had depended upon accessions from the atmosphere over the West Atlantic and the Western Continent, but on the 15th and 16th the northern side of this European high pressure began to receive an accession from the northward, illustrating the general principle that, although it is easier for the great area of high pressure in Asia to discharge its surplus eastward into Alaska and North America, yet occasions will arise in which a small surplus can flow from it northwestward and thence southwestward into Europe. The overflows northeastward from it into the North American continent exceed in number and intensity those westward into Europe. Simultaneously with this advance of cold northerly winds and high pressure over Norway and northern Europe, which began on the 15th, there occurred the advance eastward and northeastward over Mexico and the south Atlantic States of an area of high pressure which became central north of the Bermudas on the 18th, and on the 19th, N. 40°, W. 45°; 20th, N. 43°, W. 35°, and on the 21st and 22d as a ridge from N. 50°, W. 20°, to N. 30°, W. 60°; from the 17th to the 23d, the Atlantic and European areas of high pressure approached each other slowly and virtually formed one region while, at the same time, a third area of high pressure advanced from the northwest (see U. S. series, high area No. VII) southeastward over the United States, and by the 23d, noon, high pressure prevailed from W. 120° to E. 40°, and between N. 20° and N. 50°. But such an area of unusual high pressure bespeaks an unusual area of low pressure to the northward if not, indeed, also to the southward, and there are corresponding indications of the existence of areas of low pressure on the 19th off Sierra Leone, as also in the equatorial portion of South America.

I. This was a continuation of low area No. VIII, U. S. series, which passed eastward along the northern limit of the United States on the 17th and 18th, and must have been broken up in Baffins Bay on the 19th.

J. On the 19th a trough of low pressure extended from Arkansas to the mouth of the St. Lawrence, and later in the day a depression and cyclonic whirl developed off the middle Atlantic coast; this was central on the 20th, noon, near the Bay of Fundy; 21st, it disappeared north of Nova Scotia.

K. This appears as a well-developed storm center on the 24th, noon, N. 52°, W. 35°, and numerous reports of hurricane winds south and west of that locality are at hand; nothing suggesting the existence of such a storm center had been reported on the 22d or 23d, but low area No. XIV, U. S. series, was in a position to undergo rapid development as it passed over Newfoundland on the 23d; during the 25th this center moved northeastward over the Faroe Islands, and on the 26th, noon, was at about N. 65°, E. 5°; on the 27th, noon, near the Loffoden Islands, and during the 28th it was represented by a new storm center in Finland.

L. The depression or trough, of which *K* represents the eastern end, extended southwestward to N. 55°, W. 40°, on the 25th and 26th, but on the latter date a depression developed (see low area No. XV, U. S. series) on the middle Atlantic coast which moved rapidly northeastward; 27th, it was central at N. 45°, W. 50°; 28th, noon, N. 54°, W. 24°. This rapid motion brought areas *K* and *L* steadily nearer together, and at noon of the 28th the isobar of 29.3 inclosed them both, and extended from N. 50°, W. 30°, to N. 63°, E. 30°; at this time northwestern Europe and the northeast portion of the Atlantic Ocean were included in the general Icelandic whirl and depression, while the west Atlantic and the eastern portion of the Western Continent were under the influence of an area of high pressure, thus very nearly duplicating the meteorological conditions that had existed from the 3d to the 6th, and again on the 24th and 25th.

OCEAN FOG FOR FEBRUARY, 1894.

The limits of fog belts west of the fortieth meridian, as reported by shipmasters, are shown on Chart I by dotted shading. East of the fifty-fifth meridian fog was reported on 10 dates; between the fifty-fifth and sixty-fifth meridians on 4 dates; and west of the sixty-fifth meridian on 7 dates. Compared with the corresponding month of the last six years, the dates of occurrence of fog east of the fifty-fifth meridian numbered 1 less than the average; between the fifty-fifth and sixty-fifth meridians, 1 less than the average; and west of the sixty-fifth meridian, 2 more than the average.

OCEAN ICE IN FEBRUARY, 1894.

