

loss. At Red Bluff a stage of 27 feet was made, the highest since the record flood of February, 1881. In the lower Sacramento Valley the damage was not so great.

The only change in the ice situation in the Mississippi and Missouri rivers was the extension of the frozen area to Cairo, Ill., with some slight intervals below St. Louis, Mo. At the latter place the river was frozen over during almost the entire month, while back of Cairo it was frozen from the 3d to the 25th, inclusive.

In the Ohio River ice was present in large quantities during almost the entire month. In the vicinity of Pittsburg, Pa., navigation was practically suspended from the 8th to the 23d, inclusive, on account of ice and low water. There was a gorge above the Baltimore and Ohio Railroad bridge at Parkersburg, W. Va., from the 3d to the 23d, inclusive. At Cincinnati, Ohio, ice compelled a suspension of navigation from the 9th to the 24th, inclusive, the ice practically disappearing on the latter date. At Evansville, Ind., navigation was suspended on the 10th and resumed on the 26th.

In the Hudson River, in the vicinity of Albany, N. Y., the

ice situation became somewhat threatening during the last few days of the month, and merchants on the water front were advised to remove goods from cellars and low districts. In the Susquehanna River at Harrisburg, Pa., the ice began to move out on the 26th, but owing to warnings previously given, no damage of consequence was done. At Binghamton, N. Y., the ice in both the Chenango and Susquehanna rivers went out on the 28th on a fast rising tide.

The severe floods on the last two or three days of the month continued during the early days of March, and will be described in the WEATHER REVIEW for that month.

The highest and lowest water, mean stage, and monthly range at 134 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, Forecast Official.*

## CLIMATE AND CROP SERVICE.

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

The following summaries relating to the general weather and crop conditions are furnished by the directors of the respective sections of the Climate and Crop Service of the Weather Bureau:

[Temperature is expressed in degrees Fahrenheit and precipitation in inches and hundredths.]

**Alabama.**—The mean temperature was 40.4°, or 5.9° below normal; the highest was 73°, at Mobile on the 27th, and the lowest, 11°, at Ashville and Florence on the 3d. The average precipitation was 6.52, or 1.18 above normal; the greatest monthly amount, 15.40, occurred at Union Springs, and the least, 2.71, at Newburg.

Heavy and excessive rains latter part of month caused damaging floods in larger rivers, overflowed lowlands, and washed uplands, leaving ground too wet for plowing, and delaying all farm work.—*F. P. Chaffee.*

**Arizona.**—The mean temperature was 49.4°, or 0.8° above normal; the highest was 90°, at Chumles Camp on the 16th, and the lowest, 3° below zero, at Fort Defiance on the 2d and 3d. The average precipitation was 0.33, or 0.61 below normal; the greatest monthly amount, 1.80, occurred at Kingman, while none fell at a great number of stations.

On account of scarcity of water for irrigation, wheat, barley, and alfalfa are making slow growth; almonds are in full bloom.—*Wm. G. Burns.*

**Arkansas.**—The mean temperature was 35.0°, or 6.4° below normal; the highest was 72°, at Elon on the 27th and at Pine Bluff on the 28th, and the lowest, 2° below zero, at Corning on the 15th. The average precipitation was 2.60, or 0.53 below normal; the greatest monthly amount, 4.63, occurred at Blanchard, and the least, 0.50, at Texarkana.

Wheat prospects continue unfavorable by reason of the poor start in autumn and damage by the freeze in December. The weather during February was cold, and there was considerable sleet, snow, and ice; these conditions instead of being detrimental to the crops, have, on the whole, been rather beneficial. Early sown wheat and oats are generally in fair to good condition, but the late sown have been seriously injured. Very little farm work has been done, on account of the dry and frozen condition of the ground. The weather has not been warm enough to bring forward the fruit buds, and as yet there has been no damage to the fruit; many trees were broken and damaged by the sleet and ice of the latter part of January.—*Edward B. Richards.*

**California.**—The mean temperature was 50.3°, or 1.7° above normal; the highest was 92°, at Tulare on the 16th, and the lowest, 6° below zero, at Bodie on the 3d. The average precipitation was 8.14, or 5.17 above normal, the greatest monthly amount, 44.35, occurred at Branscomb, Mendocino county, while none fell at Mammoth Tank, Needles, and Ogilby.

Warm weather and heavy rainfall during the month were very beneficial to growing crops. Wheat, barley, and grass were never in better condition at this date. The heavy storm in the central and northern sections about the 25th was one of the most severe on record and caused a rapid rise of creeks and rivers, with slight damage to grain. Early deciduous fruits were in bloom at close of month.—*Alexander G. McAdie.*

**Colorado.**—The mean temperature was 31.5°, or 5.3° above normal; the highest was 76°, at Lamar on the 12th, and the lowest, 28° below zero, at Wagonwheel Gap on the 2d. The average precipitation was 0.58, or

0.33 below normal; the greatest monthly amount, 2.46, occurred at Ruby, and the least, trace, at Fort Morgan and Grover.

