

Middle Atlantic states.—1st to 31st.
South Atlantic states.—1st to 13th, 15th to 20th, 22d, 25th to 28th, 31st.
Florida Peninsula.—2d, 3d, 4th, 11th, 12th, 14th to 18th, 20th, 21st, 25th.
East Gulf states.—1st to 4th, 6th, 10th, 11th, 12th, 16th, 18th, 19th, 24th, 25th, 27th.
West Gulf states.—1st to 12th, 14th, 15th, 18th, 19th, 24th, 26th, 27th, 29th.
Rio Grande Valley.—Rio Grande City, Texas, 2d, 3d, 5th, 10th; Brownsville, 10th.
Tennessee.—1st to 12th, 14th, 15th, 17th, 18th, 19th, 23d, 24th, 26th, 27th, 29th, 30th, 31st.
Ohio Valley.—1st to 21st, 24th to 31st.
Lower lake region.—1st to 22d, 24th to 31st.
Upper lake region.—1st to 31st.
Extreme northwest.—1st to 31st.
Upper Mississippi valley.—1st to 31st.
Missouri Valley.—1st to 31st.
Northern slope.—1st to 31st.
Middle slope.—1st to 31st.
Southern slope.—1st to 12th, 15th to 29th.
Southern plateau.—1st to 31st.
Middle plateau.—1st to 31st.
Northern plateau.—1st to 31st.
North Pacific coast region.—1st to 11th, 15th, 16th, 17th, 19th, 20th, 23d to 28th, 30th, 31st.
Middle Pacific coast region.—1st, 3d, 4th, 5th, 7th to 11th, 16th, 17th, 22d to 31st.
South Pacific coast region.—7th, 9th to 12th, 15th, 21st, 23d to 30th.

ICE.

Ice formed on calm water in the southern districts of the country on the following dates:
Alabama.—Livingston, 3d.
Arizona.—Yuma, 10th, 11th, 12th; Maricopa, 12th.
California.—Sacramento, 9th, 10th, 11th, 17th, 26th, 28th, 29th; San Diego, 11th.
Florida.—Jacksonville, 2d, 3d, 4th, 19th; Sanford, 2d, 3d, 19th; Pensacola, 2d, 18th; Archer, 2d, 3d, 4th, 11th; Duke, 3d.
Georgia.—Quitman, 2d, 3d, 4th; Savannah, 11th, 19th.
Louisiana.—Shreveport, 1st, 2d, 5th, 9th, 10th, 12th.
North Carolina.—Smithville, 3d, 4th, 5th, 11th, 18th, 19th.
South Carolina.—Spartanburg, 1st to 4th, 10th, 18th; Stateburg, 2d to 12th, 18th, 19th, 20th, 27th; Charleston, 3d, 18th, 19th.
Texas.—San Antonio, 1st, 2d, 3d; Corsicana, 1st to 8th, 10th, 11th, 12th, 17th, 18th, 19th, 23d, 24th, 26th, 30th; Palestine, 5th; Rio Grande City, 10th.

PRECIPITATION.

[Expressed in inches and hundredths.]

The distribution of rainfall over the United States and Canada for January, 1887, as determined from the reports of about six hundred stations, is exhibited on chart iii, and in the table of miscellaneous data are given, for Signal Service stations, the total precipitation, with the departures from the normal. With the exception of the eastern half of Georgia and the southern half of South Carolina, the precipitation of the month is below the normal in all parts of the country lying south of the fortieth parallel; it is also deficient in northern Idaho, northern Montana, Nebraska, Iowa, and northern Michigan. The departures are quite large in the south Atlantic and Gulf states; in the latter district the deficiency averages over two inches; the deficiency is also large in the Ohio Valley and Tennessee, the departures averaging over one inch below the normal. The rainfall of the month in California is very small for the season; in the northern and central parts of the state it is only about one-fourth and in the southern part only one twenty-second of the normal; reports from various parts of the state indicate that the lack of rain is already beginning to injure the grain and other crops. In New England, Canada, the Lake region, Minnesota, Dakota, and in the northern

Pacific coast region the precipitation of the month is in excess of the normal; the departures are especially large along the coast of Washington Territory and Oregon, also in eastern Maine and the Canadian Maritime Provinces.

DEVIATIONS FROM AVERAGE PRECIPITATION.

