last seven years. For the current month ice was encountered most frequently along and off the southeast and east edges of the Banks of Newfoundland. During the early part of the month Gulf ice was reported between Cape Breton Island and Newfoundland, and a report of the 28th stated that the Straits of Belle Isle were solidly packed with ice. Although enormous quantities of Arctic ice have commonly been encountered over and near the Grand Banks in May, more especially in 1885, 1886, and 1887, the aggregate quantity for the current month probably exceeded that noted for May during the last seven years, and much delay and considerable damage was caused to shipping. The limits of the region within which Arctic ice was reported for May, 1890, are shown on chart i by ruled shading.

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

Southern limit.			Eastern limit.		
Month.	Lat. N.	Long. W.	Month.	Lat. N.	Long. W.
	° ′	° ′		° ′	° ′
May, 1883	40 30	47 00	May, 1883	45 40	45 12
May, 1884	41 30	47 30	May, 1884	43 30	44 50
May, 1885	40 50	48 15	May, 1885	42 30	40 10
May, 1886	41 36	51 30	May, 1886	48 55	46 13
May, 1887	39 38	46 00	May, 1887	39 38	46 00
May, 1888	41 00	46 00	May, 1888	41 00	46 00
May, 1889	43 07	55 47	May, 1889	49 46	36 48
May, 1890	40 50	50 28	May, 1890	44 12	36 25

FOG IN MAY.

The limits of fog belts west of the fortieth meridian are shown on chart i by dotted shading. In the vicinity of the Banks of Newfoundland fog was reported on twenty-nine dates; between the fifty-fifth and sixty-fifth meridians on twenty dates; and west of the sixty-fifth meridian on seventeen dates. Compared with the corresponding month of the last two years the dates of occurrence of fog near the Grand Banks numbered thirteen more than the average; between the fifty-fifth and sixty-fifth meridians eight more than the average; and west of the sixty-fifth meridian four less than the average. The 14th and 23d were the only dates for which fog was not reported over or near the Grand Banks for the current month. On all other dates, save the 3d, 4th, 12th, and 22d, it occurred attending the approach or passage of areas of low pressure, and on the dates named high pressure with falling barometer and threatening or rainy weather prevailed. Between the fifty-fifth and sixty-fifth meridians fog occurred with the approach or passage to the northward of low-pressure storms, save on the 3d, 4th, and 22d, when the barometer was high and falling, with threatening weather or rain in that region. West of the sixty-fifth meridian fog generally occurred with the passage to the northward of low-pressure storms, save on the 3d, 4th, 12th, and 22d, when high and falling barometer and unsettled weather prevailed in that region. On the 3d dense fog prevailed along the coasts of Massachusetts, Rhode Island, Connecticut, and New Jersey, with south to southeast winds, threatening weather, and a low-pressure storm central over the Lake region. On the 4th dense fog was reported along the coast from Maine to New Jersey with the passage of a low-pressure storm from the Ohio Valley to Pennsylvania. On the 5th dense fog prevailed off the coast from Maine to Connecticut with the passage of a low-pressure storm from New England to the Gulf of Saint Lawrence. On the 6th dense fog prevailed along the New England coast with the passage of a low-pressure storm from the middle Atlantic states to the Gulf of Saint Lawrence. On the 14th dense fog prevailed off the New England coast with the passage of a low-pressure storm over the Canadian Maritime Provinces. On the 15th and 16th dense fog prevailed along the New England coast with the passage of a low-pressure storm over the Saint Lawrence Valley, and the Signal Service observer at New London, Conn., reports that a large fleet of vessels was detained in that port by fog on those dates. On the 19th dense fog prevailed along the coast from Maine to New Jersey with the passage of a low-pressure storm over the Saint Lawrence Valley.

