

## MAXIMUM TEMPERATURE.

At Columbus and Cincinnati, Ohio, Springfield, Mo., Concordia, Kans., and Helena, Mont., the maximum temperature for the current month was the highest ever noted for March.

The highest temperature reported by a regular station of the Weather Bureau in March, 1893, was 97, at Yuma, Ariz., on the 28th. The maximum temperature reached 92 at Tucson, Ariz., on two or more dates, and a reading of 90 was noted at Abilene, Tex., on the 31st. In the Gulf States, except along the middle Gulf coast, the maximum temperature was above 80. Maximum temperature above 80 was also reported in Florida, central and southern Georgia, the interior of South Carolina, from the lower Missouri valley and the middle-eastern slope of the Rocky Mountains to the Rio Grande River, over south and west parts of the southern plateau region, and over the southern half of California, except in the Sierra Nevada Mountain districts and on the southern coast. Reports of voluntary observers show maximum temperature above 100 in the lower Colorado valley, Arizona, and in the Colorado Desert, California. The lowest maximum temperature, 41, was noted at Moorhead, Minn.; the maximum values were below 50 in the Lake Superior region and the Red River of the North Valley, and were below 55 on the southeast New England and extreme north Pacific coasts.

## MINIMUM TEMPERATURE.

At Savannah and Atlanta, Ga., Chattanooga, Tenn., Cairo, Ill., and Little Rock, Ark., the minimum temperature was as low, and at Charlotte, N. C., Memphis, Tenn., Fort Smith, Ark., Moorhead, Minn., and Los Angeles, Cal., it was lower than previously reported for March.

The lowest temperature reported by a regular station of the Weather Bureau, 26 below zero, was noted at Saint Vincent, Minn., on the 4th and 15th. In the Red River of the North Valley and over the eastern half of North Dakota the minimum temperature fell below -20, and the minimum values were below zero over the northern lake region, in the middle and upper Missouri and extreme upper Mississippi valleys, and on the middle and northeast slopes of the Rocky Mountains. The minimum temperature was also below zero over northern New England. The highest minimum temperature, 56, was noted at Key West, Fla.; the minimum readings were 40, or above, over the southern part of the Florida Peninsula, along the immediate middle and west Gulf coasts, and at San Francisco and San Diego, Cal.

## LIMITS OF FREEZING WEATHER.

The southern limit of freezing weather is shown on Chart V by a line traced southwestward over the Florida Peninsula to Tampa, Fla., and from the middle Gulf coast westward over Texas north of San Antonio. The western limit of freezing weather is shown by a line traced along the immediate north Pacific coast to extreme northwestern California, and thence over the central valleys of California, extreme southern Nevada, and western Arizona.

## RANGES OF TEMPERATURE.

The greatest daily range of temperature is shown in the table of miscellaneous meteorological data. The greatest monthly range of temperature, 93, was noted at North Platte, Nebr., and the range exceeded 80 along the middle-eastern and northeastern slopes of the Rocky Mountains. From the middle and northern Rocky Mountain regions the monthly ranges decreased eastward to less than 40 on the south New England coast, and to 40 at Hatteras, N. C., southeastward to less than 30 at Key West, Fla., and Port Eads, La., southwestward to less than 40 on the extreme south Pacific coast, and westward to less than 30 on the immediate north Pacific coast.

## COLD WAVES.

A severe cold wave overspread the Southwest on the 3d, and extended to the south Atlantic coast on the 4th, with a fall in temperature of 30 to 40 in the Gulf and south Atlantic states, freezing weather to Charleston, S. C., Montgomery, Ala., and Meridian, Miss., and the lowest temperature on record for March at points in Tennessee and Arkansas. The morning of the 5th the temperature fell below the freezing point over the northern part of the Florida Peninsula, and reached 32 at New Orleans, La. The second important cold wave of the month appeared over the Rocky Mountain regions on the 12th, overspread the Missouri Valley on the 13th with a fall in temperature of 30 to 40, extended over the middle and upper Mississippi valleys, and from the western lake region to the northern part of the east Gulf states on the 14th, and reached the Atlantic coast on the 15th, with freezing weather to the north part of the east Gulf states. The morning of the 16th the temperature fell to 31 at Wilmington, N. C. From the 21st to the 23d a cold wave swept over the northern part of the country from the eastern Saskatchewan valley to the New England coast. From the 23d to the 25th a moderate cold wave advanced from the Western States over the central valleys.

## FROST.

On the 5th frost occurred generally over the northern part of the Florida Peninsula. At Tampa, Fla., the temperature fell to 31.9, and frost damaged young fruit and vegetables. At Titusville, Fla., the temperature fell to 34 and frost damaged tender vegetation. At Pensacola, Fla., the temperature fell to 28, and garden vegetables in that section were killed by frost. On the 6th heavy frost was reported at Montgomery, Ala., and light frost at Savannah, Ga., and Charleston, S. C. Light frost occurred in southern Arizona on the 10th. On the 18th frost killed fruit blooms about Dallas, Tex. On the 19th low temperature and heavy frost damaged tender vegetation in the east Gulf and south Atlantic states. Tender plants in North Carolina were nipped by frost on the 20th. On the 29th light frost was reported in northern Louisiana, and peach blossoms were injured in northern Arkansas. Light frost was noted at points in the interior of the Gulf and south Atlantic states the morning of the 30th.

## PRECIPITATION (expressed in inches and hundredths).

The distribution of precipitation over the United States and Canada for March, 1893, as determined from reports of more than 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 March the normal precipitation is greatest at points along the Pacific coast north of the 42d parallel and at stations in the Sierra Nevada Mountains between the 37th and the 40th parallels, where it exceeds 8.00. It exceeds 6.00 over a great part of the Gulf States east of the 95th meridian and in southeastern Tennessee and western parts of the Carolinas

and Georgia. Along the Atlantic coast north of the 34th parallel, from Kentucky and Arkansas to the Florida Peninsula and eastern Texas, in areas in north-central Colorado and central Utah, and generally west of the Sierra Nevada Mountains, the normal amount is in excess of 4.00. In districts east of a line traced from northern Lower Michigan to south-central Texas the precipitation in March usually exceeds 2.00. Generally over the Rocky Mountain and plateau regions the March precipitation is less than 1.00, and in large areas in those districts it is less than 0.50.