The following table shows, for certain stations, as reported by voluntary observers, the average precipitation for the month of January for a series of years, the precipitation for January 1887, and the departures from the average:

Station.	County.	Average precipitation for Jan.	Number of years.	Precipitation for Jan., 1887.	Departure.
<i>Arkansas.</i>					
Lead Hill	Boone	2.60	5	1.33	- 1.27
<i>California.</i>					
Sacramento	Sacramento	4.18	21	1.07	- 3.11
<i>Connecticut.</i>					
Canton *	Hartford	3.60	25	5.87	+ 2.27
Hartford *	Hartford	3.96	15	5.92	+ 1.96
Middletown *	Middlesex	4.16	29	7.07	+ 2.91
New Haven *	New Haven	4.18	15	4.24	+ 0.06
Wallingford *	New Haven	4.38	29	5.71	+ 1.33
<i>Dakota.</i>					
Webster	Day	1.58	4	4.55	+ 2.97
<i>Illinois.</i>					
Collinsville	Madison	1.79	5	0.60	- 1.19
Mattoon	Coles	2.66	7	1.30	- 1.36
Peoria	Peoria	1.62	31	1.10	- 0.52
Riley	McHenry	1.82	25	3.59	+ 1.77
Sycamore	De Kalb	2.48	6	3.93	+ 1.45
<i>Indiana.</i>					
Lafayette	Tippecanoe	2.91	8	1.18	- 1.73
Logansport	Cass	1.71	33	2.85	+ 1.14
Vevay	Switzerland	4.11	21	4.18	+ 0.07
<i>Iowa.</i>					
Cresco	Howard	1.30	15	0.73	- 0.57
Monticello	Jones	1.65	34	2.39	+ 0.74
<i>Kansas.</i>					
Independence	Montgomery	1.40	15	0.79	- 0.61
Wellington	Sumner	0.71	9	0.48	- 0.23
<i>Louisiana.</i>					
Grand Coteau	Saint Landry	9.42	4	2.57	- 6.85
<i>Maine.</i>					
Gardiner *	Kennebec	3.47	49	7.32	+ 3.85
Orono *	Penobscot	3.90	19	7.56	+ 3.66
<i>Maryland.</i>					
Cumberland	Alleghany	2.09	15	0.30	- 1.79
Falleton	Harford	3.83	16	2.72	- 1.11
<i>Massachusetts.</i>					
Amherst *	Hampshire	3.31	52	4.83	+ 1.52
Cambridge *	Middlesex	4.13	46	7.04	+ 2.91
Chestnut Hill *	Middlesex	4.35	12	5.57	+ 1.22
Framingham *	Middlesex	4.16	13	5.20	+ 1.04
Lake Cochituate *	Middlesex	3.80	36	5.39	+ 1.59
Lynn *	Essex	3.98	13	6.20	+ 2.22
Mystic Lake *	Middlesex	4.14	12	5.22	+ 1.08
New Bedford *	Bristol	3.88	74	6.02	+ 2.14
Somerset	Bristol	4.20	17	6.08	+ 1.88
Springfield *	Hampden	3.42	40	4.85	+ 1.43
Waltham *	Middlesex	3.05	62	5.99	+ 2.94
Williamstown *	Berkshire	2.66	22	5.29	+ 2.63
<i>Nevada.</i>					
Carson City	Ormsby	2.01	8	1.01	- 1.00
<i>New Brunswick.</i>					
Saint John *	Saint John	4.87	27	10.95	+ 6.08
<i>New Hampshire.</i>					
Concord *	Merrimac	3.08	31	3.35	+ 0.27
Hanover *	Grafton	2.63	21	4.82	+ 2.19
<i>New Jersey.</i>					
South Orange	Essex	3.96	17	3.50	- 0.46
<i>New York.</i>					
Palermo	Oswego	3.31	34	5.39	+ 2.08
<i>Ohio.</i>					
Wauseon	Fulton	2.20	13	2.36	+ 0.16
<i>Pennsylvania.</i>					
Dyberry	Wayne	2.99	18	4.00	+ 1.01
Grampian Hills	Clearfield	3.66	17	2.57	- 1.09
<i>South Carolina.</i>					
Kirkwood	Kershaw	3.32	20	3.13	- 0.19
Stateburg	Sumter	3.98	6	3.50	- 0.48
<i>Texas.</i>					
New Ulm	Austin	4.13	14	1.09	- 3.04
<i>Vermont.</i>					
Lunenburg *	Essex	3.01	39	3.00	- 0.01
Newport *	Orleans	3.34	12	5.88	+ 2.54
Strafford	Orange	3.20	12	5.50	+ 2.30
<i>Virginia.</i>					
Dale Enterprise	Rockingham	3.01	7	2.42	- 0.59
Variety Mills	Nelson	4.14	8	2.16	- 1.98
<i>West Virginia.</i>					
Helvetia	Randolph	5.47	11	3.75	- 1.72

* From the "Bulletin of the New England Meteorological Society."