The following table shows the southern and eastern limits of the region within which icebergs or field ice were reported for February during the last 12 years:

Southern limit.			Eastern limit.		
Month.	Lat. N.	Long. W.	Month.	Lat. N.	Long. W.
	° ′	° ′		° ′	° ′
February, 1883	42 01	52 46	February, 1883	46 10	45 44
February, 1884	42 00	50 00	February, 1884	46 50	43 45
February, 1885	41 50	51 12	February, 1885	47 52	42 00
February, 1886	46 10	47 15	February, 1886	48 00	44 47
February, 1887	40 00	48 00	February, 1887	46 26	41 50
February, 1888	44 59	45 08	February, 1888	44 59	45 08
February, 1889	45 35	48 00	February, 1889	45 35	48 00
February, 1890	41 12	50 12	February, 1890	44 30	35 30
February, 1891	44 20	48 00	February, 1891	44 33	44 59
February, 1892	47 25	47 55	February, 1892	49 05	46 30
February, 1893	45 11	48 50	February, 1893	46 20	46 40
February, 1894	44 28	48 50	February, 1894	47 30	44 40
Mean	43 44	48 50	Mean	46 29	44 22

The region in which Arctic ice was reported for the current month is shown on Chart I by crosses. The southernmost ice reported, a large berg, noted on the 25th, was about three-fourths of a degree north of the average southern limit, and the easternmost ice noted, a large berg, observed on the 28th in the position given in the table, was about one-half of a degree west of the average eastern limit of ice for February.

Icebergs were reported on the 8th, 10th, 12th, 13th, 17th, 18th, 20th, 23d, 24th, 25th, and 28th. Field ice in large quantities was noted near Cape Breton Island on the 4th and 13th. Field ice was also encountered on the 7th to 10th, 12th, 17th, 18th, 24th, and 28th. A report of the British steamship *Barcelona* states: "About 300 miles off the coast of Newfoundland passed through large quantities of field ice extending to within a few miles of St. Johns." (Date unknown.)

No icebergs were reported during the month of February, 1894. On the 13th and 20th field ice was encountered off the southeast coast of Newfoundland. On the 15th, 17th to 25th, and 27th field ice was reported along the eastern edge of the Grand Banks, north of the forty-fifth parallel.

TEMPERATURE OF THE AIR.

[*In degrees Fahrenheit.*]

The distribution of the monthly mean temperature of the air over the United States and Canada is shown by the dotted isotherms on Chart II; the lines are drawn over the high irregular surface of the Rocky Mountain plateau, although the temperatures have not been reduced to sea level, and the isotherms, therefore, relate to the average surface of the

country occupied by our observers; such isotherms are controlled largely by the local topography, and should be drawn and studied in connection with a contour map.

NORMAL TEMPERATURE.

In Table II, for voluntary observers, the mean temperature is given for each station, but in Table I, for the regular stations of the Weather Bureau, both the mean temperatures and the departures from the normal are given for the current month. In the latter table the stations are grouped by geographical districts, for each of which is given the average temperature and departure from the normal; the normal for any district or station may be found by adding the departures to the current average when the latter is below the normal and by subtracting when it is above.

MONTHLY MEAN TEMPERATURE.

For the regular stations of the Weather Bureau the monthly mean temperature is the simple mean of all the daily maxima and minima; for voluntary stations a variety of methods of computation is necessarily allowed, as shown by the notes appended to Table II.

During February, 1894, the mean temperature was highest at Key West, Fla., 72.2, and was above 60 throughout the Peninsula of Florida. The temperature averaged 32 in a zone passing from central New Jersey westward to southern Ohio, Indiana, and Illinois, southern Missouri, northern Oklahoma and Texas, central New Mexico, northern Arizona, western Nevada, western Oregon, central Washington, and thence northward along the western slope of the Rocky Mountains. The lowest mean temperatures in the United States were between 5 and 10 in eastern Montana and the northern parts of North Dakota and Minnesota and Maine. The temperature of 39 prevailed on the immediate coast of Washington, as also in central Virginia and the southern peninsula of Maryland. The lowest mean temperature reported was —1.6 at White River, on the northern shore of Lake Superior.

DEPARTURES FROM NORMAL TEMPERATURE.

As compared with the normal for this month temperatures were in excess over Lake Huron, Lake Superior, northern Wisconsin and Minnesota, Manitoba, Assiniboia, Saskatchewan, Alberta, and northern Washington; the maximum excess was 6.6 at Winnipeg, Manitoba; temperatures were also slightly in excess at Hatteras, N. C., and in the southern portion of the Peninsula of Florida. The monthly averages were below the normal throughout the remaining portion of the United States; the maximum deficits were from 4 to 5 in Vermont, eastern New York, Illinois, Arkansas, Mississippi, and Louisiana, and from 7 to 8 in northern Texas, western Kansas, Colorado, Wyoming, Utah, and Nevada.

The following table shows for certain stations, as reported by voluntary observers, (1) the normal temperature for February for a series of years; (2) the length of record during which the observations have been taken, and from which the normal has been computed; (3) the mean temperature for February, 1894; (4) the departure of the current month from the normal; (5) the extreme monthly means for February and the years of their occurrence during the period of observation:

State and station.	(1) Normal for the month of Feb.	(2) Length of record.	(3) Mean for Feb., 1894.	(4) Departure from normal.	(5) Extreme monthly means for February.			
					Highest.	Year.	Lowest.	Year.
Arizona.	°	*Years*	°	°	°		°	
Fort Apache	39.8	22	35.2	— 4.6	43.6	1879	32.4	1880
Fort Mohave	56.3	22	.....	.....	62.0	1879	50.2	1882
Whipple Barracks	39.1	22	28.6	—10.5	46.1	1879	28.6	1894

Departures from normal temperature—Continued.

