

NORTH ATLANTIC STORMS FOR AUGUST, 1891 (pressure in inches and millimeters; wind-force by Beaufort scale).

The paths of storms that appeared over the west part of the north Atlantic Ocean in August, 1891, are shown on Chart I. These paths have been determined from reports of shipmasters received through the co-operation of the Hydrographic Office, Navy Department, and the "New York Herald Weather Service."

The normal distribution of atmospheric pressure over the north Atlantic Ocean in August favors the passage of storms in high latitudes, and gales of destructive violence are seldom encountered along the trans-Atlantic steamship routes during that month.

In the West Indies the month marks the height of the cyclone season, and records of past years show that storms of this class have averaged about two per month in August. These storms generally recurve over the Gulf of Mexico or off the southeast coast of the United States, and in a number of instances have been attended by enormous loss of life and property.

The most important storm of the current month was the cyclone which visited Martinique, W. I., the night of the 18th. A second storm of marked strength passed east of Bermuda on the 27th. In the middle latitudes unsettled weather attended the passage of areas of low pressure of moderate strength during the first and second decades of the month, the only storms of marked energy being noted over the eastern part of the ocean and the British Isles after the 20th.

The month opened with low pressure over the Gulf of Saint Lawrence and Newfoundland and northwest of the British Isles, and high pressure over mid-ocean. The pressure continued low over the western part of the ocean, and the morning of the 4th two storm-centers appeared, one, a continuation of low area I, off the Virginia coast, and the other, which apparently developed south of Newfoundland on the 3d, was central on the east Newfoundland coast. Low area I moved slowly eastward until the 7th, after which date it probably recurved northward and united with an area of low pressure which occupied the region north of the Gulf of Saint Lawrence. Low pressure continued north of Newfoundland until the 14th; on the 11th low area II passed into that region from the lower Saint Lawrence valley, and on the 13th low area III moved northeast over north Newfoundland. The continued low pressure over the Gulf of Saint Lawrence and Newfoundland during the first half of the month indicated an unusual westward and southward position of the Iceland area of low pressure. During the 7th and 8th there was a transfer of low pressure eastward over mid-ocean. During the 2d and 3d a storm passed eastward over the north part of the British Isles, and the pressure remained low over the North Sea until the 5th. From the 10th to 13th a storm moved from mid-ocean in high latitudes over the north part of the British Isles and disappeared over the North Sea. The night of the 15th low area IV moved off the southeast New England coast, and passing thence northeastward disappeared north of Newfoundland after the 17th. On the 18th low area V moved eastward over the Canadian Maritime Provinces and the Gulf of Saint Lawrence, and on the 19th was central over south Newfoundland. The morning of the 20th this storm was central over the Banks of Newfoundland, whence it moved northeast and passed north of the region of observation after the 21st. On the 21st and 22d low pressure prevailed over the Gulf of Saint Lawrence under the influence of low area VI which passed northeast over Labrador. During the greater part of the second and the first half of the third decades of the month low pressure continued over mid-ocean, and on the 25th pressure falling to about 29.25 (743) and whole gales were reported along the trans-Atlantic steamship routes near the 20th meridian. During the last half of the month low pressure prevailed over the British Isles. On the 21st a destructive storm occurred over the English Channel attending the passage of an area of low pressure which had advanced from the northwest. On the 26th a severe storm moved eastward over the north part of the British Isles, with heavy gales

and pressure falling to 28.70 (729) at Leith, Scotland. On the 29th low area IX passed northeastward over the Gulf of Saint Lawrence, and by the 31st this storm had apparently reached mid-ocean, where the pressure fell below 29.00 (737) and strong to whole gales were reported.