The precipitation during February was very unevenly distributed and considerably below normal for the mountain region as a whole; in fact the deficiency was even more marked than for any of the four preceding months. East of the Continental Divide the storms did not make good the loss by evaporation and the same was true of the western slope prior to the prolonged storm that set in on the 25th and continued into March. This storm proved to be the heaviest of the winter in the southwestern part of the State. Over areas on the upper watershed of the Uncompahgre and the San Miguel the snowfall was reported the heaviest in twelve years, the duration of the storm considered. Snow slides were numerous and caused loss of life and property.—*P. H. Brandenburg.*

**Cuba.**—The mean temperature was 71.2°; the highest was 92°, at Soledad (Guantanamo) on the 7th and Nuevitas on the 28th; and the lowest, 42°, at Santa Clara on the 12th. The average precipitation was 1.74; the greatest monthly amount, 4.03, occurred at Cruces, and the least, trace, at Manzanillo.

Several copious showers fell in the western half of the island, but in the eastern half the rainfall was very light. Two cool waves were very generally felt—from the 11th to 13th and on the 18th and 19th; the average temperatures, however, were very seasonable. The rains were quite favorable for the tobacco crop; while they were too late to benefit the first cutting, they caused a vigorous growth of shoots, and in Pinar del Rio and Havana a very good second crop will be harvested; in Santa Clara conditions have also improved, but the rainfall was lighter there than in the two western provinces and more moisture is needed to assure the development of the sprouts. Growing canes were also much stimulated by the showers; cane planting and preparation of ground continued, but were by no means general, while grinding progressed uneventfully, with the exception of a few interruptions caused by heavy roads, which prevented carting. Small crops and pasturage were in good condition at the end of the month.—*W. B. Stockman.*

**Florida.**—The mean temperature was 54.4°, or 4.6° below normal; the highest was 87°, at Miami on the 2d, and the lowest, 21°, at Wewahatchka on the 10th. The average precipitation was 4.88, or 1.09 above normal; the greatest monthly amount, 10.57, occurred at De Funiak Springs, and the least, 0.90, at Flamingo.

During the early part of the month seeding was retarded by dry weather, and the continued low temperatures were unfavorable for vegetable growth. Cane was planted early in the month and the planting of corn and melons began during the second decade. Vegetables made fair progress, with moderate shipments. The orange crop was practically shipped by the 10th. Citrus trees and pineapples did well. Farm work is about two weeks late.—*A. J. Mitchell.*

**Georgia.**—The mean temperature was 42.1°, or 4.8° below normal; the highest was 83°, at Waverly on the 1st, and the lowest, 10°, at Washington on the 5th. The average precipitation was 7.43, or 1.98 above normal; the greatest monthly amount, 16.48, occurred at Woodbury, and the least, 2.34, at Savannah.

The coldest February since 1895, and one of the four wettest in the past eleven years. The continued cold was the main feature of the temperature; the minima were not unusually low. A great amount of snow was deposited in the extreme northern sections by the storm of the 14-

15th. A heavy rainstorm occurred on the 27-28th, during which 7 to 9 inches of rain fell in parts of middle Georgia. The excessive precipitation caused rapid river rises. Large and small streams went over their banks, and some damage was occasioned by the overflows. Farm work was delayed in the northern counties, but in some of the southern sections considerable was done. Fall-sown oats and wheat suffered from the prevailing temperature conditions. Fruit trees remained dormant and healthy.—*J. B. Marbury.*

**Idaho.**—The mean temperature was 32.5°, or 4.6° above normal; the highest was 62°, at Pollock on the 16th and at Boise on the 17th, and the lowest, 35° below zero, at Vernon on the 1st. The average precipitation was 2.45, or 0.66 above normal; the greatest monthly amount, 5.76, occurred at Ola, and the least, 0.53, at Swan Valley.

February opened with temperature below zero in all parts of the State, except the western valley districts. A decided rise of temperature occurred on the 4th, and the remainder of the month was unusually mild. Heavy precipitation, largely snow in the mountains, occurred in the southwest sections during the second and third decades. Plowing began about the latter part of the month throughout the southern and eastern counties, although the ground was very wet in the southwest sections. Grazing lands are free from snow, and grass has made good growth on the ranges.—*S. M. Blandford.*

**Illinois.**—The mean temperature was 20.8°, or 5.8° below normal; the highest was 62°, at Effingham on the 28th, and the lowest, 16° below zero, at La Harpe on the 3d. The average precipitation was 1.29, or 0.98 below normal; the greatest monthly amount, 2.72, occurred at Sycamore, and the least, 0.27, at Danville.

