

from the Canadian Maritime Provinces, and the morning of the 19th was central east of the Banks of Newfoundland, with pressure about 29.10 (739) and strong to whole west to north gales over the Banks of Newfoundland. Crossing mid-ocean during the 20th, attended by severe gales, this storm reached the British Isles on the 21st, with very low pressure over the southern part of Great Britain, and heavy northwest gales east of the 30th meridian. By the 22d the storm-center had apparently passed over the North Sea. On the 20th low area VIII occupied Maine and New Brunswick, and on the 21st passed over the Gulf of Saint Lawrence. Moving rapidly eastward this storm apparently reached the Bay of Biscay on the 23d, and passed thence eastward by the 24th.

Low areas IX and X passed from the south New England coast to Newfoundland during the 22d and 23d, reached mid-ocean on the 24th, passed south of the British Isles on the 25th, and apparently moved eastward over the continent of Europe by the 26th. Low area XI advanced from the south New England coast to the Grand Banks during the 24th and 25th, occupied mid-ocean during the 26th and 27th, with pressure 29.20 (742) to 29.40 (744), and apparently reached the British Isles on the 28th. On the 26th a storm appeared over the Gulf of Saint Lawrence and the Canadian Maritime Provinces, and passed thence to a position east of the Grand Banks by the 27th. On the 28th this storm possessed great energy, and pressure falling to about 28.50 (724) and heavy gales were reported over mid-ocean.

OCEAN FOG FOR FEBRUARY.

The limits of fog belts west of the 40th meridian, as reported by shipmasters, are shown on Chart I by dotted shading. East of the 55th meridian fog was reported on 4 dates; between the 55th and 65th meridians on 1 date; and west of the 65th meridian on 5 dates. Compared with the corresponding month of the last 5 years the dates of occurrence of fog east of the 55th meridian numbered 7 less than the average; between the 55th and 65th meridians 4 less than the average; and west of the 65th meridian the same as the

average. Dense fog was reported at New York, N. Y., on the 1st to 3d, 6th, 7th, and 13th; at Atlantic City, N. J., on the 3d; and at Block Island, R. I., and Nantucket, Mass., on the 10th.

OCEAN ICE IN FEBRUARY.

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 10 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.....	46 00	44 47
February, 1887.....	40 00	48 00	February, 1887.....	46 26	41 56
February, 1888.....	44 59	45 08	February, 1888.....	44 59	45 08
February, 1889.....	43 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 56	February, 1893.....	46 20	46 40
Mean.....	43 42	48 50	Mean.....	46 24	44 05

The region in which Arctic ice was reported for the current month is shown on Chart I by ruled shading. The southernmost ice reported, field ice, noted on the 23d, was about $1\frac{1}{2}^{\circ}$ north of the average southern limit, and the easternmost ice noted, field ice observed on the 22d in the position given in the table, was about $2\frac{1}{2}^{\circ}$ west of the average eastern limit of ice for February.

No icebergs were reported during the month. On the 13th and 20th field ice was encountered off the southeast Newfoundland coast. On the 15th, 17th to 25th, and 27th field ice was reported along the east edge of the Grand Banks north of the 45th parallel:

Ice in harbors and bays of the middle Atlantic and New England states interfered with navigation at intervals during the month.

TEMPERATURE OF THE AIR (expressed in degrees Fahrenheit).

The distribution of mean temperature over the United States and Canada for February, 1893, is exhibited on Chart II by dotted isotherms. In the table of miscellaneous meteorological data the monthly mean temperature and the departure from the normal are given for regular stations of the Weather Bureau. The figures opposite the names of the geographical districts in the columns for mean temperature and departure from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the temperature is below the normal and subtracting when above. The monthly mean temperature for regular stations of the Weather Bureau represents the mean of the maximum and minimum temperatures.

