

CLIMATOLOGICAL DATA FOR AUGUST, 1911.

DISTRICT No. 2, SOUTH ATLANTIC AND EAST GULF STATES.

CHARLES F. VON HERRMANN, District Editor.

GENERAL SUMMARY.

It is well known that the broad expanse of the Caribbean Sea and the warmer parts of the adjacent Atlantic Ocean are the breeding places of subtropical storms or hurricanes which sometimes reach the Gulf or south Atlantic coasts with devastating force. Forming over the smooth surface of the oceans they are symmetrically developed and of great force though of small diameter, but they are often unable to maintain their strength over a land surface; hence in passing from the ocean to the land their energy is often rapidly dissipated. Such was the case with the two disturbances that entered the area of District No. 2 during August, 1911. Both were cyclonic storms of small diameter but of intense energy and both after entering the coast line rapidly lost power and drifted slowly westward as minor barometric depressions accompanied only by more or less general rains.

The first storm entered the Gulf coast west of Pensacola, Fla., on the morning of August 11, and at 7 p. m. was central between Mobile and Pensacola, with a pressure of 29.73 inches at Pensacola. These cities are about 55 miles apart. At Pensacola the wind reached a maximum velocity of 80 miles an hour from the southeast and considerable damage was done to property in the city and harbor; at Mobile, however, the maximum velocity was but 35 miles an hour and no damage was reported.

The second storm, by far the more severe and disastrous, entered the Atlantic coast between Savannah, Ga., and Charleston, S. C., on Sunday, August 27, giving a pressure of 29.02 inches at Savannah and 29.30 inches at Charleston. The distance between these cities is about 75 miles. The winds attained hurricane violence at both points, and wind and water wrought an immense amount of damage in the coast regions of Georgia and South Carolina. Twenty-five lives were lost and the damage to property is estimated at over a million dollars. The storm then drifted slowly westward over central Georgia, losing force but accompanied by heavy rains that caused much damage to railways, farm lands, and crops, especially in southeastern Georgia.

**THE SMALL HURRICANE OF AUGUST 11-12, 1911, AT
PENSACOLA, FLA.**

By W. F. REED, Jr., observer, Weather Bureau.

On the morning of August 9, 1911, a moderate atmospheric depression was evident in the east Gulf which, advancing slowly northward, appeared as a distinct disturbance between Burwood, near the mouth of the Mississippi River, and Pensacola on the morning of the 11th. The atmospheric pressure at Pensacola fell slowly from 29.95 inches at 11 a. m. to 29.73 inches at 5 p. m., the lowest pressure attained, and the 7 p. m. weather map revealed that the storm was then central between Pensacola and Mobile, with pressures of 29.78 and 29.75 inches, respectively, while the pressure at stations to the northeast was over 30.1 inches, giving a fairly steep gradient. Southeast storm warnings were displayed at 3 p. m. at Pensacola.

Moderate northeast winds prevailed to 1 p. m.; the wind shifted to southeast at 3.45 p. m., increasing in

velocity and reaching 64 miles an hour at 3.57 p. m.; the maximum 5-minute velocity between 4 and 5 p. m. was 78 miles an hour and at 5.48 p. m. a maximum of 80 miles was registered. The wind decreased to 24 miles an hour at 6.49 p. m., when the clouds began to break in the west, indicating the passage of the eye of the storm some distance west of Pensacola. Threatening, rainy weather with high southeast winds prevailed again from 8 p. m. to 12 midnight, reaching a maximum of 64 miles an hour. Excessive rain began at 4.04 p. m. and ended at 6.20 p. m., amount 2.73 inches; total precipitation on 11th and 12th, 4.48 inches.