In March, 1893, the monthly precipitation was 21.54 at Pikes Peak, Colo., 17.69 at Georgetown, Cal., and 14.83 at Neah Bay, Wash., and exceeded 10.00 at points along the immediate north Pacific coast, in northwestern California, in the Sierra Nevada Mountains between the 37th and 40th parallels, and in the mountain region east of Los Angeles, Cal. The monthly amount exceeded 8 00 generally along the immediate Pacific coast, in east-central California, and over the northern part of the Florida Peninsula. In areas in the central valleys and the Gulf and south Atlantic states, along the south New England and New Jersey coasts, and in eastern Pennsylvania and south-central Nevada 4.00, or more, fell. In the Saskatchewan Valley, western and northeastern Montana, and northwestern North Dakota, over the middle and southern Rocky Mountain regions, in the lower Rio Grande valley, and at Key West, Fla., the precipitation was less than 0.25. Over the west part of the plateau region, generally in the Rocky Mountain districts, from northern North Dakota over northern Lake Superior, in northeastern New York, northern Vermont, northern New Hampshire, southern Texas, and extreme southern Florida, the monthly precipitation was less than 1.00.

DEPARTURE FROM NORMAL PRECIPITATION.

The monthly precipitation was in excess of the normal amount for March along the middle and south New England and New Jersey coasts, in Florida, except over the extreme southern portion, generally over the Pacific coast and plateau regions, except in Oregon, in the western and northern lake regions, and thence to the middle Rocky Mountain districts; elsewhere the monthly precipitation was deficient when compared with the average amount for March. The greatest amount in excess of the normal, 6.80, was noted at Neah Bay, Wash. At Jacksonville, Fla., and Los Angeles, Cal., the excess was 5.00 to 6.00. Over northeastern Florida, northwestern Washington, and extreme northwestern and southwestern California, the precipitation was more than 4.00 greater than usual. The most marked deficiency, 3.00 to 4.00, was noted over eastern Maine, parts of Nova Scotia, and in an area extending from Mississippi and southwestern Tennessee over the interior of the east Gulf and south Atlantic states, western North Carolina, and southwestern Virginia. In the lower valley of the Columbia River, Oregon, from the middle and west Gulf coasts over the interior of the middle and east Gulf and south Atlantic states, Virginia, District of Columbia, and Maryland, and over northern New England, New Brunswick, and Nova Scotia, the monthly precipitation was 2.00 or more less than the normal amount for March.

Considered by districts the average percentage of the normal in districts where the monthly precipitation was in excess was about as follows: south Pacific coast, 317; extreme northwest, 200; southern plateau region, 183; middle Pacific coast, 153; northern plateau region, 148; middle plateau region, 146; Missouri Valley, 138; north Pacific coast, 126; upper Mississippi valley, 118. In districts where the precipitation was deficient the percentage of the normal was about as follows: middle-eastern and southeastern slopes of the Rocky Mountains, 26; Ohio Valley and Tennessee, 52; east Gulf states, 55; lower lake region, 63; west Gulf states, 64; mid-

dle Atlantic states, 67; south Atlantic states, 80. In New England, the upper lake region, and on the northeast slope of the Rocky Mountains the monthly precipitation averaged about normal.

The following table shows for certain stations, as reported by voluntary observers, (1) the average precipitation for March 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 March, 1893; (4) the departure of the current month from the average; (5) and the extremes for March during the period of observation and the years of occurrence:

