

than 18 inches occurred, Corpus Christi reporting the greatest monthly precipitation in the history of the station. Likewise in Michigan, Port Huron with a total fall of 6.38 inches had the wettest September in 50 years, although practically all this amount fell before the 15th.

In the vicinity of Washington, D. C., one of the heaviest rainfalls of record occurred during the early morning of the 2d. This storm¹ was not associated with the significant features usually attending heavy precipitation, and was extremely local in character. The region of heaviest precipitation appeared to have been central over Prince Georges County, Md., where at Cheltenham nearly 6 inches fell within a comparatively short period. From this point the amounts diminished to slightly over 5 inches at Ferry Landing in Calvert County, a few miles southeast of Cheltenham, and to a similar amount at Washington, D. C., a somewhat greater

distance to the northwest. From these points the amounts diminished rapidly, particularly toward the Virginia side, where only moderate falls were reported to the westward of the counties bordering the Potomac River.

RELATIVE HUMIDITY.

Throughout the length and breadth of the country the relative humidity, even more uniformly than the precipitation, was below normal, though the variations from normal were usually not so large as the general drought conditions would indicate. A few small areas in New England, the Lake region, the far Southwest, and the coast districts of Washington, had monthly averages slightly above normal.

Over the Great Plains and western mountain districts the monthly means ranged from 10 to 15 or even 20 per cent less than the average, the larger amounts generally being associated with the evening observation.

¹ For a detailed description of this storm see p. 487 of this REVIEW.

SEVERE LOCAL STORMS.

[The table herewith contains such data as have been received concerning severe local storms that occurred during the month. A more complete statement will appear in the Annual Report of the Chief of Bureau.]

Place.	Date.	Time.	Width of path. (yards).	Loss of life.	Value of property destroyed.	Character of storms.	Remarks.	Authority.
Needles, Calif.	1		Yards.			Wind	Houses reported blown down and several persons killed. Velocity of wind estimated 90 miles.	New York Herald (N. Y.); official, U. S. Weather Bureau.
Bismarck, N. Dak.	2		4,400			Wind and hail	Damage to buildings, trees, etc. Path of storm 2½ miles wide and 60 miles long.	Official, U. S. Weather Bureau.
Yuma (north of) and Mohave and Yavapai Counties, Ariz.	2					Rain	Heavy rains caused three serious breaks in the main canal of the Yuma irrigation project. Bridges and culverts washed out and highways damaged in Mohave and Yavapai Counties.	Do.
Binghamton, N. Y.	6	P. m.				Wind and rain	Heaviest damage to trees and streets. Cellars flooded, and streets blocked by fallen trees and branches.	The Press (Binghamton, N. Y.).
Johnson City, Tenn.	4					Rain	Portions of the town flooded damaging stocks of goods in the basements of several business houses.	Official, U. S. Weather Bureau.
Connecticut coast	6	P. m.				Wind, rain and hail	Traffic delayed, wires and trees blown down. Lives of many on the sound endangered and several persons reported missing.	New York Sun; Tribune (N. Y.).
Fellsburg, Kans. Corpus Christi, Tex., and adjacent territory.	8 15-20	P. m.			\$103,000	Wind and rain do.	Several buildings demolished. Streets, bridges and culverts damaged.	Wichita Eagle (Kans.). Official, U. S. Weather Bureau.

STORMS AND WEATHER WARNINGS.

EDWARD H. BOWIE, Supervising Forecaster.

WASHINGTON FORECAST DISTRICT.

Aside from frost warnings on a number of days for the lowlands of New Jersey and for the more northern and elevated districts of the Atlantic States and the Ohio Valley, the important warnings issued during the month were in connection with two storms of the western Atlantic. The first of these originated in low latitudes east of the Lesser Antilles, the French S. S. *Mont Rose* encountering it about 200 miles east of Martinique. This vessel received slight damage. Moving west-northwestward this disturbance passed the vicinity of St. Martin on the 16th on a northwest course and later recurved and passed over Bermuda during the early morning of the 21st. At Hamilton, Bermuda, the lowest barometer reading reported was 28.72 inches, the wind reaching hurricane velocity. Preliminary advices concerning this disturbance were issued on the 14th and they were continued daily until after the disturbance passed to the northward of Porto Rico, after which time the complete absence of reports made the issue of authen-

tic advices impossible. On its approach to Bermuda, warning of increasing winds and rain were sent by radio to vessels in the vicinity of Bermuda.

While the first of these disturbances was in progress another developed off the east Florida coast, the first evidences of it appearing the morning of the 18th, when northeast warnings were displayed along the coast from Cape Henry, Va., southward to Brunswick, Ga. Later during the same day northwest storm-warnings were displayed at and between Jacksonville and Jupiter Inlet, Fla. This disturbance increased in intensity and moved slowly northwestward during the 18th. On the morning of the 19th its center was near latitude 30° N. and longitude 78° W., and moving more to the northward, but slowly. Warnings were repeated on the 19th and vessels off the South Atlantic coast were again advised to exercise caution. From its position on the 19th this disturbance advanced north and then northeastward and passed off Cape Hatteras in an easterly direction on the 22d. On the early afternoon of the 20th storm-warnings were ordered displayed on the coast northward from the Virginia coast to Delaware Breakwater and the morning of the 21st the display was extended northward on the coast to Boston, Mass. No observations have

been received of the lowest barometer readings in the immediate center of this disturbance, but the fact that winds of hurricane velocity occurred off the North Carolina coast would lead to the supposition that the disturbance was one of major intensity, but not actually of tropical origin. So far as known no American vessels were destroyed in either of these disturbances. It is a fact of importance, however, that the Diamond Shoals Lightship was blown 12 miles from its moored position by the second of these disturbances. Details concerning these two disturbances will be found elsewhere in this number of the REVIEW.—*Edward H. Bowie.*

CHICAGO FORECAST DISTRICT.

