

South Pacific coast.—From 34° at Los Angeles, California, on the 24th and 30th, to 36° at Yuma, Arizona, on the 16th.

HIGH TEMPERATURES.

Philadelphia, Pennsylvania.—The maximum temperature on the 6th was 95°. Thirteen cases of sunstroke occurred in this city, seven of which number resulted fatally.

Decatur, Illinois.—The temperature rose to 96° in the shade at this place on the 3d. Two cases of sunstroke occurred, neither of which proved fatal.

Cleveland, Ohio.—July 3d was the hottest day of this season; the thermometer rose to 96° in the shade and to 128° in the sun. Several cases of sunstroke occurred.

Vandalia, Illinois.—The thermometer indicated a temperature of 102° in the shade at this place on the 2d. The heat was so oppressive that all out-door work was generally abandoned during a greater part of the day.

Hillsboro', Illinois.—The 2d and 3d were the hottest days of the year at this place. The thermometer registered over 95° in the shade.

FROSTS.

Factoryville, New York.—A light frost occurred at places in the valley on the morning of July 1st, but caused no damage.

Friendship, New York.—A light frost occurred in this locality on the morning of the 1st.

Light frosts occurred on the morning of the 8th at Lansing, Michigan, and at Embarrass, Wisconsin.

Davenport, Iowa.—A light frost occurred here on the morning of the 18th, causing no damage.

Boston, Massachusetts.—A telegram from the Crawford House, White Mountains, New Hampshire, states that a heavy frost occurred there during the night of the 25–26th.

At Wellsborough, Pennsylvania, a light frost occurred on the morning of the 30th; minimum temperature, 45°

On the summit of Mount Washington, New Hampshire, frost occurred on the following dates: 1st, 9th, 10th, 19th, 20th, 21st, 24th, 25th, 26th.

ICE.

The only instance of the formation of ice during July is reported from the Signal-Service station on the summit of Mount Washington, New Hampshire. On the morning of the 1st the thermometer recorded a minimum temperature of 27°, and ice formed to a thickness of nearly one inch.

PRECIPITATION.

[Expressed in inches and hundredths.]

The distribution of rainfall for July, as determined from the reports from more than six hundred stations, is exhibited on chart iv.

In the lake region, New England, the Ohio and upper Mississippi valleys, and over the southern part of the United States from western Texas to Arizona, the monthly rainfall has exceeded the average for July. The excesses are largest in the upper lake region, New England, and in the upper Mississippi valley, where they are 2.06, 1.84, and 1.56, respectively. Deficiencies in the monthly rainfall have occurred in all parts of the country, with the exception of the above-named districts. Marked deficiencies occurred in the Gulf states, and in consequence severe droughts prevailed in some localities. The greatest departures below the average rainfall are, 2.54 in the eastern Gulf states; 1.72 in the western Gulf states; 1.28 in Florida; 1.12 in the northern slope; and 1.07 in the Missouri valley. No rain fell at any of the stations in the Pacific states, except .01 at Roseburg, Oregon, and an inappreciable amount at Los Angeles, California. In the middle and south Atlantic states the rainfall for the month is about three-fourths of an inch below the average for July.

In the first column of the following table is given the average rainfall for July in the various districts for several years; in the second column is given the average of July, 1883; and the third column shows the excess or deficiency of July, 1883, as compared with the average of that month in previous years:

Average precipitation for July, 1883.

Districts.	Average for July. Signal-Service observations.		Comparison of July, 1883, with the average for several years.
	For several years.	For 1883.	
	Inches.	Inches.	Inches.
New England.....	3.92	5.76	1.84 excess.
Middle Atlantic states.....	4.04	3.28	0.76 deficiency.
South Atlantic states.....	5.65	4.92	0.73 deficiency.
Florida peninsula.....	5.77	4.49*	1.28 deficiency.
East Gulf.....	5.04	2.50	2.54 deficiency.
West Gulf.....	4.16	2.44	1.72 deficiency.
Tennessee.....	4.06	3.07	0.99 deficiency.
Ohio valley.....	4.55	5.35	0.80 excess.
Lower lakes.....	3.84	4.51	0.67 excess.
Upper lakes.....	3.36	5.42	2.06 excess.
Extreme northwest.....	2.83	2.44	0.39 deficiency.
Upper Mississippi valley.....	4.02	5.58	1.56 excess.
Missouri valley.....	4.44	3.37	1.07 deficiency.
Northern slope.....	1.94	0.82	1.12 deficiency.
Middle slope.....	2.77	2.57	0.20 deficiency.
Southern slope.....	2.50	3.19	0.69 excess.
Northern plateau.....	1.01	0.00	1.01 deficiency.
Southern plateau.....	2.35	2.50	0.15 excess.
North Pacific coast.....	0.58	0.00	0.58 deficiency.
Middle Pacific coast.....	0.01	0.00	0.01 deficiency.
South Pacific coast.....	0.08	0.15	0.07 excess.
Mount Washington, N. H.....	7.43	11.14	3.71 excess.
Pike's Peak, Col.....	4.89	5.37	0.48 excess.
Salt Lake City, Utah.....	0.68	0.10	0.58 deficiency.

