

SUMMARY OF THE HURRICANES OF 1919, 1920, AND 1921.

551.515 (729)

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[Weather Bureau, Washington, D. C., December, 1921.]

Of the storms of tropical origin occurring during 1919, 1920, and 1921, ten have been classed as hurricanes. These storms exhibit some of the variations from type, and also show great divergence in their paths from the average tracks of these disturbances. They bring out a strong relation between the positions and the movements of areas of high barometer and their own subsequent paths. These storms have been fully described in previous issues of the REVIEW, but their importance entitles them to a brief summary. Figure 1 shows the tracks of these hurricanes and another storm of tropical origin which may have been an incipient hurricane.

disturbance was brought to a standstill. It was here on the 6th that the characteristics of a hurricane began to develop; and with the increasing weight of the HIGH to the north the storm was propelled slowly in a new course toward the west, at the same time gaining great intensity. The path followed the southern periphery of the HIGH, which was now nearly stationary, passing over the Florida Keys on the 10th and starting to recurve over the eastern Gulf of Mexico on the 11th. But again the circulation was not strong enough to complete the recurve, and a rapidly advancing HIGH from the north-west reversed the air movement before the hurricane had reached the turning point. Under these new conditions

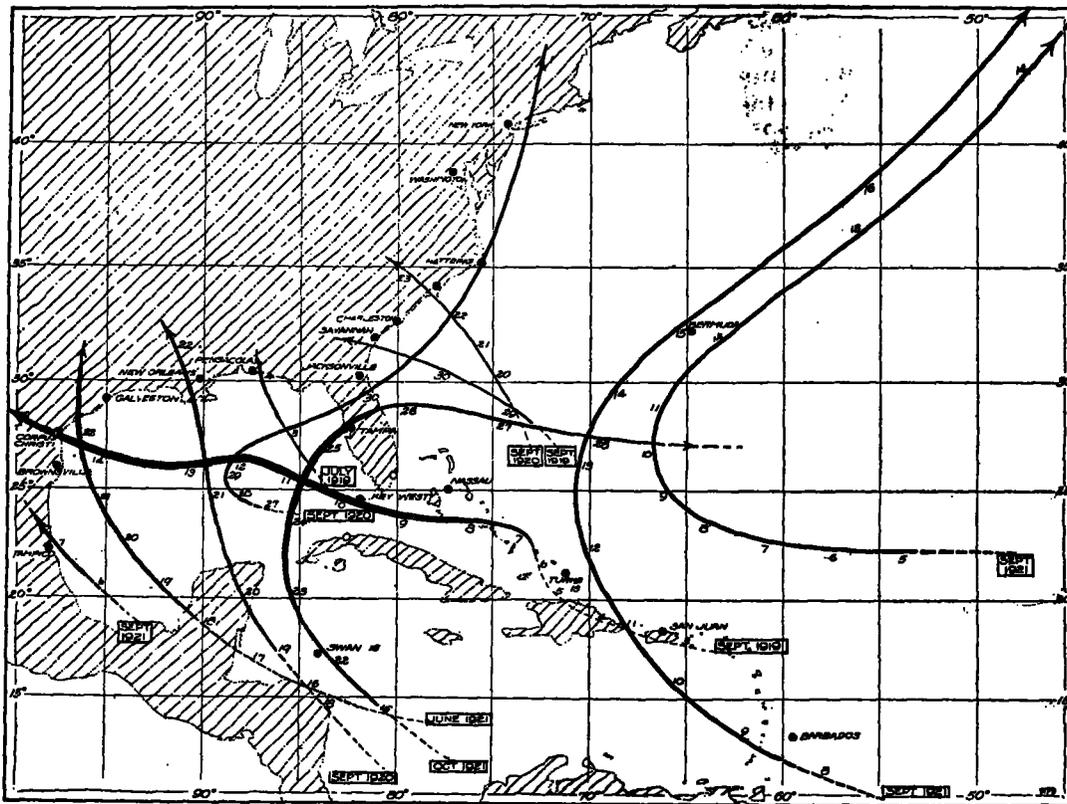


Fig. 1.—Tracks of the centers of tropical storms during the hurricane seasons of 1919, 1920, and 1921 with approximate locations at 8 a. m. (75th meridian time) for the duration of each storm.