The mean temperature was highest over the southern part of the Florida Peninsula, where it was above 70. The mean values were above 60 generally over the Florida Peninsula, at points in southeastern Louisiana, in the lower Rio Grande valley, and in adjoining parts of southwestern Arizona and southeastern California. The mean temperature was lowest in Manitoba, Assiniboia, and north-central North Dakota, where it was 5 to 7 below zero; the mean readings were below zero in northern Minnesota and northern North Dakota; and were below 10 in the middle and lower Saint Lawrence valleys, over Georgian Bay and Lake Superior, and north of a line traced from north-central Wisconsin to north-central

Iowa, and thence northwestward over central and northwestern Montana. At Climax, Colo., a mean of 9 was reported. North of a line traced from central New Jersey to the middle-eastern slope of the Rocky Mountains, thence to north-central New Mexico, thence over central Nevada to the Sierra Nevada Mountains, and thence over central Oregon and Washington the mean temperature was below 30.

DEPARTURE FROM NORMAL TEMPERATURE.

The mean temperature was below the normal, except over southern parts of the south Atlantic and middle and east Gulf states, and over the southern plateau region. The most marked departure below the normal temperature was noted on the northeast slope of the Rocky Mountains, where the mean readings were 7 to 10 lower than the February average. The departure below the normal was 7 in eastern Iowa, and was 4 to 6 from the upper Mississippi and Red River of the North valleys over the middle and northern plateau regions. The greatest departure above the normal temperature was reported on the middle coast of the Gulf of Mexico, where the month was 2 to 3 warmer than usual. The mean temperature was 2 above the normal at Southport, N. C., Charleston, S. C., and Yuma, Ariz.

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, 1893; (4) the departure of the current month from the normal; (5) and the extreme monthly mean for February during the period of observation and the years of occurrence:

