

west gales ranging from 25 to 60 miles per hour. 29th, central off the western coast of Norway; Brono, 28.86, SW., rain; Tromso, 28.96, SW.; Umea, 28.93, SW.; Hernosand, 29.00, WSW.; Christiania, 29.02, SSW.; the pressure over the British Isles rose from 0.20 to 0.50 inch with winds shifting to west and northwest with occasional light rains and generally cloudy weather; violent westerly gales continued over the English Channel, North Sea and the Baltic: the area of 29.80 covered the whole of northern Europe. During the day the depression passed eastward over northern Scandinavia followed by rapidly rising pressure and north to west winds, being central morning of the 30th over the White Sea; Archangel, barometer 29.01, NNE; over central Russia pressure generally below 29.60 with southeast to southwest winds and occasional rains; Ekaterinburg, 29.49, heavy rain. 31st, central in western Siberia; Ekaterinburg, 29.41, WSW., threatening; the pressure was generally below 29.60 over northern Russia with southwest to northwest winds. Of the storms forming over Russia No. V developed over the region north of the Caspian Sea. On the 6th there was a sudden fall in barometer of from 0.07 to 0.15 inch and the circulation of winds, with the accompanying pressure at surrounding stations, is given, as follows: Ekaterinburg, 29.56, E.; Kasan, 29.43, NW.; Krotkovo, 29.39, N.; Astrakhan, 29.56, N.; Nukuss, 29.52, WNW. During the 7th and 8th depression remained central over the province of Omsk; 7th, Krotkovo, 29.43, N., rain; Kasan, 29.49, N.; Barnaul, 29.38, ENE.; Nukuss, 29.73, WSW.; Tashkend, 29.62, calm. 8th, pressure rose from 0.05 to 0.21 inch at all stations. 9th, a fall of 0.09 inch was reported from Barnaul, atmosphere calm, followed on the 10th by another fall of 0.12 inch, wind SSW., cloudy, and at Yeniseisk, of 0.25 inch, wind S., rain. During the 10th passed northeastward beyond the Yenisei, followed on the 11th by rising barometer and SW. winds, rain still continuing at Yeniseisk. No. VIII.—After the passage of area No. III, the pressure still remained low north of the Black Sea, forming on the 13th a slight depression in the vicinity of Kieff, barometer 29.41, W. From the 14th to the 16th, depression remained about stationary over the region between the Black and Caspian seas, finally disappearing on the 17th by the encroachment of a high pressure from central Europe. Only one area for the month has been charted off the Asiatic coast. No. IX.—On the 12th the isobar of 29.80 generally covered the Japan Islands, accompanied by SE. to SW. winds, and on the 13th a fall of from 0.07 to 0.18 inch was reported, the depression appearing to be central over the Japan Sea. 14th, probably central south of the Island of Yesso; in 41° N., 152° E., 29.36, S., rain; in the vicinity of Yeddo the barometer fell about 0.10 inch, with winds shifting to westerly. 15th, probably central south of Kamtchatka peninsula; in 43° N., 158° E., 29.43, S., threatening; in 39° N., 144° E., 29.63, SW., fair; the winds over the Japan Islands generally shifted to N. and NE., with a slight rise in pressure. 16th, in 45° N., 164° E., 29.48, W., cloudy. 17th, in 46° 30' N., 170° 45' E., 29.42, S.; in 52° N., 175° 40' E., calm, clear. 18th, in 47° 39' N., 178° 21' E., 29.74, S., fair; in 52° N., 175° 40' W., SE., cloudy. 19th, in 48° 11' N., 174° 03' W., 29.87, S., cloudy; in 52° N., 175° 40' W., SW., fair. 20th, depression disappeared in a high area then prevailing to the south of Alaska: in 48° 11' N., 166° 03' W., 30.05, SW., foggy.

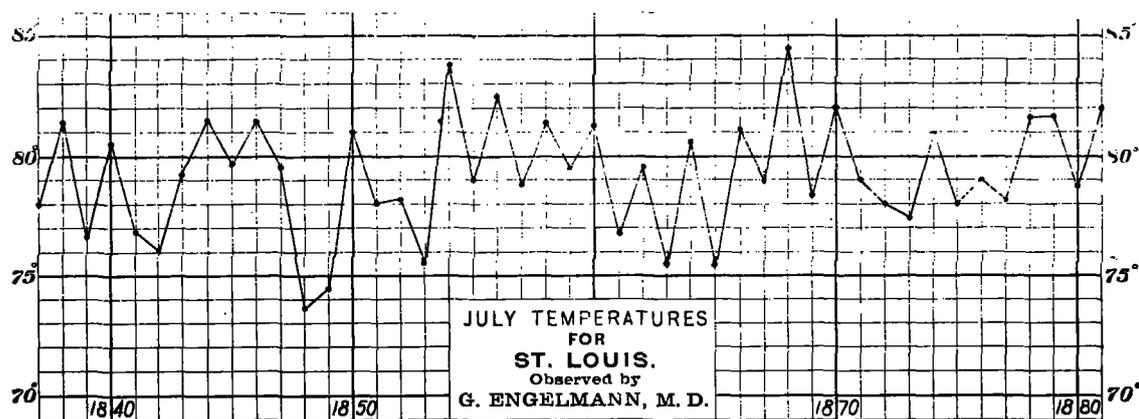
TEMPERATURE OF THE AIR.