State and station.	(1) Normal for the month of Feb.	(2) Length of record.	(3) Mean for Feb., 1894.	(4) Departure from normal.	(5) Extreme monthly means for February.			
					Highest.	Year.	Lowest.	Year.
Arkansas.	°	*Years*	°	°	°		°	
Keesees Ferry	40.8	12	37.0	— 3.8	49.9	1882	32.2	1885
California.								
Riverside	52.1	12	48.4	— 3.7	58.0	1886	48.0	1891
Colorado.								
Las Animas	31.4	12	17.8	—13.6	37.9	1888	17.8	1894
Florida.								
Merritts Island	66.2	12	65.1	— 1.1	72.6	1883	58.0	1889
Georgia.								
Forsyth	52.5	20	52.3	— 0.2	59.6	1890	44.5	1885
Idaho.								
Boise Barracks	33.7	20	28.9	— 4.8	40.3	1888	21.3	1883
Fort Sherman	26.5	10	.....	.....	37.0	1886	17.0	1887
Indiana.								
Lafayette	29.2	14	25.4	— 3.8	38.0	1882	14.7	1885
Iowa.								
Cresco	15.5	22	15.4	— 0.1	31.3	1878	1.0	1875
Kansas.								
Eureka Ranch	30.2	11	20.6	— 9.6	37.6	1888	20.6	1894
Independence	35.6	22	30.6	— 5.0	45.7	1882	25.2	1885
Louisiana.								
Grand Coteau	59.4	11	54.2	— 5.2	64.6	1887	52.4	1885
Maine.								
Orono	19.2	23	16.0	— 3.2	25.0	1877	13.3	1885
Maryland.								
Cumberland	31.5	23	31.2	— 0.3	40.0	1890	25.2	1875
Michigan.								
Kalamazoo	25.9	18	23.4	— 2.5	35.0	1882	11.2	1885
Missouri.								
Sedalia	33.2	11	27.4	— 5.8	45.9	1882	20.7	1885
Montana.								
Fort Custer	18.6	12	12.8	— 5.8	30.2	1886	2.4	1887
Nebraska.								
Fort Robinson	24.5	10	20.3	— 4.2	33.7	1886	15.9	1891
Genoa (near)	22.1	18	18.0	— 4.1	32.8	1877	13.2	1891
Nevada.								
Browns	37.6	23	.....	.....	49.0	1872	24.8	1883
Carson City	34.0	17	29.7	— 4.3	42.2	1886	23.9	1883
New Hampshire.								
Hanover	18.7	23	18.4	— 0.3	25.4	1890	10.8	1885
New Mexico.								
Fort Wingate	33.5	23	28.6	— 4.9	40.0	1879	26.0	1880
New York.								
Cooperstown	21.2	23	18.6	— 2.6	31.6	1880	10.5	1885
Plattsburg Barracks	18.0	23	12.8	— 5.2	25.7	1877	7.2	1885
North Carolina.								
Lenoir	40.7	21	40.7	0.0	49.0	1890	30.3	1875
Oklahoma.								
Fort Reno	38.5	10	.....	.....	45.2	1890	33.0	1885
Fort Sill	42.5	22	35.8	— 6.7	47.8	1892	35.6	1885
Fort Supply	36.4	15	26.6	— 9.8	44.1	1882	26.6	1894
Oregon.								
Bandon	44.1	10	43.2	— 0.9	49.2	1889	38.8	1887
Pennsylvania.								
Dyberry	22.5	23	20.2	— 2.3	30.1	1890	13.4	1875
Grampian	25.0	23	23.9	— 1.1	33.8	1890	13.7	1885
Wellsboro	26.5	14	23.6	— 2.9	34.0	1890	16.7	1885
South Carolina.								
Statesburg	50.3	13	49.9	— 0.4	56.6	1890	41.8	1885
South Dakota.								
Fort Sully	17.0	23	19.4	+ 2.4	33.4	1877	2.2	1887
Texas.								
Austin	54.5	22	.....	.....	60.6	1890	48.8	1893
Silver Falls	46.1	8	36.3	— 9.8	47.9	1886	36.3	1894
Utah.								
Terrace	30.3	21	28.5	— 1.8	40.7	1886	16.0	1882
Vermont.								
Strafford	18.3	20	15.9	— 2.4	25.7	1877	11.0	1885
Virginia.								
Dale Enterprise	36.8	14	34.1	— 2.7	44.8	1890	23.9	1885
Washington.								
Fort Townsend	39.9	22	36.5	— 3.4	47.0	1885	31.7	1887
West Virginia.								
Parkersburg	38.0	13	33.8	— 4.2	48.0	1882	30.1	1889
Wisconsin.								
Madison	20.7	23	18.0	— 2.7	33.5	1881	3.2	1875
Wyoming.								
Fort Washakie	22.2	11	15.1	— 7.1	35.8	1886	— 1.0	1883

YEARS OF HIGHEST MEAN TEMPERATURE FOR FEBRUARY.

