

# MONTHLY WEATHER REVIEW.

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The MONTHLY WEATHER REVIEW summarizes the current manuscript data received from about 3,500 land stations in the United States and about 1,250 ocean vessels; it also gives the general results of the study of daily weather maps based on telegrams or cablegrams from about 200 North American and 40 European, Asiatic, and oceanic stations.

The hearty interest shown by all observers and correspondents is gratefully recognized.

Acknowledgment is also made of the specific cooperation of the following chiefs of independent, local, or governmental services: R. F. Stupart, Esq., Director of the Meteorological Service of the Dominion of Canada; Señor Manuel E. Pastrana, Director of the Central Meteorological and Magnetic Observatory of Mexico; Camilo A. Gonzales, Director-General of Mexican Telegraphs; Capt. I. S. Kimball, General Superintendent of the United States Life-Saving Service; Commandant Francisco S. Chaves, Director of the Meteorological Service of the Azores, Ponta Delgada, St. Michaels, Azores; W. N. Shaw, Esq., Director Meteorological Office, London; Maxwell Hall, Esq., Govern-

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As far as practicable the time of the seventy-fifth meridian is used in the text of the MONTHLY WEATHER REVIEW.

Barometric pressures, both at land stations and on ocean vessels, whether station pressures or sea-level pressures, are reduced, or assumed to be reduced, to standard gravity, as well as corrected for all instrumental peculiarities, so that they express pressure in the standard international system of measures, namely, by the height of an equivalent column of mercury at 32° Fahrenheit, under the standard force, i. e., apparent gravity at sea level and latitude 45°.

## FORECASTS AND WARNINGS.

By Prof. E. B. GARRIOTT, in charge of Forecast Division.

August opened with a storm of tropical origin near the North Carolina coast. The previous history of this storm is given in the MONTHLY WEATHER REVIEW for July. During August 1 and 2 the center of disturbance moved northeastward near the middle Atlantic and New England coasts and past over or near New Foundland the night of the 2d. High barometric pressure over mid-ocean deflected the storm toward the high latitudes of the Atlantic.

The Virginian-Pilot, Norfolk, Va., of August 2, remarks as follows regarding warnings issued in connection with this storm:

It was due to the magnificent work of the Weather Bureau that there were no wrecks along the coast. Many hours before the storm developed any great strength the Bureau had sent warnings along the coast to notify mariners that there was a blow off the Florida coast and advised caution about proceeding south. These warnings were sent to several wireless stations, which transmitted them to vessels at sea having the wireless apparatus, so that the news was flashed down the line.

The general weather conditions of the closing days of July and the first week in August conformed closely to the following forecast, that was issued July 29:

There are no indications of a prolonged period of abnormal heat for any portion of the United States. A cool wave that now covers the Northwest will advance over the central valleys and the Lake region during the next three days. A barometric disturbance with rain will cross the country from about August 1 to 5, preceded by rising temperature, and followed by a period of lower temperature that will continue over the eastern districts during the latter half of next week.

The cold wave referred to advanced as forecast and reached the Atlantic coast August 1. The barometric disturbance reached the Atlantic States August 5. It was preceded by rising temperature, attended by rather well-distributed rains that were heavy in parts of the Ohio Valley, Tennessee, Mississippi, the lower Lake region, and the Middle Atlantic and New England States, and was followed by lower temperature that continued over the eastern districts during the balance of the week ending August 8.

The Times-Democrat, New Orleans, La., of August 3, comments on the forecast as follows:

Professor Moore of the United States Weather Bureau, has commenced the issue of forecasts for periods of a week or more. The success which Professor Moore has achieved in his efforts to increase the efficiency of the Weather Bureau will cause the public to accept these forecasts with more confidence. The forecast issued July 29 for the succeeding ten days is being realized generally. The temperature which was between 70° and 80° over the northern portion of the country on the morning of July 30 was between 60° and 70°, as shown by the weather map issued yesterday. A disturbance with rain and preceded by warmer weather is expected to move across the country between August 1 and 5, and this is expected to be followed by cooler weather, which will continue over the eastern districts during the latter half of the week.