The following are limits of fog-areas on the north Atlantic Ocean, west of the fortieth meridian, for May, 1890, as reported by shipmasters:

Date.	Entered.		Cleared.		Date.	Entered.		Cleared.	
	Lat. N.	Lon. W.	Lat. N.	Lon. W.		Lat. N.	Lon. W.	Lat. N.	Lon. W.
	° ′	° ′	° ′	° ′		° ′	° ′	° ′	° ′
1	44 10	44 25	43 57	44 53	15	40 26	72 36	40 23	70 39
1	39 50	49 50	39 50	47 40	15-16	40 40	60 27	41 30	54 20
1-2	44 07	49 20	43 48	50 27	15-16	41 05	66 30	40 35	71 20
1-2	48 10	48 00	46 32	55 50	16	37 00	73 30	37 05	73 34
2	41 49	59 06	41 52	55 04	16	41 08	50 10	41 14	49 17
2	42 20	49 00	41 41	51 00	16-17	41 50	52 30	41 45	52 50
2	41 59	63 33	42 05	65 34	17	41 05	64 30	40 40	68 48
3	41 52	52 04	42 38	47 56	17-18	41 48	55 40	41 56	64 11
3	41 10	59 40	41 08	60 00	17-18	46 13	40 50	44 40	44 42
3	42 00	67 00	41 45	68 00	18	41 28	64 10	41 25	64 25
3	41 26	49 56	41 26	52 19	19	40 42	71 35	40 38	72 20
4	40 46	60 39	40 49	59 29	19	43 51	44 49	43 40	45 12
4	40 30	71 15	Fire Island.		19	42 04	51 12	42 02	51 37
4	48 38	48 20	48 09	49 41	19	47 09	41 16	47 05	41 36
4-5	42 12	47 44	42 14	52 36	19-20	43 49	53 56	43 44	54 22
5	41 19	59 19	41 14	61 47	20	43 01	63 58	42 40	67 50
5	41 39	51 10	41 46	50 15	20-21	46 28	47 05	46 27	51 28
5-6	40 14	68 00	Sandy Hook.		20-21	43 12	58 51	43 05	60 25
6	47 02	47 00	47 17	46 05	21	46 25	52 41	46 40	54 51
6-7	40 40	66 28	39 43	70 37	21	45 10	45 07	44 57	46 15
6-7	42 21	58 03	42 44	65 50	21-22	45 30	57 00	46 50	60 00
7	48 11	44 01	48 24	43 26	22	41 00	69 12	40 58	69 55
7	42 10	63 35	43 13	60 50	22	46 43	40 44	46 58	41 08
7-8	42 44	49 56	42 45	50 38	22	44 50	45 00	44 40	46 50
8-9	43 15	60 40	45 43	54 39	24	42 15	50 40	42 09	51 00
8-9	43 04	45 36	42 33	48 10	24-25	43 01	48 10	42 12	50 00
9	45 43	41 03	45 36	41 22	25-26	45 42	44 25	45 08	46 57
9	42 48	58 27	42 49	58 55	25-26	48 02	48 58	46 20	55 20
9-10	44 37	44 11	42 39	51 25	26	46 27	46 29	45 53	48 45
11	41 14	66 01	41 07	66 37	27	42 14	46 32	41 54	49 44
11	41 09	50 00	41 10	49 15	27	40 40	70 50	40 35	72 10
12	43 43	52 26	43 59	50 37	27-28	48 20	45 00	47 20	49 00
12-13	41 10	65 48	40 31	70 42	27-28	45 50	59 53	46 17	60 00
13	38 57	71 01	38 57	70 03	27-28	39 35	72 09	39 25	73 11
13	42 53	50 43	42 43	53 10	28-29	42 27	67 50	42 26	68 30
13-14	42 00	61 51	42 00	68 33	29-30	43 46	48 13	43 22	50 27
14-15	40 48	68 11	Sandy Hook.		30-31	43 07	49 40	42 53	50 34
15	43 48	45 45	42 12	50 57	30-31	47 18	43 07	43 52	51 43

TEMPERATURE OF THE AIR (expressed in degrees, Fahrenheit).

The distribution of mean temperature over the United States and Canada for May, 1890, 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 Signal Service. 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 departure is below the normal and subtracting when above. The monthly mean temperature for regular stations of the Signal Service represents the mean of the maximum and minimum temperatures.

