a tremendous height the waves being estimated at fully forty feet, from crest to trough. One of the features of the sea was the mound-like wave, with no run to it, but a sudden upheaval, alongside, with no marked forward force noticeable. This appearance was probably accentuated by the very low visibility. These high irregular mounds caused the ship to roll and lurch heavily. Vessel being in good trim for such conditions, no heavy water was taken on deck.

"The sea was coming from North (T) and N.E. (T), being flattened out, by the force of the wind, and white with spray and driven surface.

"At 6.00 a.m. (10.07 G.M.T.) the barometer began to rise. At 6.30 a.m. (10.37 G.M.T.) reading 984.2 mb. Squalls now became less frequent, gradually diminishing in force. Wind shifted to N.E. by N. (T), and course was set S.W. by W. (T).

"By 8.00 a.m. (12.07 G.M.T.) barometer was 992.0 mb. wind N.E. by N. (T) force 10 in squalls, and a very heavy sea, from N.E. (T). Temperature of air 72° and 70° F., sea 76° F.

"From now onwards, weather improved rapidly."

H.M.S. *Curlew*, Captain H. D. BRIDGES, C.V.O., D.S.O., R.N., from Kingston, Jamaica, to Bermuda, according to the Deck Log forwarded by the Hydrographer of the Navy, experienced a S. by E. gale which backed to S.E. moderating to force 7 at 3 a.m. increasing again; by 6 a.m. she had a whole gale from S.E. At 7 a.m. wind S.S.E. hurricane force, after which the wind backed one point and veered during the forenoon through S.S.W. at 10 a.m. when the lowest barometer recorded 973 mb. (28.73 ins.) was logged. At 11 a.m. the wind was W.N.W. force 12, continuing so until noon after which it moderated, and at 6.5 p.m. there was a moderate gale from W. by N. when *Curlew* proceeded to the assistance of S.S. *Eastway* in distress.

At 10 p.m. the wind was N.W. force 7, when *Curlew* commenced signalling on her 24-inch searchlight *Valerian's* pendants every 15 minutes.

S.S. *Canadian Forester*, Captain COFFIN, from Bermuda for Nassau, sailed from Hamilton Harbour at 8 a.m. on October 21st, and we are indebted to *Culebra* for the following information copied from her log book. Aneroid compared with *Culebra's* tested barometer at Kingston, Jamaica, after the hurricane.

"Position at noon, 31° 57' N., 65° 10' W. Wind South 4/5. Rain.

"(*Culebra* at noon), 31° 54' N., 65° 24' W. Wind S.S.W. 5/6, passing squall.

"21.10.26. 18.00 Bar. 29.87" (Corrected), 76° F., Wind South 5/6.
20.00 Wind backed to S.S.E., force 5.
24.00 Bar. 29.73". Wind backed to S.E., force 7.

"22.10.26. 1.00 " 29.65".
2.00 " 29.52". Wind E.S.E. 8.
3.00 " 29.40". " S.E. 10.
4.00 " 29.15". " S. by E. 11.
5.00 " 28.69". " South 12.
6.00 " 28.43". " " 12.

"From 6.00-7.00 a.m. wind fell to calm, with blue sky and tremendous tumbling sea. 6.30 a.m. D.R. 30° 04' N., 66° 44' W. (very approximate).

"22.10.26. 7.00 Bar. 28.46". Wind W.N.W. 12.
8.00 " 29.10". " N.W. 12.

9.00 Bar. 29.24". Wind N.W. 12.
10.00 " 29.63". " " 10.
11.00 " 29.65". " West 8.
12.00 " 29.69". " " 7.

"At noon ☉ obs., Latitude 30° 04' N., D.R. Longitude 67° 09' W., weather then improved rapidly."

H.M.S. *Wistaria*, Commander F. Q. CHAMPNESS, R.N. in Dock at Ireland Island, Bermuda.

FIGURE 5 gives the observations recorded hourly and half-hourly in the Deck log from 1 a.m. to midnight on October 22nd, forwarded by the Hydrographer of the Navy. The barometer is an aneroid.

H.M.S. "*Wistaria*," Commander F. Q. Champness, R.N., at Bermuda.

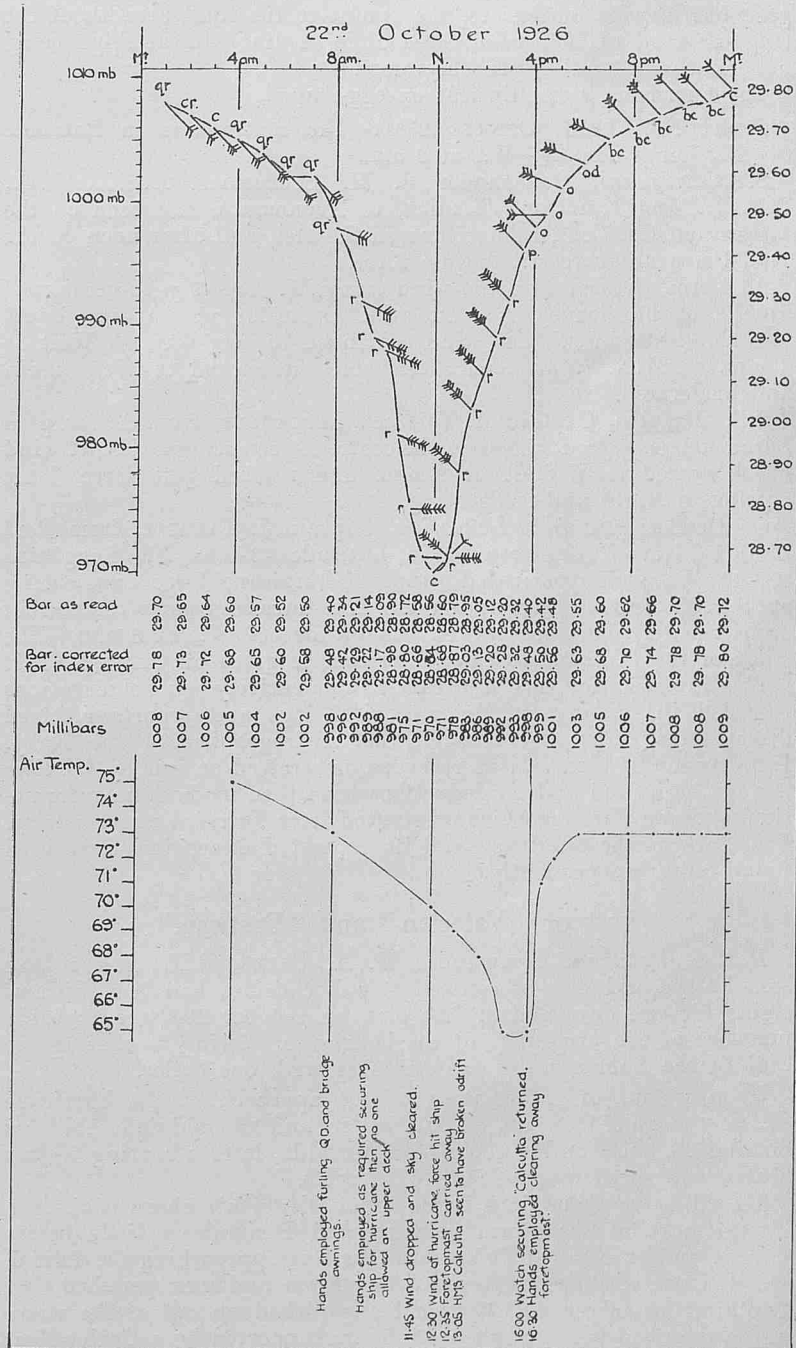


Figure 5.

When *Calcutta* broke adrift, Lieut. ROSKILL of *Wistaria* and Sub-Lieut. HANKEY of H.M.S. *Capetown* swam with lines to that ship.

Taking the time of commencement of the wind at hurricane force from E.S.E. to be 10 a.m. as indicated by *Wistaria's* log and its dropping when E. to a light breeze as 11.45 a.m.; its coming away again at hurricane force at 12.30 p.m., and ending at 3 p.m., with the speed of progression, approximate dimensions can be obtained. From 8 a.m. on October 22nd to 8 a.m. on October 23rd the centre

travelled approximately 620 miles, or at an average speed of 25 $\frac{3}{4}$ knots.

Assuming that the times logged are correct and that this speed was maintained during the passage of the system over *Wistaria's* position at Bermuda, the hurricane winds were 44 miles thick in advance of the centre; the centre was 18 $\frac{1}{2}$ miles in diameter in the fore and aft line of the hurricane; and the hurricane winds in rear of the centre were 64 miles across.

The observations recorded by *Canadian Forester* earlier in the day when the vortex passed over that ship at sea to the southward and westward of Bermuda indicate that these dimensions may have been approached before the hurricane reached Bermuda.

From the weather experienced by *Curlew* and *Culebra* at positions on either side of the track made by the centre, even though those positions may be inaccurate, they point to the total breadth of the ring of wind of hurricane force along a line athwartships being not less than 80 miles, probably more.

The hurricane was elliptical or egg-shaped.

CHART No. XVII, OCTOBER 23RD.—The centre was in Latitude 36° N., Longitude 56 $\frac{1}{2}$ ° W., at 8 a.m.

S.S. *Ariquani*, Commander J. H. SCUDAMORE, D.S.C., R.D., R.N.R., from Kingston, Jamaica, to Avonmouth, had been on the eastern outskirts of the hurricane on the 21st, and after noon on the 22nd the wind increased to gale force.

At 4 a.m. October 23rd the wind was S.W. force 9 with occasional squalls of hurricane force and the barometer was at its lowest 993 mb. (29.32 ins.). The wind continued to veer through West at 8 a.m. to W.N.W. at noon after which it backed to West again and moderated.

S.S. *Ampetco*, Captain A. VAN DEN KERCKHOVE, from Antwerp to Baton Rouge, passed in rear of the centre experiencing a S.S.W. wind which veered to W.S.W. at 8 a.m. and reached gale force, later veering to North and moderating.

On October 24th S.S. *Deucalion*, Captain J. FINDLAY, from Port Said to New York, hove to in Latitude 38° 40' N., Longitude 49° 10' W., and experienced winds of hurricane force commencing at S.S.W. and ending at West. The hurricane was centred in approximately Latitude 39° N., Longitude 50° W., at 8 a.m. The track of the *Valerian-Eastway* hurricane is given on CHART XVIII.

This investigation has been carried out entirely with observations recorded in writing in Meteorological logs and reports received direct from ships and through the Hydrographer of the Navy. Information of observations recorded as received or sent by Wireless has not been used and no deductions have been made from information made by Wireless which originated from *Valerian* and *Eastway*. The track of the hurricane and its estimated dimensions have been found quite independently.

Loss of "Valerian" and "Eastway."

H.M.S. *Valerian*, Commander W. A. USHER, R.N., as we have seen by the exchange of courtesies with *Culebra*, had been without sights for two days and at 7.20 p.m. on October 21st was probably unaware of the proximity of the hurricane. Owing to shortage of coal in the Bahamas she was steaming with one boiler.

Upon receipt of information of the approach of the hurricane steam was raised in the second boiler and at midnight she was making 11 $\frac{1}{2}$ knots on her course for Bermuda, later a bearing became heated and speed was reduced to 10 knots.

According to deductions made from *Wistaria's* observations the intense part of the storm field reached Bermuda a little before 10 a.m. and overhauled *Valerian* as she was approaching the Island, she was overwhelmed at 1 p.m., 74 officers and men perished, her Captain, one officer and 17 men being picked up out of the water where they had been for about 20 hours supported by a Carley float and wreckage, by H.M.S. *Capetown*, Captain O. H. DAWSON, R.N., at about 9.30 a.m. on October 23rd.

S.S. *Eastway*, Captain J. H. VANSTONE, coal laden, sailed from Lamberts Point, Norfolk Va., at 4.30 p.m. October 18th, 1926, for Pernambuco. Warning was received by Wireless of the approach of a hurricane between 8 p.m. and midnight on October 21st. Judging the storm centre to be to the westward of the ship and that it would not cross her track, a south-easterly course was maintained.

At 10 p.m. October 21st, there was a strong breeze which increased to a gale during the forenoon of October 22nd and the vessel was

steered to keep the wind on the Starboard bow. The ship rolled and gradually took a list. At noon, seas were coming on board both sides and the port side of the deck was awash.

Soon after 3 p.m. the port life boats and carpenter's shop were washed overboard.

While attempting personally to secure a hatch tarpaulin the Captain was washed overboard and disappeared.

At 5 p.m. the wooden covers of the port bunker hatch were carried away and water got below in considerable quantities the vessel listing 15° to port. The list rapidly increased.

At 5.38 p.m. the situation being critical an S.O.S. was sent out and received by S.S. *Luciline* 30 miles south of *Eastway's* position which according to Lloyd's was given as Latitude 31° 25' N., Longitude 64° 15' W.

At 7 p.m. *Eastway* turned on her beam ends and foundered in approximate Latitude 31° N., Longitude 63° W.

The falls of the Starboard Life Boat had been unhooked and the lashings cut and she floated clear when the vessel sank.

Twelve of the crew scrambled into her, the remaining 22, including the Chief and 2nd officers, two apprentices, boatswain, carpenter, four engineers and wireless operator perished. The twelve survivors were picked up at noon on October 23rd by S.S. *Luciline*, Captain A. B. THOMSON, and landed at Bermuda.

The wind was strongest between 4 and 6 p.m. on October 22nd approaching storm force; the seas were subsiding when the vessel sank at 7 p.m.

The Court which enquired into the loss of this ship in April, 1927, at Cardiff, found that the vessel was 10 inches by the bows and not in proper trim, being overloaded to the extent of 1 foot 1 $\frac{1}{4}$ inches, she was not in fit condition to safely encounter bad weather which might be expected at the time of year.

She was overladen with the sanction of the registered manager who abstained from taking any steps or giving any instructions as was his duty so to do to guard against overloading.

Acknowledgment and Conclusions.

Many valuable observations have been contributed by the Corps of Voluntary Marine Observers and not a few by the Captains and Officers of British ships which are not on the regular list, during the 1926 Hurricane Season in the North Atlantic; all are gratefully acknowledged.

The observations recorded in Meteorological Logs made with tested instruments in which careful regard to the advice given in "The Marine Observer's Handbook" and this Journal in the regions of origin of Tropical Revolving Storms are of special value; amongst these may be cited those of *Highland Piper* and *Orcoma*.

To make and log careful observations at regular short intervals with tested instruments in a ship at sea within the storm field of a hurricane not only requires skill and resource at the time, but preparation and training beforehand; in this *Culebra* has excelled; also, she made emergency Wireless Weather reports when she first encountered the outer edge of the hurricane and when she was in the storm field, as well as making routine reports as a "Selected Ship," of which the following is an example recorded at the end of her Meteorological Log.

"C.Q.—Weather 3032 N. 6825 W. Barometer corrected 1000 N.N.W. 8. 1300 G.M.T. Twenty second October course 230 degrees 8 knots Barometer rising very rapidly air 75 Swell N.E. very heavy. *Culebra*."

Observations of ships in Harbour during the passage of the vortex are of great value because there can be no doubt of the position and so dimensions may be determined. Of the Logs of H.M. Ships lent by the Admiralty, *Wistaria's* was most valuable for this purpose.

The Weather Charts produced are constructed after the principles advocated in "Wireless and Weather an Aid to Navigation" for use at sea; they bear out that often the general pressure distribution as shown by a Weather Chart will indicate the probable direction of progress of a hurricane during the coming day.

Generally the experiences reported go to prove that much more can be done than at present with the help of Wireless communication; it may therefore be well to repeat here briefly what is recommended in the Chapters on "Wireless and Weather," particularly those dealing with Tropical Revolving Storms.

Precursory Signs.

(1) In ships which have reliable mercurial barometers comparison with the normal should be made daily in the Tropics, a departure of 3 mb. from the normal may indicate warning of a hurricane.

(2) Careful note should be made of the appearance of high cloud and the direction from which it is coming should be ascertained if possible.

(3) Swell should be observed and noted with great care and, if possible, its period and length measured.

Signs which foretell hurricanes are well known at sea. These are refinements of observation which are particularly necessary in light of improved information.

Urgent Reports.

Any ship at any time fitted with Wireless Telegraphy observing the formation of a hurricane should make an "Urgent report" to "All Ships and Stations" giving the Greenwich Mean Time of her observation with Latitude and Longitude. Reports reciprocated between ships in a hurricane should give the Greenwich Mean Time of observation for only observations which synchronize will give true results when plotted.

Routine Reports.

These give the necessary information in conjunction with observations at the coast broadcast in Weather Bulletins to make a Weather Chart. The observations made at sea should therefore synchronize with those of the nearest coast.

In order to regulate traffic and ensure reliability of observation, it is best that these reports should be made by selected ships. British Selected ships are those whose names appear in the Fleet List in the latest MARINE OBSERVER with the letters M.L., W.T., or M., after their names. These ships are invited to make reports such as that of *Culebra* given above as an example, once or twice daily when at sea, addressed to "All Ships," and to any station which may require the information.

Information Generally for Cyclone Navigation.

Hurricane warnings made by Wireless Telegraphy from the shore are of very great value and those made on September 14th and 17th, 1926, by the United States Weather Bureau, than which no service

in the World has done more in issuing hurricane warnings to Shipping, may be cited as an example.

On September 14th *Laguna* turned from her course and avoided the Miami hurricane, while no doubt the warning received by *Sylviafield* on September 17th, influenced the Commander in the action he took in heaving to, and so not encountering the intense part of the system. Had these ships been able to make CHARTS VI and IX they would have been further convinced.

There are and there must be times when, even with the immense amount of data received at Meteorological Centres, the Meteorologists cannot be emphatic and definite in the information they give regarding hurricanes, and there are also times when at a considerable distance ahead of a hurricane the conditions appear to isolated observers to be such that fine weather is settled, and sufficient heed may not be taken of the information broadcast.

Confidence is necessary and to obtain this it is desirable that those at sea should, when possible, obtain the data and construct their own simple Weather Charts.

Take October 20th and 21st, CHARTS XIV, XV; with these before us in a ship to the southward of Bermuda we would expect that the hurricane would advance from its position at 8 a.m. on October 20th to the N.E., skirting the anti-cyclone to the westward of *Vardulia*; and on October 21st, although our Chart cannot give us the exact position of the centre, we would expect it to travel rapidly to the N.E. along the channel of comparatively low pressure. The signal log of *Curlew* records that the following storm warning was received "Tropical disturbance of great intensity central about Latitude 27° N., Longitude 76½° W., moving N.E. Extreme caution advised to vessels in its path."

The general pressure distribution gives an indication of the probable path of hurricanes, but the cause of their progression is probably to be found in the upper air; hence the importance of observing the movement of the upper clouds at sea and here is where the upper air sounding being carried out by certain of H.M. Ships of which Commander L. GARBETT, R.N., has written in this Journal may prove of great value.

In short, to improve cyclone Navigation, observation at sea and the coast should synchronise, the best use possible should be made of Wireless communication, and a more general familiarity with the rudimentary principles of synoptic meteorology should be encouraged amongst seamen.

STREAM AND DRIFT CURRENTS AND EFFECT OF WIND.

By H. W. HARVEY, MARINE BIOLOGICAL ASSOCIATION, PLYMOUTH.

Captain ISAACSON'S article on currents in the Caribbean in THE MARINE OBSERVER for March lays stress on the present demand for a wider knowledge of both fluctuations in the strength and direction of ocean currents and of the nature of currents set up by a moderate or strong wind lasting for a day or two. It may not be generally known to seamen that these two questions have an equally strong interest from an entirely different point of view. Such currents have an obvious effect upon fish and other animals and the microscopic plants which inhabit both coastal and ocean areas of the sea. They carry with them the smaller organisms and young of food-fish sometimes to areas unsuitable for their further development. Fluctuations in the currents from year to year have been shown in several instances to cause waxing and waning of valuable fisheries; in numerous other cases it is evident that they play a part. Taking the seas and oceans as a whole, all the fish and other animals which populate them are finally dependent upon the microscopic plant life for food, although many of the animals and most of the fish live by eating their neighbours during the greater part of their life. These microscopic plants flourish only in the upper layers to which sufficient light penetrates and although often pre-

sent they do not grow and multiply extensively at depths greater than 20 fathoms in our latitude and 100 fathoms in the Tropics. Just as wheat or any other plant takes nourishment out of the ground ashore, so these marine plants rapidly use up, in the upper layers of the sea, two nutrient salts—the nitrates and phosphates—which are absolutely essential to their existence and which are present in only very small quantities. Unless the upper layers of the sea were replenished with water from below, life in the oceans would soon die out. As it is, the water, which runs out of any area of the ocean as a current or passes into the atmosphere by evaporation, has its place taken by other water some of which rises from underneath, and this water from below about 100 fathoms is rich in the two necessary nutrient salts. It follows that the fertility of the sea is largely dependent upon the currents which keep the whole mass of water in slow but constant circulation, and it follows moreover that fluctuations in the currents must in one way or the other affect the animal population. The navigator is concerned with currents in the upper six fathoms or less, the biologist is more concerned with those in deeper lying water and more particularly with fluctuations from year to year causing changes in the animal

population; the two kinds of current are intimately linked, being dependent the one upon the other, since when water flows out on the surface of an area of the sea an equal quantity will come in to take its place. In spite of the obvious difficulties of obtaining measurements of slow and deep seated currents, a considerable amount of information has been collected during the last thirty years by indirect means and is constantly being added to. At the moment a German ex-gunboat, the *Meteor*, is engaged on such an investigation in the South Atlantic with a big staff, the *Discovery* is in part engaged upon such work while investigating the food, life history and prevalence of whales for the Falkland Islands Government and the Norwegians and Danes have sent out a number of fruitful expeditions during the last few years. It is of interest to note that Captain ISAACSON writes: "I am convinced that the currents in the Caribbean are caused by disturbances many hundreds of miles away from the scene of their activity. And also that they are very much more 'deep seated' than either—say the Gulf Stream or the Reynolds. That is to say, I believe they would be felt very much further beneath the surface." This is quite in accord with observations made by the Danish Oceanographical Expedition in the *Dana* in 1921. A salter intermediate layer was found below the upper layers in the Straits between Yucatan and Cuba when investigating the migrations of the eel, which was found to breed only in the Sargasso, and Dr. Nielsen concluded that water from the equatorial current ran on the surface with an undercurrent consisting of water characteristic of and derived from the Sargasso at about 100 fathoms while below that ran a current from the South Atlantic.

Unfortunately there are no books in English which deal at all completely with the causes and nature of the currents circulating the water of the oceans, and the methods and reasoning on which our present rather scanty knowledge rests. Publications dealing with this subject—termed Physical Oceanography—are numerous, in several languages, and many of the most important of them by no means easy to understand. It is a subject of indirect interest to the navigator, but the experience of the navigator is of very direct interest to those few who are engaged in investigating the kind of problems mentioned in this article.

Quite distinct from the more or less permanent ocean currents are those temporary drifts of the upper layers caused by a wind blowing for several hours or a few days. Probably a wind drift of this kind rarely exceeds a knot and then only with a high wind or one which has been blowing constantly and in one direction for some time. However, in the neighbourhood of land, particularly when sailing along a coast where sailing courses are long, and where thick weather due to rain or snow is not infrequent, a knowledge of exactly what wind drift to expect may be invaluable. We can in many places estimate the tidal streams with tolerable exactitude from available data, but how these streams are affected by the wind drift acting with or against them is a matter of guess work in almost all cases.

Up to the end of last century scientific theory and general observation agreed that the wind causes a drift in its own direction and this certainly seems to be the case in moderately shallow waters, particularly when the wind blows up and down the coast. However, the *Fram*, wedged in the Polar ice, in 1893-95 drifted with the wind but on the average 28° to the right of its direction at a speed averaging roughly 2 per cent. of the velocity of the wind blowing at the time. This led Dr. NANSEN to ask a Norwegian mathematician to investigate the whole problem, not the observations, from the basis of what is definitely known concerning the effect of the earth's rotation on moving particules of water and concerning the internal friction of water. This enquiry resulted in a theory which has not yet been confirmed by actual observations, but which does give a certain agreement with the few observations which have been made.

They concluded that the drift of the surface of the open sea, set up by a wind which has been blowing for 15 to 24 hours at a constant speed and in the same direction will run not in the same direction as the wind but 45° to the right in the Northern Hemisphere and 45° to the left in the Southern Hemisphere, provided that the depth is sufficiently great, probably about 150 fathoms. Further, with increasing depths below the surface, the current would be deflected more to the right of the wind's path, until finally before it had quite died out the direction would be opposite to that of the wind.

NANSEN writes "Strange to say, extremely few authors seem to have sufficiently noticed the fact that a surface-current produced by a wind cannot follow the direction of the wind, but must be deflected towards the right; and they have therefore arrived at erroneous results when discussing the effects of the winds upon the surface.

"Still less has sufficient attention been paid to the fact that a surface current produced by the wind will not be able to carry the underlying water along in its own direction, but the water will have a tendency to be deflected towards the right, and thus the angle of deflection of the water strata will have a tendency to increase downwards."

This refers to a sea which is not only sufficiently deep but where the movement of the water is not constrained by a neighbouring coast or by currents set up by other causes.

Thirty years ago this deflection to the right was a new idea, but further evidence confirming it was soon forthcoming. A Finn oceanographer had a very large number of observations made with an ordinary log ship from several light vessels in the Baltic. The wind drift ran 19° to the right of the wind's direction on an average.

Several cruises have been made recently by a party of Norwegian scientists, including Dr. NANSEN one summer, in a ketch of about 50 tons gross to the Azores and Canaries, and on one occasion observations were made by means of a current meter from a dinghy moored on the Rockall Bank. On a breeze springing up a surface wind drift was observed to the right of the wind's direction, this deflection increasing with depth.

During the last few years observations have been made from light vessels on the Pacific Coast of the United States by means of a pole 15 feet long weighted so that it would float one foot out of the water. This gave the average movement of the upper 14 feet as would be experienced by a coasting vessel of this draft. The current due to tidal streaming being calculated and allowed for, the residual drift due to the wind was found to run on the average 23° to the right of the wind's direction, except in the case of winds from the S.W. quadrant which set up a wind drift deflected by the coast and running northerly—on the average 24° to the left of the wind's direction.

In this series of observations, totalling many thousands, the velocity of the wind drift was roughly 2 per cent. of the wind's velocity, a value similar to that experienced by the *Fram*.

Wind.								Average Wind drift of pole submerged 14-ft. in knots.
Miles per hour.								
10-19	...	...	...	...	...	...	...	.29
20-29	...	...	...	...	...	...	...	.47
30-39	...	...	...	...	...	...	...	.64
40-49	...	...	...	...	...	...	...	.76
50-59	...	...	...	...	...	...	...	.87

These two series of observations agree in showing a deviation of two or three points to starboard, but the log ship observations of the speed of the wind drift in the Baltic do not bear the same relation to the wind's velocity. Furthermore the rate of drift up the English Channel and in the North Sea of bottles, so weighted that they only just float, accords more nearly with the Baltic observations, while their direction of drift is still more nearly the same as the wind's path. These bottles liberated between Plymouth and Ushant travel up Channel in the summer months before the prevalent south-westerly winds at an average speed of six miles a day and several have passed on to strand in Danish waters. That they are transported in a drift limited to the surface in the Western part of the Channel is indicated, because the salter water characteristic of the Atlantic only on occasion passes up Channel in quantity, and then it has been distinguished at the *Varne* some six months after passing Ushant. This shows a very much slower drift than experienced by the bottles. The up-Channel drift into the North Sea carries young herring, which have hatched out from the egg in the English Channel, into the Southern part of the North Sea, where, if they are not eaten by other fish or die, they are eaten as whitebait or help swell the herring harvest. Easterly winds stop or even reverse this flow through Dover Straits, where

under the usual south-westerly conditions it proceeds at about three miles a day from top to bottom.

The effect of wind in producing currents is little known; and

practically nothing is known about how deep the drift extends under varying circumstances, except from calculations not yet verified by actual observations.

WEATHER SIGNALS.

II.—WIRELESS WEATHER SIGNALS.

WIRELESS WEATHER BULLETINS.

UNITED STATES OF AMERICA (PACIFIC COAST).

(C.W. Issues.)

San Francisco, California, W/T Station, approximate Latitude 37° 39' N., Longitude 122° 23' W., call sign **NPG**, broadcasts weather bulletins twice daily as follows:—

At 0330 G.M.T. on a wavelength of 7,005 metres (C.W.) and 2,776 metres (C.W.) and 1700 G.M.T. on a wavelength of 7,005 metres (C.W.).

The bulletins commence with the letters USWB (U.S. Weather Bureau) and are divided into two parts.

Part I, in code, consists of surface weather conditions and upper air data, the former being based upon observations taken at 0100 and 1300 G.M.T. at the undermentioned stations, except as follows, where the observation times do not synchronise.

Alaskan observations are taken at 0500 and 1700 G.M.T.

Honolulu observations at 0630 and 1830 G.M.T.

Guam, Manila, China and Japan observations at 2200 G.M.T.

Midway observations at 1830 Midway local time of the preceding day.

Weather reports from ships in the North Pacific Ocean follow the reports from land stations in Part I. Ship's observations taken at 0000 G.M.T. being broadcast in the 1700 G.M.T. bulletin and those taken at Noon G.M.T. being broadcast in the 0330 G.M.T. bulletin.

First Part.

Indicator Letters and Stations.

Indicator Letters.	Station.	Position (approx.) Latitude.	Longitude.
<i>Alaska.</i>			
*NM	- Nome - - - - -	64° 50' N.	167° 20' W.
*SPI	- St. Paul - - - - -	57° 02' N.	170° 30' W.
*DH	- Dutch Harbour - - - - -	53° 53' N.	166° 32' W.
*TN	- Tanana - - - - -	65° 00' N.	151° 40' W.
*EA	- Eagle - - - - -	64° 50' N.	140° 50' W.
*KD	- Kodiak - - - - -	57° 40' N.	152° 30' W.
*CV	- Cordova - - - - -	60° 35' N.	145° 40' W.
*JU	- Juneau - - - - -	58° 18' N.	134° 25' W.
*SK	- Sitka - - - - -	57° 03' N.	135° 20' W.

Canada.

*ED	- Edmonton, Alberta - - - - -	53° 32' N.	113° 05' W.
*KA	- Kamloops, B.C. - - - - -	50° 48' N.	120° 03' W.
*CY	- Calgary, Alberta - - - - -	51° 00' N.	114° 00' W.
*SC	- Swift Current, Sask. - - - - -	50° 30' N.	107° 45' W.
*PR	- Prince Rupert, B.C. - - - - -	54° 15' N.	130° 21' W.

United States, etc.

TAT	- Tatoosh I, Wash. - - - - -	48° 23' N.	124° 44' W.
†SE	- Seattle, Wash. - - - - -	47° 38' N.	122° 25' W.
NH	- North Head, Wash. - - - - -	46° 18' N.	124° 05' W.
PD	- Portland, Oreg. - - - - -	45° 31' N.	122° 31' W.
RO	- Roseburg, Oreg. - - - - -	43° 11' N.	123° 10' W.
EUR	- Eureka, Calif. - - - - -	40° 42' N.	124° 16' W.
RB	- Red Bluff, Calif. - - - - -	40° 10' N.	122° 10' W.
SM	- Sacramento, Calif. - - - - -	38° 32' N.	121° 30' W.
†SF	- San Francisco, Calif. - - - - -	37° 50' N.	122° 30' W.
FN	- Fresno, Calif. - - - - -	36° 10' N.	119° 50' W.
SLO	- San Luis Obispo, Calif. - - - - -	35° 08' N.	120° 43' W.
*PAR	- Point Arguello, Calif. - - - - -	34° 35' N.	120° 38' W.
LA	- Los Angeles, Calif. - - - - -	33° 40' N.	118° 15' W.
†DI	- San Diego, Calif. - - - - -	32° 42' N.	117° 15' W.
SPO	- Spokane, Wash. - - - - -	47° 40' N.	116° 41' W.
*WW	- Walla Walla, Wash. - - - - -	46° 08' N.	118° 50' W.