State and station.	(1) Average for the month of March.	(2) Length of record.	(3) Total for March, 1893.	(4) Departure from average.	(5) Extremes for March.			
					Greatest.		Least.	
					Am't.	Year.	Am't.	Year.
<i>Arizona.</i>	<i>Inches.</i>	<i>Years</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>			
Fort Apache .....	1.63	17	2.45	+ 0.82	4.44	1884	0.03	1879
Fort Mohave .....	0.45	22	1.09	+ 0.64	2.50	1889	0.00	*
Whipple Barracks .....	1.43	21	3.26	+ 1.83	5.51	1884	0.03	1882
<i>Arkansas.</i>								
Keesees Ferry .....	3.85	11	3.75	- 0.10	6.78	1890	2.78	1892
<i>California.</i>								
Fort Bidwell .....	2.06	22	1.60	- 0.46	7.31	1889	0.04	1885
Riverside .....	2.04	12	5.74	+ 3.70	8.52	1886	0.00	1888
<i>Colorado.</i>								
Las Animas .....	0.75	11	0.05	- 0.70	2.43	1891	0.00	1890
<i>Florida.</i>								
Merritts Island .....	2.55	15	2.95	+ 0.40	7.92	1878	0.56	1892
<i>Georgia.</i>								
Forsyth .....	7.42	19	2.51	- 4.91	12.87	1875	1.37	1878
<i>Idaho.</i>								
Boise Barracks .....	1.72	19	1.30	- 0.42	7.66	1871	0.03	1885
Fort Sherman .....	1.86	10	3.35	+ 1.49	3.35	1893	0.14	1882
<i>Indiana.</i>								
Lafayette .....	2.59	13	4.12	+ 1.53	4.25	1886	0.46	1885
<i>Indian Territory.</i>								
Fort Supply .....	1.55	14	0.20	- 1.35	7.62	1876	0.00	1887, 1890
<i>Iowa.</i>								
Cresco .....	1.77	20	2.77	+ 1.00	4.55	1888	0.22	1889
<i>Kansas.</i>								
Independence .....	2.17	21	2.98	+ 0.81	5.54	1892	0.43	1872
Salina .....	1.02	10	.....	.....	3.28	1892	0.03	1885
<i>Louisiana.</i>								
Grand Coteau .....	4.81	10	3.83	- 0.98	10.20	1884	0.80	1891
<i>Maine.</i>								
Orono .....	4.27	23	.....	.....	8.20	1876	1.89	1883
<i>Maryland.</i>								
Cumberland .....	3.09	21	1.00	- 2.09	7.47	1891	0.50	1872
<i>Michigan.</i>								
Kalamazoo .....	2.39	17	2.89	+ 0.50	7.33	1877	0.42	1883
<i>Missouri.</i>								
Sedalia .....	2.60	15	2.67	+ 0.07	7.67	1888	0.43	1879
<i>Montana.</i>								
Fort Custer .....	0.54	13	0.35	- 0.19	1.19	1887	0.07	1882
<i>Nebraska.</i>								
Fort Robinson .....	1.16	9	1.19	+ 0.03	1.83	1888	T.	1889
Genoa (near) .....	1.25	17	1.72	+ 0.47	3.55	1876	T.	1882
<i>Nevada.</i>								
Browns .....	0.35	21	0.25	- 0.10	2.00	1883	0.00	*
Carson City .....	1.45	16	1.47	+ 0.02	4.22	1882	0.18	1875
<i>New Hampshire.</i>								
Hanover .....	2.33	22	2.12	- 0.21	5.25	1888	0.28	1878
<i>New Mexico.</i>								
Fort Wingate .....	1.05	22	1.11	+ 0.06	2.70	1890	0.02	1887
<i>New York.</i>								
Cooperstown .....	2.89	22	2.13	- 0.76	5.20	1871	0.55	1885
Plattsburg Barracks .....	2.05	22	0.68	- 1.37	3.68	1873	0.68	1889
<i>North Carolina.</i>								
Lenoir .....	4.17	21	1.10	- 3.07	10.20	1875	0.50	1879
<i>Oklahoma.</i>								
Fort Reno .....	1.65	10	1.90	+ 0.25	3.10	1892	0.00	1886
Fort Sill .....	1.51	21	1.36	- 0.15	4.52	1871	0.03	1872
<i>Oregon.</i>								
Bandon .....	6.78	15	10.84	+ 4.06	15.50	1879	0.63	1885
<i>Pennsylvania.</i>								
Dyberry .....	3.11	22	3.30	+ 0.19	5.00	1890	1.03	1885
Grampan .....	3.94	22	2.49	- 1.45	6.89	1875	1.31	1885
Wellsboro .....	4.93	13	5.09	+ 0.16	10.08	1884	0.66	1887
<i>South Carolina.</i>								
Statesburg .....	4.14	12	1.32	- 2.82	7.62	1891	0.97	1887
<i>South Dakota.</i>								
Fort Sully .....	1.04	22	2.80	+ 1.76	9.60	1871	T.	1887
<i>Texas.</i>								
Austin .....	2.47	21	2.90	+ 0.43	5.60	1876	0.58	1890
Silver Falls .....	0.54	5	0.93	+ 0.39	1.03	1892	0.00	1889
<i>Utah.</i>								
Terrace .....	0.41	20	0.55	+ 0.14	1.74	1884	0.00	*
<i>Vermont.</i>								
Strafford .....	3.54	20	1.90	- 1.64	4.10	1876	1.50	1892
<i>Virginia.</i>								
Dale Enterprise .....	3.56	13	1.39	- 2.17	6.86	1886	1.01	1881
<i>Washington.</i>								
Fort Townsend .....	1.79	17	2.26	+ 0.47	4.32	1876	0.11	1884
<i>West Virginia.</i>								
Parkersburg .....	3.21	7	0.94	- 2.27	6.95	1890	0.80	1885
<i>Wisconsin.</i>								
Embarrass .....	2.48	22	.....	.....	5.46	1871	0.55	1883

Departures from average precipitation—Continued.

Table with columns: State and station, (1) Average for the month of March, (2) Length of record, (3) Total for March, 1893, (4) Departure from average, (5) Extremes for March (Greatest, Least).

\* Frequently.

PRECIPITATION, JANUARY TO MARCH

For the period January to March, 1893, inclusive, the precipitation averaged about the normal amount in New England, the upper lake region, the Missouri Valley, on the northeast slope of the Rocky Mountains, over the northern plateau region, and along the middle and north Pacific coasts.

YEARS OF GREATEST PRECIPITATION FOR MARCH.

At Jacksonville, Fla., Fort Sherman, Idaho, and Neah Bay, Wash., the precipitation for the current month was the greatest reported for March during the respective periods of observation.

The greatest precipitation for March was noted at Montgomery, Ala., and Santa Fe, N. Mex., in 1892; at Washington, D. C., Charlotte, N. C., Nashville, Tenn., Marquette, Mich., Duluth, Minn., North Platte, Nebr., Denver, Colo., Salt Lake City, Utah, and Helena, Mont., in 1891; in the middle Ohio valley in 1890; in Virginia, Arizona, southern California, and the Sacramento Valley in 1884; in Minnesota and northwestern Wisconsin in 1882; in the lower Rio Grande valley in 1878; in the middle and lower Mississippi, lower Ohio, and lower Missouri valleys in 1876; over western New York in 1873; and along the South Carolina and Georgia coasts in 1872.

YEARS OF LEAST PRECIPITATION FOR MARCH.

At Eastport, Me., Baltimore, Md., Key West, Fla., Galveston, Tex., and Memphis, Tenn., the precipitation for the current month was the least reported for March during the respective periods of observation.

The least precipitation for March was noted at Jacksonville, Fla., in 1892; in South Carolina, Georgia, and eastern Alabama in 1887; generally in the middle Atlantic and south New England states, in the Ohio, upper Mississippi, and lower Missouri valleys, and in the Pacific coast states and Nevada in 1885; on the eastern slope of the Rocky Mountains from Colorado and northwestern Kansas to southern Montana, and in the middle Missouri valley in 1882; and from eastern Texas over the greater part of Louisiana, Mississippi, central Tennessee, and western Kentucky in 1879.

