BIBLIOGRAPHY

C. FITZHUGH TALMAN, *in charge of Library*

RECENT ADDITIONS

The following have been selected from among the titles of books recently received as representing those most likely to be useful to Weather Bureau officials in their meteorological work and studies:

American national red cross
Hurricane disasters of August and September 1933. Washington. 1934. 41 p. illus. tables. 23 cm.

Hettner, Alfred
Vergleichende Länderkunde. Leipzig und Berlin, B. G. Teubner, 1933–34. Band III. "Die Gewässer des Festlandes. Die Klimate der Erde." illus. (incl. maps), diagrs. 23½ cm.

Ridgley, Douglas Clay
Rainfall of the earth. Bloomington, Ill., McKnight & McKnight, 1933. 47 p. illus. 19½ cm. (Important topics in geography.)

Shaw, Sir William Napier
The drama of weather. New York, The Macmillan company; Cambridge, England, The University press, 1933. xiv, 269 p. front., illus. (incl. charts), diagrs. 21 cm. Printed in Great Britain.

Smythe, Francis Sydney
Climbs and ski runs; mountaineering and skiing in the Alps, Great Britain and Corsica, with a foreword by Geoffrey Winthrop Young. Edinburgh and London, W. Blackwood & sons, ltd., 1933. xx, 307 p. front., plates (1 fold.) 22 cm. "First printed October 1929 ... reprinted August 1933."

Somme. Commission météorologique
Bulletin de la Commission météorologique du département de la Somme [France]. Année 1923–32. Amiens. 1924–33.

Tannehill, Ivan Ray
The hurricane. Washington, U. S. Government printing office, 1934. 14 p. maps, diagrs. 28 cm. (U. S. Dept. of agriculture. Miscellaneous publication no. 197.) Contribution from Weather bureau.

U. S. Lake survey
Bulletin no. 43. Survey of northern and northwestern lakes. Detroit, U. S. Lake survey office, 1934. 482 p. fold. tables. 25½ cm.

U. S. Weather bureau
Weather code for West Indian stations. 1934. Washington, D. C. Weather bureau. 1934. 11 p. tables. 29½ cm. (Mimeographed.)

U. S. Weather bureau
Weather code for West Indian and Caribbean Sea observers. Washington, D. C. 1917. 32 p. 29½ cm.

SOLAR OBSERVATIONS

SOLAR RADIATION MEASUREMENTS DURING DECEMBER 1934

By IRVING F. HAND, Assistant in Solar Radiation Investigations

For a description of instruments employed and their exposures, the reader is referred to the January 1932 REVIEW, page 26.

Table 1 shows that solar radiation intensities at normal incidence averaged above normal for December at Washington and Madison, and close to normal at Lincoln.

Table 2 shows an excess in the total solar and sky radiation received on a horizontal surface at Chicago, New York, Twin Falls, Miami, and New Orleans, and a deficiency at all other stations for which normals have been computed. A marked excess of radiation for the year was received at all stations with the exception of Pittsburgh, which was close to normal, and Madison and Miami, both of which were considerably below normal.

The December turbidity measurements at Washington are noteworthy because of the large water-vapor content on all clear days except the 12th.

Polarization measurements obtained at 5 days at Washington give a mean of 54 percent with a maximum of 64 percent on the 5th. Both of these values are close to their respective December normals. No polarization readings were made at Madison owing to continuous snow and ice coverage.

TABLE 1.—*Solar radiation intensities during December 1934*

[Gram-calories per minute per square centimeter of normal surface]

WASHINGTON, D. C.

Date	Sun's zenith distance										
	8 a. m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	Noon
	75th mer. time	Air mass									Local mean solar time
		A. M.					P. M.				
	e	5.0	4.0	3.0	2.0	* 1.0	2.0	3.0	4.0	5.0	e
	mm	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mm*
Dec. 5	2.74				1.36			1.20	1.03	0.92	2.74
Dec. 11	1.88				1.26						1.88
Dec. 12	1.68			1.03							1.78
Dec. 14	2.36	0.92	0.98	1.05	1.30			1.20	1.08	1.01	2.36
Dec. 15	2.87	.71	.88	.99							2.62
Dec. 18	3.00	1.01	1.12	1.17	1.21						3.00
Means		.88	.99	1.06	1.24			(1.20)	(1.06)	(.96)	
Departures		+.09	+.08	+.01	+.00			+.16	+.15	+.16	

TABLE 1.—*Solar radiation intensities during December 1934*—Con.

[Gram-calories per minute per square centimeter of normal surface]

MADISON, WIS.

Date	Sun's zenith distance										
	8 a. m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	Noon
	75th mer. time	Air mass									Local mean solar time
		A. M.					P. M.				
	e	5.0	4.0	3.0	2.0	* 1.0	2.0	3.0	4.0	5.0	e
	mm	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mm*
Dec. 6	1.68							1.31			1.88
Dec. 7	1.37		1.20	1.34							1.52
Dec. 10	1.96	1.16	1.22	1.34							1.60
Dec. 11	1.88	1.04		1.15							1.45
Dec. 13	2.36							1.30			2.87
Dec. 17	2.87							1.10			2.49
Dec. 26	.66			1.38							.51
Means		(1.16)	(1.21)	1.30				1.24			
Departures		+.20	+.12	+.08				+.01			

LINCOLN, NEBR.

