

Reports were most numerous from: Montana, 6; Nevada, 7; North Dakota, 8.

The number of reports was a large percentage of the number of observers in: North Dakota, 17; Montana, 16; Nevada, 15.

In Canada.—Auroras were reported on the following dates: Father Point, 4; Quebec, 16, 17; Toronto, 11; White River, 18; Minnedosa, 15, 16, 21, 24; Medicine Hat, 23, 30; Battleford, 27; Banff, 14.

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 21 regular stations of the Weather Bureau by its photographic, and at 45 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 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 percentages 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 November, 1897, is 7 per cent for photographic and 6 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. In obtaining the total possible sunshine the value for the parallel of latitude nearest the station is used.

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.
Key West, Fla.	24 34	T.	326.2	65	...	...	73	+13
Tampa, Fla.	27 57	T.	323.5	61	...	...	68	+3
Galveston, Tex.	29 18	P.	321.7	61	66	+5	...	...
New Orleans, La.	29 58	T.	319.7	58	...	...	57	-1
Jacksonville, Fla.	30 20	T.	319.7	58	...	...	63	+15
Savannah, Ga.	32 05	P.	315.0	48	66	+8	...	...
Vicksburg, Miss.	32 22	T.	315.9	65	...	...	66	+1
San Diego, Cal.	32 43	P.	314.0	83	85	+2	...	...
Charleston, S. C.	32 47	T.	314.0	62	...	...	64	+2
Phoenix, Ariz.	33 28	P.	314.0	78	91	+15	...	...
Atlanta, Ga.	33 45	T.	312.2	85	...	...	84	-1
Los Angeles, Cal.	34 03	P.	312.2	81	88	+7	...	...
Wilmington, N. C.	34 14	T.	312.2	65	...	...	72	+7
Little Rock, Ark.	34 45	T.	310.1	54	...	...	73	+19
Chattanooga, Tenn.	35 04	T.	310.1	52	...	...	56	+4
Santa Fe, N. Mex.	35 41	P.	308.3	70	81	+11	...	...
Raleigh, N. C.	35 45	T.	308.3	56	...	...	67	+11
Knoxville, Tenn.	35 56	T.	308.3	56	...	...	61	+3
Nashville, Tenn.	36 10	T.	306.3	52	...	...	55	+3
Fresno, Cal.	36 48	T.	305.7	63	...	...	78	+15
Dodge City, Kans.	37 45	P.	304.0	66	74	+8	...	...
San Francisco, Cal.	37 48	T.	304.0	44	...	...	59	+15
Louisville, Ky.	38 15	T.	304.0	40	...	...	54	+14
St. Louis, Mo.	38 38	T.	301.5	46	...	...	52	+6
Washington, D. C.	38 54	P.	301.5	49	55	+6	...	...
Kansas City, Mo.	39 05	P.	301.5	52	53	+1	...	...
Cincinnati, Ohio	39 06	T.	301.5	43	...	...	44	+0
Parkersburg, W. Va.	39 18	T.	301.5	31	...	...	31	+0
Baltimore, Md.	39 18	T.	301.5	48	...	...	55	+7
Atlantic City, N. J.	39 22	P.	301.5	44	59	+15	...	...
Denver, Colo.	39 45	P.	299.7	47	66	+19	...	...
Indianapolis, Ind.	39 46	T.	299.7	37	...	...	42	+9
Philadelphia, Pa.	39 57	T.	299.7	36	...	...	47	+11
Columbus, Ohio	39 58	T.	299.7	37	...	...	36	-1
Harrisburg, Pa.	40 16	T.	299.7	37	...	...	47	+18
Pittsburg, Pa.	40 32	T.	297.3	29	...	...	34	+5
New York, N. Y.	40 42	T.	297.3	34	...	...	50	+16
Salt Lake City, Utah	40 46	P.	297.3	40	45	+5	...	...
Eureka, Cal.	40 48	P.	297.3	39	33	0	...	...
Cheyenne, Wyo.	41 08	P.	297.3	52	61	+9	...	...
Omaha, Nebr.	41 16	P.	294.9	50	...	...	...	...
Cleveland, Ohio	41 30	T.	294.9	16	...	...	20	+4
Des Moines, Iowa	41 35	T.	294.9	55	...	...	55	+0
Chicago, Ill.	41 53	T.	294.9	31	...	...	32	+1
Erie, Pa.	42 07	T.	294.9	26	...	...	16	-11
Binghamton, N. Y.	42 08	T.	294.9	24	...	...	32	+8
Detroit, Mich.	42 20	T.	294.9	23	...	...	27	+4
Boston, Mass.	42 21	T.	294.9	32	...	...	40	+8
Dubuque, Iowa	42 30	T.	294.9	45	...	...	42	+3
Albany, N. Y.	42 39	T.	293.3	23	...	...	35	+12
Buffalo, N. Y.	42 58	T.	292.8	12	...	...	23	+11
Yankton, S. Dak.	42 54	T.	292.3	48	...	...	55	+10
Rochester, N. Y.	43 08	T.	292.3	20	...	...	21	+8
Idaho Falls, Idaho	43 29	T.	292.3	30	...	...	33	+3
Portland, Me.	43 38	T.	289.7	84	...	...	42	+8
Northfield, Vt.	44 10	P.	289.7	20	27	+7	...	...
Huron, S. Dak.	44 21	T.	289.7	35	...	...	47	+2
Eastport, Me.	44 54	P.	287.2	26	37	+11	...	...
St. Paul, Minn.	44 58	P.	287.2	37	40	+3	...	...
Minneapolis, Minn.	44 59	T.	287.2	...	...	...	80	...
Portland, Oreg.	45 32	T.	284.1	15	...	...	23	+8
Helena, Mont.	46 34	P.	281.0	15	12	-3	...	...
Bismarck, N. Dak.	46 47	P.	281.0	29	33	+4	...	...
Tacoma, Wash.	47 16	T.	281.0	51	61	+10	...	...
Seattle, Wash.	47 38	T.	278.0	12	...	...	16	+6
Spokane, Wash.	47 40	T.	278.0	12	...	...	14	+2

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 54.6°, or 0.6° above normal; the highest was 85°, at Newburg on the 14th, and the lowest, 21°, at Jasper on the 30th. The average precipitation was 2.03, or 0.97 below normal; the greatest monthly amount, 6.58, occurred at Riverton, and the least, 0.50, at Highland Home.—F. P. Chaffee.

Arizona.—The mean temperature was 55.0°, or normal; the highest was 101°, at Maricopa, and the least, 9°, at Snowflake. The average precipitation was 0.02, or 0.83 below normal; the greatest monthly