

Mississippi, below the mouth of the Missouri, were issued in time to serve all interests concerned.

During the second decade of the month melting snow in the mountains caused rapidly rising stages in the rivers of the north Pacific coast. Owing to ample warnings very little damage resulted.

From the 17th to the 22d heavy frost occurred in the Ohio Valley and the Middle Atlantic States, and on the 20th frost was general in Maryland, Virginia, and northern portions of Georgia and the interior of the Carolinas.

NEW ENGLAND FORECAST DISTRICT.

Viewing the month as a whole the weather was very unpleasant, the temperature being exceptionally and uniformly low and the precipitation decidedly in excess of the average. A storm of marked severity, considering the season, accompanied by very heavy rain and strong to high northeast gales prevailed during the 27th and 28th. The gales were of unusual force along the southern New England coast, and by many were considered the heaviest ever known at this time of the year. All shipping remained in the harbor, timely warnings having been given of the approaching storm and, so far as known, no casualties resulted.—*J. W. Smith, District Forecaster.*

WEST GULF FORECAST DISTRICT.

The month opened with showery weather over the greater portion of the district and showers were reported from some part of the district every day during the first nine days. These conditions were generally covered in the forecasts. Frost occurred in the northern portion of the district on the 10th and 13th, for which warnings were issued. Warnings for frost were issued for other dates, on most of which the temperature fell to about the frost point.

No general storm occurred along the Gulf coast during the month. Conditions appeared which warranted the issue of warnings on three dates.—*I. M. Cline, District Forecaster.*

NORTH CENTRAL FORECAST DISTRICT.

Unseasonably cool weather prevailed over this forecast district during the entire month. No general cold-wave warnings were issued, and the storm-warning service on the upper Lakes was not in operation on account of the lateness of the season. Advices were sent to ports on Lake Michigan for the benefit of the companies which maintained winter navigation. No casualties occurred during the month.—*H. J. Cox, Professor and District Forecaster.*

ROCKY MOUNTAIN FORECAST DISTRICT.

No severe storms occurred during the month. Frosts were frequent, but there was no serious damage; as a rule their occurrence was accurately forecast.—*F. H. Brandenburg, District Forecaster.*

SOUTH PACIFIC FORECAST DISTRICT.

The month was, as a whole, uneventful and in decided contrast to the preceding month, which was one of frequent and heavy rainfalls. At the beginning of April moderate showers fell throughout California. There appeared to be a tendency for depressions forming in the intermountain region to move rapidly southward over the Valley of the Colorado. A slow-moving area of high pressure rested over the western half of the country from April 5 to 12, and was accompanied by generally pleasant weather on the Pacific slope. On April 14 a well-marked depression moved southward on the western edge of the high, and for several days following the disturbance seemed to linger over Utah and Arizona. On April 18 a moderate depression overlay the Pacific slope, and high southerly winds and generous rains were reported generally on the 19th.

Light to heavy frosts occurred on the morning of the 20th, following the eastward march of the depression. On the morning of April 21 the disturbance crossed the Rocky Mountains.

Another marked depression appeared over Nevada on the morning of the 26th.—*A. G. McAdie, Professor and District Forecaster.*

NORTH PACIFIC FORECAST DISTRICT.

Several damaging frosts occurred in the North Pacific States during April, for which timely warnings were issued. The winds were moderate and storm warnings were only issued on two occasions.

The most noteworthy feature was an unusually severe hot spell beginning on the 7th and lasting until the 15th, which caused the snow in the foothills to melt very fast and all rivers, creeks, and lakes in this district to rise rapidly. This hot spell was followed by temperatures, as a rule, below normal, with the result that the snow afterwards melted more gradually, and, except in a few small streams, no damaging floods occurred.—*E. A. Beals, District Forecaster.*

RIVERS AND FLOODS.

The April flood in the lower Mississippi Valley passed into the Gulf of Mexico without exciting apprehensions beyond those that would naturally be caused by any flood, and with but little or no damage or inconvenience. In the Memphis district alone were any fears expressed. The river at Memphis reached a stage of 39.0 feet on April 10, but 1.1 feet below the great high-water mark of the previous year, and it was thought that possibly the weak places in the levees at Luxora and Golden Lake, Ark., might give way, and also that the enormous strain would prove too powerful for the levees in the St. Francis district. Fortunately, none of these fears were realized; the river remained stationary at 39.0 feet from the 10th to the 12th, inclusive, and then began to fall, passing below the danger line of 33.0 feet during the morning of the 22d. Below Memphis the stages reached were from 3.0 feet to 6.0 feet lower than those of 1903, and nothing of unusual interest was chronicled. The usual warnings were issued about ten days in advance of the flood waves, and no reports of loss or damage have been received.