The mean temperature of the air for July, 1881, is shown by the isothermal lines (in red) on chart No. II. The table of mean and comparative temperatures in the right hand corner of the chart shows, in the first column, the average for the month throughout the various districts, as deduced principally from observations taken at Signal Service stations. In the two remaining columns are shown the means for the present month, and the departures of such means from the average for many years. Throughout the entire country west of the 107th meridian, the mean temperature of the month is from 1°.9 to 4°.3 below the normal. Eastward of this meridian, except in New England, there has been a general increase in every district over the average mean temperature for many years, being most marked over those States lying between the 82° and 90th meridians, where the excess ranges from 1°.7 to 2°.0. It is interesting to note that this elongated region of high mean temperature lies between thermometric normals in the Middle Atlantic States to the east and in the Mississippi valley to the west. The departure from normal over the whole of the Eastern Rocky Mountain slope, shows a gradual transition from the area of deficiency to that of excess.

Ranges of Temperature at Signal Service stations.—Monthly ranges in general varied from 35° to 40° over the country east of the Rocky Mountains, and from 40° to 50° to the westward of that region. The *smallest ranges* were: Port Eads, 18°; Key West and Punta Bassa, 19°; Indianola, 20°; New Orleans, 21°; Galveston, Thatchers Island and San Diego, 22°; Macon and Brownsville, 23°; Cape May and Cedar Keys, 25°. The *largest* were: Dayton, 62°; Fort Keogh, Fort Buford and Rock creek, 61°; Fort Benton, 60°; Fort Assinaboine and Missoula, 59°. The *daily ranges* varied in the different districts as follows: New England, 16° at Thatchers Island to 31° at Burlington; Middle Atlantic states, 16° at Cape May to 31° at New York and 33° at Norfolk; South Atlantic states, 16° at Macon to 28° at Augusta; Eastern Gulf states, 16° at New Orleans and 17° at Key West and Punta Bassa to 32° at Vicksburg; Western Gulf States, 13° at Port Eads and 18° at Indianola to 31° at Denison and Fort Gibson; Rio Grande valley, 29° at Rio

Grande City, Laredo and Brackettville to 34° at Eagle Pass; Ohio valley and Tennessee, 24° at Memphis to 30° at Pittsburg and 33° at Nashville; Lower Lake region, 19° at Erie to 22° at Cleveland and 30° at Oswego and Rochester; Upper Lake region, 18° at Grand Haven to 31° at Marquette and Port Huron and 32° at Duluth; Upper Mississippi valley, 22° at La Crosse to 29° at St. Louis and 31° at St. Paul; Missouri valley, 25° at Omaha to 37° at Fort Bennett; Extreme Northwest, 33° at Moorhead to 42° at Bismarck and Fort Buford; Northern Slope, 31° at North Platte to 47° at Fort Keogh; Middle Slope, 27° on Pike's Peak to 33° at Denver and 37° at Dodge City; Southern Slope, 30° at Henrietta and Jacksboro to 41° at El Paso and 50° at Davis; Northern Plateau, 39° at Lewiston to 45° at Boise City and 49° at Missoula; Middle Plateau, 34° at Pioche and 36° at Salt Lake City to 49° at Winnemucca; Southern Plateau, 31° at Santa Fe to 42° at Florence and Fort Verde; North Pacific coast, 33° at Portland to 38° at Olympia and Roseburg; Middle Pacific coast, 24° at San Francisco to 38° at Red Bluff; South Pacific coast, 20° at San Diego to 44° at Visalia and 56° at Campo.

Deviation from Mean Temperatures.—*Illinois:* Riley, mean temperature 72°.⁵, or 1°.⁷ above the mean of the past 20 years; the years 1866, 1868, 1870, 1874 and 1878 were warmer. *Maine:* Gardiner, mean temperature, 2°.⁸ below the mean of past 45 years; there have been four instances of a colder July, viz.: in 1844, 1855, 1858 and 1860. *Missouri:* St. Louis, Missouri



Weather Service reports: mean temperature, 82°.⁰⁰, or 2°.⁸ above the mean of the past 45 years; higher mean temperatures were recorded in 1854, 1856, 1868. *New Hampshire:* Contoocookville, mean temperature 0°.⁵ below the mean of the past 11 years. *New York:* North Volney, mean temperature 0°.⁰² below the mean of past 13 years; warmest July occurred in 1868, mean 76°.²; coldest July occurred in 1865, mean, 69°.¹. *Ohio:* Bethel, mean temperature, 39°.¹ above the mean of past 50 years. *Texas:* Clarksville, warmest July in past 13 years.