United States, etc.—cont.

Indicator Letters.	Station.	Position (approx.) Latitude.	Longitude.
BA	- Baker, Oreg. - - - - -	45° 00' N.	117° 30' W.
HL	- Helena, Mont. - - - - -	46° 10' N.	111° 50' W.
BS	- Boise, Idaho - - - - -	43° 40' N.	116° 00' W.
LD	- Lander, Wyo. - - - - -	41° 40' N.	108° 40' W.
WM	- Winnemucca, Nev. - - - - -	40° 50' N.	118° 10' W.
R	- Reno, Nev. - - - - -	39° 20' N.	119° 50' W.
SLC	- Salt Lake City, Utah - - - - -	40° 45' N.	111° 40' W.
MD	- Modena, Utah - - - - -	37° 30' N.	113° 50' W.
*DV	- Denver, Colo. - - - - -	39° 48' N.	105° 05' W.
GJ	- Grand Junction, Colo. - - - - -	39° 10' N.	108° 20' W.
SA	- Santa Fe, N. Mex. - - - - -	35° 39' N.	106° 02' W.
*PH	- Phoenix, Ariz. - - - - -	33° 00' N.	112° 00' W.
YU	- Yuma, Ariz. - - - - -	32° 46' N.	114° 38' W.
*HO	- Honolulu, Hawaii - - - - -	21° 18' N.	157° 52' W.
*MDI	- Midway Island - - - - -	28° 15' N.	177° 22' W.
*FMA	- Manila P.I. - - - - -	14° 35' N.	120° 52' E.
*FGM	- Guam. - - - - -	13° 32' N.	144° 53' E.

China and Japan, etc.

*FHO	- Hong Kong, China - - - - -	22° 13' N.	114° 16' E.
*FSH	- Shanghai, China - - - - -	31° 15' N.	121° 30' E.
*FBI	- Bonin Island - - - - -	27° 05' N.	142° 11' E.
*FKO	- Koshun, Formosa - - - - -	25° 08' N.	121° 45' E.
*FNA	- Naha, Japan - - - - -	26° 13' N.	127° 41' E.
*FKA	- Kagoshima, Japan - - - - -	31° 34' N.	130° 33' E.
*FTO	- Tokio, Japan - - - - -	35° 39' N.	139° 45' E.
*FNE	- Nemuro, Japan - - - - -	43° 20' N.	145° 35' E.

* Cloud reports not included.

† Upper air observations from these stations included in bulletins.

The observations from land stations which are preceded by the indicator letters of the station are contained in two or more 5 figure groups for each station. Groups one and two give surface observations, group three, cloud; and the remainder, upper air data.

The letter "X" will be substituted for any missing or unavailable data.

Code used—Special (United States Meteorological).

Explanation of first and second groups.

First Group.—1st three figures give the barometer reading corrected in inches and hundredths, the first figure (2 or 3) being omitted. (To convert to millbars, see Table XXXIX, p. 164, Vol. IV, No. 44.)

4th figure gives the wind direction.

(Table XXXV, p. 163, Vol. IV, No. 44.)

5th figure gives the wind force by Beaufort Scale. The letters W (Whole gale), S (Storm), H (Hurricane), being used for forces 10, 11 and 12 respectively.

Second Group.—1st figure gives the present weather (State of weather at surface). (Table XXXVI, p. 163, Vol. IV, No. 44.)

2nd figure gives barometric change in hundredths of an inch during the two hours preceding observation. (Table XXXVII, p. 163, Vol. IV, No. 44.)

3rd figure gives the past weather during the preceding 12 hours. (Table XXXVIII, p. 163, Vol. IV, No. 44.)

4th and 5th figures give the air temperature in degrees F.

Ship reports are included in the first part of the bulletin immediately following the land stations. They are included in two groups, preceded by the call letters identifying the ship. The first group consists of five numerals, signifying the ship's position, and the second group of five numerals expressing the barometric pressure, wind direction and force. In the group giving the ship's position (to the nearest degree), the first two numerals express the latitude (north) and the last three and longitude (west).

Second Part.

The second part of the bulletin is in plain language and consists of a summary of general pressure distribution; wind and weather forecasts for ocean zones (*see* CHARTLET below); storm warnings, and flying weather forecasts by zones (*see* CHARTLET below).

Period covered by Forecasts.

In 0330 G.M.T. bulletins:

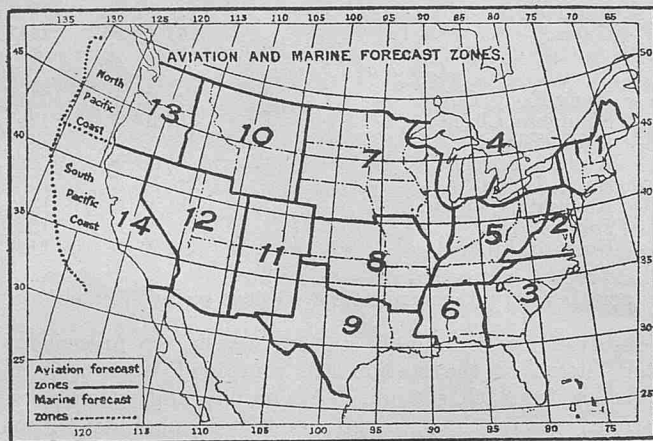
Wind and weather forecasts; 24 hours, beginning at 0800 G.M.T.

Flying weather forecasts; 12 hours, 0800 G.M.T., until 2000 G.M.T.

In 1700 G.M.T. bulletins:

Wind and weather forecasts; 24 hours beginning at 2000 G.M.T.

Flying weather forecasts; 12 hours, 2000 G.M.T., until 0800 G.M.T.



San Francisco W/T Station also transmits a report of the weather conditions in the Bonita Channel, every four hours, commencing with 0000 G.M.T. Wavelength, 2,776 metres (C.W.).

UNITED STATES OF AMERICA, CARIBBEAN SEA, GULF COAST AND WEST INDIAN ISLANDS

Weather bulletins are broadcast from the under-mentioned W/T stations. They are of the same general character and can be similarly decoded. They are based upon observations taken in the U.S.A. at 0100 and 1300 G.M.T., and one hour earlier at stations in the Gulf of Mexico and Caribbean Sea. The bulletins are divided into two parts.

Explanation of bulletins.

Part I contains reports in code of barometer pressure, wind direction and force at certain stations each of which is denoted by one or more indicator letters, and using a group of five figures to represent the data contained in the report, viz.:—

1st, 2nd and 3rd figures of group give the corrected barometer reading in inches and tenths, the first figure (2 or 3) being omitted.

(*See* Table XXXIX, p. 164, Vol. IV, No. 44, for conversion of ins. to mbs.)

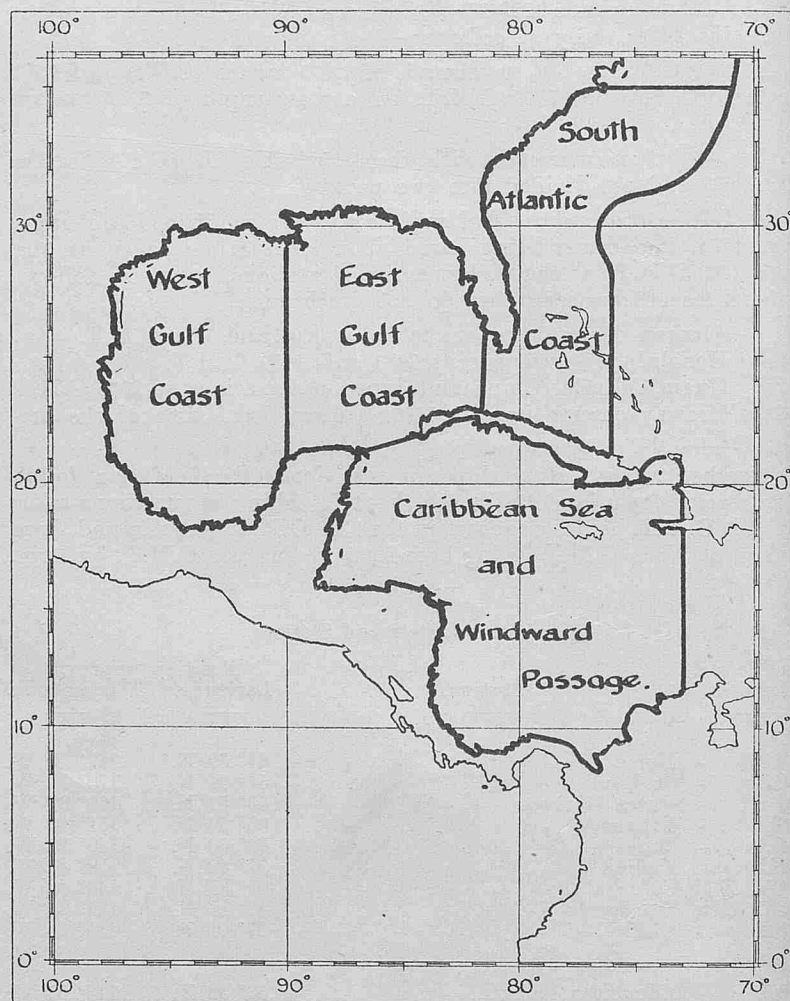
4th figure of group gives the wind direction true. (Table XXXV, p. 163, Vol. IV, No. 44.)

5th figure of group gives the wind force. The letters W, S, or H will be used for forces 10, 11 and 12 respectively.

NOTE.—If observations from any station cannot be supplied, the indicator letters and data figures will be omitted altogether. If only a portion of the observations are missing, the letter "X" will be sent in lieu.

Part II.—Sent in plain language, consists of wind and weather forecasts for 24 hours, storm and hurricane warnings for the various areas shown on the CHARTLET, and as described below.

Chartlet of U.S. Marine Forecast Areas.



W/T Stations from which the Bulletins are Broadcast.

Caribbean Sea (C.W. Issues.)

Almirante-Panama—by arrangement with the United Fruit Co. (owners of the W/T station).

Approximate Latitude $9^{\circ} 20' N.$, Longitude $82^{\circ} 17' W.$

Call Sign **UB**. Wavelength, 4,075 metres (C.W.).

Times (G.M.T.) of broadcast, 0445 and 1730.

At 1730 G.M.T. **Part I**, observations from following stations broadcast *only during the hurricane season*, June to November inclusive. **Part II** broadcast daily *throughout the year*.

Observation Stations in Part I. of Bulletin.			Part II. of Bulletin.
Indicator Letters.	Station.	Position (approx.). Lat. Long.	
SI	Swan Island - -	17° 24' N. 83° 57' W.	Storm and Hurricane Warnings. Wind and Weather forecasts for West Gulf of Mexico. Wind and Weather forecasts for East Gulf of Mexico. Wind and Weather forecasts for Caribbean Sea and Windward Passage. (See Chartlet, p. 184.)
DZ	Belize, Honduras -	18° 00' N. 88° 20' W.	
BFD	Bluefields, Nicaragua -	12° 00' N. 83° 45' W.	
W	Willemstadt, Curaçao -	12° 10' N. 69° 00' W.	
SJ	San Juan, P.R. -	18° 28' N. 66° 06' W.	
PP	Port au Prince, Haiti -	18° 37' N. 72° 17' W.	
CFG	Cienfuegos, Cuba -	22° 11' N. 80° 33' W.	
GUE	Guane, Cuba - -	- - - -	
KN	Kingston, Jamaica -	18° 10' N. 76° 48' W.	
TI	Turks I., Bahamas -	21° 31' N. 71° 08' W.	

At 0445 G.M.T. **Part II** only of bulletin as above, broadcast *daily throughout the year*.

The above bulletins are sent by W/T to **Almirante** and **Swan Island W/T** stations from the **Tropical Radio Telegraph Station at New Orleans La.**, call sign **WNU** at 0430 and 1630 G.M.T. on a wavelength of 3,331 metres (C.W.) and ships are invited to intercept them and repeat them to other ships should they so desire.

Ships failing to obtain the weather bulletins from **Almirante W/T** Station are permitted to call the **Swan Island W/T** Station, approximate Latitude 17° 24' N., Longitude 83° 57' W., call sign **US**, at any time for the latest weather forecasts.

Gulf Coast and Islands. (C.W. Issues.)

Key West, Fla.—Approximate Latitude 24° 33' N., Longitude 81° 48' W.

Call sign **NAR**. Wavelengths 5,657 metres (C.W.) and 2,939 metres (C.W.) simultaneously. Time of broadcast, 0300 and 1700 G.M.T. 1700 G.M.T. broadcast made on 2,939 metres (C.W.) only.

Observation Stations in Part I. of Bulletin.			Part II. of Bulletin.
Indicator Letters.	Station.	Position (approx.). Lat. Long.	
H	Hatteras, N.C. - -	35° 14' N. 75° 32' W.	Wind and Weather forecasts for South Atlantic Coast. Wind and Weather forecasts for East Gulf of Mexico. Wind and Weather forecasts for West Gulf of Mexico. Wind and Weather forecasts for Caribbean Sea and Windward Passage. Storm and Hurricane Warnings. (See Chartlet, page 184.)
C	Charleston, S.C. -	32° 43' N. 79° 52' W.	
JA	Jacksonville, Fla. -	30° 19' N. 81° 51' W.	
MI	Miami, Fla. - -	33° 35' N. 84° 13' W.	
K	Key West, Fla. - -	24° 33' N. 81° 48' W.	
P	Pensacola, Fla. - -	30° 21' N. 87° 19' W.	
BW	Burwood, La. - -	28° 57' N. 89° 23' W.	
GV	Galveston, Tex. -	29° 19' N. 94° 48' W.	
BV	Brownsville, Tex. -	25° 53' N. 97° 28' W.	
FW	Fortworth, Tex. -	32° 30' N. 97° 40' W.	
KN	Kingston, Jam. - -	18° 01' N. 76° 48' W.	
TI	Turks Island - -	21° 31' N. 71° 08' W.	
HA	Havana, Cuba - -	23° 10' N. 82° 22' W.	
GO	Guantanamo Bay (Cuba). - -	19° 54' N. 75° 12' W.	
SI	Swan Island - -	17° 24' N. 83° 57' W.	
SJ	San Juan, P.R. - -	18° 28' N. 66° 06' W.	

West Indian Islands. (C.W. Issue.)

San Juan P.R. (*June to November inclusive*).—Approximate Latitude 18° 28' N., Longitude 66° 06' W.

Call sign, **NAU**.

Time of broadcast, 0045, 0400 and 1600 G.M.T.

Wavelength, 4,836 metres (C.W.).

Observation Stations in Part I. of Bulletin.			Part II. of Bulletin.
Indicator Letters.	Station.	Position (approx.). Lat. Long.	
SJ	San Juan, P.R. - -	18° 28' N. 66° 06' W.	Hurricane Warnings.
ST	St. Thomas, Virgin Is. -	18° 23' N. 64° 55' W.	
BT	Basseterre, St. Kitts -	17° 18' N. 62° 43' W.	
RS	Roseau, Dominica -	15° 17' N. 61° 24' W.	
BB	Bridgetown, Barbados. -	13° 09' N. 59° 35' W.	
SD	Santo Domingo, S.D. -	18° 28' N. 69° 53' W.	
PL	Puerto Plata, S.D. -	19° 49' N. 70° 42' W.	
LU	Castries, St. Lucia -	14° 01' N. 61° 00' W.	
W	Willemstadt, Curaçao. -	12° 10' N. 69° 00' W.	
PS	Port of Spain, Trinidad. -	10° 40' N. 61° 30' W.	
SM	St. Martins, D.W.I. -	18° 02' N. 63° 04' W.	

NOTE.—This bulletin is re-broadcast by Guantanamo, Cuba, W/T station call sign **NAW**, on a wavelength of 4,543 metres (C.W.) at 0200 G.M.T. during the hurricane season, June 1st to November 1st inclusive.

MEXICO.

(Spark Issue.)

Chapultepec W/T station approximate Latitude 19° 25' N. Longitude 99° 11' W. call sign **XDA**, broadcasts a weather bulletin at 1900 G.M.T. on a wavelength of 2,000 metres (spark).

The bulletin is in two parts.

Part I., in special code, contains the observations of 1300 G.M.T. from the following stations:—

Station.	Position approx.	
	Latitude.	Longitude.
Acapulco - - - -	16° 52' N.	99° 50' W.
Chihuahua - - - -	28° 32' N.	106° 28' W.
Frontera - - - -	18° 35' N.	92° 38' W.
Guaymas - - - -	27° 58' N.	110° 48' W.
Leon - - - -	21° 01' N.	101° 15' W.
Lerdo - - - -	- - - -	- - - -
Manzanillo - - - -	19° 00' N.	104° 20' W.
Islas Marias - - -	21° 40' N.	106° 30' W.
Matamoros - - - -	25° 53' N.	97° 33' W.
Mazatlan - - - -	23° 10' N.	106° 22' W.
Monterrey - - - -	25° 34' N.	100° 20' W.
Payo Obispo - - -	18° 29' N.	83° 22' W.
La Paz - - - -	24° 10' N.	110° 18' W.
Progreso - - - -	21° 16' N.	89° 36' W.
Salina Cruz - - -	16° 17' N.	95° 15' W.
Tacubaya - - - -	19° 24' N.	99° 12' W.
Tampico - - - -	22° 11' N.	97° 53' W.
Tapachula - - - -	15° 10' N.	92° 27' W.
Vera Cruz - - - -	19° 12' N.	96° 10' W.

Explanation of Part I.

Commencing with the word "Meteorologico," the name of the observation station is sent, followed by two groups of figures, there being five figures in each group.

First Group.—1st, 2nd and 3rd figures give the corrected barometer reading in millimetres and tenths, initial 7 omitted. To convert to mbs., see Table XV, p. 57, Vol. IV, No. 39.

4th figure gives the wind direction on scale 0-8, Table XXXV, p. 163, Vol. IV, No. 44.

5th figure gives the wind force by Beaufort scale, 9 being used for forces 9 and above.

Second Group: 1st figure gives the state of the weather at the time of observation. Table XXXVI, p. 163, Vol. IV, No. 44.

2nd figure gives the barometric tendency in millimetres for the 2 hours previous to the time of observation. Table XL.

3rd figure gives the cloud amount (number of tenths of sky obscured). Table XLI.

4th figure gives the cloud form and speed. Table XLII.

5th figure gives the direction of movement of the clouds on scale 0-8; 0 = no appreciable movement, &c. Table XXXV, p. 163, Vol. IV, No. 44. When both upper and lower clouds are observed, only the amount, kind, and direction of the lower clouds will be sent. In such cases the amount of the upper clouds, if any, can be determined, approximately, by taking the difference between the tenths of cloudiness interpreted from the figures showing "present weather" and "amount of clouds."

NOTES.—(1) Missing observations replaced by letter "X."

(2) When all the data for a station cannot be supplied, the name of the station will be omitted.

Part II. sent *en clair* (Spanish) gives information concerning the general weather situation, position of centres of High or Low pressure areas, and weather forecasts for 24 hours.

Special Weather Telegraphy Tables.

Not New International Code.

Table XL. Barometer Tendency.

Code figure.

0 = Steady (rise or fall less than 1 mm.).
1 = Rising 1 mm. (1.4 mb.).
2 = Falling 1 mm. (1.4 mb.).
3 = Rising 1.5 mm. (2.0 mb.).
4 = Falling 1.5 mm. (2.0 mb.).
5 = Rising 2 mm. (2.7 mb.).
6 = Falling 2 mm. (2.7 mb.).
7 = Rising 2.5 mm. (3.4 mb.).
8 = Falling 2.5 mm. (3.4 mb.).
9 = Rise or fall 3 mm. (4.1 mb.) or more. (Whether it is an increase or decrease can be determined by the tendency at surrounding stations.)

Table XLI.

Cloud Amount—Number of Tenths of the Sky obscured
(10 Tenths is Total Cloudiness).

Code figure.

0 = 1 tenth or less of sky covered.
2 = 2 to 3 tenths of sky covered.
4 = 4 to 5 tenths of sky covered.
6 = 6 to 7 tenths of sky covered.
8 = 8 to 10 tenths of sky covered.

Table XLII.

Cloud Form and Speed.

Code figure.

0 = 1 tenth clouds or less (kind not indicated).
1 = upper clouds (cirrus, cirro-stratus, cirro-cumulus, alto-cumulus, or alto-stratus), rapidity not indicated.
2 = strato-cumulus moving slowly.
3 = strato-cumulus moving rapidly.
4 = cumulus moving slowly.
5 = cumulus moving rapidly.
6 = stratus moving slowly.
7 = stratus moving rapidly.
8 = nimbus or cumulo-nimbus moving slowly.
9 = nimbus or cumulo-nimbus moving rapidly.

WIRELESS STORM WARNINGS.

United States of America. (Pacific Coast.)

(C.W. and Spark Issues.)

THE following W/T Stations broadcast storm warnings at the times stated or as necessary. Ships may request any of the stations mentioned to furnish the latest storm warning. The warnings are for a period of 24 hours beginning at the hour indicated in the messages.

W/T Station and position (approx.).	Call Sign.	Wave-length. metres.	Broad-casting Time G.M.T.	Particulars.
Seattle, Wash. - Lat. 47° 24' N. - Long. 122° 37' W.	NPC	2,541 (C.W.)	0100, 0300 0400, 1300 1700, 2100	} Storm Warnings.
Tatoosh I., Wash. - Lat. 48° 23' N. - Long. 124° 44' W.	NPD	800 (Spk.)	0100, 0400 1300, 1700 2100	
North Head, Wash. - Lat. 46° 18' N. - Long. 124° 05' W.	NPE	2,677 (C.W.)	0130, 0430 1330, 1730 2130	} Storm Warnings.

Wireless Storm Warnings U.S.A. (Pacific Coast)—cont.

W/T Station and position (approx.).	Call Sign.	Wave length metres.	Broad-casting Time G.M.T.	Particulars.
Eureka, Calif. - Lat. 40° 42' N. - Long. 124° 16' W.	NPW	2,883 (C.W.)	1700	} Storm Warnings for the coast of California N. of San Francisco and advices concerning storm warnings for the N. Pacific Coast.
" " -	"	2,883 (C.W.)	0130, 2200	
San Francisco, Calif. - Lat. 37° 39' N. - Long. 122° 23' W.	NPG	7,005 (C.W.)	0330, 1700	} Storm Warnings. In second part of weather bulletin.
" " -	"	2,776 (C.W.)	0000, 0400 0800, 1200 1600, 2000	
San Diego, Calif. - Lat. 32° 42' N. - Long. 117° 15' W.	NPL	2,939 (C.W.)	0430, 1630 2200	} Storm Warnings. Broadcast on receipt and at times stated.

UNITED STATES OF AMERICA (CARIBBEAN SEA, GULF COAST) AND WEST INDIAN ISLANDS.

(C.W. and Spark Issues.)

STORM and hurricane warnings are broadcast by the following W/T Stations for the areas shown on the CHARTLET, p. 184 at the times stated or when necessary. When a storm exists that is likely to affect an area, the location and expected direction of movement of the storm centre will be given, followed by any storm or hurricane warnings and advices to shipping that have been issued.

Almirante, Panama.—Call sign **UB**. Wave length 4,075 metres (C.W.). Times, G.M.T. 0445 and 1730.

Storm Warnings for Gulf of Mexico and Caribbean Sea precede the wind and weather forecasts in Part II of the weather bulletins. The warnings will also contain information regarding "northers" during the winter months.

Hurricane Warnings.—Location, direction, progress and intensity of the hurricane broadcast every 2 hours.

Swan Island.—Call sign **US**. Approximate Latitude 17° 24' N., Longitude 83° 57' W.

Ships are permitted to call this W/T Station for weather information regarding hurricanes or "northers."

Key West, Fla.—Call sign **NAR**. Wave lengths, 5,657 metres (C.W.) and 2,939 metres (C.W.), at 0300 G.M.T. and at 1700 G.M.T., 2,939 metres (C.W.).

Storm Warnings broadcast for S. Atlantic Coast (Hatteras to Key West), and east and west Gulf Coasts, *see* CHARTLET, p. 184, also all **Hurricane Warnings** and advices.

San Juan P.R.—Call sign **NAU**. Wave length, 4,836 metres (C.W.).

(During the hurricane season (June to November inclusive).

Hurricane Warnings and advisory messages relating thereto are broadcast when necessary, and repeated at 2 hour intervals until 0500 G.M.T. In the absence of a tropical storm the words "Weather Normal" will be sent each day.

Guantanamo (Cuba) —NAW—2,541 (spk.) Port au Prince (Haiti) NSC.—2,271 (C.W.) St. Croix } Virgin NNI—450 (spk.) St. Thomas } Islands NBB—2,271 (C.W.)	{ Transmit hurri- cane warnings when necessary and repeat them every 4 hours.
-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------

III. WIRELESS TIME SIGNALS.

UNITED STATES OF AMERICA.

For method of transmission of the undermentioned Time Signals see diagram, p. 164, Vol. IV, No. 44.

Hawaiian Islands (C.W. Issues).

W/T Station.	Call Sign.	Wavelength metres.	Time of Signal being made G.M.T.	—
Honolulu, Pearl Hbr. Lat. 21° 20' 45" N. Long. 157° 57' 56" W.	NPM	2,828 (C.W.) and 11,490 (C.W.) simultaneously	h m s h m s 23 55 00-0 00 00	Sent daily.

United States of America, Pacific Coast.
(C.W. Issues.)

W/T Station.	Call Sign.	Wavelength metres.	Time of Signal being made G.M.T.	—
North Head, Wash.- Lat. 46° 17' 58" N. - Long. 124° 04' 30" W.	NPE	2,677 (C.W.)	h. m. s. h. m. s. 19 55 00-20 00 00	Sent daily.
Eureka, Calif. - Lat. 40° 41' 22" N. - Long. 124° 16' 10" W.	NPW	2,883 (C.W.)	19 55 00-20 00 00	Sent daily.
San Francisco, Calif. Lat. 38° 05' 55" N. - Long. 122° 16' 37" W.	NPG	2,776 (C.W.)	5 55 00- 6 00 00	Sent daily.
San Diego, Calif. - Lat. 32° 42' 28" N. - Long. 117° 14' 49" W.	NPL	2,776 (C.W.) and 2,939 (C.W.)	19 55 00-20 00 00 16 55 00-17 00 00	

NOTE.—The time signal, broadcast from San Francisco W/T Station, emanates from the Chronometer and Time Station, Mare Island. The time signal broadcast by San Diego W/T Station is relayed from the Naval Observatory and has a lag of about 0.5 second.

Panama.
(C.W. Issues.)

W/T Station.	Call Sign.	Wavelength metres.	Time of Signal being made G.M.T.	—
Balboa - Lat. 9° 07' 15" N. - Long. 79° 46' 20" W.	NBA	6,663 (C.W.)	h m s h m s 3 55 00- 4 00 00	Sent daily.
Colon - Lat. 9° 22' 09" N. - Long. 79° 54' 07" W.	NAX	2,271 (C.W.)	17 55 00-18 00 00 3 55 00- 4 00 00 17 55 00-18 00 00	

United States of America, Gulf Coast.
(C.W. Issues.)

W/T Station.	Call Sign.	Wavelength metres.	Time of Signal being made G.M.T.	—
New Orleans - Lat. 29° 56' 50" N. - Long. 90° 02' 18" W.	NAT	2,828 (C.W.)	h. m. s. h. m. s. 16 55 00-17 00 00	Sent daily.
Key West - Lat. 24° 33' 22" N. - Long. 81° 48' 21" W.	NAR	2,939 (C.W.)	16 55 00-17 00 00	"Lag" of Key West time signal is 0.28 second.

IV. VISUAL STORM WARNINGS.

United States of America (Pacific and Gulf Coasts) and West Indian Islands.

The United States system of Visual Small-craft, Storm, and Hurricane Warnings as explained on p. 165 of Vol. IV, No. 44, is

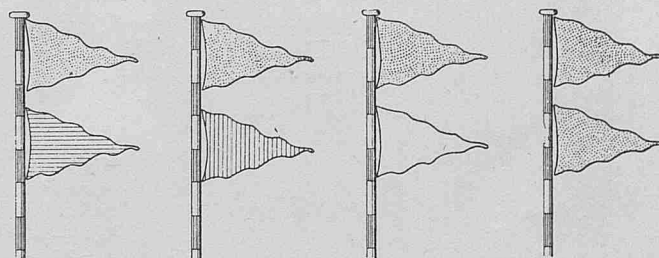
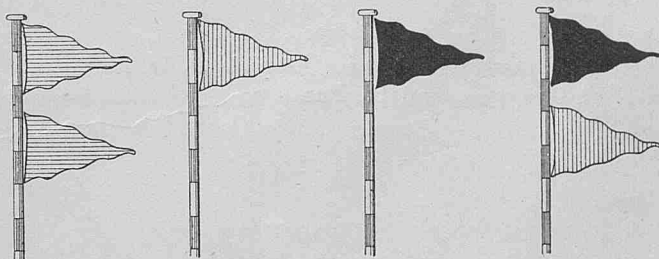
in operation at a number of stations on the Pacific and Gulf Coasts of the United States.

These warnings are also displayed at certain places in the following West Indian Islands:—St. Kitts, Porto Rico, Jamaica (Kingston), Vieques Island, Santa Domingo, Haiti, Dominica, St. Thomas, Virgin Islands of the U.S.A., Grand Turk Island, Swan Island, Turks Island and Cuba.

MEXICO.

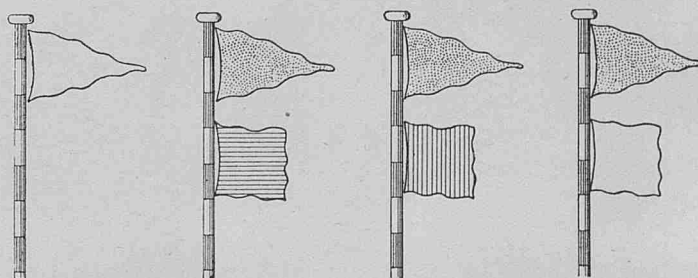
The following system of visual storm and wind signals has been established at ports on the coasts of Mexico.

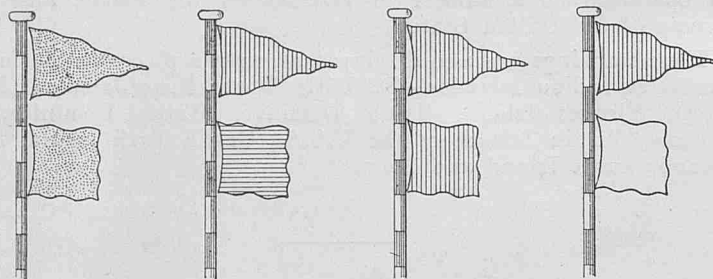
(1) Storm signals are used to give warning of the existence of cyclonic disturbances whether distant or near, or, of the existence of bad weather outside the port. These storm signals which consist of pennants only and their meanings, are as follows:—

Bad weather
North of the
port.Bad weather
South of the
port.Bad weather
East of the
port.Bad weather
West of the
port.Northerly gale
from Matamoras
begun. (Gulf
ports only.)Gulf ports.—
Cyclone in
Caribbean Sea.
Pacific ports.—
Distant cyclone.Gulf ports.—
Cyclone in Gulf
of Mexico.
Pacific ports.—
Cyclone
close by.Cyclone at the
Port, or will
pass close by
on that day.

Night Signals.—Two red lights, vertical, are hoisted to indicate that navigation may be dangerous.