The general distribution of rainfall for the month of July, with the districts of maximum departures from the normal, in each year since 1873, are as follows:

Districts.	Maximum departures.	Year.	Remarks.
Western Gulf.....	+ 4.20	1873...	Excessive over the northern districts from the upper lakes to the New England coast; normal in the south Atlantic and Gulf states; deficient in the Ohio, Mississippi, and Missouri valleys.
Eastern Gulf.....	+ 1.85		
Saint Lawrence valley.....	+ 1.40		
Minnesota.....	+ 3.10		
Upper Mississippi valley.....	- 0.85		
Ohio valley.....	+ 5.60	1874...	Excessive in the Saint Lawrence valley, lower lake region, New England, and in the south Atlantic and Gulf states; deficient in other districts, except normal in the middle Atlantic states.
Missouri valley.....	+ 4.80		
Upper Mississippi valley.....	+ 2.75		
South Atlantic states.....	+ 4.85		
Minnesota.....	+ 4.11		
Eastern Gulf.....	- 3.55	1875...	Large excesses in the upper Mississippi, lower Missouri, and Ohio valleys, and a slight excess in New England; large deficiencies on the Pacific coast, in Minnesota, and in the south Atlantic and Gulf states, slight deficiencies in the lake region and Saint Lawrence valley; normal in the middle Atlantic states. In the Ohio valley the rainfall was nearly three times as great as the normal.
Lower Missouri valley.....	+ 3.35		
Eastern Gulf.....	+ 2.10		
Upper Mississippi valley.....	+ 1.25		
Western Gulf.....	+ 0.90		
Ohio valley and Tennessee.....	- 0.25	1876...	Deficient in the upper Missouri and Ohio valleys, Tennessee, west Gulf states, and on the Pacific coast; excessive in all other districts.
South Atlantic states.....	+ 1.38		
Middle Atlantic states.....	+ 1.28		
Ohio valley.....	+ 3.74		
Saint Lawrence valley.....	- 0.83		
Lower lakes.....	+ 1.08	1877...	Excessive in the middle and south Atlantic states; normal in Minnesota, New England, and on the Pacific coast; deficient in the lake region, and in the Ohio, Saint Lawrence, upper Mississippi, and Missouri valleys.
Tennessee.....	+ 1.83		
Upper Missouri valley.....	+ 1.40		
Eastern Gulf.....	+ 1.36		
Ohio valley.....	- 0.09		
Minnesota.....	+ 3.63	1878...	Deficient in the east Gulf states, Ohio valley, New England, and in California; excessive in all other districts.
Upper Missouri valley.....	+ 3.40		
Eastern Gulf.....	+ 2.46		
Western Gulf.....	+ 1.15		
Ohio valley.....	- 1.09		
Western Gulf.....	+ 2.84	1879...	Deficient in the middle Atlantic and west Gulf states, in the Ohio and lower Missouri valleys, and in California; excessive in all other districts, the departures being very slight in the lower lakes and south Atlantic states.
South Atlantic states.....	+ 1.73		
Middle Atlantic states.....	+ 1.08		
Ohio valley.....	+ 2.71		
Upper Missouri valley.....	- 1.59		
Upper Mississippi valley.....	- 1.58	1880...	Deficient on the Pacific coast, in Florida, Tennessee, Minnesota, and in the upper Missouri and upper Mississippi valleys; normal in the lower lakes and lower Missouri valley; excessive in the upper lakes, Saint Lawrence valley, and in the states bordering on the Atlantic ocean and Gulf of Mexico, except in Florida.
Florida.....	+ 1.82		
South Atlantic states.....	+ 0.77		
Ohio valley.....	- 2.58		
Tennessee.....	- 2.40		
Eastern Gulf.....	- 2.16	1881...	Excessive in the north Pacific coast region, Florida, the south Atlantic states, upper lake region, and upper Mississippi valley, the departures in the two latter districts being very slight; deficient in all other parts of the country, except normal in California.
Middle Atlantic states.....	- 2.05		
Southern slope.....	+ 3.04		
Western Gulf.....	+ 1.95		
South Atlantic states.....	+ 1.73		
Ohio valley.....	+ 1.74	1882...	Excessive in the south Atlantic and Gulf states, southern slope, extreme northwest, and north Pacific coast region, the departures being very small in the last-named district; deficient in all other districts, except normal in California.
Missouri valley.....	- 1.42		
Lower lakes.....	- 1.34		

Table of Excessive, Greatest, and Least Monthly Rainfalls.