High Temperatures.—From the following data, it will be observed, that the region of country within which the excessive and dangerous heat of the month was experienced, covers that portion of territory extending northward from the central portion of the Gulf to the Lakes, corresponding thereby, with the area of greatest departure of the monthly mean from the average for many years. Within the region above indicated the high temperatures of the month appeared to be productive of most suffering, in the Ohio valley. The period covering the occurrence of this marked rise in the temperature, is confined to that portion of the month included between the 5th and 15th, and again between the 19th and 22nd. In connection herewith, and with a view to elucidate, it is of interest to carefully consider chart No. I. for the month, on which is displayed the movement of the centres of areas of low barometer. The extreme northerly position of areas No. I, II and III, and their comparatively sluggish movement between the 80th and 100th meridians appeared to induce an excessive movement northward of the warm air from the Gulf, which added to the modifying intensity of local influences such as cloudiness, humidity and topography would form a powerful exponent in the production of high temperatures.

The following reports are from various sources, but independent of the data obtained from Signal Service stations: Cincinnati, for the week ending July 14th, the health officer reported 549 deaths, 213 of which were caused by actual sunstroke, 150 brought on by the influence of extreme heat, and the remainder the result of various diseases. The least number of deaths by sunstroke, (20) occurred on the 7th and the greatest 68, on the 11th. Charleston, S. C., 22nd, highest temperatures ever recorded in the history of the city occurred on this day, but accompanied by no sunstrokes. At Dr. Blackman's drug store the thermometer registered at 8 a. m., 90°; 10 a. m., 96°; 12, noon, 99°.⁵; 2 p. m., 104°; 4 p. m., 101°; 6 p. m., 97°; 8 p. m., 95°; average for the twelve hours 97°.⁵. At the State Quarantine office, 8 a. m., 89°; 1 p. m., 100°; 2.30 p. m., 102°; 3 p. m., 97°; average for the seven hours 97°. On the 12th of July, 1879, the temperature at Dr. Blackman's reached a maximum of 101°, the average for the day being 95°.⁵. In warehouses and under tinued sheds in various por-

tions of the city, higher temperatures were recorded. At that time the suffering from heat was very great, 15 deaths being recorded from sunstroke. A large number of horses were stricken down in the streets, and the street railways were compelled to suspend operations during most of the day. Although the hourly record as well as the daily average temperature is higher for July, 1881, still the effect of the heat upon persons and animals appears to have been far less disastrous. A strong southwest wind was blowing nearly all day, which very probably relieved the actual heat of the body by the rapid evaporation of moisture from its surface. During the heated spell of July, 1879, there was a perfect calm for nearly two days. A careful research through all the accessible authorities on the subject of maximum temperatures in Charleston, shows that for 100 years previous to 1738 the thermometer had never reached 98°, and that for 114 years previous to 1752 it had never reached 101°, except in that year. From 1752 up to 1791, the highest point reached was 97°. This gives a clear record from 1638 up to 1791, showing that the highest point reached during that period was 101° in 1752. Franklin, Ohio, 11th, 108° in the shade, great suffering from the heat, but no sunstrokes. Covington, Ky., 11th, 7 fatal cases of sunstroke; 12th, 11 cases, 3 fatal. St. Louis, 11th, 38 cases of sunstroke since the 8th, 23 of which were fatal; 12th, 21 cases, 7 fatal. Lincoln, Ill., 21st, 100° in the shade, no sunstrokes. Decatur, Ia., 21st, 2 sunstrokes, 1 fatal. Springfield, Ill., 21st, several sunstrokes, none fatal. Louisville, Ky., 11th, 7 fatal cases of sunstroke; 12th, 2 fatal. Memphis, Tenn., 12th, 4 fatal cases of sunstroke. Pittsburg, 12th, 7 sunstrokes, 4 fatal. Lafayette, Ind., 12th, 6 fatal cases of sunstroke; hogs and cattle dying from excessive heat. Dayton, Ohio, 11th, 100 cases of sunstroke, 30 of which were fatal; 12th, 5 fatal cases. Shelbyville, Ind., 12th, a. m., 102°; 2 p. m., 106°, hottest for past 36 years; evening, 100°; three fatal sunstrokes. Kankakee, Ill., 12th, one fatal case of sunstroke; hottest weather for many years. Springfield, Ohio, 12th, 12 cases of sunstroke, two fatal. Wilmington, Ohio, 10th to 12th, temperature remained steady from 99° to 101°; hottest in past 40 years; two fatal cases of sunstroke. Portsmouth, Ohio, 12th, 104° to 108°; five cases of sunstroke, one fatal. Lima, Ohio, 12th, eight cases of sunstroke, none fatal; Piqua, Ohio, 12th, 100° in the shade; three cases of sunstroke, one fatal. Logan, Ohio, 12th, 103° in the shade; five cases of sunstroke, two fatal. Zanesville, Ohio, 11th, six cases of sunstroke, none fatal; 12th, five cases, none fatal. Ft. Wayne, Ind., 12th, two cases of sunstroke, one fatal. Rising Sun, Ind., 12th, 102° in the shade; two cases of sunstroke, none fatal. Waynesville, Ohio, 12th, one fatal sunstroke. Paris, Ky., 12th, one fatal sunstroke. Keokuk, Ia., 12th, 100° in the shade; one fatal