The weather during February was cold and dry until near the end of the month. Snow which fell the latter part of January, and which was augmented from time to time during February, afforded protection to wheat throughout the greater portion of the State. Good rains were general at the end of the month, and these added to the melting snow, saturated the surface of the soil quite thoroughly. There was a slight improvement in the condition of wheat during the month, and the prospects are quite favorable in the northern and central districts. In the southern districts prospects continue very unfavorable; grass did well in some localities and poorly in others. Peach buds are reported killed to a large extent in the central and southern districts.—*M. E. Blystone.*

**Indiana.**—The mean temperature was 21.5°, or 6.6° below normal; the highest was 59°, at Richmond on the 27th, and the lowest, 20° below zero, at Winamac on the 3d. The average precipitation was 0.99, or 1.76 below normal; the greatest monthly amount, 2.62, occurred at Hammond, and the least, 0.10, at Greensburg.

The temperature was abnormally low throughout the State, the maximum being but slightly above freezing in the north and central portions until after the 23d. During the same period the ground was generally covered with snow in the north and central portions and ice in the southern counties, and the condition of wheat was largely a matter of conjecture. After the 23d the snow and ice rapidly disappeared and at the end of the month wheat, although far below the average in appearance, showed marked improvement. Fruit was believed not to have been injured.—*W. T. Blythe.*

**Iowa.**—The mean temperature was 17.6°, or 4.1° below normal; the highest was 62°, at Humboldt on the 27th, and the lowest, 21° below zero, at Galva on the 2d. The average precipitation was 0.73, or 0.33 below normal; the greatest monthly amount, 2.39, occurred at Belle Plaine, and the least, 0.02, at Thurman.

The month was unusually favorable for stock feeding and ordinary farm operations. The ground was well covered with snow the greater part of the month, and winter grain and grasses suffered no material damage. The snow was mostly absorbed by the soil during the warm period at the close of the month.—*John R. Sage.*

**Kansas.**—The mean temperature was 26.9°, or 3.2° below normal; the highest was 74°, at Garden City on the 23d, and the lowest, 17° below zero, at Delphos on the 2d. The average precipitation was 0.78, or 0.27 below normal; the greatest monthly amount, 3.50, occurred at Moran, and the least, 0.02, at Leoti.

The month was cold, with insufficient moisture, but the ground has been fairly well covered with snow over the eastern half of the State, and decidedly well covered in the central-eastern counties. Wheat, though somewhat damaged by the cold in the central counties, is generally in good condition. Plowing has progressed in the central and southern counties, and oat sowing has commenced in the southeastern counties.—*T. B. Jennings.*

**Kentucky.**—The mean temperature was 27.9°, or 5.9° below normal; the highest was 69°, at Warfield on the 25th, and the lowest, 3° below zero, at Scott on the 3d. The average precipitation was 1.30, or 2.08 below normal; the greatest monthly amount, 3.60, occurred at Pikeville, and the least, 0.46, at Carrollton.

The severe weather of the month was detrimental to agricultural interests. The condition of wheat was bad at the beginning of the month. The heavy sleet which fell the last of January remained on the ground until nearly the end of February. The effect of this is uncertain; some claim that it was beneficial. Little farm work could be done except the stripping of tobacco, which was nearly completed. Stock did well con-

sidering the bad weather. Old orchards severely damaged by the sleet; young trees not hurt so much.—*S. P. Gresham.*

**Louisiana.**—The mean temperature was 47.6°, or 5.6° below normal; the highest was 81°, at Wallace on the 14th, and the lowest, 19°, at Lake Providence on the 3d, north Louisiana Experiment Station on the 4th, and Plain Dealing on the 16th. The average precipitation was 3.55, or 1.24 below normal; the greatest monthly amount, 8.24, occurred at Venice, and the least, 1.32, at Jennings.

The weather of the month was not favorable for agricultural interests. The temperature was below the average, and cool rains with sleet in the northern portion of the State retarded farming operations. Preparations for the cotton and corn crops are not well advanced. Plowing has, however, made good progress in some of the southern parishes, where corn planting has commenced. The bulk of the sugar cane was planted by the close of the month. The condition of both seed and stubble cane is good. Preparations for the rice crop have been pushed vigorously. Seeding has commenced and indications point to a large acreage. The oat crop is not large. The fall seeding is poor, while spring oats are generally up to good stands. Truck gardens are being planted.—*I. M. Cline.*

**Maryland and Delaware.**—The mean temperature was 27.4°, or 3.8° below normal; the highest was 68°, at Easton, Md., on the 27th, and the lowest, 17° below zero, at Sunnyside, Md., on the 20th. The average precipitation was 4.53, or 0.98 above normal; the greatest monthly amount, 6.85, occurred at Sudlersville, Md., and the least, 2.48, at Guard, Md.