Dec. 3	2.26							1.25			2.36
Dec. 4	2.26	1.03	1.14	1.30				1.29	1.19	1.08	2.87
Dec. 7	.96							1.26	1.12	1.01	1.19
Dec. 11	1.02							1.21	1.04	.97	2.62
Dec. 12	3.00	1.06	1.15	1.28				1.20	1.00		4.17
Dec. 15	4.37			1.02				1.20	1.08	.95	5.16
Dec. 19	1.96	1.13	1.21	1.34				1.15			2.36
Dec. 20	3.81	.81	1.00	1.20							4.37
Dec. 26	.48	.92	1.07	1.23				1.07			4.17
Dec. 27	2.36	.66	.86	1.09				1.10	.96	.82	3.81
Means		.94	1.07	1.21				1.19	1.06	.97	
Departures		+.01	+.01	−.01				−.01	−.01	+.01	

BLUE HILL, MASS.

Dec. 2	3.3						1.25	1.04	0.95	0.83	3.5
Dec. 3	3.2	1.00	1.10	1.23							2.2
Dec. 4	6.5			1.07							6.5
Dec. 5	2.9		1.08	1.23	1.42			1.19			2.3
Dec. 8	1.2			1.20	1.32						1.1
Dec. 9	1.0			1.31	1.42			1.27			1.1
Dec. 11	1.0	1.01	1.12	1.24	1.36			1.24			1.0
Dec. 12	1.3		1.22	1.31	1.42			1.22			1.3
Dec. 14	1.3		1.20	1.29	1.44			1.24			2.1
Dec. 15	1.0		1.23	1.33	1.45			1.28			1.0
Dec. 18	1.2		1.26	1.35	1.40			1.31			1.3
Dec. 20	3.5			1.06	1.28			1.23		1.02	2.6
Dec. 27	.6	1.18	1.20	1.27	1.42			1.27			.6
Dec. 30	1.0	1.06	1.16	1.28	1.45			1.32			1.1
Dec. 31	1.0	1.12	1.27	1.35	1.46			1.31			.7
Means		1.07	1.18	1.25	1.40		(1.25)	1.24	(.95)	(.92)	

* Extrapolated.

TABLE 2.—*Average daily totals of solar radiation (direct+diffuse) received on a horizontal surface*

Week beginning—	Washington	Madison	Lincoln	Chicago	New York	Fresno	Pittsburgh	Fairbanks	Twin Falls	Miami	New Orleans	Riverside	Blue Hill	Friday Harbor
	Gram-calories per square centimeter													
1934	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*
Dec. 3	160	126	169	67	164	218	52	3	129	209	209	210	197	122
Dec. 10	137	119	134	91	144	160	----------	4	164	369	270	136	182	44
Dec. 17	87	92	166	145	80	112	----------	11	147	254	223	254	134	44
Dec. 24 [1]	136	105	146	87	128	159	----------	10	129	286	154	224	158	72
	Departures from weekly normals													
Dec. 3	0	+12	−9	−1	+66	+26	−35	−14	+11	−1	−2	----------	----------	----------
Dec. 10	−4	+6	−35	+13	+50	−10	----------	−2	+53	+70	+74	----------	----------	----------
Dec. 17	−58	−27	−16	+56	−13	−38	----------	+5	+31	−29	+44	----------	----------	----------
Dec. 24	−12	−17	−36	+2	+18	+18	----------	+4	−7	+3	+7	----------	----------	----------
	Accumulated departures on—													
	+1,668	−3,461	+5,363	----------	+14,242	+8,481	+358	+410	+6,454	−7,159	+7,092	----------	----------	----------
	Percentage departures at end of year													
	+1.3	−2.9	+1.9	----------	+14.8	+5.2	+0.3	+0.3	+4.4	−4.7	+6.3	----------	----------	----------

[1] 8-day mean.

TABLE 3.—*Total, I_m, and screened, I_y, I_r, solar radiation intensity measurements, obtained during December 1934, and determinations of the atmospheric turbidity factor, β, and water-vapor content, w=depth in millimeters, if precipitated*

AMERICAN UNIVERSITY, WASHINGTON, D. C.