MARTINIQUE CYCLONE OF AUGUST 18, 1891. *Hurricane*

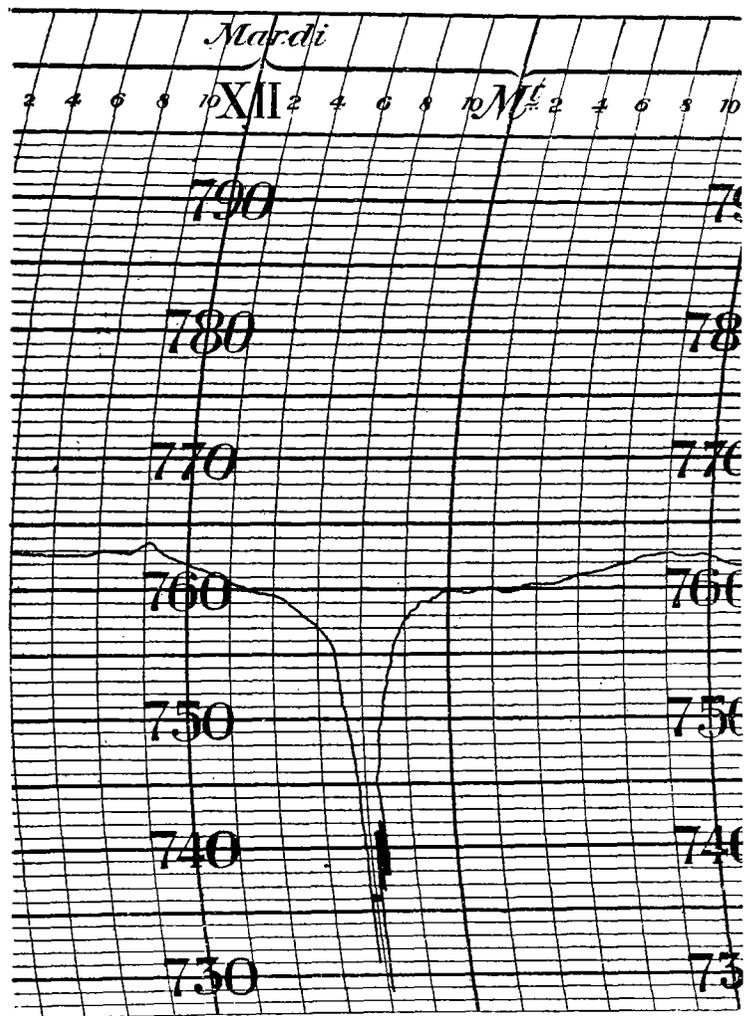
The night of the 18th one of the most disastrous of the type of storms known as West India cyclones devastated the Island of Martinique, in the Windward West Indies. At Martinique the storm continued four hours, from 6 to 10 p. m., and the center passed that place between 7 and 8 p. m., apparently traveling in a west-northwest direction at a speed of about 11 miles per hour. During the day a fresh north-northeast breeze had prevailed at Martinique, with rapidly falling barometer and wind increasing in force. The storm struck the east side of the island about 6 p. m., and in its passage over the island the destruction was less complete on the elevated plains. The wind veered from ene. to sse., and was most destructive from the latter point. Incessant lightning, unaccompanied by thunder, continued throughout the storm, and at its conclusion two distinct shocks of earthquake occurred at intervals of about five seconds. It is stated that in the vicinity of Caraval Rock at 10 a. m. two immense waves passed from the direction of Saint Lucia, the sea in the vicinity being quite calm. Another notable feature was the deafness experienced by every person in Martinique during the passage of the storm. The loss of life at Martinique is reported at 700; many persons were injured; property was destroyed to the value of about \$10,000,000; and all vessels about the island, some 50 sail of all classes, were wrecked. The commander of the S. S. "Esk" reports that he sailed from Barbados for Saint Lucia at 5.35 p. m., 17th, with northeast to east-northeast winds of force 3 to 4, and barometer at 30.17 (766); arrived at Saint Lucia at 6 a. m., 18th, with wind east-northeast, force 4, and barometer 30.19 (767); arrived at Saint Pierre, Martinique, at 1 p. m., with wind north-northeast, force 4, and barometer 30.10 (764); and left Martinique for Dominica, Windward Islands, at 2.35 p. m., with wind northeast, force 5, and barometer 30.07 (764). During the passage to Dominica northeast and east gales attaining hurricane force, heavy rain, violent squalls, and high seas from east-northeast were experienced, and the barometer fell to 29.96 (761) from 5 to 6 p. m. At Dominica the gale continued from east-northeast to east at force 10 to 11 until midnight, when the wind shifted to east-southeast, and from that point to southeast by 6 a. m. of the 19th, with slowly rising barometer and wind moderating in force.

Pursuing a west-northwest course the storm passed north of Grand Turk, Turks Islands, W. I., about midnight of the 21st. During the afternoon of the 21st there were indications of a cyclone approaching. In the evening the barometer fell steadily until 11.20 p. m., when it remained stationary at 29.21 (742) until midnight, after which it began to rise. From the force and changes of the wind it appeared that a cyclone had passed north of the islands, the vortex being probably 100 miles, or less, distant. During the afternoon there had been frequent rain squalls and a marked increase in the force of the wind. At 10.15 p. m. the first and only heavy gust of wind occurred, after which the wind decreased in force until midnight, at which time it again increased from the west. At 12.20 a. m., 22d, the wind was west by south and increasing in force; at 12.50 a. m. it was about west-southwest, and at 8 a. m. it was blowing from the southeast with heavy rain. At Grand Turk three persons were drowned, and the loss to property was confined to small houses and sailing vessels. From Grand Turk the storm-center passed to the Bahama Islands, a south hurricane being reported over Crooked Island, Bahamas, the evening of the 22d. During the 23d, 24th, and 25th a ridge of high barometer occupied the ocean off the south Atlantic coast of the United States, the pressure at Bermuda being 30.20 (767)

and above. This distribution of pressure had the apparent effect of preventing the cyclone from making the usual recurve to the north and northeast, and reports at hand indicate that it moved westward with diminished energy over extreme south Florida during the 24th, and passed thence into the Gulf of Mexico, where it probably dissipated, although reports indicate the presence of a cyclonic disturbance over the central and east Gulf until after the 29th. Early warning was received of the passage of this storm over the Windward Islands by telegrams to this office from Mr. Jos. Ridgeway, the observer at Saint Thomas.

