given in the REVIEW for August, 1890. The precipitation for the current month was the greatest on record at: Augusta, 10.39; Narragansett Pier, 6.95. It was the least on record at: San Antonio, 0.40; Moorhead, 0.88; Indianapolis, 0.42; Kittyhawk, 1.33; Cape Henry, 1.53.

The *total accumulated monthly departures* from January 1 to the end of the current month are given in the second column of the following table; the third column gives the current accumulated precipitation expressed as a percentage of its normal value.

Districts.	Accumulated departures.	Accumulated precipitation.	Districts.	Accumulated departures.	Accumulated precipitation.
	Inches.	*Per ct.*		*Inches.*	*Per ct.*
New England	+ 1.70	106	Middle Atlantic	− 2.10	93
Florida Peninsula	+ 4.50	114	South Atlantic	− 3.30	91
Ohio Valley and Tenn	+ 1.20	104	East Gulf	− 1.80	95
North Dakota	+ 0.10	101	West Gulf	− 6.40	78
Upper Mississippi Valley	+ 1.70	107	Lower Lake	− 1.10	95
Middle Slope	+ 0.70	104	Upper Lake	− 0.30	99
Southern Slope	+ 1.70	111	Missouri Valley	− 1.30	94
Southern Plateau	+ 2.80	149	Northern Slope	− 1.00	91
Middle Plateau	+ 0.10	101	North Pacific	− 1.60	95
Northern Plateau	+ 0.40	104	Middle Pacific	− 2.30	88
South Pacific	+ 0.80	110			

HAIL.

The following are the dates on which hail fell in the respective States:

Alabama, 30, 31. Arizona, 2, 6, 18, 19. Arkansas, 30. California, 20. Colorado, 1, 2, 3, 6, 14 to 17, 30. Connecticut, 15. Florida, 13. Georgia, 30. Idaho, 4. Illinois, 9. Indiana, 1, 14, 15, 19, 24. Iowa, 2, 3, 7, 20, 23, 25. Kentucky, 1, 2, 4, 6, 10, 15, 22, 23. Louisiana, 30. Maryland, 11, 14, 15, 16, 23, 24, 25. Massachusetts, 22. Michigan, 9, 10, 14, 15, 24, 28, 29. Minnesota, 2, 28, 31. Missouri, 3, 4, 19, 21, 25. Montana, 1, 5, 13, 31. Nebraska, 7, 13, 16, 17, 20. Nevada, 17, 26. New Jersey, 4, 16, 22, 23. New Mexico, 4, 6, 9, 10, 11, 16, 18, 19, 21. New York, 10, 12, 15, 17, 19. North Carolina, 5, 16, 20, 25, 31. North Dakota, 3, 18, 27, 28. Ohio, 4, 10, 15, 16, 29. Pennsylvania, 4, 10, 15, 18. South Carolina, 1, 6, 14, 29, 30, 31. South Dakota, 1, 31. Tennessee, 3, 22, 25, 30. Vermont, 9, 15, 16, 19. Virginia, 5, 10, 16, 23, 30. Washington, 4. West Virginia, 23. Wisconsin, 9. Wyoming, 2, 14, 17, 19, 30.

WIND.

The *prevailing winds* for August, 1897, viz, those that were recorded most frequently, are shown in Table I for the regular Weather Bureau stations.

Maximum wind velocities are given in Table I, which also gives the altitudes of the Weather Bureau anemometers above the ground. Maxima of 50 miles or more per hour were reported during this month at regular stations of the Weather Bureau as follows (maximum velocities are averages for five minutes; extreme velocities are gusts of shorter duration, and are not given in this table):

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
		Miles				*Miles*	
Chicago, Ill	1	56	ne.	Knoxville, Tenn	30	50	sw.
Duluth, Minn	8	50	nw.	Sault Ste. Marie, Mich.	29	50	nw.
Fort Canby, Wash	31	52	s.	Tatoosh, Wash	3	50	e.

The *resultant winds*, as deduced from the personal observations made at 8 a. m. and 8 p. m., are given in Table VIII. These latter resultants are also shown graphically on Chart IV, where the small figure attached to each arrow shows the number of hours that this resultant prevailed, on the assumption that each of the morning and evening observations represents one hour's duration of a uniform wind of average velocity. These figures indicate the relative extent to which winds from different directions counterbalanced each other.

ATMOSPHERIC ELECTRICITY.