Table of Maximum and Minimum Temperatures for July, 1881.

State or Territory.	Signal Service.		U. S. Army Post Surgeons or Voluntary Observers.		State or Territory.	Signal Service.		U. S. Army Post Surgeons or Voluntary Observers		
	Station.	Max.	Min.	Station.		Max.	Min.	Station.	Max.	Min.
Alabama.....	Mobil e.....	101°	69°	Green Springs 103°	Mississippi.....	Vicksburg.....	100°	62°	Pierce City.....	54°
Do.....	Do.....	114°	51°	Auburn.....	Missouri.....	St. Louis.....	104°	62°	Lincoln.....	108°
Arizona.....	Ft. Verde.....	114°	51°	Texas Hill.....	Montana.....	Fort Keogh.....	103°	62°	Do.....	54°
Do.....	Prescott.....	114°	51°	Do.....	Do.....	Ft. Assinabine.....	103°	62°	Hor Springs, Golden	105°
Arkansas.....	Little Rock.....	100°	67°	Mt. Ida.....	Nebraska.....	North Platte.....	104°	58°	do, P. B. and Oreg.	105°
California.....	Visalia.....	104°	64°	Mam'oth Tank 162°	Nevada.....	Winnemucca.....	87°	40°	Carson City.....	38°
Do.....	Campe.....	99°	33°	Do.....	Do.....	Do.....	Do.....	Do.....	Auburn.....	98°
Colorado.....	Denve.....	99°	30°	Ft. Lyon.....	Do.....	Do.....	Do.....	Do.....	Freehold.....	56°
Do.....	Pike's Peak.....	90°	30°	Do.....	N. Hampshire.....	Mt. Washing'n.....	72°	32°	Do.....	45°
Connecticut.....	New London.....	90°	54°	Do.....	New Jersey.....	Barnegat.....	82°	37°	West Point.....	97°
Do.....	New Haven.....	90°	54°	Do.....	Do.....	Atlantic City.....	80°	37°	Johnston.....	43°
Dakota.....	Smithville.....	118°	37°	Do.....	Do.....	La Messilla.....	80°	37°	Weldon.....	102°
Do.....	Rapid City.....	118°	37°	Do.....	New Mexico.....	Do.....	Do.....	High Inds.....	52°	
Delaware.....	Bre.kwater.....	90°	60°	Do.....	Do.....	Santa Fe.....	88°	34°	College Hill.....	108°
Dist. Columbia.....	Washington.....	98°	62°	Do.....	New York.....	Rochester.....	89°	34°	Milton.....	104°
Florida.....	Jacksonville.....	98°	60°	Do.....	Do.....	Oswego.....	90°	34°	Franklin.....	44°
Do.....	Cedar Keys.....	89°	60°	Houston & Mayport 100°	Do.....	Charlotte.....	100°	34°	Fort Adams.....	91°
Do.....	Do.....	89°	60°	Ft. Barrancas.....	Do.....	Smithville.....	100°	34°	Stateburg.....	64°
Georgia.....	Augusta.....	102°	64°	Do.....	Do.....	Columbus.....	100°	34°	Ashwood and	102°
Iowa.....	Des Moines.....	98°	56°	For-yth.....	Do.....	Cincinnati.....	103°	37°	Austin.....	102°
Do.....	Do.....	98°	56°	Ft. Madison & Des Moines.....	Do.....	Cleveland.....	103°	37°	Promontory.....	106°
Do.....	Do.....	98°	56°	Nora Springs.....	Oregon.....	Roseburg.....	91°	47°	Colville.....	39°
Idaho.....	Ft. Lapwai.....	104°	40°	Do.....	Pennsylvania.....	Pittsburg.....	103°	37°	Charlotte.....	89°
Illinois.....	Springfield.....	93°	57°	Swanwick.....	Do.....	Do.....	Do.....	Woodstock.....	49°	
Do.....	Do.....	93°	57°	Riley.....	Rhode Island.....	Newport.....	87°	37°	Wytheville & Snowville.....	50°
Indiana.....	Indianapolis.....	101°	57°	Logansport & Veray 102°	South Carolina.....	Charleston.....	103°	67°	Flemington.....	98°
Do.....	Do.....	101°	57°	Do.....	Tennessee.....	Nashville.....	101°	67°	Helvetia.....	49°
Do.....	Do.....	101°	57°	Logansport.....	Do.....	Knoxville.....	101°	67°	Mission House.....	97°
Do.....	Do.....	101°	57°	Do.....	Texas.....	Eagle Pass.....	112°	39°	Neilsville.....	50°
Indian Ty.....	Fort Sill.....	100°	63°	Yates Center.....	Utah.....	Fort Davis.....	112°	39°	Ft. Bridger.....	32°
Do.....	Fort Gibson.....	100°	63°	Do.....	Do.....	Salt Lake City.....	96°	46°		
Kansas.....	Leavenworth.....	100°	60°	Clay Centre.....	Vermont.....	Burlington.....	90°	50°		
Do.....	Do.....	100°	60°	Do.....	Do.....	Do.....	Do.....			
Kentucky.....	Louisville.....	101°	62°	Williamstown.....	Do.....	Norfolk.....	102°	60°		
Louisiana.....	Shreveport.....	103°	60°	Thornville.....	Virginia.....	Cap. Henry.....	103°	60°		
Maine.....	Portland.....	84°	49°	Do.....	Do.....	Almont.....	103°	60°		
Do.....	Eastport.....	84°	49°	Cornish.....	Washington Ty.....	Colfax and Dayton.....	103°	60°		
Maryland.....	Baltimore.....	96°	65°	Cumberl'd. Owing' Mill's & Edmunds's.....	Do.....	Morgantown.....	88°	35°		
Do.....	Do.....	96°	65°	Somerset.....	West Virginia.....	Do.....	Do.....			
Massachusetts.....	Boston.....	89°	54°	Williamstown.....	Do.....	Do.....	Do.....			
Do.....	Do.....	89°	54°	Thornville.....	Wisconsin.....	La Crosse.....	88°	35°		
Michigan.....	Marquette.....	97°	45°	Do.....	Do.....	Milwaukee.....	88°	35°		
Minnesota.....	Moorhead.....	95°	40°	Do.....	Wyoming.....	Cheyenne.....	100°	45°		
Do.....	St. Vincent.....	95°	40°							