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 March, 1893:

Monthly precipitation to equal or exceed 10.00.

Table with columns: State, Number of stations, State, Number of stations.

Precipitation to equal or exceed 2.50 in 24 hours.

Table with columns: State, Number of stations, Dates, State, Number of stations, Dates.

Precipitation to equal or exceed 1.00 in 1 hour.

Table with columns: State, Number of stations, Dates, State, Number of stations, Dates.

Table of excessive precipitation, March, 1893.

Table with columns: State and station, Monthly rainfall to inches, or more, Rainfall 2.50 inches, or more, in 24 hours, Rainfall 1 inch, or more, in one hour.

Table of excessive precipitation—Continued.

State and station.	Monthly rainfall to 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.
<i>California—Continued.</i>						
Santa Margarita	10.60					
Santa Cruz (a)	11.03					
Shasta	12.36	3.22	7-8			
Shelter Cove	13.93	2.70	9-10			
Summit	14.58					
Towles	16.61					
<i>Colorado.</i>						
Pikes Peak	21.54	6.18	7-8			
Do	5.68		15			
Do	2.74		20			
Do	4.05		22-23			
Rico	2.77		23			
<i>Connecticut.</i>						
Colchester		2.65	9-10			
Southington		2.60	9-10			
Wallingford		2.70	9			
<i>Florida.</i>						
Bristol		4.30	23-24			
Chattahoochee Landing		3.85	24-25			
Jupiter		3.45	26	2.95	0 33	26
Lake City		2.83	25			
Moseley Hall		3.66	24-25			
Saint Andrews Bay		4.13	24-25			
<i>Georgia.</i>						
Albany		3.25	24			
Bainbridge		4.06	25			
Blakely		3.60	24			
Cordale		3.25	24-25			
Lumpkin		3.52	24			
Marshallville		2.63	23			
Morgan		2.76	24			
Piscola		3.10	24-25			
Quitman (b)		2.50	24-25			
Reynolds		2.87	24-25			
<i>Illinois.</i>						
Griggsville		4.00	7-8			
<i>Indiana.</i>						
Evansville				1.20	1 00	23
Hawpatch		2.69	23-24			
Muncie		2.50	11			
<i>Iowa.</i>						
Fort Madison		2.50	8			
<i>Kentucky.</i>						
Canton		3.00	23			
<i>Louisiana.</i>						
Abbeville		2.50	16			
Baton Rouge		3.25	16-17			
Cameron		3.60	16			
Coushatta (a)				1.65	1 30	23
Dorlandsonville		2.50	17			
Farmerville				1.13	0 30	23
Grand Coteau		3.00	16			
Hammond		2.85	16-17			
Houma		2.53	20-21			
Jeanerette		2.59	15-16			
Lake Charles		6.00	20	6.00	6 00	20
Maurepas		2.57	16			
Plaquemine		2.63	16			
Shell Beach		2.80	20			
<i>Massachusetts.</i>						
Fall River (a)		3.50	9-10			
Long Plain		3.90	9-10			
Middleboro		3.65	9-10			
New Bedford (a)		3.84	9-10			
New Bedford (b)		3.61	9-10			
Somerset		3.61	9-10			
South Dennis		3.69	9			
Taunton (b)		3.16	9-10			
Taunton (c)		3.84	9-10			
Woods Holl		2.51	9-10			
<i>Mississippi.</i>						
Canton		2.51	23			
Logtown		2.95	17			
<i>Missouri.</i>						
Lamar				1.20	0 30	7
<i>New Jersey.</i>						
Imlaystown		3.55	9			
<i>New York.</i>						
Setauket		2.78	9			
<i>Oregon.</i>						
Bandon	10.84					
Glenora	14.10					
Langlois	15.85	2.60	10			
<i>Pennsylvania.</i>						
Wellaboro		2.75	9			
<i>Rhode Island.</i>						
Kingston (b)		3.60	9-10			
Providence (a)		2.98	9-10			
Providence (b)		2.73	9-10			
Providence (c)		3.02	9-10			
<i>South Dakota.</i>						
Alexandria		2.66	8			
Faulkton		2.75	12-13			
<i>Texas.</i>						
Arlington		2.50	7			
Waco		2.75	7-8			
<i>Virginia.</i>						
Spottsville		2.57	3-4			
<i>Washington.</i>						
Aberdeen	10.82					

Table of excessive precipitation—Continued.

State and station.	Monthly rainfall to 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.
<i>Washington—Continued.</i>						
East Clallam	12.47					
Neah Bay	14.83	3.08	6-7			
Tatoosh Island	12.63	2.86	6-7			

MAXIMUM RAINFALL IN ONE HOUR OR LESS.

The following table is a record of the heaviest rainfall during March, 1893, for periods of five and ten minutes and one hour, as reported by regular stations of the Weather Bureau furnished with self-registering gauges:

Maximum rainfall in one hour or less.