Numerical statistics relative to auroras and thunderstorms are given in Table IX, which shows the number of stations from which meteorological reports were received, and the number of such stations reporting thunderstorms (T) and auroras (A) in each State and on each day of the month, respectively.

Thunderstorms.—The dates on which the number of reports of thunderstorms for the whole country were most numerous were: 10th, 227, and 15th, 277.

Reports were most numerous from Colorado, 236; Florida, 238; Ohio, 274.

Thunderstorm days were most numerous in: Florida, 31; New Mexico, 29; Mississippi, 28; Colorado and Louisiana, 27.

In Canada.—Thunderstorms were reported as follows: St. Johns, 5, 6, 8, 9, 10, 14; Halifax, 6, 15, 25; Grand Manan, 16; Yarmouth, 11, 16; Charlottetown, 6, 9, 16; Chatham, 16, 20; Father Point, 15, 16; Quebec, 8, 10, 15, 16, 20, 27; Montreal, 3, 10, 16, 25; Rockliffe, 9; Toronto, 10, 15, 18, 24, 30; White River, 15, 29; Port Stanley, 4, 10, 25, 29, 30; Saugeen, 10; Parry Sound, 10, 14, 18, 24; Port Arthur, 9, 13, 28; Winnipeg, 8, 12; Minnedosa, 12; Qu'Appelle, 3, 11, 21, 25; Medicine Hat, 7; Swift Current, 1, 5; Calgary, 9, 12; Banff, 7, 10, 11, 16, 21, 25; Prince Albert, 7, 12, 13, 15, 21; Edmonton, 5, 11, 12, 24; Battleford, 7, 10, 11, 12.

Auroras.—The evenings on which bright moonlight must have interfered with observations of faint auroras are assumed to be the four preceding and following the date of full moon, viz, from the 8th to the 16th, inclusive. On the remaining twenty-two days of this month 74 reports were received, or an average of about 3 per day. The dates on which the number of reports of auroras for the whole country especially exceeded this average were: 19th, 13; 20th, 7; 29th, 7.

Reports were most numerous from Minnesota, 9; North Dakota, 19; Ohio, 10; Wisconsin, 8.

The number of reports was a large percentage of the number of observers in: North Dakota, 40.

In Canada.—Auroras were reported as follows: Grand Manan, 20; Yarmouth, 31; Quebec, 20, 22, 28, 30; Montreal, 20, 23; White River, 29, 30; Winnipeg, 2, 15, 23, 26, 29, 30; Minnedosa, 1, 3, 26, 29, 30.

SUNSHINE AND CLOUDINESS.

The quantity of sunshine, and therefore of heat, received by the atmosphere as a whole is very nearly constant from year to year, but the proportion received by the surface of the earth depends upon the absorption by the atmosphere, and varies largely with the distribution of cloudiness. The sunshine is now recorded automatically at 22 regular stations of the Weather Bureau by its photographic, and at 40 by its thermal effects; at one of these stations records are kept by both methods. The photographic record sheets show the apparent solar time, but the thermometric records show seventy-fifth meridian time; for convenience the results are all given in Table X for each hour of local mean time. In order to complete the record of the duration of cloudiness these registers are supplemented by special personal observations of the state of the sky near the sun in the hours after sunrise and before sunset, and the cloudiness for these hours has been added as a correction to the instrumental records, whence there results a complete record of the duration of sunshine from sunrise to sunset.

The average cloudiness of the whole sky is determined by numerous personal observations at all stations during the daytime, and is given in the column "average cloudiness" in Table I; its complement, or percentage of clear sky, is given in the last column of Table X for the 61 stations at which instrumental self-registers are maintained.

COMPARISON OF DURATIONS AND AREAS.

The sunshine registers give the *durations* of effective sunshine whence the durations relative to possible sunshine are derived; the observers' personal estimates give the percentage of *area* of clear sky. These numbers have no necessary relation to each other, since stationary banks of clouds may obscure the sun without covering the sky, but when all clouds have a steady motion past the sun and are uniformly scattered over the sky, the percentages of duration and of area agree closely. For the sake of comparison, these percentages have been brought together, side by side, in the following table, from which it appears that, in general, the instrumental records of percentages of durations of sunshine are almost always larger than the observers' personal estimates of percentages of area of clear sky; the average excess for August, 1897, is 10 per cent for photographic and 10 per cent for thermometric records.

The details are shown in the accompanying table, in which the stations are arranged according to the *total possible* duration of sunshine, and not according to the *observed* duration.

Difference between instrumental and personal observations of sunshine.