No general frost warnings were issued during the month. Unseasonable warm weather prevailed throughout the Chicago Forecast District until the 8th, when warnings were issued for the northern Rocky Mountain region and the northeastern slope. After that date warnings were issued for limited areas on several dates. No warnings were issued, however, for sections farther south than western and northern Nebraska, northern Iowa, and the central portions of Wisconsin and lower Michigan. At the end of the month killing frost had occurred at only three stations in the district, as follows: Yellowstone Park, Wyo., on the 8th; Valentine, Nebr., on the 19th; and Sault Ste. Marie, Mich., on the 25th.

Following the warm spell the first part of the month, frost warnings or advisory messages were sent to points in the cranberry regions of Wisconsin on 15 dates. The lowest temperature registered was 20° at Mather on the 16th. Warnings were also issued for the tobacco region of Wisconsin on the 15th, 16th, and 19th; however, no damaging frosts occurred.

Special daily fire-weather warnings were continued to the district forester at Missoula, Mont., until September 14. Daily fire-weather warnings for northeastern Minnesota were sent to the State forester at St. Paul until September 20.

Special forecasts were issued for the Kansas Free Fair, which was held at Topeka from September 11 to September 15, inclusive; and for the Illinois State Fair, which was held at Springfield from the 16th to the 23d, inclusive.

There were no storms on the Great Lakes during the month. The only warnings issued were small-craft warnings for the lower Lakes from Sandusky eastward on the 10th.—*Chas. L. Mitchell.*

NEW ORLEANS FORECAST DISTRICT.

Disturbed conditions prevailed off the Texas coast in the vicinity of Corpus Christi from the 17th to the 20th, with squally weather south of Matagorda Bay on the 17th and during the night of the 19th-20th. Anticyclones of considerable extent prevailed in the interior of the United States at the time and winds were mostly from the northeast. These conditions were preceded and attended by excessive rainfall on the Texas coast, over 13 inches being recorded at Corpus Christi during the period of the 15th-20th. Northeast storm warnings were displayed on the Texas coast from Galveston to Corpus Christi during the afternoon and night of the 17th. The stormy conditions, however, did not extend as far north as Galveston. No other warnings were issued or required during the month.—*R. A. Dyke.*

DENVER FORECAST DISTRICT.

Although a number of areas of low and high pressure of considerable intensity advanced from the North Pacific coast southeastward or eastward over the northern Rocky Mountain region and the Missouri Valley, no cyclones or anticyclones of importance crossed the Denver district. As a whole, the month was much drier than the average, and it was also one of the warmest Septembers on record.

On the morning of the 9th a warning was issued for frost at the higher elevations of southern Utah, and on the morning of the 28th of frost at the higher elevations of northern Arizona and in northern and western Utah. These warnings were justified by the occurrence on the following mornings of minimum temperature favorable for frost, except on the morning of the 29th at Salt Lake City, where the weather was cloudy and the temperature did not fall below 50°.

A warning of probable frost, issued for northeastern Colorado on the morning of the 15th, was not verified, owing to the fact that the crest of a high-pressure area of unusual intensity, which was over southern Saskatchewan and western North Dakota, did not advance as far southward as was expected.

No reports of frosts were received from any of the regular stations of the District during the month.—*J. M. Sherier.*

SAN FRANCISCO FORECAST DISTRICT.

Two well-marked storms from the North Pacific during the month passed inland far enough south to give rain in the northern portion of this district. The rainfall was quite generous in western Washington but in other sections it was light.

A period of very warm weather prevailed over the southern portion of the district from the 7th to the 25th and over the northern portion from the 10th to the 19th. Records for high temperatures in September were broken on the 10th, at Red Bluff and Roseburg, and equaled on the 11th, at Portland.

Light frost occurred in eastern Washington and Idaho on the 8th, in southern Idaho and Nevada on the 28th and 29th, and killing frost in eastern Oregon on the 28th.

Fire-weather warnings were issued in California on the 22d, and to the forest supervisor at Wenatchee on the 16th.

Advisory warnings of a severe storm in the North Pacific moving southeastward, were sent to Washington and Oregon stations on the 23d, warning vessels about to sail for Alaska and the Orient.

Southwest storm warnings were ordered at Washington and Oregon stations on the 25th. These were not verified but the magnitude of the storm is believed to have justified them.

Rain warnings were issued in northern California on the 26th, but the rain was confined to the coast sections.—*G. H. Willson.*

RIVERS AND FLOODS.

By E. W. GRAEFF, Temporarily in Charge.

The lower Rio Grande River was in flood at Rio Grande City, Tex., on September 21 and 22, with a crest stage of 19.0 feet on the 21st, or 4.0 feet above the flood stage. Warnings of this rise were issued on the 20th.