(2) The following signals consisting of pennants, denoting the strength, and flags the direction of the wind, are used to indicate its probable strength and direction from the time of hoisting the signal until the following 0600. They will be lowered, if necessary, to hoist a storm signal and in the evening when no longer visible:—

Light or
moderate
winds.Moderate or
strong North-
easterly winds.Moderate or
strong South-
easterly windsModerate or
strong Easterly
winds.

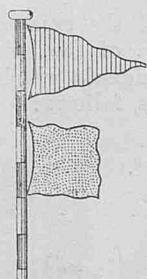


Moderate
or strong
Westerly
winds.

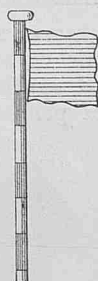
Gale or Hurri-
cane from the
North.

Gale or Hurri-
cane from the
South.

Gale or Hurri-
cane from the
East.



Gale or Hurri-
cane from the
West.



Northerly Gale
expected the
following day.
(Gulf Ports
only.)

Yellow White. Blue. Red. Black.

The signals are exhibited at the following ports from flagstaffs painted in *red* and *white* bands:—

Gulf Coast.—Matamoras, Tampico, Tuxpan, Vera Cruz, Puerto Mexico, Frontera, Ciudad del Carmen, Campeche, and Progreso.

Caribbean Coast.—Payo Obispo.

Pacific Coast.—Salina Cruz, Acapulco, Manzanilla, San Blas, Mazatlan, Guaymas, and La Paz.

Special Notices regarding Personnel.

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

Captain H. A. Yardley, D.S.C.

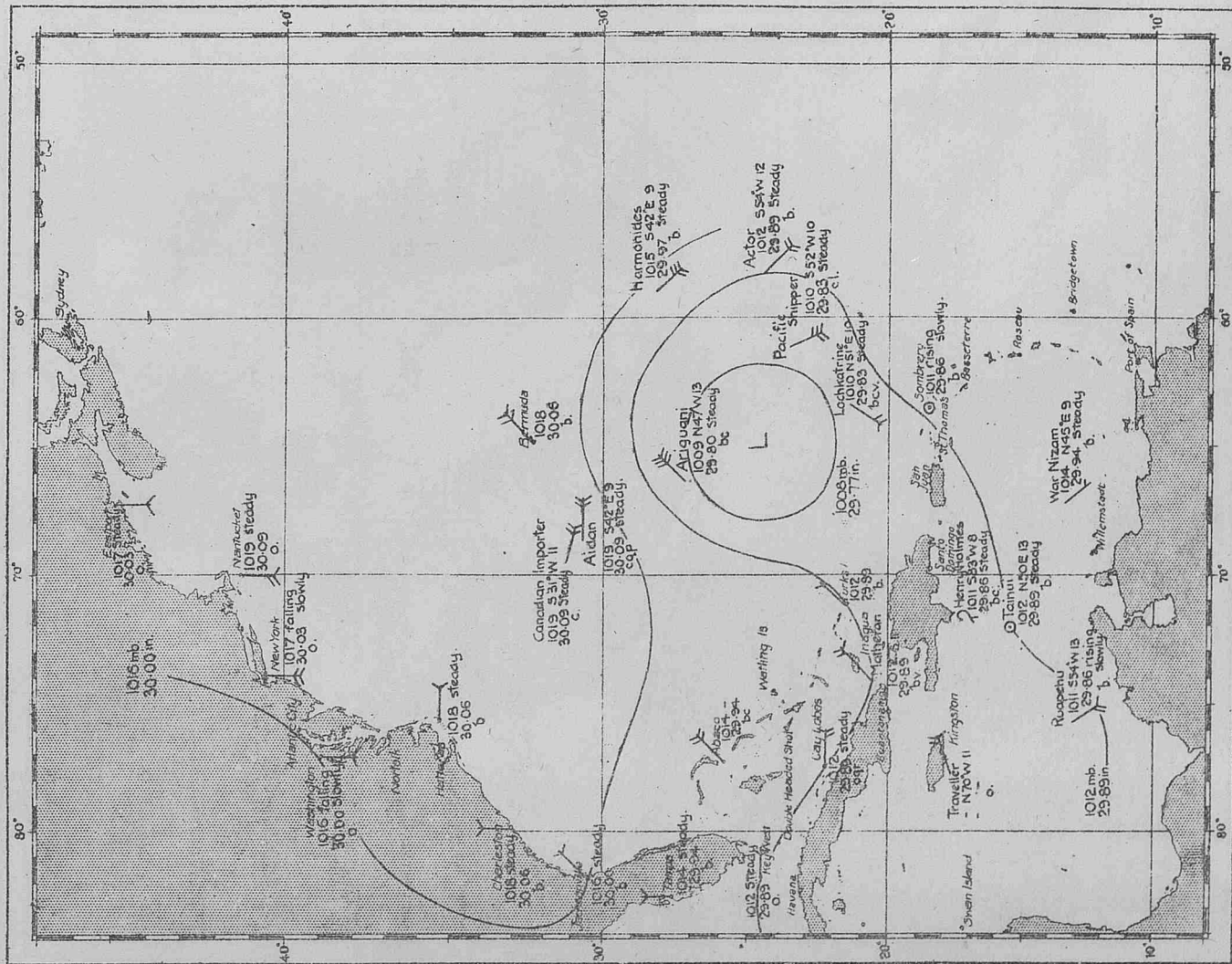
Captain HENRY ARTHUR YARDLEY, Commander of the S.S. *Aba* has retired after 35 years' service with the ELDER DEMPSTER STEAMSHIP Co.

Captain YARDLEY served his apprenticeship in the Ships, *White Rose*, *Suffolk* and *Oneida* owned by Messrs. HENRY ELLIS and SONS of London. In 1892 he joined the service of ELDER DEMPSTER & Co. Ltd. as an officer.

Obtaining command in 1898 he has since had under his charge many ships of the ELDER DEMPSTER Fleet.

A member of the corps of Voluntary Marine Observers since 1902, Marine Observers will join with the Marine Division in wishing Captain YARDLEY long life and happiness in his retirement.

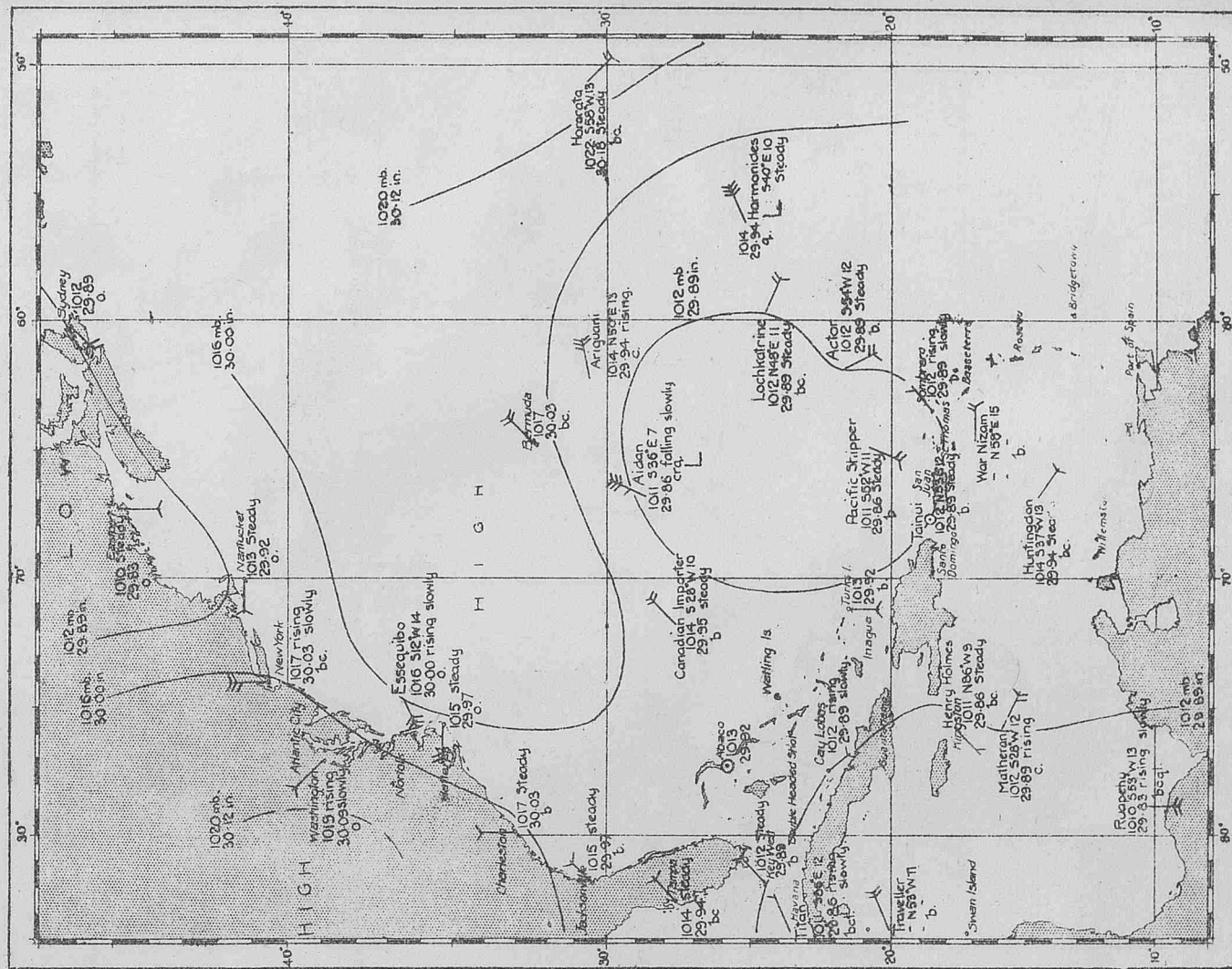
MORNING OF SEPTEMBER 9 TH., 1926.



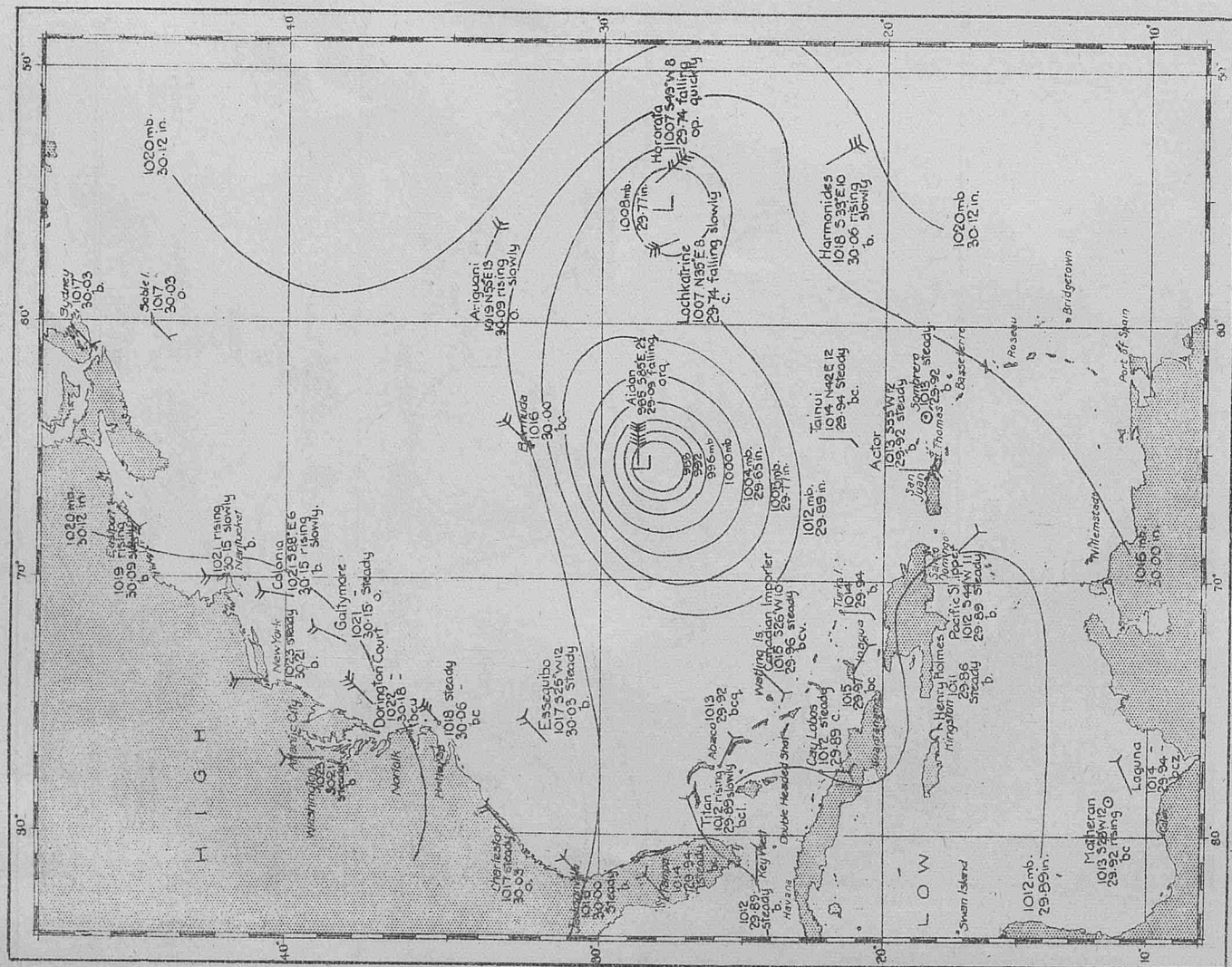
Weather Chart I.

"Hurricanes of the W. Indies & N. Atlantic in 1926."

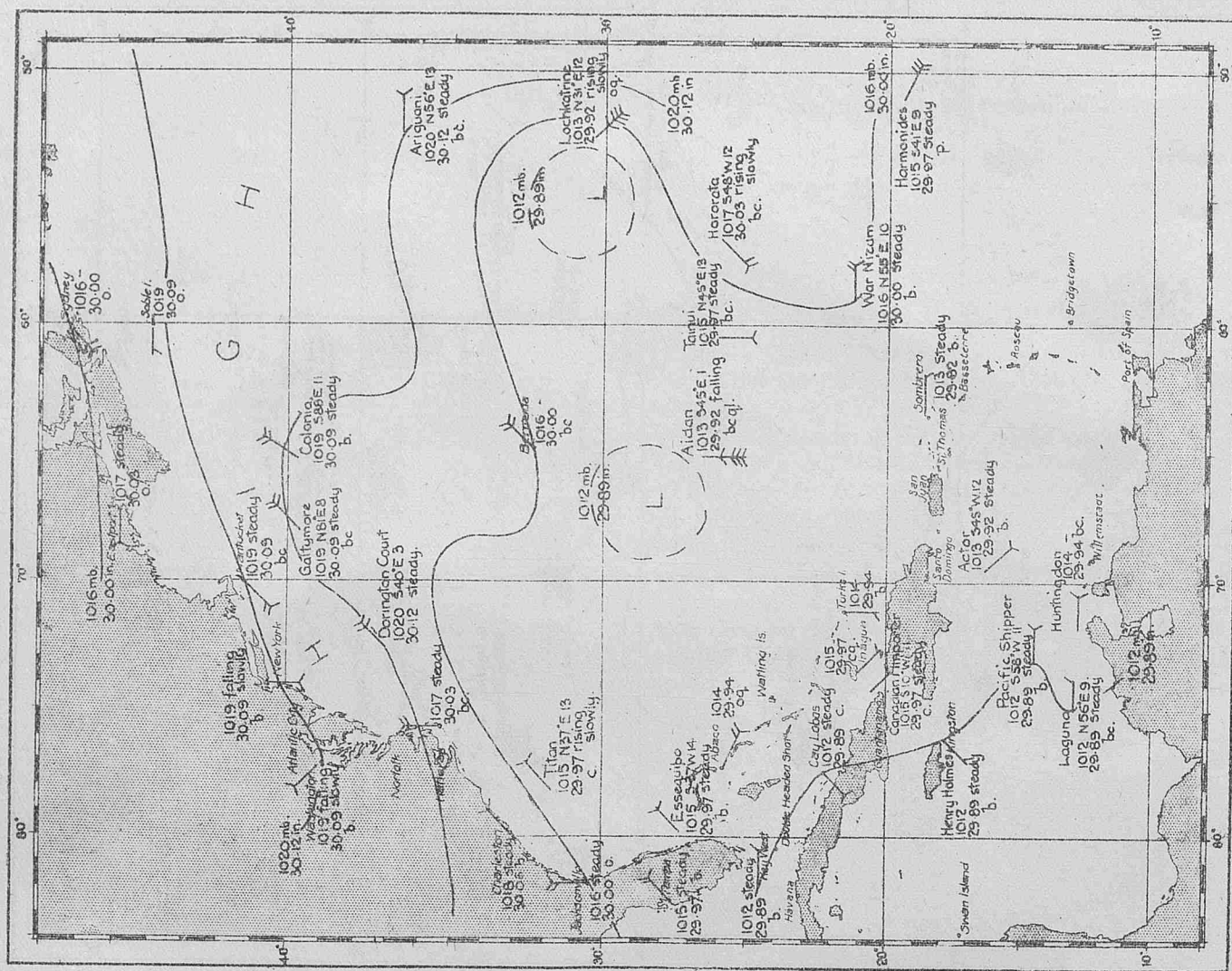
MORNING OF SEPTEMBER 10 TH., 1926.



Weather Chart II.



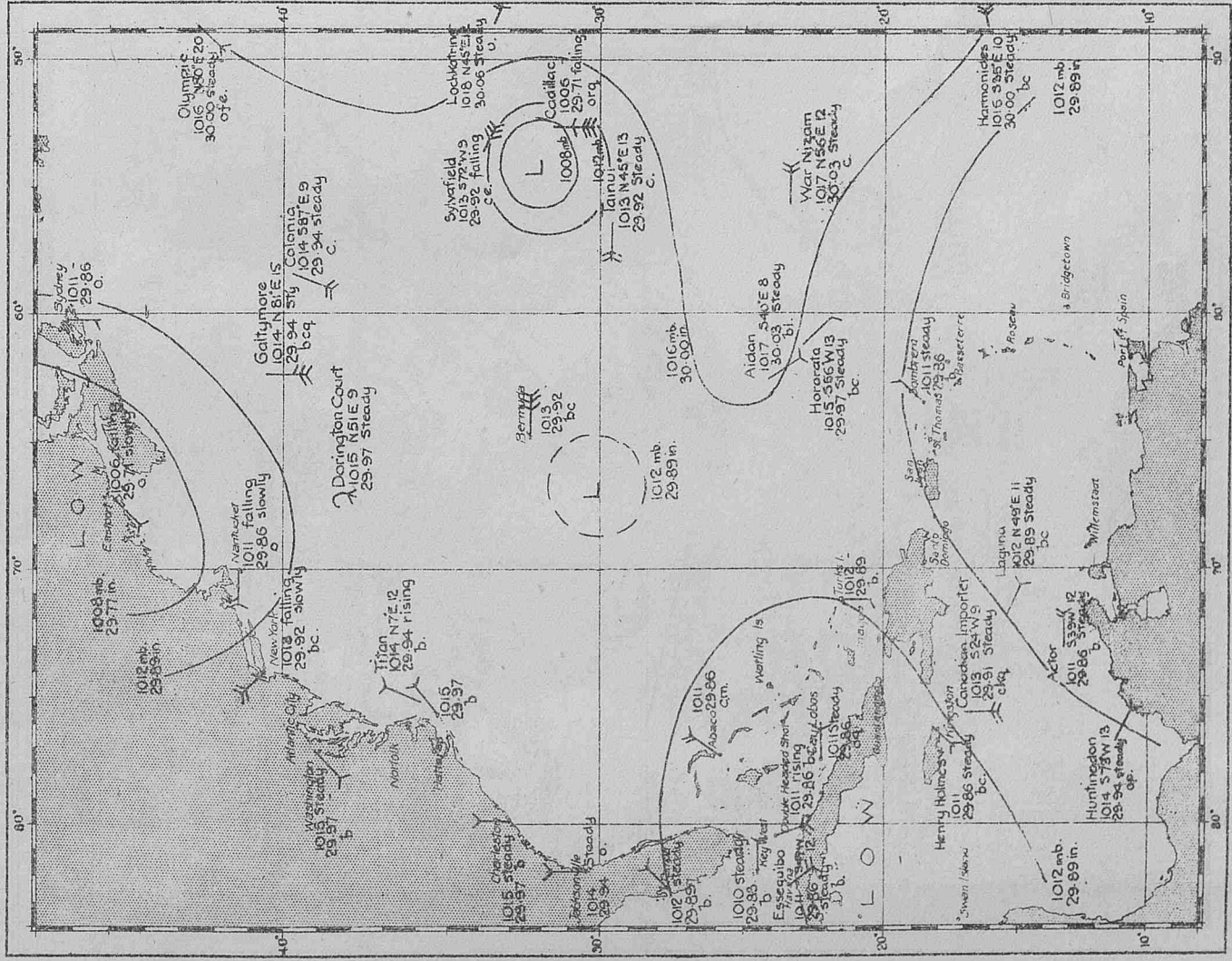
Weather Chart III.



Weather Chart IV.

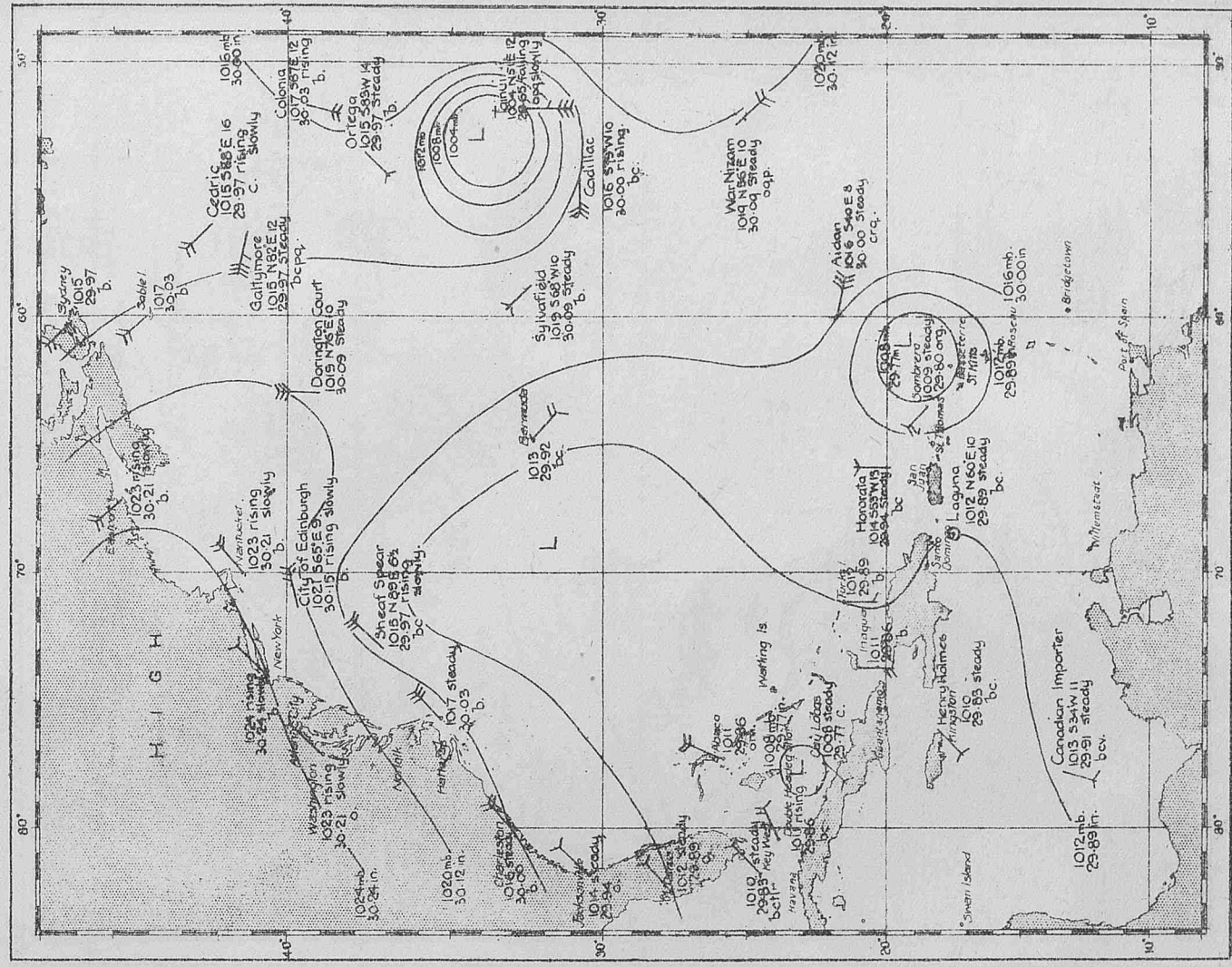
"Hurricanes of the W. Indies & N. Atlantic in 1926."

MORNING OF SEPTEMBER 13 TH., 1926.



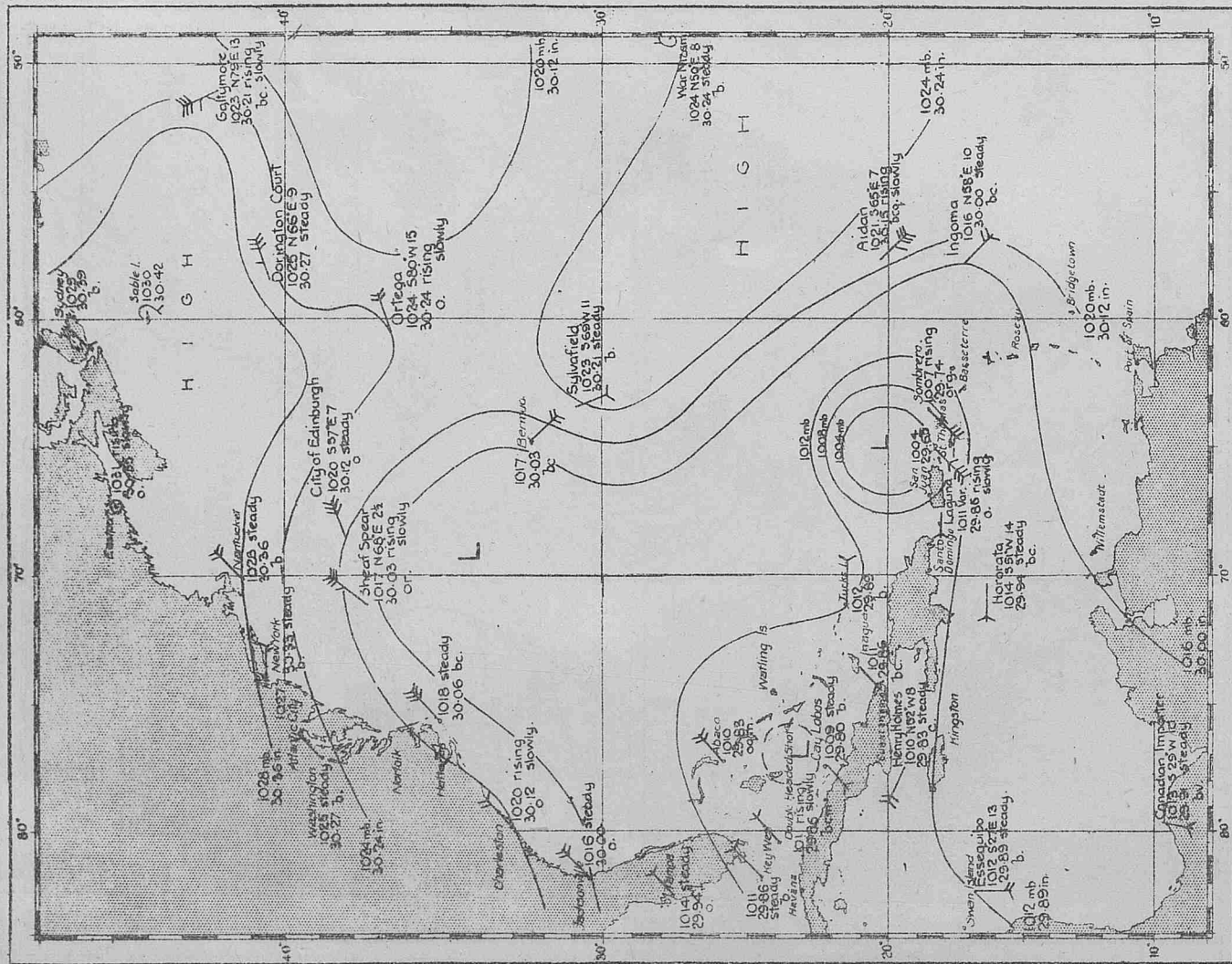
Weather Chart V.

MORNING OF SEPTEMBER 14 TH., 1926.

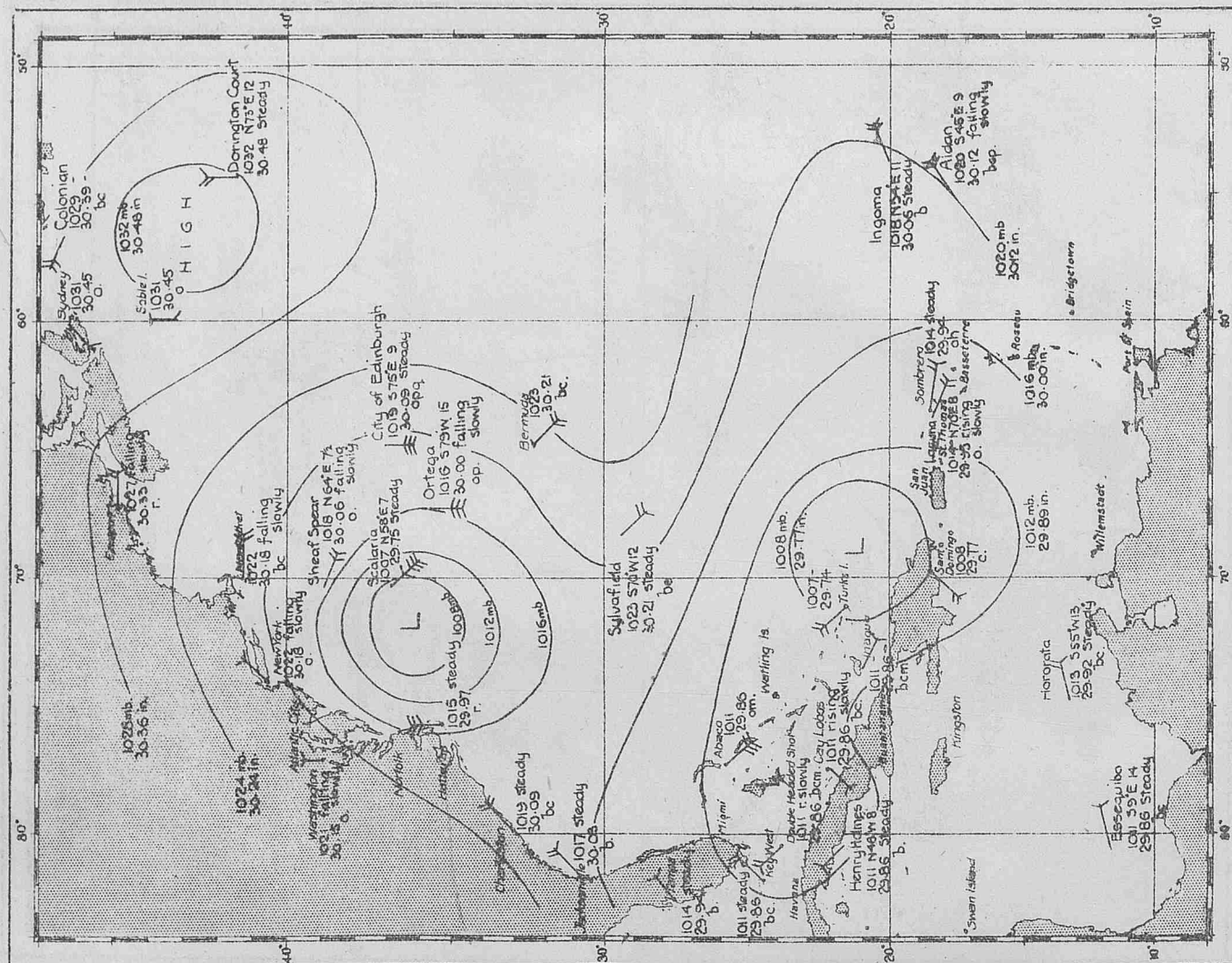


Weather Chart VI.