Stations.	Latitude.		Apparatus.	For whole month.		Instrumental record of sunshine.			
				Total possible.	Personal.	Photographic.	Difference.	Thermometric.	Difference.
	°	′		*H'rs.*	%	%	%	%	%
Key West, Fla	24	34	T.	403.3	47	.....	.....	77	+30
Tampa, Fla	27	57	T.	406.9	58	.....	.....	63	+ 5
Galveston, Tex	29	18	P.	408.0	50	58	+ 8	.....	.....
New Orleans, La	29	58	T.	409.7	43	.....	.....	42	− 1
Savannah, Ga	32	05	P.	412.6	44	54	+10	.....	.....
Vicksburg, Miss	32	22	T.	412.6	54	.....	.....	63	+ 9
San Diego, Cal	32	43	P.	414.0	82	74	− 8	.....	.....
Charleston, S. C.	32	47	T.	414.0	44	.....	.....	50	+ 6
Phœnix, Ariz	33	28	P.	414.0	71	78	+ 7	.....	.....

Difference between instrumental and personal observations.—Cont'd.

Stations.	Latitude.		Apparatus.	Total possible duration for the whole month.	Personal estimated area of clear sky.	Instrumental record of sunshine.			
						Photographic.	Difference.	Thermometric.	Difference.
	°	′		*H'rs.*	%	%	%	%	%
Atlanta, Ga	33	45	T.	415.8	47	.....	.....	51	+ 4
Los Angeles, Cal	34	03	P.	415.8	72	83	+11	.....	.....
Wilmington, N. C.	34	14	T.	415.8	62	.....	.....	66	+ 4
Little Rock, Ark	34	45	T.	417.1	65	.....	.....	85	+20
Chattanooga, Tenn	35	04	T.	417.1	50	.....	.....	55	+ 5
Santa Fe, N. Mex	35	41	P.	418.7	56	70	+14	.....	.....
Raleigh, N. C.	35	45	T.	418.7	48	.....	.....	72	+24
Nashville, Tenn	36	10	T.	418.7	66	.....	.....	79	+13
Fresno, Cal	36	43	T.	420.1	88	.....	.....	94	+ 6
Dodge City, Kans	37	45	P.	422.1	69	79	+10	.....	.....
San Francisco, Cal	37	48	T.	422.1	54	.....	.....	60	+ 6
Louisville, Ky	38	15	T.	422.1	55	.....	.....	73	+18
St. Louis, Mo	38	38	T.	423.2	64	.....	.....	81	+17
Washington, D. C	38	54	P.	423.2	61	78	+17	.....	.....
Kansas City, Mo	39	05	P.	423.2	68	72	+ 4	.....	.....
Cincinnati, Ohio	39	06	T.	423.2	67	.....	.....	72	+ 5
Parkersburg, W. Va	39	16	T.	423.2	45	.....	.....	60	+15
Baltimore, Md	39	18	T.	423.2	54	.....	.....	49	− 5
Atlantic City, N. J	39	22	P.	423.2	63	75	+12	.....	.....
Denver, Colo	39	45	P.	425.2	55	74	+19	.....	.....
Indianapolis, Ind	39	46	T.	425.2	52	.....	.....	68	+16
Philadelphia, Pa	39	57	T.	425.2	50	.....	.....	66	+16
Columbus, Ohio	39	58	T.	425.2	53	.....	.....	74	+19
Harrisburg, Pa	40	16	T.	425.2	55	.....	.....	77	+22
Pittsburg, Pa	40	32	T.	427.4	49	.....	.....	44	− 5
New York, N. Y	40	43	T.	427.4	53	.....	.....	69	+16
Salt Lake City, Utah	40	46	P.	427.4	48	77	+29	.....	.....
Eureka, Cal	40	48	P.	427.4	40	28	−12	.....	.....
Cheyenne, Wyo	41	08	P.	427.4	55	.....	.....	.....	.....
Omaha, Nebr	41	16	P.	427.4	57	72	+15	.....	.....
Cleveland, Ohio	41	30	T.	429.4	53	.....	.....	60	+ 7
Des Moines, Iowa	41	35	T.	429.4	72	.....	.....	74	+ 2
Chicago, Ill	41	53	T.	429.4	55	.....	.....	54	− 1
Erie, Pa	42	07	T.	429.4	52	.....	.....	73	+21
Binghamton, N. Y	42	08	T.	429.4	50	.....	.....	65	+15
Detroit, Mich	42	20	T.	429.4	56	.....	.....	69	+13
Boston, Mass	42	21	T.	429.4	52	.....	.....	63	+11
Dubuque, Iowa	42	30	T.	429.4	62	.....	.....	64	+ 2
Albany, N. Y	42	39	T.	431.3	55	.....	.....	78	+23
Buffalo, N. Y	42	53	T.	431.3	49	.....	.....	77	+18
Rochester, N. Y	43	08	T.	431.3	56	.....	.....	59	+ 3
Idaho Falls, Idaho	43	29	T.	431.3	65	.....	.....	67	+ 2
Portland, Me	43	39	T.	433.6	52	.....	.....	63	+11
Northfield, Vt	44	10	P.	433.6	45	57	+12	.....	.....
Eastport, Me	44	54	P.	435.6	38	51	+13	.....	.....
St. Paul, Minn	44	58	P.	435.6	45	59	+14	.....	.....
Minneapolis, Minn	44	59	T.	435.6	.....	.....	.....	66	.....
Portland, Oreg	45	32	T.	437.6	71	.....	.....	82	+11
	45	32	P.	437.6	71	80	+ 9	.....	.....
Helena, Mont	46	34	P.	440.0	78	85	+ 7	.....	.....
Bismarck, N. Dak	46	47	P.	440.0	68	70	+ 2	.....	.....
Seattle, Wash	47	38	T.	442.5	72	.....	.....	80	+ 8
Spokane, Wash	47	40	P.	442.5	65	89	+24	.....	.....

