

The following positions of icebergs and field ice reported are shown on chart i by ruled shading:

18th.—S. S. "La Bretagne," N. 43° 57', W. 50° 20', two small bergs.

23d.—S. S. "Glenrath," N. 46° 00', W. 59° 32', field ice about five by one miles in extent.

24th.—S. S. "Lake Superior," N. 46° 55', W. 46° 57', one moderate sized and two small bergs. S. S. "Damara," N. 48° 17', W. 44° 51', a plateau-shaped berg; passed eight bergs during the day. S. S. "Ansterlitz," N. 47° 42', W. 46° 12', one berg about three hundred feet high and one-half mile long, wedge shaped, and a number of large floes. S. S. "Nova Scotian," N. 48° 31', W. 49° 08', one large berg and a large quantity of broken ice.

25th.—S. S. "Circassian," N. 49° 12', W. 44° 00', several bergs. S. S. "Oregon," N. 49° 15', W. 44° 41', one small berg; N. 48° 19', W. 47° 22', a large and a small berg; N. 48° 08', W. 47° 53', a large berg. Mr. Jno. Higgins, observer at Saint Johns, N. F., reported a large iceberg off the Narrows. S. S. "Palestine," N. 47° 40', W. 43° 50', a berg about one hundred by fifty feet.

26th.—S. S. "Hungaria," N. 45° 40', 47° 20', a large berg. S. S. "Slavonia," N. 46° 01', W. 47° 35', a berg about one

hundred feet high and four hundred feet long. S. S. "Palestine," N. 46° 54', W. 46° 30', two bergs about one hundred and fifty by sixty feet.

27th.—S. S. "Lake Superior," off Bird Rocks, several narrow strips of ice.

29th.—S. S. "Roman," N. 47° 16', W. 43° 11', a moderate sized and two small bergs.

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

Southern limit.			Eastern limit.		
Month.	Lat. N.	Long. W.	Month.	Lat. N.	Long. W.
April, 1883	40 49	52 06	April, 1883	48 00	43 00
April, 1884	41 26	48 46	April, 1884	45 25	43 34
April, 1885	41 40	49 50	April, 1885	44 10	39 41
April, 1886	40 51	46 39	April, 1886	47 43	30 11
April, 1887	40 02	50 04	April, 1887	48 00	38 18
April, 1888	41 33	50 00	April, 1888	47 40	49 00
April, 1889	43 57	50 20	April, 1889	47 16	43 11

* Isolated iceberg.

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

The distribution of mean temperature over the United States and Canada for April, 1889, 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.

In April, 1889, the mean temperature was highest over the southern extremity of Florida, along the immediate Gulf coast west of the Mississippi River, in the lower Rio Grande Valley, and at stations in the Colorado Valley south of the thirty-sixth parallel, where the values were above 70°, the highest mean reading, 76°.0, being reported at Rio Grande City, Tex. The mean temperature was lowest in the lower Saint Lawrence Valley, and on the north shore of Lake Superior, where it was below 35°, the lowest mean value, 34°.0, being noted at Father Point, Québec. The mean temperature was below 40° north of a line traced from Manitoba east-southeast over the upper Lakes, and thence eastward over the Saint Lawrence Valley and central New Brunswick.

Over a greater portion of the country the month was warmer than the average April, the only stations reporting mean temperature below the normal being confined to limited areas which embraced Florida and the immediate south Atlantic and east Gulf coasts, southern Texas, and the south and southeast shores of Lake Michigan. The greatest departures above the normal were noted at stations in the British Possessions north of Dakota and Montana, where they amounted to 10°. The departures above the normal were more than 5° over a greater portion of the Rocky Mountain regions, in the upper Missouri and Red River of the North Valleys, and along the west coast of the Gulf of Saint Lawrence. Along the Pacific coast the mean temperature averaged from 2° to 3° above the normal. In the localities where the temperature for the month was below the normal the departures were small.

Considered by districts, the greatest average departure above the normal temperature occurred in the extreme Northwest, where it was 6°.6; in the middle plateau region the

average departure above the normal was 5°.6; on the north Pacific coast 4°.9, and in the southern plateau region 4°.7. The smallest average departures above the normal were shown in the south Atlantic and east Gulf states, where they amounted to but 0°.5. The only districts showing average departures below the normal were the Florida Peninsula and Rio Grande Valley, where the means averaged 2°.4 and 0°.8, respectively, below the April normal.