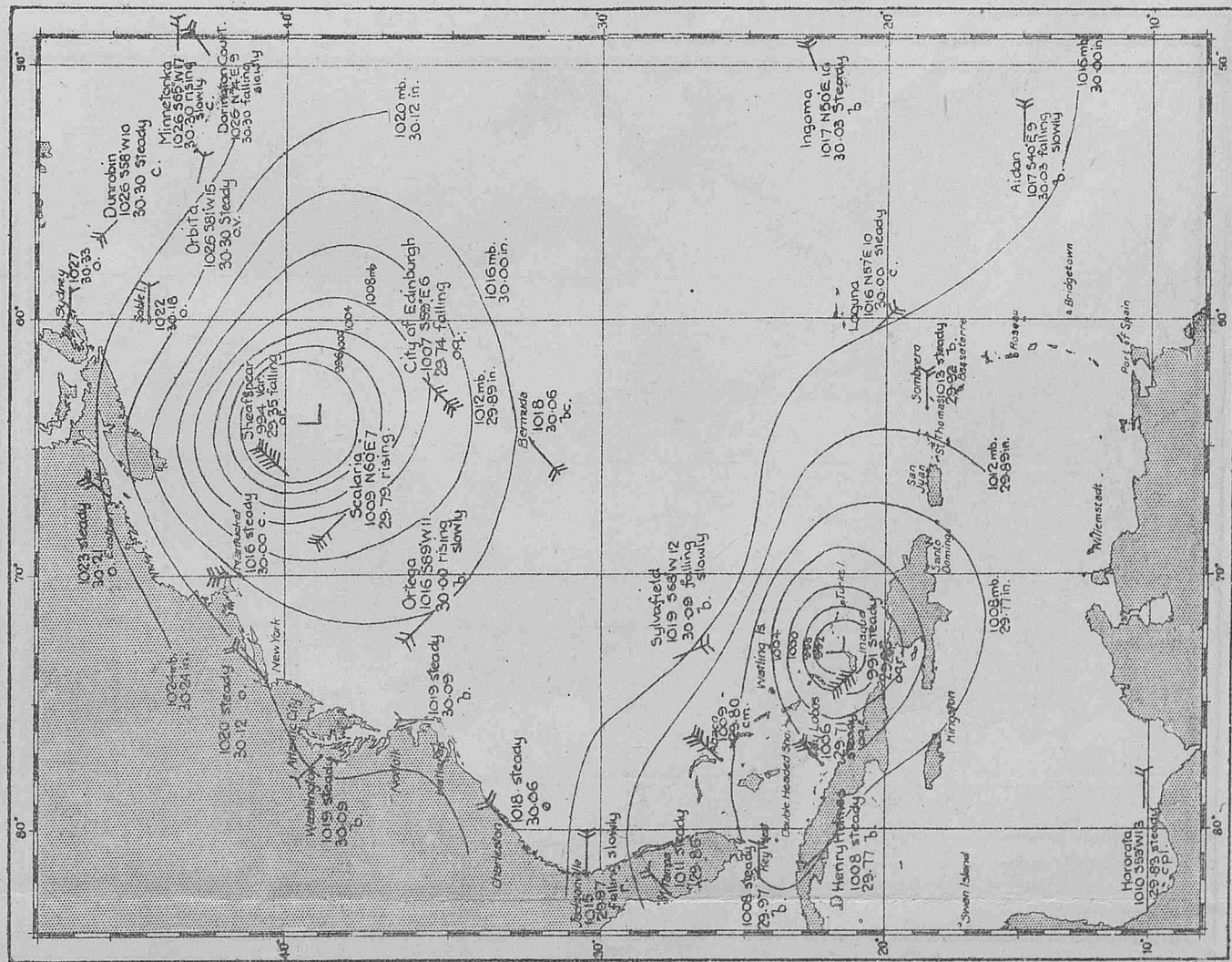
"Hurricanes of the W. Indies & N. Atlantic in 1926."



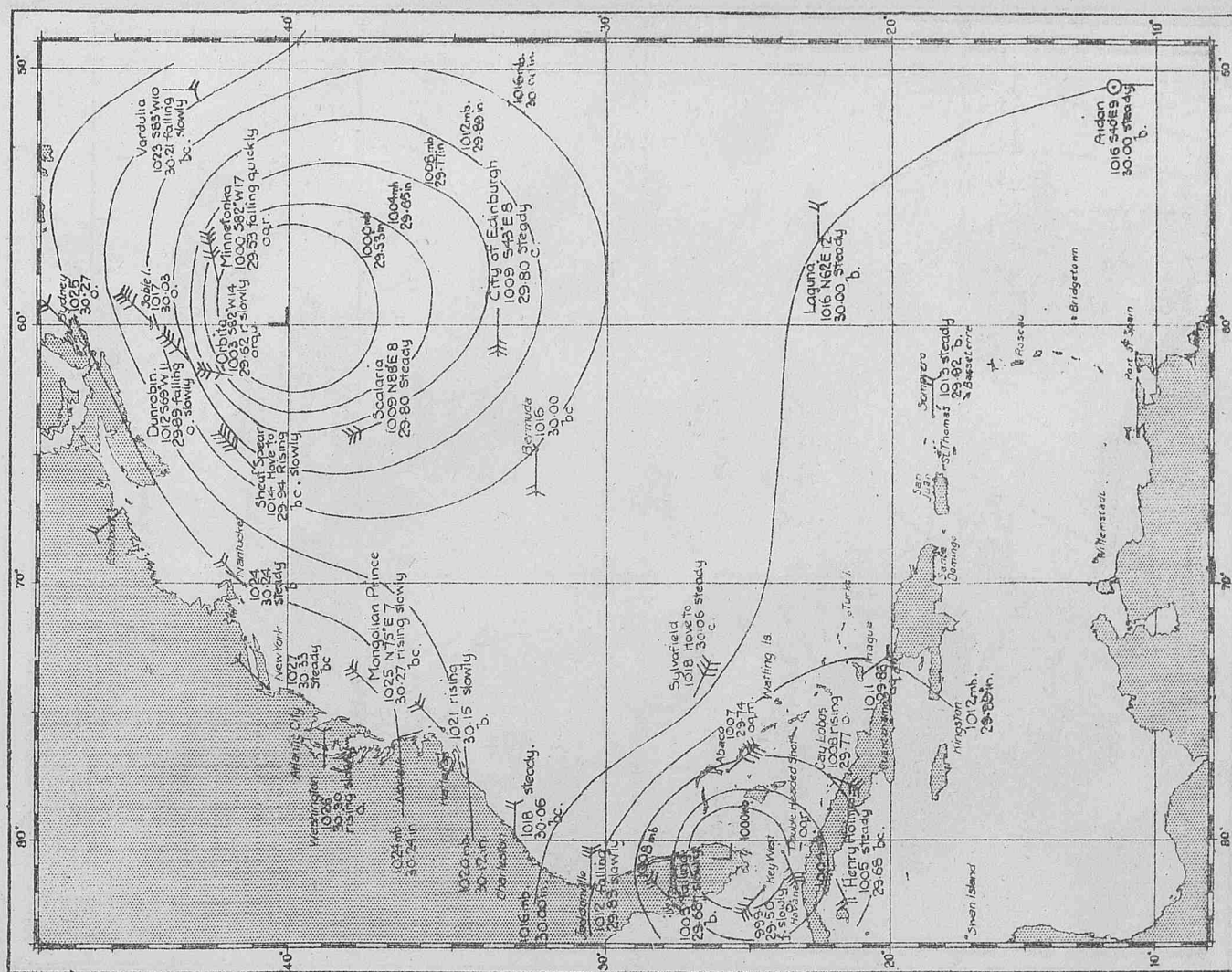
Weather Chart VII.



Weather Chart VIII.
Hurricanes of the W. Indies & N. Atlantic in 1926."



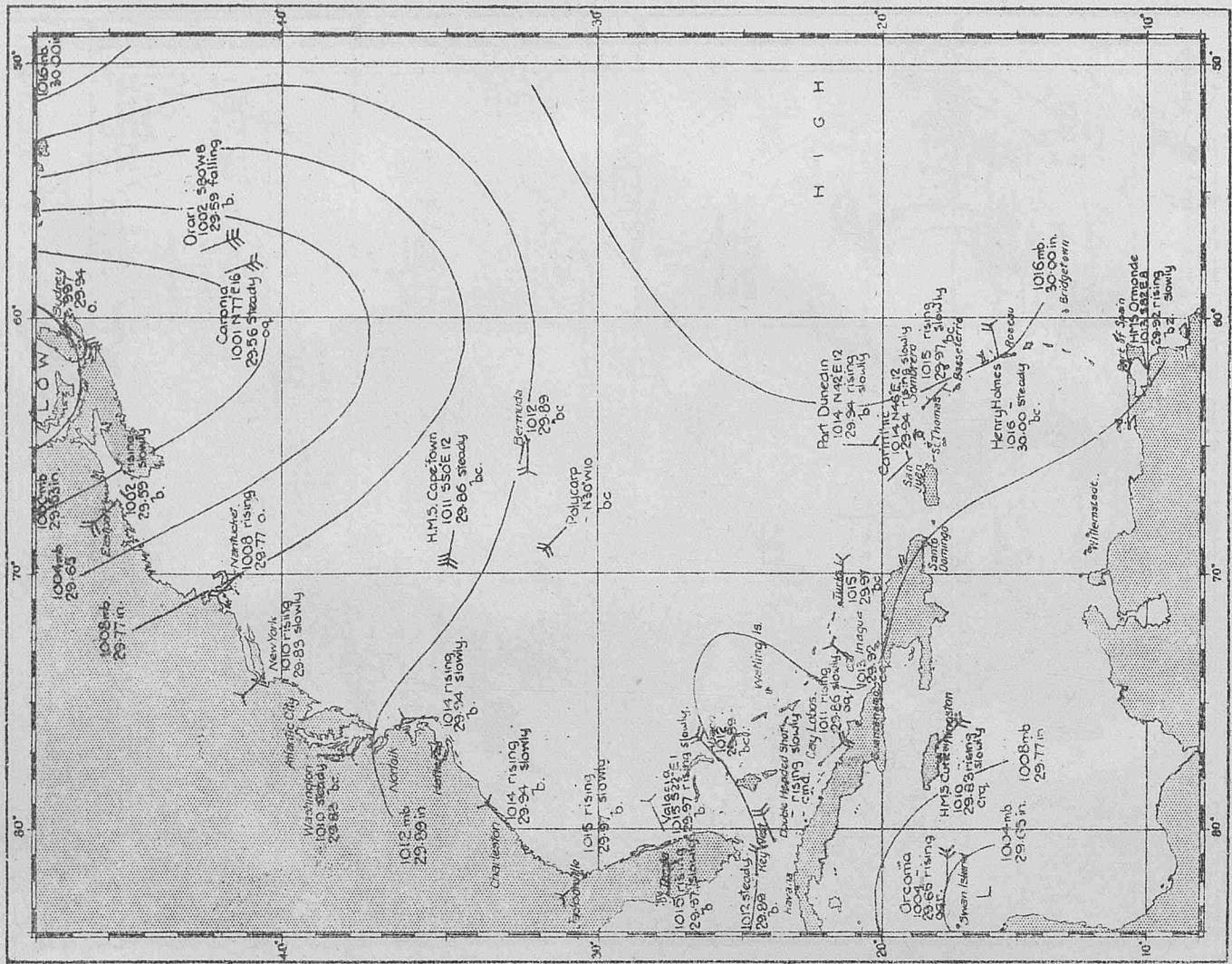
Weather Chart IX.



Weather Chart X.

"Hurricanes of the W. Indies & N. Atlantic in 1926."

MORNING OF OCTOBER 18 TH., 1926.



Weather Chart XII. "Valerian--Eastway Hurricane."

WEST INDIAN HURRICANES, SEPTEMBER 1926.

Tracks of Hurricanes I, II, III, V, and VI,

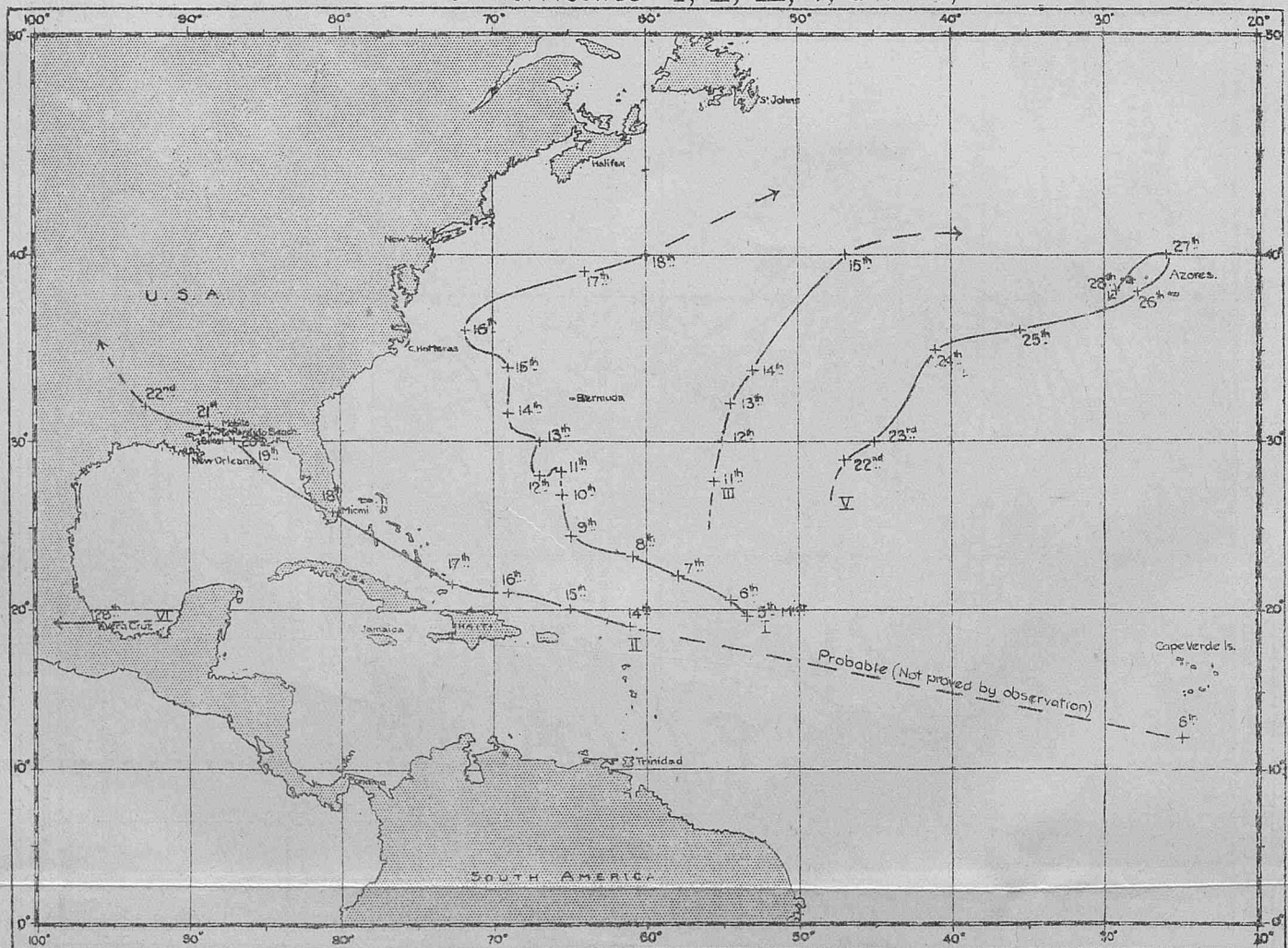
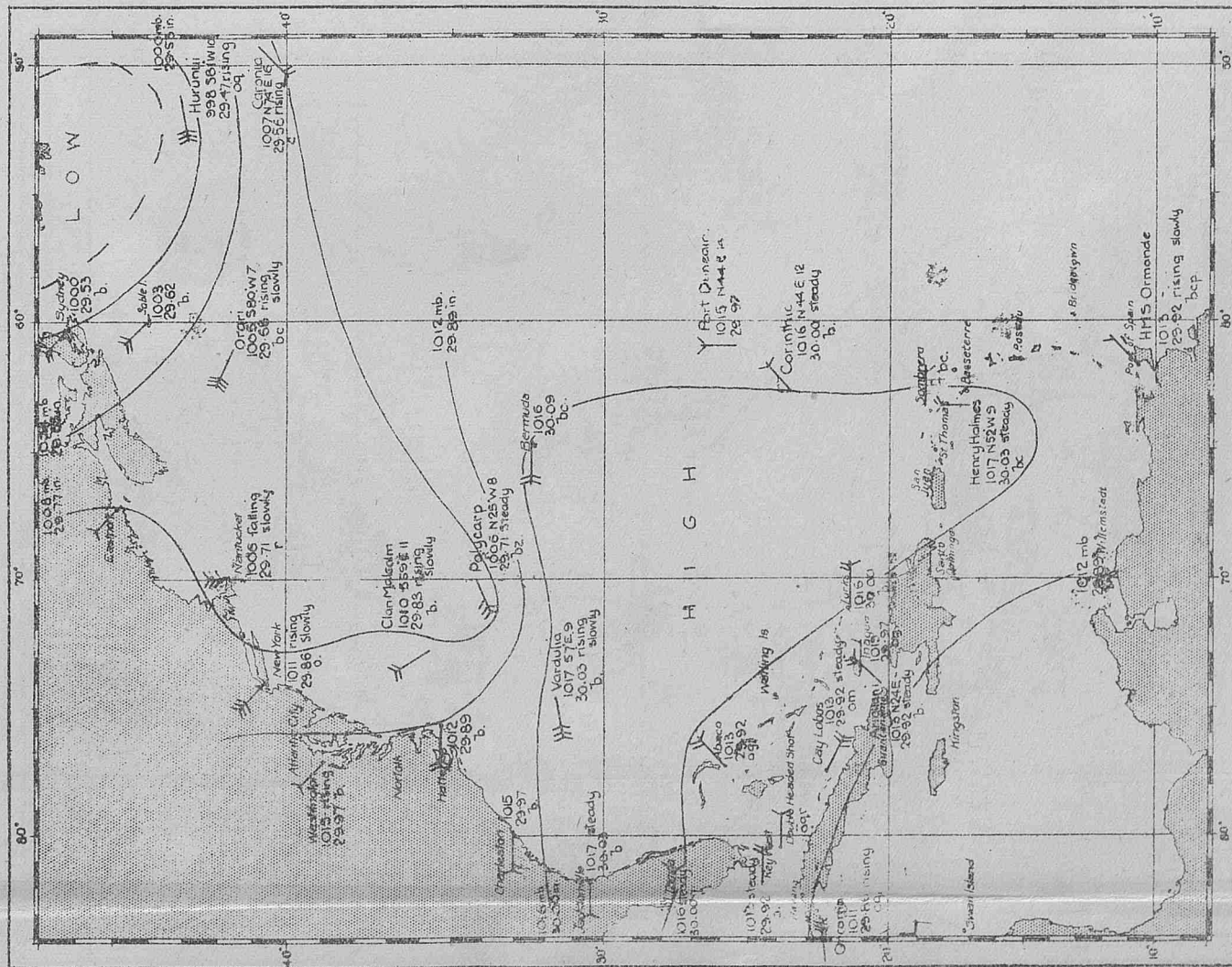


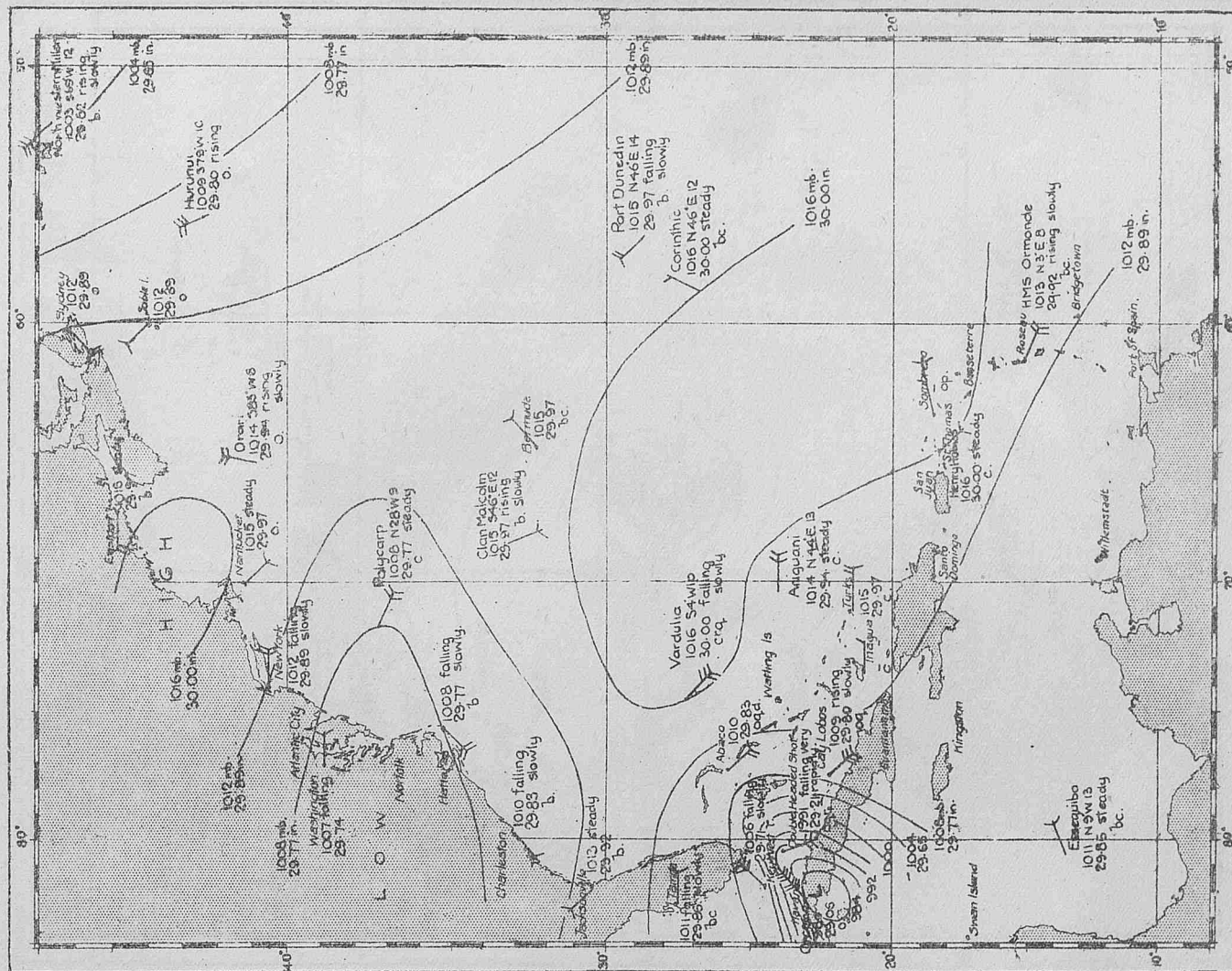
Chart XI. + Indicates position of centre at 8 a.m. unless otherwise stated

MORNING OF OCTOBER 19 TH., 1926.



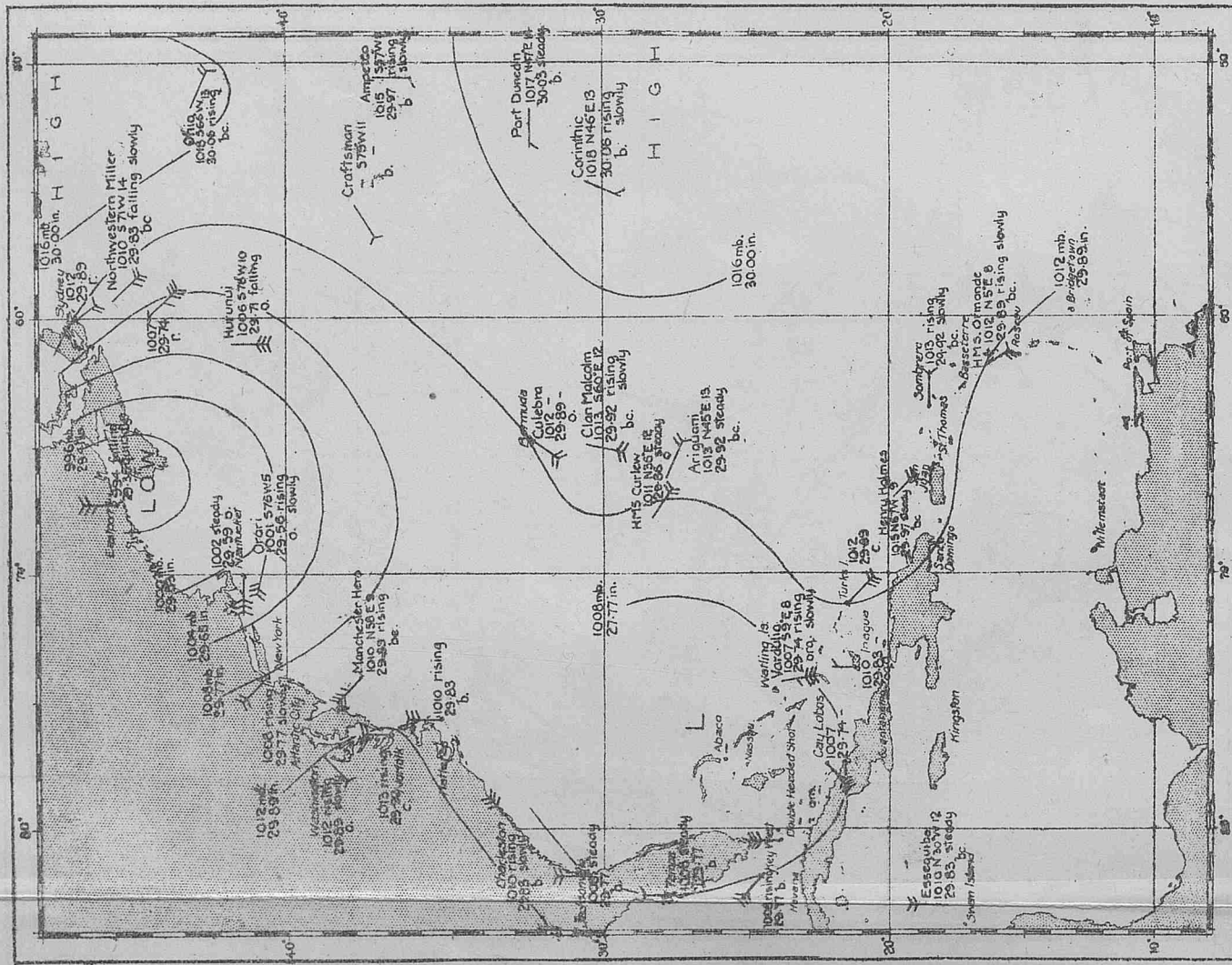
Weather Chart XIII. "Valerian - Eastway Hurricane."

MORNING OF OCTOBER 20 TH., 1926.



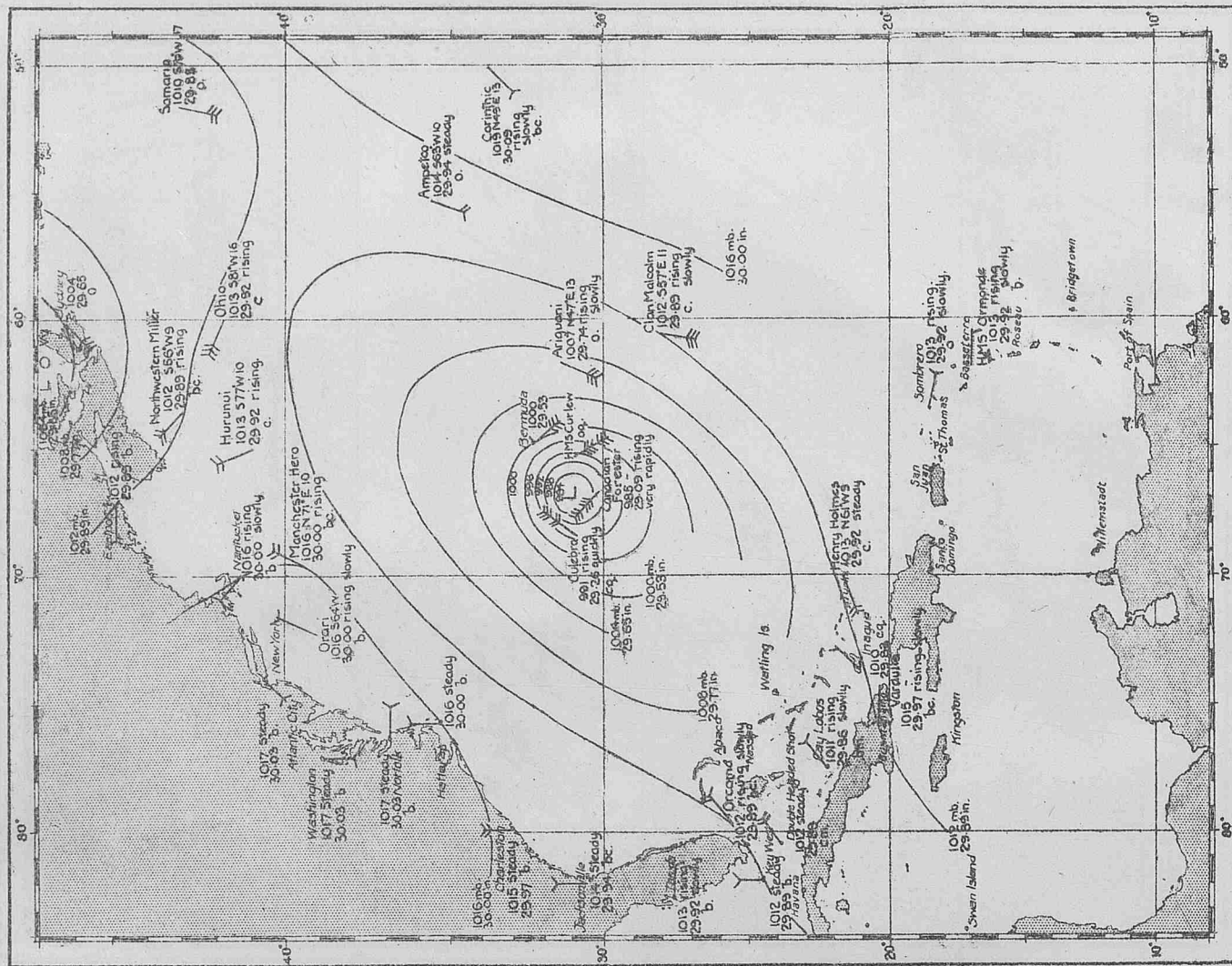
Weather Chart XIV. "Valerian - Eastway Hurricane."

MORNING OF OCTOBER 21ST, 1926.



