the Rocky Mountains, with temperature 10 to 20 below the normal on the eastern slope of the Rocky Mountains, after which it lost intensity, and did not materially affect the temperature conditions of the central valleys. The temperature had continued generally below the normal over the western part of the country, and on the 5th a decided fall occurred west of the Rocky Mountains, and the temperature was 10 to 20 below the normal from the British Northwest Territory to western Texas. During the 6th the cold wave advanced to the Mississippi River, and during the 7th reached the Atlantic coast south of New England. On this date the temperature was below the normal, except in the north-central districts, and the lowest temperature of the month, 22, was noted at Abilene, Tex.

Low temperature continued over the southern part of the country during the 8th; over a great part of Texas it was more than 20 below the normal; the lowest temperature of the month was reported at El Paso and San Antonio, Tex., where the minimum fell to 8 and 26, respectively; and the minimum readings fell below 32 almost to the immediate Gulf and south Atlantic coasts. The weather continued cold in the Southern States until the 9th. The morning of the 16th the temperature was below zero in the Red River of the North Valley. During the 17th and 18th this cold wave extended over the Ohio Valley and the middle Atlantic and New England states, with temperature below freezing to the north part of the Gulf States and South Carolina, and the lowest temperature of the month occurred at points in the Lake region, the Ohio Valley, and the Atlantic coast states north of the Carolinas.

The morning of the 24th the temperature was below zero in the British Northwest Territory, and the coldest weather of the month was noted on the north Pacific coast, where the minimum temperature fell below freezing. On the 25th this cold wave extended over the entire Pacific coast and the plateau region and reached the eastern slope of the Rocky Mountains; the line of zero temperature extended from the middle plateau region to Minnesota; freezing weather occurred over the entire western half of the country, except along the immediate middle California coast; and the lowest temperature ever reported for December was reported at Yuma, Ariz., Keeler, Cal., and Montrose, Colo., where it was 25, 17, and —17, respectively. On the 26th the cold wave advanced to the Alleghany Mountains; the minimum temperature was below —20 in the Red River of the North Valley, and a reading of —27 was noted at Saint Vincent, Minn.; freezing weather occurred north of a line traced from northern Louisiana to the lower lake region; the lowest temperature of the month was recorded at points in the western central valleys and the west part of the Lake region; and at San Diego, Cal., the minimum temperature, 32, was as low as ever reported in December.

During the 27th the cold wave reached the middle and south Atlantic coasts; in New England and the Saint Lawrence Valley the temperature continued above the normal; the line of freezing weather extended to Mobile, Ala.; and the lowest temperature of the month was noted at stations in the Lake region, the lower Mississippi valley, and on the west Gulf coast. During the 28th the cold wave disappeared off the Atlantic coast. On this date the temperature fell below zero in the Red River of the North Valley, and the line of freezing weather extended over the plateau region and the eastern slope of the Rocky Mountains to Mexico. By the 29th this cold wave had extended over the Lake region, with zero temperature in the north Lake Superior region, and freezing weather to the central east Gulf states; by the 31st it passed off the Atlantic coast, with temperature below zero in the Saint Lawrence Valley, and freezing weather to Georgia.

FROST.

The first heavy frost of the season was reported as follows: 3d, New River, Ariz.; Fresno, Cal. 5th, Eureka and Red Bluff, Cal. 6th, Sacramento, Cal.; Tatoosh Island, Wash. 12th, Yuma, Ariz. 17th, Austin, Tex. 18th, Rio Grande City, Tex. 19th, Dudleyville, Ariz.

On the 5th light frost injured tender vegetation near Los Angeles, Cal. The first light frost of the season occurred at San Diego, Cal., on the 6th, causing some injury to vegetation in the mountain valleys. The cold of the 6th killed the tender growth of orange and fig trees at Peoria, Ariz. The first heavy frost of the season occurred generally in the region about Los Angeles, Cal., on the 25th. Vegetables and berries in the bottom lands were generally killed, a small percentage of the orange crop was frosted, and considerable damage was caused to young trees and nursery stock. The first heavy frost of the season occurred generally about San Diego, Cal., on the 26th. Considerable damage was caused to the orange crop, and vegetation of all kinds was badly injured. Ice one-half inch in thickness formed on shallow pools, and in Mission Valley ice formed one inch in thickness and oranges were frozen. On this date young orange trees were badly damaged by cold at Peoria, Ariz. The first light frost of the season was reported at Tampa and Tarpon Springs, Fla., on the 28th.

PRECIPITATION (expressed in inches and hundredths).

The distribution of precipitation over the United States and Canada for December, 1891, as determined from the reports of about 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 regular stations of the Weather Bureau. 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 December the monthly precipitation is usually greatest on the north Pacific coast, where it exceeds 10.00; the normal amount exceeds 8.00 along the Pacific coast north of the 38th parallel, in parts of northeastern California, and in a small area in northeastern Louisiana; and it exceeds 4.00 from the middle and east Gulf coasts to the middle Ohio valley, along the immediate Atlantic coast from North Carolina to southern New England, and over Nova Scotia and southeastern Maine. Except in parts of the northern plateau region the monthly precipitation is less than 1.00 over the greater part of the Rocky Mountain and plateau regions and thence over Kansas, Nebraska, the Dakotas, and Minnesota.

In December, 1891, the monthly precipitation was greatest on the extreme north Pacific coast, where it exceeded 20 00 at Neah Bay and Tatoosh Island, Wash.; it exceeded 10.00 along the Pacific coast north of the 40th parallel; and more than 8.00 fell along the line of the Central Pacific Railroad crossing the summit of the Sierra Nevada Mountains in California, and in an area extending over east-central Texas. Over the western part of the southern plateau region, and in parts of the upper Missouri, Saskatchewan, and middle Rio Grande valleys, the monthly precipitation was less than 0.25, and it was less than 1.00 generally on the eastern slopes of the Rocky Mountains north of the 40th parallel, over the Dakotas and Montana, in southern Texas, and over the southwest part of the Florida Peninsula.

DEPARTURES FROM NORMAL PRECIPITATION.