State and station.	(1) Normal for the month of Feb.	(2) Length of record.	(3) Mean for Feb., 1893.	(4) Departure from normal.	(5) Extreme monthly mean for February.			
					Highest.	Year.	Lowest.	Year.
<i>Arizona.</i>	0	Years	0	0	0		0	
Fort Apache	39.7	21	42.2	+ 2.5	43.6	1879	32.4	1880
Fort Mohave	56.3	21	55.8	- 0.5	62.0	1879	50.2	1882
Whipple Barracks	39.0	21	40.4	+ 1.4	46.1	1879	30.0	1880
<i>Arkansas.</i>								
Keesee Ferry	41.2	11	36.9	- 4.3	49.9	1882	32.2	1885
<i>California.</i>								
Fort Bidwell	33.3	22	26.4	- 6.9	42.8	1886	25.3	1874
Riverside	52.3	11	50.4	- 1.9	53.0	1886	48.0	1891
<i>Colorado.</i>								
Las Animas	31.2	11	33.8	+ 2.6	37.9	1888	22.2	1883
<i>Florida.</i>								
Merritts Island	66.0	11	68.4	+ 2.4	72.6	1883	58.0	1889
<i>Georgia.</i>								
Forsyth	52.5	19	53.0	+ 0.5	59.6	1890	44.5	1885
<i>Idaho.</i>								
Boise Barracks	33.9	19	30.9	- 3.0	40.3	1888	21.3	1883
Fort Sherman	26.9	9	22.8	- 4.1	37.0	1886	17.0	1887
<i>Indiana.</i>								
Lafayette	29.3	13	27.7	- 1.6	36.0	1882	14.7	1885
<i>Indian Territory.</i>								
Fort Supply	36.7	14	32.0	- 4.7	44.1	1882	32.0	1883, 1893
<i>Iowa.</i>								
Cresco	15.8	21	9.3	- 6.5	31.3	1878	1.0	1875
<i>Kansas.</i>								
Eureka Ranch	30.4	10	28.0	- 2.4	37.6	1888	25.8	1885
Independence	35.8	21	31.4	- 4.4	45.7	1882	25.2	1885
Salina	30.6	10	28.2	- 2.4	37.0	1886	23.4	1885
<i>Louisiana.</i>								
Grand Coteau	59.4	10	59.5	+ 0.1	64.6	1887	52.4	1885
<i>Maine.</i>								
Orono	19.2	23	.....	.....	25.0	1877	13.3	1885
<i>Maryland.</i>								
Cumberland	31.5	22	31.8	+ 0.3	40.0	1890	25.2	1875
<i>Michigan.</i>								
Kalamazoo	26.2	17	21.3	- 4.9	35.0	1882	11.2	1885
<i>Missouri.</i>								
Sedalia	33.8	10	27.2	- 6.6	45.9	1882	20.7	1885
<i>Montana.</i>								
Fort Custer	19.2	11	12.0	- 7.2	30.2	1886	2.4	1887
<i>Nebraska.</i>								
Fort Robinson	24.7	9	23.2	- 1.5	33.7	1886	15.9	1891
Genoa (near)	22.2	17	19.8	- 2.4	32.8	1877	13.2	1891
<i>Nevada.</i>								
Browns	37.7	22	35.4	- 2.3	49.0	1872	24.8	1883
Carson City	34.0	16	33.3	- 0.7	42.2	1886	23.9	1883
<i>New Hampshire.</i>								
Hanover	18.8	22	17.6	- 1.2	25.4	1890	10.8	1885
<i>New Mexico.</i>								
Fort Wingate	33.5	22	34.6	+ 1.1	40.0	1879	26.0	1880
<i>New York.</i>								
Cooperstown	21.3	22	19.4	- 1.9	31.6	1880	10.5	1885
Plattsburg Barracks	18.2	22	13.8	- 4.4	25.7	1877	7.2	1885
<i>North Carolina.</i>								
Lenoir	40.6	20	41.9	+ 1.3	49.0	1890	30.3	1875
<i>Oklahoma.</i>								
Fort Reno	38.5	9	38.1	- 0.4	45.2	1890	33.0	1885
Fort Sill	42.8	21	37.2	- 5.6	47.8	1892	35.6	1885
<i>Oregon.</i>								
Bandon	44.0	9	45.0	+ 1.0	49.2	1889	38.8	1887
<i>Pennsylvania.</i>								
Dyberry	22.6	22	20.7	- 1.9	30.1	1890	13.4	1875
Grampian	25.1	22	23.5	- 1.6	33.8	1890	13.7	1885
Wellsboro	26.8	13	23.0	- 3.8	34.0	1890	16.7	1885
<i>South Carolina.</i>								
Statesburg	50.3	12	50.1	- 0.2	56.6	1890	41.8	1885
<i>South Dakota.</i>								
Fort Sully	17.2	22	13.1	- 4.1	33.4	1877	2.2	1887
<i>Texas.</i>								
Austin	54.8	21	48.8	- 6.0	60.6	1890	48.8	1893
Silver Falls	46.6	7	42.7	- 3.9	47.9	1886	41.0	1889
<i>Utah.</i>								
Terrace	30.6	20	24.0	- 6.6	40.7	1886	16.0	1882
<i>Vermont.</i>								
Stratford	18.5	19	15.0	- 3.5	25.7	1877	11.0	1885
<i>Virginia.</i>								
Dale Enterprise	37.0	13	34.4	- 2.6	44.8	1890	23.9	1885
<i>Washington.</i>								
Fort Townsend	40.1	21	35.9	- 4.2	47.0	1885	31.7	1887
<i>West Virginia.</i>								
Parkersburg	38.2	12	35.6	- 2.6	48.0	1882	30.1	1889
<i>Wisconsin.</i>								
Embarrass	16.7	21	.....	.....	30.7	1877	- 2.7	1875
Madison	21.0	22	15.0	- 6.0	33.5	1881	3.2	1875
<i>Wyoming.</i>								
Fort Washakie	22.4	10	20.7	- 1.7	35.8	1886	- 1.0	1883

TEMPERATURE, JANUARY AND FEBRUARY.

For the period January 1 to February 28, 1893, the temperature averaged 5 to 6 below the normal in the middle Atlantic

and New England states, the Lake region, and upper Mississippi valley, and was 2 to 4 below the normal in the south Atlantic states, at Key West, Fla., in the Ohio Valley and Tennessee, in the Missouri Valley, on the middle-eastern slope of the Rocky Mountains, over the middle and northern plateau regions, and along the middle and north Pacific coasts. In the extreme northwest, over the southern plateau region, and along the south Pacific coast the mean temperature was about 2 above the normal. In the Gulf States and on the northeast and southeast slopes of the Rocky Mountains the mean temperature averaged about normal for the period named.

YEARS OF HIGHEST MEAN TEMPERATURE FOR FEBRUARY.