Station.	Specially heavy.			Largest monthly.	Smallest monthly.	
	Date.	Amt.	Duration	Amount.	Station.	Amt.
<i>Arkansas.</i>						
Lead Hill.....	8	2.15		11.60	Yuma.....	1.00
Do.....	14	4.68	14 hours		Phoenix.....	0.07
Mount Ida.....	31	2.75	1 hr. 30 m.		<i>California.</i>	
Fort Smith.....	14	2.01			Alta.....	0.00
<i>Connecticut.</i>						
New London.....	15, 16	2.06	9 hours	7.84	Alcatraz Island.....	0.00
Do.....	28, 29	2.10	10 hours		Anaheim.....	0.00
New Haven.....	28	3.62	8 hours		Angel Island.....	0.00
<i>Dakota.</i>						
Huron.....	6, 6	2.21			Antioch.....	0.00
Fort Randall.....	29	2.30			Auburn.....	0.00
<i>Florida.</i>						
Live Oak.....				7.85	Benicia Barracks.....	0.00
Jacksonville.....				6.88	Borden.....	0.00
Archer.....	20	2.02	1 hour	6.55	Brentwood.....	0.00
Saint Augustine.....	18	2.80			Brighton.....	0.00
<i>Georgia.</i>						
Brunswick.....	26	2.00		7.77	Caliente.....	0.00
Savannah.....	1	1.61	2 hours		Callistoga.....	0.00
<i>Illinois.</i>						
Cairo.....	12	2.02		9.75	Cape Mendocino.....	0.00
Mattoon.....	7	2.45			Chico.....	0.00
Springfield.....	16	1.35	1 hr. 30 m.		Cisco.....	0.00
<i>Indiana.</i>						
Miami.....				7.72	Colton.....	0.00
Greencastle.....	12	2.24		6.18	Davis.....	0.00
Kokomo.....	23	2.60		6.11	Dunnigan.....	0.00
Indianapolis.....				6.12	Emigrant Gap.....	0.00
Mitchell.....	8	2.00			Farmington.....	0.00
La Porte.....	23	2.00			Fort Gaston.....	0.00
<i>Iowa.</i>						
Creco.....	20	4.92		12.70	Fresno.....	0.00
Do.....	23	3.19		6.18	Galt.....	0.00
Monticello.....	14	2.84		6.11	Gilroy.....	0.00
Do.....	23	2.11		6.12	Goshen.....	0.00
Guttenburg.....	16	2.37		10.01	Hollister.....	0.00
Do.....	23	3.58			Indio.....	0.00
Dubuque.....	4	2.13		7.90	Keen.....	0.00
Do.....	23	2.31			Kingsbury.....	0.00
Fort Madison.....	10	2.40		7.90	Knight's Landing.....	0.00
Independence.....				7.52	Lathrop.....	0.00
Ames.....	4	4.54		6.30	Lemoore.....	0.00
Humboldt.....	22, 23	2.12	12 hours	6.12	Livermore.....	0.00
<i>Kansas.</i>						
Elk Falls.....	7	2.00		8.50	Marysville.....	0.00
Do.....	27	2.50			Merced.....	0.00
South Haven.....				7.37	Modesto.....	0.00
Wellington.....	26	2.10		6.64	Mojave.....	0.00
Oxford.....				6.64	Monterey.....	0.00
Topeka.....	10	2.93		6.52	Napa.....	0.00
Belle Plaine.....				6.20	Newhall.....	0.00
Clay Centre.....	29, 30	2.07			Niles.....	0.00
Fort Scott.....	26, 27	2.12			Oakland.....	0.00
Independence.....	13, 14	2.67	18 hours		Oakwood.....	0.00
Leavenworth.....	30	2.03			Orland.....	0.00
Pretty Prairie.....	26, 27	2.33			Pejaro.....	0.00
<i>Kentucky.</i>						
Louisville.....	16	2.00			Petaluma.....	0.00
<i>Louisiana.</i>						
New Orleans.....	9	1.25	1 hr. 10 m.		Pleasanton.....	0.00
<i>Maine.</i>						
Eastport.....	14	5.24	10 hours	9.07	Princeton.....	0.00
Orono.....				6.90	Ravenna.....	0.00
Cornish.....				6.21	Red Bluff.....	0.00
<i>Massachusetts.</i>						
New Bedford.....	28, 29	4.83	16 h. 30 m.	6.92	Reading.....	0.00
Provincetown.....	28, 29	3.59			Rocklin.....	0.00
<i>Michigan.</i>						
Lansing.....	21	3.43		10.12	Sacramento.....	0.00
Grand Haven.....	20, 21	3.65		7.96	Salinas City.....	0.00
Northport.....	6, 7	2.35		7.60	San Fernando.....	0.00
Do.....	27	2.25			San Francisco.....	0.00
Ionia.....				7.44	San Jose.....	0.00
Traverse City.....				6.52	San Mateo.....	0.00
Thornville.....				6.52	Santa Cruz.....	0.00
Fort Brady.....	10, 11, 12	4.20		6.02	Suisun.....	0.00
<i>Minnesota.</i>						
Northfield.....				6.73	Soldad.....	0.00
Fort Snelling.....	5, 6	2.50	19 h. 30 m.		South Vallejo.....	0.00
Minneapolis.....	6	2.65			Summer.....	0.00
Saint Paul.....	6	2.32			Stockton.....	0.00
<i>Missouri.</i>						
Carthage.....				12.18	Tehachapi.....	0.00
Pierce City.....	14	5.00	18 hours	9.30	Tehama.....	0.00
Do.....	19	2.10	1 hour		Tracy.....	0.00
Greenfield.....				9.00	Tulare.....	0.00
Sedalia.....				7.83	Turlock.....	0.00
Lamar.....				7.55	Williams.....	0.00
Shelbina.....				7.15	Willows.....	0.00
Pleasant Hill.....				7.05	Woodland.....	0.00
Miami.....				6.88	Fort Bidwell.....	1.00
Lexington.....				6.86	Los Angeles.....	1.00
Macon.....				6.68	<i>Idaho.</i>	
<i>New Hampshire.</i>						
Mount Washington.....	4, 5	3.58		11.14	Coeur d'Alene.....	0.00
New Market.....	4, 5	3.66		7.29	<i>Louisiana.</i>	
Wolfsboro.....				6.92	Shreveport.....	0.22
Woodstock.....				6.30	<i>Montana.</i>	
Antrim.....	15	3.00			Fort Shaw.....	0.15
<i>New York.</i>						
Menand Station.....	12, 13	2.87		6.78	Fort Assiniboine.....	0.24
Humphrey.....				6.69	Helena.....	0.32
Port Jervis.....				6.47	Fort Ellis.....	0.41
<i>North Carolina.</i>						
Sloop Point.....	25	2.87		10.09	<i>Nevada.</i>	