The following notes, in connection with this subject, are furnished by voluntary observers:

Kansas.—Wellington, Sumner county: the precipitation of the month was all in the form of snow, which fell to a depth of 5.5 inches. During the past nine years the largest monthly rainfall for January, 1.54, occurred in 1886; the lowest, 0.18, in 1881.

New York.—Palermo, Oswego county: the total snowfall of the month, 51 inches, is 27 inches above the January average of the last thirty-four years; it is also the greatest amount that has fallen in January during that time; the smallest, 2 inches, fell in 1882.

Ohio.—Wauseon, Fulton county: the total snowfall of the month, 15.8 inches, is 3.8 inches above the average of the past thirteen years; the largest January snowfall in that time, 22.2 inches, occurred in 1885; the least, 5.0 inches, in 1880.

Texas.—New Ulm, Austin county: during the past fourteen years the heaviest January precipitation, 10.56, fell in 1882; the least, 1.09, in 1887.

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

Above normal.		Below normal.	
	Inches.		Inches.
Portland, Oregon.....	5.27	Red Bluff, California.....	4.90
Eastport, Maine.....	4.03	Mackinaw City, Michigan.....	4.11
Alpena, Michigan.....	2.68	Charlotte, North Carolina.....	3.91
Roseburg, Oregon.....	2.44	Palestine, Texas.....	3.86
Deadwood, Dakota.....	2.14	Atlanta, Georgia.....	3.82
Grand Haven, Michigan.....	2.00	Kitty Hawk, North Carolina.....	3.52
Dubuque, Iowa.....	1.74	Cedar Keys, Florida.....	3.42

In the following table are shown, for the several geographical districts, the normal precipitation for January, the average for January, 1887, and the excess or deficiency, as compared with the normal:

Average precipitation for January.

Districts.	Average for Jan., Signal-Service observations.		Comparison of Jan., 1887, with the average for several years.
	For several years.	For 1887.	
	Inches.	Inches.	Inches.
New England.....	4.76	5.90	+ 1.14
Middle Atlantic States.....	3.88	3.14	- 0.74
South Atlantic States.....	4.77	3.73	- 1.04
Florida Peninsula.....	3.24	1.94	- 1.30
Eastern Gulf States.....	6.12	4.09	- 2.03
Western Gulf States.....	4.15	2.01	- 2.14
Rio Grande Valley.....	1.67	0.12	- 1.55
Tennessee.....	6.26	4.93	- 1.33
Ohio Valley.....	3.55	2.39	- 1.16
Lower lake region.....	2.72	1.95	- 0.87
Upper lake region.....	2.22	2.54	+ 0.32
Extreme northwest.....	0.58	0.65	+ 0.07
Upper Mississippi Valley.....	1.90	1.44	- 0.46
Missouri Valley.....	0.66	0.63	- 0.03
Northern slope.....	1.03	1.42	+ 0.39
Middle slope.....	0.44	0.19	- 0.25
Southern slope.....	0.83	trace	- 0.83
Southern plateau.....	0.83	0.10	- 0.73
Middle plateau.....	1.74	1.44	+ 0.30
Northern plateau.....	2.75	2.30	- 0.45
North Pacific coast region.....	7.28	10.11	+ 2.83
Middle Pacific coast region.....	4.89	1.20	- 3.69
South Pacific coast region.....	1.74	0.08	- 1.66

SNOW.

Augusta, Georgia: sleet and rain fell during the early morning of the 5th; at 10.45 a. m. snow began falling and continued until 3.05 p. m., depth, 1.1 inches. Owing to the low temperature that prevailed on the 5th and 6th the snow did not melt until noon of the latter day. A light fall of snow occurred also on the 7th. At Columbia, South Carolina, sleet and snow fell for fifteen hours, the fall of snow being greater than any other that has occurred during the past six years. In the western portion of the state, and in western North Carolina, the fall was very heavy. This is the second heavy snowfall that has occurred in Georgia and South Carolina this winter.

Lansing, Michigan: light snow fell during the 13th until late in the afternoon, when it began falling heavily. Snow fell also on the 14th, from 8.10 a. m. to 7.30 p. m., total depth 13 inches; the storm was accompanied by north, backing to northwest, winds and low barometer. The fall of snow was very heavy over the surrounding country, delaying all trains several hours; street-car travel was entirely suspended on the 14th.