The mean temperature for February, 1894, was not the highest on record at any regular Weather Bureau station during the current month, as indeed might be expected from the fact that almost the whole country experienced average temperatures below the normal.

YEARS OF LOWEST MEAN TEMPERATURE FOR FEBRUARY.

The mean temperature for February, 1894, was the lowest on record at the regular stations mentioned in the following table, which also gives the previous lowest temperatures recorded:

Lowest mean temperature for February.

Stations.	Feb., 1894.	Departure from normal.	Lowest previous.	
			Temperature.	Year.
Springfield, Mo	32.0	—4.9	32.6	1889
Dodge City, Kans	24.3	—8.0	25.8	1885
Abilene, Tex	40.8	—7.3	44.4	1893
San Antonio, Tex	51.9	—4.8	53.0	1883
Corpus Christi, Tex	55.2	—3.7	57.0	1889
El Paso, Tex	44.3	—5.6	46.7	1880
Carson City, Nev	31.6	—4.0	33.0	1890
Fresno, Cal	46.8	—2.9	47.8	1890
San Diego, Cal	50.5	—4.5	50.8	1880

MAXIMUM TEMPERATURE.

The maximum temperatures at regular stations of the Weather Bureau are given in Table I, from which it appears that the highest maximum temperatures have been: Jupiter, Fla., 85; Titusville, Fla., 84; Corpus Christi and San Antonio, Tex., 83; Key West, Fla., and Yuma, Ariz., 82; Palestine, Tex., 81; Tampa and Jacksonville, Fla., 80. The lowest maxima have been: Idaho Falls, Idaho, 35; Baker City, Oreg., 40; Moorhead, Minn., and Sault Ste. Marie, Mich., 41; Salt Lake City, Utah, and Saint Paul, Minn., 42; Eastport, Me., and Minneapolis, Minn., 43; Northfield, Vt., Williston, N. Dak., and Huron, S. Dak., 44; Saint Vincent and Duluth, Minn., Green Bay, Wis., Grand Haven, Mich., and Oswego, N. Y., 45.

MINIMUM TEMPERATURE.

The lowest temperatures recorded at regular stations of the Weather Bureau are given in Table I, from which the following are selected. The highest minima have been: Key West, Fla., 55; Jupiter, Fla., 39; Tampa, Fla., 36; San Francisco, Cal., 38; Point Reyes Light, Cal., 36; Titusville, Fla., and Los Angeles, Cal., 35; Port Eads, La., and San Diego, Cal., 34; Jacksonville, Fla., 33; New Orleans, La., and Sacramento, Cal., 32; Hatteras, N. C., Mobile, Ala., Yuma, Ariz., Fresno and Red Bluff, Cal., 30. The lowest minima have been: Northfield, Vt., —31; Williston, N. Dak., Idaho Falls, Idaho, and Lander, Wyo., —28; Saint Vincent, Minn., and Sault Ste. Marie, Mich., —26; Miles City, Mont., —25.

ACCUMULATED TEMPERATURE.

From January 1 to the end of the current month the average temperature for each geographical district was above or below the normal by amounts that are given by adding together the departures, as given in Table I in heavy faced type for the respective months. The average departure is then found by dividing these sums by the proper number of months. If this average departure were added to the normal temperature and multiplied by the number of days, it would give the accumulated temperature, as that term is used by some phænologists. If, however, we confine our attention to the average departures from normal values, we obtain an equally plausible basis for the comparison of temperatures and crops.

In regions where the accumulated temperature has been deficient, the average deficit for the period was as follows: New England, 0.2; northern slope, 0.1; middle slope, 1.05; southern slope, 1.3; southern plateau, 3.8; middle plateau, 2.1; north Pacific coast, 0.5; middle Pacific coast, 2.55; south Pacific coast, 3.0.

In regions where the accumulated temperature was in excess, the average excess for the period was as follows: Middle Atlantic coast, 1.2; south Atlantic coast, 1.15; Key West, Fla., 0.5; east Gulf States, 0.75; west Gulf States, 0.45; Ohio Valley and Tennessee, 1.65; lower Lake region, 1.9; upper Lake region, 2.5; North Dakota, 0.9; upper Mississippi Valley, 1.25; Missouri Valley, 0.65; northern plateau, 1.4.