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

Above normal.		Below normal.	
Minnedosa, N. W. T.	10.0	Key West, Fla	2.9
Bismarck, Dak	7.9	Rio Grande City, Tex	2.0
Chatham, N. B.	7.0	Cedar Keys, Fla	1.9
Helena, Mont.	6.2	Savannah, Ga.	1.6
Salt Lake City, Utah	6.2	Grand Haven, Mich	0.6

DEVIATIONS FROM NORMAL TEMPERATURES.

The following table shows for certain stations, as reported by voluntary observers, (1) the normal temperature 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 April, 1889; (4) the departure of the current month from the normal; (5) and the extreme monthly means for April during the period of observation and the years of occurrence:

State and station.	County.	(1) Normal for the month of April.	(2) Length of record.	(3) Mean for April, 1889.	(4) Departure from normal.	(5) Extreme monthly mean temperature for April.			
						Highest.	Year.	Lowest.	Year.
Arkansas.		°	Years	°	°	°	°	°	°
Lead Hill	Boone	61.8	7	63.1	+1.3	65.3	1888	56.7	1884
California.									
Sacramento	Sacramento	59.3	36	58.6	-0.7	63.3	1857	54.6	1880
Colorado.									
Fort Lyon	Bent	51.6	19	54.3	+2.7	57.1	1885	43.9	1874
Connecticut.									
Middletown	Middlesex	45.4	22	48.7	+3.3	50.9	1865	38.3	1874
Florida.									
Merritt's Island	Brevard	69.4	6	60.0	-9.4	74.9	1885	60.0	1889
Georgia.									
Forsyth	Monroe	64.8	15	66.7	+1.9	68.8	1888	61.0	1875
Illinois.									
Peoria	Peoria	52.3	33	54.9	+2.6	57.9	1878	40.6	1857
Riley	McHenry	44.5	33	46.5	+2.0	52.2	1856	35.5	1874

Deviations from normal temperatures—Continued.

State and station.	County.	(1) Normal for the month of April.	(2) Length of record.	(3) Mean for April, 1889.	(4) Departure from normal.	(5) Extreme monthly mean temperature for April.			
						Highest.	Year.	Lowest.	Year.
Indiana.		0	Years	0	0	0	0	0	0
Vevay.....	Switzerland.....	54.9	22	56.1	+1.2	60.5	1866	47.4	1874
Iowa.									
Cresco.....	Howard.....	42.8	17	46.3	+3.5	48.7	1878	37.5	1874
Monticello.....	Jones.....	48.2	35	48.8	+0.6	56.0	1855	38.0	1857
Logan.....	Harrison.....	49.9	15	54.2	+4.3	55.0	1887	42.6	1874
Kansas.									
Lawrence.....	Douglas.....	54.5	21	56.4	+1.9	59.6	1875	47.7	1874
Wellington.....	Sumner.....	56.0	10	58.3	+2.3	59.6	1880	50.7	1884
Louisiana.									
Grand Coteau.....	Saint Landry.....	69.6	6	70.2	+0.6	70.9	1885	68.6	1884
Maine.									
Gardiner.....	Kennebec.....	41.4	49	45.0	+3.6	46.2	1878	35.1	1874
Maryland.									
Cumberland.....	Allegany.....	48.6	30	52.3	+3.7	57.6	1881	42.2	1859
Massachusetts.									
Amherst.....	Hampshire.....	45.3	53	48.8	+3.5	52.2	1839, '78	38.3	1874
Newburyport.....	Essex.....	43.6	9	46.5	+2.9	47.5	1886	41.4	1888
Somerset.....	Bristol.....	44.9	16	49.2	+4.3	51.8	1878	38.7	1874
Michigan.									
Kalamazoo.....	Kalamazoo.....	46.6	12	48.0	+1.4	52.9	1878	42.0	1881
Thornville.....	Lapeer.....	45.5	12	46.2	+0.7	52.1	1878	42.3	1881, '88
Minnesota.									
Minneapolis.....	Hennepin.....	43.1	23	48.4	+5.3	49.2	1886	36.6	1874
Montana.									
Fort Shaw.....	Lewis & Clarke.....	44.4	19	50.2	+5.8	51.2	1870	38.6	1882
New Hampshire.									
Hanover.....	Grafton.....	41.1	54	46.5	+5.4	46.8	1886	33.7	1874
New Jersey.									
Moorestown.....	Burlington.....	49.3	26	51.1	+1.8	55.1	1865	42.3	1874
South Orange.....	Essex.....	47.5	18	49.2	+1.6	52.9	1878	42.2	1874
New York.									
Cooperstown.....	Otsego.....	40.6	35	44.3	+3.7	51.6	1878	33.6	1874
Palermo.....	Oswego.....	40.9	29	44.2	+3.3	50.0	1878	32.4	1874
North Carolina.									
Lenoir.....	Caldwell.....	55.4	16	58.7	+3.3	60.0	1887	42.6	1885
Ohio.									
N'th Lewisburgh.....	Champaign.....	50.9	57	52.0	+1.1	63.0	1888	39.0	1857
Wauson.....	Fulton.....	46.3	19	47.2	+0.9	54.8	1878	38.6	1874
Oregon.									
Albany.....	Linn.....	51.6	11	53.8	+2.2	55.4	1888	48.4	1882
Eola.....	Polk.....	49.3	18	52.6	+3.3	54.8	1875	43.2	1872
Pennsylvania.									
Dyberry.....	Wayne.....	41.8	23	45.8	+4.0	49.7	1878	35.0	1874
Grampian Hills.....	Clearfield.....	43.0	24	47.8	+4.8	52.2	1878	29.0	1875
Wellaborough.....	Tioga.....	43.7	10	44.2	+0.5	52.0	1886	40.1	1881
South Carolina.									
Statesburgh.....	Sumter.....	62.3	8	62.1	-0.2	64.6	1882	60.1	1884
Tennessee.									
Austin.....	Wilson.....	58.9	21	60.8	+1.9	65.3	1878	53.9	1874
Milan.....	Gibson.....	59.9	6	60.4	+0.5	63.3	1888	56.2	1884
Texas.									
Fort Concho.....	Tom Green.....	66.1	15	69.2	+3.1	71.5	1880	59.7	1874
New Ulm.....	Austin.....	68.5	16	69.9	+1.4	71.5	1878, '80	63.6	1874
Vermont.									
Strafford.....	Orange.....	40.2	16	46.5	+6.3	48.3	1886	34.9	1874
Virginia.									
Bird's Nest.....	Northampt'n.....	54.5	21	54.5	0.0	61.6	1880	49.4	1875
Wisconsin.									
Madison.....	Dane.....	44.2	21	47.9	+3.7	49.8	1870	37.4	1874
Washington.									
Fort Townsend.....	Jefferson.....	48.5	15	52.4	+3.9	52.4	1889	36.2	1859