Huron, Dakota: the Chicago and Northwestern Railroad, in western Minnesota, was blockaded by snow from the 16th to 22d; on the latter date the first through mail since the 15th

arrived. Travel on the same road was impeded by snow on the 24th, 25th, 26th, and 29th.

Saint Vincent, Minnesota: on the 18th the barometer fell rapidly, with rising temperature and high southerly, veering to northerly, winds. At 10.30 a. m. a gale set in, attaining at 12.15 p. m. a velocity of forty-four miles per hour from the south. The high wind caused the snow which fell on the 16th to drift into railroad cuttings, delaying trains.

Salt Lake City, Utah: light snow began falling at 3.36 p. m. of the 24th and continued until midnight. Trains on all railroads passing through the city were delayed two to eight hours by heavy snow in the mountains.

Fort Buford, Dakota: snow fell during the night of the 28-29th and, being followed on the 29th by a heavy westerly gale, drifted badly. The gale began at 2.50 a. m. and continued until 11.50 p. m., attaining between 11 a. m. and noon a velocity of forty-seven miles per hour. Travel on the Northern Pacific Railroad was suspended, the road being badly blockaded by snow. During the storm the temperature was 21° below zero.

Bismarck, Dakota: light snow fell during the night of the 28-29th. At 7.30 a. m. of the 29th a northwesterly gale, accompanied by rapidly falling temperature, began, attaining at 12.25 and 10.05 p. m. a velocity of thirty miles per hour. The snow that had fallen during the night drifted to such an extent as to render travel impossible, and trains on the Northern Pacific Railroad were blockaded for the first time this season.

Moorhead, Minnesota: on the 29th snow fell from 3 to 9 a. m.; at 6.30 a. m. a severe northwesterly gale set in and continued until 10.50 p. m.; maximum velocity of the gale thirty-six miles per hour, with a minimum temperature of 31° below zero. During the storm the snow drifted badly and trains on all roads were delayed.

The dates on which snow fell in the various districts are, as follows:

New England.—1st to 31st.

Middle Atlantic states.—1st, 2d, 4th to 10th, 12th to 19th, 21st, 23d to 31st.

South Atlantic states.—1st, 3d, 5th to 9th, 17th, 18th.

East Gulf states.—Vicksburg, Mississippi, 2d, 4th, 5th; Greensborough, Montgomery, and Livingston, Alabama, and Pensacola, Florida, 5th; Atlanta, Georgia, 5th, 7th.

West Gulf states.—Little Rock, Arkansas, 2d, 4th; Fort Smith, Arkansas, 2d, 8th; Shreveport, Louisiana, 4th, 5th; Palestine, Texas, 4th, 8th, 9th.

Tennessee.—1st to 5th, 9th, 26th.

Ohio Valley.—1st to 19th, 24th, 25th, 26th, 29th, 30th, 31st.

Lower lake region.—1st to 21st, 23d to 26th, 28th to 31st.

Upper lake region.—1st to 31st.

Extreme northwest.—3d, 4th, 5th, 9th to 16th, 19th to 20th, 21st, 24th, 25th, 28th, 29th, 31st.

Upper Mississippi valley.—1st, 3d to 17th, 22d to 25th, 29th, 30th, 31st.

Missouri Valley.—1st to 9th, 11th to 16th, 21st to 26th, 28th to 31st.

Northern slope.—1st to 10th, 12th to 31st.

Middle slope.—1st, 2d, 4th to 8th, 10th, 12th, 13th, 14th, 16th, 19th to 22d, 25th, 27th, 28th, 31st.

Southern slope.—8th, 22d.

Southern plateau.—4th, 7th, 8th, 21st, 22d, 23d.

Middle plateau.—5th to 16th, 18th to 22d, 24th to 30th.

North Pacific coast region.—11th, 15th, 16th, 18th to 27th, 29th, 30th, 31st.

Middle Pacific coast region.—15th, 18th, 19th, 20th, 24th.

LARGEST MONTHLY SNOWFALLS.

[Expressed in inches and tenths.]

Monthly snowfalls of ten inches or more were reported from the various states and territories during the month, as follows:
California.—Summit, 56; Cisco, 40.5; Emigrant Gap, 21.5; Boca, 16.

Connecticut.—Hartford *a*, 33.5; Hartford *b*, 32.5; North Colebrook, 31.5; Collinsville, 28.2; Canton, 27; Middletown, 23; Bethel, 19; Norfolk, 18; Wallingford, 15.8.

Dakota.—Deadwood, 35.8; Fort Sally, 31; Richardtown, 19; Webster, 16; Fort Totten, 13; Fort Buford, 11.5.