Table of Excessive, Greatest, and Least Monthly Rainfalls.—Continued.

Station.	Specially heavy.			Largest monthly.	Smallest monthly.	
	Date.	Amt.	Duration.	Amount.	Station.	Amt.
<i>North Carolina.—Cont'd.</i>						
Goldboro.....				7.43	<i>Nevada.—Continued.</i>	
Fort Macon.....	18	2.39		6.71	Battle Mountain.....	1.00
Portsmouth.....	9, 10	3.66		6.41	<i>North Carolina.</i>	
Hatteras.....	9, 10	2.63		6.20	Brevard.....	0.10
Do.....	10	1.60	1 hr. 10 m.		<i>Oregon.</i>	
Charlotte.....	5	1.43	1 hr. 30 m.		Albany.....	0.00
Do.....	24, 25	2.23			Eola.....	0.00
Lenoir.....	28	2.50	1 hr. 5 m.		Portland.....	0.00
<i>Pennsylvania.</i>						
Wellsborough.....				10.24	Roseburg.....	0.01
Franklin.....				7.17	<i>Utah.</i>	
Wilkesbarre.....				7.08	Ogden.....	1.00
Blooming Grove.....				6.10	Salt Lake City.....	0.10
Granplan Hills.....	8	1.90		6.05	Terrace.....	0.15
<i>Rhode Island.</i>						
Narragansett Pier.....				6.09	Blue Creek.....	0.13
<i>South Carolina.</i>						
Charleston.....	9, 10	2.41		8.93	Kelton.....	0.50
Do.....	3d, 31	2.77			<i>Virginia.</i>	
<i>Tennessee.</i>						
Ashwood.....				7.30	Lynchburg.....	0.19
Gadsden.....				6.99	<i>Washington.</i>	
Dyersburg.....				6.45	Fort Canby.....	0.00
Bolivar.....				6.44	Dayton.....	0.00
Milan.....	30	2.16			Fort Spokane.....	0.00
<i>Texas.</i>						
Brownsville.....	1	2.34			<i>Wyoming.</i>	
Fort Stockton.....	8	2.34			Fort Bridger.....	0.16
Fort Concho.....	7	2.21				
<i>Vermont.</i>						
Strafford.....				6.00		
<i>Virginia.</i>						
Cape Henry.....	17	1.50	1 hr. 45 m.			
<i>West Virginia.</i>						
Helvetia.....	24	2.16		7.84		
<i>Wisconsin.</i>						
Manitowoc.....	21	3.41		13.68		
Ripon.....	23	3.34		12.59		
La Crosse.....	20	2.60	2 hr. 30 m.	11.03		
Do.....	22, 23	4.65				
Madison.....	21	2.05		8.99		
Sussex.....				8.78		
Nellisville.....	20, 21	3.80		8.40		
Embarrass.....	3	2.20		7.80		
Milwaukee.....				7.13		

DEVIATIONS FROM AVERAGE PRECIPITATION.