The mean temperature for May, 1890, was highest in the lower Rio Grande and the central Gila valleys, where it was above 80°. The mean readings were above 70° south of a line traced from central North Carolina west-southwest to central Mississippi, thence northwest to central Arkansas, thence westward to west-central Texas, thence southward to southeastern New Mexico, thence irregularly westward to southeastern Arizona, thence northwestward over southern Nevada to central California, and thence east of south over California to Lower California. The mean temperature was lowest on the northeast shore of Lake Superior and at the more elevated stations in west-central Colorado, where it fell below 40°, and the mean values were below 50° in the Canadian Maritime

Provinces, eastern and northern Maine, the Saint Lawrence Valley, and north of a line traced from central lower Michigan west-northwest to the British Possessions north of eastern Montana. The mean temperature also fell below 50° over a considerable area in west-central Colorado, and at one station each in central Utah and east-central Nevada.

The mean temperature was generally below the normal in the central valleys, the Lake region, and the Gulf States, and over the extreme eastern part of the country, save at Atlantic coast stations north of the thirty-third parallel. Over the plateau region and adjoining parts of the eastern slope of the Rocky Mountains and on the Pacific coast north of the thirty-fifth parallel the month was warmer than the average May. The greatest departures below the normal temperature occurred in Manitoba, western Ontario, upper Michigan, western Wisconsin, and Minnesota, where they exceeded 6°, and the most marked departures above the normal temperature were noted at stations in Utah, New Mexico, and eastern Arizona, where they were more than 3°.

The following are some of the most marked departures from the normal at the older established stations:

Above normal.	°	Below normal.	°
Fort Thomas, Ariz	3.8	Winnipeg, Man	8.0
Salt Lake City, Utah	3.3	La Crosse, Wis	6.6
Somerset, Mass	3.1	Oswego, N. Y	4.2
Albany, Oregon	8.2	Saint Louis, Mo	3.2
Hatteras, N. C	2.8	Vicksburg, Miss	2.3

At Keeler, Cal., six years record, the mean temperature for the current month, 69°.0, was 0°.2 higher than the highest mean temperature previously reported for May, noted in 1889; at Winnemucca, Nev., twelve years record, the mean, 58°.1, was 1°.2 above the mean of 1881; and at Albany, Oregon, thirteen years record, the mean, 61°.4, was 1°.1 above the mean of 1885. At Marquette, Mich., twenty years record, the mean temperature for the current month, 42°.2, was 1°.0 lower than the lowest mean temperature previously reported for May, noted in 1888; and at Saint Vincent, Minn., ten years record, the mean, 45°.2, was 0°.6 lower than the mean for May, 1883.

DEVIATIONS FROM NORMAL TEMPERATURES.

The following table shows for certain stations, as reported by voluntary observers, (1) the normal temperature for May 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 May, 1890; (4) the departure of the current month from the normal; (5) and the extreme monthly means for May, during the period of observation and the years of occurrence:

State and station.	County.	(1) Normal for the month of May.	(2) Length of record.	(3) Mean for May, 1890.	(4) Departure from normal.	(5) Extreme monthly mean temperature for May. Highest.	Year.	Lowest.	Year.
		°	Years	°	°	°		°	
Arkansas.									
Lead Hill	Boone	68.0	8	67.0	− 1.0	74.4	1886	62.9	1882
California.									
Sacramento	Sacramento	64.2	37	62.0	− 2.2	70.2	1865	58.5	1860
Connecticut.									
Middletown	Middlesex	57.1	23	57.1	0.0	61.3	1864	52.4	1861
Florida.									
Merritt's Island	Brevard	75.3	8	76.6	+ 1.3	79.2	1884	70.3	1886
Georgia.									
Forsyth	Monroe	72.8	16	71.9	− 0.9	75.8	1880	69.2	1877
Illinois.									
Peoria	Peoria	64.6	34	61.4	− 3.2	71.4	1881	55.2	1867
Riley	McHenry	57.3	34	53.4	− 3.9	64.4	1881	49.8	1867
Indiana.									
Vevay	Switzerland	65.1	23	64.3	− 0.8	71.2	1880	60.4	1867
Iowa.									
Cresco	Howard	56.6	18	53.2	− 3.4	64.1	1881	49.9	1888
Monticello	Jones	59.5	36	56.6	− 2.9	68.1	1881	51.8	1867
Logan	Harrison	62.2	16	59.7	− 2.5	71.3	1880	56.1	1878
Kansas.									
Lawrence	Douglas	65.1	28	63.2	− 1.9	70.6	1880	55.5	1867
Wellington	Sumner	65.1	11	65.2	+ 0.1	71.1	1880	58.2	1882
Louisiana.									
Grand Coteau	Saint Landry	74.7	7	74.3	− 0.4	75.7	1884	73.2	1889
Maine.									
Gardiner	Kennebec	53.4	50	52.4	− 1.0	57.0	1880	49.1	1856
Maryland.									
Cumberland	Allegany	59.9	27	61.4	+ 1.5	67.0	1880	51.1	1866
Massachusetts.									
Amherst	Hampshire	57.1	54	.....	.....	64.2	1880	52.7	1842
Newburyport	Essex	55.5	11	56.0	+ 0.5	61.0	1880	50.2	1882
Somerset	Bristol	58.3	17	61.4	+ 3.1	63.6	1880	51.7	1882
Michigan.									
Kalamazoo	Kalamazoo	57.6	13	55.6	− 2.0	66.0	1881	41.3	1882
Thornville	Lapeer	57.8	13	53.7	− 4.1	66.6	1880	46.9	1877
Minnesota.									
Minneapolis	Hennepin	57.3	25	51.5	− 5.8	63.4	1887	47.9	1867
Montana.									
Fort Shaw	Lewis & Clarke	54.2	21	55.0	+ 0.8	59.8	1869	47.4	1883
New Hampshire.									
Hanover	Grafton	54.4	55	54.3	− 0.1	62.0	1880	48.7	1850
New Jersey.									
Moorestown	Burlington	60.6	26	60.3	− 0.3	68.0	1880	54.4	1882
South Orange	Essex	60.6	18	58.0	− 2.6	66.4	1880	57.3	1885
New York.									
Cooperstown	Otsego	54.6	36	53.4	− 1.2	60.7	1880, '87	46.7	1861
Palermo	Oswego	54.9	36	52.2	− 2.7	60.9	1887	47.5	1867
North Carolina.									
Lenoir	Caldwell	62.5	17	64.9	+ 2.4	67.8	1887	48.0	1881
Ohio.									
N'th Lewisburgh	Champaign	61.4	58	61.8	+ 0.4	68.0	1887	53.0	1838
Wauseon	Fulton	58.8	20	56.1	− 2.7	64.3	1880	52.2	1882
Oregon.									
Albany	Linn	53.2	13	61.4	+ 8.2	61.4	1890	52.4	1880
Eola	Polk	54.0	20	57.4	+ 3.4	59.1	1888	45.2	1880
Pennsylvania.									
Dyberry	Wayne	54.4	23	54.1	− 0.3	64.1	1880	43.7	1865
Grampian Hills	Clearfield	56.5	25	57.2	+ 0.7	65.1	1887	48.8	1867
Wellsborough	Tioga	56.4	11	53.5	− 2.9	68.4	1879	50.5	1882
South Carolina.									
Statesburgh	Sumter	70.3	9	70.2	− 0.1	73.8	1881	65.9	1885
Tennessee.									
Austin	Wilson	69.3	21	66.6	− 2.7	79.2	1887	64.5	1877
Milan	Gibson	67.0	7	66.0	− 1.0	71.4	1887	64.0	1883
Texas.									
New Ulm	Austin	74.3	17	75.6	+ 1.3	77.4	1879	72.0	1885
Vermont.									
Strafford	Orange	55.8	17	54.4	− 1.4	63.0	1887	50.5	1882
Virginia.									
Birdsnest	Northampt'n	65.2	22	66.3	+ 1.1	73.7	1880	60.8	1869
Wisconsin.									
Madison	Dane	56.7	21	52.9	− 3.8	64.2	1870	51.5	1883
Washington.									
Fort Townsend	Jefferson	54.0	18	54.7	+ 0.7	57.0	1889	50.2	1880

MAXIMUM AND MINIMUM TEMPERATURES.