The weather was decidedly wintry in its aspects until near the close of the month, with much ice in the waters and an ample snow cover on the land. Navigation was considerably interfered with. A general thaw on the 26th loosened the grip of winter, and the melting snows and heavy rains of that time produced flood stages in all water courses. Winter wheat was still very unpromising at the close of the month. Prospects remain good in the extreme west, and a few fields of early sown present a fair appearance, but the greater part of the crop is in unusually poor condition. The general snow cover helped the uplands, but ice and standing water caused damage in low lying fields. The severe sleet storm of the 21st and 22d caused great destruction to fruit and forest trees, especially throughout the interior parts of the section.—*Oliver L. Fassig.*

**Michigan.**—The mean temperature was 19.8°, or 0.6° above normal; the highest was 58°, at St. Joseph on the 26th, and the lowest, 26° below zero, at Humboldt on the 19th. The average precipitation was 1.06, or 0.90 below normal; the greatest monthly amount, 3.12, occurred at Chatham, and the least, 0.20, at Hayes.

In the winter wheat counties, February was dry and cold, with very little snow protection. At the close of the month the snow was practically all gone in the winter wheat counties, but correspondents quite generally report that very little winter killing had occurred, and that the present condition of wheat is fairly promising. Very little alternate freezing and thawing has occurred and little or no heaving. It should be remembered, however, that the wheat plant was small when the winter began, although quite healthy; it was seeded late, and for that reason did not get as much fall growth as usual.—*C. F. Schneider.*

**Minnesota.**—The mean temperature was 15.5°, or 3.0° above normal; the highest was 60°, at Morris on the 25th, and the lowest, 41° below zero, at Tower on the 9th. The average precipitation was 0.67, or 0.10 below normal; the greatest monthly amount, 1.70, occurred at Farmington, and the least, trace, at St. Cloud.

The cold weather of the latter part of January continued into the first decade of February, with the lowest temperatures generally from the 1st to the 5th, the minimum temperatures ranging from 11° below zero in extreme southern to 41° below in northern portions. The temperatures continued moderately low till the 20th, but from then to the end of the month there was mild weather. The maximum temperatures occurred for the most part on the 26th, and ranged from 43° to 60° throughout the state. Light snows fell at brief intervals till the 16th, after which there was generally dry weather till the evening of the 26th, when moderate rains fell throughout the state, which changed to snow on the 27th and 28th. Snow covered the ground till about the 23d, and in the timbered regions till about the 25th. The warm weather after the 20th, by melting the ice roads, seriously interfered with work in the logging regions, and by the 27th nearly all work was stopped. The snow of the 28th was probably beneficial by adding moisture to the soil. Very little farm work was possible during the month.—*T. S. Outram.*

**Mississippi.**—The mean temperature was 42.0°, or 6.3° below normal; the highest was 77°, at Batesville on the 28th, and the lowest, 12°, at Batesville on the 3d. The average precipitation was 3.63, or 1.20 below normal; the greatest monthly amount, 7.00, occurred at Swartwout, and the least, 1.95, at Hernando.

Owing to the uniformly low temperatures and to much cloudy, damp weather, the month was very unfavorable for farm work, and as a result practically nothing was accomplished over the northern portion of the State in the way of clearing the land, plowing, or sowing oats; but very little progress was made in plowing, planting, and gardening in the southern counties. Fall oats and wheat were either killed or seriously injured by the cold winter. Fruit buds remained dormant.—*W. S. Belden.*

**Missouri.**—The mean temperature was 23.9°, or 6.3° below normal; the highest was 72°, at Gayoso on the 28th, and the lowest, 17° below zero, at Fulton on the 3d and at Montreal on the 15th. The average precipitation was 1.51, or 0.75 below normal; the greatest monthly amount, 3.17, occurred at Mount Vernon, and the least, 0.14, at St. Joseph.

Over the larger portion of the State the ground was well covered with snow until the 22d, affording ample protection to winter wheat, which continued in good condition, except in some of the southern counties and in a few localities in the northeast section. In portions of the southern sections the ground was covered with a thick coating of ice during the greater part of the month which, it was believed, injured wheat to some extent. The melting snow, together with moderately heavy rains at the close of the month, materially increased the supply of stock water in the eastern and southern sections.—*A. E. Hackett.*

**Montana.**—The mean temperature was 24.9°, or 3.6° above normal; the highest was 66°, at Marysville on the 17th, and the lowest, 38° below zero, at Ovando on the 1st. The average precipitation was 0.86, or 0.15 above normal; the greatest monthly amount, 2.69, occurred at Troy, and the least, 0.05, at Fort Logan.