The damage by this storm at Pensacola was less than expected. The wind was steady and did not come in severe puffs as during the hurricane of September 26, 1906. One-third of the roof of the Monarch pavilion on Santa Rosa Island was torn off, and also a few portions of old roofs in the city. The British steamship *Durham*, at anchor in the harbor, drifted into shoal water, but steamed out safely on the morning of the 12th. About 12 barges dragged anchors and grounded, some small launches and fishing smacks were wrecked, and some coal barges belonging to the navy yard went ashore. In the city telegraph and telephone lines were blown down and the street car and electric light services were interrupted. The damage at Pensacola is conservatively estimated as follows: To electric lines, \$500; local lumber interests, \$500; to launches, barges, etc., \$3,000; fishing smacks, \$2,500; loss of coal belonging to navy yard, \$1,100; total, \$12,600.

The highest wind at Mobile was 35 miles an hour and no damage resulted at that place. The storm drifted slowly westward to Louisiana and Texas on the 12th, with heavy rains causing some washouts. Rain and high southeast winds continued at Pensacola on the 12th, the wind becoming light after 4.35 p. m.

THE HURRICANE OF AUGUST 27-29, 1911.

The Charleston-Savannah hurricane of August 27-29, 1911, was characterized by its relatively small diameter but intense energy, its unusual path directly from east to west, and its rapid loss of power after entering the coast line. Advancing from the ocean where no meteorological observations are possible the only indication given of its approach was the low and decreasing atmospheric pressure at Charleston and Savannah on the morning of August 27, and the rapidly increasing winds; nevertheless storm warnings were displayed in both cities by about noon on the 27th, and hurricane warnings at 4.12 p. m. at Charleston and at 5 p. m. at Savannah. As the day was Sunday both offices were greatly hampered in the work of disseminating the warnings, although all means at hand—the telephone, the telegraph, signal flags, and rocket—were utilized as far as possible. The descriptions of the storm prepared by Mr. H. B. Boyer, of the Weather Bureau at Savannah, and Mr. H. S. Cole, at Charleston, indicate the tremendous force capable of being exerted by air in motion and the destruction wrought by the warring elements.

Remembering that the trend of the Atlantic coast line between Charleston and Savannah is exactly northeast to southwest, and that Charleston is thus 65 miles east of Savannah as well as 50 miles north the data available enable a fairly accurate computation of the rate of movement of the entire storm, which, of course, is quite a distinct matter from the velocity of the winds blowing into it, and of the diameter of a chosen isobar. At

Charleston the lowest pressure, 29.30 inches, occurred at 11.50 p. m., August 27, wind southeast; at Savannah it was 29.02 inches at 8 a. m., August 28, wind northwest. Assuming that the storm traveled in a straight line from east to west, the trough of low pressure required 9 hours to traverse 65 miles, indicating a velocity of translation of only 7.2 miles an hour. The diameter of the isobar of 29.30 inches surrounding the storm was approximately 100 miles. The center or eye of the storm passed a few miles north of Savannah, where for two hours, from 8.10 a. m. to 10.10 a. m., the 28th, the pressure remained lowest and the wind decreased to only 20 miles an hour. The eye of the storm was about 14 or 15 miles in diameter. At Savannah the wind backed from northwest to south about 10 a. m., the 28th, and the wind again increased suddenly in velocity, heavy rain began, and the pressure rose rapidly. At Charleston the wind veered from northeast to east and southeast, and the destruction of property was much greater than at Savannah because the winds were onshore. At Charleston the damage to property is estimated to have exceeded \$1,000,000 and 17 lives were lost. The damage at Savannah was of a minor nature though large in the aggregate.

The storm drifted slowly to southeastern Georgia on the 29th, with the pressure below 29.70 inches, and was accompanied by exceptionally heavy rains near the coast of Georgia, where much damage was done to crops and live stock and numerous washouts occurred on the railroads. County roads suffered and many bridges were washed away.