The highest temperature reported by a regular station of the Signal Service was 106°, at Yuma, Ariz., on the 25th. The maximum temperature rose above 100° in the Gila Valley, Arizona, in the Colorado Valley northward into southern Nevada, and in the upper San Joaquin valley, California, and rose to 100° at Rio Grande City, Tex. The maximum temperature rose to or above 90° in the interior of the south Atlantic states, in central Florida, northwestern Louisiana, along the Mississippi River from Saint Louis, Mo., to Dubuque, Iowa, at stations on the eastern slope of the Rocky Mountains south of the fortieth parallel, over the greater part of the southern plateau region, and in the interior of California. The lowest maximum temperatures were noted on the coast of southeastern and extreme eastern New England, and on the extreme north Pacific coast, where they fell below 70°. At Springfield, Ill., eleven years record, the maximum temperature for the current month, 89°, was 1° above the highest temperature previously reported for April, noted for two or more preceding years; Rapid City, S. Dak., six years broken record, 90°, 1° above maximum of 1882; Colorado Springs, Colo., six years record, 85°, 6° above maximum of 1889; Fort Stanton, N. Mex., six years record, 85°, 1° above maximum of 1885. In May of preceding years the highest absolute temperature was generally reported in the middle Atlantic states in 1880 or 1889; in the south Atlantic states in 1878 or 1889; in the west Gulf states, the northeastern and southeastern slopes of the Rocky Mountains, and the southern plateau region in 1886; in the lower lake region in 1879 or 1889; in the extreme northwest in 1880 or 1887; in the upper Mississippi valley in 1874; over the northern plateau region and on the middle Pacific coast in 1887,

and on the north Pacific coast in 1887 or 1888; elsewhere the periods of occurrence were irregular. The following are the highest temperatures reported by Signal Service stations in the several districts for May of preceding years: 97°, at Boston, Mass., in 1880; 96°, at Philadelphia, Pa., and Washington City in 1880; 100°, at Augusta, Ga., in 1878; 98°, at Micco, Fla., in 1889; 98°, at Mobile, Ala., in 1878; 103°, at San Antonio, Tex., in 1879; 111°, at Rio Grande City, Tex., in 1879; 95°, at Memphis, Tenn., in 1879; 95°, at Pittsburgh, Pa., in 1887; 95°, at Toledo, Ohio, in 1871; 92°, at Marquette, Mich., in 1879; 96°, at Moorhead and Saint Vincent, Minn., in 1887; 96°, at La Crosse, Wis., in 1874; 101°, at Fort Sully, S. Dak., in 1874; 96°, at Fort Custer, Mont., in 1886; 101°, at Fort Reno, Ind. T., in 1886; 105°, at Abilene, Tex., in 1886; 116°, at Fort McDowell, Ariz., in 1886; 110°, at Yuma, Ariz., in 1885; 96°, at Winnemucca, Nev., in 1887; 102°, at Roseburgh, Oregon, in 1887; 110°, at Red Bluff, Cal., in 1887; and 101°, at Fresno, Cal., in 1889. The reports of United States Army post surgeons and state weather service and voluntary observers show the following maximum temperatures in states and territories where the temperature was reported 90°, or above, in May, 1890: Florence and Fort McDowell, Ariz., 108°; Eureka Ranch, Kans., 106°; El Dorado Canyon, Colo., and Fort Hancock, Tex., 105°; Barstow, Cal., and Fort Seldon, N. Mex., 104°; Moab, Utah; 102°; Washington, Ark., and Long Pine, Nebr., 100°; Lake Charles, La., Columbus, Miss., and Grant's Pass, Oregon, 98°; Andersonville, Ga., Willow Springs, Mo., and Powder River, Mont., 97°; McLeansborough, Ill., Crandall, and Muncie, Ind., Blakeville, Iowa., Chapel Hill, N. C., at several stations in South Dakota, and at Dyersburgh, Tenn., 96°; Pine Apple, Ala., Alva and Archer, Fla., Tipton, Pa., and Chester and Simpsonville, S. C., 95°; Bucyrus and West Milton, Ohio, 94°; at several stations in Colorado, Lewiston, Idaho, and Richmond, Ky., 93°; Caddo Creek, Ind., T., Benton Harbor, Mich., Watervale, Wash., at several stations in Wisconsin, and at Forts D. A. Russell and Fetterman, Wyo., 92°; at Red Wing, Minn., Nottaway Court House, Va., and Oceana, W. Va., 90°.