The above table shows that at one station, Fort Townsend, Wash., with a broken record of 15 years, the mean temperature for the month was 0°.4 above the highest previous mean for April, recorded in 1884, and that one station, Merritt's Island, Fla., with a record of 6 years, reports a mean temperature 6° below the lowest previous mean for April, noted in 1886. At Fort Townsend the mean for the month was 16° above the lowest April mean, recorded in 1859, and at Merritt's Island the temperature for the current month was 15° below the highest mean for April, noted in 1885. Among the stations showing marked differences between the current mean and the lowest mean temperature recorded for April, are: Grampian Hills, Pa., 24 years record, 19° above mean of 1875; Lenoir, N. C., 16 years record, 16° above mean of 1885; Peoria, Ill., 33 years broken record, 14° above mean of 1857; Hanover, N. H., 54 years record, and North Lewisburgh, Ohio, 57 years record, 13° above those of 1874 and 1857, respectively; Logan, Ind., 12 years broken record; Minneapolis, Minn., 23 years record; Fort Shaw, Mont., 19 years record; Palermo, N. Y., 29 years record, and Strafford, Vt., 16 years record, 12° above means of 1874, 1874, 1882, 1874, and 1874, respectively.

MAXIMUM AND MINIMUM TEMPERATURES.

The highest temperature reported for April, 1889, was 104°

at Yuma, Ariz. The only other stations reporting maximum temperature of 100°, or more, were: Fort Mohave and Fort McDowell, Ariz., 103° and 100°, respectively, and El Dorado Canyon, Nev., 100°. At stations in the Rio Grande Valley in Texas, in the upper San Joaquin valley, southern California, and southeastern Kansas the maximum values were above 90°. In north-central California, a considerable portion of the middle and northern plateau regions, in the middle Missouri and Red River of the North valleys, and from the middle and southern slopes of the Rocky Mountains eastward south of the fortieth parallel to the Atlantic coast, and including Pennsylvania, southern New York, and central New England, the maximum readings were above 80°, except along the immediate coast north of the fortieth parallel, where they fell to and below 60°, the lowest maximum reading for the month, 58°, being noted at Block Island, R. I. Along the Pacific coast north of the fortieth parallel the maximum values were below 70°. At a number of stations distributed over the country from the Lakes and lower Mississippi valley to the Pacific coast states the maximum temperature for April, 1889, was higher than has been noted for the corresponding month of previous years. At New Orleans, La., 19 years record, the maximum temperature was 1° above the highest previous maximum, which occurred in 1887; Escanaba, Mich., 15 years record, 1° above the maximum of 1875 and 1880; Leavenworth, Kans., 18 years record, same as maximum of 1880; Fort Assiniboine, Mont., 9 years record, same as maximum of 1881; Fort McDowell, Ariz., 6 years record, 1° above maximum of 1888; Fort Thomas, Ariz., 10 years record, 4° above maximum of 1881; San Carlos, Ariz., 7 years record, 4° above maximum of 1882; Willcox, Ariz., 6 years record, 5° above maximum of 1886; Keeler, Cal., 5 years record, same as maximum of 1888; Salt Lake City, Utah, 16 years record, 1° above maximum of 1874; Montrose, Colo., 5 years record, 2° above maximum of 1887. At a majority of stations in the middle Atlantic states the maximum temperature for April was noted in 1888; in the lower lake region and Ohio Valley in 1883; in the lower Mississippi and Red River of the North valleys in 1887; in northern Texas and Kansas in 1880, and in California, Nevada, and Idaho in 1888; elsewhere the periods of occurrence were irregular. The most marked differences between the maximum readings for the current month and the absolute maximum readings for April were noted at a limited number of stations in the Lake region and along the Atlantic coast north of the fortieth parallel, where they were 10°, or more, below the record of previous years.