Idaho.—Fort Cœur d'Alene, 17.1.

Illinois.—Lake Forest, 27.2; Waukegan, 24; Prairieville, 22.2; Sandwich, 22; Rockford, 20.5; Aurora, 19.4; Sycamore, 18; Chicago, 16.8; Woodstock, 15.9; Riley, 15.5; Ottawa, 15; Monmouth, 12.

Indiana.—Franklin, 12.7; Logansport, 11.7; Angola, 10.

Iowa.—Dubuque, 20.3; Des Moines *a*, 17.5; Des Moines *b*, 17.2; Bancroft, 12; Oskaloosa and Independence, 11.2; Monticello, 10.8.

Maine.—Gardiner, 35.7; Orono *a*, 35.5; Orono *b*, 33.5; Belfast, 32; Livingston, Cornish, and Kent's Hill, 26; Solon, 25.5; Portland, 24.8; Eastport, 22.5.

Massachusetts.—Fall River, 40; Gilbertville, 39; Monson, Rowe, and Nonotuck, 37; Fitchburg *a*, 35.5; Lawrence, 33.2; Deerfield, 33; Newburyport, 32.5; Holyoke, 30.7; Concord, 30.2; Dudley, 30; Springfield, 29.8; Amherst *a*, 29.5; Worcester, 29.2; Westborough, 28; Leominster, 27.5; Fitchburg *b*, 27; Williamstown *a*, 26; Amherst *b*, 25.5; Williamstown *b*, 24; Ludlow and Winchester, 23; Beverly Farms, 21; Blue Hill (base), 18; Cambridge, 17.9; Salem, 16.8; Blue Hill (summit), Boston, and South Hingham, 16; Milton, 15; Somerset, 14.8; Wood's Holl, 14.4; Randolph, 13; Taunton, 12.5; Plymouth, 11.

Michigan.—Alpena, 51.9; Traverse City, 41.5; Thornville, 25.5; Mackinaw City, 23.7; East Saginaw and Lansing, 21.8; Marquette, 20.2; Grand Haven, 19.5; Detroit, 18.9; Hudson and Swartz Creek, 17.5; Kalamazoo, 14.4; Port Huron, 14; Escanaba, 13.4; Mottville, 13; Birmingham, 10.5.

Minnesota.—Saint Paul, 22; Duluth, 20.5; Minneapolis, 13.7; Saint Cloud, 10.8.

Montana.—Fort Maginnis, 31.1; Helena, 16.2; Fort Assinaboine, 15.9.

Nebraska.—Tecumseh, 11; Valentine, 10.2.

Nevada.—Toano, 23.

New Brunswick.—Parker's Ridge, 55; Saint John, 30.

New Hampshire.—Quincy, 41.4; Manchester *a*, 35.5; Berlin Mills, 34.5; Manchester *b* and Nashua, 32; Antrim, 30.9; Concord, 27; Walpole, 26.5; Shelburne and Grafton, 26; Hanover, 23.5; Mount Washington, 22.2; West Milan, 21.2; Strafford, 18.

New Jersey.—Roseland, 13; Dover, 12.8.

New York.—Palermo, 51.5; Lebanon Springs, 38; Oswego, 32.5; North Concord, 29.8; Auburn, 24; Cooperstown, 23.5; Albany, 20.5; Le Roy, 20.2; Buffalo, 19.2; Humphrey and Menand's, 18.5; Boyd's Corners, 18.2; North Volney, 17; Rochester, 12; White Plains, 11.

Ohio.—Wauseon, 15.3; Garrettsville and Toledo, 13.4; Hiram, 11.5; Tiffin, 11.2; Napoleon, 10.8; Columbus and Sandusky, 10.3; Cleveland, 10.

Oregon.—Linkville, 21.8; La Grande, 13; East Portland, 11.1.

Pennsylvania.—Erie, 23; Phillipsburg, 20.8; Grampian Hills, 14; Zionsville and Catawissa, 10.6; Quakertown, 10.5; Blooming Grove, 10.

Rhode Island.—Providence *a*, 16.5; Lonsdale, 15; Pawtucket, 13.8; Providence *b* and Woonsocket, 12; Bristol and Olneyville, 10.5.

Utah.—Salt Lake City, 23.1; Ogden, 14.8; Promontory, 11.5.

Vermont.—Strafford, 46; Brattleborough, 44.8; Jacksonville, 43; Marlborough, 37.9; Vernon, 36; Chelsea, 31.4; Burlington and Lunenburg, 29; Newport, 28.8; Poultney, 25; Cornwall, 24.5; Post Mills *a*, 23; Post Mills *b*, 21; Charlotte, 17.