DIURNAL PERIODICITY.

The regular diurnal period in temperature is shown by the hourly means given in Table V for all stations having self-registers.

DAILY AND MONTHLY RANGES OF TEMPERATURE.

The greatest daily range of temperature is given for each of the regular Weather Bureau stations in Table I, from which the following are selected:

Greatest daily ranges.—Pueblo, Colo., 53; Lander, Wyo., 50; Denver, Colo., and North Platte, Nebr., 47; Northfield, Vt., and Abilene, Tex., 46; Columbia, Mo., and Pikes Peak, Colo., 45; St. Vincent, Minn., Williston, N. Dak., Carson City, Nev., and Idaho Falls, Idaho, 43; Miles City, Mont., Pierre, S. Dak., Valentine, Nebr., and Yuma, Ariz., 42; Huron, S. Dak., 41.

Smallest daily ranges.—The maximum daily ranges were less than 20 at the following stations: Port Eads, La., 19; Galveston, Tex., 18; Key West, Fla., 17; San Francisco and Point Reyes Light, Cal., 16; Fort Canby and Tatoosh Island, Wash., 10.

Monthly ranges.—The extreme monthly ranges can be computed for each Weather Bureau station from the data given in Table I, from which it appears that monthly ranges of 60 or more occurred in New England, the upper Lake region, and the Rocky Mountain slope.

Largest monthly ranges.—Lander, Wyo., 77; Northfield, Vt., and Pueblo, Colo., 75; Pierre and Rapid City, S. Dak., 74; Miles City, Mont., 73; Williston, N. Dak., 72; St. Vincent, Minn., Bismarck, N. Dak., Valentine and North Platte Nebr., 71.

Smallest monthly ranges.—Key West, Fla., and Eureka, Cal., 27; Fort Canby and Tatoosh Island, Wash., 23; Point Reyes Light, Cal., 24.

LIMITS OF FREEZING TEMPERATURE.

The southern limit of the region within which the air has had a freezing temperature at some time during the month is approximately shown by the full and dotted lines on Chart V, joining the places at which the minimum temperatures of 32 and 40, respectively, occurred within the instrument shelters of the Weather Bureau; the latter minimum is usually accompanied by a more or less severe frost on the ground outside of the shelter. During February, 1894, the line of minimum 40 crossed the south portion of Florida, just below Titusville, Fla., and does not reappear on the Gulf or the California coasts within the limits of the United States. The line of the minimum 32 passes from just above Jacksonville southwest across the head of the Florida peninsula and reappears in the southeastern portion of Louisiana, where, also, it again disappears; it reappears at the head of the Gulf of California and disappears on the coast of northern California.

PERIODS OF HIGH TEMPERATURE.

The maximum temperatures of the month occurred as usual in connection with the eastward progress of areas of high pressure, with northerly winds, and low pressure, with southerly winds, provided the sun shines clear in the middle of the day. Thus, on the 7th, the maximum temperatures of the month occurred at Havre and Helena, Mont., and Baker City, Oreg., and also at Omaha, Nebr., Columbia, Mo., Keokuk and Dubuque, Iowa, St. Paul and Duluth, Minn., and Alpena, Mich.; these two regions of high temperature were clear spaces on the southwestern side of low areas Nos. III and IV, respectively, and so far as concerns the first area in Idaho and Montana the air in that region was undoubtedly rapidly descending in its flow toward low area No. IV. On the 9th the maximum temperatures of the month occurred over the greater part of Tennessee, Kentucky, Indiana, Ohio, Lake Erie, West Virginia, western Pennsylvania, Virginia, North Carolina, and northern Georgia and Alabama; this entire region was on the south and southeast sides of low area No. V, which was at that time central near Lake Michigan.

On the 27th the maximum temperatures of the month occurred over the greater part of Missouri, Illinois, Wisconsin, and adjoining States, which area was at that time to the south of low area No. XVI.

On the 18th the maximum temperatures of the month occurred over the greater part of New England and the middle Atlantic States, which were at that time to the south and southeast of low area No. VIII.

PERIODS OF LOW TEMPERATURE.

The lowest temperatures of the month occurred on the 11th at many stations in California and Idaho, over which region the cold air was then descending from the high area, No. IV, central in Manitoba. On the same date, and in connection with the same area, the lowest temperatures occurred at Tucson, Ariz., Denver, Colo., Miles City, Mont., and Williston and Bismarck, N. Dak. On the 12th the cold air from this high area descended into Texas and brought the lowest temperatures of the month to many stations in that State.