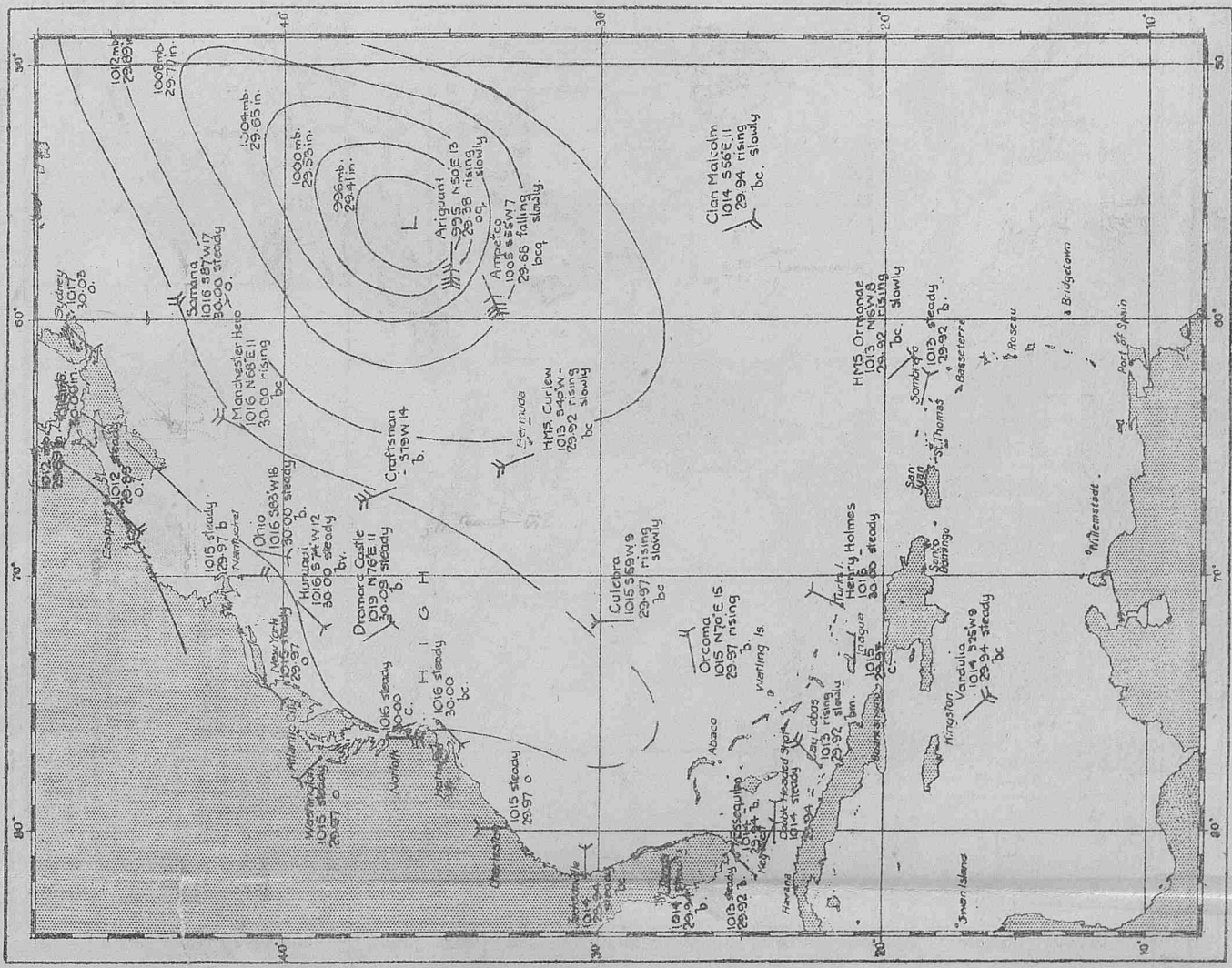
Weather Chart XV. "Valerian—Eastway Hurricane."

MORNING OF OCTOBER 22ND, 1926.



Weather Chart XVI. "Valerian—Eastway Hurricane."

MORNING OF OCTOBER 23RD., 1926.



Weather Chart XVII. "Valerian - Eastway Hurricane."

"VALERIAN - EASTWAY HURRICANE", OCTOBER 1926.

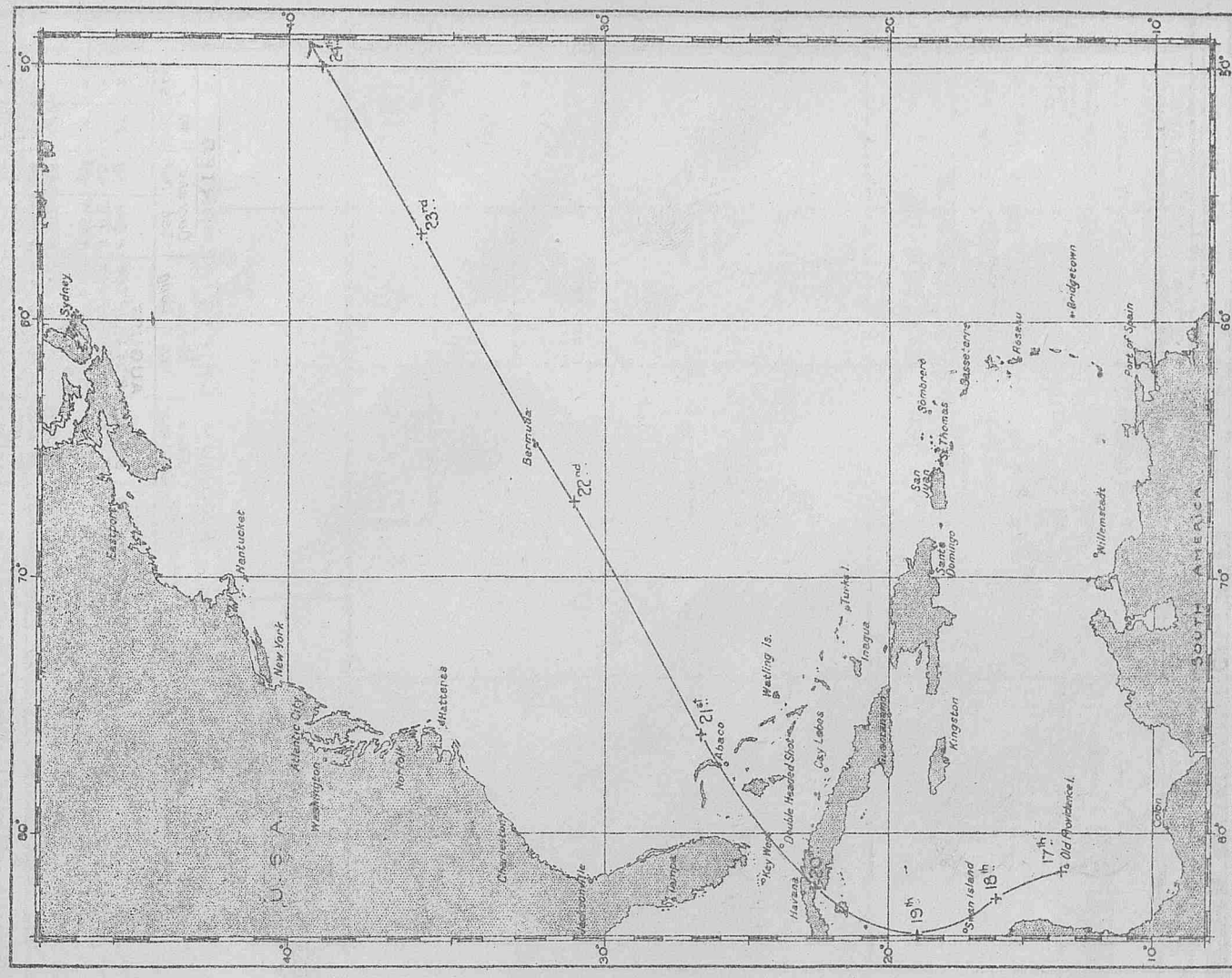


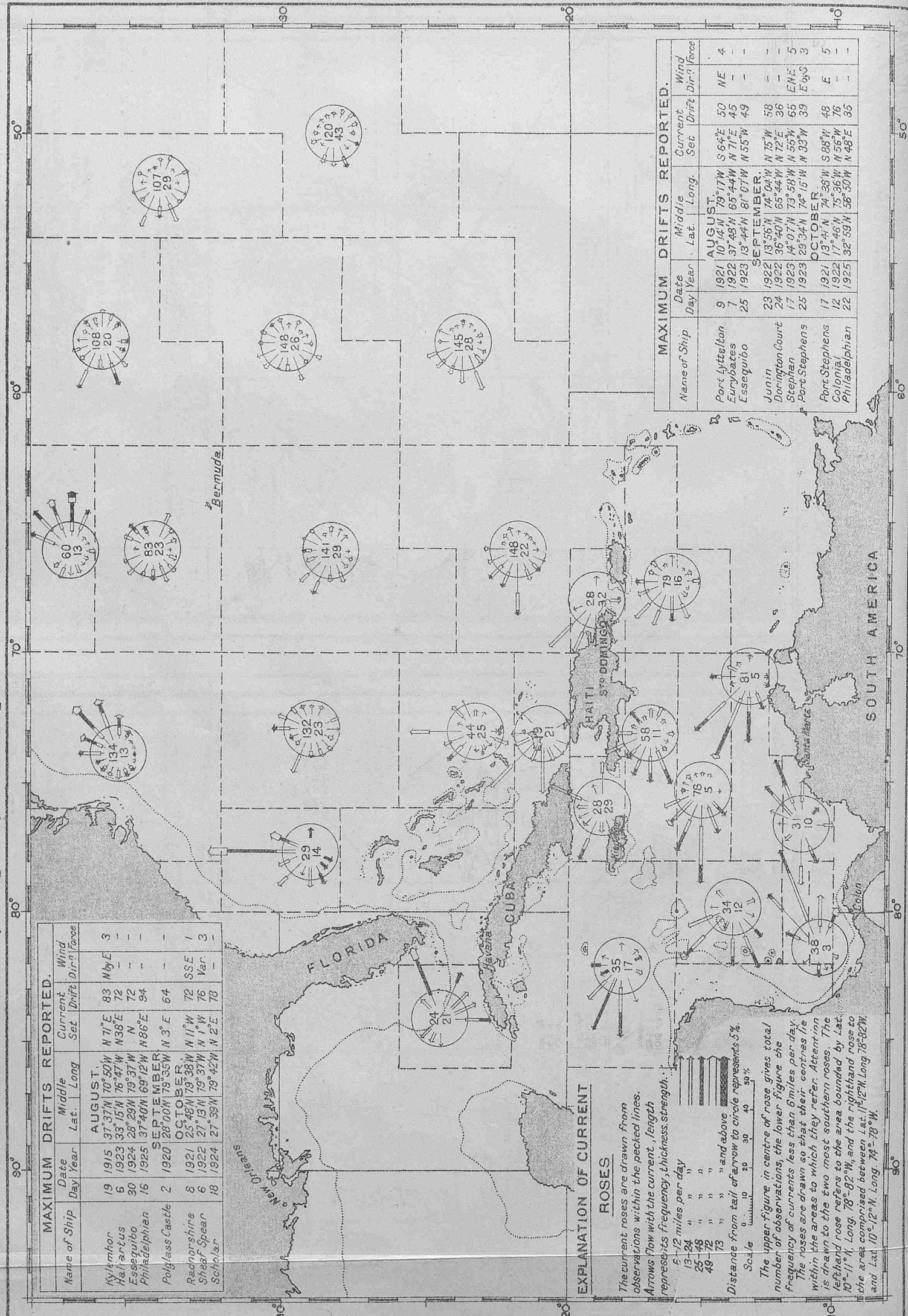
Chart XVIII. + Indicates position of centre at 8 a.m.

CURRENTS ON THE TRACKS TO AND FROM THE WEST INDIES AND PANAMA.

(WESTERN PORTION)

AUGUST, SEPTEMBER AND OCTOBER.

Observations of ships regularly observing for British Meteorological Office 1910-1925.



MAXIMUM DRIFTS REPORTED.				
Name of Ship	Date Day Year	Middle Lat. Long.	Current Set	Wind Dir. Force
AUGUST.				
Kyllamhor	19 1915	37° 37' N 70° 50' W	N 71° E	83
Hallantus	6 1923	33° 15' N 76° 47' W	N 38° E	72
Essequibo	30 1924	28° 29' N 79° 37' W	N	72
Philadelphia	16 1925	37° 40' N 69° 12' W	N 86° E	84
SEPTEMBER.				
Polyglass Castle	2 1920	28° 00' N 79° 35' W	N 3° E	64
OCTOBER.				
Radnorshire	8 1921	25° 48' N 79° 38' W	N 11° W	72
Sheaf Spear	6 1922	27° 13' N 79° 37' W	N 1° W	76
Scholar	18 1924	27° 39' N 79° 42' W	N 2° E	78

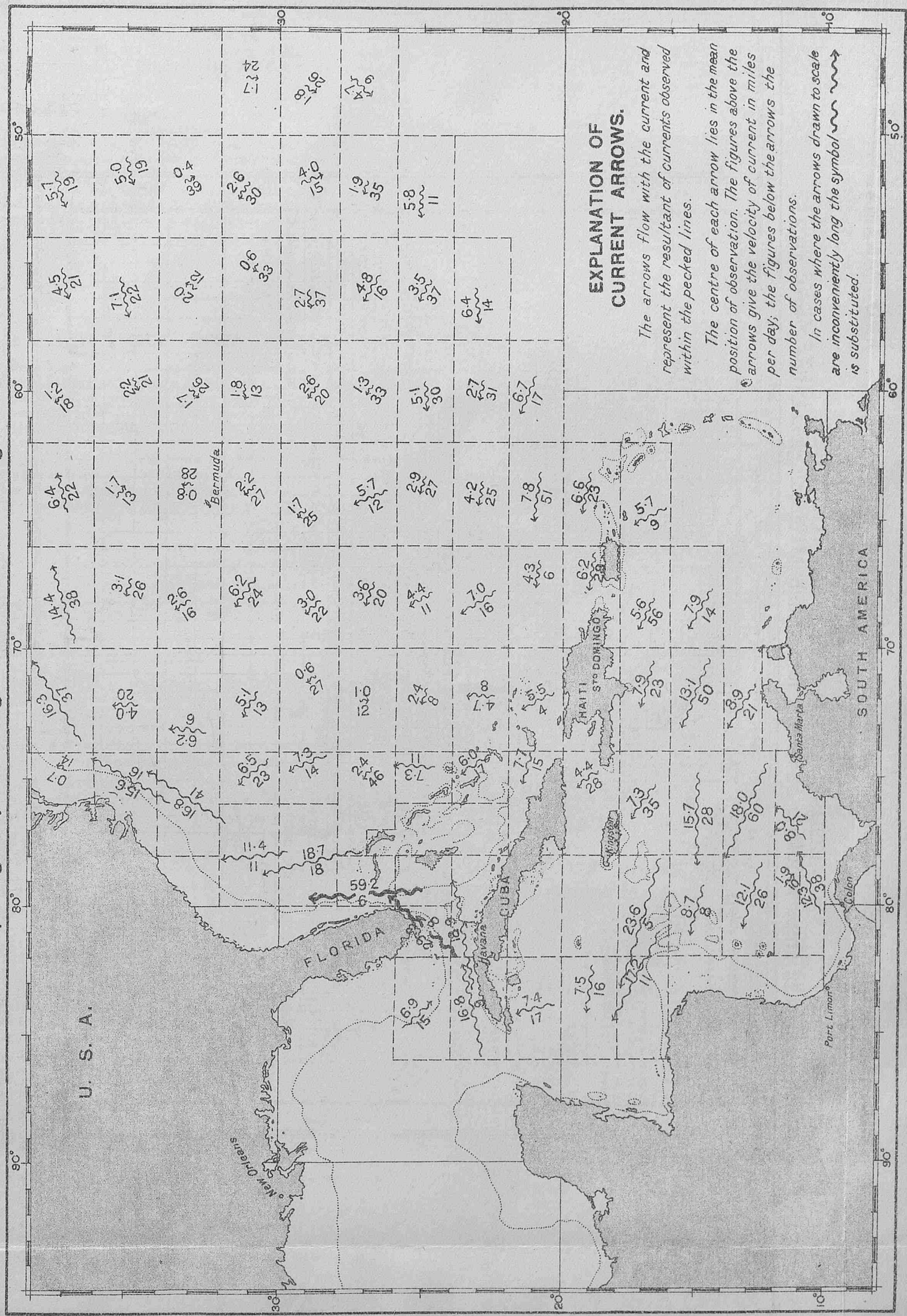
MAXIMUM DRIFTS REPORTED.				
Name of Ship	Date Day Year	Middle Lat. Long.	Current Set	Wind Dir. Force
AUGUST.				
Port Lyttelton	9 1921	10° 14' N 79° 17' W	S 64° E	50
Eurybates	7 1922	37° 48' N 65° 44' W	N 71° E	45
Essequibo	25 1923	13° 44' N 81° 07' W	N 55° W	49
SEPTEMBER.				
Junin	23 1922	13° 55' N 74° 04' W	N 75° W	58
Donington Court	24 1922	36° 40' N 65° 44' W	N 72° E	36
Stephan	17 1923	14° 07' N 73° 58' W	N 55° W	65
Port Stephens	25 1923	29° 34' N 74° 15' W	N 33° W	39
OCTOBER.				
Port Stephens	17 1921	13° 41' N 74° 38' W	S 88° W	48
Colonial	12 1922	17° 46' N 75° 36' W	N 56° W	76
Philadelphia	22 1925	32° 59' N 58° 50' W	N 48° E	35

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. 13-24 " " " " 25-48 " " " " 49-72 " " " " 73 " " " " and above Distance from tail of arrow to circle represents 5%. Scale 0 10 20 30 40 50% The upper figure in centre of rose gives total number of observations, the lower figure the 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. Attention is drawn to the two most southern roses. The left-hand rose refers to the area bounded by Lat. 10°-11° N. Long. 78°-82° W. and the right-hand rose to the area comprised between Lat. 11°-12° N. Long. 78°-82° W. and Lat. 10°-12° N. Long. 74°-78° W.

CURRENTS ON THE TRACKS TO AND FROM THE WEST INDIES AND PANAMA. (WESTERN PORTION)


AUGUST, SEPTEMBER AND OCTOBER.
Observations of ships regularly observing for British Meteorological Office 1910-1925.



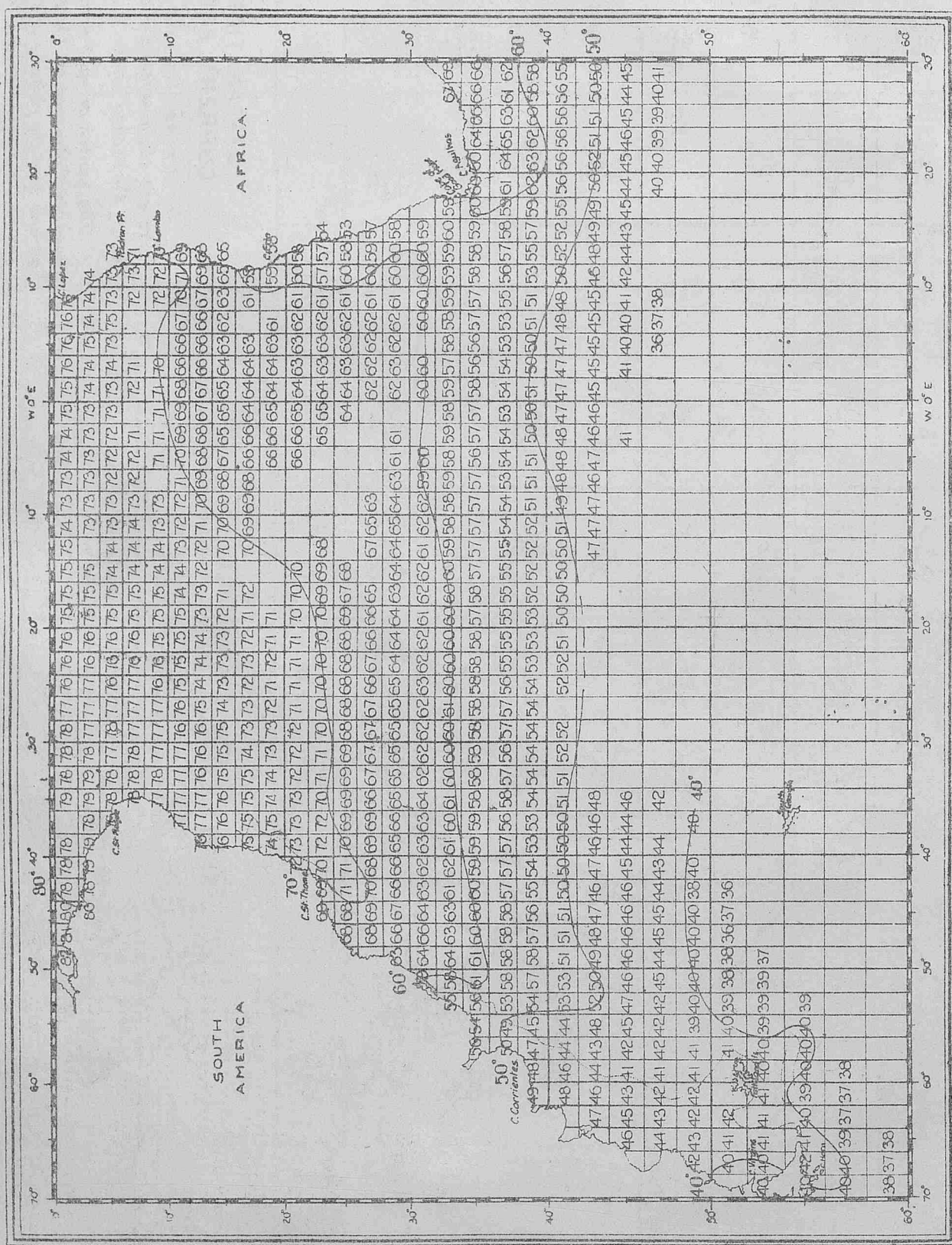
EXPLANATION OF CURRENT ARROWS.

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

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

In cases where the arrows drawn to scale are inconveniently long the symbol  is substituted.

SOUTH ATLANTIC.
MEAN SEA SURFACE TEMPERATURES FOR MONTH OF SEPTEMBER



Computed from observations of British ships during the years 1855 to 1899 except to the Southward and Eastward of Latitude 30° South and Longitude 10° East where the observations are for the years 1855 to 1878.

POSITIONS IN METEOROLOGICAL LOG.

Marine Observers can do much to facilitate data extraction and research work in the Marine Division by carefully following the instructions for keeping the Original Note Book and Meteorological Log.

Usually it is customary to enter the D.R. and observed positions at noon and at such times as the set and drift of current is determined between positions fixed by stellar observations.

For many purposes in the Marine Division we have to work out the exact position from these with the course and distance run of the position at the end of each watch when the weather is logged.

As the position is often worked out for the purpose of navigating the ship at these times it would be of great assistance if the D.R. position were entered in columns 4 and 6 when the weather observations are entered at 4 a.m., 8 a.m., 4 p.m., 8 p.m. and midnight, particularly 8 a.m.

SEA AND SWELL MEASUREMENTS.

Marine Observers are invited to make special efforts to obtain measurements of Seas and Swells in all parts of the Oceans and under all conditions of weather. These observations are required for completing scales for routine observation and for many other purposes including information upon which to base form of ship's hull and construction.

An article will be found in Volume II, No. 19, upon "Sea and Swell" giving suggestions as to how to take these observations and Form 684 has been circulated to all regular observing ships for the purpose. Further supplies of Form 684 may be had on request.

ICE REPORTS.

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

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

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.

THE BAROMETER.

Before barometer readings are compared with the normal isobars shown on the Meteorological Ocean Charts, transmitted by W/T or plotted on Weather Charts, mercurial barometers should be corrected for height, gravity, temperature and index error, for which tables are given on pp. 84 to 92 4th edition of the Marine Observer's Handbook; see also pp. 10-12, Vol. IV, No. 37, of this Journal. A table for converting inches to millibars is also given below.

Aneroids require to be corrected for height and index error only. They should be frequently compared, as the mechanism is liable to get out of adjustment without detection.

Readings of the barometer should be entered in the Meteorological Log as read—i.e., uncorrected—and the attached thermometer should also be recorded. A column is now given for the corrected reading, and it will be of great assistance if this is also completed. *which should also be entered with great care.*

While a difference from the pressure values shown on the charts does not necessarily mean unusual weather, when there is a divergence the mariner should be on the alert, particularly within cyclone regions.

It is strongly urged that Marine Observers, whether using Official or Ship's Barometers, for W/T reports, Meteorological Logs or Forms 911, will complete and send in the Blue Post Card, at least once every voyage, so that an effectual check may be kept on the index error.

BLUE POSTCARD FOR BAROMETER COMPARISON.

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

Form 913.

Barometer Error.

TEST CARD FOR BAROMETER ERROR.

To be forwarded with Logs or Reports to

Meteorological Office,
Air Ministry,
Kingsway, London

Name of Ship				Ship
Captain				Capt.
In Port of				Port
Mercurial or Aneroid				Date
Maker's Name and No.				Bar. No.
Height above Mean Sea Level .....ft.				..... } Too high
				..... } Too low
Date 192	Time.	Barometer readings.	Attached Therm.	At
				Date
				This counterfoil will be returned to Ship.

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

CONVERSION TABLE.

To Convert Inches into Millibars.

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

ICE CHART. WESTERN NORTH ATLANTIC.

LETTERS OF TRANSATLANTIC TRACKS INDICATE

- (C) From 1st September to 31st January, inclusive.
- (F) From 16th May to Opening of Belle Isle route, and to 30th November when not using Belle Isle route.
- (F) Westbound, on approaching Cape Race steer a course to pass 10 miles S. of Cape Race.
- (F) Eastbound, steer from position 25 miles S. of Cape Race.
- (G) From the opening of the Straits of Belle Isle to 14th November.

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

ROUTE NOTICES.

For latest information re Tracks see pages 78-9, Vol. IV. No. 40, of this Journal.

SYMBOLS USED ON THE CHART

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

PHENOMENAL DRIFTS OF ICE.

Date.	Ship or Source of Report.	Position. Lat. Long.	Remarks.
Sept. 2, 1893	Bark Oliveette	35°40' N. 30°00' W.	Lump of ice.
" 1895	S.S. Gulf of Taranto	36°35' N. 71°36' W.	2 bergs 30 ft. high, 200-400 ft. long, and much field ice over 2 miles area.
" 19, 1906	S.S. Lord Lansdowne	54°20' N. 22°00' W.	Small berg 20 ft. by 6 ft.
" 10, 1908	S.S. Deutschland	45°28' N. 27°18' W.	2 small bergs and 1 large.
" 6, 1920	U.S. Hyd. Bulletin	47°10' N. 38°04' W.	Bergs.
" 2, 1922	S.S. Halliard	50°00' N. 40°05' W.	Berg.
" 15, 1922	S.S. Empress of Britain	52°52' N. 40°12' W.	Large berg.
" 3, 1923	S.S. Djambi	40°10' N. 31°38' W.	Piece of ice, about 30 ft. long, 14 ft. out of water.

Reports of Ice sighted between July 1st and July 31st, 1927, 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.

DISCONTINUANCE OF INTERNATIONAL ICE PATROL SERVICE.

The International Ice Patrol Service was discontinued for the season on June 25th, 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 pages 15 and 17 of Vol. IV. No. 37.

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.	
BALTIC.			
20.7.27	2 miles S.W. of Svensen Bjorn Light Vessel.		Swedish brig <i>Gerda</i> drifting, abandoned by the crew.
NORTH SEA.			
2.7.27	51°14'N. 2°07'E.		Heavy floating object, resembling a pontoon, dangerous to navigation.
2.7.27	51°11'N. 1°38'E.		Spar attached to wreckage.
4.7.27	E. & S., 3 miles from West Hinder Light Vessel.		Drifting open boat 6 metres long.
8.7.27	51°35'N. 2°04'E.		Two spars about 25 feet long, quarter mile apart, one covered with green slime.
24.7.27	51°43'N. 2°20'E.		Floating wreckage consisting of heavy upright spar.
ENGLISH CHANNEL.			
2.7.27	2 miles 157° (true) from East Goodwin Light Vessel.		Spar 4 feet above water, apparently attached to wreckage. Dangerous to navigation.
3.7.27	48°55'N. 5°05'W.		Bulk of timber, 30-35 feet long and about 2½ feet diameter.
13.7.27	50°42'N. 0°16'W.		Ketch abandoned, on fire.
14.7.27	51°08'N. 1°51'E.		Pontoon awash.
14.7.27	14 miles West of the dyck (Dunkerque Castellan).		Raft adrift, dangerous to navigation.
24.7.27	10½ miles S. by E. & E. (magnetic) from Owers Light Vessel.		Small flat bottom boat, grey top and red bottom, one oar inside, adrift.
24.7.27	10 miles South of Start Point.		Two spars projecting 10 feet, apparently attached to submerged wreckage.
IRISH SEA.			
14.7.27	3 to 4 miles off Heads of Ayr.		Heavy pieces of timber, dangerous to navigation.
MEDITERRANEAN.			
4.7.27	40°57'N. 2°42'E.		Iron cylindrical object. Dangerous to navigation.
NORTH ATLANTIC.			
3.7.27	40°32'N. 71°09'W.		Mast about 60 feet long and 2½ feet diameter, floating horizontally with rigging attached.
3.7.27	39°16'N. 72°50'W.		Mast of a schooner apparently attached to submerged wreckage.
4.7.27	43°51'N. 60°43'W.		Menace to navigation in the form of stationary wreckage with one mast visible.
9.7.27	36°37'N. 73°28'W.		Heavy raft, about 20 feet long by 15 feet wide.
12.7.27	40°04'N. 10°59'W.		Large spherical buoy, painted black. Dangerous to navigation.
18.7.27	37°26'N. 11°38'W.		Iron cylindrical wreckage emerging about 12 feet, dangerous to navigation.
18.7.27	49°06'N. 7°36'W.		Log 12 feet long by 4 feet in diameter.
18.7.27	52°30'N. 11°55'W.		Number of large baulks of timber afloat, dangerous to navigation.

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

LONDON ... Captain L. A. BROOKE SMITH, R.D., R.N.R., Marine Superintendent.
 Commander J. Hennessy, R.D., R.N.R., Senior Nautical Assistant.
 Room 319, Adastral House, Kingsway, W.C.2.
 (Telephone No.: Holborn 3434 Extension 421).
 Nearest station Temple, District Railway.
 Mr. W. T. GRIEVES, Visiting Officer for the Port of London.

LIVERPOOL ... Lieut. Commander M. CRESSWELL, R.N.R., Port Meteorological Officer, Dock Office.
 (Telephone No.: Bank 8959).

Agents.

BELFAST ... Captain J. MCINTYRE, Harbour Master, Harbour Office.
 (Telephone No.: Belfast 4090).
CARDIFF ... Captain T. JOHNSTON, Technical College, Cathays Park.
CLYDE ... Captain M. C. CORRANCE, Board of Trade Surveyor's Office, 73, Robertson Street, Glasgow.

Agents (contd.).

FREMANTLE, W. Australia. Captain J. J. AIREY, Deputy Director of Navigation, Dalgety's Buildings.
HONG KONG, China. Lieut. Commander O. C. G. LEVESON-GOWER, R.N., Superintendent, Admiralty Chart and Chronometer Depot, H.M. Dockyard.
HULL ... Captain Geo. B. STURDY, c/o Mr. W. HAKES, Commercial Road.
LEITH ... Captains G. BLACK and C. G. BONNER, V.C., D.S.C., Leith Salvage and Towage Co., Ltd., 2, Commercial Street.
SOUTHAMPTON Captain D. FORBES, Nautical Academy, 1, Albion Place.
SYDNEY, New South Wales. Commander G. D. WILLIAMS, D.S.O., R.D., R.N.R., Deputy Director of Navigation, Customs House.
TYNE ... Captain J. J. McEWAN, Marine School, South Shields.
VANCOUVER, British Columbia. Mr. T. S. H. SHEARMAN, Room 40, Post Office Building.