Cold weather prevailed during the first ten days of the month, followed by decidedly warmer over the central and east portion.—*E. J. Glass.*

**Nebraska.**—The mean temperature was 23.6°, or 0.5° below normal; the highest was 65°, at Ansley on the 22d, and the lowest, 24° below zero, at Valentine on the 2d, at O'Neill on the 3d, and at Lynch on the 4th. The average precipitation was 0.39, or 0.29 below normal; the greatest monthly amount, 0.90, occurred at Ericson and Guiderock, and the least, trace, at several stations.

During most of the month winter wheat was nicely protected by snow, which melted after the 18th, leaving the ground moist and wheat in good condition. No unfavorable conditions, except on some high land, where snow blew off, but acreage injured is very small; crop generally very promising.—*G. A. Loveland.*

**Nevada.**—The mean temperature was 36.4°, or 4.8° above normal; the highest was 75°, at Lovelock on the 15th, and the lowest, 16° below zero, at Elko on the 3d. The average precipitation was 1.41, or 0.34 above normal; the greatest monthly amount, 7.19, occurred at Lewer's Ranch, and the least, 0.23, at Wabuska.

The weather was moderately mild and pleasant until the last week of the month, when heavy rains and snowfall were somewhat general throughout the State. The heavy snowfall in the mountains gives assurance of a good flow of water this summer. In the warmer valleys plowing was in progress the first three weeks of the month.—*J. H. Smith.*

**New England.**—The mean temperature was 23.8°, or 0.7° above normal; the highest was 65°, at North Bridgton, Me., on the 27th, and the lowest, 23° below zero, at Berlin Mills, N. H., on the 5th and other dates. The average precipitation was 3.77, or 0.33 above normal; the greatest monthly amount, 7.76, occurred at Chestnut Hill, Mass., and the least, 1.08, at St. Johnsbury, Vt.

The weather was characteristic of the month, with many stormy days and marked and sudden changes. Several storms of marked intensity passed over the district, causing rain and snow and severe gales. At the close of the month there was less snow on the ground than usual for the season. Owing to the light covering of snow, the ground in northern sections of New England is reported as frozen to an unusual depth. The weather of the month was not favorable for outdoor work.—*J. W. Smith.*

**New Jersey.**—The mean temperature was 27.4°, or 4.0° below normal; the highest was 62°, at Camden, on the 28th, and the lowest, 7° below zero, at Layton on the 6th. The average precipitation was 6.24, or 2.19 above normal; the greatest monthly amount, 8.44, occurred at Hanover, and the least, 4.29, at Layton.

The last half of the month was particularly noticeable for its two very destructive storms. The heavy snowstorm of the 17th drifted badly, blocking all trolley lines and bringing business to a standstill. Public schools and factories were closed, as walking was almost an impossibility. The average depth of snow was over 13 inches. The ice and sleet storm of the 21st and 22d was the most destructive of which we have a record. All telegraph, telephone, traction, and electric-light wires were prostrated for several days and thousands of shade and fruit trees were seriously injured by having the top branches broken off by the weight of ice. The rivers overflowed their banks and did great damage in the vicinity of Paterson, Bound Brook, and other points.—*Edward W. Metcalf.*

**New Mexico.**—The mean temperature was 39.5°, or 2.8° above normal; the highest was 92°, at Carlsbad on the 17th, and the lowest, 7° below zero, at Bluewater on the 2d. The average precipitation was 0.20, or 0.35 below normal; the greatest monthly amount, 0.80, occurred at Folsom and Raton, while none fell at six stations and only a trace at nine.

Fine and warm, excepting the last three days, which brought stormy, windy weather, preceded by a general thunderstorm. Very dry on the ranges, but stock not generally suffering.—*R. M. Hardinge.*

**New York.**—The mean temperature was 20.9°, or 2.2° below normal; the highest was 68°, at North Lake on the 28th, and the lowest, 26° below zero, at Axton on the 11th. The average precipitation was 3.07, or 0.10 above normal; the greatest monthly amount, 8.24, occurred at Salisbury Mills, and the least, 0.73, at Westfield.

February was a cold month with much snow and high winds, followed by a general thaw after the 23d, the ground being bare on the 28th, ex-

cept in the colder sections. The weather was generally favorable for crops, and winter wheat, rye, grass, and fruit trees were in good condition, except in the southeast, where much damage to forest and fruit trees was done by the sleet storm of the 21st and 22d.—*R. G. Allen.*

**North Carolina.**—The mean temperature was 35.7°, or 7.0° below normal; the highest was 76°, at Kingston and Goldsboro on the 28th, and the lowest, zero, at Linville on the 13th. The average precipitation was 6.05, or 1.69 above normal; the greatest monthly amount, 10.26, occurred at Horse Cove, and the least, 3.01, at Mount Airy.