Storm of July 2-4, 1919.—This storm developed over the eastern Gulf of Mexico on the 2d, was at all times of very small diameter, but with isobars exhibiting the vortex core of the true hurricane. The eastward movement of a trough of low pressure opened up a path and the storm fell into its wake, striking the coast a short distance east of Pensacola, Fla. Some damage was done but storm winds were of short duration.

Storm of September 3-14, 1919.—Some indications of a tropical disturbance were noted as early as the evening of the 2d in the vicinity of the island of St. Kitts (in the Leeward group). This low moved slowly (and apparently with no further development) in a northwesterly direction, starting its recurve on the 4th into the southern opening of a shallow trough. It was now in the vicinity of Turks Island, but meanwhile the trough was filling up, and with high and rising pressure to the north the

the storm after apparently remaining stationary for about 12 hours, now (the evening of the 12th) began, at first slowly and then with increasing speed of progression, a new path toward the west, which carried it to the Texas coast during the afternoon of the 14th. The center struck near Corpus Christi, the hurricane being one of the most severe ever recorded. The day to day changes in the general circulation and their effect upon the subsequent path of the storm are more clearly shown than usual on account of the very slow rate of progression and the fairly complete observations which have since been accumulated.

Storm of September 29-October 1, 1919.—This was a tropical disturbance which developed and moved nearly westward along the southern edge of a belt of high pressure, passing inland south of Savannah, Ga., but lacked the energy of a hurricane.

Storm of September 17-22, 1920.—This storm developed in the vicinity of the Swan Islands, moved north-northwestward with increasing intensity, but retaining its small diameter. It was prevented from making a normal recurve by high pressure to the northeast, and the increasing effect of this HIGH as it spread out toward the southwest caused a further shift of the storm's course toward the northwest. It passed inland on the Louisiana coast, where winds of hurricane force were reported, particularly on the right-hand side, where the isobaric gradients were increased by the proximity of the HIGH.

Storm of September 20-23, 1920.—This storm, which was nearly coincident with the preceding, developed off the South Atlantic coast in an area of low barometer which had stagnated there. No low barometer readings were recorded at Weather Bureau stations in the vicinity because of the extremely small diameter of the storm, but the lightship off Smiths Island, N. C., was dragged several miles from its station and a 72-mile wind was reported.

Storm of September 26-30, 1920.—The first evidences of this disturbance were noted on the morning of the 26th over the eastern Gulf of Mexico. Under the influence of a ridge of high pressure it was propelled slowly westward. On the 28th it came under the influence of a rapidly developing trough of low pressure, recurved, and moved rapidly northeast. But in crossing Florida it lost its identity as a hurricane, and on the morning of the 30th could not be separately identified in the general trough formation which covered the Atlantic coast region. This large and elongated disturbance developed into a severe coast storm, which should not, however, be confused with the original hurricane. In fact, there is some doubt whether the Gulf disturbance was ever a true hurricane. The heavy north winds which occurred over the Gulf on the 30th, long after the passage of the storm center, were due to the steep-pressure gradient formed as a great HIGH moved down from the northwest in the rear of the trough.