The lowest temperature for the current month, 9°, was noted at Saint Vincent, Minn. At Sault de Ste. Marie, Mich., a minimum reading of 10° was reported. The minimum temperature fell below 30° north of a line traced from the east coast of Massachusetts to northern Tennessee, and thence irregularly westward to the Rocky Mountains, where it curved southward to southern New Mexico, and east of this line continued northwest to Oregon, and thence southeast into Utah, and northward over Idaho to the British Possessions. The highest minimum temperature reported was 65° at Key West, Fla. Over the southern half of Florida, and along the west Gulf coast, the minimum values did not fall below 50°. Along the immediate Pacific coast temperature below 40° was not reported, save on the northwest coast of Washington. Unusually low temperatures for the month were not reported, and the minimum readings generally ranged considerably above the absolute minimum reported for preceding years. In New England the minimum temperatures were 12° to 24° above the lowest previous readings which were noted at most stations in 1874; in the middle Atlantic states, 5° to 17° above record of 1874, and in Maryland and Virginia of 1875; in the east Gulf states, 7° to 16° above record of 1881; west Gulf states, 14° to 20° above record of 1881, and at a number of stations, 1886; Rio Grande Valley, 11° to 13° above record of 1881; Tennessee, 12° to 14° above record of 1881; Ohio Valley, 4° to 8° above record of 1875; Lake Erie stations, 9° to 12° above

record of 1875; lower Missouri valley, 17° to 30° above record of 1881; in all other districts the absolute minimum temperatures were noted for different years at the various stations.

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 occurred in the valley of the Red River of the North, where they exceeded 70°. From this region the ranges decreased eastward to the south coast of New England, where they were less than 30°; southeast to southern Florida, where they were less than 20°; south to the Gulf coast and west to the Pacific coast, where they fell below 30°. Within limited areas, embracing parts of Ohio and West Virginia, eastern Kansas, northeastern Utah, and southeastern Arizona, the ranges were more than 60°.

The following are some of the extreme monthly ranges:

Greatest.		Least.	
Saint Vincent, Minn	74.0	Key West, Fla.	17.0
Topeka, Kans.	67.0	Galveston, Tex.	21.0
Bismarck, Dak.	65.0	Port Eads, La.	23.0
Parkersburgh, W. Va.	62.0	Fort Canby, Wash.	24.0
Fort Thomas, Ariz.	62.0	Block Island, R. I.	26.0
Fort Du Chesne, Utah	60.0	San Francisco, Cal.	28.0

FROST.

Frost injurious to vegetation was not reported south of the fortieth parallel, save at Athens, Ga., where the voluntary observer reports that frost injured tender plants on the 7th. In the Atlantic coast and east Gulf states frost was reported as far south as Archer, Fla., Thomasville, Ga., and Livingston, Ala., on the 8th. In the west Gulf states the only station reporting frost was New Ulm, Tex., where it was noted on the 1st, 2d, and 3d. In New Mexico frost occurred as far south as Fort Stanton on the 1st; in Arizona, at Eagle Pass, 11th, and Whipple Barracks, 12th. In California no frost was reported

save at Susanville, 6th and 17th. In Oregon and Washington frost was noted frequently during the month.