On the 17th an area of high pressure (No. VII) and low temperatures advanced from Alberta southeastward, and in connection with this came the lowest temperatures of the month, beginning on the 17th at Keeler, Cal., and extending, on the 19th, to Nebraska and Manitoba, and by the 21st to Illinois, Iowa, and Wisconsin, and by the 24th to Ohio and Michigan, and by the 25th to New York, New England, and the middle and south Atlantic States. The slow progress and extensive influence of this area of high pressure, with its clear, dry weather and intense radiation, and the strong winds that marked its advancing front, were the most notable features of the meteorology of the month.

AREAS OF 20° FALL IN TWENTY-FOUR HOURS.

A fall of 20, or more, in temperature in twenty-four hours is not called a cold wave by the Weather Bureau unless the temperature falls below 40, and is, therefore, likely to cause a frost injurious to vegetation, but all falls of 40 are indicated on the Daily Weather Map by inclosing the areas within which they occur by heavy dotted lines, and the following list enumerates these regions for the month of February. An approximate idea of the size of the area covered is given by stating in miles the lengths of the two principal dimensions when these can be given; one of these is necessarily omitted when the area extends beyond the region covered by the Weather Map. The falls of 20 in twenty-four hours may be divided into two classes: (1) those due to the local radiation consequent upon the clearing away of cloudy skies; (2) those due to the advent of cold winds attending the progress of an area of high pressure; such winds are more severe on the south and east sides of areas of high pressure, but the temperatures are often a little lower in other portions of the area; the injuries to delicate plants and the unpleasant harshness to human beings are often due to the dryness as much as to the coldness, in which respect the effects of the dry, cold winds that penetrate the mild climate of California and the Gulf States resemble the dry, hot winds of the summer season in Kansas.

(A) This was a continuation of area S of January. 1st, p. m., an area of 300 by 200 miles in eastern Texas; also 400 by 200 miles in Tennessee and the Ohio Valley. 2d, a. m., 400 by 200 miles in West Virginia and North Carolina.

(B) 2d, p. m., 200 by 200 miles in Manitoba. 3d, a. m., 300 by 500 miles, Wyoming and Montana; 800 by —— miles, Manitoba and Ontario. 3d, p. m., 500 by 300, miles New Mexico and Kansas, and 500 by 200 miles, lakes Superior and Ontario. 4th, a. m., 800 by 400 miles, Texas, Arkansas, and Missouri; 600 by 400 miles, Ontario and the lower Lake region; p. m., 800 by 200 miles, Louisiana to North Carolina; 500 by 400 miles, Lake Huron to Vermont. 5th, a. m., 800 by 400 miles, northern Florida, Mississippi, and North Carolina; 700 by 200 miles, eastern New York, Pennsylvania, New Jersey, New England, and Nova Scotia.

(C) 8th, p. m., 300 by 200 miles, Wyoming; 500 by 200 miles, Alberta and Montana. 9th, a. m., 700 by 400 miles, Assiniboia, Montana, Wyoming; p. m., 600 by 500 miles, Idaho, Montana, North and South Dakota, Manitoba, and Nebraska. 10th, a. m., 400 by 600 miles, South Dakota, Minnesota, Nebraska. Iowa, Missouri; p. m., 100 by 300 miles, Wyoming; 300 by 100 miles, Colorado and Kansas; 400 by 200 miles, Minnesota and Wisconsin; 200 by 100 miles, Chio. 11th, a. m., 300 by 200 miles, northern Texas and western Kansas; 400 by 300 miles, Ontario; p. m., 700 by 500 miles, Indian Territory, Oklahoma, and Texas; 800 by —— miles, Ontario and Vermont. 12th, a. m., 600 by 500 miles, Texas, Arkansas, Louisiana; 900 by 300 miles, Ontario, Quebec, Vermont, and New Hampshire; p. m., 200 by 100 miles, Arkansas; 500 by —— miles, New Brunswick and Cape Breton. 13th, a. m., 400 by 300 miles, Tennessee, Alabama, and Georgia; p. m., 200 by —— miles, eastern North Carolina. This closes the long path followed by the area of falling temperature which first appeared on the 8th in Alberta and Wyoming, moved slowly south to Texas, and thence east over North Carolina. In the first portion of its path it may be considered as a mass of descending cold, dry air on the front of an area of high pressure, but in the latter portion of its path the fall of temperature was due largely to the radiation consequent on the clearing off of the skies in the rear of low area No. VI.

(D) 9th, p. m., temperatures in New Brunswick and Nova Scotia had fallen 20 in twenty-four hours in connection with an area of high pressure moving southward, but this area of falling temperature then disappeared.

(E) 15th, p. m., temperatures had fallen 20, or more, in southern Georgia and central Florida over an area 200 by 300 miles, consequent on the clearing away of rain clouds in the rear of low area No. VII, and in front of the eastward moving high area No. VI. 16th, a. m., 400 by 200 miles, Florida Peninsula.