The lowest temperature reported by a regular station of the Signal Service was 14° at Moorhead, Minn., on the 1st. The minimum temperature fell below 20° in the valley of the Red River of the North, and was below 30° north of a line traced irregularly south of west from central Maine to extreme north-central New Mexico, in western Colorado, central Utah and Nevada, and on the northeastern slope of the Rocky Mountains. The highest minimum temperature, 69°, was reported at Key West, Fla.; the minimum values were above 60° in extreme southern Louisiana, at Galveston, Tex., and in the lower Rio Grande valley; and were above 50° at stations in extreme southeastern and southwestern Arizona. In May of preceding years the lowest absolute temperature was generally reported in New England in 1882 or 1888; in the middle Atlantic states in 1876; in the south Atlantic states in 1876 or 1877; in the east Gulf states and the middle-eastern and southeastern slopes of the Rocky Mountains in 1880; in the Rio Grande Valley in 1877; in the upper Mississippi valley in 1875; in the southern plateau region in 1884; in the middle plateau region in 1887; and on the south Pacific coast in 1883; elsewhere the periods of occurrence were irregular. At the following-named stations the minimum temperature for the current month was as low or lower than previously reported for May: Atlanta, Ga., twelve years record, 40°, the same as minimum of 1883; Chattanooga, Tenn., twelve years record, 40°, the same as minimum of 1888; Nashville Tenn., twenty years record, 37°, the same as minimum of two or more preceding years; Sandusky, Ohio, twelve years record, 34°, the same as minimum of 1880; Grand Haven, Mich., nineteen years record, 28°, the same as minimum of 1875; Moorhead, Minn., ten years record, 14°, 6° below minimum of two or more preceding years; La Crosse, Wis., eighteen years record, 29°, the same as minimum of 1875; Colorado Springs, Colo., six years record, 30°, 1° below minimum of two or more preceding years; and Concordia, Kans., six years record, 31°, the same as minimum of 1885. The reports of United States Army post surgeons and state weather service and voluntary observers show the following minimum temperatures in states and territories where temperature falling to, or below, 32° was reported: Fort D. A. Russell, Wyo., 5°; Breckenridge, Colo., 11°; Fort Pembina, N. Dak., 12°; Fort Niobrara, Nebr., 14°; Aberdeen, S. Dak., 15°; Crookston and Pokegama Falls, Minn., 16°; Bonanza, Idaho, 17°; Fort Keogh, Mont., 19°; at several stations in Michigan, 20°; Potsdam, N. Y., and East Berkshire, Vt., 21°; Berlin Falls and West Milan, N. H., and Neillsville Wis., 22°; Austin, Nev., and Nesbit, Pa., 23°; Brinkley, Ark., Mayfield, Me., and Garrettsville, Ohio, 24°; Clinton and Fayette, Iowa, Gibson, Kans., Heath, Mass., Hernando, Miss., Highlands, N. C., Beulah and Jordan Valley, Oregon, and Camp Sheridan, Wyo., 26°; Bethany, Mo., Chama, N. Mex., and Mount Pleasant, Utah, 27°; Point Isabel, Ind., 29°; Spartanburgh (1), S. C., and Kingwood, W. Va., 30°; Canton, Conn., 31°; Walla Walla Creek, Cal., Fort McPherson, Ga., Fort Supply, Ind. T., Lawrenceburgh and Waynesborough, Tenn., and Lexington, Va., 32°.

LIMITS OF FREEZING WEATHER.

The southern limit of freezing weather for May, 1890, is shown on chart ii by a line traced from east-central Maine southwestward to southern Vermont, thence irregularly westward to northern Illinois, and thence west-southwest to northern New Mexico. The temperature also fell below freezing over a greater part of Nevada, central Utah, in northeastern California, and southeastern Oregon. Compared with the limits of freezing weather for the preceding month the southern limit for the current month was about eight to nine degrees farther north in the Atlantic coast states; four to five degrees farther north in the central valleys; and four to five degrees farther north in the Rocky Mountain and plateau regions. The western limit of freezing weather was decidedly to the eastward of the limit for the preceding month, more especially over the north Pacific coast and the northern plateau region, where it was about twelve degrees farther east than in April.

