

and 24th, and at Corpus Christi on the 23d and 24th. From the 1st to 5th heavy frost was reported daily in southern California.

BOSTON FORECAST DISTRICT.

The mean temperatures of the month were decidedly above normal in all sections, and the maximum readings that occurred from the 21st to the 24th were among the highest recorded in the January official observations. The warm weather during the period mentioned caused buds to start on some trees and leaves to appear on shrubs in sheltered places in central and southern sections. Ice disappeared from many streams and ponds. There was an absence of severe storms, with the exception of the storm of the 14-15th, when wind velocities of from 40 to 67 miles an hour occurred at coast stations. So far as known at this office no damage resulted from the gales. The precipitation of the month was generally much below the monthly average, and the greater portion of it occurred as rain. The light snowfall was unfavorable to the lumbering interests, and, owing to the prevalence of mild weather, there has been little ice harvested. There were no storms during the month with high winds for which warnings were not ordered.—*J. W. Smith, District Forecaster.*

NEW ORLEANS FORECAST DISTRICT.

High winds prevailed along the west Gulf coast on the 9th and 22d, for which timely warnings were issued. No high winds occurred without warnings. Two general cold waves passed over the district during the month, one on the 8th and 9th and another on the 21st and 22d. Frost or freezing temperature warnings were issued for the sugar and trucking regions of Texas and Louisiana for every injurious condition that occurred during the month.—*I. M. Cline, District Forecaster.*

CHICAGO FORECAST DISTRICT.

Advices of impending storms were sent to open ports on Lake Michigan during the month. A well-marked storm developed in the southwest early in the month and reached the middle Mississippi Valley on the morning of the 3d, at which time messages advising the various interests that severe and dangerous gales would occur were issued. The storm continued to develop great energy and moved directly across the Lake region, accompanied by general gales for 24 hours. Advices were sent out on the 4th that the storm would gradually lose force. There was no other severe storm until the 15-16th. Advisory messages were issued in advance of this storm. The storm which appeared in the Pacific coast region on the 17th moved very slowly southeastward and thence northeastward over the Lake region, reaching the Lakes by the morning of the 22d and causing high winds until the morning of the 23d. Advices were sent out 24 hours in advance of its occurrence.

There was no general cold wave during the month, although the temperatures were very low in the northwest from the 21st to the 23d. Cold-wave warnings were issued on the 19th, 20th, 21st, and 22d, resulting finally in a display at all stations. The warnings were verified at the majority of the stations, and a remarkable fall in temperature occurred at practically all points, although limiting temperatures were not reached in some cases. No other general cold-wave warnings were issued. The chief value of the warnings lay in the fact that abnormally high temperatures for the season had previously prevailed. This storm was accompanied by rain, changing to sleet and snow, which caused great damage to telephone and telegraph lines. The temperatures were, as a rule, far above the normal over the greater portion of the district, and it was the warmest January since 1880.—*H. J. Cox, Professor and District Forecaster.*

LOUISVILLE FORECAST DISTRICT.

The month was unusually mild and fair, there being only two periods, 8-9th and 23d to 26th, when the temperature was below normal. On the 20th and 21st the temperature was 70° to 80° over the greater portion of Kentucky and Tennessee, the highest generally for January since the establishment of the

National Weather Bureau Service. Thunderstorms were quite general on the 15th. Three general storms passed across or near the district during the month, giving rain and high winds; these occurred 2-3d, 14-15th, and 20th-22d. The month was remarkably free from snow, there being only one snowstorm, on the 8th, over any great portion of the district. On the 26th snow fell quite heavily in the mountain portions of Kentucky and Tennessee, but none elsewhere in either State. Cold-wave warnings were issued the night of the 7th and morning of the 8th, and again on the 20th and 21st. These warnings were fully justified.—*F. J. Walz, District Forecaster.*

DENVER FORECAST DISTRICT.

In western Montana and in the mountain districts of the western slope the month was cold, with here and there an excess of precipitation, while mild and dry weather was almost continuous in the plains region of the eastern slope. In southwestern Colorado the stormy period of the 18th, 19th, and 20th, which was forecast, was followed by the most destructive snow slides in the history of San Juan district. Five lives were lost from this cause, and the Denver and Rio Grande Railroad was blocked for thirteen days in Animas Canyon. The greatest depth noted in connection with these slides was 63 feet. The most important cold wave of the winter followed the low pressure area that overlay the middle Rocky Mountain region on the morning of the 20th. Timely warnings were given full distribution in southern Wyoming, northern Arizona, southwestern and eastern Colorado, and northern and eastern New Mexico, which was the area covered by the cold wave.—*F. H. Brandenburg, District Forecaster.*

SAN FRANCISCO FORECAST DISTRICT.

