

Storm tides and waves are the agents of greatest destruction in tropical storms and as this storm came in at low tide the damage along the coast was not so great as it would have been if the storm had moved inland in the forenoon.

Damage was confined mainly to railroad, telegraph, and telephone systems, the losses sustained by these interests being estimated at \$750,000. The tides and waves washed out the Louisville & Nashville Railroad bridge at Chef Menteur and damaged the roadbed in other places to such an extent that it was about ten days before train service could be resumed. The telephone company reported 2,500 telephones out of commission in New Orleans and a little more than one third of the long distance system was put out of commission. The telegraph service west and north was badly crippled. The telephone and telegraph services were restored promptly. Damage to rice and sugar cane was confined mainly to Terrebonne, Lafourche, Plaquemine, and Jefferson Parishes. The total damage to crops is estimated at about \$700,000. Only one death was reported and that as a result of an electric wire which had been broken down by the wind at New Orleans.

The fact that not a sea-going vessel was lost in the storm and only one life is reported lost shows the great value of the warnings and the effectiveness of their distribution.

NOTE.—Full reports of cloud observations, barometer readings, and remarks of cooperative observers can be seen on the original manuscript on file in the Central Office of the Weather Bureau, Washington, D. C.

TROPICAL STORM, SEPT. 29-30, 1920.

By ALEXANDER J. MITCHELL, Meteorologist.

[Weather Bureau, Jacksonville, Fla.]

The existence of the tropical storm of September 29-30, was first announced by the Central Office on September 27. (See pp. 544-545, below.) At the time reports from coast stations were rather indefinite, except that the wind direction may have been an affirmative factor.

Minus pressure changes became more significant on the 28th, and on the 29th they were conclusive as to the future direction of the disturbance. The rainfall increased on the lower coast of the section on the 28th, becoming heavy and general in the west-central portion of the peninsula on the 29th, on which date minus pressure changes were confined to South Atlantic districts and the immediate Gulf coast from Louisiana eastward. The western anticyclone, but feebly felt in the west Gulf States on the 28th, had, by the 29th, increased in magnitude and was rapidly pushing east and south, thus adding celerity to the northeast movement of the disturbance, as was indicated by the forecaster in his early advisory messages regarding the probable course of the storm.

The configuration of the isohyets and the 24-hour rainfall show the approximate path of the storm to have been from near Cedar Keys on the Gulf coast, which it approached during the night of the 29-30th, thence northeast to the Atlantic seaboard. The 24-hour rainfall along the path of the storm ranged from 5 inches at Cedar Keys, Levy County, to 8 inches at Lake City, Columbia County. Local observers reported "high winds," "storm," or "gales."

The storm was very severe when deep into the Gulf, as indicated by reports from masters of vessels, but it

was probably losing energy as it approached the coast, as the minimum central pressure was not below 29.47 inches at any Florida station. Gales occurred, however, from Key West northward during the night of the 29th and early on the 30th. And considerable damage was done along the west coast from about Fort Myers northward to St. Marks. High tides, salt spray, and high winds inundated low lands on the immediate coast, and heavy rains flooded fields more inland, where truck and fruit suffered to a considerable extent. As the result of a prostrated wire one person was killed at St. Petersburg. A yacht was sunk at Fort Myers, and a number of vessels were wrecked or dismantled in the Gulf, among which was the American steamer *Speedwell*, en route British Honduras to New Orleans.

In view of the existence of the strong anticyclone which was rather exceptional for these low latitudes so early in the season, resulting in the breaking of minimum temperature records, is it altogether unorthodox to suspect an interdependence between the two phenomena? At least a relationship more than casual or incidental? Did the tropical storm, as reflected in the wide area over which a great displacement took place, accentuate the upbuilding of the "high"? Its counterpart, the cold wave, is not altogether the result of translation from high to low latitudes, but it arises, in a great measure, probably, as the result of outward radiation from the barren regions, of higher latitudes. Most of the great anticyclones, as they sweep south and east, incidentally develop LOWS which, as well developed entities, frequently play a vital part in the ultimate effects of cold waves.

TYPHOON IN PHILIPPINES.

By JOSÉ CORONAS, S. J.

[Weather Bureau, Manila, P. I., September, 1920.]

On the evening of August 31 a small typhoon struck Manila, the worst experienced in the city since September, 1905. It had formed almost unexpectedly in the China Sea, west of the southern part of Luzon, and moved ENE. across the Provinces of Bataan, Rizal, Bulacan and the narrow strip of the northern part of Tayabas, a track altogether abnormal and never before observed in the neighborhood of Manila. Considerable damage was done to the four provinces just mentioned as well as to Manila, particularly to the shipping, Corregidor and to the northern part of Cavite Province. The center passed between 7 and 8 p. m. a few miles north of the observatory where a gale blew for two to three hours backing very quickly from SE. to S., SW., and WNW.; relative calm was observed for about 15 minutes. The barographic record obtained on this occasion shows how small the typhoon was: it might be well called a miniature of a typhoon. In the early morning of September 1 the cyclonic center could still be noticed over the Pacific ENE. of Manila near Polillo Island; but it soon disappeared probably absorbed or swallowed up, we may say, by a big typhoon which was sweeping the Pacific from Guam to Formosa.

This big typhoon had passed near to the north of Guam on August 28, the barometric reading being at 2 p. m. as low as 742.9 mm. (29.248 inches), gravity correction applied, and a gale blowing for several hours from the north and west quadrants. The typhoon moved practically WNW. and struck Formosa on September 4. When the center was in Meiacoshima on September 3, it caused such