Storm of June 14-23, 1921.—This storm apparently developed over the western Caribbean Sea about the 14th and was carried northwestward by the general circulation, pressure being high over the eastern Gulf of Mexico and low over Mexico. This distribution of pressure continued until the 19th, the disturbance meanwhile crossing the Gulf of Honduras, the Yucatan Peninsula, and passing into the Gulf of Campeche. So far, heavy winds had occurred only on the right-hand side of the storm path, in the direction of the normal increase in pressure. No further reports from the vicinity of the storm were received until the late afternoon of the 21st, when special observations indicated its position some distance off the Rio Grande, and later reports showed a north-northwest movement and a fully developed hurricane. The storm center crossed the Texas coast line at Matagorda Bay and moved nearly due north over Palacios, Wharton, and Wallis, Tex., the last-named place being about 40 miles west of Houston, Tex., the nearest approach to a regular Weather Bureau station.

The three tropical storms during the period September 5-15, 1921.—From more complete reports which have since accumulated it appears that three important tropical storms were coexistent over southern waters during this period. A small disturbance made its appearance over the southwestern Gulf of Mexico on the 6th and passed inland near Tampico, Mex. The northward movement of the disturbance was evidenced by the torrential rains which fell over southern and central Texas between the 8th and 10th.

On the morning of the 8th a small but very severe hurricane made its appearance to the southeast of Barbados, crossed the Grenadines, moving northwest and with low pressure to the northward the storm turned in that direction, passed through the Mona Passage, and to the east of Turks Island during the 10th and 11th and crossed the Bermudas on the 15th with undiminished intensity.

On the 12th, when the preceding storm was central immediately northeast of Turks Island, the S. S. *Capillo* reported a hurricane of small diameter a short distance southeast of Bermuda. This storm has since been traced back (Tropical Hurricane of Sept. 5-15, 1921, by F. G. Tingley, in this issue, p. 674) and was found to be in existence as early as the 5th in approximate Lat. 22° N. and Long. 54° W. As shown by the accompanying chart, the storm moved slowly west-northwest, recurving near Lat. 27° N., Long. 67° W. These two storms attained great severity over the steamer lanes as they passed into higher latitudes.

Storm of October 20-28, 1921.—This was probably the most severe hurricane since the September storm of 1919. A disturbed condition was first noted to the southwest of Jamaica about the 20th. Then followed a very rapid development in area and intensity. Carried along slowly in the general circulation it passed near the Swan Islands, through the Yucatan Channel, and during the 24th, with high pressure breaking down in front and under the influence of a southwest current in the upper air, the hurricane recurved and on the morning of the 25th was centered immediately southwest of Tampa, Fla. A clear path was now apparently open to the northeast, but, meanwhile, a great HIGH was bearing down from the north and under its influence the storm, which had lost considerable intensity while crossing Florida, was forced to take a new path to the east-southeast and was last noted on the 28th south of Bermuda and still in the latitude of Tampa. Some very low barometric readings were made in the path of this hurricane, the schooner *Virginia* reporting 27.84 inches in the Yucatan Channel on the 23d, the S. S. *El Estero*, 27.84 inches at 10 p. m. of the 24th in the eastern Gulf and 28.12 inches at Tarpon Springs, Fla., at noon on the 25th.

551.578.7 (761)

HAILSTORM IN ALABAMA, NOVEMBER 14, 1921.¹

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[Weather Bureau, Montgomery, Ala., Jan. 7, 1922.]

The weather map on the morning of November 14, 1921, showed a slight barometric depression centered in extreme northeastern Texas, with a pressure gradient of about three-tenths of an inch from the center of the LOW to the south Atlantic coast. North of the LOW, pressure was only relatively high, with no well-defined crest. During the day the northeast-Texas depression filled considerably and the center of the high lying to the north drifted eastward to Missouri. The evening weather map on November 14, showed pressure to be nearly uniform east of the Rocky Mountains, with isotherms running almost east and west from the Rocky Mountains to the Alleghenies, and varying from freezing in the northern portions of Illinois, Indiana and Ohio, to 70° to 74° on the central and east Gulf coast. During the night of November 14, the HIGH increased somewhat in intensity

¹ See also Mo. Weather Rev., Sept. 1915, 43: 446-448 Fassig, O. L.: Remarkable fall of hail in Maryland. (Illustrated.)