Such forecasts show a marked step forward by the Weather Bureau, and are in line with the many improvements made in the weather service.

The Herald, Rochester, N. Y., of August 10, states:

In this forecast, which predicted complicated weather conditions, including a warm wave which at that time did not appear on the weather map, Chief Moore made a perfect forecast.

Special forecasts were issued on the 9th and 13th. That of the 9th was in general terms. The forecast of the 13th specified the passage of a barometric disturbance from the Rocky Mountains to the Atlantic coast, from the 14th to 18th, that would be preceded by rising temperature, attended by copious rains that would cover the corn and spring wheat States, and followed by a period of lower temperature. The disturbance progressed as forecast and crossed the Atlantic coast on the 18th. It was preceded by rising temperature that at points in the interior was the highest of the present season, was attended by copious rains in the corn and spring wheat States, and was followed by a several day period of temperature below the seasonal average.

The St. Louis Times, of August 15, refers editorially as follows to weather forecasts in general, and to the forecast of the 13th in particular:

Close observers of weather conditions have noted in recent months that the Department of Meteorology at Washington has been indulging in some long-distance and wide-range forecasts.

Time was when the word chiefly employed by the forecasters was "probably." Now there is a certain note of positiveness in the 24-hour

forecast, and the long-distance, wide-range bulletins amount almost to predictions. Several weeks ago, for instance, the department announced that a blanket of rain would begin at the Rocky Mountains and stretch to the Atlantic. The forecast covered a period of a week, gave great cheer to the agriculturalist and business man generally, and was fulfilled exactly.

Yesterday the department made a prediction, technically called a forecast, covering a period of five days, ending next Wednesday morning. All of the spring wheat and corn States are to have needed hot weather, followed by needed rain, after which it will be cooler. It will be worth while noting the outcome of this prediction.

If the Department at Washington finds it possible to make a forecast covering the great growing section of the country for a week, it will have increased its usefulness immeasurably.

A special feature of a forecast issued on the 18th, was a prediction of well-distributed rains in the cotton belt where rain was needed. The rains occurred over the cotton belt as forecast, and in the Atlantic States the rains that set in were exceptionally heavy.

The following from the Daily Picayune, New Orleans, of August 26, 1908, indicates the demand for weather information that increases with recognition of the value of the forecasts:

The weather map issued by the United States Weather Bureau yesterday showed generally settled weather conditions over the greater portion of the country for the first time in several days. These conditions call attention to the special forecast issued by Chief Willis L. Moore of the Weather Bureau, Tuesday, August 18, and published in the Picayune on the 19th. Looking over the weather map we see that the barometric depression referred to in the forecast crossed the Rocky Mountain districts on the 20th and 21st, the Plains States on the 22d, the central valleys and the Lake region on the 23d and 24th and is now over the Atlantic States. The well-distributed rains forecast by Professor Moore have fallen, and those sections of the cotton belt where rain was needed have received copious showers. The map issued Tuesday shows the comparatively cool and settled weather moving eastward just as forecast eight days ago. Forecasts of this character, when so fully verified as has been the case with the Weather Bureau forecasts, are of great importance to agricultural and commercial interests, and the public will look keenly for information telling a week or more in advance what weather to expect as they look for the daily forecasts covering a period of thirty-six to forty-eight hours. Commercial interests attach such importance to the forecast that request<sup>1</sup> has been made that such forecasts be telegraphed as soon as issued at the expense of the recipient.

The beginning of the third decade of the month showed the first signs of a breaking up of the summer distribution of atmospheric pressure over the Northern Hemisphere. From the 18th to 21st the barometer rose over the Siberian area and reached a reported reading of 30.18 inches at Irkutsk on the 21st. During the 21st and 22d the first frost-bearing cool wave of the summer advanced from the British Northwest Territory over extreme north-central portions of the United States.