Table of Comparative Maximum Temperatures for the month of July.

State or Territory.	Maximum for July, 1881, Signal Service.		Highest since Signal Service Stations were opened—3 to 10 years.			Highest from any other source.			
	Station.	Temp.	Station.	Year.	Temp.	Place.	Year.	Temp.	Length of Record.
Alabama.....	Mobile.....	101°	Montgomery.....	1877	103°	Huntsville.....	1875	101°	9 years.
Arizona.....	Fort Verde.....	114°	Yuma and Phoenix.....	1879	116°	Wilsonville.....	1879	101°	8 "
Arkansas.....	Little Rock.....	100°	Little Rock.....	1879	100°	Fort Mojave.....	1877	119°	4 "
California.....	Visalia.....	104°	Visalia.....	77, 79	107°	Washington.....	1861	168°	27 "
Colorado.....	Denver.....	99°	Denver.....	1874	102°	Fort Yuma.....	1877	119°	24 "
Connecticut.....	New London.....	86°	New Haven.....	1876	95°	Fort Miller.....	1853	119°	13 "
Dakota.....	Smithville.....	108°	Fort Sully.....	1877	109°	Fort Lyon.....	68, 78	108°	13 "
Delaware.....	Delaware Breakwater.....	90°	Delaware Breakwater.....	1880	91°	New Haven.....	1864	102°	87 "
Dist. of Columbia.....	Washington.....	98°	Washington.....	1879	102°	Fort Sully.....	1871	114°	8 "
Florida.....	Jacksonville.....	99°	Jacksonville.....	75, 77	101°	Fort Delaware.....	1865	101°	74 "
Georgia.....	Augusta.....	101°	Augusta.....	1878	105°	Washington.....	1838	103°	48 "
Iowa.....	Des Moines.....	98°	Dubuque.....	1874	101°	Houston.....	1879	108°	8 "
Idaho.....	Boise City.....	101°	Boise City.....	1877	106°	Fort Barrancas.....	1874	100°	52 "
Illinois.....	Cairo and Springfield.....	99°	Springfield.....	1879	102°	Fort McPherson.....	1878	105°	5 "
Indiana.....	Indianapolis.....	101°	Indianapolis.....	1874	97°	Augusta Arsenal.....	1845	103°	48 "
Indian Territory.....	Fort Sill.....	106°	Fort Gibson.....	1879	109°	Brookside.....	1868	105°	5 "
Kansas.....	Dodge City.....	104°	Dodge City.....	1876	108°	Fort Madison.....	1870	105°	20 "
Kentucky.....	Louisville.....	101°	Louisville.....	1874	102°	Fort Boise.....	1871	113°	14 "
Louisiana.....	Shreveport.....	105°	Shreveport.....	1875	107°	Chicago.....	1868	106°	47 "
Maine.....	Portland.....	84°	Portland.....	1876	97°	Wabash.....	1876	104°	7 "
Maryland.....	Baltimore.....	96°	Baltimore.....	79, 80	99°	Fort Gibson.....	1834	106°	46 "
Massachusetts.....	Boston and Springfield.....	89°	Boston.....	1880	101°	Fort Sill.....	1879	106°	5 "
Michigan.....	Marquette.....	97°	Marquette and Detroit.....	1878	100°	Fort Larned.....	1871	115°	14 "
Minnesota.....	Moorhead.....	95°	Brookridge.....	73, 78	97°	Fort Leavenworth.....	1860	105°	50 "
Mississippi.....	Vicksburg.....	100°	Vicksburg.....	1878	100°	Bennettsville.....	1876	98°	6 "
Missouri.....	St. Louis.....	104°	St. Louis.....	74, 79	100°	Newport Barracks.....	1871	98°	28 "
Montana.....	Fort Keogh.....	109°	Fort Benton.....	1874	100°	Fort Jesup.....	1824	101°	22 "
Nebraska.....	North Platte.....	104°	North Platte.....	1877	107°	Baton Rouge Barracks.....	1877	102°	58 "
Nevada.....	Winnemucca.....	97°	Winnemucca.....	1877	104°	New Orleans.....	1840	100°	61 "