The areas of excess and deficiency of monthly precipitation were irregularly distributed. The precipitation was in excess of the December average on the north Pacific coast and thence southeastward to the west Gulf states, from the southeast

slope of the Rocky Mountains to the Red River of the North and Lake Superior, and in an area extending from Arkansas and Mississippi northeastward to the lower lake region and south New England, the greatest excess appearing on the Oregon and Washington coasts, where it was more than 4.00. The monthly precipitation was deficient in the central valleys of California, on the south Pacific coast, over the west and south parts of the southern plateau region, over the northern part of the country from the Dakotas to the northern plateau region, from northern Arkansas and eastern Missouri northeastward over the Ohio Valley, the south part of the Lake region, northern New York, and northern New England, and generally along the immediate middle and south Atlantic and Gulf coasts, the most marked deficiency occurring along the Atlantic coast between the 32d and 38th parallels and at Los Angeles, Cal., where it exceeded 2.00.

Considered by districts the average percentage of the normal in districts where the precipitation was in excess was about as follows: middle-eastern and southeastern slopes of the Rocky Mountains, 170; Missouri Valley and north Pacific coast, 150; west Gulf states and extreme northwest, 130. In districts where the precipitation was deficient the percentage of the normal was about as follows: south Atlantic states, 44; south Pacific coast, 48; Key West, Fla., 64; northeastern slope, 70; middle plateau, 73; southern plateau, 84; east Gulf states and middle Pacific coast, 86; middle Atlantic states, 88; northern plateau, 92. In New England, the lower Rio Grande and upper Mississippi valleys, the Ohio Valley and Tennessee, and the Lake region the monthly precipitation averaged about normal.

DEVIATIONS FROM AVERAGE PRECIPITATION.

The following table shows for certain stations, as reported by voluntary observers, (1) the average precipitation for December for a series of years; (2) the length of record during which the observations have been taken and from which the average has been computed; (3) the total precipitation for December, 1891; (4) the departure of the current month from the average; (5) and the extremes for December during the period of observation and the years of occurrence:

Deviations from average precipitation—Continued.

State and station.	County.	(1) Average for the month of Dec.	(2) Length of record.	(3) Total for Dec., 1891.	(4) Departure from average.	(5) Extremes for Dec.			
						Greatest.		Least.	
						Am't.	Year.	Am't.	Year.
Arkansas.		*Inches*	*Years*	*Inches*	*Inches.*	*Inches.*		*Inches*	
Lead Hill	Boone	3.47	10	1.48	−1.99	11.37	1884	1.15	1889
California.									
Sacramento	Sacramento	4.68	41	3.55	−1.13	13.41	1852	0.00	'50,'76
Connecticut.									
Middletown	Middlesex	3.77	31	5.08	+1.31	7.91	1878	1.20	1875
Florida.									
Merritts Island	Brevard	2.52	13	2.57	+0.05	8.55	1888	0.00	1889
Georgia.									
Forsyth	Monroe	4.42	17	3.60	−0.82	7.56	1887	0.79	1889
Illinois.									
Peoria	Peoria	2.38	36	2.39	+0.01	7.15	1873	0.28	1876
Riley	McHenry	2.03	40	2.16	+0.13	5.67	1876	0.28	1857
Indiana.									
Logansport	Cass	3.18	15	2.07	−1.11	5.99	1881	0.46	1890
Vevay	Switzerland	3.84	26	2.42	−1.42	7.60	1879	1.16	1888
Iowa.									
Cresco	Howard	1.32	20	3.44	+2.12	3.44	1891	0.30	1874
Monticello	Jones	2.34	36	2.09	−0.25	6.99	1856	0.65	1867
Logan	Harrison	1.37	20	2.72	+1.35	3.10	1868	0.14	1889
Kansas.									
Lawrence	Douglas	1.63	27	2.41	+0.78	4.39	1873	0.08	1889
Wellington	Sumner	0.96	12	.....	.....	3.14	1884	T.	1889
Louisiana.									
Grand Coteau	St. Landry	5.38	8	4.86	−0.52	14.43	1884	2.27	1890
Maine.									
Orono	Penobscot	3.95	21	4.76	+0.81	7.92	1878	1.50	1875
Maryland.									
Cumberland	Allegany	2.19	20	3.42	+1.23	4.50	1881	0.70	1870
Massachusetts.									
Amherst	Hampshire	3.55	56	4.88	+1.33	7.09	1839	0.96	1838
Newburyport	Essex	3.99	13	3.27	−0.72	5.80	1886	2.45	1880
Somerset	Bristol	3.48	19	3.15	−0.33	5.67	1884	0.82	1875
Michigan.									
Kalamazoo	Kalamazoo	2.90	15	1.47	−1.43	7.14	1884	1.35	1890
Thornville	Lapeer	2.45	14	2.92	+0.47	5.25	1879	0.67	1880
Minnesota.									
Minneapolis	Hennepin	1.53	24	3.46	+1.93	5.30	1873	0.33	1866
Montana.		*Inches*	*Years*	*Inches*	*Inches.*	*Inches.*		*Inches*	
Fort Custer	Custer	0.90	12	0.45	−0.45	1.87	1883	0.09	1885
New Hampshire.									
Hanover	Grafton	2.56	49	2.89	+0.33	5.05	1839	0.78	1875
New Jersey.									
Moorestown	Burlington	3.13	28	4.60	+1.47	5.77	1865	0.90	1877
South Orange	Essex	3.83	21	4.70	+0.87	7.07	1878	0.91	1877
New York.									
Cooperstown	Otsego	2.63	37	4.96	+2.33	6.02	1881	0.97	1877
Palermo	Oswego	3.83	37	4.05	+0.22	7.95	1878	1.60	1874
North Carolina.									
Lenoir	Caldwell	3.70	17	4.00	+0.30	8.70	1877	0.50	1889
Ohio.									
N. Lewisburgh	Champaign	2.88	19	1.75	−1.13	5.45	1873	1.50	1882
Wauseon	Fulton	2.33	19	1.91	−0.42	4.32	1879	0.41	1874
Oregon.									
Albany	Linn	8.31	12	13.19	+4.88	14.21	1887	4.30	1888
Eola	Polk	5.73	22	11.88	+6.15	11.88	1891	0.84	1876
Pennsylvania.									
Dyberry	Wayne	2.75	25	4.17	+1.42	5.29	1890	1.20	1874
Grampian Hills	Clearfield	3.67	21	5.15	+1.48	5.15	1891	1.99	1871
Wellsborough	Tioga	4.70	12	4.01	−0.69	9.57	1881	1.27	1883
South Carolina.									
Statesburgh	Sumter	3.03	10	1.82	−1.21	5.87	1884	0.75	1889
Tennessee.									
Austin	Wilson	4.23	21	4.12	−0.11	10.20	1879	0.85	1882
Texas.									
New Ulm	Austin	4.19	18	7.27	+3.08	16.43	1875	0.37	1889
Vermont.									
Strafford	Orange	3.26	18	3.50	+0.24	5.90	1878	0.15	1875
Virginia.									
Birdsnest	Northampton	3.75	22	1.90	−1.85	6.75	1880	0.55	1889
Washington.									
Fort Townsend	Jefferson	2.62	17	5.34	+2.72	5.34	1891	1.14	1879
Wisconsin.									
Madison	Dane	1.97	19	2.24	+0.27	5.73	1884	0.45	1874