Washington Territory.—Pysht, 11.

Wisconsin.—Green Bay, 28.2; Milwaukee, 19.6; Manitowoc, 18.8; Embarras, 17.4; Wausau, 16.5; Delavan, 13.4; Madison, 13.1; Fond du Lac, 12; Franklin, 11.

Wyoming.—Fort Bridger, 12.5.

DEPTH OF UNMELTED SNOW ON GROUND AT END OF MONTH.

[Expressed in inches and tenths.]

Connecticut.—North Colebrook, 9; Bethel, trace.

Dakota.—Richardton, 36; Deadwood, 30; Fort Buford, 24.3; Webster, 20; Bismarck, 9.8; Fort Totten, 6.8.

Illinois.—Riley, 10; Sycamore, 6; Chicago, 4.5; Windsor, trace.

Indiana.—Logansport, 2.8;

Iowa.—Dubuque, 15.9; Monticello, 14; Independence, 12; Bancroft, 10; Cresco and Humboldt, 6; Oskaloosa, 5; Cedar Rapids, 4; Davenport, 3; Des Moines, 1.8; Fort Madison, 0.5.

Kansas.—Leavenworth, 11.4; Dodge City, 0.8.

Maine.—Kent's Hill, 16; Gardiner, 10; Portland, 7; Eastport, 0.5.

Massachusetts.—Westborough, 8; Deerfield, 6; Amherst *a*, 1; Amherst *b*, trace.

Michigan.—Traverse City, 35; Marquette, 14; Mackinaw City, 12; Grand Haven, 8; Detroit, Escanaba, and Alpena, 6; Kalamazoo, 5.5; Lansing, 4; East Saginaw, Hudson, and Lansing, 3; Mottville, 2; Thornville, 1.5; Port Huron, 0.3.

Minnesota.—Eau Claire, 22; Duluth and Saint Paul, 20; Morris, 18; Albert Lea and Red Wing, 15; Northfield and Bird Island, 12; Saint Vincent, 8.7; Mankato, 6.

Missouri.—Conception, 2.

Montana.—Fort Maginnis, 20.5; Fort Assinaboine, 18.3; Helena, 12.

Nebraska.—Yutan, 5; Omaha, 2.2; De Soto, Hay Springs, Valentine, Genoa, and Tecumseh, 2; Tremont, Brownville, Weeping Water, Stromsburg, and Ashland, 1; Marquette, York, Stockham, and Tacoma, 0.5.

New Hampshire.—Mount Washington, 11; Antrim, 7 (in the woods); Nashua, 2.

New Jersey.—Paterson, 1; Beverly and Dover, trace.

New York.—Palermo, 15; Oswego, Penn Yan, and Coopers-town, 5; Auburn, and Le Roy, 4; Ithaca, 3; Humphrey, 2.5; Buffalo, 2; Rochester, 1.3; Albany, 1.

Ohio.—Garrettsville, 13.4; Toledo, 1.8; Wauseon, 1.5; Hiram, 1; Napoleon and Cleveland, 0.5; Sandusky, 0.3; Tiffin, trace.

Oregon.—East Portland, 4; La Grande, 3.

Pennsylvania.—Dyberry and Grampian Hills, 6; Erie, 3; Phillipsburg, 2; Pittsburg, 0.5; Catawissa and Quakertown, trace.

Vermont.—Poultney, 27; Strafford and Brattleborough, 24; Post Mills, 13; Newport, 10; Charlotte, 4 to 5; Burlington, 1.

Washington Territory.—Port Angeles, 5.5; Walla Walla, 3; Fort Spokane, 0.5.

Wisconsin.—Green Bay, 23; Embarras, 20; Wausau, 17; Fond du Lac, 13; Franklin, 12; Delavan, 11; Madison, 8; Milwaukee, 7; La Crosse, 5.

Wyoming.—Fort Bridger, 2.

HAIL.

Nashville, Tennessee: heavy rain, with thunder and lightning, occurred on the afternoon of the 13th; during the storm large hail stones fell from 6.20 to 6.32 p. m. Reports from Waverly, sixty-four miles west of Nashville, state that heavy hail fell from 5.40 to 5.50 p. m., the stones being the size of walnuts, and in some cases five inches in diameter. On the Hillsborough turnpike, four miles west of Nashville, hail as large as marbles fell.