New Hampshire.....	Mount Washington.....	72°	Mount Washington.....	1875	69°	Brunswick.....	1868	108°	33 "
New Jersey.....	Barnegat & Atlantic City.....	92°	Sandy Hook.....	1876	100°	Fort Washington.....	1853	102°	38 "
New Mexico.....	La Mesilla.....	105°	La Mesilla.....	1880	107°	Fort McHenry.....	1879	102°	42 "
New York.....	Oswego and Rochester.....	96°	Oswego.....	1878	100°	Fort Warren.....	1872	100°	12 "
North Carolina.....	Charlotte.....	100°	Wilmington.....	1879	103°	New Bedford.....	1818	96°	68 "
Ohio.....	Columbus & Cincinnati.....	103°	Cincinnati.....	1874	103°	Marquette.....	1862	103°	22 "
Oregon.....	Umatilla.....	106°	Umatilla.....	1880	107°	Monroe.....	1866	103°	11 "
Pennsylvania.....	Pittsburg.....	130°	Pittsburg.....	76, 78	101°	Fort Ripley.....	1871	103°	20 "
Rhode Island.....	Newport.....	87°	Newport.....	1878	92°	Fort Snelling.....	1838	100°	61 "
South Carolina.....	Charleston.....	103°	Charleston.....	1879	104°	Brookhaven.....	1879	102°	5 "
Tennessee.....	Nashville.....	101°	Nashville.....	74, 79	101°	Allenton.....	1868	109°	4 "
Texas.....	Eagle Pass.....	112°	Laredo.....	1879	110°	Jefferson Barracks.....	1860	105°	36 "
Utah.....	Salt Lake City.....	96°	Salt Lake City.....	1877	98°	Fort Shaw.....	1872	112°	13 "
Vermont.....	Burlington.....	90°	Burlington.....	1878	90°	Fort McPherson.....	1870	115°	15 "
Virginia.....	Norfolk.....	102°	Norfolk.....	1876	103°	Fort Kearney.....	1857	102°	20 "
Washington T'y.....	Almota.....	103°	Dayton.....	1880	102°	Camp Halleck.....	1875	110°	18 "
West Virginia.....	Morgantown.....	89°	Morgantown.....	1874	97°	Stratford.....	1868	100°	10 "
Wisconsin.....	La Crosse.....	95°	La Crosse.....	1874	101°	Dunbarton.....	1880	100°	8 "
Wyoming.....	Cheyenne.....	100°	Cheyenne.....	1874	98°	Fort Constitution.....	1850	96°	33 "
						Haddonfield.....	1866	102°	6 "
						Newark.....	1879	99°	35 "
						Fort McRae.....	1873	116°	10 "
						Fort Union.....	1871	101°	30 "
						Poultkeepsie.....	1849	105°	20 "
						Newburg.....	1849	105°	40 "
						Moriches.....	1868	105°	16 "
						Fort Columbus.....	1825	104°	59 "
						Weldon.....	1879	107°	8 "
						Fort Johnson.....	1831	102°	54 "
						Marietta.....	1859	102°	53 "
						College Hill.....	68, 79	99°	67 "
						Fort Dalles.....	1853	105°	16 "
						Carlisle Barracks.....	1868	105°	34 "
						Philadelphia.....	1866	101°	122 "
						Fort Adams.....	1867	102°	39 "
						Charleston.....	1752	101°	243°
						Castellum Springs.....	1875	103°	5 "
						Glenwood Cottage.....	1860	99°	10 "
						Fort Mason.....	1860	114°	9 "
						San Antonio.....	1871	108°	34 "
						Mount Carmel.....	1877	112°	7 "
						Camp Douglas.....	1871	103°	19 "
						Randolph.....	1868	102°	4 "
						Lunenburg.....	1864	97°	19 "
						Nattaway.....	1876	111°	2 "
						Fortress Monroe.....	1837	102°	55 "
						Fort Walla Walla.....	1859	107°	10 "
						Fort Townshend.....	1870	95°	22 "
						Weston.....	1877	98°	3 "
						Embarrass.....	1866	104°	17 "
						Fort Winnebago.....	1838	104°	14 "
						Fort Howard.....	1823	100°	30 "
						Fort Crawford.....	1839	100°	25 "
						Fort Laramie.....	1876	107°	27 "