RANGES OF TEMPERATURE.

The greatest and least daily ranges of temperature at regular stations of the Signal Service are given in the table of miscellaneous meteorological data. The greatest monthly ranges of temperature occurred from Nebraska northward over the Dakotas and western Minnesota, where they exceeded 60°, whence they decreased eastward to less than 30° on the coast of southeastern New England, southeastward to less than 20° over extreme southern Florida and extreme southern Louisiana, southward to less than 30° on the west Gulf coast, southwestward to less than 30° on the extreme south Pacific coast, and westward to less than 40° on the immediate middle and north Pacific coasts.

The following are some of the extreme monthly ranges:

Greatest.	°	Least.	°
Moorhead, Minn	70.0	Port Eads, La	16.0
Dodge City, Kans	64.0	Key West, Fla	18.0
Wilcox, Ariz	62.0	Block Island, R. I	24.0
Fresno, Cal	61.0	Hatteras, N. C	27.0
Baker City, Oregon	58.0	San Diego, Cal	29.0

FROST.

The following is a summary of reports of damaging frost made by regular and voluntary observers of the Signal Service: On the 1st vegetables, crops, and foliage were injured by freezing weather in South Dakota, and ice formed to a thickness of one-fourth inch at Parkston, S. Dak. The frost of the 3d and 11th caused much damage to young plants in upper Michigan. On the 2d, 7th, 8th, and 11th heavy frost occurred in the northern and middle sections and light frost in the southern section of Ohio. On the 4th and 5th freezing weather killed fruit at North Loup, Nebr. On the 6th frost caused some damage to tender plants and fruit in valleys in north-

eastern Iowa, and damaging frost was reported in various parts of Missouri. Frost also occurred at points in Missouri on the 5th, 7th, 14th, and 16th. On the 7th frost killed fruit blossoms, early fruit, and foliage in Decatur and Osborne counties, Kansas. On the 8th frost damaged young vegetables in northern Alabama. On the 9th frost caused considerable damage to tender vegetation in Middlesex, Monmouth, Burlington, Morris, and Sussex counties, New Jersey. On the 11th a severe frost occurred in Michigan; clover and young fruits were damaged, and wheat was reported injured. On the 12th and 15th frost killed tender vegetation in northern North Dakota. On the 14th and 16th frost was very destructive to fruit and garden vegetables in Buchanan county, Missouri, and on the latter-named date frost injured vegetables in western Indian Territory, and Montgomery county, Kansas. On the 21st and 29th frost killed bean and cucumber vines in Multnomah county, Oregon, and the frosts of the last three days of the month severely injured vines and garden vegetables in Morrow and Malheur counties, Oregon.

The southern limit of frost for the month is indicated by a line traced from the coast of east-central Virginia northward to south-central Pennsylvania, thence west of south to central Georgia, thence north of west to northern Mississippi, thence northward to southern Illinois, thence irregularly westward to east-central Arizona, and thence northwestward to central Nevada. On the Pacific coast frost was reported as far south as Jolon, Cal., on the 1st, and at Pasadena, Cal., on the 11th. Compared with the preceding month the southern limit of frost for May, 1890, was about six degrees farther north on the Atlantic coast, one to three degrees farther north in the east Gulf states, about seven degrees farther north in the Mississippi Valley, about six degrees farther north on the eastern slope of the Rocky Mountains, about three degrees farther north in the plateau region, while on the Pacific coast the southern limit of frost was about the same for each month. As compared with the average dates of last killing frost in the respective regions the frost of the 11th in Ohio was about three weeks late, the frost of the 6th in Iowa was about one week late, the frost of the 8th in Alabama was about seven weeks late, the frost of the 9th in New Jersey was three to four weeks late, the frost of the 11th in lower Michigan was nearly two weeks late, the frost of the 15th in North Dakota was seasonable, the frost of the 16th in Missouri and Indian Territory was about one month late, the frost of the 16th in Kansas was about three weeks late, and the frost of the last three days of the month in Oregon was about two weeks late.

TEMPERATURE OF WATER.