The month, as a whole, was pleasant, the condition during the early portion being favorable for heavy frost generally in the interior of California. Ample warning was given to fruit growers, and losses due to frost were therefore small. On the morning of the 11th a general warning of rain and southerly winds was issued, and the storm that followed broke a prolonged dry period that was beginning to seriously interfere with farming operations. Ample warning was also given to river interests concerning the probable effect of the heavy rains upon river heights. The third decade, like the first, was dry.—*A. G. McAdie, Professor and District Forecaster.*

PORTLAND FORECAST DISTRICT.

The stormy period of the month was between the 11th and the 25th, during which time four noteworthy disturbances passed across the district. The third one evidently resulted from the coalescence of two minor disturbances, which were first noted over Nevada and western British Columbia, respectively. It moved east across the southern portion of the district. The last one made its appearance off Cape Flattery on the evening of the 21st, and moved slowly northeastward. The steamer *Valencia* was wrecked on Vancouver Island during the passage of the last storm and 117 lives were lost. From the 25th to the end of the month, the weather was controlled by a stagnant high pressure area which settled over southern Idaho, and but little precipitation occurred thereafter. Timely warnings were issued for all gales. No cold waves occurred and no cold-wave warnings were issued.—*E. A. Beals, District Forecaster.*

RIVERS AND FLOODS.

Owing to the continued absence of normal winter conditions, river stages were generally higher than is usual during the month of January. Temperatures were high and rainfall abundant, and, as a consequence, the great rivers were well supplied with water, while moderate floods occurred in many of the smaller rivers. Danger-line stages were exceeded in a number of these floods with the usual accompaniment of flooded lowlands. Along the headwaters of the Tennessee

River, and in the mountain districts of the Virginias, a great amount of damage was done to railroads and bridges.

The Grand River of Michigan was in flood during the last decade of the month, the first January flood for a great many years. At Grand Rapids, Mich., the maximum stage of the water was 11.5 feet, 0.5 foot above the danger line, and some of the lower factory basements along the river front were flooded.

The heavy rains in California from the 17th to the 19th, inclusive, caused a flood in the Sacramento River, and some unusually high stages were reported. At Red Bluff, Cal., the maximum stage was 25.3 feet, 2.3 feet above the danger line, while at Marysville, Cal., the crest stage was 21.6 feet, 1.6 feet above the previous high-water mark of February 25 and March 20, 1904. Some damage occurred from Colusa, Cal., northward, the most serious of which was the breaking of the Crocker levee in Colusa County.

Warnings were issued in advance of all the floods, and reports received indicate that they were of great value to all interested.

At the end of the month the Missouri River was frozen as

far south as the northern Nebraska line, and the ice had increased somewhat in thickness to the northward. The quantity, however, still continued to be less than that of the previous winter. The Mississippi River was frozen as far south as LeClaire, Iowa, whereas at the end of January, 1905, it was frozen as far as St. Louis where the ice was 11 inches in thickness. There was some increase in the ice in the rivers of northern New England, but there were still from eight to twenty inches less than at the corresponding period of 1905.

The rivers of the other districts were comparatively low, and nothing of more than ordinary interest was noted.

The highest and lowest water, mean stage, and monthly range at 287 river stations are given in Table VI. Hydrographs for typical points on seven principal rivers are shown on Chart I. 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, Professor of Meteorology.*

## CLIMATOLOGICAL SUMMARY.

By Mr. JAMES BERRY, Chief of the Climatological Division.

The following summaries relating to the general weather and crop conditions during January are furnished by the directors of the respective sections of the Climatological Service of the Weather Bureau; they are based upon reports from cooperative observers and crop correspondents, of whom there are about 3300 and 14,000, respectively:

**Alabama.**—The mild weather was favorable for winter grain, though frequent rains kept the ground too wet for work. It was unseasonably warm from the 15th to 22d, though light freezes occurred during the first decade and the latter part of the third decade. Rainfall was heavy to locally excessive on the 21st and 22d. Wheat and fall oats advanced well. Little progress was made in seeding spring oats. Fruit trees continued in good condition. Preparation for staple crops was begun in southern counties during the last week.—*F. P. Chaffee.*

**Arizona.**—The month was unusually cold and cloudy from the 1st to the 25th, with a small amount of precipitation. Farm work was practically suspended, and winter feed was scarce in the northern counties, due to the accumulated depths of snow and the frozen condition of the soil. Wheat, oats, and barley grew slowly; in the southern counties these crops were still being sown. Almonds and strawberries were in bloom. The river beds were full of water. A large yield of citrus fruit continued. The ranges and cattle in the southern sections were in excellent condition.—*L. N. Jesunofsky.*