Station.	Maximum fall in—					
	5 min.	Date.	10 min.	Date.	1 hour.	Date.
Atlanta, Ga.	Inch.	11	Inch.	11	Inch.	11
Bismarck, N. Dak.*	0.25		0.36		0.50	
Boston, Mass.*	0.05	15	0.08	15	0.21	15
Buffalo, N. Y.*						
Cincinnati, Ohio*	0.03	11	0.05	11	0.20	11
Chicago, Ill.*	0.02	8	0.04	8	0.18	8
Cleveland, Ohio*						
Denver, Colo.*						
Detroit, Mich.*	0.03	9	0.05	9	0.21	9
Dodge City, Kans.†						
Duluth, Minn.*						
Eastport, Me.*	0.04	13	0.06	13	0.24	13
Galveston, Tex.	0.10	16	0.11	16	0.17	16
Indianapolis, Ind.*	0.06	22	0.09	22	0.29	22
Jacksonville, Fla.	0.20	25	0.35	25	0.91	25
Jupiter, Fla.	0.75	26	1.25	26	2.95	26
Kansas City, Mo.	0.10	23	0.14	23	0.28	23
Key West, Fla.‡						
Marquette, Mich.*						
Memphis, Tenn.	0.20	23	0.40	23	0.65	23
Milwaukee, Wis.*						
New Orleans, La.†						
New York, N. Y.*	0.09	9	0.12	9	0.45	9
Norfolk, Va.	0.07	25	0.09	25	0.22	25
Philadelphia, Pa.	0.05	11	0.06	11	0.20	11
Pittsburg, Pa.†						
Portland, Oregon	0.02	17	0.03	17	0.13	17
Saint Louis, Mo.	0.17	22	0.30	22	0.69	22
Saint Paul, Minn.*						
Salt Lake City, Utah	0.01	19	0.02	19	0.07	19
San Diego, Cal.	0.10	8	0.19	8	0.45	8
San Francisco, Cal.	0.04	7	0.06	7	0.22	11
Savannah, Ga.	0.22	4	0.30	4	0.53	27
Tampa, Fla.	0.30	17	0.40	17	0.90	26
Washington, D. C.*	0.05	9	0.05	9	0.15	9
Wilmington, N. C.	0.10	4	0.12	4	0.29	4

\* Record incomplete on account of snow.

† Self-register out of order.

‡ Less than 0.05 in 1 hour.

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 March during the last 23 years:

Excessive monthly precipitation.

State.	No. years noted.	State.	No. years noted.
Georgia	13	Illinois	3
Alabama	12	New Hampshire	3
California	11	New York	3
Washington	10	Indiana	2
North Carolina	9	New Jersey	2
Oregon	9	Pennsylvania	2
Mississippi	9	Virginia	2
Tennessee	8	Wisconsin	2
Florida	6	Delaware	1
Louisiana	6	Kentucky	1
Arkansas	5	Kansas	1
Massachusetts	4	Maryland	1
South Carolina	4	Nebraska	1
Texas	4	Ohio	1
Connecticut	3	Rhode Island	1

Excessive monthly precipitation—Continued.

Table with 4 columns: State, No. years noted, State, No. years noted. Lists states like Utah, Arizona, Colorado, etc., with their respective precipitation frequency.

Excessive daily precipitation (24 hours).

Table with 4 columns: State, No. years noted, State, No. years noted. Lists states like Alabama, Georgia, Louisiana, etc., with their respective precipitation frequency.

Excessive hourly precipitation.

Table with 4 columns: State, No. years noted, State, No. years noted. Lists states like Texas, Tennessee, Florida, etc., with their respective precipitation frequency.

The following tables give exceptionally heavy monthly, daily, and hourly precipitation reported for March during the last 23 years:

Monthly.

Table with 6 columns: Station and state, Am't., Year, Station and state, Am't., Year. Lists stations like Delta, Cal., Cisco, Cal., etc., with precipitation amounts and years.

Daily (24 hours).

Table with 6 columns: Station and state, Amount, Date, Station and state, Amount, Date. Lists stations like Okaloosa, La., Kosciusko, Miss., etc., with precipitation amounts and dates.

Excessive daily precipitation—Continued.

Table with 6 columns: Station and state, Amount, Date, Station and state, Amount, Date. Lists stations like Vicksburg, Miss., Mobile, Ala., etc., with precipitation amounts and dates.

One hour and less.

Table with 6 columns: Station and state, Amount, Time, Date. Lists stations like Wilmington, N.C., Saint Louis, Mo., etc., with precipitation amounts, times, and dates.

SNOW.

On the 3d a heavy snowstorm, with high wind and rapidly falling temperature, prevailed generally over the states of the lower Ohio and middle Mississippi valleys. On the 4th the storm of snow and wind reached the middle Atlantic coast, and snow fell as far south as Montgomery, Ala., in the morning. At Pasadena, Cal., snow pellets fell in sufficient quantity to whiten the ground the afternoon of the 9th. On the 11th the heaviest snowfall on record for that section was reported in the eastern part of Fresno County, Cal. A heavy snowstorm, with a northeast gale, prevailed in Minnesota and Upper Michigan on the 13th. During the day and night of the 22d snow drifted by high wind interrupted traffic in the eastern Dakotas and Minnesota.

MONTHLY SNOWFALL (in inches and tenths).

Chart V shows the depth of snowfall reported for the month.

The greatest depth of snowfall reported was 179, at Pikes Peak, Colo. A depth of 145 was noted at Summit, Cal. 61 was noted at Flagstaff, Ariz.; 60 at Siskiyou, Oregon; 54 at Palmetto, Nev.; and 52 at Chama, N. Mex. In the mountains of Colorado and northeastern California the monthly snowfall exceeded 30. In the mountains of New England, at Marquette, Mich., at points in the Dakotas, extreme northern Wisconsin, northern Nebraska, northern Utah, central Nevada, and central Idaho the depth was 20, or more. Snow fell along the Atlantic coast to South Carolina, and the southern limit of snow is shown by a line traced from central Georgia and central Alabama west-northwest to southern Kansas, and thence to extreme western Texas. Heavy snow fell in the mountains of southwestern California, and the snow line reached the coast at Eureka, Cal.

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

At points in the interior of New England, over the north-

ern lake region, and thence over the eastern Dakotas, at stations in the Rocky and Sierra Nevada mountains, and at points in northeastern Utah, central and northeastern Nevada, a depth of 20, or more, was noted on the 15th. On that date the snow line extended southward over the Alleghany range of mountains to extreme northeastern Tennessee, thence over Kentucky and central Missouri to southern Nebraska, thence to central Arizona, thence to east-central California, and thence along the Sierra Nevada and Cascade ranges of mountains to British Columbia.