YEARS OF GREATEST PRECIPITATION FOR DECEMBER.

The greatest monthly precipitation ever reported for December was noted at Port Angeles and Port Townsend, Wash., Roseburgh and Eola, Oregon, Concordia, Kans., Cresco, Iowa, Saint Paul, Minn., and Grampian Hills, Pa., in 1891; over the greater part of the plateau region and on the south Pacific coast in 1889; at a number of stations on the north Pacific coast in 1882 and 1886; from the west Gulf states to Upper Michigan in 1884; over parts of the middle Pacific coast and on the northeastern slope of the Rocky Mountains in 1880; from the middle Ohio valley to the east Gulf coast in 1879 and 1881; in New York and Massachusetts in 1878; and along the Carolina coast in 1877.

In December, 1891, the excess above the greatest monthly precipitation previously reported for December was 1.24 at Port Angeles, Wash.; 0.24 at Port Townsend, Wash.; 2.82 at Roseburgh, Oregon; 0.38 at Eola, Oregon; 0.57 at Concordia, Kans.; 0.61 at Cresco, Iowa; 0.18 at Saint Paul, Minn.; and 0.03 at Grampian Hills, Pa.

YEARS OF LEAST PRECIPITATION FOR DECEMBER.

At Fort Assinaboine, Mont., the monthly precipitation for the current month, 0.08, was the same as the least monthly precipitation ever reported for December, noted in 1881. The least precipitation for December occurred from Iowa over Minnesota and northern North Dakota in 1890; in the Gulf States and in districts south of the Ohio Valley and Pennsylvania in 1889; in the lower lake region in 1874; and in the Lake Michigan region in 1872.

In 1889, when the monthly precipitation was the greatest on record for December over the plateau region and on the south Pacific coast, it was the least on record for the month over the southeastern part of the country.

EXCESSIVE PRECIPITATION.

The following tables show, by states, the number of stations reporting monthly precipitation to equal or exceed 10.00; precipitation to equal or exceed 2.50 in 24 hours; and precipitation to equal or exceed 1.00 in 1 hour in December, 1891:

Monthly precipitation to equal or exceed 10.00.

State.	Number of stations.	State.	Number of stations.
Oregon	14	Washington	7
California	9	Texas	1

Precipitation to equal or exceed 2.50 *in* 24 *hours.*

State.	Number of stations.	Dates.	State.	Number of stations.	Dates.
Louisiana	18	13-14, 14, 14-15, 15, 16, 22-23, 23, 23-24.	Mississippi	4	14-15.
			Tennessee	4	22-23, 23.
			Washington	3	6-7, 7.
Texas	15	10-11, 11, 11-12, 12, 12-14, 13-14, 14.	Oregon	2	26.
			Maine	2	29-30.
			California	1	7-9, 25-26.
Alabama	7	3, 15.	Florida	1	17-18.
Arkansas	7	22, 22-23, 23, 23-24.	Michigan	1	14.
			Missouri	1	6.
Wisconsin	6	13-14, 14, 14-15.	Virginia	1	3-4.

Precipitation to equal or exceed 1.00 *in* 1 *hour.*

State.	Number of stations.	Date.	State.	Number of stations.	Date.
District of Columbia	1	24.	Mississippi	1	14.

Table of excessive precipitation, December, 1891.

State and station.	Monthly rainfall 10 inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
Alabama.	*Inches.*	*Inches.*		*Inches*	*h. m.*	
Brewton		3.00	15			
Chepultepec		2.20	3			
Cordova		2.64	3			
Daphne		3.74	15			
Mobile		4.32	15			
Mount Vernon Barracks		3.59	15			
Wiggins		3.13	15			
Arkansas.						
Arkansas City		3.00	23-24			
Brinkley		3.90	23			
Devall Bluff		2.70	23			
Gaines Landing		3.27	23			
Helena(1)		2.90	23-24			
Little Rock		3.42	22-23			
Lonoke		3.50	22			
California.						
Colfax	11.04					
Crescent City L. H	11.86					
Emigrant Gap	12.90					
Eureka	10.97					
Fort Gaston	18.21	4.70	7-9			
Do		4.10	25-26			
Point Arena L. H	13.52					
Sisson	11.20					
Summit	11.90					
Trinidad L. H	10.88					
District of Columbia.						
West Washington				1.09	1 00	24
Florida.						
Saint Francis Barracks		4.00	17-18			
Louisiana.						
Abbeville		3.00	14			
Edgard		3.60	15			
Emilie		2.65	14-15			
Grand Cane		4.70	23-24			
Grand Coteau		2.78	14			
Houma		4.60	13-14			
Jackson Barracks		2.65	14-15			
Lake Charles		2.60	14			
Liberty Hill		3.20	23			
Luling		4.88	14-15			
Mandeville		2.60	16			
Minden		6.02	23			
New Orleans		2.92	14-15			
Shell Beach		2.75	14			
Shreveport		4.64	22-23			
Sugar Experimental Station		3.55	14			
Thibodeaux		3.00	14			
West End		4.55	13-14			
Maine.						
Farmington		2.65	29-30			
Kennebec Arsenal		2.60	29-30			

Table of excessive precipitation—Continued.