**Arkansas.**—The mean temperature was slightly above normal, but very cold weather prevailed during the first and last decades. The precipitation as a whole was slightly above normal, and excessive locally in the northwest. Snow occurred on several dates and was general on the 22d, with monthly amounts ranging from trace to 11.5 inches. The weather was generally unfavorable for farm work. Wheat and oats were in fairly good condition. Fruit was generally uninjured. Cotton picking was finished. Stock was generally in good condition, except locally in the southwest.—*H. F. Alciatore.*

**California.**—The dry northerly winds and low temperature early in the month were followed by warm weather and generous, well distributed rainfall, with heavy snowfall in the mountains. The rain and melting snow caused high water and overflow of rivers in the central and northern sections, resulting in considerable damage to grain fields. On the whole, the rain was exceedingly beneficial, and by the close of the month grain and grass were in good condition.—*Alexander G. McAdie.*

**Colorado.**—Except for a brief period, the weather was mild and unusually favorable to live stock on the eastern slope, but in parts of the western slope and San Luis Park it was very cold. Range grass was covered with snow in some of the western and northwestern counties, but elsewhere grazing was not seriously interrupted. For the time of the year range cattle, horses, and sheep were generally in fine condition throughout the State.—*Fred. H. Brandenburg.*

**Florida.**—The temperature averaged practically normal. There were much cloudiness and some heavy rains, the greatest amounts of rainfall occurring over western counties and the least over the southern district. A fair acreage was sown to oats and some land was prepared for corn. Farmers were mostly engaged during the latter half of the month clearing fields and burning trash. Vegetables were backward, owing to frequent rains, but citrus trees were well advanced, many showing bloom.—*A. J. Mitchell.*

**Georgia.**—Land was damaged somewhat and farming operations were

retarded by excessive precipitation. Winter grains showed good stands and satisfactory progress was made by these crops in most localities. Fruit suffered no injury, the trees being in excellent condition generally. Scarcity of labor was reported from some localities. Roads were bad and very little hauling was done.—*J. B. Marbury.*

**Hawaii.**—Temperatures were generally above normal during the first half of the month, but were abnormally low during the latter half; the nights were very cold during the second and third decades. Although rather heavy showers occurred in portions of windward Hawaii, eastern Maui, and northern Kauai during the first few days, and heavy leeward rains were general during the latter part of the second decade, the month as a whole was dry for this season of the year. High winds occurred at intervals all the month, and exceptionally stormy weather prevailed during the second decade, causing considerable damage to young cane, plantation buildings and flumes, trees, and shrubs, especially in northern Hawaii and Maui. The growth of young cane was retarded by low temperatures, but conditions during the first and third decades were very favorable for ripening of 1906 cane and for harvesting, which proceeded rapidly in all sections. Ripening of winter pineapples was retarded during the first and third weeks by cloudy days and cold nights. Preparation of rice lands was general throughout the month; by the close of the month the setting out of seedling plants had begun in all sections. Coffee picking was virtually finished during the month, the yield on the whole meeting the expectations of growers. Leeward pastures were dry during the early part of the month, but were greatly helped by the rains of the second decade.—*Alex. McC. Ashley.*

**Idaho.**—Snow covered most of the winter range during the month, necessitating continued feeding of stock. In some localities feed became very scarce, but most stock came through the month in good condition. Winter grain was well protected by snow. Fruit trees and shrubs were reported as wintering well.—*Eduard L. Wells.*

**Illinois.**—The month was the mildest January since 1880. Precipitation was above normal, being heavy in parts of the southern district. Wheat maintained a good winter condition. The plant was exposed most of the season, but the weather had not been sufficiently rigorous to cause damage. Corn was keeping well; a considerable portion of the crop had been marketed. Meadows and pastures had wintered well. Apples and potatoes were not keeping well.—*Wm. G. Burns.*

**Indiana.**—The prevailing warmth, with frequent, but generally light, rains from the 3d to 23d, inclusive, caused a rather rank growth of wheat, rye, and grasses. There was a slight improvement in the general condition of southern bottom lands, but in most cases the moisture continued excessive. Early fruit buds formed prematurely and were in danger from later freezes. Some plowing for oats was done during the last two weeks.—*W. T. Blythe.*

**Iowa.**—The month was abnormally warm, with less than the usual amount of stormy weather. The average precipitation was slightly above normal and mainly in the form of snow; the ground was generally well covered during the prevalence of lowest temperature, affording protection to winter wheat and rye. Conditions were favorable for stock feeding and the usual winter work on farms.—*John R. Sage.*

**Kansas.**—The past January was the warmest since 1886, except that of 1900, when the average temperature was the same. The precipitation was slightly below normal, but the ground remained moist. Wheat continued in good condition. Plowing for spring crops continued, and was nearly completed in Chautauqua County by the close of the month.