Tatoosh Island, Washington Territory: on the 20th heavy rain fell during the greater part of the day; between 8.10 a. m. and 10.45 p. m. it was accompanied by a strong westerly gale which attained a maximum velocity of forty-five miles per hour. Between 4 and 4.10 p. m. heavy hail fell to a depth of half an inch, the stones consisted of irregularly shaped pieces of clear ice about one third of an inch in diameter.

Hail is also reported to have occurred, as follows:

Arizona.—Fort Verde, 22d.

Arkansas.—Little Rock, 22d.

California.—Anderson, 7th to 10th.

Connecticut.—Bethel, 17th.

Delaware.—Cape Henlopen, 5th.
Idaho.—Boisé City, 2d; Fort Oœur d'Alene, 13th, 15th, 26th, 27th.
Illinois.—Cairo, 13th.
Indiana.—Vevay, 23d.
Iowa.—Independence, 21st, 22d; Cedar Rapids, 22d.
Maine.—Cornish, 22d.
Massachusetts.—Westborough, 14th, 21st; Dudley, 15th, 24th.
Nebraska.—Tecumseh, 22d.
New Jersey.—Beverly, 5th, 29th; Salem, 24th.
New York.—West Point, 14th; Setauket, 15th.
North Carolina.—Raleigh, 5th, 17th; West Point, 12th.
Ohio.—Jacksonborough, 28th.
Oregon.—Astoria, 15th, 19th, 20th, 21st, 24th, 25th, 26th, 29th, 30th, 31st; Albany, 21st, 26th.
South Carolina.—Spartanburg, 9th.
Tennessee.—Austin, 13th, 29th; Milan, 17th, 22d.
Virginia.—University of Virginia, 13th.
Washington Territory.—Neah Bay, 14th, 15th, 16th, 20th, 21st, 24th, 30th.
Wisconsin.—Embarras, 21st.

Table of excessive and greatest monthly precipitation for January, 1887.

Station.	Specially heavy.		Largest monthly amount.	Station.	Specially heavy.		Largest monthly amount.
	Date.	Amt.			Date.	Amt.	
<i>Alabama.</i>				<i>N. Carolina—Con.</i>			
Greenville			7.55	Lenoir	23, 24	2.50	
Fayette			6.50	<i>Oregon.</i>			
Mount Vernon	23	2.18		Astoria	22, 23	2.75	18.24
<i>California.</i>				Do	29, 30	4.28	
Fort Gaston	19, 20, 21	5.87	9.43	Mount Angel	18, 19	2.03	15.36
Summit			6.25	Do	23, 24	2.90	
<i>Connecticut.</i>				Do	29, 30	3.10	
Middletown			7.07	Albany	28, 29	2.82	12.58
Voluntown			7.00	Portland	23	2.67	12.31
Collinsville			6.10	Do	29, 30	2.19	
<i>Florida.</i>				Eola	29, 30	2.42	9.86
Tallahassee	11, 12	2.70	6.20	Roseburg			8.64
Jacksonville	13, 14	2.18		Fort Klamath	18, 19, 20	3.33	
<i>Illinois.</i>				<i>Pennsylvania.</i>			
Sandwich	21, 22	2.09		Phillipsburg			6.50
South Evanston	21, 22	2.40		Zionsville	13, 14	3.10	
Geneseo	22	2.26		Wellaborough	23	2.00	
Waukegan	22	2.10		<i>Rhode Island.</i>			
Beviders	22	2.00		Block Island	6	2.15	6.99
Oneida	22	2.13		Narragansett Pt			6.73
Pekin	22	2.00		Providencea			6.61
Sycamore	22, 23	2.18		Bristol			6.59
Lake Forest	23	2.04		Woonsocket			6.52
Centerville	23	2.00		Olneyville			6.29
<i>Louisiana.</i>				Providenceb			6.19
Shreveport	28	2.00		<i>Tennessee.</i>			
<i>Maine.</i>				Waynesborough	23	3.10	6.65
Eastport	1, 2	2.30		Do	28	2.05	
Orono			7.78	Fosteria	23	3.03	6.40
Gardiner	14, 15	2.18	7.56	Milan	22	2.04	
<i>Massachusetts.</i>			7.32	Do	28	2.10	
Fall River				Memphis	22, 23	3.11	
South Hingham			7.38	Chattanooga	23	3.48	
Taunton			7.34	Nashville	23	2.02	
Rowe			7.33	Do	29, 30	2.05	
New Bedford a			7.30	Andersonville	23	2.00	
Wellesley			7.18	Parkeville	23	2.50	
Cambridge			7.10	Grief	23	2.95	
Randolph			7.04	Farmingdale	23	2.62	
Gilbertville			6.96	Manchester	23	2.43	
Northampton			6.68	Beech Grove	23	2.10	
Millford			6.66	Hohenwald	23	2.80	
Blue Hill (base)			6.46	Dickson	23	2.67	
Williamstown			6.36	Do	28	2.53	
Lynn			6.29	Trenton	22, 23	2.49	
Concord			6.20	Bolivar	28	2.80	
Beverly Farms			6.16	<i>Vermont.</i>			
Fitchburg			6.20	Brattleborough	14	2.03	6.58
Somerset			6.12	Do b			6.54
New Bedford b			6.08	Jacksonville			6.43
<i>Michigan.</i>			6.02	<i>Virginia.</i>			
Grand Haven	22	2.67		Rappahanock	23, 24	2.18	
East Saginaw	22, 23	2.71		Washington Ter.			
<i>New Brunswick.</i>				New Bay	11, 12, 13	4.49	22.30
Saint John			10.95	Do	25, 26	2.26	
Parker's Ridge			6.91	Do	29, 30	2.85	
<i>New Hampshire.</i>				Tatoosh Island	11, 12	2.44	14.46
Woodstock			6.90	Pysh	13, 14	2.15	13.76
<i>New Jersey.</i>				Fort Canby	14, 15	2.00	11.01
Phillipsburg			6.65	Olympia			9.83
Union			6.35	Port Angeles			6.20
Dover			6.21	<i>Wisconsin.</i>			
<i>North Carolina.</i>				Madison	22, 23	2.48	
Hatteras			6.09	<i>Wyoming.</i>			
Flat Rock	23	3.19		Camp Sheridan			7.70