State and station.	Monthly rainfall 10 inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
Michigan.	*Inches.*	*Inches.*		*Inches*	*h. m.*	
Harrisville		2.60	14			
Mississippi.						
Bay Saint Louis		3.10	14-15			
Logtown		3.20	14-15			
Meridian		2.66	14-15			
Ship Island		3.70	14-15			
Vaiden				1.30	1 00	14
Missouri.						
Conception		3.05	6			
Oregon.						
Albany (1)	13.19	2.60	26			
Astoria	15.79					
Aurora	10.52					
Bandon	14.87	2.88	26			
East Portland	14.07					
Eola	11.88					
LaFayette	13.25					
Leland	13.50					
McMinnville(1)	14.00					
Mount Angel	10.41					
Portland (Weather Bureau)	11.45					
Portland (S. P. R. R.)	10.73					
Roseburgh (Weather Bureau)	12.02					
Springfield	10.55					
West Fork	10.98					
Tennessee.						
Bethel Springs		2.87	23			
Clarksville		2.69	22-23			
Covington (1)		3.50	23			
Jackson		2.90	23			
Texas.						
Austin (3)	10.31	5.31	11-12			
Do		2.87	13-14			
Brenham		3.52	11-12			
Burnet		3.35	12			
College Station		7.78	12-14			
Columbia		2.80	14			
Cuero (2)		2.90	11			
Gallinas		3.56	11-12			
Hallettsville		5.93	11-12			
Highland		3.00	10-11			
Houston		2.53	12			
Huntsville		2.50	12			
New Braunfels		3.14	12			
New Ulm		3.81	12			
San Antonio (Weather Bureau)		2.59	11-12			
San Antonio (2)		2.54	11-12			
Venus		2.59	13-14			
Virginia.						
Avon		2.75	3-4			
Washington.						
Aberdeen	19.34	2.50	7			
Chehalis	11.32					
Fort Canby (Weather Bureau)	12.50					
Fort Canby (Post Hospital)	14.29					
Neah Bay	23.91	3.60	6-7			
Olympia	13.61					
Tacoma	10.55					
Tatoosh Island	20.08	4.21	6-7			
Wisconsin.						
Embarrass		2.90	14-15			
Green Bay		2.50	14-15			
Lincoln		4.40	14			
Medford (2)		2.65	14-15			
Peshtigo		2.90	14-15			
Shawano		2.64	13-14			

Received too late to be used in general discussion for December, 1891.

California.						
Arcata	11.38					
Boulder Creek	11.97					
Crescent City	12.56					
Felton	14.08					
Georgetown	13.74					
Grass Valley (1)	10.26					
Hydesville	11.17					
Iowa Hill	11.64					
La Grange		2.97	30			
Oakland (1)		2.73	29			
Oleta		2.75	29			
Placerville (1)	12.57					
Redding (2)	10.38	2.91	29			
San Ardo (2)		2.75	28-29			
Santa Cruz (2)		3.20	29			
Shasta Springs	11.49	2.50	26-27			
Steeles		3.73	30			
Towles	11.18					
Upper Mattole	17.31	3.30	27			
Walla Walla Creek	12.40					
Oregon.						
Albany (2)	11.11					
Brownsville	10.20					
Cascade Locks	21.50	2.50	26			
Comstock	16.25					
Corvallis (1)	11.93					
Corvallis (2)	11.40					
Eugene	10.40					
Forest Grove	14.11					

Table of excessive precipitation—Continued.

State and station.	Monthly rainfall 10 inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
Oregon—Continued.	*Inches.*	*Inches.*		*Inches*	*h. m.*	
Gardiner	17.60					
Hood River (near)	12.85					
Hubbard	10.54					
Langlois	18.67					
McMinnville (2)	12.02					
Newberg	11.75					
Newport	13.86					
Piedmont	10.11					
Roseburgh (S. P. R. R)	10.77					
Sheridan	11.37					
Siskiyou	15.65					
Toledo	12.17					
Vernonia	17.44	2.84	7			
Washington.						
Lapush	15.11					

MAXIMUM RAINFALL IN ONE HOUR OR LESS.

The following table is a record of the heaviest rainfall during December, 1891, for periods of five and ten minutes and one hour, as reported by regular stations of the Weather Bureau furnished with self-registering gauges:

Station.	Maximum fall in—					
	5 min.	Date.	10 min.	Date.	1 hour.	Date.
	Inch.		*Inch.*		*Inch.*	
Atlanta, Ga	0.30	4	0.37	4	0.52	4
Bismarck, N. Dak *						
Boston, Mass	0.08	30	0.14	30	0.51	30
Buffalo, N. Y	0.05	4	0.10	4	0.20	4
Cincinnati, Ohio	0.03	24	0.05	24	0.15	23, 24
Chicago, Ill	0.05	1	0.06	1	0.15	1
Cleveland, Ohio	0.03	15	0.05	15	0.15	23
Denver, Colo *						
Detroit, Mich	0.02	4, 15	0.03	4, 15	0.12	4
Dodge City, Kans	0.04	13	0.06	13	0.15	13
Duluth, Minn *						
Eastport, Me	0.11	5	0.12	5	0.22	23
Galveston, Tex *						
Indianapolis, Ind	0.18	24	0.22	24	0.27	29
Jacksonville, Fla	0.05	18	0.08	18	0.25	18
Jupiter, Fla	0.10	5	0.15	5	0.40	5
Kansas City, Mo *						
Key West, Fla	0.15	18	0.24	18	0.70	18
Marquette, Mich *						
Memphis, Tenn	0.10	23	0.20	23	0.60	23
New York, N. Y	0.10	4, 24	0.13	4, 24	0.39	24
New Orleans, La	0.15	15	0.25	15	0.75	15
Norfolk, Va	0.25	4	0.26	4	0.28	4
Philadelphia, Pa	0.08	24	0.16	24	0.47	24
Philadelphia Water Works *						
Pittsburg, Pa	0.05	15	0.10	15	0.30	15
Portland, Oregon	0.05	22	0.06	22	0.20	22
Saint Louis, Mo	0.10	3	0.15	3	0.23	3
Saint Paul, Minn *						
San Diego, Cal	0.10	30	0.10	30	0.15	30
San Francisco, Cal	0.05	3	0.12	3	0.28	3
Savannah, Ga	0.10	7	0.12	7	0.13	7
Washington, D. C	0.10	24	0.15	24	0.58	24
Wilmington, N. C	0.05	29	0.10	29	0.20	29

*Record incomplete.