The following table shows the maximum, minimum, and mean water temperature as observed at the harbors of the several stations; the monthly range of water temperature; and the mean temperature of the air for May, 1890:

Stations.	Temperature at bottom.				Mean temperature of air at the station.
	Max.	Min.	Range.	Monthly mean.	
	°	°	°	°	°
Boston, Mass	57.3	49.2	8.1	52.5	57.0
Canby, Fort, Wash	.....	.....	.....	.....	.....
Charleston, S. C	77.8	70.0	7.8	74.6	73.0
Eastport, Me	45.1	39.5	5.6	41.7	47.9
Galveston, Tex	82.0	73.5	8.5	77.4	75.0
Key West, Fla	85.3	79.2	6.1	82.7	78.8
Portland, Oregon	60.0	51.9	8.1	55.7	60.6

PRECIPITATION (expressed in inches and hundredths).

The distribution of precipitation over the United States and Canada for May, 1890, as determined from the reports of nearly 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 each Signal Service station. 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.

The heaviest precipitation reported for May, 1890, was 16.19, at Hypoluxo, Fla., and the precipitation exceeded 15.00 at Titusville, Fla. Over 14.00 was reported at Caddo Creek, central Texas, over 12.00 in east-central Pennsylvania, over 11.00 in central and southeastern Louisiana and northwestern South Carolina, and over 10.00 in central Alabama, central Georgia, south-central Indiana, central and south-central Maine, and northwestern Pennsylvania. Over a greater part of Arizona, and in southeastern California, southern Nevada, southwestern Colorado, eastern Utah, southwestern New Mexico, and extreme western Texas no precipitation was reported, and in central Washington, western Oregon, northeastern lower Idaho, east-central Wyoming, western Kansas, south-central North Dakota, north-central South Dakota, and south-central Wisconsin less than one-half inch of precipitation fell.

The precipitation was generally in excess of the normal east of the Mississippi River, and from the middle Pacific coast northeastward over the northern plateau region and a part of the northeastern slope of the Rocky Mountains. In the interior of the country from Manitoba southward to the Rio Grande Valley and southwestward to the south Pacific coast the precipitation was deficient. The greatest departures above the normal precipitation occurred from central Alabama southeastward over northeastern Florida, where they exceeded six inches, and at stations on the south shores of Lakes Ontario and Erie, the excess was more than three inches. The most marked deficiencies in precipitation were noted from central Wyoming eastward to north-central Nebraska, and in the Panhandle of Texas, where they exceeded three inches, and over a large part of the middle-eastern and southeastern slopes of the Rocky Mountains, and on the north Pacific coast in adjoining parts of Washington and Oregon the deficiency was more than two inches. Considered by districts the average percentages of the normal in districts where the precipitation was in excess were about as follows: middle Pacific coast, 261 per cent.; lower lake region, 170 per cent.; northern plateau region, 155 per cent.; east Gulf states, 143 per cent.; south Atlantic states, 135 per cent.; middle Atlantic states, 133 per cent.; New England, 132 per cent.; upper lake region, 118 per cent.; Ohio Valley and Tennessee, 108 per cent.; Key West, Fla., 107 per cent.; and upper Mississippi valley, 102 per cent. In districts where the precipitation was deficient the percentages of the normal were about as follows: southern plateau region, 5 per cent.; south Pacific coast, 15 per cent.; northeastern and middle-eastern slopes of the Rocky Mountains, 45 per cent.; north Pacific coast, 46 per cent.; extreme northwest, 49 per cent.; middle plateau region, 51 per cent.; Missouri Valley, 63 per cent.; Rio Grande Valley, 83 per cent.; southeastern slope of the Rocky Mountains, 90 per cent.; and west Gulf states, 96 per cent.

The table of miscellaneous meteorological data for regular stations of the Signal Service and the table of deviations from the normal precipitation for certain stations, as reported by voluntary observers, show that at the following-named places the precipitation for the current month was the heaviest ever reported for May during the respective periods of observation: Albany, N. Y.; Atlantic City, N. J.; Jacksonville, Fla.; Erie, Pa.; Merritt's Island, Fla.; Forsyth, Ga.; Cumberland, Md.; Newburyport and Somerset, Mass.; Thornville, Mich.; Coopers-