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 15.7.27.	Date Received.
<i>Aba</i> ...	Hughes, J. ...	S. J. Bristowe, O. E. Jones, C. Spark.	M.L.	Elder Dempster ...	Met. Log. 13.10.26 to 12.3.27...	17.3.27.
<i>Abinsi</i> ...	Millson, H. E. ...	E. W. Bascombe ...	No. A.	" " ...	Form 911 29.12.26 to 23.2.27...	3.3.27
<i>Achilles</i> ...	Wilson, C. A. ...	A. Gillard, A. M. Wright, F. B. Allen.	M.L.	A. Holt " ...	Met. Log. 27.12.26 to 1.5.27 ...	10.6.27
<i>Actor</i> ...	Haylett, E. ...	A. Frew, J. McKay, G. Morrice.	"	Harrison ...	" 9.1.27 to 7.4.27 ...	21.4.27
<i>Adda</i> ...	Toft, J. T. ...	A. E. Longlen ...	M.L.	Elder Dempster ...	Form 911 11.5.27 to 19.6.27 ...	22.6.27
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. 30.5.27 to 18.6.27 ...	21.6.27
<i>Aeneas</i> ...	Wallace, W. K. ...	J. M. Anderson ...	No. A.	A. Holt ...	Form 911 6.4.27 to 5.5.27 ...	24.6.27
<i>Agapenor</i> ...	Ramsay, J. ...	S. G. Ellams ...	" A.	" ...	" 4.5.27 to 19.5.27 ...	20.6.27
<i>Aidan</i> ...	Pym, J. ...	J. Whayman ...	" A.	Booth ...	" 10.3.27 to 22.3.27 ...	4.5.27
<i>Alban</i> ...	Whayman, W. R. ...	S. E. Adams ...	" A.	" ...	" 9.3.27 to 26.4.27 ...	11.5.27
<i>Alipore</i> ...	Harrison, R., D.S.O., R.D., Captain, R.N.R.	" ...	" M.	P. and O. ...	" 2.3.27 to 5.5.27 ...	30.5.27
<i>Almanzora</i> ...	Clarke, E. C. ...	D. O. Llewellyn ...	" A.	R.M.S.P. ...	" 14.5.27 to 27.6.27 ...	29.6.27
<i>Albantic</i> ...	Parker, W. H., C.B.E., R.D., Capt. R.N.R.	J. Farrell ...	" A.	White Star ...	" 23.4.27 to 10.6.27 ...	14.6.27
<i>Alondra</i> ...	Prendergast, J. J. ...	H. Peters ...	" A.	Yeoward ...	" 4.6.27 to 26.6.27 ...	28.6.27
<i>Ampetco</i> ...	Vandenkerckhove, A. ...	L. Brachs ...	" A.	American Petroleum ...	" 17.5.27 to 18.6.27 ...	5.7.27
<i>Andalucia</i> ...	Thomas, R. J. ...	R. A. Winne ...	" M.	Blue Star ...	" 12.5.27 to 26.6.27 ...	6.7.27
<i>Anchises</i> ...	Woodgett, R. J. ...	" ...	" A.	A. Holt ...	Form 911 27.3.27 to 15.4.27 ...	9.5.27
<i>Andes</i> ...	Smith, W. E. ...	" ...	" M.	R.M.S.P. Co. ...	" 2.4.27 to 16.5.27 ...	18.5.27
<i>Antiochus</i> ...	Clark, J. W. ...	R. W. Trethewey ...	" A.	A. Holt ...	" 26.5.27 to 12.6.27 ...	23.6.27
<i>Aorangi</i> ...	Crawford, R. ...	G. H. Kime, E. Anderson, C. G. Eustace, D. Richards.	M.L.	Canadian-Australasian ...	Met. Log. 15.12.26 to 26.5.27 ...	16.6.27
30 <i>Aquitania</i> ...	Charles, Sir J. T. W., K.B.E., C.B., R.D., Commr. R.N.R.	F. P. Collins, J. Locke, D. MacLean.	W.T.	Cunard ...	W.T. Reg. 12.6.27 to 26.6.27 ...	4.7.27
62 <i>Arabic</i> ...	Harvey, H. ...	W. F. Jackman, J. M. Appleby, W. Jenkins.	"	White Star ...	" 5.6.27 to 24.6.27 ...	28.6.27
<i>Arafura</i> ...	Gordon, A. S. ...	G. C. Smith, R. Lloyd Harry, C. G. Knight, B. W. Dun.	M.L.	Eastern and Australian ...	Met. Log. 28.1.27 to 26.4.27 ...	18.6.27
<i>Arawa</i> ...	Summers, W. G. ...	" ...	"	Shaw, Savill and Albion ...	" ...	"
<i>Archimedes</i> ...	Downs, E. B. ...	E. R. Hartley ...	No. A.	Lamport & Holt ...	Form 911 30.4.27 to 12.5.27 ...	1.6.27
<i>Argyllshire</i> ...	Wallace, J. ...	J. M. Crone ...	" M.	Federal ...	" 22.4.27 to 12.5.27 ...	2.6.27
<i>Ariguani</i> ...	Scudamore, J. H. H., D.S.O., R.D., Commr. R.N.R.	J. W. Kendal ...	M.L.	Elders & Fyffes ...	Met. Log. 15.1.27 to 14.5.27 ...	4.7.27
<i>Armadaile Castle</i> ...	(Owen, S. H., Imlah, C. B. ...	A. B. Connon, G. D. Pennick, L. G. May.	"	Union Castle ...	" 31.10.26 to 24.4.27 ...	9.5.27
<i>Arracan</i> ...	Willis, M. ...	R. McInnes, G. B. Christie, C. C. Weir.	"	P. Henderson ...	" 22.5.26 to 3.12.26 ...	4.4.27
<i>Arundel</i> ...	Short, H. ...	Mr. Hill ...	C.C.	Southern Rly. ...	Telegraphic Report 1.7.27 ...	1.7.27
<i>Arundel Castle</i> ...	George, J., O.B.E. ...	H. G. Leach, L. G. May ...	No. A.	Union Castle ...	Form 911 20.5.27 to 10.7.27 ...	12.7.27
<i>Astronomer</i> ...	Richards, J. ...	A. Brown, J. Glen, A. Thompson.	M.L.	Harrison ...	Met. Log. 22.1.27 to 20.6.27 ...	28.6.27
<i>Ascanius</i> ...	Agnew, J. ...	" ...	" A.	A. Holt ...	" ...	"
<i>Athenic</i> ...	Binks, J. W. ...	W. Hill ...	No. A.	White Star ...	Form 911 25.4.27 to 17.5.27 ...	9.6.27
<i>Atreus</i> ...	Salter, G. H. ...	F. A. Brown ...	" A.	A. Holt ...	" 14.3.27 to 21.5.27 ...	9.6.27
<i>Atsuta Maru</i> ...	Shibutani, S. ...	A. Hurakami ...	" A.	Nippon Yusen Kaisha ...	" 12.2.27 to 13.6.27 ...	17.6.27
<i>Auditor</i> ...	Owen, W. T. ...	T. E. Steel ...	" M.	Harrison ...	" 14.5.27 to 2.6.27 ...	22.6.27
<i>Ausonia</i> ...	Stafford, W., D.S.O., R.D., Lt.-Commr. R.N.R.	J. J. Wiseman ...	" A.	Cunard ...	" 28.5.27 to 19.6.27 ...	21.6.27

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 15.7.27.	Date Received.
<i>Avon</i> ...	Hannam, F. S. ...	E. S. Dunch ...	No. M.	R.M.S.P. ...	Form 911 10.11.26 to 20.1.27...	8.2.27
<i>Balfour</i> ...	Moore, F. ...	J. Biggs ...	" A.	Canadian Pacific ...	" 1.6.27 to 8.6.27 ...	28.6.27
<i>Balranald</i> ...	Townshend, W. P. ...	C. Hannen, F. Ward, — Cowell, — Davis.	M.L.	P. & O. Branch ...	Met. Log. 25.12.26 to 1.5.27 ...	7.5.27
<i>51 Baltic</i> ...	White, E. R., Commr., R.N.R.	J. W. Paine, D. K. Crawford, J. Law.	W.T.	White Star ...	W.T. Reg. 13.6.27 to 2.7.27 ...	6.7.27
<i>Bampton Castle</i> ...	Hutchings, A. H. ...	J. F. H. Coombes ...	No. A.	Union Castle ...	Form 911 12.6.27 to 2.7.27 ...	5.7.27
<i>Banbury Castle</i> ...	Swiney, W. A. ...	C. G. Cuthbertson ...	" A.	" ...	" 20.4.27 to 24.5.27 ...	9.6.27
<i>Banffshire</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. ...	" ...	M.L.	" ...	" 24.4.27 to 30.5.27 ...	20.6.27
<i>Baron Murray</i> ...	Edgar, J. E. ...	W. P. G. Arthur, H. Thompson	No. A.	Hogarth & Sons ...	Form 911 8.5.26 to 10.6.26 ...	21.9.26
<i>Barpeta</i> ...	Strachan, J. ...	W. P. Page ...	" M.	British India ...	" 18.5.27 to 15.6.27 ...	5.7.27
<i>Barrabool</i> ...	Rhodes, H. R. ...	F. S. Bowman ...	" M.	P. & O. Branch ...	" 19.4.27 to 27.5.27 ...	10.6.27
<i>Baychimo</i> ...	O'Connor, T. ...	A. Watson ...	" A.	Hudson's Bay Co. ...	" 14.5.27 to 5.6.27 ...	24.6.27
<i>59 Belgenland</i> ...	Howell, T. ...	F. Good, F. Clitty ...	W.T.	Red Star ...	W.T. Reg. 13.6.27 to 1.7.27 ...	4.7.27
<i>Beltana</i> ...	Allin, C. H. C. ...	F. Arden ...	No. M.	P. & O. Branch ...	Form 911 12.6.27 to 2.7.27 ...	5.7.27
<i>Benalder</i> ...	Cole, J. H., D.S.C. ...	" ...	" A.	Ben Line ...	" 6.4.27 to 21.4.27 ...	9.5.27
<i>Bendigo</i> ...	Nicholl, R. N. C. ...	J. Young ...	" M.	P. & O. Branch ...	" 5.4.27 to 14.5.27 ...	16.5.27
<i>Benefactor</i> ...	O'Connor, T. ...	A. Watson ...	" M.	Harrison ...	" 4.2.27 to 18.3.27 ...	24.3.27
<i>31 Berengaria</i> ...	McNeil, S. G. S., R.D., Capt., R.N.R.	J. A. Myles, W. C. A. Robson.	W.T.	Cunard ...	W.T. Reg. 17.5.27 to 6.6.27 ...	8.7.27
<i>Berrima</i> ...	Short, C. E. ...	T. Ferguson ...	No. M.	P. & O. Branch ...	Form 911 19.6.27 to 4.7.27 ...	7.7.27
<i>Berwyn</i> ...	McCombie, G. ...	D. Dunn ...	" A.	Canadian Pacific ...	" 4.8.26 to 5.12.26 ...	7.12.26
<i>Bintang</i> ...	Morzer Bruyns, M. F.	M. C. Altins ...	" M.	Nederland ...	" 23.1.27 to 19.3.27 ...	24.3.27
<i>Bogota</i> ...	Barkley, E. ...	" ...	" A.	R.M.S.P. Co. ...	" 26.2.27 to 25.3.27 ...	29.3.27
<i>Boltingbroke</i> ...	Murray, M. F. ...	J. B. Hewson, F. G. Webster, N. Scallan, R. Davidson.	M.L.	Canadian Pacific ...	Met. Log. 15.2.27 to 2.3.27 ...	22.3.27
<i>Borda</i> ...	Holland, R. ...	" ...	No. M.	P. & O. Branch ...	Met. Log. 16.9.26 to 23.3.27 ...	25.5.27
<i>Bothwell</i> ...	— Biggs ...	" ...	" A.	Canadian Pacific ...	Form 911 18.2.27 to 28.6.27 ...	7.7.27
<i>Brandon</i> ...	Sargent, A. H., R.D., Lt.-Commr., R.N.R.	T. Beck ...	" A.	" ...	" 6.3.27 to 14.4.27 ...	20.4.27
<i>Brecon</i> ...	Rothwell, A. ...	E. H. Coleman ...	" A.	" ...	" 25.7.26 to 25.8.26 ...	27.8.26
<i>Brenda</i> ...	Lamont, A. ...	M. MacInnes ...	" A.	Scottish Fishery Board	" 5.5.27 to 6.6.27 ...	14.6.27
<i>Brighton</i> ...	Hill, A. ...	Mr. Munton ...	C.C.	Southern Railway ...	" 11.6.27 to 29.6.27 ...	5.7.27
<i>British Advocate</i> ...	Taylor, R. J. ...	E. Williams ...	No. M.	British Tankers ...	Telegraphic Report 14.7.27 ...	14.7.27
<i>British Engineer</i> ...	Joures, F. W. ...	W. Evans ...	" M.	" ...	Form 911 15.2.27 to 1.4.27 ...	8.4.27
<i>British Enterprise</i> ...	Putt, R. O. ...	" ...	" M.	" ...	" 11.2.27 to 26.2.27 ...	25.5.27
<i>British Soldier</i> ...	Putt, R. O. ...	H. J. Crangle ...	" A.	" ...	Form 911 17.11.26 to 10.12.26 ...	3.1.27
<i>Bronte</i> ...	Crappier, J. S. ...	W. Jones ...	" A.	Lampert & Holt ...	" 1.5.27 to 20.5.27 ...	14.6.27
<i>Burma</i> ...	Reid, R. B. ...	J. Henderson ...	" A.	Henderson ...	" 24.7.26 to 10.10.26 ...	29.10.26
<i>Cambria C.S.</i> ...	Sherwood, C. A., D.S.C.	A. J. English, B. C. Farrow, C. F. St. John.	No.	Eastern Tel. Co. ...	Met. Log. 9.9.26 to 25.1.27 ...	23.2.27
<i>Cambria</i> ...	Telfer, J. E., O.B.E. ...	V. S. Phillips ...	C.C.	L.M. & S. Rly ...	Telegraphic Report 9.7.27 ...	9.7.27
<i>Cameronia</i> ...	Gemmell, W. ...	W. Black ...	No. A.	Anchor ...	Form 911 8.5.27 to 5.6.27 ...	23.6.27
<i>Camito</i> ...	Forrester, W. T., O.B.E.	W. T. Broome, P. C. Congdon, F. Dudgeon.	M.L.	Elders & Fyffes ...	Met. Log. 20.11.26 to 21.3.27 ...	26.3.27
<i>Canadian Importer</i> ...	Forson, A. ...	G. R. Randall ...	No. A.	Canadian Gov. Mer- cantile Marine.	Form 911 28.4.27 to 1.6.27 ...	28.6.27
<i>Canadian Inventor</i> ...	Boulton, F. W. ...	O. Dalcorn ...	" A.	" ...	" 13.2.27 to 2.6.27 ...	9.6.27
<i>Canadian Scottish</i> ...	Wallace, C. ...	" ...	" A.	" ...	" 6.3.27 to 18.4.27 ...	30.5.27
<i>Canadian Skir- misher.</i> ...	Millar, W. H. ...	" ...	" A.	" ...	" 19.11.26 to 5.1.27 ...	11.1.27
<i>Canadian Winner</i> ...	Hocking, N. P. ...	" ...	" M.	" ...	" 26.5.27 to 21.6.27 ...	7.7.27
<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. 12.6.27 to 1.7.27 ...	5.7.27
<i>Carnarvon Castle</i> ...	Hague, J. W., Commr., R.N.R.	S. Colbourne, H. A. Causton, G. Gorrings, H. Iddes.	M.L.	Union Castle ...	Met. Log. 24.12.26 to 17.4.27 ...	1.5.27
<i>34 Caronia</i> ...	Hossack, W. H., R.D., Capt., R.N.R.	M. Boston, H. G. Hayward, D. McMillan.	W.T.	Cunard ...	W.T. Reg. 10.6.27 to 24.6.27 ...	4.7.27
<i>Casanare</i> ...	Steidemann, H. ...	R. O. Jones ...	No. A.	Elders & Fyffes ...	Form 911 10.6.27 to 24.6.27 ...	5.7.27
<i>Cavina</i> ...	Riseley, A. D. ...	W. J. Dodd ...	" A.	" ...	" 14.5.27 to 18.6.27 ...	27.6.27
<i>52 Cedric</i> ...	Smith, R. G. ...	S. S. Fieldwood, F. E. Patchett, E. Lloyd.	W.T.	White Star ...	" 10.5.27 to 12.6.27 ...	15.6.27
<i>53 Celtic</i> ...	Berry, G. ...	A. Thompson, J. Peters.	"	" ...	W.T. Reg. 19.6.27 to 10.7.27 ...	12.7.27
<i>Centaur</i> ...	Rose, A. F. ...	L. Johnstone ...	No. M.	A. Holt & Co. ...	Form 911 19.6.27 to 10.7.27 ...	13.7.27
<i>Ceramic</i> ...	Roberts, J., C.B.E., D.S.O., R.D., Capt., R.N.R.	H. J. Yates ...	" A.	White Star ...	W.T. Reg. 5.6.27 to 26.6.27 ...	1.7.27
<i>Changte</i> ...	Gambrill, F. C. ...	J. Thomas, D. D. Tyer, J. A. Allan.	M.L.	Yuill & Co. ...	Form 911 22.12.26 to 2.2.27 ...	14.3.27
<i>Changuinola</i> ...	Thorburn, R. A. ...	" ...	No.	" ...	" 14.4.27 to 20.5.27 ...	21.5.27
<i>China</i> ...	Furlong, G. H. S., R.D., Capt., R.N.R.	M. K. Stone ...	No. M.	Elders & Fyffes ...	Met. Log. 18.12.26 to 8.4.27 ...	7.6.27
<i>Chindwara</i> ...	Brooks, E. G. ...	J. J. Smith ...	" M.	P. & O. ...	Form 911 8.10.26 to 27.10.26 ...	15.11.26
<i>Chindwin</i> ...	Esslemont, C. ...	W. D. Tulloch ...	" A.	British India ...	" 20.11.26 to 28.11.26 ...	29.12.26
<i>City of Baroda</i> ...	McMillan, J. ...	A. Beaton, E. H. Routledge, H. C. Snow.	M.L.	Henderson ...	" 22.1.27 to 8.4.27 ...	13.4.27
<i>City of Benares</i> ...	Anderson, W. W. ...	C. G. Inglis ...	No. A.	Ellerman ...	Met. Log. 3.2.27 to 17.5.27 ...	27.6.27
<i>City of Brisbane</i> ...	Seaborne, F. O., D.S.C.	R. M. Redhead ...	" A.	" ...	Form 911 9.5.27 to 2.6.27 ...	9.6.27
<i>City of Canterbury</i> ...	Bremner, D. M. ...	W. F. Munro ...	" A.	" ...	" 11.3.27 to 8.5.27 ...	11.5.27
<i>City of Carlisle</i> ...	Mordue, J. A. ...	" ...	" A.	" ...	" 19.5.27 to 15.6.27 ...	21.6.27
<i>City of Chester</i> ...	Letton, F. W. ...	H. Asher, W. Speakman, H. A. Hazell.	M.L.	" ...	" 1.5.27 to 22.5.27 ...	9.6.27
<i>City of Edinburgh</i> ...	Wyper, J. ...	N. G. Fraser ...	No. M.	" ...	Met. Log. 21.9.26 to 5.2.27 ...	23.2.27
<i>City of Hong Kong</i> ...	Walton, H. L., O.B.E., R.D., Commr., R.N.R.	" ...	" A.	" ...	Form 911 17.2.27 to 9.4.27 ...	13.4.27
<i>City of London</i> ...	Parker, F. W., R.D., Commr., R.N.R.	J. McHattie ...	" A.	" ...	" 29.4.27 to 22.5.27 ...	1.6.27
<i>City of Rangoon</i> ...	Jones, P. ...	E. R. Wildermoth, R. H. Stewart, G. T. Willet.	M.L.	" ...	" 26.2.27 to 8.5.27 ...	28.5.27
<i>City of Venice</i> ...	Lee, A. ...	" ...	No. A.	" ...	Met. Log. 22.1.27 to 4.6.27 ...	29.6.27
<i>City of Yokohama</i> ...	McDonald, W. D. ...	W. N. M. Faichney ...	" A.	" ...	Form 911 2.3.27 to 17.3.27 ...	4.5.27
<i>Clan Alpine</i> ...	Lennox, W. J. ...	G. Short ...	" A.	Clan ...	" 17.2.27 to 17.3.27 ...	4.5.27
<i>Clan Lamont</i> ...	Urquhart, F., D.S.C.	P. de Gruchy ...	" A.	" ...	" 27.1.27 to 21.3.27 ...	6.4.27
					" 22.2.27 to 6.6.27 ...	14.6.27

LIST OF VOLUNTARY OBSERVING SHIPS

111

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 15.7.27.	Date Received.
<i>Clan Lindsay</i> ...	Worthington, J. H. ...	E. P. Smith ...	No. A.	Clan ...	Form 911 26.5.27 to 11.6.27 ...	20.6.27
<i>Clan Macbeth</i> ...	Young, A. H., R.D., Lieut. - Commr. R.N.R.	J. M. Lorimer ...	" A.	" ...	" 8.4.27 to 5.5.27 ...	21.5.27
<i>Clan Macfadyen</i> ...	Stenson, F. J. R.D., Capt. R.N.R.	H. M. Wavell ...	" A.	" ...	" 25.3.27 to 23.4.27 ...	27.4.27
<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> ...	Low, A. ...	D. McAllister ...	" A.	" ...	" 10.5.27 to 4.6.27 ...	28.6.27
<i>Clan Mackellar</i> ...	Smith, W. P. ...	J. K. Thomas ...	" A.	" ...	" 15.5.27 to 10.6.27 ...	14.6.27
<i>Clan Mackinnon</i> ...	McComish, A. B. ...	W. F. Isaac, G. E. G. Davey, J. W. Innes.	M.L.	" ...	Met. Log. 21.12.26 to 5.5.27 ...	13.5.27
<i>Clan Macphee</i> ...	Gourlay, J. B. ...	D. S. Rae, A. F. Martin, W. A. Shewan.	"	" ...	" 14.5.26 to 2.5.27 ...	9.6.27
<i>Clan Macnaughton</i> ...	Simpson, A. W. ...	F. Cossar ...	No. A.	" ...	Form 911 20.5.27 to 6.6.27 ...	20.6.27
<i>Clan Macnaghten</i> ...	Mee, F. T. ...	S. A. Carter, R. J. Richardson	" A.	" ...	" 9.4.27 to 16.5.27 ...	21.5.27
<i>Clan Macwhirter</i> ...	Waterhouse, J. ...	R. W. Roberts ...	M.L.	" ...	" 26.11.26 to 12.12.26 ...	17.12.26
<i>Clan Macwilliam</i> ...	Thompson, W. ...	T. B. Cranwill ...	No. A.	" ...	" 7.12.26 to 20.6.27 ...	11.7.27
<i>Clan Malcolm</i> ...	Neill, G. A. ...	J. T. Bell, H. V. Wightman, A. R. McDonald.	M.L.	" ...	Met. Log. 23.9.26 to 3.3.27 ...	30.3.27
<i>Clan Morrison</i> ...	Porterfield, W. M. ...	L. C. Higgins ...	No. A.	" ...	Form 911 19.4.27 to 16.5.27 ...	14.6.27
<i>Clan Murdoch</i> ...	Miller, W. ...	H. F. M. Preston ...	" A.	" ...	" 25.5.27 to 14.6.27 ...	22.6.27
<i>Clan Ranald</i> ...	Laird, C. ...	J. B. Templeman ...	" A.	" ...	" 16.5.27 to 14.6.27 ...	27.6.27
<i>Clan Ross</i> ...	Openshaw, L. G. ...	H. T. Booth ...	" A.	" ...	" 7.3.27 to 22.5.27 ...	14.6.27
<i>Clan Sinclair</i> ...	George, L. S. ...	N. Macleod ...	" A.	" ...	" 10.5.27 to 23.5.27 ...	11.7.27
<i>Clan Urquhart</i> ...	Baker, E. W. ...	E. A. Hewson ...	" A.	" ...	" 8.2.27 to 8.5.27 ...	12.5.27
<i>Colonia, C.S.</i> ...	Carlton, G. F., O.B.E., Commr. R.N.R.	W. E. Allen, W. F. Anderson, F. B. Bolingbroke.	M.L.	Telegraph Construc- & Maintenance.	Met. Log. 4.12.26 to 25.2.27 ...	8.3.27
<i>Colonian</i> ...	Gittins, R. P. ...	B. Pollitt ...	No. A.	Leyland ...	Form 911 15.4.27 to 8.6.27 ...	10.6.27
<i>Comorin</i> ...	Borland, J. Mc. I., C.B., D.S.O., R.D., Capt. R.N.R.	B. Pollitt ...	" M.	P. & O. ...	" 26.2.27 to 2.6.27 ...	8.6.27
<i>Concordia</i> ...	Telfer, J. H. ...	T. Philip, W. Law, L. H. Hobson.	M.L.	Anchor Donaldson ...	Met. Log. 5.2.27 to 11.7.27 ...	14.7.27
<i>Corinthia</i> ...	Hart, F. ...	E. Burt, J. Waire, M. Ben- nett.	"	White Star ...	" 3.12.26 to 19.3.27 ...	11.4.27
<i>Cornwall</i> ...	Haines, F. P. ...	H. S. White ...	No. A.	Federal ...	Form 911 26.1.27 to 28.2.27 ...	12.4.27
<i>Craftsman</i> ...	Gibbins, W. ...	J. Williams ...	" A.	Harrison ...	" 23.12.26 to 10.3.27 ...	14.3.27
<i>Crawford Castle</i> ...	Morgan, A. O., R.D., Commr. R.N.R.	J. A. Wilson ...	" A.	Union Castle ...	" 12.5.27 to 30.6.27 ...	7.7.27
<i>Culebra</i> ...	Mackay, A. S., R.D., Commr. R.N.R.	P. Cooper, F. B. Collinson, J. W. Smith.	M.L.	R.M.S.P. Co. ...	Met. Log. 27.12.26 to 23.3.27 ...	12.4.27
<i>Cumberland</i> ...	Deith, G. T. ...	J. D. Marks ...	No. A.	Federal ...	Form 911 7.8.26 to 8.1.27 ...	9.2.27
<i>Cuthbert</i> ...	Barlow, F. P. ...	J. R. C. Evans ...	" A.	Booth ...	" 29.5.27 to 9.6.27 ...	27.6.27
<i>Cyclops</i> ...	Cosker, W. ...	J. R. C. Evans ...	" A.	A. Holt ...	" 28.4.27 to 3.6.27 ...	11.7.27
<i>Dardanus</i> ...	Williams, D. T. ...	C. F. Morgan ...	" M.	" ...	" 29.3.27 to 19.4.27 ...	16.5.27
<i>Darian</i> ...	Masters, W. ...	" ...	" A.	Leyland ...	" 12.6.27 to 22.6.27 ...	5.7.27
<i>Darro</i> ...	Matthews, G. P. ...	W. Halder-Campe ...	" M.	R.M.S.P. Co. ...	" 22.4.27 to 13.5.27 ...	16.5.27
<i>Demerara</i> ...	Shillitoe, B., R.D., Commr. R.N.R.	J. R. Baty ...	" M.	" ...	" 17.5.27 to 7.7.27 ...	14.7.27
<i>Demosthenes</i> ...	Orriss, F. A. ...	J. Cruickshank ...	" M.	Aberdeen ...	" 5.2.27 to 17.3.27 ...	23.3.27
<i>Deseado</i> ...	Shillitoe, B., R.D., Commr. R.N.R.	L. D. Jennings ...	" M.	R.M.S.P. Co. ...	" 26.2.27 to 18.3.27 ...	29.3.27
<i>Desna</i> ...	Green, J. ...	A. F. Walker ...	" M.	" ...	" 3.12.26 to 19.1.27 ...	31.1.27
<i>Deucalion</i> ...	Melling, C. F. ...	R. Wilson ...	" A.	A. Holt ...	" 28.5.27 to 20.6.27 ...	11.7.27
<i>Dieppe</i> ...	Marmery, S. ...	Mr. Parsons ...	C.C.	Southern Railway ...	Telegraphic Report 15.7.27 ...	15.7.27
<i>Dimboola</i> ...	Lloyd, T. L. ...	H. L. Price ...	No. A.	Melbourne S.S. Co. ...	Form 911 4.5.27 to 8.6.27 ...	11.7.27
<i>Discoverer</i> ...	Ling, J. T. ...	H. W. Gostage ...	" M.	Harrison ...	" 8.4.27 to 9.7.27 ...	12.7.27
<i>Discovery, R.R.S.</i> ...	Stenhouse, J. R., D.S.O., D.S.C., O.B.E., R.D., Commr. R.N.R.	T. W. Goodchild ...	M.L.	Discovery Expedition	Met. Log. 8.5.26 to 11.7.26 ...	30.9.26
<i>Domala, M.V.</i> ...	Kitson, A. G. ...	J. G. Wallace ...	No. M.	British India ...	Form 911 28.3.27 to 4.6.27 ...	15.6.27
<i>Domitia, 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 Construc- & Maintenance.	Met. Log. 11.9.26 to 4.2.27 ...	25.2.27
<i>Doric</i> ...	Bolton, S., D.S.C., R.D., Commr. R.N.R.	H. R. Wilkinson ...	No. A.	White Star ...	Form 911 12.6.27 to 3.7.27 ...	8.7.27
<i>Doric Star</i> ...	Thomas, R. T. ...	L. McDermott ...	" A.	Blue Star ...	" 22.11.26 to 20.12.26 ...	10.1.27
<i>Dorington Court</i> ...	Clarke, E. J. ...	E. W. Blomberg ...	" A.	Haldin & Co. ...	" 11.2.27 to 1.5.27 ...	9.5.27
<i>Dromore Castle</i> ...	Vincent, E. S., R.D., Commr. R.N.R.	D. H. McDougall ...	" A.	Union Castle ...	" 10.12.26 to 3.4.27 ...	13.4.27
<i>Dryden</i> ...	Major, T. W. ...	" ...	" M.	Lampart & Holt ...	" 27.2.27 to 18.3.27 ...	4.5.27
<i>Duendes</i> ...	Pape, E. R. ...	W. Billington ...	" M.	P.S.N. Co. ...	" 18.5.27 to 9.6.27 ...	10.6.27
<i>Dumaff Head</i> ...	Butt, H. L., R.D., Commr. R.N.R.	S. Duff ...	" A.	Ulster S.S. Co. ...	" 3.2.27 to 15.5.27 ...	23.5.27
<i>Dundrum Castle</i> ...	Weller, H. E. ...	" ...	" A.	Union Castle ...	" 27.1.27 to 24.2.27 ...	14.3.27
<i>Dunrobin</i> ...	Ramsay, J. D. ...	C. H. Kendall ...	" A.	Glen & Co. ...	" 27.5.27 to 2.7.27 ...	13.7.27
<i>Duquesa</i> ...	Ellis, F., D.S.C.	E. W. Denman ...	" M.	Furness Withy ...	" 1.4.27 to 18.5.27 ...	25.5.27
<i>Durenda</i> ...	Beeching, P. H. ...	" ...	" A.	British India ...	" ...	...
<i>Edinburgh Castle</i> ...	Knight, A. ...	" ...	No. A.	Union Castle ...	" 6.5.27 to 22.5.27 ...	24.5.27
<i>Egyptian Prince</i> ...	Ord, T. ...	" ...	" A.	Prince ...	" 13.1.27 to 7.3.27 ...	31.3.27
<i>El Paraguay</i> ...	Smith, F. C. ...	G. Fletcher ...	" M.	Houlder Bros. ...	" 12.3.27 to 4.5.27 ...	11.5.27
<i>Elpenor</i> ...	Gordon, A. L. ...	M. Robertson, C. Kavanagh	M.L.	A. Holt ...	Met. Log. 11.10.26 to 7.2.27 ...	10.2.27
<i>Elysia</i> ...	Duncan, A. R. ...	A. Laidlaw, H. C. Fry, J. Herbert.	"	Anchor ...	" 4.5.27 to 7.7.27 ...	13.7.27
<i>Empress of Asia</i> ...	Douglas, L. D. R.D., Lt.-Commr. R.N.R.	P. Sinclair, L. G. Goddard, R. Hickey.	"	Canadian Pacific ...	" 6.2.27 to 27.5.27 ...	2.7.27
<i>Empress of Canada</i> ...	Robinson, S., C.B.E., R.D., Commr. R.N.R.	" ...	"	" ...	" 26.2.27 to 18.6.27 ...	14.7.27
<i>Empress of France</i> ...	Hailey, A. J. ...	E. Roberts, W. Ewens, W. Pickersgill.	"	" ...	" 29.1.27 to 15.4.27 ...	1.5.27
<i>Empress of Russia</i> ...	Hosken, A. J. ...	F. A. R. Dobbin ...	"	" ...	" 25.12.26 to 8.5.27 ...	13.6.27
<i>Empress of Scotland</i> ...	Latta, R. G. ...	P. Powys Smith, T. Sargent, E. Aikman.	"	" ...	" 14.11.26 to 22.4.27 ...	3.5.27