The following tables show the number of years for which monthly precipitation to equal or exceed 10.00 inches, daily precipitation to equal or exceed 2.50 inches, and hourly precipitation to equal or exceed 1.00 inch has been reported in the several states and territories for December during the last 22 years:

Excessive monthly precipitation.

State.	No. years noted.	State.	No. years noted.
Washington	16	Alabama	1
California	13	Arizona	1
Oregon	10	Indiana	1
Texas	7	Kentucky	1
North Carolina	6	Massachusetts	1
Louisiana	5	Michigan	1
Florida	4	Missouri	1
Mississippi	3	Nevada	1
Arkansas	2	New Hampshire	1
Georgia	2	New Jersey	1
New York	2	Tennessee	1

Excessive monthly precipitation—Continued.

State.	No. years noted.	State.	No. years noted.
Virginia	1	Minnesota	0
Colorado	0	Montana	0
Connecticut	0	Nebraska	0
The Dakotas	0	New Mexico	0
Delaware	0	Ohio	0
District of Columbia	0	Pennsylvania	0
Idaho	0	Rhode Island	0
Illinois	0	South Carolina	0
Indian Territory	0	Utah	0
Iowa	0	Vermont	0
Kansas	0	West Virginia	0
Maine	0	Wisconsin	0
Maryland	0	Wyoming	0

Excessive daily precipitation (24 hours).

California	14	Michigan	3
Texas	12	New Jersey	3
Louisiana	11	Arizona	2
North Carolina	11	Iowa	2
Georgia	10	Missouri	2
Alabama	9	District of Columbia	2
Florida	9	Connecticut	1
Oregon	9	Delaware	1
Tennessee	9	New Hampshire	1
Mississippi	9	Utah	1
Virginia	8	Vermont	1
Indiana	7	Colorado	0
Washington	7	The Dakotas	0
Illinois	6	Idaho	0
Ohio	6	Indian Territory	0
Pennsylvania	6	Minnesota	0
South Carolina	6	Montana	0
Maryland	5	Nebraska	0
New York	5	Nevada	0
Arkansas	4	New Mexico	0
Kentucky	4	Rhode Island	0
Massachusetts	4	West Virginia	0
Kansas	3	Wisconsin	0
Maine	3	Wyoming	0

Excessive hourly precipitation.

Texas	7	The Dakotas	0
California	6	Delaware	0
Louisiana	3	District of Columbia	0
Tennessee	3	Idaho	0
Illinois	2	Indian Territory	0
Indiana	2	Iowa	0
Pennsylvania	2	Kentucky	0
Alabama	2	Maryland	0
Arkansas	2	Minnesota	0
Michigan	2	Montana	0
Mississippi	2	Nebraska	0
Georgia	1	Nevada	0
Kansas	1	New Hampshire	0
Massachusetts	1	New Jersey	0
Florida	1	New Mexico	0
Maine	1	New York	0
Missouri	1	North Carolina	0
Oregon	1	Ohio	0
Virginia	1	Rhode Island	0
Washington	1	South Carolina	0
Wisconsin	1	Utah	0
Arizona	0	Vermont	0
Colorado	0	West Virginia	0
Connecticut	0	Wyoming	0

The following tables give exceptionally heavy monthly, daily, and hourly precipitation reported for December during the last 22 years:

Monthly.

Station and state.	Am't.	Year.	Station and state.	Am't.	Year.
	Inches.	*Year.*		*Inches.*	*Year.*
San Andreas, Cal	51.05	1871	Grass Valley, Cal	22.69	1888
Pilarcitos, Cal	41.87	1871	Neah Bay, Wash	22.57	1887
Felton, Cal	34.95	1889	Do	22.09	1890
Mount Hamilton, Cal	33.84	1884	Vacaville, Cal	21.85	1880
Reeds Camp, Cal	32.07	1880	Colfax, Cal	21.85	1889
Laurel, Cal	31.79	1889	Pysht, Wash	21.61	1886
Emigrant Gap, Cal	31.20	1884	Fort Stevens, Oregon	21.27	1880
Neah Bay, Wash	30.70	1886	American Hill, Cal	21.22	1889
Upper Mattole, Cal	29.36	1889	Grass Valley, Cal	21.08	1889
Mount Saint Helena, Cal	28.91	1880	Iowa Hill, Cal	21.04	1889
Summit, Cal	28.88	1871	San Rafael, Cal	20.96	1884
Cisco, Cal	28.39	1871	Emigrant Gap, Cal	20.85	1889
Crescent City, Cal	26.26	1885	Los Gatos (1), Cal	20.73	1889
Tatoosh Island, Wash	25.84	1886	Crescent City, Cal	20.58	1889
Delta, Cal	25.83	1889	Dunsmuir, Cal	20.58	1889
Cisco, Cal	25.57	1889	Healdsburgh, Cal	20.42	1871
Do	25.05	1884	Point Pleasant, La	20.39	1884
Mumford Hill, Cal	24.34	1880	Santa Cruz, Cal	20.38	1889
Neah Bay, Wash	23.91	1891	Portland, Oregon	20.14	1882
Colfax, Cal	23.60	1884	Paducah, Ky	20.12	1879
Neah Bay, Wash	23.22	1880	Tatoosh Island, Wash	20.08	1891
Georgetown, Cal	22.94	1889	Cathlamet, Wash	20.00	1875

Daily (24 hours).