At the close of the month snow to a depth of 20, or more, was reported in the mountains of New England, Colorado, Idaho, eastern Oregon, eastern Washington, and northeastern California, and at stations in Upper Michigan, northern Wisconsin, central Minnesota, and north-central North Dakota. A slight depth of snow was reported on the ground generally in the interior of New England, New York, and Lower Michigan, and over the greater part of Wisconsin, Minnesota, North Dakota, and northern South Dakota.

Monthly snowfall of 10 inches, or more, was reported as follows, and in states and territories where the maximum depth was below that amount the station reporting the greatest is given:

*Alabama*.—Auburn, Clanton, Cordova, Gadsden, Jasper, Lynn, Maysville, Montgomery, Scottsboro, Talladega, and Tallassee Falls, trace. *Arizona*.—Flagstaff, 61; Chiricahua Mountains, 19.2; Payson, 14; Whipple Barracks, 13.5; Fort Bowie and Natural Bridge, 12. *Arkansas*.—Keesees Ferry, 1. *California*.—Summit, 145; Edmanton, 89; Emigrant Gap, 73; Towles, 61; Dunsmuir, 56; Truckee, 43; Tehachapi (b), 28.5; Shasta, 27.2; Tehachapi (a), 21; Boca, 18; Iowa Hill, 16; Edgwood, 15.5; Nevada City, 12.5; San Ardo (b), 12; Fort Bidwell, 11.2; Mariposa, 11; Grass Valley (a), 10. *Colorado*.—Pikes Peak, 179; Climax, 65; Cumbres, 60; Rico, 52.9; Breckenridge, 52.1; Pagoda (near), 49; Meeker, 42.5; Red Cliff, 35.1; Lay, 32.5; Moraine, 22; Dillon, 18.5; Colbran, 12.8; Saint Cloud, 10.

*Connecticut*.—North Franklin, 11. *Delaware*.—Millsboro, 12.5; Seaford, 11.5. *District of Columbia*.—Washington, 2. *Georgia*.—Diamond, 3.3. *Idaho*.—Martin, 38.5; Garden Valley, 28; Idaho Falls, 16.2; Bonanza City, 14; American Falls, 13; Ruthburg, 12. *Illinois*.—Saint John, 5.5. *Indiana*.—Laconia, 6.5. *Iowa*.—Villisca, 17.3; Blockton, 12; Winterset, 11.2; Blakeville, 11. *Kansas*.—Atchison and Morse, 10. *Kentucky*.—Lexington, 6.2. *Maine*.—Indian Stream, 13; Farmington, 12.5. *Maryland*.—Cambridge, 12.3; Denton, 12; Barren Creek Springs, 11; Sunnyside, 10.9. *Massachusetts*.—Woods Holl, 18.5; Hyannis, 18; South Dennis and Vineyard Haven, 16; Monroe, 13.5; Plymouth, 11.5; New Bedford (a), 11; Provincetown, 10.5; Adams (a) and Gilbertville, 10. *Michigan*.—Marquette, 28.4; Calumet, 17; Lathrop, 14; Berrien Springs (a), 12.8; Escanaba, 11.7; Alpena, 10.4; Berrien Springs (b) and Washington, 10.

*Minnesota*.—Duluth and Wabasha, 16.4; Montevideo, 16; Sandy Lake Dam, 15.3; Ortonville, 15; Alexandria (b) and Leech Lake, 14; Caledonia and Long Prairie, 13; Maple Plain, 12.9; Alexandria (a) and Blooming Prairie, 12; Park Rapids, 11.6; Minnesota City and Saint Charles, 11; Lake Winnibigoshish, 10.6; Pine River, 10.5; Camden, 10. *Mississippi*.—Palo Alto, Pontotoc, and University, trace. *Missouri*.—Liberty, 9. *Montana*.—Powder River, 8.5. *Nebraska*.—Whitman, 30; Ewing, 22; Hay Springs, 20.5; Valentine, 14.8; Kennedy and Ponca, 12; Arborville, 10. *Nevada*.—Palmetto, 54.5; Stoffel, 33; Carlin, 32.5; Tybo, 30; Palisade, 26; Belmont, 24.9; Monitors Ranch, 24.6; Austin, 20.5; Halleck, 17.5; Saint Clair, 16.5; Genoa and Sunnyside, 16; Elko, 14.5; Empire Ranch, 14; Virginia City and Winnemucca, 12.2; Lewers Ranch and Wells, 12; Tuscarora, 11.5; Carson City, 10.6; Cranes Ranch, 10.5.

*New Hampshire*.—West Milan, 25; Bethlehem, 23; Berlin Mills, 21; Lancaster, 20; North Conway, 19; Littleton, 18; Stratford, 15; Sanbornton, 11. *New Jersey*.—Cape May and Woodbine, 12; Elizabeth, 11; Ocean City, 10.4. *New Mexico*.—Chama, 51.5; Monero, 12. *New York*.—Le Roy, 17; Utica, 15.8; Alfred Center and Turin, 14; Victor, 13; South Canisteo, 12.5; Wedgwood, 11.8; Brookfield, 11.5; Humphrey and Number Four, 11.2; Albion, 11; Eden Center, 10.5; Arcade, 10.4. *North Carolina*.—Louisburg, 6. *North Dakota*.—Jamestown, 28.4; Ashley, 24; Forman, 17.5; Bismarck, 16.9; Wild Rice, 16; Berlin and Ellendale, 12.5; Willow City, 11; Mayville and Napoleon, 10. *Ohio*.—Garrettsville, 12.5. *Oregon*.—Siskiyou, 60; Crook, 27; Sparta, 24; Joseph, 20; Lakeview, 16; Canyon City, 14.5; Happy Valley, 11.9; Silver Lake, 10.5; Baker City, 10.1.