On the 25th a period of unusually cool weather set in over the eastern portion of the United States and continued during the balance of the month. During this period the barometer was low over the British Isles and the Iceland area with readings below 29.00 inches over northern Scotland on the 27th and 29th. Pressure continued high over the eastern portion of the North American Continent and adjacent ocean, and from the 26th to 28th pressure was again high over the Siberian area. Over western-interior portions of the United States the barometer was falling gradually. At the close of the month abnormally low barometer over Great Britain and northwestern Europe was attended by severe gales over the North Sea and the British coasts.

BOSTON FORECAST DISTRICT.\*  
[New England.]

Rainfall was fairly well distributed and in excess of the normal, and temperature was slightly below the seasonal average. Maximum temperatures ranging from 80° to 90° occurred generally on the 13th to 14th, and minimum temperatures ranging from 32° to 55° were, with a few excep-

<sup>1</sup>The request referred to was made by the New Orleans Cotton Exchange.

tions, noted on the 28th and 29th with scattered frosts from Massachusetts to Maine. There were no gales during the month.—*J. W. Smith, District Forecaster.*

NEW ORLEANS FORECAST DISTRICT.\*  
[Louisiana, Texas, Oklahoma, and Arkansas.]

Moderate weather conditions prevailed and temperature was slightly above the normal. No general storms occurred along the west Gulf coast.—*I. M. Cline, District Forecaster.*

LOUISVILLE FORECAST DISTRICT.\*  
[Kentucky and Tennessee.]

Generous and beneficial rains occurred during the first half and drought conditions prevailed during the latter half of the month. Temperature averaged about normal and there were no devastating storms.—*F. J. Walz, District Forecaster.*

CHICAGO FORECAST DISTRICT.\*  
[Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas, and Montana.]

Precipitation, mostly in the form of local showers, was well distributed. No storm warnings were ordered and no conditions occurred that justified their display. A notable feature was the frosts that occurred in North Dakota, Minnesota, and Wisconsin from the 20th to 24th. The frosts were light and not of a character to cause serious damage, except in the cranberry marshes of Wisconsin where killing frost was reported on the 20th, 23d, and 24th. Timely warnings had been sent and the marshes were flooded, so that no damage occurred. The Milwaukee, Wis., Sentinel commented on the warnings as follows:

Prompt action on the part of the Weather Bureau has saved the cranberry crop of Wisconsin, and the first frost of the season last night fallen in its apparent effort to ruin an important part of the Thanksgiving dinner. Major Hersey, who is temporarily in charge of the Chicago office, has been at the Milwaukee station several seasons and during that time has learned the importance of the Wisconsin cranberry crop. Accordingly when the temperature dropped off in the Dakotas night before last he began to watch things closely. Yesterday morning it became evident that the cold weather was spreading down into Wisconsin. Warnings were accordingly sent out to the marshes, and this morning, though there had been a distinct frost across the belt, it was announced that the crop was safe. In all the marshes floodgates are kept ready for just such a warning, and the moment word was received of the approaching frost water began to run out over the acres and acres of berry land.

*H. B. Hersey, Inspector and District Forecaster.*

DENVER FORECAST DISTRICT.\*  
[Wyoming, Colorado, Utah, New Mexico, and Arizona.]

The month was cool, with an excess of rainfall, and in localities the rainfall was heavy. From the 25th to the close of the month the weather was fair, with low night temperatures. Killing frost occurred the morning of the 31st in portions of Wyoming and northwestern Colorado.—*P. M. McDonough, Local Forecaster, temporarily in charge.*

SAN FRANCISCO FORECAST DISTRICT.†  
[California and Nevada.]