The following extract from the report by Mr. H. S. Cole, local forecaster at Charleston, S. C., is of interest:

The barometer continued to fall slowly during the forenoon of August 27, and the wind increased in force from the north, attaining a velocity of 46 miles an hour. At 4.30 p. m. the wind shifted to northeast and the pressure decreased more rapidly, and the wind soon attained hurricane force. At 6.50 p. m. the velocity was 60 miles an hour, at 8.40 p. m. 68 miles, at 9.15 p. m. 72, and at 9.45 p. m. 86. The wind shifted to east or nearly directly on-shore at 11.05 and at 11.20 was blowing with a velocity of 94 miles an hour when the anemometer ceased to properly record. After 11.20 the wind became southeast and was estimated to have attained a velocity of 106 miles an hour. It continued to blow steadily from the southeast all of next day (28th), remaining above 50 miles an hour most of the forenoon, and not falling below 36 miles an hour until after 4 a. m. of the 29th. At the moment when the wind shifted to east, 11.05 p. m. 27th, the barometer rose rapidly 0.06 inch, then resumed its rapid fall and reached its lowest point, 29.30 inches, at 11.50 p. m.

Great damage was done by the wind. The electric light and street car services gave out at 8 p. m. and the telephone system was useless after 8.15 p. m. Soon after this tin roofs began to be blown off and hundreds of houses were unroofed and chimneys blown down. A great many windows and display signs were broken. The streets were a tangle of fallen trees and wires. Many houses were destroyed and 4 persons were killed by falling walls and 13 were drowned.

After the high tide on the morning of the 27th the sea began to rise and at the high tide that night reached a point 10.6 feet above mean low water, or somewhat lower than the tide of 1893. A great deal of damage was done by water in the wholesale districts and in other low portions of the city. The water front next day was a confused mass of wrecked vessels and damaged wharfs. The heavy rain increased the damage by flooding unroofed houses. The total rainfall for 3 days was 4.90 inches. The area of greatest destruction lay in the vicinity of Charleston and along the coast to the southwest. The estimated loss at Charleston was over \$1,000,000.

The hurricane was not so destructive at Savannah, although the center passed nearly over that city. The following extract from Mr. H. B. Boyer's narrative will complete the picture of this dramatic event:

In point of violence the storm that swept over Savannah and contiguous territory on August 27 and 28 was the worst in the history of the local station of the Weather Bureau, the wind attaining a maximum (5 minute) velocity of 88 miles an hour shortly after 3 a. m. on August 28, with an extreme (1 mile) velocity of 96 miles an hour at 3.08 a. m. during one of the terrific gusts.

During the early morning of the 27th the sky had been overcast with cirro-stratus clouds moving from the northeast, the wind was northwest, about 20 miles an hour, and the pressure was 29.91 and slowly falling. The barometer began to fall rapidly about 10 a. m. the wind freshened, and lower clouds began to appear. Light rain fell from 2.15 to 2.58 p. m. The wind at 2.20 p. m. abruptly dropped from a velocity of 38 miles an hour to merely a fresh breeze, and coincident with this the barometer began to rise until the rain ended, then resuming its rapid fall. Conditions now became more threatening. The barometer at 8 p. m. was 29.71 inches and began to fall with extreme rapidity. The wind reached 62 miles an hour at 11.40 p. m., still blowing from the northwest with strong gusts, and at midnight the pressure registered 29.50 inches. The wind attained a velocity of 66 miles an hour at 12.05 a. m. August 28, 74 miles at 1.40 a. m., 78 at 2.45 a. m., and between 3.05 and 3.10 a. m. it reached its maximum force of 88 miles an hour from the northwest. From 3 a. m. to 6.05 a. m. the wind maintained a velocity ranging between 80 and 90 miles an hour from the northwest, accompanied by light rain, which set in about 2 a. m. At 8 a. m. the lowest pressure, 29.02 inches, was recorded, the wind diminished with astonishing quickness, and from 8.10 to 10.10 a. m. the vortex of the storm passed practically over Savannah, the wind dying down to 20 miles an hour and shifting to south about 10 a. m. Immediately after the shift of the wind its velocity rapidly increased and the rainfall became heavier. The highest velocity attained after the passage of the center was 64 miles an hour at 11.30 a. m. and at 12.05 p. m. Throughout the afternoon of the 28th the rain fell incessantly and the weather continued wild and threatening. The rain ceased about 1.45 a. m. of the 29th, and the wind fell below the verifying velocity of 36 miles at 2.10 a. m.