With the single exception of February, 1895, the month was the coldest February on record in North Carolina, and in regard to the amount of precipitation was surpassed only in February 1873 and 1899. Very little farm work of any kind was accomplished during the month. It is difficult to estimate the condition of winter wheat and oats on account of the slight signs of growth above ground, but all reports were unfavorable, and indicated an extremely backward condition of winter grains. While much grain was winter killed, it is thought that most of the roots have sufficient vitality left to give a moderate stand when growth starts. The heavy snow from the 14th to 17th, which remained on the ground in the chief wheat raising districts for more than a week, and the abundant moisture, with warmer weather at the close of the month, are thought to have greatly benefited the cereals. Some tobacco was seeded in beds and came up nicely.—*C. F. von Herrmann.*

**North Dakota.**—The mean temperature was 12.1°, or 5.5° above normal; the highest was 56°, at Power on the 21st and at Fort Yates on the 23d, and the lowest, 33° below zero, at Portal on the 4th. The average precipitation was 0.98, or 0.50 below normal; the greatest monthly amount, 3.60, occurred at Donnybrook, and the least, 0.21, at Bismarck.

The month was very favorable for the stock industry, cattle and sheep being able to graze on the ranges during almost the entire month. In the Red River Valley some ground was prepared for spring seeding, an unusual occurrence in February.—*B. H. Bronson.*

**Ohio.**—The mean temperature was 22.3°, or 5.7° below normal; the highest was 66°, at Cambridge and Hanging Rock on the 28th, and the lowest, 17° below zero, at Orangeville on the 14th. The average precipitation was 0.88, or 1.87 below normal; the greatest monthly amount, 2.61, occurred at Marietta, and the least, 0.17, at Vickery.

Wheat was well protected by snow during all cold weather. Many correspondents in southern and eastern portions report an improved condition of the wheat plant. There are no reports of winter killing and none that the roots have been upheaved. Reports from northwestern counties are less promising. The plant in many sections is small and weak and will be easily affected by adverse conditions. Peach buds reported killed in some sections. Other fruit trees appear uninjured. Stock continues in good condition.—*J. Warren Smith.*

**Oklahoma and Indian Territories.**—The mean temperature was 36.5°, or 1.5° below normal; the highest was 82°, at Hennessey, Okla., on the 26th, and the lowest, 10° below zero, at Pawhuska, Okla., on the 10th. The average precipitation was 0.39, or 0.79 below normal; the greatest monthly amount, 1.42, occurred at Hartshorne, Ind. T., while none fell at Beaver, Okla.

Precipitation decidedly below the average amount and insufficient to protect the cereals in the ground. Wheat continues to hold its own, but is suffering for moisture; over some counties the early sown soft wheat was badly damaged by overfeeding and effects of cold, but the hard wheat was only slightly damaged; the late sown wheat is generally in fair condition. Rye and alfalfa are doing well. Plowing was delayed by hard condition of ground. Some early potatoes and some oats were planted. Stock continues to do well. Fruit trees are uninjured and have a good prospect.—*C. M. Strong.*

**Oregon.**—The mean temperature was 43.0°, or 4.2° above normal; the highest was 76°, at Jacksonville on the 16th and at Pendleton on the 18th, and the lowest, 14° below zero, at Joseph on the 1st. The average precipitation was 8.87, or 3.84 above normal; the greatest monthly amount, 29.75, occurred at Buckhorn Farm (Kerby), and the least, 1.00, at Prineville.

The month was mild, with abundant rainfall. In the Willamette Valley and southern Oregon fall wheat and oats came through the winter in excellent condition and at the close of the month were well rooted, thrifty, and of excellent color. In eastern Oregon the condition of fall wheat was not so promising, although the bulk of the crop was thought to be in good condition. Stock wintered well.—*Edward A. Beals.*

**Pennsylvania.**—The mean temperature was 23.9°, or 4.6° below normal; the highest was 64°, at Aleppo and Pittsburgh on the 28th, and the lowest, 24° below zero, at Saegerstown on the 14th. The average precipitation was 3.99, or 0.92 above normal; the greatest monthly amount, 7.43, occurred at Doylestown, and the least, 0.45, at Davis Island Dam.