The heavy rains of the 23d–26th, inclusive, over the lower Missouri and upper Mississippi watersheds, caused the rivers to rise to the danger lines at almost all points, and in some places somewhat higher. In the lower Kansas River there were fears of a repetition of the disasters of 1903, but they were soon allayed by the early cessation of the rains. The Weather Bureau warnings of the floods enabled all interested to remove or protect their property whenever effective measures were possible. However, many thousand acres of bottom lands along the Mississippi River which had been planted to wheat were overflowed and the wheat was almost totally destroyed. The bottoms opposite Louisiana, Mo., which were submerged during the great floods of 1903, due to a crevasse in the Sny levee, were again overflowed, and it is estimated that about 30,000 acres of wheat were overflowed. Much of the overflowed land has been planted in corn since the subsidence of the waters.

The following report on the flood at Hannibal, Mo., and vicinity was made by Mr. B. L. Waldron, Official in Charge, United States Weather Bureau office, Hannibal, Mo.:

The river was 0.9 foot above the danger line on the first of the month, but fell steadily until the 22d, except that a slight rise occurred from the 8th to the 11th. The heavy rains in Missouri and southern and central Iowa from the 24th to the morning of the 26th caused an unusually rapid rise in the river in the vicinity of Hannibal; the danger line was passed on the 25th, and the crest was reached on the 28th, with a stage of 16.4 feet.

Flood warnings were issued at 10:45 a. m. of the 26th, and it was then estimated that a stage of about 17 feet would be reached on the 28th; on the 27th those interested were advised that the crest would arrive on the 28th with a stage a little above 16 feet.

The Salt River overflowed its banks by the morning of the 25th, and extensive wheat fields and other lowlands were overflowed. Bear Creek cross levee, Indian Grave district, broke on the 23d, and a considerable

area was overflowed; the Lima levee, south of Meyer, broke on the 24th, and north of Meyer on the 26th, the water overflowing hundreds, and perhaps thousands of acres of land, much of which was in wheat and oats. Long Island, near Quincy, was overflowed, and stock was taken off by boats on the 26th. There were also large areas overflowed in the Fabius Valley. Most of the residents of Bay Island moved to the mainland on the 27th, nearly all of the islands being then under water. On the night of the 27th the boathouse at Hannibal was almost surrounded by water, and some cellars were flooded.

It was estimated that 15,000 to 20,000 acres of land between Hannibal and Quincy was overflowed, and also 30,000 acres opposite Louisiana, Mo.

The damage from this flood consists largely of washing out new levee work, causing to the contractors the delay and expense of moving to highland and return.

Wheat on the overflowed lands was not much injured; it was already in poor condition, and the water left it before doing much damage.

In East St. Louis and vicinity the high water occasioned considerable inconvenience and some alarm for a few days, but no material damage was done.

A moderate flood in the Pittsburg district on the 1st and 2d was well covered by preliminary warnings, and no damage resulted, except the flooding of cellars and the covering of some railroad tracks.

In the lower Ohio and its tributaries, the flood, which was quite marked, was made the subject of the following report by Mr. P. H. Smith, Official in Charge, United States Weather Bureau office, Cairo, Ill.:

The first important rise in the lower Ohio River during the present spring occurred at Evansville from March 5 to 14, inclusive. The stage of water reached on that rise was 36.2 feet. The river commenced falling on March 14 and continued falling until the 23d, when a second rise started in, which crested at 39.3 feet at 9 a. m., March 31. The river remained stationary at that stage until some time during the evening of April 1, when it again began to rise slowly and continued rising until the morning of April 3. The highest stage reached was 39.8 feet. The river commenced to fall on April 4, and passed below the danger line at 9 p. m. of April 10.

The official in charge at Evansville was advised by wire on the morning of March 26, when the river at that point was 31.3 feet, that the danger-line stage of 35 feet would be reached within thirty-six hours. The exact time was 4 p. m., March 27. On this date the official at Evansville was further advised that the maximum stage at that place would be between 39 and 40 feet. These warnings were disseminated as widely as possible. The official in charge at Evansville in reporting upon the flood states:

"All river interests were given timely notice in regard to the maximum stage expected. While the high water caused more or less inconvenience by submerging some parts of the roads in the bottom lands, and will also somewhat delay spring plowing, no direct damage can be attributed to it in this vicinity."

The rise during the first half of March at Paducah and Cairo caused only a moderate tide. The river commenced falling at Paducah on the 17th and at Cairo on the 18th. Another rise set in at Paducah on the 24th, which crested on April 4 at 44.7 feet. The fall set in on the morning of April 5, and the river passed below the danger line of 40 feet during the night of April 10-11.

At Cairo the river commenced rising again on March 24, reached 49.1 feet on the morning of April 5, commenced falling by the afternoon of April 5, and passed below the danger line of 45 feet on April 13. The maximum stage forecast for Cairo was 48.5 to 49.0 feet. The remarkably high stage at Cairo, considering the moderate floods out of the upper Ohio and the southern tributaries of the lower Ohio, was due in part to torrential rains over southern Illinois during March 24-25.