*Pennsylvania*.—Meadville, 14; Girardville, 13.5; Clarion, 11.3. *Rhode Island*.—Kingston (b) and Pawtucket, 9. *South Carolina*.—Greenville, 1.5. *South Dakota*.—Fort Meade and Webster, 33.5; Wessington, 28.5; Aberdeen and Fort Sully, 28; Bowdle, 24; Mellette, 22.2; Walsey, 20.5; Frankfort, 20; Oelrichs, 19.8; Spearfish, 18; Gary, 17; Gale, 16.2; Watertown, 15.8; Millbank, 15.3; Hotch City, 14.2; Castlewood, 13.5; Huron, 13; Ashcroft, 12; Pierre, 11.6; Cross, 11.4; Parkston, 11; Britton and Sioux Falls, 10.6; Midland, 10.5; Alexandria, Parker, and Plankinton, 10. *Tennessee*.—Greeneville, 4.6. *Texas*.—El Paso, trace.

*Utah*.—Ogden (a), 31; Levan, 29.5; Scofield, 28; Castle Gate, 23; Fort Du Chesne, 21; Corinne and Grouse Creek, 20.5; Stockton, 18.7; Promontory, 17; Blue Creek, 16; Beaver and Losee, 14.5; Salt Lake City, 13.7; Provo City, 12.5; Parowan, 12; Lake Park, 11; Randolph, 10. *Vermont*.—Strafford, 20; Chelsea, 12. *Virginia*.—Birdsnest, 7.6. *Washington*.—Chelan, 10.7. *West Virginia*.—Bluefield and Davis, 10. *Wisconsin*.—Bayfield, 21; Centralia, 18; Ashland, 17.2; Osceola, 16.3; Florence, 16; Barron, 15.5; Menomonie, 14.6; Hayward, 14; Columbus and Shawano, 13; Chippewa Falls, Green Bay, and Stevens Point, 12.5; Depere, 12.1; Medford (a), 12; Viroqua, 11; La Crosse, 10.8; Medford (b), 10.5; Koepenick and Oconto, 10. *Wyoming*.—Lander, 13.4; Camp Pilot Butte, 11.5.

## HAIL.

Description of the more severe hailstorms reported for the month is given under "Local Storms".

Hail was reported as follows: 2d, Illinois, Indian Territory, and Missouri. 3d, Alabama, Arkansas, Georgia, Kansas, Louisiana, Mississippi, Missouri. 4th, California and Mississippi. 5th, Alabama. 6th, Arizona and California. 7th, Arizona, Colorado, New Jersey, and Texas. 8th, California, Illinois, Indiana, Missouri, Ohio, Oregon, Texas, and Washington. 9th, Arizona, California, Ohio, and Washington. 10th, California, Iowa, Oregon, South Dakota, Washington, and Wisconsin. 11th, California, Indiana, Michigan, Ohio, Oregon, Tennessee, Virginia, and West Virginia. 12th, California, Oregon, and Washington. 13th, Oregon. 14th, Nevada.

15th, California, Nevada, Rhode Island, and Washington. 16th, Alabama, Louisiana, and Washington. 17th, Washington. 18th, Nevada, North Carolina, South Carolina, and Washington. 19th, Oregon. 20th, California, Iowa, Louisiana, and Mississippi. 21st, California and Missouri. 22d, Iowa, Kansas, Mississippi, Missouri, Nebraska, Ohio, Oklahoma, and Texas. 23d, Arizona, Arkansas, Indiana, Iowa, Kentucky, Louisiana, Michigan, Mississippi, Missouri, Oklahoma, Tennessee, and Texas. 24th, Florida, Illinois, Michigan, New York, and Ohio. 25th, Colorado and Florida. 26th, Florida, Georgia, and Texas. 27th, Georgia and Kansas. 28th, Massachusetts and Mississippi. 29th, Florida, Oregon, and Washington. 30th, Montana, Oregon, and Washington. 31st, Washington.

## SLEET.

Description of the more severe sleetstorms of the month is given under "Local Storms."

Sleet was reported as follows: 1st, South Dakota. 2d, Iowa and South Dakota. 3d, Arkansas, Illinois, Kansas, Kentucky, Michigan, Mississippi, Missouri, Nebraska, New Jersey, and Virginia. 4th, Alabama, Missouri, Nevada, North Carolina, South Carolina, and Virginia. 5th, California and Nevada. 6th, Missouri and Washington. 7th, California, Nebraska, Oregon, and Washington. 8th, Arizona, Illinois, Iowa, Kentucky, Minnesota, Nebraska, and Washington. 9th, Arizona, Colorado, Indiana, Minnesota, Nevada, Utah, Washington, and Wisconsin. 10th, Minnesota, Nebraska, North Dakota, South Dakota, and Texas. 11th, California, Iowa, Michigan, Nevada, New York, North Dakota, Oregon, and Utah.

12th, California, Michigan, Montana, New Hampshire, North Dakota, and Washington. 13th, Colorado, Iowa, Minnesota, Nebraska, and South Dakota. 14th, Illinois, Michigan, New York, and Virginia. 15th, Maine and Nevada. 16th, Alabama, Arkansas, Florida, Louisiana, and Missis-

issippi. 17th, Arkansas, Georgia, Kentucky, Mississippi, Nevada, South Carolina, Tennessee, Virginia, and Washington. 18th, Alabama, Mississippi, Oregon, South Carolina, Virginia, and Wisconsin. 19th, Montana, Ohio, South Dakota, and Utah. 20th, Colorado, Georgia, Nevada, South Dakota, and Wisconsin. 21st, Iowa, Michigan, Minnesota, Missouri, Nebraska, Nevada, New Jersey, New York, and Utah.

22d, Colorado, Illinois, Iowa, Michigan, Minnesota, Nebraska, Nevada, New Jersey, New York, Ohio, Pennsylvania, South Dakota, and Wisconsin. 23d, Connecticut, Iowa, Maine, Michigan, Minnesota, Nebraska, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, South Dakota, Utah, and Wisconsin. 24th, Connecticut, Illinois, Maine, Michigan, Minnesota, Mississippi, Nebraska, Oregon, and Washington. 25th, Colorado, Minnesota, Nebraska, Ohio, and Utah. 26th, Colorado, Indiana, South Dakota, and Utah. 27th, Kansas, Missouri, Montana, Nebraska, North Carolina, and Oregon. 29th, Georgia and Washington. 30th, Massachusetts and New York. 31st, Colorado, New York, South Dakota, and Utah.