Considering the severity of the storm it is remarkable that the damage in the city of Savannah and contiguous territory was not larger. No lives were lost, and while the aggregate property loss was large, the damage done was mostly of minor nature. There was scarcely a house in the city that escaped damage of some sort. The streets were littered with trees and fences, and the telegraph, telephone, street railway and electric light companies suffered severely. But singular to relate, there was little or no unroofing of dwellings. Small craft in the river and at nearby resorts suffered greatly. That the storm was not more destructive on the water front was due to the fact that the wind was westerly and southerly and not at any time from the east. The hotel and residences on Tybee Island were greatly damaged.

All but one of the large vessels that encountered the storm, the steamships *Cretan* of the Merchants & Miners' Transportation Co., the Clyde liner *Apache*, the *City of Montgomery*, and the *City of Savannah* weathered the storm and arrived in port safely. The steamship *Lexington* was driven ashore near the mouth of the Edisto River on the north side of the storm center, where the winds were from the east. The passengers and members of the crew were all saved. Mr. Boyer states that this vessel put to sea in the face of the warnings telephoned to the agent's office at the dock fully three-

quarters of an hour before she sailed and that the vessel passed in plain view of the hurricane signal displayed over the local office of the Weather Bureau and at the display station at Tybee Island. Considerable damage to property occurred at Beaufort and Port Royal, S. C., but no lives were lost. Subsequent heavy rains caused great damage to crops in the coastal region of Georgia.

WEATHER, FORECASTS, AND WARNINGS FOR THE MONTH.

By EDWARD H. BOWIE, District Forecaster.

On the morning of the 3d the pressure at Willemstadt, Curaçao, was 29.84 inches, showing a fall of 0.10 inch in 24 hours, and on the morning of the 5th a further fall of 0.04 inch was reported. At 6 p. m. of the latter date a reading of 29.76 inches was recorded and advices were accordingly issued to shipping. Although there were plainly evidences of a tropical disturbance, no reports of severe winds or other indications of destructive storm energy have been reported in the region of the Antilles. A cable report, however, from Corinto, Nicaragua, dated the 12th, states that a hurricane struck that city, causing the death of 10 and injury to 50 persons. Eight city blocks, comprising 250 houses, were razed to the ground with an estimated loss of \$2,000,000. It is quite probable that this storm and the one noted in the West Indies on the 5th were one and the same.

sent to stations in the West Indies and to ports on the Atlantic and Gulf coasts:

Some indications disturbance south of Haiti. Vessels bound for western portion Caribbean Sea should be cautious.

On the morning of the 17th advices were disseminated placing the center of the disturbance south-southwest of Jamaica. On the 18th the following was issued to ports on the Atlantic and Gulf coasts from Boston to New Orleans:

Indications disturbance in Caribbean Sea is west of Jamaica and approaching Yucatan Channel. Intensity unknown.

At Habana a wind velocity of 32 miles an hour from the northeast was reported as having occurred during the night of the 17th-18th. No further evidence of this storm has been reported.

Temperatures for the week ending the 18th were generally above normal, except in a large portion of the Plateau region, the North Pacific, and the Northeastern States. The minimum temperatures in the North Atlantic States on the morning of the 14th were as low as or lower than had occurred during the second decade of September in the last 40 years, while in Kansas a maximum of 100° was reported. A newspaper clipping from Kansas City states that on the 13th it was necessary to dismiss the school children on account of the heat. Precipitation for the week was light over large portions of the lake region and the Ohio and middle Mississippi valleys; elsewhere it was above normal. Falls of from 4 to 8 inches occurred in southeastern Kansas and southwestern Missouri. There are indications that the secondary low which developed over southern New England during the night of the 15th-16th moved southeastward and passed over Bermuda during the 17th, with barometer reading at 8 p. m. of that date 29.64 inches. With this storm at Bermuda and a high pressure area on the Atlantic coast centered at Father Point with a pressure of 30.34 inches, northeast storm warnings were issued on the afternoon of the 18th for the New England coast. A velocity of 48 miles from the northeast was reported at Nantucket the evening of the 18th and again on the morning of the 19th. Although no other verifying velocities were reported, winds approximating the verifying velocities occurred at Weather Bureau stations along the New England coast, and off the coast winds of storm force were undoubtedly experienced.