The present August was not an abnormal month. Thunder-storms were frequent from the 3d to 6th in the high Sierra, and in the Valley of the Colorado. Rain from a disturbance of the Sonora type occurred from the 8th to 10th. A series of reports by wireless was received from the Pacific fleet under command of Admiral Swineburne. These were valuable and were utilized in the forecasts. There were no frost nor storm warnings issued.—*A. G. McAdie, Professor and District Forecaster.*

PORTLAND, OREG., FORECAST DISTRICT.†  
[Oregon, Washington, and Idaho.]

The month was quiet, and storm warnings were neither issued nor required. Temperature averaged slightly below normal and there was about the usual amount of rainfall.

\* Morning forecasts made at district center; night forecasts made at Washington, D. C.

† Morning and night forecasts made at district center.

Numerous small forest fires occurred until the 25th when light but general rains cleared the atmosphere. Light frosts were reported in exposed places in extreme eastern Oregon and in southern Idaho on the 26th, 30th, and 31st, for which warnings were, as a rule, issued in time to be of service.—*E. A. Beals, District Forecaster.*

**RIVERS AND FLOODS.**

Disastrous floods occurred during the last decade of August in the rivers of Georgia, North Carolina, and South Carolina, and a flood of moderate proportions prevailed in the James River coincident with the floods in Georgia and the Carolinas. The floods were attributable to heavy and widespread rains over the States drained by these rivers, and more especially to the heavy rains in the southern Appalachian Mountains, where these rivers have their sources. Warnings were issued well in advance of the floods and resulted in the saving of many lives and the protection of much movable property. The following editorial is taken from the Baltimore American of August 28, 1908:

Augusta has been visited by the sweep of the tempest, the storms Wednesday and Thursday making wide wreckage and creating tremendous losses in the southern city. There is naturally a great deal of suffering attending the destruction of property and commodity values, estimated at a million dollars. Hundreds of persons are homeless and many have been thrown out of employment. The Savannah River played havoc with the property lining its banks. Its overflow inundated the city and caused the citizens to take to the boats provided for their rescue.

The value of the Weather Bureau to flood-threatened communities was shown in the warnings issued Tuesday morning that the river, by the following evening, would rise 35 to 37 feet. The citizens, thus forewarned, took to the hills, and many saved their household effects by acting on the prediction. It seems that the flooding of Augusta was aggravated by the system of water supply, consisting of a series of canals and dams in the hills above the city, which thus conveyed the water for the consumption of the people, as well as to supply power for the cotton mills. The overflowing of the central supply caused these canals to become sluices, through which the water poured into the city in great volume.

Throughout Georgia and adjacent States great damage has been done the crops. \* \* \*

Reports in detail concerning these floods follow.

Rivers in other parts of the country were not in flood at any time during the month. As a matter of fact, unusually low stages were prevalent in a number of rivers, the water being so low as to interfere with navigation.

**FLOOD IN THE SAVANNAH RIVER.**

By D. FISHER, Official in Charge, Local office, Weather Bureau, Augusta, Ga.

The greatest and by far the most destructive flood in the history of this section occurred August 26-27, 1908, which was 0.1 foot higher than the memorable freshet of September 11, 1888.

On the 24th special reports from rainfall and river stations in this district showed the following amounts of rainfall, viz: Anderson, S. C., 5.50 inches; Calhoun Falls, S. C., 4.25 inches; Carlton, Ga., 5.64 inches; Washington, Ga., 0.15 inch, and Greenwood, S. C., 2.46 inches. The river gage at Augusta indicated 11.9 feet.

On the morning of the 25th the river at Augusta had risen to 22.3 feet, and the following rainfall reports were received, viz: Anderson, 5.50 inches; Calhoun Falls, 3.65 inches; Washington, 1.28 inches. Based upon these data, a river forecast was issued announcing a maximum stage of 33 feet in the next twenty-four hours, which was mainly intended for and distributed to the farmers in the lowlands below Augusta, since no damage from this stage would be anticipated at this city. At 10:30 a. m. of the 26th, a forecast was issued stating that the river at Augusta would in all probability reach 36 feet. The following warning was disseminated at 11 a. m.:

Supplemental forecast issued 10:30 a. m., placing the maximum stage at 38 feet by midnight; entire city likely to be submerged by midnight.