The departures exhibited by the reports from the regular Signal-Service stations are shown in the table of average precipitation for July, 1883. Voluntary observers report the following notes in connection with this subject:

Illinois.—Anna, Union county: monthly rainfall, 2.86, is 1.69 below the July average of the last eight years. The largest July rainfall of that period, 11.09, occurred in 1875; in July, 1881, no rain fell during the entire month.

Riley, McHenry county: monthly rainfall, 2.94, is 1.14 below the July average of the last twenty-two years.

Indiana.—Vevay, Switzerland county: monthly rainfall, 4.83, is 0.68 above the July average of the last eight years.

Wabash, Wabash county: monthly rainfall, 5.08, is 1.64 above the July average of the last seven years.

Kansas.—Yates Centre, Woodson county: monthly rainfall, 3.12, is 0.52 below the July average of the last three years.

Manhattan, Riley county: monthly rainfall, 4.15, is 0.51 below the July average of twenty-four years.

Lawrence, Douglas county: monthly rainfall, 7.23, is 2.94 above the July average of sixteen years, and with but one exception [7.30 in 1871] is the largest July precipitation of that period; the smallest July rainfall, 1.19, occurred in 1874.

Wellington, Sumner county: monthly rainfall, 6.64, is 2.87 above the July average of the last four years, and is the largest July rainfall of that period; the smallest, 2.52, occurred in 1879. The total rainfall for the first seven months of 1883 is 25.81, or an excess of 7.60 over the average of the same months in the four preceding years.

Maine.—Gardiner, Kennebec county: monthly rainfall, 3.49, is 0.13 above the July average of the last forty-seven years.

New Hampshire.—Antrim, Hillsborough county: monthly rainfall, 5.55, is 0.77 above the July average of a period of ten years.

Grafton, Grafton county: monthly rainfall, 4.81, is 0.63 above the July average of the last five years.

New York.—Palermo, Oswego county: monthly rainfall, 3.17, is 0.16 above the July average of the last thirty years. The largest July rainfall of that period, 6.60, occurred in 1874; the smallest, 0.62, occurred in 1882.

North Volney, Oswego county: monthly rainfall, 3.95, is 0.24 above the July average of the last twelve years.

Ohio.—Wauseon, Fulton county: monthly rainfall, 6.44, is 2.08 above the July average of the last eleven years. The largest monthly rainfall of that period, 7.26, occurred in 1872; the smallest, 1.60, occurred in 1875.

Pennsylvania.—Dyberry county: monthly rainfall, 5.02, is 0.02 above the July average of the last twelve years. The largest monthly rainfall of that period, 7.68, occurred in 1871; the smallest, 2.71, occurred in 1869.

Texas.—New Ulm, Austin county: monthly rainfall, 1.22, is 3.75 below the July average of the last twelve years. The largest July rainfall of that period, 14.38, occurred in 1873; the smallest, 0.90, occurred in 1872.

Vermont.—Woodstock, Windsor county: monthly rainfall, 5.56, is 1.47 above the July average of the last fifteen years. The largest July rainfall of that period, 7.61, occurred in 1873; the smallest, 1.76, occurred in 1869.

Virginia.—Variety Mills, Nelson county: monthly rainfall, 1.68, is 1.78 below the average of five years.

West Virginia.—Helvetia, Randolph county: monthly rainfall, 7.84, is 0.57 above the average of seven years.

Wisconsin.—Manitowoc, Manitowoc county: the general average rainfall for all months of the year at this station, as determined from a record covering a period of twenty years, is 3.16. The rainfall for July, 1883, (13.68,) exceeds the general average by 10.52, and is 4.87 greater than has been previously recorded in any one month of the record, the next largest being 8.81 for September, 1881.

HAIL.

Arkansas.—Hot Springs, Garland county: the hail storm of the 18th caused great damage to the grape crops at points south of this place. It is estimated that about one-third of the crops was destroyed.

Colorado.—Fort Collins, Larimer county: a destructive hail storm passed over this county on the afternoon of the 3d, the hailstones covering the ground, in some places, to a depth of five inches. Growing crops in the track of the storm were totally destroyed. The losses are estimated at \$30,000.