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 15.7.27.	Date Received.
<i>Endeavour</i> ...	Commr. S. A. Geary-Hill, D.S.O., R.N.	C. S. E. Lansdown ...	M.L.	His Majesty's Ship ...	Met. Log. 14.11.26 to 13.3.27 ...	28.3.27
<i>Essequibo</i> ...	Kite, E. ...	H. E. Hughes ...	No. M.	R.M.S.P. Co. ...	Form 911 21.4.27 to 6.6.27 ...	20.6.27
<i>Eumaeus</i> ...	Read, J. W. ...	J. L. Millar ...	" A.	A. Holt ...	6.3.27 to 6.5.27 ...	14.6.27
<i>Euripides</i> ...	Collins, P. J., O.B.E.	H. S. Cox, K. D. Fisher, P. Congdon.	M.L.	Aberdeen ...	Met. Log. 1.1.27 to 8.5.27 ...	14.5.27
<i>Euryades</i> ...	Stewart, J. R. ...	" ...	No. A.	A. Holt ...	Form 911 22.2.27 to 3.4.27 ...	6.4.27
<i>Explorer</i> ...	Allan, J. ...	A. Stout ...	" A.	Scottish Fishery Board.	" 1.6.27 to 29.6.27 ...	5.7.27
<i>Ferndale</i> ...	Daniel, F. ...	D. Jones ...	" M.	Commonwealth Govt.	" 30.4.27 to 18.5.27 ...	28.6.27
<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. ...	J. C. Nettleship ...	" A.	Ellerman Wilson ...	" 31.3.27 to 6.7.27 ...	8.7.27
<i>Freya</i> ...	Angus, W. ...	W. Pirrie ...	" A.	Scottish Fishery Board.	" 1.6.27 to 12.6.27 ...	5.7.27
<i>Gaika</i> ...	Whitfield, G. J. ...	R. E. H. Partington ...	" A.	Union Castle ...	" 26.1.27 to 21.4.27 ...	4.5.27
<i>Galtymore</i> ...	Yeoman, J. T. ...	R. B. Gurner ...	" M.	Furness Withy ...	" 27.5.27 to 5.6.27 ...	27.6.27
<i>Garoe</i> ...	Visser, C. W. ...	C. J. Vandenboom ...	" M.	Rotterdam Lloyd ...	" 29.4.27 to 9.5.27 ...	21.6.27
<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>Gelria</i> ...	Veldkamp, C. J. ...	T. van der Mast ...	" M.	Holland Lloyd ...	" 22.4.27 to 13.5.27 ...	16.5.27
<i>Geranium</i> ...	Bennett, H. T., D.S.O., Commr. R.A.N.	" ...	M.L.	His Majesty's Australian Ship.	" ...	"
<i>Glamorganshire</i> ...	Spriddell, F. G., R.D., Commr., R.N.R.	" ...	No. M.	R.M.S.P. Co. ...	" ...	"
<i>Glenamoy, M.V.</i> ...	Homan, C. E. ...	R. H. Bishop ...	" A.	Glen Line ...	Form 911 11.6.27 to 24.6.27 ...	5.7.27
<i>Glengarry</i> ...	Angier, J. ...	C. S. Brewer ...	" M.	" ...	" 25.6.27 to 6.7.27 ...	13.7.27
<i>Glennuce</i> ...	Kennett, W. H. ...	J. Rankine ...	" A.	" ...	" 21.3.27 to 11.5.27 ...	14.6.27
<i>Glenshane</i> ...	Beer, E. ...	D. C. Evans ...	" A.	" ...	" 4.2.27 to 21.4.27 ...	4.5.27
<i>Gloucestershire</i> ...	Robin, E. ...	H. J. Jarrett ...	" A.	Bibby ...	" 12.3.27 to 20.5.27 ...	23.5.27
<i>Gorgon</i> ...	Hughes, J. W. ...	A. E. Bowlt, E. W. Powell, J. M. T. Edward.	M.L.	A. Holt & Co. ...	Met. Log. 29.10.27 to 7.4.27 ...	9.5.27
<i>Halesius</i> ...	Samuels, C. ...	L. W. Cook ...	No. A.	R. P. Houston ...	Form 911 15.4.27 to 18.5.27 ...	24.6.27
<i>Haliartius</i> ...	Marsh, L. V. ...	W. H. Upton ...	" A.	" ...	" 25.4.27 to 21.5.27 ...	24.6.27
<i>Harmonides</i> ...	Hughes, W. F. ...	S. S. Davidson ...	" A.	" ...	" 10.4.27 to 2.5.27 ...	16.5.27
<i>Hatarana</i> ...	Graham, H. A. ...	" ...	M.L.	British India ...	" ...	"
<i>Hatimura</i> ...	Lane, S. R., R.D., Capt., R.N.R.	" ...	No. M.	" ...	" ...	"
<i>Hauraki, M.V.</i> ...	Frew, J. D. ...	B. F. Fisher ...	M.L.	Union S.S. Co., N.Z. ...	Met. Log. 11.8.26 to 6.3.27 ...	9.6.27
<i>Henry Holmes, C.S.</i> ...	Bicker Caarten, A. ...	K. G. M. Pearce ...	No. M.	W. I. & Panama Telegraph Co.	Form 911 25.4.27 to 14.5.27 ...	15.6.27
<i>Herald</i> ...	Silk, H. V., Lieut-Commr., R.N.	D. G. V. Williams ...	M.L.	His Majesty's Ship ...	Met. Log. 4.9.26 to 30.11.26 ...	27.1.27
<i>Herefordshire</i> ...	Mann, R. P. ...	H. R. Mackay ...	No. A.	Bibby ...	Form 911 21.8.26 to 29.1.27 ...	7.2.27
<i>Herminius</i> ...	Roberts, T. V. ...	G. P. McCraith ...	" A.	Shaw, Savill & Albion	" 25.9.26 to 11.10.26 ...	22.11.26
<i>Herschel</i> ...	Watson, W. W. ...	J. F. Maurey ...	" A.	Lampport & Holt ...	" 21.3.27 to 4.4.27 ...	25.4.27
<i>Hertford</i> ...	Urquhart, D. ...	A. Robertson ...	" A.	Federal ...	" 1.2.27 to 21.2.27 ...	4.4.27
<i>Hibernia</i> ...	Tanner, E. B., O.B.E.	R. Woodall ...	C.C.	L.M. & S. Railway ...	Telegraphic Report 14.7.27 ...	14.7.27
<i>Highland Laddie</i> ...	Jones, T. J. ...	E. F. Smart ...	No. A.	Nelson ...	Form 911 9.5.27 to 27.5.27 ...	12.7.27
<i>" Piper</i> ...	Collings, D. ...	S. E. Jackson, R. G. Owen, G. E. Leech.	M.L.	" ...	Met. Log. 11.10.26 to 12.5.27 ...	8.6.27
<i>" Pride</i> ...	Robinson, R. H. ...	" ...	No. A.	" ...	Form 911 8.4.27 to 6.6.27 ...	10.6.27
<i>" Prince</i> ...	Brown, J. B. ...	S. A. Wheaton ...	" A.	Prince ...	" 28.4.27 to 9.5.27 ...	20.5.27
<i>" Rover</i> ...	Ashby Graves, F. ...	C. C. Legg ...	" A.	Nelson ...	" 25.4.27 to 11.6.27 ...	23.6.27
<i>Hildebrand</i> ...	Maddrell, J. ...	" ...	" A.	Booth ...	" 18.5.27 to 30.6.27 ...	12.7.27
<i>Hobson's Bay</i> ...	Kydd, O. J. ...	R. Pearce, G. Clinch, H. Benson, H. Hendy.	M.L.	Commonwealth Govt.	Met. Log. 18.1.27 to 8.5.27 ...	18.5.27
<i>Holbein</i> ...	Gough, W. A. ...	H. L. Rudd ...	No. A.	Lampport & Holt ...	Form 911 2.4.27 to 9.6.27 ...	20.6.27
<i>54 Homerie</i> ...	Holme, A. ...	A. E. Dyer, H. G. Morgan, S. B. Morfee.	W.T.	White Star ...	W.T. Reg. 2.6.27 to 17.6.27 ...	20.6.27
<i>Hororata</i> ...	Holland, E. ...	B. Evans, F. Malcouronne ...	No. A.	New Zealand S.S. Co.	Form 911 22.1.27 to 17.5.27 ...	21.5.27
<i>Hubert</i> ...	Evans, L. ...	S. G. Edwards ...	" A.	Booth ...	" 2.4.27 to 30.5.27 ...	20.6.27
<i>Huntingdon</i> ...	Ashworth, W. ...	A. Carlyon ...	" A.	Federal ...	" 4.5.27 to 27.5.27 ...	12.7.27
<i>Huntsman</i> ...	Russell, W. ...	" ...	No.	Harrison ...	" ...	"
<i>Hurutui</i> ...	Burton Davies, J. ...	J. Oxnard, F. Longheed, L. Cann, K. Goldsworthy.	M.L.	New Zealand S.S. Co.	Met. Log. 2.1.27 to 23.6.27 ...	28.6.27
<i>Ingoma</i> ...	Barrow, R. K. ...	D. G. Russell ...	No. M.	Harrison ...	Form 911 14.4.27 to 27.5.27 ...	8.6.27
<i>Inkum</i> ...	Meetham, J. T. ...	" ...	" A.	J. H. Welsford ...	" ...	"
<i>Iris, C.S.</i> ...	Hughes, H. R. ...	W. Oliver, D. Bruce, D. MacDonald, T. Vickers.	M.L.	Pacific Cable Board ...	Met. Log. 23.1.26 to 25.4.26 ...	5.10.26
<i>Iroquois</i> ...	Jackson, A. L., Commr., R.N.	H. L. Jenkins ...	"	His Majesty's Ship ...	" 24.8.26 to 3.12.26 ...	15.2.27
<i>Ision</i> ...	Reed, G. C. ...	C. W. R. Murphy ...	No. A.	A. Holt ...	Form 911 10.1.27 to 10.3.27 ...	19.4.27
<i>Japanese Prince</i> ...	Naylor, E. ...	W. Venn ...	" A.	Prince ...	" 5.5.27 to 6.6.27 ...	23.6.27
<i>Jervis Bay</i> ...	Chaplin, W. R. ...	R. W. Laycock ...	" M.	Commonwealth Govt.	" 30.3.27 to 18.4.27 ...	9.5.27
<i>John Pender, C.S.</i> ...	Smythe, T. W. ...	H. W. Milne ...	" A.	Eastern Tel. Co. ...	" 8.9.26 to 25.9.26 ...	25.10.26
<i>Justin</i> ...	Lee, O. J. P., R.D., Commr., R.N.R.	" ...	" A.	Booth ...	" 17.6.27 to 1.7.27 ...	5.7.27
<i>Kaisar-i-Hind</i> ...	Manley, G. ...	A. H. Cole ...	" M.	P. & O. ...	" 4.6.27 to 22.6.27 ...	27.6.27
<i>Kalyan</i> ...	Cotching, A. ...	" ...	" M.	P. & O. ...	" ...	"
<i>Kamo Maru</i> ...	Shiratori, S. ...	" ...	" A.	Nippon Yusen Kaisha	Form 911 15.1.27 to 15.2.27 ...	6.4.27
<i>Kangaroo</i> ...	(Norris, H. C., Turner, J. E.)	V. J. Denton, V. L. Gilbert, H. Brackenridge.	M.L.	State Service Australia.	Met. Log. 21.11.26 to 30.4.27 ...	13.6.27
<i>Karapara</i> ...	Miller, A. C. ...	J. W. Knight ...	No. M.	British India ...	Form 911 24.11.26 to 7.1.27 ...	24.1.27
<i>Kashmir</i> ...	Stringer, R. H., O.B.E., R.D., Commr., R.N.R.	J. H. Anderson ...	" M.	P. & O. ...	" 1.5.27 to 13.5.27 ...	23.6.27
<i>Kenilworth Castle</i> ...	Chave, Sir B., K.B.E.	" ...	M.L.	Union Castle ...	Met. Log. 8.8.26 to 30.1.27 ...	5.4.27
<i>Kent</i> ...	Downton, M. M. ...	F. M. Knight ...	No. A.	New Zealand S.S. Co.	Form 911 28.7.26 to 31.8.26 ...	8.9.26
<i>Khiva</i> ...	Cooper, C. P., O.B.E., R.D., Capt., R.N.R.	G. W. Wood, F. Hewison, E. Allen.	M.L.	P. & O. ...	Met. Log. 12.3.27 to 19.4.27 ...	8.6.27
<i>Khyber</i> ...	Hester, C. W., R.D., Commr., R.N.R.	C. B. Roche, E. J. Parry, H. D. Case, G. S. B. Collard.	"	P. & O. ...	" 1.1.27 to 19.5.27 ...	23.5.27
<i>Kia Ora</i> ...	McIntosh, A. ...	E. A. Hickling ...	No. M.	Shaw Savill & Albion	" 30.1.27 to 15.6.27 ...	20.6.27
<i>Knight Companion</i> ...	Cox, B. T. ...	" ...	" M.	A. Holt ...	Form 911 3.3.27 to 15.3.27 ...	23.3.27
<i>Koolinda, M.V.</i> ...	Norris, H. ...	J. S. Airey ...	" M.	State Service, Australia.	" 9.5.27 to 25.5.27 ...	28.6.27
<i>Kovno</i> ...	Dossor, W. A. ...	H. Redfern, A. Snowdon, A. Hebblewhite.	M.L.	Ellerman Wilson ...	Met. Log. 12.6.26 to 26.11.26 ...	27.11.26
<i>Kyogle</i> ...	Coalstad, C. ...	E. W. Hughes, C. B. Odman	No. A.	Commonwealth Light-house Service.	Form 911 26.11.26 to 19.12.26 ...	7.2.27
<i>37 Laconia</i> ...	Britten, E. T. ...	T. Parry, J. Ashcroft, J. W. Caunce.	W.T.	Cunard ...	W.T. Reg. 29.5.27 to 18.6.27 ...	21.6.27
					Form 911 29.5.27 to 19.6.27 ...	21.6.27

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 15.7.27.	Date Received.
<i>Lady Denison</i> <i>Pender</i> , C.S.	West, G. W. ...	F. Lawrence ...	No. A.	Eastern Tel. Co. ...	Form 911 9.5.26 to 7.7.26 ...	7.8.26
<i>Laguna</i> ...	Pattison, G. H. ...	E. A. Owen ...	" A.	Pacific S.N. Co. ...	" 9.3.27 to 27.3.37 ...	19.4.27
<i>Lahore</i> ...	Kirkwood, J. H. ...	W. G. Stevenson ...	" M.	P. & O. ...	" 27.11.26 to 31.12.26 ...	5.1.27
<i>Lalande</i> ...	Dawson, E. N. ...	A. E. Warburton ...	" A.	Lampport & Holt ...	Form 911 25.3.27 to 26.6.27 ...	11.7.27
<i>Lancashire</i> ...	Hamill, H. ...	F. Holdsworth ...	" A.	Bibby ...	" 9.4.27 to 18.6.27 ...	27.6.27
36 <i>Lancastria</i> ...	de Legh, P. ...	R. P. Cambell, L. R. Sharp.	W.T.	Cunard ...	W.T. Reg. 8.5.27 to 2.6.27 ...	7.6.27
<i>Laomedon</i> ...	Oram, B. B., R.D., Capt., R.N.R.	F. G. Russell. H. A. Standfield ...	No. A.	A. Holt... ...	Form 911 7.5.27 to 2.6.27 ...	9.6.27
<i>La Paz</i> , M.V.	Beswick, W., D.S.C., Lt.-Commr., R.N.R.	D. Beamer ...	" M.	Pacific S.N. Co. ...	" 19.5.27 to 3.6.27 ...	28.6.27
<i>Laplace</i> ...	Benson, C. W. ...	A. L. Murray, R. D. Cottam	" A.	Lampport & Holt ...	" 23.4.27 to 9.5.27 ...	28.5.27
55 <i>Lapland</i> ...	Shaw, W. ...	E. Cornelli, J. C. Flett ...	W.T.	Red Star ...	" 18.11.26 to 31.3.27...	13.4.27
<i>Lautaro</i> , M.V.	Knight, R. A. ...	E. Sandon ...	No. M.	Pacific S.N. Co. ...	W.T. Reg. 8.5.27 to 18.6.27 ...	21.6.27
<i>Leicestershire</i> ...	Morehouse, W. M. ...	J. Cullen, P. Hawkins, J. K. Gemmell, H. S. Vickers.	M.L.	Bibby ...	Form 911 8.5.27 to 18.6.27 ...	21.6.27
<i>Leighton</i> , M.V.	Dunn, R. E., O.B.E....	J. T. A. Thomson ...	No. A.	Lampport & Holt ...	Met. Log. 13.2.27 to 15.4.27 ...	27.4.27
<i>Leitrim</i> ...	Lindesay, J. M. ...	Robertson, A. ...	" A.	Dowie, J., & Co. ...	Form 911 21.2.27 to 12.3.27 ...	4.4.27
<i>Llandaff Castle</i> ...	Morton Betts, W. ...	R. Bayen ...	" A.	Union Castle ...	" 22.2.27 to 9.4.27 ...	19.4.27
<i>Llandowery Castle</i> ...	Owens, G. ...	R. J. Finch ...	M.L.	R.M.S.P. Co. ...	" 19.5.27 to 9.6.27 ...	5.7.27
<i>Loch Katrine</i> ...	Buret, T. J. C. ...	Young, H. J., D.S.C....	No. M.	Furness Withy ...	Form 911 5.2.27 to 2.5.27 ...	12.5.27
<i>London Commerce</i> ...	Fowler, W. H. ...	J. S. Williams, W. Stanley ...	M.L.	Ulster S.S. Co. ...	Met. Log. 23.1.27 to 15.4.27 ...	1.5.27
<i>Lord Antrim</i> ...	Jarvis, F. E. ...	L. G. Kirwan ...	No. A.	Pacific S.N. Co. ...	Form 911 27.4.27 to 10.5.27 ...	23.5.27
<i>Loriga</i> , M.V.	Clapham, E. C. ...	R. W. Gill ...	" A.	" " ...	" 28.1.27 to 12.4.27 ...	19.4.27
<i>Losada</i> , M.V.	Ross, J. ...	E. Baxter ...	" M.	" " ...	" 23.2.27 to 16.5.27 ...	24.5.27
<i>Macedonia</i> ...	Potter, H. W., R.D., Commr., R.N.R.	E. Lee ...	" M.	P. & O. ...	" 2.6.27 to 12.6.27 ...	12.7.27
<i>Macharda</i> ...	Tyers, W. O. ...	W. Cowie... ...	" M.	Brocklebank ...	" 14.5.27 to 29.5.27 ...	20.6.27
<i>Mahana</i> ...	Kershaw, W. A. R. ...	F. M. Smith, H. C. Smith, J. C. K. Rogers.	" A.	Shaw, Savill & Albion	Met. Log. 15.4.26 to 10.8.26 ...	30.8.26
<i>Maharani</i> ...	Elliott, G. F. ...	M. Haslett ...	" M.	Asiatic S.N. Co. ...	Form 911 16.5.27 to 5.6.27 ...	7.7.27
<i>Mahar</i> ...	Rowe, J. P. ...	C. Shaw, C. Cadwallader, S. S. Slade.	M.L.	Brocklebank ...	Met. Log. 24.7.26 to 1.5.27 ...	10.5.27
<i>Maimyo</i> ...	Smith, G. C. ...	H. M. Drummond ...	No. A.	Burns Philp ...	Form 911 21.3.27 to 2.5.27 ...	9.6.27
58 <i>Majestic</i> ...	Brown, T. M. ...	W. W. Pearson, L. Thompson	M.L.	White Star ...	W.T. Reg. 16.6.27 to 30.6.27 ...	6.7.27
<i>Makambo</i> ...	Metcalf, G. R. ...	F. C. Vogelmann, W. O. L. Wilding, J. B. Norris, R. W. Holmes.	W.T.	Burns Philp ...	Met. Log. 16.10.26 to 3.3.27 ...	17.5.27
<i>Makura</i> ...	Davey, A. H. ...	O. C. Bray, W. J. Weber, L. P. Bourke.	"	Canadian- Australasian	" 9.9.26 to 20.1.27 ...	7.2.27
<i>Malabar</i> ...	Mawson, J. ...	R. Morris ...	" M.	Burns, Philp & Co. ...	" 6.7.26 to 15.12.26 ...	23.3.27
<i>Malakuta</i> ...	Hillman, E. J. ...	N. Grayson ...	No. M.	Brocklebank ...	Form 911 15.4.27 to 19.5.27 ...	24.5.27
<i>Malancha</i> ...	Adamson, F. L. ...	R. Humble ...	" M.	" " ...	" 5.2.27 to 24.2.27 ...	4.5.27
<i>Malda</i> ...	Sharpe, G. ...	D. J. B. Bailing... ...	" M.	British India ...	" 12.4.27 to 8.7.27 ...	12.7.27
<i>Maloja</i> ...	Baird, S. K. ...	C. S. Cooke ...	" A.	P. & O. ...	" 11.3.27 to 17.6.27 ...	20.6.27
<i>Mamari</i> ...	Warner, S. C. ...	P. Campbell ...	" A.	Shaw, Savill & Albion	" 30.4.27 to 16.5.27 ...	9.6.27
<i>Manchester Brigade</i> ...	Falconer, H. ...	W. S. Eustace ...	" A.	Manchester Liners ...	" 4.6.27 to 3.7.27 ...	5.7.27
<i>Manchester Corporation</i> ...	Stott, C. H. ...	H. Swindells ...	" A.	" " ...	" 2.4.27 to 16.5.27 ...	9.6.27
<i>Manchester Hero</i> ...	Makin, T. ...	H. Anderton ...	M.L.	" " ...	Met. Log. 16.2.27 to 27.6.27 ...	7.7.27
<i>Manchester Merchant</i> ...	Riley, J. E. ...	E. W. Jeffries ...	No. A.	" " ...	Form 911 26.6.26 to 11.8.26 ...	20.8.26
<i>Manchester Regiment</i> ...	Struss, F. D. ...	J. Shaw ...	" A.	" " ...	" 28.5.27 to 25.6.27 ...	30.6.27
<i>Manchester Shipper</i> ...	Foale, J. R. ...	H. Swindells, C. A. Walker, W. R. Cullen.	M.L.	" " ...	Met. Log. 10.12.26 to 16.6.27...	20.6.27
<i>Manipur</i> ...	Raper, E. W. ...	R. Penston, K. Leadbetter ...	No. M.	Brocklebank ...	Form 911 6.1.27 to 4.2.27 ...	8.3.27
<i>Mantua</i> ...	Cochran, G. N. ...	" " " " " " " "	" M.	P. & O. ...	" 23.4.27 to 12.5.27 ...	8.6.27
<i>Marella</i> ...	Randell, G. G. ...	Mortimer, S. ...	M.L.	Burns Philp ...	Met. Log. 3.10.25 to 7.11.26 ...	5.4.27
<i>Marengo</i> ...	Mortimer, S. ...	Williams, J. C., R.D., Commr., R.N.R.	"	Ellerman Wilson ...	" 14.1.27 to 21.2.27 ...	16.3.27
<i>Margha</i> ...	Williams, J. C., R.D., Commr., R.N.R.	P. Wright, H. E. Evans, R. M. Wyatt, R. A. Clarke.	"	British India... ...	" 27.2.27 to 7.5.27 ...	18.5.27
<i>Marsina</i> ...	Milne, R. A., R.D., Commr., R.N.R.	H. C. Tarrington ...	No. A.	Burns, Philp & Co. ...	Form 911 15.9.26 to 6.10.26 ...	15.11.26
<i>Mastira</i> ...	Rothery, S. ...	A. E. Evans ...	" M.	Brocklebank ...	" 12.9.26 to 13.10.26 ...	10.11.26
<i>Matakana</i> ...	Mallett, R. ...	J. Hart, J. Dickson, G. E. Lindsay.	M.L.	Shaw, Savill & Albion	Met. Log. 1.2.27 to 13.3.27 ...	18.3.27
<i>Mataram</i> ...	Thurston, H. P. ...	V. V. Edmonds... ...	No. A.	Burns, Philp & Co. ...	Form 911 26.12.26 to 20.1.27...	28.2.27
<i>Mataroa</i> ...	Voy, W. ...	T. T. Oliver, J. J. Nicoll, G. Lindsay.	M.L.	Shaw, Savill & Albion	Met. Log. 25.3.27 to 10.7.27 ...	12.7.27
<i>Matheran</i> ...	Kershaw, W. A. R. ...	L. Jeans, H. Simpson, J. Richardson.	"	Brocklebank ...	" 2.2.27 to 29.4.27 ...	30.5.27
<i>Matiana</i> ...	Ison, W. A. ...	R. M. Morrison... ...	No. M.	British India... ...	Form 911 18.4.27 to 24.5.27 ...	25.5.27
<i>Maunganui</i> ...	Green, F. V. ...	C. G. Eustace ...	" M.	Union S.S. Co. of N.Z.	" 4.6.26 to 9.7.26 ...	23.8.26
32 <i>Mauretania</i> ...	Davey, A. H. ...	E. R. Taylor, J. A. Quarrie, G. Duguid.	W.T.	Cunard ...	W.T. Reg. 5.6.27 to 20.6.27 ...	23.6.27
<i>Medic</i> ...	Diggle, E. G., R.D., Capt., R.N.R.	W. Nicoll... ...	No. A.	White Star ...	Form 911 25.6.27 to 12.7.27 ...	14.7.27
<i>Megantic</i> ...	Jones, W. H. ...	" " " " " " " "	" A.	" " ...	" 10.3.27 to 18.4.27 ...	21.4.27
22 <i>Melita</i> ...	Trant, E. L., R.D., Commr., R.N.R.	J. Shearer ...	W.T.	Canadian Pacific ...	" 5.6.27 to 25.6.27 ...	29.6.27
<i>Memnon</i> ...	Dott, J. F. ...	" " " " " " " "	No. A.	A. Holt... ...	W.T. Reg. 12.6.27 to 30.6.27 ...	4.7.27
21 <i>Metagama</i> ...	Dougall, W. T. ...	R. Walker, H. J. Ferguson ...	W.T.	Canadian Pacific ...	Form 911 22.5.27 to 7.6.27 ...	5.7.27
<i>Middlesex</i> ...	Freer, A., Capt., R.N.R.	A. V. Pearce ...	No. M.	Federal... ...	W.T. Reg. 30.5.27 to 17.6.27 ...	20.6.27
<i>Minderoo</i> ...	MacRae, A., D.S.C., Lt.-Commr., R.N.R.	B. J. Bennie, W. J. McPhedran, J. H. Oxtan.	" A.	West Australia Nav. Co.	Form 911 25.5.27 to 28.6.27 ...	5.7.27
<i>Minna</i> ...	Richardson, E. ...	A. M. Campbell ...	" A.	Scottish Fishery Board.	Met. Log. 2.5.26 to 4.10.26 ...	1.12.26
23 <i>Minnedosa</i> ...	Mackenzie, G. G. ...	A. Mackie ...	W.T.	Canadian Pacific ...	Form 911 2.6.27 to 27.6.27 ...	5.7.27
<i>Minnesota</i> ...	Griffiths, J. N. ...	A. J. Smith ...	No. M.	Atlantic Transport... Board.	W.T. Reg. 28.5.27 to 17.6.27 ...	21.6.27
<i>Minnetonka</i> ...	Pollard, W. F., D.S.O., Capt., R.N.R.	H. E. Macartney ...	" M.	" " ...	Form 911 30.4.27 to 20.5.27 ...	24.5.27
<i>Minneapolis</i> ...	Gates, T. F., O.B.E....	F. Mummery ...	" M.	" " ...	" 29.5.27 to 18.6.27 ...	23.6.27
<i>Mirror</i> , C.S.	Claret, F. H., O.B.E., Commr., R.N.R.	A. G. Watts ...	" M.	Eastern Tel. Co. ...	" 18.6.27 to 25.6.27 ...	29.6.27
	Gibson, L. ...	" " " " " " " "	" M.	" " ...	" 20.6.27 to 9.7.27 ...	13.7.27