Station and state.	Amount.	Date.	Station and state.	Amount.	Date.
	Inches.			*Inches.*	
Point Pleasant, La.	13.50	19, 1882	Hallettsville, Tex	5.93	11-12, 1891
Monroe, La	12.15	29-30, 1884	Mount St. Helena, Cal.	5.73	19-20, 1880
San Rafael, Cal.	11.45	17-21, 1884	Louisville, Ill	5.70	3, 1873
Mount Ida, Ark	10.35	26-30, 1884	New Ulm, Tex.	5.62	3, 1875
Mount St. Helena, Cal.	9.04	23-24, 1880	Neah Bay, Wash.	5.45	16-17, 1887
Clarksville, Tex	8.50	29-30, 1874	Fort Barrancas, Fla.	5.43	5, 1879
Do	8.50	28-29, 1876	Merritts Island, Fla.	5.39	17, 1888
Yaquina L. H., Oregon.	8.47	5-6, 1887	Fort Barrancas, Fla.	5.36	3-4, 1877
Point Pleasant, La.	8.03	28-30, 1884	Do	5.36	3-4, 1887
College Station, Tex.	7.78	12-14, 1891	Do	5.32	20, 1881
Portland, Oregon	7.66	12-13, 1882	Austin, Tex.	5.31	11-12, 1891
Point Pleasant, La.	7.02	8-9, 1878	Highlands, N. C.	5.30	26, 1881
Lynchburgh, Va.	6.74	21, 1884	Titusville, Fla.	5.28	17, 1888
Mount St. Helena, Cal.	6.65	2-3, 1880	Trinity, Ala.	5.20	4, 1887
Fort Gaston, Cal.	6.60	24-25, 1883	Vicksburg, Miss	5.05	18-19, 1872
Micco, Fla	6.33	24, 1888	Red Bluff, Cal.	5.04	19, 1879
Fort Meade, Fla	6.20	17, 1888	Boyds Corners, N. Y.	5.02	11, 1878
Farmerville, La.	6.15	5, 1890	Point Pleasant, La.	5.01	14, 1884
Minden, La	6.02	23, 1891	Elsworth, N. C.	5.00	1-2, 1880
Fayetteville, N. C.	6.00	9-10, 1878	Melissa, Tex	5.00	27-28, 1877
Do	6.00	20-21, 1878			
Clarksville, Tex	6.00	31-Jan. 1, 1874-75			

One hour and less.

Station and state.	Amount.	Time.	Date.
	Inches.	*h. m.*	
New Orleans, La	0.30	0 05	5, 1890
Norfolk, Va	0.25	0 05	4, 1891
Savannah, Ga.	0.25	0 05	8, 1890
Galveston, Tex	0.20	0 05	24, 1890
Clarksville, Tex	1.36	0 20	28, 1871
Galveston, Tex	1.36	0 20	28, 1871
Wellsborough, Pa	1.20	0 20	7, 1884
Winnebago, Ill	1.00	0 20	21, 1889

SNOW (in inches and tenths).

The first snow of the season was reported as follows: 1st, Flagstaff, Ariz. 2d, Carson City, Nev.; Folsom, Fort Bayard, and Olio, N. Mex.; Eola, Oregon. 3d, Portland, Oregon; Embuda and Fort Wingate, N. Mex. 4th, Keeler, Cal.; Middlesborough, Ky.; Moab, Utah. 5th, Holbrook and Oracle, Ariz.; Seattle, Wash. 7th, Chelan, Wash.; Ella, W. Va. 11th, Natural Bridge and Payson, Ariz. 12th, Calabasas, Mount Huachuca, and Strawberry, Ariz.; Red Canon and Springer, N. Mex.; Neah Bay, Wash. 13th, Bisbee, Ariz.; La Luz, Wash. 14th, Saint Johns, Ariz. 15th, Walnut Ranch, Ariz.; New Ulm, Tex. 17th, Moorestown, N. J. 18th, Waterville, Wash. 20th, Fort Grant, Ariz. 22d, Fort Bliss, Tex.; Doe Bay, Wash. 23d, Roseburgh, Oregon; Madrone, Wash. 24th, Tucson, Ariz.; Aberdeen, Wash. 25th, Albany, McMinnville, and Mount Angel, Oregon; Chehallis, Wash. 28th, Ochiltree, Tex. 30th, Gila Bend, Ariz.; Fort Canby, Wash. 31st, Fort Gaston, Cal.

In New England and the middle Atlantic states the monthly snowfall was generally very deficient. In parts of southern New England, Pennsylvania, Virginia, and West Virginia no snow fell during the month, and the snowfall generally in those districts was light and afforded no protection to grass and grain.

A severe snowstorm, with high wind, set in over North Dakota on the 2d and continued 3 days. The snow drifted heavily, and railroad communication was interrupted. At Saint Vincent, Minn., the storm began the morning of the 3d and continued until the 5th. Owing to high wind the ground was entirely free from snow in places and in others the snow drifts were 15 to 20 feet in depth. Heavy snow fell in Iowa, northern Missouri, northern Illinois, and southern Wisconsin on the 6th. A heavy snowstorm swept over the Rocky Mountain regions of Colorado and northern New Mexico on the 14th, and on the divide the snow drifted heavily. The principal snowstorm of the month over the northeastern part of the country occurred on the 15-16th, when the depth varied from 1.0 to 4.0 in northern New England. Very heavy snow fell in the mountains of Oregon, California, and Nevada the latter part of the month; telegraphic communication was interrupted, and the snow drifted badly along the line of the Central Pacific Railroad.

MONTHLY SNOWFALL.

The depth of snowfall for the month, as reported by regular and voluntary observers of the Weather Bureau, is shown on Chart V. The greatest depth reported was 119 at Summit, Cal.; 107 was noted at Sisson, Cal.; more than 90 in the mountains of Colorado; upward of 50 in the mountains of north-central New Mexico and at points in central and northeastern Nevada and northeastern Utah; more than 30 at stations in north-central Arizona, extreme Upper Michigan, southwestern Wyoming, Idaho, and eastern Oregon; and more than 10 generally in the plateau region north of the Gila and lower Colorado valleys, in eastern North Dakota, adjoining parts of southeastern South Dakota and northeastern Nebraska, in Upper Michigan, east-central New York, and at points in northern New England.

