



HURRICANE OF SEPTEMBER 17 TO 21, 1938*

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U. S.
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The hurricane was first definitely located by radio on the evening of September 17, when it was centered approximately 500 miles northeast of the Leeward Islands. Mail reports now at hand show that it was centered at about 21° N., 53° W. late on the 16th. Its subsequent course is shown on the attached chart. On September 21 the center passed over Long Island and into New England near New Haven.

Tropical Storms in New England

Perhaps the earliest of the severe tropical storms of record in New England was that which occurred on August 15, 1635. A strong northeast wind with heavy rain began before daybreak, increased in violence and was accompanied by torrential rain. After the gale continued five or six hours, it changed to northwest and gradually subsided. In the same month there was a hurricane, possibly the same one, between St. Kitts and Martinique, exact date unknown, and also a violent gale on the coast of Haiti.

The "Great September Gale" of 1815 is probably the most noted of the early storms of New England. It was generally destructive in Rhode Island and in the central portion of Massachusetts. On the coast of Connecticut the high tides and hurricane winds destroyed many buildings and numerous vessels were driven ashore. The storm began from the northeast late on September 22 and reached its height shortly before noon of the following day. This hurricane came from the West Indies. It was recorded at St. Bartholomew on the 18th.

Other storms, probably all of tropical origin, which have seriously affected the New England States, are summarized briefly as follows:

August 19, 1788. A storm passed northward over eastern New York and western New England. There was considerable damage in Connecticut and western Massachusetts.

September 3, 1821. The center of this destructive hurricane crossed the western part of Long Island and passed northward into Connecticut.

September 8, 1869. This storm appears to have passed over eastern Connecticut, Rhode Island and eastern Massachusetts with a path about 60 miles wide, then over the ocean to the Maine Coast. Many vessels were driven ashore. There was much property damage in eastern Massachusetts and on the Maine Coast.

October 23-24, 1878. Center of the hurricane crossed eastern Pennsylvania and southeastern New York, then turned to the northeast and east across New England. Much damage was reported in New York City, Brooklyn, the Hudson Valley and Long Island Sound. Several vessels were sunk along the Connecticut Coast.

August 24, 1893. A storm passed over New York City, then northeast across New England. It was severe in Connecticut and Rhode Island.

August 29, 1893. A storm was severe from New York to the eastern New England Coast.

September 16, 1903. This storm apparently passed up the Connecticut Valley; there was extensive damage to shipping on the coast and to property in Connecticut.

* Condensed from report to appear later in the Monthly Weather Review.

National Oceanic and Atmospheric Administration Weather Bureau Hurricane Series

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The Hurricane of 1938 at Sea

There was some evidence of cyclonic circulation central about 19° N., 37° W., on the morning of September 13, 1938, but the storm has not been definitely charted prior to the evening of September 16, when it appears to have been a fully developed hurricane. At about 9:30 p.m., ship's time, on September 16, the Brazilian S.S. Alegrete was near the center in approximately 21°12' N., 52°46' W., barometer 28.31 (uncorrected), wind force 12, shifting from east-northeast to east-southeast. Early on the morning of September 17, the Netherlands S.S. Socrates encountered the storm while near 21° N., 59° W., and had increasing winds, backing from east-northeast to northwest and then to west-southwest, lowest barometer 29.29 inches. The highest wind experienced was W.-11 at 9:35 p.m., ship's time, in latitude 20°38' N., longitude 59°17' W.

During the 17th and 18th, the hurricane moved in a direction only slightly north of west, its progressive motion averaging more than 20 miles an hour. On the 19th and 20th the hurricane recurved, with somewhat slower movement, about 15 miles an hour, until the evening of the 20th when it turned more to the northward and began an increasingly rapid march which culminated in a progressive rate of about 50 miles an hour during the 21st.

Many vessels were heavily involved in the storm during the period from the 18th to 21st. Two vessels reporting by radio gave barometer readings below 28 inches, the British S.S. Corrales, 27.90 on the 18th and the British S.S. Carinthia, 27.85 on the 20th, but neither have rendered gale reports.

Central Pressure

It appears that central pressure was near or below 28.00 inches throughout the storm's course at sea, beginning late on the 16th and continuing until the center moved inland near New Haven on the afternoon of the 21st.

The Hurricane in Coastal Areas and in New England

It was not until the early morning of September 21 that the hurricane approached any coastal or island area close enough to be felt seriously. At about 7:30 a.m., E.S.T. of that day, the center was about 75 miles east or slightly north of east from Cape Hatteras, where the barometer reading at that time was 29.30 and the wind velocity 50 miles an hour from the northwest. With the center approximately the same distance east of Atlantic City, at about 1:00 p.m., the hurricane caused a maximum wind velocity of 61 miles an hour from the west at 12:55 p.m., simultaneously with the lowest barometer reading, 28.99 inches. At Sandy Hook, the lowest reading was 28.71 inches, shortly after 2:00 p.m., maximum wind 56 N. at 1:00 p.m. The calm center was felt at Brentwood, Long Island, between 2:50 p.m. and 3:50 p.m. (Daylight Saving Time). Drizzling rain was reported at intervals, with the sun shining during two or three 5-minute periods. The wind movement was so slight during this time that "a cigarette could have been lighted in the open without difficulty." Minimum pressure readings (uncorrected) below 28.00 inches were recorded at points on Long Island.