sunstroke. Madison, Ohio, 12th, one fatal sunstroke. Somerset, Ohio, 12th, six cases of sunstroke, none fatal. Vincennes, Ind., 12th, one fatal sunstroke. Circleville, Ohio, 12th, seven cases of sunstroke, none fatal. Gore, Ohio, 12th, 106° in the shade, hottest ever known, all business suspended. New Albany, Ind., 12th, 102° to 104° from 11 a. m. to 4 p. m.; six cases of sunstroke, three fatal. Burlington, Ia., 12th, 100° in the shade. Muncie, Ind., 11th, 100° to

103° in the shade; six cases of sunstroke, one fatal. Thornton, Ind., 11th, 104° in the shade, highest ever known; no sunstrokes. Charleston, Ind., 11th, 103° in the shade; two cases of sunstroke, one fatal. Connersville, Ind., 11th, 104° in the shade; two cases of sunstroke. Alton, Ill., 11th, one fatal sunstroke. Sidney, Ohio, 11th, 103° in the shade; one fatal sunstroke. Madison, Ind., 11th, one fatal sunstroke. Columbus, Ind., 11th, one fatal sunstroke. Clinton, Ill., 12th, maximum temperature for past 10 days 102° to 108°; hottest ever known, all business suspended; no sunstrokes. Danville, Ill., 102° in the shade; 4 cases of sunstroke, all laborers suspended work; warmest in 15 years. New Castle, Ind., 12th, one fatal sunstroke. Bluffton, Ind., 12th, 104° in the shade; 10 cases of sunstroke, none fatal. Knightstown, Ind., 12th, two cases of sunstroke, none fatal. Peru, Ind., 12th, hottest for many years, no sunstrokes. Tuscola, Ind., 12th, 100° to 105° in the shade, several cases of sunstroke, none fatal. Indianapolis, 9th, 3 cases of sunstroke, 2 fatal; 10th, 104°, 8 cases of sunstroke, 3 fatal; 11th, 100° at 4 p. m., 8 cases of sunstroke, 4 fatal; 12th, 99°, 7 cases of sunstroke, 2 fatal. Southport, Ind., 12th, 1 fatal sunstroke. Wheeling, W. Va., 12th, 1 fatal sunstroke. Chicago, 8th, 12 sunstrokes, 4 fatal. Assumption, Ill., 8th, 1 fatal sunstroke. Paxton, Ill., 8th, 1 fatal sunstroke.

Frost.—Campo, Cal., 1st, light; Crows Nest, Mont., 17th, light, 18th, heavy; Fall River, Mass., 5th, heavy; Carson City, Nev., 3d, light; Coalville, Utah, 8th.

PRECIPITATION.