Snowfall of 10.0 or more was reported as follows, and in states and territories where the maximum depth was below that amount the station reporting the greatest amount is given: *Arizona.*—Flagstaff, 30; Natural Bridge, 19.5; Payson, 14.8; Strawberry, 14; Whipple Barracks, 13.2; Fort Bowie, 11.3. *California.*—Summit, 119; Sisson, 107; Shasta Springs and Walla Walla Creek, 88; Emigrant Gap, 77; Dunsmuir, 73; Sims, 50.5; Truckee (1), 50.2; Delta, 38.5; Bishop Creek, 35.2; Susanville, 34; Edgwood, 24; Fort Bidwell, 20.6; Yreka, 20; Redding, 12.5; Georgetown, 12. *Colorado.*—Platoro, 98.8; Cumbres, 97; Stamford, 73.5; Breckenridge, 47.5; Dillon, 42.2; Watervale, 41.5; Red Cliff, 40; Climax, 38; Greenhorn, 37.5; Rico, 37; Steamboat Springs, 34; Twin Lakes, 33; Carson, 32.8; Apishapa, 30; Arboles, 27.2; Alma, 27; Como (near), 26.8; San Luis, 25.8; Pagoda (near), 25; Castle Rock, 23; East Dale, 21.5; Meeker and Paradox, 21; First View, 20.5; Kirk and Smoky Hill Mine, 20; Table Rock, 18.2; Montrose and Villa Grove, 18; Idaho Springs and Denver, 17.5; Box Elder, 17; Watkins, 16.5; Husted, 16.2; Cope, 16; Deer Trail, 15.8; Antonito, Georgetown, and Parachute, 15; Dumont, 14.8; Fruita, 14; Jefferson, 13.4; Del Norte and Moraine, 13; Ward District, 12.8; Monte Vista (1), 12.2; Byers, 12; Springfield, 11.4; Pueblo, 11.2; Abbott and Aroya, 11; Robb and Yuma, 10.5; Agate, 10.2.

Connecticut.—Falls Village, New Hartford (1 and 2), and West Simsbury, trace. *Idaho.*—Era, 41.5; Garden Valley, 41; Henrys Lake, 39; Kootenai, 36; Payette, 34.5; Fort Sherman, 30.5; American Falls, 22; Ruthburg, 21. *Illinois.*—Rockford, 8. *Indiana.*—Michigan City, 6.5. *Iowa.*—Havelock, 13; Bonaparte, 10. *Kansas.*—Oberlin, 9.5. *Kentucky.*—Richmond, 0.5. *Maine.*—Orono, 10.5. *Maryland.*—Easton, 0.3. *Massachusetts.*—Florida, 4. *Michigan.*—Atlantic, 34; Rockland, 24; Calumet, 23; Marquette, 22.1; Crystal Falls, 20; Sault de Ste. Marie, 16.8; Cheboygan, 15; Charlevoix, 11.5; Lathrop, 10.8; Alma, Harbor Springs, and Paw Paw, 10. *Minnesota.*—Saint Vincent, 18. *Mississippi.*—Fayette, 6? *Missouri.*—Platte River, 8.5. *Montana.*—Fort Keogh, 8.2. *Nebraska.*—O'Neill, 13; Thedford, 12.5; Sargeant, 11; Long Pine, 10.

Nevada.—Cranes Ranch and Elko, 54; Austin, 52.2; Halleck, 48; Virginia City, 43.2; Palisade, 42.5; Wells, 41.5; Lewers Ranch, 40.4; Stofiel, 33.5; Palmetto, 30; Genoa, 29; Beowawe, 26; Downeyville, 22; Battle Mountain, 20.8; Ely, 20.5; Eureka, 18.1; Tybo, 18; Golconda, 17.5; Winnemucca, 16.8; Pioche, 16; Carson City, 15.9; Hawthorne (2), 15.5; Hawthorne (1), 13; Belmont, 10. *New Hampshire.*—Groveton, 1. *New Jersey.*—Junction, Moorestown, Paterson, and Trenton, trace. *New Mexico.*—Chama, 51; Monero, 41; Folsom, 28.5; Dulce, 28.1; Gallinas Spring and Halls Peak, 26; Estalina Springs, 21.3; Coolidge, 17; Springer, 15.5; Santa

Fé, 15; Bloomfield, 10.3. *New York.*—Utica, 14; Arcade (1), 11.8; Turin, 11.7; Constableville, 11. *North Carolina.*—Asheville, Bakersville, Linville, Mount Airy, and Oak Ridge, trace. *North Dakota.*—Saint Thomas, 61; Saint Johns, 29; Napoleon, 17.6; Gallatin, 14; Grand Forks, 13.8; Grand Rapids, 11.3; Fort Pembina, 11.2; Milton, 10. *Ohio.*—Montpelier, 3. *Oregon.*—Leland, 17. *Pennsylvania.*—Blue Knob, 3.5. *Rhode Island.*—Kingston (1 and 2), trace. *South Dakota.*—Webster, 18.5; Parker and Sioux Falls, 12; Yankton, 10.4; Aberdeen and Tyndall, 10. *Tennessee.*—Greeneville, McMinnville, and Rugby, trace. *Texas.*—Hartley, 0.5. *Utah.*—Park City, 49; Nephi, 33.5; Ogden, 32; Grouse Creek, 31; Provo City, 29; Levan, 22.5; Salt Lake City, 21; Blue Creek and Kelton, 20; Snowville and Terrace, 17; Losee and Parowan, 15; Cisco, 14; Richfield, 12; Mount Carmel, 10.7; Fort Du Chesne, 10.6. *Vermont.*—Strafford, 7. *Washington.*—Spokane, 22.2; Chelan, 14.5; Waterville, 11.5. *West Virginia.*—Grafton and Kingwood, 1. *Wisconsin.*—Baraboo, 17.5; Bayfield, 14.1; Florence, 10.5. *Wyoming.*—Evanston, 34; Fort Yellowstone, 24.7; Camp Pilot Butte and Casper, 10.

DEPTH OF SNOW ON GROUND ON 15TH AND AT THE CLOSE OF THE MONTH.

Chart VI shows the depth of snow on the ground at the close of the month, as reported by regular and voluntary observers of the Weather Bureau.

On the 15th a depth of more than 10 was reported over eastern North Dakota, in parts of Upper Michigan, in the mountains of Colorado and New Mexico, and in an area extending from northeastern Nevada over southwestern Idaho. The greatest depth in New England was 5 to 6 in central Maine and northern New Hampshire; 3 to 5 was reported in east-central New York; no snow was reported in southern New England, southeastern New York, Pennsylvania, and the Ohio and upper Mississippi valleys; 2 to 10 was noted in northern lower Michigan; 3 to 15 in Upper Michigan; trace to 8 in upper Wisconsin; 2 in central Minnesota; 5 to 12 in eastern North Dakota; trace to 5 in Nebraska; trace to 1 in Kansas; 10 to over 20 in the mountains of Colorado and New Mexico; 4 to 6 in northeastern Arizona; 2 to 4 in Utah; 8 to 18 in southern Idaho; 2 to 13 in Nevada; 3 to 18 in northeastern California; and 3.2 at Baker City, Oregon.