The highest mean temperature for February was noted at Jacksonville, Fla., in 1891; in the middle and south Atlantic and New England states, in the interior of the middle and east Gulf states, and on the west Gulf coast in 1890; over the northern plateau region in 1888; on the middle Gulf coast in 1887; along the middle and south Pacific coasts in 1886; along the north Pacific coast in 1885; from the eastern lake region over the Ohio, middle Mississippi, and lower Missouri valleys to the lower Rio Grande valley in 1882; in northern Wisconsin and Upper Michigan in 1878; and in the middle Missouri valley, Minnesota, and on the Maine coast in 1877.

YEARS OF LOWEST MEAN TEMPERATURE FOR FEBRUARY.

At Abilene and Austin, Tex., the mean temperature for the current month was the lowest noted for February during the respective periods of observation. The lowest mean temperature for February was noted along the south part of the Atlantic coast in 1889; along the middle and north Pacific coasts, and from the north Pacific coast to the Dakotas in 1887; from the eastern Rocky Mountain slope eastward, south of the 40th parallel, to the Atlantic coast (save along the south part of the south Atlantic coast), and in New York and southern New England in 1885; in the valley of the Red River of the North in 1884; in northern Utah and Wyoming and thence to western Kansas and western Nebraska in 1883; from the south Pacific coast over the southern plateau region in 1882; and from the middle Missouri valley over the Lake region and northern New England in 1875.

MAXIMUM TEMPERATURE.

At Corpus Christi, Tex., the maximum temperature for the current month, 88, noted on the 27th, was the highest ever recorded at that station in February, and was the highest temperature reported by a regular station of the Weather Bureau in February, 1893. The maximum values were above 85 on the east Florida coast on the 28th, and reached 87 in the lower Colorado valley on the 19th. South of a line traced from southeastern Virginia to extreme northwestern Texas, thence to southern New Mexico, and thence to the middle California coast the maximum temperature was above 70. At Saint Vincent, Minn., the maximum temperature was 30, and the maximum readings were below 40 generally in Minnesota and North Dakota, and at points in the northern lake region.

MINIMUM TEMPERATURE.

At Moorhead, Minn., Huron, S. Dak., Bismarck and Fort Buford, N. Dak., Helena, Mont., and Walla Walla, Wash., the minimum temperature for the current month, noted on the 1st, was the lowest reported for February during the respective periods of observation.

The lowest temperature noted at a regular station of the Weather Bureau in February, 1893, was 46 below zero at Fort Buford, N. Dak., on the 1st. The minimum values were generally below -40 over North Dakota and Montana, and the line of zero temperature is traced from the Massachusetts

coast south of west to southern Missouri, northern Oklahoma, and northern New Mexico, thence to central and northwestern Nevada, and thence over central Oregon and central Washington. The minimum temperature was highest, 59, at Key West, Fla., and the minimum values were 40 to 45 over the Florida Peninsula. At Port Eads, La., a reading of 49 was recorded, and at San Diego, Cal., the lowest temperature of the month, 40, was registered on the 20th.

LIMITS OF FREEZING WEATHER.

The southern limit of freezing weather is shown on Chart V by a line traced from Southport, N. C., over the central parts of the east Gulf states, southern Mississippi, central Louisiana, and thence inside the Texas coast line to the Rio Grande River. The western limit of freezing weather is traced from the Pacific coast in about latitude north 39°, southeastward inside the coast line to about the 35th parallel, thence eastward over southern California, and thence southward to Yuma, Ariz.

In the preceding month the line of freezing weather crossed the Florida Peninsula south of Titusville and Tampa, and was traced just inside the west Gulf coast line. On the Pacific coast the limit of freezing weather was about 3° farther north in January, 1893.

RANGES OF TEMPERATURE.

The greatest daily range of temperature is shown in the table of miscellaneous meteorological data. The greatest monthly range of temperature, 93, occurred at Miles City, Mont. From Montana the monthly ranges decreased eastward to less than 50 on the immediate south New England and middle Atlantic coasts, and to less than 40 at points on the south Atlantic coast, southeastward to less than 30 over extreme southern Florida and extreme southern Louisiana, southward to less than 50 over the southern plateau region, and westward to less than 30 along the immediate middle Pacific coast.

COLD WAVES.