CLIMATE AND CROP SERVICE.

By JAMES BERRY, Chief of Climate and Crop Service Division.

The following extracts relating to the general weather conditions in the several States and Territories are taken from the monthly reports of the respective sections of the Climate and Crop Service. The name of the section director is given after each summary.

Snowfall and rainfall are expressed in inches.

Alabama.—The mean temperature was 78.8°, or 0.1° below normal; the highest was 106°, at Gadsden on the 3d, and the lowest, 53°, at Maplegrove on the 13th, and at Scottsboro on the 25th. The average precipitation was 5.58, or 1.57 above normal; the greatest monthly amount, 13.83, occurred at Citronelle, and the least, 1.05, at Clanton.—*F. P. Chaffee.*

Arizona.—The mean temperature was 79.9°, or 0.9° above normal; the highest was 112°, at Signal on the 18th, and at Yuma on the 17th, and the lowest, 43°, at Whipple on the 20th. The average precipitation was 2.30, or 0.24 below normal; the greatest monthly amount, 5.37, occurred at Mount Huachuca, and the least, 0.17, at Flagstaff.—*W. T. Blythe.*

Arkansas.—The mean temperature was 79.7°, or 1.6° above normal; the highest was 111°, at Malvern on the 4th, and the lowest, 45°, at Jonesboro on the 17th. The average precipitation was 2.59, or 0.63 below normal; the greatest monthly amount, 5.97, occurred at Fort Smith, and the least, 0.25, at Camden.—*F. H. Clarke.*

California.—The mean temperature was 73.9°, or 0.2° above normal; the highest was 124°, at Salton on the 12th, and the lowest, 18°, at Sneddens Ranch on the 29th. The average precipitation was 0.03, or normal; the greatest monthly amount, 1.57, occurred at Little Rock Creek, while no rain fell at most places.—*W. H. Hammon.*

Colorado.—The mean temperature was 65.0°, or 1.0° below normal; the highest was 102°, at Lamar on the 1st, and the lowest, 21°, at Walden on the 15th. The average precipitation was 2.38, or 0.70 above normal; the greatest monthly amount, 8.10, occurred at Castlerock, and the least, 0.26, at Paonia.—*F. H. Brandenburg.*

Florida.—The mean temperature was 81.6°, or 0.2° above normal; the highest was 104°, at Macclenny on the 2d, and the lowest, 65°, at Manatee on the 7th, at Wausau on the 25th, and at New Smyrna on the 27th. The average precipitation was 6.68, or 0.20 above normal; the greatest monthly amount, 12.41, occurred at De Funiak Springs, and the least, 19.1, at Merritts Island.—*A. J. Mitchell.*

Georgia.—The mean temperature was 78.3°, or 0.7° below normal; the highest was 105°, at Poulen on the 2d, and the lowest, 50°, at Cedartown on the 14th, and at Diamond on the 30th. The average precipitation was 5.07, or 0.32 above normal; the greatest monthly amount, 10.39, occurred at Augusta, and the least, 1.63, at Clayton.—*J. B. Marbury.*