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 15.7.27.	Date Received.
Mississippi ...	Wylie, J. T. J. ...	S. C. Skinner ...	No. A.	Atlantic Transport ...	Form 911 16.5.27 to 26.6.27 ...	8.7.27
Moldavia ...	Burleigh, C. W., D.S.O., R.D., Capt., R.N.R.	G. H. Durrant ...	" M.	P. & O. ...	" 24.5.27 to 30.6.27 ...	5.7.27
Mongolian Prince	Edwards, W. ...	V. E. Palmer ...	" A.	Prince ...	" 21.3.27 to 4.4.27 ...	4.5.27
24 Montcalm ...	Hamilton, G. ...	H. McFadyen ...	" W.T.	Canadian Pacific ...	W.T. Reg. 19.6.27 to 9.7.27 ...	12.7.27
25 Montclare ...	Webster, G. S., R.D., Lt.-Commr., R.N.R.	A. Mansey, R. W. Jackson, W. J. Roberts.	"	" ...	" 5.6.27 to 23.6.27 ...	27.6.27
Montferland ...	Van Noppen, C.D. ...	W. Slooten ...	No. M.	Holland Lloyd ...	Form 911 5.8.26 to 6.11.26 ...	17.11.26
27 Montnabru ...	Turnbull, J., A.D.C., C.B.E., R.D., Capt., R.N.R.	L. Hammersley, N. A. Goater, J. Roche.	" W.T.	Canadian Pacific ...	W.T. Reg. 7.5.27 to 25.5.27 ...	31.5.27
Montoro ...	" ...	" ...	No. A.	Burns, Philp & Co. ...	" ...	"
26 Montrose ...	Landy, E. ...	A. Watt ...	" W.T.	Canadian Pacific ...	W.T. Reg. 11.6.27 to 30.6.27 ...	5.7.27
20 Montroyal ...	Sibbons, H. ...	R. Antrobus ...	"	" ...	" 18.6.27 to 4.7.27 ...	7.7.27
Moresby ...	Edgell, J. A., O.B.E., Capt., R.N.	W. H. Martin ...	" M.L.	His Majesty's Australian Ship.	Met. Log. 31.8.26 to 14.12.26 ...	24.1.27
Morvada ...	Mills, T. L., O.B.E., R.D., Commr., R.N.R.	D. S. Johnston ...	No. M.	British India ...	Form 911 13.3.27 to 6.6.27 ...	10.6.27
Mulbera ...	Steadman, W. R. ...	E. H. Spriggs ...	" M.	" ...	" 5.5.27 to 28.6.27 ...	5.7.27
Nagara ...	Foster, E. ...	J. Watson ...	" M.	R.M.S.P. Co. ...	" 15.1.27 to 24.5.27 ...	1.6.27
Nagoya ...	Davis, H. C., D.S.C., R.D., Commr., R.N.R.	L. Porter ...	" M.	P. & O. ...	" 28.1.27 to 3.5.27 ...	12.5.27
Naldera ...	Coldwell, G. J. ...	W. F. Laughland ...	" M.	" ...	" ...	"
Nardana ...	Moth, F. L. ...	F. G. Sharp ...	" M.	British India ...	Form 911 4.6.27 to 15.6.27 ...	22.6.27
Nellore ...	Hignett, A. H., R.D., Lt.-Commr., R.N.R.	S. H. Baldwin ...	" M.	P. & O. ...	" 29.3.27 to 21.6.27 ...	27.6.27
Nerbudda ...	Williams, B. N. ...	J. W. B. Archibald, T. Barnard.	" M.	British India ...	" 19.3.27 to 8.4.27 ...	16.5.27
Nestor ...	Houghton, G. K. ...	O. C. Williams, G. R. Cheetham, N. Anderson.	" M.L.	A. Holt ...	Met. Log. 17.1.27 to 19.5.27 ...	26.5.27
Newby Hall ...	Butler, J. ...	E. M. Robertson, A. W. Wise, R. Y. Smith.	"	Ellerman ...	" 26.11.26 to 6.3.27 ...	28.3.27
Newfoundland	Furieux, S. ...	R. F. Handley, E. Sainty, S. Moore.	"	Furness Withy ...	" 11.12.26 to 6.5.27 ...	18.5.27
	Westgarth, W. A., D.S.C.	"	"	"	"	"
Niagara ...	Showman, A. C. ...	A. P. Cousin, D. McKenzie, T. Haulton, J. M. Hood.	"	Canadian- Australasian	" 22.9.26 to 30.1.27 ...	5.4.27
Ningchow ...	Christie, W. ...	" ...	No. A.	A. Holt ...	Form 911 13.10.26 to 30.12.26 ...	10.1.27
Norfolk ...	Mead, G. F. ...	J. W. Pring ...	" A.	Federal ...	" 28.5.27 to 10.7.27 ...	13.7.27
Norna ...	Wright, J. W. ...	" ...	" A.	Scottish Fishery Board	" 5.6.27 to 27.6.27 ...	5.7.27
Norseman, C.S.	Barter, H. O., R.D., Commr., R.N.R.	R. W. Greenfield ...	" M.	Western Tel. Co. ...	" 3.6.27 to 7.6.27 ...	30.6.27
Northwestern Miller	Nuttall, E. L. ...	" ...	" A.	Furness Withy ...	" 20.11.26 to 23.12.26 ...	29.12.26
Nova Scotia	Furieux, S. ...	" ...	" A.	" ...	" 8.6.27 to 19.6.27 ...	9.7.27
Noushera ...	Rowe, S. N. ...	W. D. L. Reeves ...	" M.	British India ...	" 12.3.27 to 1.6.27 ...	10.6.27
Nubian ...	Watmough, T. M. ...	" ...	" A.	Leyland ...	" 28.2.27 to 14.3.27 ...	22.3.27
Oaklands Grange	St. Clair, C., D.S.C. ...	E. J. Longheed ...	" A.	Houlder Bros. ...	" 1.6.27 to 30.6.27 ...	5.7.27
57 Olympic ...	Marshall, W., C.B., D.S.O., A.D.C., R.D., Commodore, R.N.R.	A. Fisher, H. J. C. Day, A. E. Weller.	" W.T.	White Star ...	W.T. Reg. 9.6.27 to 23.6.27 ...	27.6.27
	"	"	"	"	Form 911 8.6.27 to 23.6.27 ...	27.6.27
Opawa ...	Robinson, F. W. ...	" ...	" M.L.	New Zealand S.S. Co.	" ...	"
Orama ...	Shelford, W. S., Lieut.-Commr., R.N.R.	T. Fox Russell, C. K. Blake, H. Tanner.	"	Orient ...	Met. Log. 6.3.27 to 7.6.27 ...	14.6.27
Oranian ...	Hoskins, W. ...	W. R. Atkinson ...	No. A.	Leyland ...	Form 911 28.3.27 to 1.6.27 ...	9.6.27
Orbita ...	" ...	" ...	No.	R.M.S.P. Co. ...	" ...	"
Orcoma ...	Dominy, R. H., C.B.E., Commr., R.N.R.	T. Naylor, G. Gerety, T. Mit- chell.	" M.L.	Pacific S.N. Co. ...	Met. Log. 18.11.26 to 4.2.27 ...	22.2.27
Orduna ...	Daniel, T. ...	E. Hicks ...	No. M.	R.M.S.P. Co. ...	Form 911 12.4.27 to 16.6.27 ...	21.6.27
Orestes ...	Flynn, G. A. ...	F. T. Berry ...	" A.	A. Holt ...	" 1.5.27 to 9.5.27 ...	18.5.27
Orita ...	Splatt, W. A. ...	D. W. Hutchinson, J. L. Jones, A. G. Litherhead, J. W. Milne.	" M.L.	Pacific S.N. Co. ...	Met. Log. 22.12.26 to 30.5.27 ...	10.6.27
Ormonde ...	Wyatt, A. G. N., Lieut.-Commr., R.N.	A. M. Hughes ...	"	His Majesty's Ship ...	" 7.9.26 to 17.11.26 ...	1.12.26
Ormonde ...	James, L. V., D.S.C. ...	" ...	No. M.	Orient ...	Form 911 18.4.27 to 27.4.27 ...	4.5.27
Oronsay ...	Owens, A. L., R.D., Commr., R.N.R.	J. C. K. Dowding, R. K. Rogerson, R. Galpin, R. S. Hawker.	" M.L.	" ...	Met. Log. 6.2.27 to 11.5.27 ...	16.5.27
Oroya ...	Duncan, E. E. ...	" ...	No. M.	Pacific S.N. Co. ...	Form 911 9.2.27 to 19.4.27 ...	4.5.27
Orsova ...	Cameron, E. P., R.D., Commr., R.N.R.	L. E. Fordham, L. J. Vesty, A. Croft Cohen, H. A. Whittle.	" M.L.	Orient ...	Met. Log. 3.4.27 to 7.7.27 ...	13.7.27
Orvieto ...	Thorne, G. G., R.D., Commr., R.N.R.	I. E. G. Goldworthy, G. L. Carter, J. L. Skilling, T. L. Shurrock.	"	" ...	" 25.12.26 to 31.3.27 ...	4.4.27
Osterley ...	Hayes, I. J. ...	S. Burnnand ...	No. A.	" ...	Form 911 1.11.26 to 3.2.27 ...	8.2.27
Ofaki ...	McNish, R. ...	C. R. Brown ...	" A.	New Zealand S.S. Co.	" 24.12.26 to 7.2.27 ...	10.2.27
Oflra ...	Wood, C. ...	D. N. MacGregor ...	" M.	Shaw, Savill & Albion	" 14.5.27 to 2.6.27 ...	20.6.27
Ofranto ...	Staunton, H. G., C.B.E., R.D., Commr., R.N.R.	" ...	" M.	Orient ...	" 20.1.27 to 1.4.27 ...	19.4.27
Oxfordshire ...	Crumplin, W. E. ...	C. F. Hicks ...	" A.	Bibby Bros. ...	" 27.3.27 to 3.6.27 ...	9.6.27
Pacific Shipper,	Newman, G. W. A. ...	G. Davis ...	" A.	Furness Withy ...	" 5.5.27 to 2.6.27 ...	8.7.27
M.V.	" ...	" ...	"	" ...	" ...	"
Pacuare ...	Sapsworth, S. A. ...	V. R. Watkins ...	" A.	Elders & Fyffes ...	" 15.5.27 to 18.6.27 ...	28.6.27
Pakeha ...	W. P. Clifton Mogg ...	E. T. Baker, R. E. Nicholson, A. J. Tillot.	" M.L.	Shaw, Savill & Albion	Met. Log. 21.12.26 to 29.4.27 ...	7.5.27
Pareora ...	Evans, J. O. ...	N. F. Finch ...	No. A.	Hain S.S. Co. ...	Form 911 27.3.27 to 3.5.27 ...	24.5.27
Paris ...	Cook, C. L. ...	Mr. Biles ...	" C.C.	Southern Ry. ...	Telegraphic Report. 13.7.27 ...	13.7.27
Patia ...	Makepeace, S. ...	J. Kinsley ...	No. A.	Elders & Fyffes ...	Form 911 27.12.26 to 28.1.27 ...	14.2.27
Patrician ...	Pugh, R. H. ...	H. W. Stanley ...	" M.	Harrison ...	" 11.6.26 to 28.9.26 ...	23.11.26
Patrol, C.S.	Welsh, T. K. ...	J. S. Brown ...	" No.	Eastern Extension (A. & C.) Telegraph Co.	Met. Log. 18.10.26 to 15.11.26 ...	9.2.27
Petsander ...	Slater, H. N. ...	" ...	No.	A. Holt ...	" ...	"

LIST OF VOLUNTARY OBSERVING SHIPS

vii

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 15.7.27.	Date Received.
<i>Peshawur</i> ...	Wilding, H. G. ...	J. C. Mellonie, J. K. Crone, R. G. Wood.	M.L.	P. & O. ...	Met. Log. 30.10.26 to 6.3.27 ...	18.3.27
<i>Piako</i> ...	Kettlewell, C. R. ...	E. W. Smith, M. Rose, H. N. Lawson.	"	New Zealand S.S. Co.	" 7.12.26 to 20.5.27 ...	26.5.27
<i>Polycarp</i> ...	Jackson, T. ...	J. G. West ...	No. A.	Booth ...	Form 911 14.5.27 to 30.6.27 ...	5.7.27
<i>Port Adelaide</i> ...	Williams, R. ...	E. N. Rogerson ...	M.L.	Commonwealth & Dominion.	Met. Log. 13.1.27 to 20.6.27 ...	12.7.27
<i>Port Albany</i> ...	Robinson, C. A. ...	E. A. Leavett, W. Eastoe, J. Thom.	"	" " "	" 24.12.26 to 10.5.27 ...	23.5.27
" <i>Auckland</i> ...	Durham, R. S. ...	G. L. Hazlewood, C. F. Post, J. H. Sloan, H. E. Braine.	"	" " "	" 18.9.26 to 22.1.27 ...	7.2.27
" <i>Bowen</i> ...	Gilling, W. ...	W. R. Johnston ...	No. A.	" " "	Form 911 8.2.27 to 20.3.27 ...	28.3.27
" <i>Caroline</i> ...	Hoad, A. C. ...	" " " " " "	M.L.	" " "	Met. Log. 16.1.27 to 16.6.27 ...	29.6.27
" <i>Darwin</i> ...	Sawbridge, I. R. ...	S. Hearn, W. Lynd, E. T. N. Lawrey.	"	" " "	" 28.1.27 to 29.6.27 ...	4.7.27
" <i>Denison</i> ...	Ferris, J. ...	P. J. Howe ...	"	" " "	Form 911 25.5.27 to 7.7.27 ...	9.7.27
" <i>Dunedin</i> ...	Lea, W. H. ...	E. G. Jones, R. Needham, H. M. Post, E. Wheeler.	M.L.	" " "	Met. Log. 4.12.26 to 2.3.27 ...	5.4.27
" <i>Fremantle</i> ...	Kearney, F. J. ...	" " " " " "	No.	" " "	" " " " " "	" " " " " "
" <i>Hacking</i> ...	Higgs, H. E. ...	F. W. Elgar, J. A. Fairbairn, E. Luker.	M.L.	" " "	Met. Log. 1.1.27 to 14.6.27 ...	16.6.27
" <i>Hobart</i> ...	Craven, R. ...	C. Hersee, L. Copeland, G. G. Langford, C. L. Webb.	"	" " "	" 4.2.27 to 30.5.27 ...	10.6.27
" <i>Hunter</i> ...	Cottell, S. C. ...	A. Cooper, R. Forrest, J. T. Weldin.	"	" " "	" 7.1.27 to 13.5.27 ...	7.6.27
" <i>Melbourne</i> ...	Brown, A. H. ...	D. G. H. Bradley, E. M. Fenton, L. H. B. Bloye.	"	" " "	" 26.10.26 to 3.3.27 ...	23.3.27
" <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. L. Lewis, G. L. H. Dean, P. A. Munday, C. Jolly.	M.L.	" " "	Met. Log. 10.9.26 to 3.1.27 ...	19.1.27
" <i>Pirte</i> ...	Kippins, T. ...	" " " " " "	"	" " "	" 6.11.26 to 8.3.27 ...	24.3.27
" <i>Sydney</i> ...	Higgs, W. G. ...	H. G. Boys Smith ...	"	" " "	" 25.9.26 to 19.2.27 ...	28.2.27
" <i>Victor</i> ...	Swan, L. H. ...	L. M. R. Bayly, J. B. Watson, A. Brown.	"	" " "	" 8.12.26 to 8.6.27 ...	13.6.27
" <i>Wellington</i> ...	Farmer, F. ...	P. H. Pedrick ...	No. A.	" " "	Form 911 14.10.26 to 2.2.27 ...	11.2.27
<i>President Jackson</i> ...	Griffith, J. ...	P. Treanor ...	" A.	Pacific Mail S.S. Co.	" 11.4.27 to 27.4.27 ...	11.7.27
<i>President Jefferson</i> ...	Nichols, F. R. ...	C. H. Moen, B. Christensen ...	" A.	Admiral Oriental Line	" 3.4.27 to 22.5.27 ...	10.6.27
<i>President Wilson</i> ...	Nelson, H. ...	A. M. Quinlan ...	" A.	Dollar ...	" 5.9.26 to 2.11.26 ...	22.11.26
<i>Protea</i> , H.M.S.A.S. ...	Woodhouse, A. F. B., Lt.-Commr., R.N.	" " " " " "	M.L.	South African Naval Service.	" 1.2.27 to 28.2.27 ...	29.3.27
<i>Protestant</i> ...	Nelson, T. B. ...	" " " " " "	"	A. Holt ...	" " " " " "	" " " " " "
<i>Pyrrhus</i> ...	Elford, W. J. ...	R. E. Wilks ...	No. A.	" " " " " "	Form 911 25.5.27 to 9.6.27 ...	5.7.27
<i>Ranpura</i> ...	King, A. M., D.S.C. ...	G. Randall ...	" M.	P. & O. ...	" 15.4.27 to 8.6.27 ...	10.6.27
<i>Regina</i> ...	Davies, E. ...	R. C. Cochrane ...	" A.	White Star-Dominion	" 29.5.27 to 18.6.27 ...	20.6.27
<i>Reindeer</i> ...	Langdon, C. ...	" " " " " "	C.C.	G.W. Railway	Telegraphic Report 1.6.27 ...	1.6.27
<i>Reventazon</i> ...	Jack, D. A. ...	B. R. Wickham Tarr ...	No. A.	Elders & Fyffes	Form 911 9.4.27 to 14.5.27 ...	21.5.27
<i>Rhodesian Transport</i> ...	Bullock, F. W. H. ...	H. B. Parkins ...	" A.	Houlder Bros.	" 6.4.27 to 22.5.27 ...	10.6.27
<i>Rimutaka</i> ...	Hemming, F. A. ...	H. A. Fryer, D. E. Hughes, G. O. Saul, H. Vernon.	M.L.	New Zealand S.S. Co.	Met. Log. 23.12.26 to 21.4.27 ...	28.4.27
<i>Risaldar</i> ...	Matthews, E. G. ...	" " " " " "	No. M.	Asiatic S.N. Co.	Form 911 7.6.27 to 11.6.27 ...	11.7.27
<i>Rotorua</i> ...	Hunter, J. B. ...	E. Lawrence, R. G. Rees, H. Cockerill.	M.L.	New Zealand S.S. Co.	Met. Log. 18.11.26 to 4.3.27 ...	10.3.27
<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
<i>Royal Transport</i> ...	Dove, J. ...	R. W. Wass ...	" A.	Houlder Bros.	" 18.8.26 to 7.4.27 ...	27.4.27
<i>Ruapehu</i> ...	McKellar, A. W., R.D., Capt., R.N.R.	H. M. Selmer, W. J. Glassborow, T. M. Devitt.	M.L.	New Zealand S.S. Co.	Met. Log. 4.2.27 to 9.6.27 ...	15.6.27
<i>St. Albans</i> ...	Smith, G. L. ...	J. M. Heddle, F. O. Colvin, R. S. Millington, J. Kavanagh.	"	Eastern and Australian.	" 31.12.26 to 29.3.27 ...	23.5.27
<i>St. Helier</i> ...	Mulhall, W. ...	C. Bell ...	C.C.	G.W. Railway	Telegraphic Report 14.7.27 ...	14.7.27
<i>St. Julien</i> ...	Langdon, C. H. ...	C. Joy ...	"	" " " " " "	" 13.7.27 ...	13.7.27
<i>St. Andrew</i> ...	Bearpark, E. W. ...	J. G. Feint ...	No. A.	Rankin Gilmour	Form 911 2.1.27 to 17.2.27 ...	11.3.27
<i>Salaga</i> ...	Jones, W. ...	C. V. Evans ...	" A.	Elder Dempster	" 19.3.27 to 4.6.27 ...	15.6.27
<i>38 Samaria</i> ...	Malin, R. G., Lieut.-Commr., R.N.R.	C. S. Williams, A. B. Fasting	W.T.	Cunard ...	" 13.6.27 to 3.7.27 ...	5.7.27
<i>Samarinda</i> ...	Flack, Z. W. ...	R. F. Rikherth ...	No. M.	Rotterdam Lloyd	W.T. Reg. 13.6.27 to 3.7.27 ...	6.7.27
<i>Saxon</i> ...	Lang, T. M., Lieut.-Commr., R.N.R.	G. H. Pickering ...	" A.	Union Castle ...	Form 911 8.5.27 to 3.6.27 ...	9.6.27
<i>Scholar</i> ...	Egerton, J. J. ...	" " " " " "	"	" " " " " "	" 14.5.27 to 3.7.27 ...	5.7.27
<i>Scotia</i> ...	Prichard, S.D., M.B.E.	J. McLellan ...	" M.	Harrison ...	" 9.3.27 to 5.5.27 ...	9.5.27
<i>Scottish Bard</i> ...	McDonnell, S. ...	O. W. L. Jones ...	C.C.	L.M. & S. Railway	Telegraphic Report 4.7.27 ...	4.7.27
<i>33 Scythia</i> ...	Prothero, W. ...	J. W. Lilley ...	No. A.	Tankers Ltd. ...	Form 911 22.11.26 to 3.12.26 ...	3.1.27
<i>Sheaf Mount</i> ...	Groves, C. V. ...	G. Overton, G. H. Morris, P. G. Britten.	W.T.	Cunard ...	W.T. Reg. 6.6.27 to 25.6.27 ...	4.7.27
<i>Sheaf Spear</i> ...	Whitfield, G. A., O.B.E.	W. Thomson ...	No. A.	W. A. Souter ...	Form 911 26.1.27 to 19.2.27 ...	3.3.27
<i>Shropshire, M.V.</i> ...	Adamson, B. W. ...	S. J. Dring, T. B. Fishley ...	M.L.	" " " " " "	" 1.5.27 to 4.6.27 ...	28.6.27
<i>Socrates</i> ...	Taylor, F. C. ...	" " " " " "	"	" " " " " "	Met. Log. 14.10.26 to 13.2.27 ...	1.3.27
<i>Somme</i> ...	Miles, F. R., Commr., R.D., R.N.R.	W. L. Whiteside, J. V. Brown, J. E. Goldsworthy.	"	Bibby ...	" 17.2.27 to 22.4.27 ...	27.4.27
<i>Spero</i> ...	Montgomery, H. ...	W. E. Jordan ...	No. A.	Lampart & Holt ...	Form 911 1.4.27 to 18.6.27 ...	8.7.27
<i>Stockwell</i> ...	Thowless, E. ...	D. Fraser, J. G. F. Betson ...	" A.	R.M.S.P. Co. ...	" 1.5.26 to 23.7.26 ...	13.8.26
<i>Surrey</i> ...	Lamb, C. B. ...	D. Millward ...	M.L.	Ellerman Wilson ...	Met. Log. 24.12.26 to 3.7.27 ...	8.7.27
<i>Suva Maru</i> ...	Gotoh, M. ...	W. Gibson ...	No. A.	Brocklebank ...	Form 911 5.4.27 to 29.5.27 ...	2.6.27
<i>Sylviafield</i> ...	Biddick, E. ...	S. C. Bradley ...	" A.	Federal ...	" " " " " "	" " " " " "
<i>Tainui</i> ...	Elford, H. C. ...	G. Toh, M. ...	" A.	Nippon Yusen Kaisha	Form 911 22.1.27 to 20.2.27 ...	11.3.27
<i>Tahiti</i> ...	Aldwell, B. M. ...	E. Holmes ...	" A.	Hunting & Son	" 17.5.27 to 17.6.27 ...	20.6.27
<i>Taipei</i> ...	Frame, A. M. ...	" " " " " "	"	" " " " " "	" 26.2.27 to 7.6.27 ...	10.6.27
<i>Talhybuis</i> ...	Hatfield, J. ...	" " " " " "	"	" " " " " "	" 20.4.27 to 14.5.27 ...	22.6.27
<i>Tamara</i> ...	Hartman, W. H. ...	R. T. Harries ...	No. A.	Union S.S. Co. of N.Z.	Met. Log. 17.9.26 to 8.1.27 ...	15.3.27
<i>Tambora</i> ...	Huisman, N. ...	F. W. Lutyens ...	" M.	A. Holt ...	Form 911 3.5.27 to 20.5.27 ...	20.6.27
<i>Tanda</i> ...	Pilcher, E. ...	H. Van Manen ...	" M.	Shaw, Savill & Albion	" 9.4.27 to 15.5.27 ...	20.5.27
<i>Tetresias</i> ...	Wilkinson, W. H. ...	J. W. Kavanagh, B. Dun, C. Stratford, H. E. Nuzum.	" M.	Rotterdam Lloyd	" 29.8.26 to 14.10.26 ...	30.10.26
<i>Tekoa</i> ...	Barnett, H. ...	" " " " " "	"	E. & A. S.S. Co.	" 27.8.26 to 3.12.26 ...	7.1.27
<i>Tetresias</i> ...	Wilkinson, W. H. ...	W. Stanger ...	" A.	A. Holt & Co. ...	" 3.1.27 to 13.3.27 ...	17.3.27
<i>Tekoa</i> ...	Barnett, H. ...	P. H. Chalwin ...	" M.	New Zealand S.S. Co.	" 6.2.27 to 17.3.27 ...	21.3.27

Name of Vessel.	Captain.	Observing Officers.	Official Meteorological Equipment.	Line.	Last Log, Register, or Report Contributed. Received up to 15.7.27.	Date Received.
<i>Telamon</i> ...	Clark, D. ...	F. Wardrobe ...	No. A.	A. Holt ...	Form 911 3.5.27 to 31.5.27 ...	21.6.27
<i>Teucer</i> ...	Hodgson, R. N. ...	D. T. Thorne ...	" A.	" ...	" 22.5.27 to 10.6.27 ...	24.6.27
<i>Themistocles</i> ...	Jermyn, W. M. ...	H. C. Howe ...	" M.	Aberdeen ...	" 5.5.27 to 18.6.27 ...	30.6.27
<i>Theseus</i> ...	Jones, E. ...	W. A. Fyffe ...	" A.	A. Holt ...	" 22.4.27 to 6.5.27 ...	9.6.27
<i>Titan</i> ...	Wilkinson, T. G. ...	D. MacTavish, G. W. Best, C. G. Bailey.	M.L.	" ...	Met. Log. 27.8.26 to 12.2.27 ...	23.2.27
<i>Tongariro</i> ...	Williams, J. M. ...	E. A. Quick ...	No. M.	New Zealand S.S. Co.	Form 911 12.3.27 to 26.4.27 ...	10.6.27
<i>Transylvania</i> ...	Bone, D. W. ...	P. Middleton ...	" A.	Anchor ...	" 11.6.27 to 3.7.27 ...	5.7.27
<i>Traveller</i> ...	Worthington, B. ...	E. L. Stockley ...	" M.	T. & J. Harrison ...	" 3.5.27 to 21.6.27 ...	5.7.27
<i>Trematon</i> ...	Evans, B. ...	R. Gregory, C. Warren, J. Toms.	M.L.	Hain S.S. Co. ...	Met. Log. 10.10.26 to 7.3.27 ...	25.4.27
<i>Turakina</i> ...	Hamilton, E. S. ...	A. N. Marshall, G. S. Shepherd	No. M.	New Zealand S.S. Co.	Form 911 27.9.26 to 5.1.27 ...	28.1.27
<i>Tuscania</i> ...	Smart, R. W. ...	" ...	" A.	Anchor ...	" 28.5.27 to 19.6.27 ...	23.6.27
<i>Tyndareus</i> ...	Williams, R. J. ...	A. G. Phillips, F. Howe, A. R. McDavid.	M.L.	A. Holt ...	Met. Log. 16.12.26 to 18.5.27...	2.7.27
<i>Ulmaraea</i> ...	Wylie, W. J. ...	A. N. Robertson ...	No. M.	Huddart Parker, Ltd.	Form 911 1.4.27 to 25.4.27 ...	10.6.27
<i>Ulysses</i> ...	Owen, R. D., O.B.E....	A. Studholme ...	" A.	A. Holt ...	" 2.3.27 to 10.7.27 ...	13.7.27
<i>Umvolosi</i> ...	Barnes, E. W. ...	R. L. B. Ryde ...	" A.	Bullard King ...	" 4.5.27 to 20.5.27 ...	20.6.27
<i>Valacia</i> ...	Inch, F. ...	G. Meggitt ...	" M.	Cunard ...	" 12.1.27 to 10.4.27 ...	13.4.27
<i>Vardulia</i> ...	Robinson, F. W. ...	" ...	" A.	" ...	" 31.5.27 to 12.6.27 ...	11.7.27
<i>Verbania</i> ...	Pooley, T. S. M. ...	A. F. Watts ...	" A.	" ...	" 8.2.27 to 26.3.27 ...	19.4.27
<i>Vigilant</i> ...	Simpson, E. S. S. ...	J. Hunter ...	" A.	Scottish Fishery Board.	" 1.6.27 to 27.6.27 ...	5.7.27
<i>Waioapu</i> ...	Harris, E. ...	J. W. McCaskill ...	" M.	Canadian - Australasian.	" 5.3.27 to 4.4.27 ...	20.4.27
<i>Wairuna</i> ...	Whyborn, H. S. ...	R. Howie, G. H. George, A. W. Rabbitts.	M.L.	Union S.S. Co. of N.Z.	Met. Log. 19.6.26 to 25.9.26 ...	29.12.26
<i>Wangaratta</i> ...	Scutt, W. ...	T. W. Wordingham, S. R. Millard, K. M. Morrison, A. G. Brooks.	"	British India ...	" 18.9.26 to 1.2.27 ...	7.2.27
<i>Warfield</i> ...	Steel, R. ...	C. M. Quick ...	No. A.	" ...	Form 911 18.5.27 to 8.6.27 ...	5.7.27
<i>War Nizam</i> ...	Moncrieff, T. ...	J. Row, B. Kieran ...	" A.	British Tankers ...	" 6.4.27 to 30.6.27 ...	9.7.27
<i>Welshman</i> ...	Rollerson, W. ...	J. Mendus ...	" M.	White Star-Dominion	" 22.10.26 to 14.11.26 ...	26.11.26
<i>Westmoreland</i> ...	Gardner, H. W. ...	" ...	M.L.	Federal ...	" ...	"
<i>William Scoresby, R.S.S.</i> ...	Mercer, G. M., D.S.C., Lt.-Commr., R.N.R.	A. Irving, M. C. Lester	"	Falkland Islands Government.	Met. Log. 5.7.26 to 23.12.26 ...	4.4.27
<i>Windsor Castle</i> ...	Strong, H., R.D., Commr., R.N.R.	F. Wilbraham, C. L. Lovegrove, S. E. Aldham, L. A. J. Keeble.	"	Union Castle ...	" 1.10.26 to 29.5.27 ...	13.6.27
<i>Winfredian</i> ...	Harrocks, W. ...	" ...	No. M.	Leyland ...	Form 911 18.5.27 to 16.6.27 ...	23.6.27
<i>Wonganella</i> ...	Suffern, H. ...	G. F. Phillips ...	"	W. Crossby & Sons ...	" 21.4.27 to 20.5.27 ...	28.6.27
<i>Woodarra</i> ...	Reilley, J. V. ...	L. D. Graham, H. Goater, B. W. Smith.	M.L.	British India...	Met. Log. 23.10.26 to 18.4.27...	1.5.27
<i>Forkshire</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>Conway H.M.S.</i> ...	Richardson, F. A., D.S.C., Commr., R.N.	The Senior Cadets ...	Cadets' M.L.	" ...	Cadets' Met. Log. 23.1.27 to 2.4.27...	4.4.27
<i>Pangbourne Nautical College</i> ...	Tracy, A. F. G., Commr., R.N.	" ...	"	" ...	Cadets' Met. Log. 16.1.27 to 26.3.27	30.3.27
<i>Worcester, H.M.S.</i> ...	Sayer, M.B., C.B.E., R.D., Capt., R.N.E.	" ...	"	" ...	Cadets' Met. Log. 21.1.27 to 13.4.27	19.4.27
<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 1.7.26 to 31.12.26	20.4.27
<i>Double Headed Shot</i> ...	" ...	" ...	"	" ...	Lighthouse Register 1.7.26 to 31.12.26	20.4.27
<i>Inagua</i> ...	" ...	" ...	"	" ...	Lighthouse Register 1.7.26 to 31.12.26	20.4.27
<i>Sombrero</i> ...	" ...	" ...	"	" ...	Lighthouse Register 15.7.26 to 23.1.27	1.2.27
<i>Watling Island</i> ...	" ...	" ...	"	" ...	Lighthouse Register 1.7.26 to 31.12.26	10.11.26
<i>Cape Pembroke (Falkland Is.).</i> ...	" ...	" ...	"	" ...	Lighthouse Register 17.1.26 to 20.7.26	24.2.27

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 30.6.27.	Date Received.
<i>Casanare</i> ...	Steidelman, H. ...	R. O. Jones ...	Elders & Fyffes ...	Water Samples ...	29.6.27
<i>Darro</i> ...	Matthews, G. P. ...	W. Halder-Campe ...	R.M.S.P. Co. ...	" ...	20.5.27
<i>Deseado</i> ...	Shillitoe, B. ...	F. F. Wheeler ...	" ...	" ...	3.6.27
<i>Hildebrand</i> ...	Maddrell, J. ...	A. Allan ...	Booth ...	" ...	6.5.27
<i>Reventazon</i> ...	Jack, D. A. ...	J. Hughes ...	Elders & Fyffes ...	" ...	30.6.27

September, M.O., 1927.