SLEET.

Sleet fell in the various states and territories during the month, as follows:
Alabama.—5th.
Arizona.—22d.
Connecticut.—5th, 14th, 17th.
Florida.—5th.
Georgia.—5th, 7th, 17th.
Illinois.—12th, 13th, 23d, 25th, 26th, 31st.
Indiana.—28th.
Indian Territory.—7th.
Iowa.—21st, 22d, 23d.
Kansas.—7th.
Kentucky.—13th.
Louisiana.—9th.
Maine.—1st, 2d, 7th, 14th, 17th, 18th, 26th.
Maryland.—9th.
Massachusetts.—10th.
Michigan.—13th, 15th, 16th, 21st.
New Jersey.—5th, 24th, 26th.
New York.—1st, 14th, 17th, 22d.
North Carolina.—5th, 23d.
Ohio.—13th, 14th, 28th.
Pennsylvania.—1st, 14th.
South Carolina.—5th, 7th.
Tennessee.—9th, 17th, 26th.
Utah.—29th.
Vermont.—1st.
Wisconsin.—13th, 14th, 21st, 23d.

DROUGHT.

During the past summer, when other parts of Texas were suffering from drought, copious rainfalls occurred at San Antonio and over the surrounding country, but since the first of October, 1886, very little rain fell at that station, the total precipitation of the four months from October 1, 1886, to January 31, 1887, being only 1.36 inches. Water pools have dried and ranch men are forced to drive their stock five to ten miles for water. Grass in some sections has become parched and unnutritious. Cattle men say that but for the abundant growth of cactus large numbers of cattle would have starved. At Fort Elliott, in the "Panhandle" district, one of the great cotton and cattle-raising sections of the state, during the months of November, December, and January only 0.28 inch of rain fell. Reports from Dallas, Fort Worth, Sherman, and Waco, situated in the midst of the grain-growing districts of the state, say that the wheat fields are dry and dusty. The observer at Rio Grande City states that a severe drought prevailed in that district during the month; in some places the ground was entirely bare and very dusty, and during high winds which occurred there on the 17th, 19th, 20th, 21st, 23d, and 27th, very heavy clouds of dust and sand filled the atmosphere.

The rainfall of the winter thus far has been small in Illinois; the observer at Windsor, Shelby county, states that this county has been much in need of rain since the drought began in July, and that numerous wells have become dry. The observer at Pekin, Tazewell county, says that many wells are dry and farmers are obliged to drive their cattle long distances for water.

WINDS.

The most frequent directions of the wind during January, 1887, are shown on chart ii by the arrows flying with the wind; they are also given in the table of miscellaneous meteorological data. In New England, the middle Atlantic states, the Lake region, and upper Mississippi valley, the wind blew generally from the west or northwest; in the west Gulf states the prevailing winds were from the south; in the Ohio Valley southwest; along the eastern slope of the Rocky Mountains the wind blew mostly from the west; in California northwesterly winds prevailed. In other parts of the country they were vari-