Dakota.—Morrison, Davidson county: a destructive hail storm occurred on the 8th, beginning at a point about twenty miles south of this place and pursuing a southerly course for about thirty miles. The width of the storm's path averaged about two and one-half miles, within which all crops were destroyed. All window-glass on the north and east sides of buildings was broken, and much poultry was killed. The greatest damage was done in the vicinity of Scotland, a station on the Running Water Branch of the Chicago, Milwaukee, and Saint Paul railroad.

Huron: from 3.20 to 3.40 p. m. of the 8th small hail fell at this station. At a point two and one-half miles south the hailstones were as large as walnuts and fell to a considerable depth. On Pearl creek (thirteen miles southeast) the storm was very severe, and caused a great deal of damage to the crops in that locality. It appears that the path of this storm was not more than two and one-half miles wide; its course was from northwest to southeast. A hail storm of considerable severity also occurred at Huron on the 18th. On the 23d, at Lake Byron, eighteen miles northeast of this place, a violent hail storm occurred. The hailstones were remarkably large, and were found to be mixed with sand. Prairie chickens and other birds in the path of the storm were killed. Thousands of acres of grain were destroyed. A number of hailstones were brought a distance of ten miles to this city, and after having been exposed to the heat for one hour, were found to measure two and one-half inches in diameter.

Redfield, Spink county: at 6 a. m. of the 23d, a destructive

hail storm passed over this place, lasting about thirty minutes and doing much damage to the crops.

Fort Buford: between 5 and 6 p. m. of the 11th hail fell for about twenty minutes, causing slight damage to the post garden.

Illinois.—Macomb, McDonough county: at 10.15 p. m. of the 12th the heaviest hail storm occurred that has been known at this place for many years. The storm came from the northwest, its path varying from three to eight miles in width. All unharvested grain within the track of the storm was completely ruined, and more than half the apple crop was beaten from the trees; the grape crop was entirely ruined.

Galesburg, Knox county: between 9 and 10 p. m. of the 13th a hail storm of unusual severity passed over this city; nearly every window of northern exposure in the city was broken by the hailstones, which were very large. Corn, oats, and wheat in this vicinity were badly damaged.

Havana, Mason county: at 11 p. m. of the 13th a terrific rain and hail storm visited this region. Hailstones of unusually large size fell, causing great damage to wheat, oats, and corn. Windows were broken, fowls killed, and stock injured by the hailstones. The storm passed from north to southeast, and its path was about two miles in width.

The following extract is taken from the "Chicago Inter-Ocean" of July 14, 1883:

Vessel and tug masters who were twenty to thirty miles northeast of Chicago on the lake at 6 o'clock Thursday evening, July 12th, report a most remarkable occurrence. They say that there was heavy thunder and lightning out of a clear sky, and that for half an hour there was a shower of hail or ice, such as they never before witnessed or heard of. At first it was ordinary hail, but the "stones" speedily grew in size, and came pelting down in great nuggets as large as geese eggs. One lump of ice that struck and remained on the tug Mary McLane's deck was as large as a brick, and weighed fully two pounds. This huge missile made a deep dent in the deck when it struck, and the deckhand narrowly escaped it. It was put in the cook's refrigerator and kept until last evening, and was shown to numerous curious people.

When the captains who encountered this remarkable storm outside were told that there was no hail storm ashore here Thursday evening they were incredulous and refused to believe it. At about 6 o'clock Thursday evening there was heavy thunder here which came out of a clear sky, but no lightning, rain, or hail. The weather Thursday night was cold enough for November, as it was also last night. It is certainly a most remarkable season.

Urbana, Champaign county: reports from points fourteen miles northwest of here, state that a destructive hail storm visited that locality on the 16th. It is stated that the hailstones were as large as bricks, many of them measuring twelve inches in circumference and that they broke through the roofs and weather-boarding of houses.

Iowa.—Davenport: a violent hail storm occurred in the northern part of this (Scott) county on the night of the 12-13th. The fall of hail is said to have been the heaviest ever known in this part of the country. The track of the storm was from three to four miles wide, and about ten miles in length. Along the course of the storm, the fields of grain were beaten to the ground, and the corn was entirely stripped of its blades. The damage to crops and other property in this county is estimated at \$15,000. Some of the hailstones were as large as English walnuts and fell to depths of from three to five inches, and remained on the ground until the following morning.

Roseberry: a heavy wind and hail storm passed over this section at about 1.30 p. m. of the 13th, lasting one hour. Great damage was done to growing crops, the corn being cut to pieces. Several houses and barns near here were blown down.

Sidney, Fremont county: this section was visited by a terrific wind, rain, and hail storm at about noon of the 13th. Reports from all points within a radius of from ten to twelve miles of this place state that the growing corn and fields of grain were almost entirely destroyed. All windows of north-western exposure were broken, and stock was injured to some extent by the hailstones.