The month opened with temperature 40 to 45 below zero in Montana and North Dakota, and zero temperature to northern Missouri. During the 1st the temperature fell 50 in the Southwest and 40 over Lake Superior, the line of zero temperature reached southern Kansas, and the evening temperature at Abilene, Tex., was 12. By the morning of the 2d the temperature had fallen 30 to 40 over the interior of Texas, 20 to 30 over the eastern lake region, and a reading of -2 was reported at Dodge City, Kans. The evening of the 2d a slight fall in

temperature was shown over the middle Atlantic and New England states. By the morning of the 3d a temperature fall of 20 to 30 was noted over Maine, and a reading of -2 was recorded at Eastport.

A cold wave advanced from the upper Missouri valley to the Atlantic coast from the 2d to the 4th, attended by a fall in temperature of 20 to 30 in the upper Mississippi and Ohio valleys, the Lake region, and the Atlantic coast states from southern New England to the Carolinas. A cold wave of marked severity advanced from the middle-eastern slope of the Rocky Mountains to the Atlantic coast from the 5th to the 8th, with a temperature fall of 40 to 50 in the middle Mississippi and lower Missouri valleys, a fall of 20 to 30 in the Ohio Valley and the east Gulf and Atlantic coast states, zero temperature to southern Missouri, and freezing weather south of San Antonio, Tex.

A moderate cold wave overspread the middle Mississippi valley and the region north of Lake Superior on the 10th, and reached the east Gulf and south Atlantic states and Quebec during the 11th. A cold wave appeared over the middle Missouri valley on the 13th, and overspread the central valleys as a moderate cold wave during the 14th and 15th. The morning of the 16th a fall in temperature of 20 to 30 was shown in the region north of Lake Superior; by the evening report of the 16th the cold wave had extended over northern Ontario and northern New England; and on the 17th a temperature fall of 20 to 30 occurred along the middle Atlantic coast.

A cold wave advanced from the region north of Lake Superior to the middle Atlantic and New England coasts from the 19th to the 21st, attended by a fall in temperature of about 20. From the 26th to the 28th a cold wave advanced from the northeast slope of the Rocky Mountains over the central valleys, with a temperature fall of 20 to 30 in the Western and Southwestern States, and a fall of 10 to 20 from eastern Texas to the western lake region.

FROST.

Frost was reported at points in the interior of the Florida Peninsula as far south as Jupiter on the 23d; at Mobile, Ala., on the 20th and 23d; in southern Louisiana on the 8th and 13th; in the vicinity of Corpus Christi, Tex., on the 8th; and at San Antonio, Tex., on the 7th and 8th. At Bakersfield, Kern county, Cal., frost was noted on the 2d, 6th, 14th to 18th, 24th, 27th, and 28th; at Fresno, Cal., on the 14th, 16th, 18th, 24th, 27th, and 28th; and at San Francisco, Cal., on the 15th.

PRECIPITATION (expressed in inches and hundredths).

The distribution of precipitation over the United States and Canada for February, 1893, as determined from reports of more than 2,000 stations, is exhibited on Chart III. In the table of miscellaneous meteorological data the total precipitation and the departure from the normal are given for regular stations of the Weather Bureau. The figures opposite the names of the geographical districts in the columns for precipitation and departure from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the precipitation is below the normal and subtracting when above.

In February the normal precipitation is usually greatest on the extreme north Pacific coast, where it exceeds 11.00 at Neah Bay, Wash. In areas on the immediate Pacific coast north of the 42d parallel, and along the line of the Central Pacific Railroad crossing the summit of the Sierra Nevada

Mountains in California, the average precipitation for February exceeds 8.00, and it is 4.00 to 6.00 generally along the Pacific coast and in the central valleys of California north of the 38th parallel. In an area extending southward over central Utah and in the mountains of Colorado the normal amount is 2.00 to 4.00.

East of the Rocky Mountains the greatest precipitation for February is generally noted over a great part of the Gulf states east of the 95th meridian, and in parts of southern Tennessee, where it exceeds 6.00, and the normal amount exceeds 4.00 in the Gulf States, Kentucky, Tennessee, the interior of the south Atlantic states, over the southwest and northern parts of the Florida Peninsula, and along the Atlantic coast from North Carolina to the Gulf of Saint Lawrence.

Over the greater part of the Rocky Mountain and plateau region the February precipitation is usually less than 1.00 and in large areas in that district it is less than 0.50. The average amount is less than 2.00 from Lake Superior westward