## WINDS.

The prevailing winds in March, 1893, are shown on Chart II by arrows flying with the wind. In New England the winds were generally from west to north; in the middle Atlantic states and on the middle-eastern slope of the Rocky Mountains, from the northwest; in the west Gulf states, from southeast to south; in the Ohio Valley and Tennessee, from south to southwest; in the lower lake region, the extreme northwest, the Missouri Valley, and over the southern plateau region, from west to northwest; in the upper lake region and upper Mississippi valley, from northwest to north; on the southeast slope of the Rocky Mountains, from south to west; over the middle plateau region and along the north and middle Pacific coasts, from southeast to southwest; over the northern plateau region, from the south; and in the south Atlantic and east Gulf states, over the Florida Peninsula, on the northeast slope of the Rocky Mountains, and along the south 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: 2d, 51, nw., at Woods Holl, Mass. 3d, 60, e., at Tatoosh Island, Wash. 4th, 60, n., at Kittyhawk, N. C.; 56, nw., at Hatteras, N. C.; 50, nw., at Galveston, Tex.; 50, e., at Tatoosh Island, Wash. 7th, 60, s., at Fort Canby, Wash. 8th, 55, se., at Chicago, Ill. 9th, 56, sw., at Amarillo, Tex.; 54, ne., at Block Island, R. I. 10th, 72, s., at Fort Canby, Wash.; 60, ne., at Block Island, R. I.; 60, nw., at Kearney, Nebr.; 56, nw., at Colorado Springs, Colo.; 52, nw., at Valentine, Nebr.; 50, sw., at Amarillo, Tex.; 50, e., at Tatoosh Island, Wash. 11th, 66, s., at Fort Canby, Wash.; 52, nw., at Kearney, Nebr.; 51, se., at Keeler, Cal.; 50, nw., at Valentine, Nebr. 12th, 85, w., at Pikes Peak, Colo.; 58, sw., at Amarillo, Tex.; 54, nw., at Colorado Springs, Colo. 13th, 50, nw., at Colorado Springs, Colo. 14th, 54, e., at Tatoosh Island, Wash. 15th, 90, sw., at Pikes Peak, Colo.; 50, se., at Amarillo, Tex. 16th, 50, nw., at Block Island, R. I. 17th, 61, e., at Tatoosh Island, Wash.; 56, se., at Fort Canby, Wash. 18th, 92, w., at Pikes Peak, Colo.; 50, s., at Amarillo, Tex. 21st, 56, sw., at Amarillo, Tex. 22d, 60, sw., at Amarillo, Tex.; 56, ne., at Chicago, Ill.; 50, sw., at Abilene, Tex. 24th, 56, sw., at Chicago, Ill.; 54, w., at Columbus, Ohio. 27th, 52, s., at Fort Canby, Wash.; 50, sw., at Key West, Fla. 31st, 82, sw., at Pikes Peak, Colo.; 66, s., at Fort Canby, Wash.; 57, nw., at Colorado Springs, Colo.

## LOCAL STORMS.

**3d.**—In the evening severe local storms occurred in the east Gulf states. The more destructive storms of this group visited Lauderdale and Clarke counties, in extreme east-central Mississippi, about 6 p. m., the adjoining counties of Sumter and Choctaw, in Alabama, between 6.30 and 7 p. m., and Troup, Meriwether, Pike, and northern Upson counties, in extreme west-central Georgia, between 8.30 and 9 p. m. At Vicksburg, Miss., a thunderstorm, with rain and hail, began 5 p. m. and ended 5.40 p. m. (75th meridian time). At Meridian, Miss., a thunderstorm, with rain, began 7.48 p. m. and ended 8.17 p. m. (75th meridian time); from 6.50 to 7.05 p. m. the wind was high from the southwest. At Toomsaba, Lauderdale County, Miss., a funnel-shaped cloud moved eastward in a path 250 to 300 yards in width about 6 p. m., attended by heavy thunder, vivid lightning, heavy rain after, and small hail. Articles were carried up in the funnel, and property was destroyed to the estimated value of \$30,000 to \$40,000.

At Pachuta, Clarke County, Miss., a storm moved southeast in a path about 200 yards in width, with heavy rain during and after, continuous vivid lightning, and some hail. One person was killed; trees were torn up by the roots or twisted off, and were piled in and to the right of the center of the path, and a number of buildings were torn to pieces. The value of property destroyed at Pachuta was placed at \$12,000 to \$15,000. A heavy thunder and hail storm moved northeast in a path  $\frac{1}{2}$  to  $\frac{1}{2}$  mile in width near Cuba, Sumter County, Ala., about 6.30 p. m., killing one person and leveling timber. About 7 p. m. a storm passed eastward in a path 250 to 300 yards in width through a sparsely settled district, 10 miles from Butler, Choctaw County, Ala., with heavy rain before, small hail, sheet lightning, and some thunder.

At Montgomery, Ala., a thunderstorm approached from the northwest at 8.38 p. m. (75th meridian time). From 8.40 to 9.50 p. m. the lightning was incessant and there was a continuous rumble of thunder. Hail fell at 9.05 p. m., some of the hailstones being one-half inch in diameter and irregular in shape; a second fall of hail occurred from 9.41 to 9.44 p. m. At 9.45 p. m. the wind reached a velocity of 41 miles per hour from the northwest. The storm was very severe north of Montgomery. At Tuscaloosa, Ala., a heavy thunder and hail storm moved southeast at 5.45 p. m.; a number of buildings were blown down. A severe storm passed south of Lagrange, Troup County, Ga., at 8.30 p. m., injuring a number of persons, and destroying many buildings. The electrical