CLIMATE AND CROP SERVICE.

By Mr. JAMES BERRY, Chief of Climate and Crop Service Division.

The following summaries relating to the general weather and crop conditions during April are furnished by the directors of the respective sections of the Climate and Crop Service of the Weather Bureau; they are based upon voluntary reports from meteorological observers and crop correspondents, of whom there are about 3000 and 14,000, respectively:

Alabama.—Dry, cool month, favorable for work, but unfavorable for germination and growth; local damage by frost and hailstorms. Cotton made generally poor stands; considerable not up, much replanting in progress. Upland corn made slow growth; planting of lowland corn retarded by dry, hard soil. Wheat and oats heading low during last decade, when all minor crops were backward; strawberries yielded well;

No material damage resulted from the flood in the vicinity of Cairo. Railroad traffic at Birdspoint, Mo., across the river from Cairo, was interfered with for a short period. Lowlands were flooded and wheat damaged somewhat. The damage to wheat will not, however, exceed 10 per cent unless later floods follow. At Birdspoint about 40 per cent of the lowland behind the Cotton Belt tracks and the levees were submerged. This is the smallest amount of land ever submerged at so high a stage of water in this vicinity.

The flood in the lower Tennessee Valley was not of much importance. Warnings were sent out well in advance of the flood and no damage was done that could have been prevented by warnings. At Florence the river reached a maximum stage of 17.2 feet on March 27-28. At Johnsonville the maximum stage reached was 28.1 feet on March 29. Warnings issued to points on the lower Tennessee were bulletined and distributed by mail. Lumber and cross-ties were the principal properties protected. The observer at Florence estimates that property in that vicinity valued at about \$40,000 was protected, but states that there was practically no danger.

The most damaging flood occurred in the lower Wabash. A rise during the early part of March brought the stage at Mount Carmel up to 19.7 feet on the 14th. This rise caused little or no damage. The river fell to 15.5 feet by the morning of March 21, when a second rise began which crested at 27.1 feet on April 2. The river commenced falling by the morning of April 3 and passed below the danger line (15 feet) on April 17.

Warnings were telegraphed to Mount Carmel and several other points affected, and distributed from those points to other river towns. The maximum stage forecast for Mount Carmel was 28 feet. The maximum stage reached was 27.1 feet. The river at Mount Carmel would probably have reached 28 feet, or higher, had not some of the levees in that section given way.

Reports from the flooded Wabash district show that the warnings were of great value. The observer at Mount Carmel reports that, on account of the warnings, farmers had time to remove their families and stock.

Mr. Henry Johnson, of Owensville, Ind., reports as follows:

"Relief parties were sent out to the flooded districts, and telephone messages giving warnings of danger were sent to all neighborhoods. Many relief parties were sent out in boats to remove people and stock to places of safety. The warnings enabled us to save most all property exposed to danger."

The rivers of the Pacific States were moderately high during the month, but the situation developed nothing of particular interest.

The last ice of the season in the Mississippi River was reported at Prairie du Chien, Wis., on the 2d. On the 26th the first boat of the season arrived at St. Paul, coming from Wabasha, Minn. In the Missouri River the ice moved out at Williston on the 4th and 5th, and at Bismarck, N. Dak., on the 6th. The last ice of the season passed Sioux City, Iowa, on the 12th, and Omaha, Nebr., on the 13th. At Pierre, S. Dak., local navigation for the season was opened on the afternoon of the 10th. The Penobscot River opened on the 8th. No ice was reported from any other river of the Atlantic system.

The highest and lowest water, mean stage, and monthly range at 201 river stations are given in Table VII. Hydrographs for typical points on seven principal rivers are shown on Chart V. The stations selected for charting are Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississippi; Cincinnati and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.—H. C. Frankenfield, District Forecaster.

fruit prospects continued good, except in some northern and western countries.—F. P. Chaffee.

Arizona.—Generally dry weather, with high, drying winds, and at times abnormally low temperatures, accompanied, except in the warmest sections, by light to killing frost, prevailed during April. In the lower Colorado Valley, where irrigation water was abundant, crops made fine growth. In the other parts of the Territory, however, crop conditions were generally very poor, and considerable injury to fruit, as well as other crops, resulted from frost. Range feed and stock water were scarce and stock suffered greatly.—M. E. Blystone.

Arkansas.—Cool temperatures with early excessive rains delayed farm operations and were unfavorable for germination. Cotton planting progressed slowly; the early planted came up to only a fair stand and replanting was necessary in some sections. Corn planting was well advanced by the close of the month; the stand was irregular and there was some replanting. Small grains and gardens made slow growth. Peaches