Dubuque: a destructive wind and hail storm occurred at this place on the 20th. Outbuildings and trees were blown down, and the corn and grain crops within the path of the storm were

ruined. The hail-belt was about one half of a mile in width, and extended from northwest to southeast.

Minnesota.—Lake Benton, Lincoln county: the hail storm of the evening of the 19th was one of the severest that has ever visited this section. A number of farmers in this locality sustained heavy losses, their crops being badly damaged, and in some instances fields of grain were entirely destroyed.

Nebraska.—Johnson, Nemaha county: at 12.30 p. m. of the 13th a very destructive hail storm occurred in this county. The path of the storm was about two miles in width and seven miles in length. The damage to crops in this locality is estimated at \$20,000. The hailstones varied from one-eighth to three-fourths of an inch in diameter, were very hard and of irregular shapes.

Louisville, Cass county: a very severe hail storm occurred at this place on the 13th. Window-glass was broken in nearly every house in the town. Crops in the locality were completely ruined.

Austin, Sherman county: hail storms occurred at this place on the 11th and 15th, causing damage to crops.

New Jersey.—Ocean Beach: a severe hail and wind storm passed over this place during the night of 12th–13th, breaking many windows and causing other damage. A large barn was demolished and several buildings were unroofed.

New York.—Albany: a severe hail storm passed over this place during the night of the 12–13th, doing great damage to crops and fruit trees, and breaking many windows.

Pennsylvania.—Lancaster, Lancaster county: reports from various parts of this county show that the hail storm of the night of the 28th–29th destroyed more than 1,000 acres of growing tobacco.

Wisconsin.—Eau Claire, Eau Claire county: a severe hail and thunder storm occurred in this vicinity on the afternoon of the 3d, doing great damage to buildings, crops, etc. The storm was especially severe in the vicinity of New Chicago and Mondovi; at the latter place five barns were destroyed.

Hail storms of less severity occurred in the various states and territories as follows:

- Arizona.**—Fort Bowie, 26th; Fort Grant, 31st.
- Arkansas.**—Little Rock, 4th and 8th.
- Colorado.**—Fort Lewis, 3d; Pike's Peak, 4th; Fort Garland, 21st.
- Dakota.**—Fort Yates, 10th and 15th; Yankton, 15th; Deadwood, 22d; Bismarck, 23d.
- Georgia.**—Atlanta, 24th; Brunswick, 26th.
- Illinois.**—Morrison, 11th; Riley, 21st.
- Indiana.**—Logansport, 4th; Indianapolis, 12th.
- Iowa.**—Independence, 12th; Cresco, 15th and 18th; Monticello and Davenport, 20th.
- Kansas.**—Topeka, 10th.
- Maine.**—Gardiner, 31st.
- Michigan.**—Thornville, 3d; Swartz Creek, 4th; Fort Brady, 11th; Ionia, 16th; Lansing, 21st.
- Montana.**—Fort Keogh, 6th.
- Nebraska.**—Marquette, 12th; Genoa, Fremont, and Red Willow, 13th.
- New Hampshire.**—Grafton, 4th; New Market, 4th and 5th; Mount Washington, 29th, 30th, and 31st.
- New Mexico.**—Fort Cummings, 12th; Fort Union, 15th; Fort Wingate, 18th.
- New York.**—Factoryville, 2d and 3d; Menand station (near Albany), 12th.
- North Carolina.**—Lenoir, 28th.
- Pennsylvania.**—Wellsboro', 2d; Leetsdale and Grampian Hills, 23d.
- Tennessee.**—Austin, 2d; Nashville, 3d and 24th.
- Wisconsin.**—Ripon, 2d; Sussex, 16th; Neillsville, 21st; Beloit, 22d.

SNOW.

Snow fell on the summit of Pike's Peak, Colorado, on the following dates: 4th, from 6th to 9th, 13th, 14th, 15th, 27th. The

total depth of snowfall for the month was about twenty-three inches, of which amount more than eighteen inches fell during the snow storm of the 6th and 7th. At the end of the month the snow had not entirely disappeared from the ground.

The "Lancaster (New Hampshire) Republican," of August 1st, states that, during last week, Colebrook (Coos county) was visited by quite a heavy hail and snow storm. The area over which the storm prevailed was only about one mile in width, and two miles in length. Snow fell to a depth averaging nearly six inches.

SLEET.

Sleet fell on the summit of Pike's Peak, Colorado, on the 4th, 5th, 9th, and 24th.

Table of rainy and cloudy days, relative humidity, and dew-point for July, 1883.