The general distribution of rain-fall for July, 1881, is shown on chart No. III, from the reports of over 500 stations. From the table in the left hand corner of the chart is obtained a monthly average for each of the various districts, determined from the records (covering a period of many years) of Signal Service stations, and also a comparison of the present month with such averages. Upon examination of the chart and a comparison with the records of July for previous years, it is found that there is a general deficiency over the country east of the 100th meridian, being most marked in Tennessee and the Ohio valley. Within this large area of unusual deficiency for the month, there is a small area of remarkable excess, 4.69 inches, covering the Upper Mississippi valley; there are small excesses in the South Atlantic states and in the Upper Lake and Northern Pacific Coast regions. Although no precipitation was reported during the month throughout California west of the Sierra Nevadas, the condition is normal. Over the Plateau regions and at the Rocky Mountain stations the usual irregularity of distribution prevails. In southeastern Arizona and southern New Mexico an unusually heavy precipitation was recorded for the month.

Deviations from the Average Precipitation for Several Years.—*Illinois:* Anna, this July is the only month during the past 18 years, that has no record of rainfall. *Maine:* Gardiner, monthly rainfall 0.38 inch above the mean for past 45 years. *Missouri:* St. Louis, Missouri Weather Service reports: monthly rainfall, 1.70 inches below the normal. *New York:* North Volney, monthly rainfall, 1.18 inches below the mean for the past 13 years.

Special Heavy Rains.—1st, Wilmington, N. C., 4.48 inches; Smithville, N. C., 2.85; Elsworth, N. C., 2.25, in 1 hour and 15 minutes. 3rd, New Orleans, La., 3.11 in 1 hour and 15 minutes. 4th, San Geronio, Cal., 0.94, in 1 hour and 30 minutes. 6th, Elmira, Ill., 1.23, in 39 minutes. 6th and 7th, Ames, Ia., 4.70. Dubuque, Ia., 2.17, in 2 hours. 9th, El Paso, Tex., 6.50 in 2 hours. 9th and 10th, De Soto, Nebr., 2.80. 10th, Dubuque Ia., 3.32; Logan, Ia., 3.00; Ames, Ia., 4.55; Clear Creek, Nebr., 1.25, in 25 minutes. 11th, Ames, Ia., 5.35; Port Jervis, N.Y., 1.62, in 1 hour and 30 minutes; Elsworth, N. C., 2.00, in 1 hour; Patterson, N. J., 0.50, in 4 minutes. 12th, Ft. Scott, Kan., 3.80; Flemington, W. Va., 2.00, in 2 hours; Detroit, Mich., 2.23 in 1 hour. 13th, Carroll, O., 12.00, in 3 hours, (estimated.) 14th, College Hill, O., 2.50, in 4 hours. 19th, Port Eads, La., 2.96; Omaha, Nebr., 1.00, in 20 minutes. 20th, Mallory Lake, Hillsdale Co., Mich., 0.90, in 10 minutes; Niles, Mich., 3.08; Augusta, Ga., 1.28, in 1 hour and 5 minutes. 20th and 21st, Coldwater, Mich., 3.90. 21st, Madison, Wis., 4.32; Riley, Ill., 2.03, in 45 minutes; La Crosse, Wis., 5.00; Cresco, Ia., 2.18, in 1 hour; Langanore Mills, Bernon Co., Wis., 7.00, in 14 hours. 21st and 22nd, North Lewisburg, O., 4.50; Niles, Mich., 3.60, in 10 hours; Ft. Supply, Ind. Ty., 5.10. 22nd, Columbus, O., 2.24, in 9 hours; Elsworth, N. C., 1.25, in 2 hours and 30 minutes; Helvetia, W. Va., 2.91, in 10 hours; Memphis, Tenn., 0.81, in 20 minutes; Silver City, N. Mex., 2.03, in 1 hour. 24th, Guttenburg, Ia., 0.63, in 30 minutes; La Crosse, Wis., 0.75, in 8 minutes. 25th, Antrim, N. H., 4.33; Ashland, N. H., 3.60; Belmont, N. H., 3.08; Rowe, Mass., 3.00, in 12 hours; Auburn, Ala., 1.05, in 30 minutes. 25th and 26th, Grafton, N. H., 3.40; Lake Village, N. H., 2.89; Weir's Bridge, N. H., 3.74; Bristol, N. H., 4.29; Wolfboro, N. H., 3.00; Williamstown, Mass., 3.75. 26th, Tucson, Ariz., 3.00, in 6 hours and 44 minutes. 27th, Wilmington, N. C., 2.97; Smithville, N. C., 2.81; New Orleans, La., 1.13, in 42 minutes. 28th, Ft. Barrancas, Fla., 1.17, in 30 minutes. 30th, Denver, Colo., 1.10, in 20 minutes. 31st, Atco, N. J., 3.00, in 5 hours; Dyberry, Pa., 1.00, in 15 minutes.

Largest Monthly Rainfalls.—Ames, Ia., 16.31 inches; Wilmington, N. C., 12.40; Cedar Key, 11.86; Smithville, N. C., 10.65; Dubuque, 10.53; Port Eads, 10.44; Mt. Washington, 9.93; Macon,