At the time of sending the telegram above referred to the water was entering the city, and at noon was rushing thru the

streets like a mill race, finally submerging the city, and reaching the highest stage of 38.8 feet about 2 a. m., August 27. The river remained at a stand for about three hours and on the following morning the water had fallen to 33 feet at which stage the flood-stricken people were able to leave their homes. The freshet exceeded the flood of September 11, 1888, by 0.1 foot.

In this connection it is proper to state that all that human effort could do was accomplished by means of the telephone, and, thru advice given, many merchants were able to protect their goods which otherwise would have been ruined. When the water was coming over Broad street, at noon of the 27th, those who were in the stores engaged in saving their property had great difficulty in reaching their homes in safety.

A conservative estimate places the damage as follows, viz:

Money value of property destroyed or damaged, including railroads, etc .....	\$1,000,000
Money value of crops destroyed .....	50,000
Damage to farm lands by erosion or deposit .....	10,000
Money value of losses occasioned by enforced suspension of business, including wages of employees, such as causing a shut-down of the four large cotton mills here for a period of at least three months .....	60,000
Money value of property saved by flood warnings .....	50,000

**FLOODS IN THE OCMULGEE AND OCONEE RIVERS.**

By W. A. MITCHELL, Official in Charge, Local Office, Weather Bureau, Macon, Ga.

On the 25th heavy rains occurred over central and northern Georgia. In the basins of the Ocmulgee and Oconee rivers the following rainfalls in inches were reported on the morning of the 25th: Atlanta, 0.76; Griffin, 1.40; Covington, 2.00; Greensboro, 2.36; and Athens, 8.17. The river stage at Macon the morning of the 22th was 11.8 feet and at Milledgeville, 8.9 feet.

The following warning was issued at 8:20 a. m. of the 25th: Moderate rise expected in the Ocmulgee River to-day, reaching a stage of probably 14.0 feet at Macon. Considerable rise expected in the Oconee, but not to flood stage.

But later in the day a heavy rain of 2.80 inches fell at Macon and vicinity and 1.65 at Athens, and smaller amounts at other points in the upper basin. By 4 p. m. the stage at Macon was 16.7 feet, and at Milledgeville 15.2 feet.

The following warning was then issued:

Continued rains in the basin of the Ocmulgee and Oconee rivers will cause a rise to or near flood stage in both streams.

At 5:30 p. m., the Ocmulgee at Macon had reached 17.5 feet and was still rising. It evidently went near 18 feet during the night, from appearances along the bank the next morning.

The Oconee at Milledgeville at 7 a. m. of the 26th was 24.8 feet, rising. The only rainfall of importance then reported in the Oconee Basin was 1.32 inches at Greensboro. At 3 p. m. the stage at Milledgeville was 29.4 feet, rising, and the following forecast was issued:

Flood crest past Macon last night with a stage of 18 feet; it will reach Abbeville September 1 with a stage of about 14 feet. The Oconee was 29 feet at Milledgeville to-day; this rise will reach Dublin August 30 with stage of about 20 feet.

On the morning of the 27th reports showed a stage of 33.2 feet at Milledgeville and the river was still rising. An advisory warning was accordingly issued to residents in the Oconee Valley to prepare for extreme high water. A report at 3 p. m. showed 32.8 feet and falling. This flood crest reached Dublin on August 30, with a stage of 23.2 feet. The crest of the rise in the Ocmulgee reached Hawkinsville on August 31, with a stage of 12.3 feet; Abbeville on September 2, with a stage of 11.6 feet and Lumber City on September 6, when a height of 9.5 feet was noted.

Some damage resulted from the flood in the upper course of the Oconee, from Milledgeville to Athens. Several bridges and factories were damaged and some cattle lost. In the Ocmulgee the flood proved to be a blessing to the navigation interests on the river, the boats having been tied up and idle