Shortly before 4 p.m. the center reached the Connecticut coast, passing between New Haven and Bridgeport; lowest pressure at New Haven was 28.11 at 3:50 p.m. At Hartford the minimum pressure, 28.04, was reached at 4:30 p.m.

Moving at a very rapid rate, the center crossed Vermont between 6:00 and 9:00 p.m.; its course appears to have changed from north by east to north by west, while crossing Massachusetts. At Northfield the lowest barometer reading was 28.77 at 7:30 p.m., and at Burlington 28.68 at 8:00 p.m.

Destructive Effects of the Hurricane

Owing to the unusually rapid rate of progress of the storm across New England, the winds on the right or east side of the path were very destructive while strong winds did not extend far to the westward. Maximum wind velocities (5-minute intervals) were reported from Weather Bureau Stations as follows:

Albany	42 W.	Hartford	46 NE.
Block Island	82 SE.	Nantucket	52 SE.
Boston (Airport)	73 S.	New Haven	38 NE.
Burlington	47 S.	New York	70 NW.
Concord	56 SE	Northfield	47 S.
Eastport	32 SE.	Portland	43 S.
		Providence	87 SW.

At Blue Hill Observatory, Milton, Mass., the maximum 5-minute velocity was 121 miles an hour and for shorter intervals the wind velocity was indicated to be 173 for one measurement and 183 for another. At the observatory on Mt. Washington the 5-minute maximum was 136. The higher velocities at these stations, as compared with Weather Bureau Offices, are attributed to the effect of upslope at Blue Hill and the elevation of the Mt. Washington station.

Along the shores of Long Island and New England, tides caused by the hurricane winds exceeded all records at a number of points. Furthermore, the rivers in the Connecticut and Merrimac Valleys were already practically bank full at the time the hurricane rains began. Over most of this area rain had been falling for about a week. The hurricane rains produced disastrous floods. The winds damaged buildings and broke off or uprooted thousands of trees in all parts of the affected area.

The Inundation

Damage to property along the coast was largely due to the storm wave. At Sandy Hook the tide was 8.2 feet above mean low water; at the Battery, New York City, it was 6.44 feet above mean sea-level.

Along the coast of Connecticut, Rhode Island and on the shores of Narragansett and Buzzards Bays the highest tide ranged from 12 to 25 feet above mean low water, being highest on the southern shores of Massachusetts, where the maximum stage occurred about 5 or 6 p.m. At Point Judith Coast Guard Station the water rose 18 feet above mean low water; at Fairhaven it was estimated at 25 feet; at Pocasset, 20 feet; at the Nobska Point Light Station, 15 feet. At Fall River it was reported that "the water came up rapidly in a great surge," the crest being estimated at "18 feet above normal."

The storm tide, combined with the hurricane winds, raised havoc with small craft and was very destructive to harbor, resort and beach property.

Damage and Loss of Life

The American Red Cross reported on October 27 that 488 lives were lost in the hurricane, 100 persons were missing, 1,754 were injured more or less severely and 93,122 families had suffered more or less serious property losses. Summer dwellings destroyed was placed at 6,933 and other dwellings at 1,991. Boats destroyed numbered 2,605, barns 2,369, and other buildings 7,438.

Estimates of the total economic losses, in all the areas affected, ranged from \$250,000,000 to \$300,000,000.

Warnings

The first advisory warnings were issued from the forecast center at Jacksonville at 9:30 p.m. of September 17, when the hurricane was about 500 miles northeast of the Leeward Islands. Advisory messages were issued at 6-hour intervals thereafter. By 9:30 a.m. of September 19, the hurricane had approached within 650 miles of the southern Florida Coast and was moving west-northwestward at a rate of about 25 miles an hour; northeast storm warnings were then ordered from Key West to Jacksonville. Later in the day it became evident that the hurricane had turned more to the northward, hence hurricane warnings were not ordered for the Florida Coast. At 9:30 a.m. of September 20, storm warnings were ordered displayed on the coast southward of Hatteras to Wilmington.

At the same time (9:30 a.m.) the Washington forecaster ordered storm warnings southward of Virginia Capes to Hatteras. At 9:30 p.m. of September 20, when the hurricane was centered about 400 miles east of Jacksonville, storm warnings were ordered by the Washington forecaster for the area from the Virginia Capes to Atlantic City and on the morning of September 21, with the center 75 miles east of Hatteras, warnings were extended from Atlantic City to Eastport, Maine. At 10:00 a.m. storm warnings were changed to whole gale warnings from the Virginia Capes to Sandy Hook and at 2:00 p.m. the last warning was issued, stating that the storm would likely pass over Long Island and Connecticut in the late afternoon or early night.