LIMITS OF FREEZING WEATHER.

The southern and western limits of freezing weather for April, 1889, are shown on chart v. A line representing the southern limit is traced from the vicinity of Boston, Mass., irregularly southwestward to central North Carolina; thence north of west to southwestern Iowa, and from that locality irregularly southwestward to southern New Mexico. A line showing the western limit of freezing weather is traced from southern New Mexico northwestward to west-central Oregon, where it curves eastward over the valley of the Columbia River, and passes northward near Olympia and Port Angeles, Wash., into British Columbia. Compared with the lines representing similar data for the preceding month, it is shown that for the current month the southern limit of freezing weather averaged about five degrees farther north. On the Pacific coast the western limit was somewhat farther east than for March, 1889.

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 April, 1889:

Stations.	Temperature at bottom.				Mean temperature of air at the station.
	Max.	Min.	Range.	Monthly mean.	
	°	°	°	°	°
Canby, Fort, Wash.	57.3	53.0	4.3	55.1	51.0
Cedar Keys, Fla.	82.0	67.0	15.0	73.4	68.1
Charleston, S. C.	68.1	60.0	8.1	64.0	63.5
Eastport, Me.	40.1	36.9	3.2	38.5	41.4
Galveston, Tex.	74.0	62.0	12.0	70.3	70.2
Key West, Fla.	81.1	73.0	8.1	77.5	74.1
New York City.	50.3	39.5	10.8	44.6	51.6
Pensacola, Fla.*	72.0	62.0	10.0	68.9	67.8
Portland, Oregon.	57.2	51.9	5.3	55.2	54.3

* Ten days missing.

PRECIPITATION (expressed in inches and hundredths).

The distribution of precipitation over the United States and Canada for April, 1889, as determined from the reports of over 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.

In April, 1889, the precipitation was greatest along and near the coasts of North Carolina, Virginia, and southern Maryland, where it exceeded ten inches. Within limited areas occupying central and southeastern Kansas, adjoining parts of Arkansas, Louisiana, and Texas, central Alabama, and the south-central coast of Nova Scotia the precipitation amounted to more than six inches. The smallest precipitation east of the one hundredth meridian was reported at stations in the upper Lake region, the upper Mississippi, Missouri, and lower Ohio valleys, and along the middle and west Gulf coasts, where it was less than one inch. In the Rocky Mountain and plateau regions the precipitation was greatest from Salt Lake City southward over central Utah, where it was more than two inches. In Arizona, western New Mexico, southern and western Nevada, and southern California the precipitation was less than one-half inch, and at a number of stations in central and southern Arizona no rain fell during the month. Along the Pacific coast the precipitation was greatest from the Columbia River to the north coast of California, where it exceeded four

inches, and least on the south coast of California, where it was 0.27 and 0.19 at Los Angeles and San Diego, respectively.

Compared with the normal for the month the greatest departures above the normal precipitation for April, 1889, occurred along the Virginia coast, where they were more than eight inches. The precipitation was above the normal from North Carolina to the lower Lake region. It was also in excess in Nova Scotia, over Lake Superior, a part of the upper Mississippi valley and the middle eastern slope of the Rocky Mountains, in the lower Rio Grande valley, south-central Arizona, and at stations on the north Pacific coast and in the valley of the Columbia River. Elsewhere the precipitation was deficient, the greatest departures below the normal being noted on the middle Gulf coast, where they varied from three to four inches. Within an area extending from eastern Kentucky and Tennessee to west-central Arkansas the rainfall was more than three inches below the normal; elsewhere the departures below the normal were less marked.

Among the more remarkable features of the precipitation of the month were the great excess of rainfall in the Rio Grande Valley, where it was 250 per cent. above the normal, and the heavy precipitation in the middle Atlantic states, where it averaged nearly double the usual amount for April. On the middle eastern slope of the Rocky Mountains the average excess amounted to 9 per cent., and on the northern slope of the Rocky Mountains, in the Missouri Valley, and the south Atlantic states to 6 per cent. of the normal. The most marked deficiency in precipitation occurred on the south Pacific coast, where the average rainfall amounted to but 16 per cent. of the normal for the month. In other districts where the precipita-