February will be memorable for its extreme and continued cold; its severe wind, rain, sleet, and snow storms; the damage to property; loss of life; interruption to travel, transportation, telegraph, telephone, and mail service. The ground was well covered with snow and ice most of the month, and grain was probably well protected and in good condition if not smothered by the ice.—*T. F. Townsend.*

**Porto Rico.**—The mean temperature was 75.3°, or 0.6° above normal; the highest was 97°, at Cayey on the 23d, and the lowest, 51°, at Adjuntas and Corozal on several days. The average precipitation was

0.51, or 0.61 below normal; the greatest monthly amount, 4.76, occurred at Isabela, while none fell at Cidra.

Four consecutive weeks of hot, dry weather have resulted in considerable damage to growing crops and the paralysis of all farm work except the cutting and grinding of cane, for which the conditions have been ideal. This work is now general and is being energetically pushed. The yield is good and the grade of juice slightly improved. The young canes on low lands continue to grow, but those on the hill sides are at a standstill for lack of rain. The tobacco crop has suffered the greatest material damage from the drought, and without rain in the near future much of this crop will certainly be lost. Coffee continues promising, but a continuation of the dry weather will be injurious, as many of the trees have arrived at the flowering stage. Small crops and vegetables continue plentiful, but pastures are rapidly drying up and stock is suffering accordingly.—*E. C. Thompson.*

**South Carolina.**—The mean temperature was 40.6°, or 5.4° below normal; the highest was 77°, at Conway on the 22d and at St. George on the 27th, and the lowest, 11°, at Barksdale on the 6th. The average precipitation was 5.89, or 1.20 above normal; the greatest monthly amount, 10.51, occurred at Barksdale, and the least, 2.38, at Yemassee.

Unfavorable weather prevailed over the western and northern portions, where wheat and oats were injured by winter killing, and little or no farm work was practicable. Over the southeastern portion the conditions were favorable for general farm work, but were too cool for rapid germination and growth. In this section some fruit trees began to bloom at the close of the month.—*J. W. Bauer.*

**South Dakota.**—The mean temperature was 17.7°, or 2.0° above normal; the highest was 65°, at Oelrichs on the 21st, and the lowest, 30° below zero, at Mitchell on the 4th. The average precipitation was 0.53, or 0.03 above normal; the greatest monthly amount, 2.30, occurred at Fort Meade, and the least, trace, at Cherry Creek and Silver City.

The weather during the first decade was cold, with temperature considerably below normal much of the time, being a continuation of the cold period which set in on January 25. During the second and third decades it was much milder, with temperature generally above normal. Snow, with high northwest wind, fell over much of the State during the night of the 27th and on the 28th, in some localities being the most disagreeable storm of the winter, but the temperature was not low. There was some local loss of young, unprotected cattle reported on the ranges west of the Missouri River, due to cold weather and to interruption by snow to steady grazing. A little field work, such as clearing of ground and dragging, was done during the latter part of the month.—*S. W. Glenn.*

**Tennessee.**—The mean temperature was 32.7°, or 6.8° below normal; the highest was 68°, at Palmetto on the 27th, and the lowest, 1° below zero, at Silver Lake on the 14th. The average precipitation was 3.41, or 1.11 below normal; the greatest monthly amount, 6.72, occurred at Isabella, and the least, 1.68, at Wildersville.

The month was very unfavorable for winter grain. Continuous freezes and low temperature caused the poorest prospect for many years; many fields look entirely bare, and will be plowed up and planted in spring crops. The snowfall about the middle of the month afforded some protection, but came almost too late. At the end of the month, early drilled wheat was the most promising, while late sowings were in bad condition. Oats were mostly winter killed.—*H. C. Bate.*

**Texas.**—The mean temperature was 48.9°, or 1.5° below normal; the highest was 104°, at Fort Ringgold on the 26th, and the lowest, 1°, at Tulla on the 2d. The average precipitation was 1.05, or 0.74 below normal; the greatest monthly amount, 3.86, occurred at Houston, while none fell at Fort Ringgold, Kent, Wichita Falls, and Sanderson.

The month was without special phenomena other than severe sandstorms in the western sections during the latter part of the month. Moderate rains fell in the eastern and coast districts; elsewhere the drought has continued with increased severity. The condition of wheat was somewhat improved in the central and southern portions of the wheat belt, but continues very unsatisfactory over the northern portions. Spring oats are being seeded; corn planting has become general in the southern portion and has begun in the central section; the crops need

heavy rains. Preparation of land for cotton is well advanced, except where the ground is too hard and dry to plow. The first shipments of strawberries have been made, and shipments of other vegetables have been large throughout the month.—*Edward H. Bowie.*

**Utah.**—The mean temperature was 34.1°, or 5.3° above normal; the highest was 74°, at St. George on the 17th, and the lowest, 20° below zero, at Loa on the 2d. The average precipitation was 0.87, or 0.35 below normal; the greatest monthly amount, 2.54, occurred at Ranch, and the least, trace, at Emery and Terrace.