(F) 15th, p. m., pressure was falling rapidly throughout the Rocky Mountain plateau region, while low area No. VII was near the Bay of Fundy; an area of clearing cold weather moved southward over Ontario and, by the 16th, a. m., a fall of 20, or more, prevailed on the northern shores of lakes Superior, Huron, and Ontario, covering an area of at least 600 by 300 miles. 16th, p. m., 700 by 300 miles, Ontario, northern New York, and New England. 17th, a. m., 700 by 200 miles, Vermont, New Hampshire, Maine, New Brunswick, and Nova Scotia.

(G) 16th, a. m., temperature had fallen 20, or more, in northern Alberta; p. m., 400 by 200 miles, Saskatchewan, Assiniboia, and Montana. 17th, a. m., 300 by 100 miles, Saskatchewan and Assiniboia; p. m., 500 by 200 miles, Manitoba, North and South Dakota, and Minnesota. 18th, a. m., 900 by 400 miles, Manitoba, Ontario, Minnesota, Wisconsin, Iowa, and northern Illinois; p. m., 300 by 300 miles, Lake Superior.

(H) 17th, a. m., an area of 20 fall, 500 by 300 miles, covered portions of Utah, Colorado, and Wyoming; this could not have resulted from the southward movement of cold air from the region (G) which was some distance to the northward, but separated by a trough of low pressure; on the contrary the falling temperature of area H must have been due principally to local radiation at plateau stations, which were then coming under the influence of an area of high pressure pushing from the southwest over California and the central plateau region; this area of falling temperature disappeared the next day, inasmuch as its cold air flowing eastward over Colorado became rapidly warmed up.

(I) 18th, a. m., 100 by 200 miles, western Arkansas; this small region of 20 fall was evidently due to local radiation.

(J) 17th, p. m., 400 by 150 miles, western Montana and southern Alberta. 18th, a. m., 200 by 100 miles, western half of South Dakota; p. m., 600 by 200 miles, eastern Montana, western South Dakota, and eastern Nebraska. 19th, a. m., 400 by 400 miles, South Dakota, Nebraska, Kansas, and western Iowa; p. m., 1,200 by 300 miles, Wisconsin, Iowa, Illinois, Missouri, Kansas, Oklahoma, and Texas. 20th, a. m., 200 by 200 miles, Lake Huron; 200 by 100 miles, Arkansas; 200 by 200 miles, Texas; 400 by 200 miles, Wyoming and Colorado; these four smaller areas represent the gradual expansion of the front of high area No. VII, as it spread from Alberta east and south; p. m., 200 by 200 miles, northern New Hampshire, Vermont, and New York; 500 by 150 miles, Wyoming, Colorado, and northern Texas; these two widely-separated areas represent, respectively, the eastern extremity of high area No. VII pushing into New England and its southwestern edge pushing southward up the slope of the Rocky Mountains. 21st, a. m., 100 by 400 miles, southern Colorado to central Texas; p. m., 800 by 200 miles, southern Texas, Louisiana, and central Mississippi. 22d, a. m., 300 by 200 miles, southern Texas; p. m., 500 by 400 miles, New Mexico and Arizona; the fall of temperature in this region showed that the great area of high pressure, No. VII, with its cold air, had surmounted the Rocky Mountain plateau and was sending an overflow southwestward over New Mexico and Arizona into the Gulf of California; the pressure, which had been low at Yuma and Tucson, Ariz., with warm southerly winds, now suddenly rose, with cold northerly winds; the southward flow of cold air from Kansas to the coast of Texas still continued. 23d, a. m., 100 by —— miles, Arizona and southward; the temperature continued falling at Tucson during the night, 22–23d, and, in fact, throughout Nevada and California, but the area of 20 fall included the former station only; this ended the advance of sudden falls of temperature in connection with high area No. VII; the central region of this area remained during the rest of the month moving very slowly south and west over the Rocky Mountain plateau; its central highest pressure slowly diminished from 30.9 to 30.3, and the central temperatures slowly rose from —10, on the morning of the 22d, to 34, on the morning of the 28th, at which time the greater portion of the United States lay under the influence of high pressures and rising temperatures.

(K) 22d, p. m., 300 by 200 miles, Manitoba; this fall of temperature was accompanied by a corresponding rise in the barometer and northerly winds, belonging to high area No. VIII, which approached from Saskatchewan, notwithstanding the presence of high area No. VII. 23d, a. m., 1,000 by 400 miles, Manitoba, Minnesota, and Ontario; p. m., 700 by 400 miles, Ontario, northern New York, Vermont, New Hampshire, and Maine. 24th, a. m., 1,100 by 400 miles, New Jersey, New York, Ontario, New England, Nova Scotia, and New Brunswick; p. m., 400 by 200 miles, New Brunswick, Nova Scotia, and Cape Breton.