At the close of the month 1 to 2 was reported in northern New England and northeastern and western New York; 0.5 in the mountains of Pennsylvania; trace to 2 in Lower Michigan; 1 to 6 in Upper Michigan; 1 to 5 in northern Wisconsin; 3 to 12 in Minnesota and eastern North Dakota; trace to 2 in northern Iowa; 3 to 14 in eastern South Dakota; trace to 5 in Nebraska and eastern and western Kansas; 20 to 30 in the mountains of Colorado and northern New Mexico; 3 to 5 in northeastern Arizona and central and west-central New Mexico; 2 to 14 in Utah; 20 to 30 in Idaho; 4 to 50 in Nevada; 1 to 45 in northeastern California; 15 at Baker City, Oregon; and 4 to 6 in central and eastern Washington.

HAIL.

Description of the more severe hailstorms of the month is given under "Local storms." Hail was reported as follows: 1st, Washington. 2d, Oregon, Utah, and Washington. 3d, Nebraska. 4th, Kentucky and Utah. 5th, Indiana, Missouri, Oregon, and Washington. 6th, Illinois, Missouri, and Ohio. 8th, Oregon, Utah, Washington, and Wisconsin. 9th, California, Utah, and Wyoming. 12th, Arizona and New Mexico. 15th, Maine, Massachusetts, and Pennsylvania. 16th, Delaware. 18th, Alabama. 19th, Arizona and New York. 21st, Indian Territory, Iowa, Nebraska, Washington, and Wisconsin. 22d, Iowa, Washington, and Wisconsin. 23d, Oregon and Texas. 24th, Massachusetts. 27th, California and Washington. 28th, Arkansas and Washington. 29th, California, Georgia, Maryland, Missouri, New Jersey, New York, North Carolina, Oregon, Virginia, and Washington. 30th, Arizona and California. 31st, California, Kansas, Missouri, New York, Ohio, Oklahoma Territory, and Texas.

SLEET.

Description of the more severe sleet storms of the month is given under "Local storms." Sleet was reported as follows: 2d, Nevada and Utah. 3d, Minnesota. 4th, Michigan, Minnesota, New York, Ohio, South Dakota, and Utah. 5th, Kansas, Missouri, and New York. 6th, Illinois, Indiana, Kansas, Michigan, Missouri, New York, and Ohio. 7th, Ohio and Pennsylvania. 8th, California and Utah. 9th, Nevada and Utah. 12th, Arizona. 13th, Nebraska and New York. 14th, Nebraska and South Dakota. 15th, Connecticut, Massachusetts, Nevada, New York, Pennsylvania, and Vermont. 16th, Maine, Massachusetts, Nevada, and Pennsylvania. 18th, Alabama, Georgia, and South Carolina. 19th, Georgia and South Carolina. 21st, Iowa, Utah, and Washington. 22d, Minnesota, Texas, and Utah. 23d, California. 25th, Iowa and Missouri. 27th, Oregon. 28th, Iowa and Nebraska. 29th, Connecticut, Maine, New Jersey, Ohio, and Washington. 30th, California, Indiana, New Mexico, Ohio, and Washington. 31st, Kansas, Michigan, Missouri, Ohio, Pennsylvania, and Texas.

WINDS.

The prevailing winds in December, 1891, are shown on Chart II by arrows flying with the wind. In New England, the middle Atlantic states, and on the northeast slope of the Rocky Mountains southwest to northwest winds were most frequently noted; in the south Atlantic and east Gulf states and over the Florida Peninsula they were generally from northeast to southeast; in the west Gulf states, the lower Rio Grande valley, the Ohio Valley and Tennessee, and on the north Pacific coast, from east to south; in the Lake region and over the northern plateau region, from southeast to southwest; in the extreme northwest and on the south Pacific coast, from west to north; in the upper Mississippi valley and on the southeast slope of the Rocky Mountains, from south to southwest; in the Missouri Valley, on the middle-eastern slope of the Rocky Mountains, and over the middle plateau region, from south to northwest; over the southern plateau region, from north to southeast; and on the middle Pacific coast, variable.

HIGH WINDS.

[In miles per hour.]

Wind velocities of 50 miles, or more, per hour were reported at regular stations of the Weather Bureau as follows: 1st, 60, w., at Tatoosh Island, Wash.; 57, se., at Chicago, Ill. 3d, 52, s., at Cairo, Ill.; 52, e., at Tatoosh Island, Wash. 4th, 63, se., at Woods Holl, Mass.; 62, sw., at Buffalo, N. Y.; 60, w., at Block Island, R. I.; 54, se., at Harrisburg, Pa.; 54, s., at Chicago, Ill.; 51, sw., at Grand Haven, Mich. 5th, 58, se., at Woods Holl, Mass.; 54, sw., at Buffalo, N. Y.; 54, sw., at Lexington, Ky. 6th, 52, s., at Fort Canby, Wash. 7th, 98, s., at Fort Canby, Wash.; 60, s., at Tatoosh Island, Wash.; 52, sw., at Fort Assinaboine, Mont. 8th, 53, sw., at Chicago, Ill.; 51, sw., at Fort Assinaboine, Mont. 9th, 56, w., at Cheyenne, Wyo.; 52, sw., at Winnemucca, Nev.; 51, sw., at Woods Holl, Mass. 11th, 50, s., at Tatoosh Island, Wash.; 50, n., at Keeler, Cal. 12th, 60, s., at Fort Canby, Wash.; 50, sw., at Buffalo, N. Y. 14th, 60, n., at Pueblo, Colo.; 52, e., at Tatoosh Island, Wash. 16th, 59, nw., at Woods Holl, Mass.; 52, se., at Fort Canby, Wash.; 50, s., at Tatoosh Island, Wash. 17th, 51, nw., at Woods Holl, Mass. 20th, 62, w., at Tatoosh Island, Wash. 22d, 60, w., at Tatoosh Island, Wash.; 52, w., at Fort Canby, Wash. 23d, 56, w., at Tatoosh Island, Wash. 25th, 66, se., at Fort Canby, Wash.; 51, sw., at Chicago, Ill.