The following diagram of a self-registering Richard barometer is of especial interest and value, inasmuch as it indicates the pressure changes attending the passage of the storm-center over Saint Pierre, Martinique.

Record of a self-registering Richard barometer, Saint Pierre, Martinique, August 18, 1891 (in millimeters).



Mr. Léon Sully, in a report accompanying the diagram, states that from 8.10 to 8.40 p. m. this barometer vibrated excessively, but a good aneroid barometer recorded every difference of pressure, and the passage of the center over Saint Pierre was clearly marked at 28.98 (736). The other minima (due to rapid oscillations varying in time from 2 to 3 seconds to 2 to 3 minutes) indicated clearly the passage of secondary whirls, rendered evident by the terrific noise of tiles and broken roofs; this fact was corroborated on the following day by the appearance of certain broken trees which could not have been bent in the way they were except by a strong gyratory movement. Moreover, in certain places in the country

there were long lanes or paths where the destruction was greater than elsewhere.

A second storm of tropical or subtropical origin advanced from the southeastward toward Bermuda during the 26th and passed east of that island during the 27th. By the morning of the 28th it had passed north of the 35th parallel, after which it apparently united with low area IX which occupied the Gulf of Saint Lawrence the morning of the 29th. For two days preceding the passage of this storm over the latitude of Bermuda the wind had been northeast, force 1 to 3, at that island. At 7 a. m., 27th, the wind was northeast, force 6; by 8 a. m. the wind had shifted to northwest, force 6, and it continued to blow from that point, with heavy rain squalls, until noon, when it shifted to west-northwest, to west at 3 p. m., to west-southwest at 6 p. m., and to southwest at 9 p. m. The barometer fell steadily to 29.60 (752) at 12.30 p. m., after which it began to rise. No damage was caused to shipping or buildings at Bermuda.

OCEAN ICE.

The following table shows the southern and eastern limits of the region within which icebergs or field ice were reported for August during the last 10 years:

Southern limit.			Eastern limit.		
Month.	Lat. N.	Long. W.	Month.	Lat. N.	Long. W.
August, 1882	46 50	46 00	August, 1882	46 50	46 00
August, 1883	43 25	51 41	August, 1883	46 00	44 00
August, 1884	43 24	48 44	August, 1884	47 50	43 50
August, 1885	43 48	52 04	August, 1885	48 03	42 45
August, 1886	48 35	48 40	August, 1886	50 00	48 00
August, 1887	42 21	49 51	August, 1887	48 06	40 00
August, 1888	Straits of Belle Isle		August, 1888	51 33	55 00
August, 1889	43 34	48 38	August, 1889*	53 00	45 00
August, 1890	42 30	50 21	August, 1890	50 13	39 10
August, 1891	44 07	52 05	August, 1891	47 32	42 45
Mean	45 01	50 25	Mean	49 06	44 39

* Isolated field ice in N. 58°, W. 46°.

The above table shows that for August, 1891, ice was reported about 1° south and about 2° east of the average southern and eastern limits of ice for the corresponding month of the last 9 years. The southernmost ice reported was a small iceberg on the 22d, and the easternmost ice was a piece of field ice on the 2d in the positions given in the table. The ice noted for the dates named was the only ice reported south of the 49th parallel. From the Straits of Belle Isle to the 50th meridian icebergs were reported throughout the month. Although ice is not commonly encountered in quantities along the trans-Atlantic steamship routes in August reports indicate an unusual deficiency over and near the Grand Banks for the current month. The limits of the region within which icebergs and field ice were reported for August, 1891, are shown on Chart I by ruled shading.

OCEAN FOG.

The limits of fog-belts west of the 40th meridian, as determined from reports of shipmasters, are shown on Chart I by dotted shading. Near the Banks of Newfoundland fog was reported on 23 dates; between the 55th and 65th meridians on 15 dates; and west of the 65th meridian on 10 dates. Compared with the corresponding month of the last 3 years the dates of occurrence of fog near the Grand Banks numbered 1 more than the average; between the 55th and 65th meridians 5 more than the average; and west of the 65th meridian 1 more than the average.

The fog noted by shipmasters and that reported by Weather Bureau observers along the New England and New Jersey coasts generally occurred in the east quadrants of general storms which advanced from the westward.