FROSTS.

The frosts that occurred in February, within the limits of the United States, partook rather of the nature of cold waves and freezing weather, and can hardly be presented in a table of first or last frosts; they will, therefore, be mentioned under "Temperature as affecting agriculture."

COLD WAVES.

In addition to the general account of areas of 20° fall of temperature, some notes relative to the special severe cold wave that prevailed from the 24th to the 26th are given under "Temperature as affecting agriculture," and again under "Local storms" for those dates.

TEMPERATURE AS AFFECTING AGRICULTURE.

The following records of cold and warm periods are taken from the reports of the State Weather Services:

Arizona.—A range of temperature of 71° was recorded at Whipple Barracks.

Florida.—Frost occurred as far south as Titusville on the east coast, and Tarpon Springs on the Gulf coast, and Lee County in the interior; the frost of the 18th was the most extensive.

Kansas.—This has been one of the coldest Februarys on record, having been exceeded but six times within the past 37 years.

Louisiana.—Despite the fact that the precipitation was not excessive yet the cold, damp, and disagreeable weather prohibited much farm work, even in the northern parishes, and the general statement is that farmers are considerably behind in their work. Abbeville: taken as a whole the month was very unfavorable for farm work; considerable plant cane, in open mats, has been frozen; cattle are dying from exposure and cold. Clinton: this has been the severest and worst February for years; no planting has been done; the fruit crop is doubtless injured as many of the trees had bloomed. Coushatta: farming is backward; some spring-sown oats are reported killed; country roads almost impassible. New Orleans: during the entire week, from the 18th to 24th, not a ray of sunlight was observed. Plain Dealing: farmers are behind with work; a few peach blooms observed.

Mississippi.—On the 24th and 25th there was a general storm of snow and sleet, and in the northern and central districts trees were covered with ice for two or three days.

Missouri.—Akron: wheat looks well; stock all healthy and in fine condition; feed plentiful. Gallatin: fine weather up to the 10th, and again after the 12th, but during the 11th and 12th 19 inches of snow fell; with the exception of a few days, when the snow was too deep, the entire month was favorable for out-door work. Oregon: during the month the ground was frozen to the depth of two feet; portions of the snowdrifts remained on the ground from the 11th to the close of the month. Marceline: the blizzard of the 12th was the severest storm in years and stock was necessarily driven to shelter. Eldon: stock is wintering fine and in good condition. Houston: fruit buds appear to have been greatly damaged by the cold spell in January. Ironton: peaches are killed and possibly plums and raspberries; some oats have been sown; ground in good condition to work. Oak Ridge: peaches are all killed; wheat not looking so well; oats not yet sown. Olden: wheat is looking well; stock in good condition. Poplar Bluff: farmers sowing oats and ploughing for corn. Arthur: wheat has stood the winter well; stock is doing well. Half Way: wheat on lowlands somewhat injured. Panacea: the variable temperature has been very hard on stock. Virgil City: farmers have commenced sowing oats.

Nevada.—Notwithstanding the heavy snowfall, stock has been doing fairly well, except in the eastern portion of the State.

New Jersey.—Friesburg: the amount of snow remaining on the ground has been of too short duration to afford much protection to the crops. Millville: no ice has been gathered in this vicinity, owing to the mild winter; considerable plowing and early spring work has been done; rye and wheat are looking well; fruit trees have not yet started enough to be injured.

South Carolina.—The warmest days occurred on the 3d at 6 stations, on the 9th, 10th, and 11th at 20 stations, on the 19th and 20th at 12 stations; the coldest days occurred on the 5th and 6th at 7 stations, on the 16th at 6 stations, and on the 24th and 25th at 24 stations. Long Shore: plum trees in bloom on the 5th. Columbia: peach trees in bloom on the 12th.

Utah.—Storms of the 9th, 10th, and the 20th–21st reached almost the severity of blizzards.

Wisconsin.—The month was in general cold; on the last day of the month in the southern half of the State, containing nearly all the winter grain, the ground was entirely bare and the frost rapidly coming up; conditions very unfavorable for crops, as considerable freezing weather must ensue. Cadiz: clover, wheat, and rye have wintered in good condition. City Point: cranberry vines have been well covered during the whole month; logging camps will break up by March 1. Harvey: from the 9th to 26th snow was probably sufficient to fairly protect the crops; since then the ground has been bare and freezing nights.

Wyoming.—The mean temperature for the month was decidedly below the normal. La Barge: snow in the mountains west of this station is from 6 to 10 feet deep; stock on the range is wintering badly.