The month was the warmest February since 1886. Fall grain improved and is now generally in good condition. Peach buds have been damaged in Weber County, but elsewhere all fruit buds are still in good condition.—*L. H. Murdoch.*

**Virginia.**—The mean temperature was 31.2°, or 6.2° below normal; the highest was 72°, at Barboursville on the 22d, and the lowest, zero, at Burkes Garden on the 5th. The average precipitation was 4.77, or 1.40 above normal; the greatest monthly amount, 7.32, occurred at Roanoke, and the least, 2.20, at Stanardsville.

Crop growth was much retarded by the generally cold weather prevailing. Snow protection caused some local improvement, but outlook poor at close of month. The early seeded winter wheat which has formed the best portion of this year's prospective crop, was further injured. Winter oats and clover have also suffered severely.—*Edward A. Evans.*

**Washington.**—The mean temperature was 39.2°, or 3.1° above normal; the highest was 74°, at Pasco on the 15th, and the lowest, 18° below zero, at Hooper on the 1st. The average precipitation was 6.89, or 2.49 above normal; the greatest monthly amount, 26.63, occurred at Brinnon, and the least, 1.29, at Dayton.

The month was mild and open, and therefore favorable for winter wheat and the pastures of the western section. Much damage was done to wheat by the cold snap of the last week of January. About half will have to be re-sown; the remainder is not considered especially strong and healthy. Spring plowing and seeding have begun.—*G. N. Salisbury.*

**West Virginia.**—The mean temperature was 26.7°, or 4.9° below normal; the highest was 68°, at Byrne on the 28th, and the lowest, 11° below zero, at Buckhannon on the 14th. The average precipitation was 3.20, or 0.15 below normal; the greatest monthly amount, 5.65, occurred at Byrne, and the least, 1.33, at Moscow.

From the 1st to 23d the ground was covered with sleet, ice, and snow; the depth of snow was sufficient to afford ample protection to wheat, rye, and oats, but the effect of sleet and deep freezing upon these crops is doubtful, and it is feared considerable damage was done in some counties. Farm work was absolutely suspended; orchards were considerably damaged by sleet, and peaches are thought to be killed in some localities.—*E. C. Vose.*

**Wisconsin.**—The mean temperature was 17.1°, or 0.8° above normal; the highest was 62°, at Knapp on the 27th, and the lowest, 30° below zero, at Osceola on the 2d. The average precipitation was 1.30, or about normal; the greatest monthly amount, 2.30, occurred at Port Washington, and the least, 0.22, at Hayward.

The weather during the month was very favorable to winter grains and grass; winter wheat shows good vitality and clover appears to be in good condition; there is but little frost in the ground in the southern counties and it is rapidly disappearing elsewhere; no farm work done.—*W. M. Wilson.*

**Wyoming.**—The mean temperature was 29.2°, or 6.9° above normal; the highest was 70°, at Rock Springs on the 18th, and the lowest, 27° below zero, at Fort Laramie on the 2d. The average precipitation was 0.48, or 0.27 below normal; the greatest monthly amount, 1.58, occurred at Border, while none fell at Hyattville, and only traces at Alcova and Daniel.

The mild weather of the month was very favorable for the stock interests of the State, and stock continues in good condition. Snow in the mountains was materially increased during the month, especially over the headwaters of the Laramie and Platte rivers. The unusually mild weather allowed some plowing to be done in several sections of the State.—*W. S. Palmer.*

## SPECIAL CONTRIBUTIONS.

### HAWAIIAN CLIMATOLOGICAL DATA.

By CURTIS J. LYONS, Territorial Meteorologist.

#### GENERAL SUMMARY FOR FEBRUARY, 1902.

Temperature mean for the month, 69.5°; normal, 70.4°; average daily maximum, 76.1°; average daily minimum, 64.4°; mean daily range, 11.7°; greatest daily range, 24°; least daily range, 5°; highest temperature, 79°; lowest, 52°.

Barometer average, 30.000; normal, 29.960; highest, 30.22, on the 4th; lowest, 29.72, on the 14th; greatest 24-hour change, i. e., from any given hour on one day to the same hour on the

next, 0.27. Lows passed this point on the 14th and 22d; highs on the 4th, 16th, and 28th.

Relative humidity, 75 per cent; normal, 75; mean dew-point, 60.7°; normal, 62°; absolute moisture, 5.93 grains to the cubic foot; normal, 6.24. A most unusual drop of 20° in the dew-point took place from the 14th to the 15th.

Rainfall, 1.25 inch; normal, 5.70; rain record days, 12; normal, 16; greatest rainfall in one day, 0.44, on the 2d; total at Luakaha, 3.44; normal, 14.50; at Kapiolani Park, 0.27; normal, 5.20.