Districts.	Rainy days.		Cloudy days.		Rel. humidity.*		Dew-point.	
	From	To	From	To	From	To	From	To
	Percentages.							
New England.....	8	14	1	5	70.8	82.2	52.9	63.9
Middle Atlantic states.....	6	18	1	6	60.2	81.7	59.1	69.3
South Atlantic states.....	8	18	1	12	60.8	81.5	63.8	76.7
Florida peninsula.....	10	15	1	4	69.4	73.9	73.0	74.4
East Gulf.....	9	15	0	2	65.1	76.0	68.3	73.5
West Gulf.....	4	14	1	5	66.4	78.7	69.9	74.6
Tennessee.....	14	18	2	8	63.6	75.9	63.8	69.2
Ohio valley.....	11	15	4	6	64.0	70.7	60.1	65.1
Lower lakes.....	13	23	3	9	66.9	75.9	58.3	61.3
Upper lakes.....	11	21	5	9	65.4	80.3	50.9	60.2
Extreme northwest.....	10	14	3	4	60.9	75.0	50.1	55.3
Upper Mississippi valley.....	11	17	4	10	67.2	71.5	59.0	63.3
Missouri valley.....	11	14	4	7	66.1	75.8	56.9	64.6
Northern slope.....	3	12	0	5	38.5	64.5	35.6	58.6
Middle slope.....	5	15	5	9	41.3	59.1	45.6	59.7
Southern slope.....	3	9	2	5	61.6	63.8	59.9	62.9
Southern plateau.....	2	21	0	7	45.9	60.4	52.2	56.7
Northern plateau.....	0	1	none	none	33.4	43.8	42.2	45.1
North Pacific.....	0	3	From 0	1	55.0	62.2	48.4	52.7
Middle Pacific.....	none	none	0	7	33.1	90.4	49.1	56.3
South Pacific.....	From 1	6	0	1	51.0	72.8	59.3	69.5
Mt. Washington, N. H.....	Fourteen	Fourteen	Four	Four	70.8		59.2	
Pike's Peak, Col.....	Nineteen	Nineteen	One	One	71.7		29.8	
Salt Lake City, Utah.....	Six	Six	Two	Two	31.7		42.1	

* Relative humidity corrected for altitude.

COTTON REGION REPORTS.

Temperature and rainfall observations were continued during the month of July, 1883. The averages for the various districts are determined from observations taken at the stations, as shown on chart vi., issued with the REVIEW for April, 1882. For the purpose of comparison, the averages for July, 1883, with the departures, are also given in table below.

It will be seen from this table, that the rainfall for July, 1883, when compared with that of July, 1882, shows large deficiencies in nearly all districts. The means of the maximum temperatures have been higher in all districts, except for the district of Galveston, where there is no change; and the means of the minimum temperatures have also been higher in all districts, except for the district of Little Rock, where it is 1°.5 lower.

Meteorological Record of the Cotton Districts for the months of July, in 1882 and 1883.

Districts.	Rainfall in inches.			Temperatures.						Extremes for July, 1883.	
				Mean of the maxima.		Change.	Mean of the minima.		Change.		
	1882.	1883.	Deficiency.	1882.	1883.		1882.	1883.		Max.	Min.
New Orleans.....	8.30	3.30	— 5.00	90.4	93.2	+ 2.8	71.3	74.4	+ 3.1	104	62
Savannah.....	6.21	3.42	— 2.79	91.0	95.7	+ 4.7	70.3	72.7	+ 2.4	107	55
Charleston.....	7.28	4.40	— 2.88	90.9	94.6	+ 3.7	68.0	72.1	+ 4.1	104	53
Atlanta.....	5.45	1.24	— 4.21	87.9	93.2	+ 5.3	67.6	69.4	+ 1.8	102	47
Wilmington.....	4.90	3.16	— 1.74	90.2	93.2	+ 3.0	67.7	70.2	+ 2.5	105	60
Memphis.....	5.45	4.00	— 1.45	88.0	91.4	+ 3.4	67.1	68.3	+ 1.2	101	57
Galveston.....	3.74	2.15	— 1.59	94.0	94.0	0.0	71.3	73.7	+ 2.4	104	50
Yicksburg.....	10.30	3.48	— 6.82	89.4	92.2	+ 2.8	69.0	72.3	+ 3.3	99	61
Montgomery.....	5.18	1.65	— 3.53	88.6	95.3	+ 6.7	67.1	69.8	+ 2.7	101	53
Augusta.....	4.93	1.94	— 2.99	90.0	94.5	+ 4.5	69.2	72.7	+ 3.5	107	58
Little Rock.....	3.08	2.39	— 0.69	89.2	94.2	+ 5.0	66.0	64.9	— 1.5	101	49
Mobile.....	6.06	1.37	— 4.69	90.5	97.4	+ 6.9	68.7	71.0	+ 2.3	107	59

WINDS.

The prevailing directions of the wind for the month of July, 1883, are shown on chart iii., by arrows flying with the wind. East of the Mississippi river the prevailing winds were, with the