The following weekly forecast was issued Sunday the 17th:

The barometric pressure is low and falling at West Indian stations, and conditions are favorable to the formation of a disturbance in that region. There were indications Saturday and Sunday that a storm was in the early stages of development in the Caribbean Sea east of Jamaica and south of Haiti. Vessel masters at Atlantic and Gulf ports have been advised to this effect.

In the United States during the coming week the weather will be unsettled, with sharp changes in temperature over northern and central districts. A disturbance that is now over the plains States will advance eastward, preceded by warm weather and followed by a change to cooler weather, which will likely cause frosts by the first part of the week in the Northwestern States and by Wednesday in the Lake region, the upper Mississippi Valley, and the northern plains States. It will be attended by showers Monday in the great central valleys and Monday night or Tuesday in the Middle Atlantic and New England States. The next disturbance to cross the country will appear in the Northwest Wednesday, whence it will advance eastward, preceded by rising temperature, attended by local rains, and followed by a pronounced change to lower temperature; this disturbance will cross the Middle West Thursday or Friday and the Eastern States near the close of the week.

On the morning of the 16th a decided fall in barometer set in over the West Indies, a fall of 0.14 inch in 36 hours being indicated at one station and of 0.12 inch at another. Although the center of the disturbance and its intensity were not definitely known, the following advices were

passed northeastward over the Atlantic Ocean during the night with decreasing intensity. Only moderately high winds occurred, and light winds only were recorded north of Savannah, Ga., or south of Jacksonville, Fla.

On Sunday, October 29, the following bulletin was issued:

No abnormal weather conditions are probable during the next several days in any part of the country, and the indications are that the coming week will be one of seasonal temperature and generally fair weather in the United States. The next disturbance to cross the country will appear in the far West about Tuesday, advance thence in an easterly course and reach the Great Central Valleys Wednesday or Thursday and the Eastern States about Friday; it will be attended by a short period of unsettled weather and precipitation and be followed by colder weather over the northern half of the country.

On the morning of Monday, October 23, a decided pressure fall over the West Indies indicated the presence of a disturbance in the Caribbean Sea not far from Porto Rico and Santo Domingo. The usual advices were at once telegraphed and special observations called for at frequent intervals. The disturbance was of small diameter and moved slowly west-northwestward, passing south of and near Habana, Cuba, early on the morning of Friday, October 27, and moving into the Gulf of Mexico during the day. The meteorological office at Habana reported a rough sea at Puerto Plata, Santo Domingo, on October 23, and a moderately high wind of 44 miles an hour from the southeast at Habana as the storm center passed that point, but nothing of special importance was reported from any land station. However, excellent wireless reports were received from various vessels each day, and these afforded the only really accurate information as to the probable location of the storm center until it appeared over northwestern Cuba.

The high pressure that prevailed over the interior of the United States prevented the recurving of the storm over Florida, and it continued its west-northwest movement into the Gulf of Mexico. On the morning of Thursday, October 26, northeast storm warnings were ordered displayed on the south Florida coast, and at 3 p. m. of the same day hurricane warnings were ordered from Tampa to West Palm Beach, Fla. On the following morning, when it was apparent that the disturbance had passed into the Gulf, the warnings were lowered. The disturbance apparently lingered in the southern Gulf of Mexico, as barometric conditions continued unsettled over western Cuba and southern Florida for several days after October 27, and on Tuesday, October 31, there were strong indications that the storm had recurved and was approaching the northwest coast of Florida. Storm warnings were ordered from Norfolk, Va., to Jacksonville, Fla., and by night the storm center was over northern Florida. It still retained its moderate character and