Date and hour angle	Solar altitude	Air mass	I_m	I_y	I_r	$\beta_{I_{m-r}}$	$\beta_{I_{y-r}}$	β_{mean}	$\frac{I_{w=0}}{1.94}$ (Percentage of solar constant)	$\frac{I_{w=0}-I_m}{1.94}$ (Percentage of solar constant)	w	Air-mass type
Dec. 5, 1934	° ′	*m*	*gr. cal.*	*gr. cal.*	*gr. cal.*						*mm*	
0:54 a. m.	27 30	2.16	1.354	0.976	0.792	0.026	0.020	0.023	79.8	12.0	15.8	N_{TP} or N_{PC}
Dec. 12, 1934												
2:14 a. m.	20 34	2.82	1.057	.791	.661	.066	.072	.069	62.7	10.0	5.1	P_C
2:06 a. m.	21 24	2.72	1.042	.791	.661	.078	.075	.076	61.7	9.8	5.0	
Dec. 14, 1934												
2:11 a. m.	20 47	2.99	1.135	.849	.675	.035	.015	.025	72.4	15.8	----------	P_C
2:07 a. m.	21 12	2.75	1.153	.852	.676	.032	.018	.025	74.0	16.5	----------	
0:31 a. m.	27 28	2.16	1.292	.932	.757	.038	.034	.036	76.0	11.7	14.2	
0:27 a. m.	27 35	2.15	1.294	.922	.757	.037	.035	.036	76.1	10.7	9.3	
Dec. 15, 1934												
3:05 a. m.	14 16	4.00	.859	.681	.563	.066	.050	.058	57.1	14.7	24.9	P_C
3:01 a. m.	14 48	3.86	.859	.681	.563	.068	.056	.062	57.4	14.7	25.8	
2:26 a. m.	19 05	3.03	.999	.778	.654	.054	.068	.076	58.7	9.3	2.6	
2:21 a. m.	19 46	2.94	1.034	.780	.656	.070	.070	.070	61.4	9.8	4.6	
2:05 a. m.	21 20	2.74	1.043	.792	.637	.064	.038	.051	66.6	16.6	----------	
2:01 a. m.	21 41	2.69	1.070	.794	.638	.044	.040	.042	69.8	15.4	----------	
Dec. 18, 1934												
2:26 a. m.	17 50	3.24	1.186	.881	.728	.022	.024	.023	72.4	13.2	16.4	P_C
0:18 a. m.	26 46	2.21	1.195	.877	.701	.048	.023	.036	74.0	14.6	----------	
0:44 a. m.	26 55	2.20	1.168	.879	.703	.068	.024	.046	73.0	15.0	----------	

Atmospheric conditions during turbidity measurements

Dec. 5: Temperature, 2° C; wind, NW. 12; visibility, 50 miles; polarization, 64 percent; blueness of sky, 6.
Dec. 12: Temperature, −5° C.; wind, NW. 14; visibility, 12 miles; polarization, 42 percent; blueness of sky, 4.
Dec. 14: Temperature, 0° C.; wind, NW. 15; visibility, 20 miles; polarization, 57 percent; blueness of sky, 5.
Dec. 15: Temperature, −1° C.; wind, NW. 10; visibility, 20 miles; polarization, 55 percent; blueness of sky, 5.
Dec. 18: Temperature, 0° C.; wind, NW. 8; visibility, 30 miles; polarization, 54 percent; blueness of sky, 5.

TABLE 3.—*Total, I_m, and screened, I_y, I_r, solar radiation intensity measurements, obtained during December 1934, and determinations of the atmospheric turbidity factor, β, and water-vapor content, w=depth in millimeters, if precipitated*—Continued

Date and hour angle from apparent noon	Solar altitude		Air mass	I_m	I_y	I_r	β_{I_m-r}	β_{I_y-r}	β_{mean}	$\frac{I_{w=0}}{1.94}$	$\frac{I_{w=0}-I_m}{1.94}$	w	Air-mass type
										Percentage of solar constant			
Dec. 2, 1934	°	′	*m*	*gr. cal.*	*gr. cal.*	*gr. cal.*						*mm*	
0:21 a. m.	25	24	2.30	1.174	0.870	0.721	0.076	0.086	0.081	68.9	5.1	1.1	N_F, T_c aloft.
0:14 a. m.	25	43	2.30	1.188	.....	.710	.092	.....	.092	68.7	9.1	6.9	N_F, T_c aloft.
Dec. 4, 1934													
1:59 p. m.	19	55	2.92	.887	.680	.579	.102	.148	.125	50.3	5.9	1.5	N_{FC}, T_c aloft
Dec. 5, 1934													
2:47 a. m.	14	49	3.86	1.097	.844	.704	.049	.050	.050	61.0	6.6	1.3	P_c
1:25 a. m.	22	32	2.60	1.295	.951	.780	.036	.038	.037	72.1	7.3	2.9	
1:13 a. m.	23	17	2.52	1.310	1.014	.793	.047	.046	.046	70.3	4.7	2.6	
0:20 a. m.	25	16	2.33	1.360	.987	.810	.036	.054	.045	72.2	4.1	2.6	
0:20 p. m.	25	16	2.33	1.370	.997	.815	.033	.054	.044	72.5	3.9	2.4	P_c
1:50 p. m.	20	42	2.81	1.257	.930	.763	.033	.033	.033	71.8	8.9	5.2	
Dec. 8, 1934													
1:21 a. m.	24	50	2.37	1.271	.947	.783	.058	.061	.060	68.5	4.9	2.1	P_c
Dec. 9, 1934													
1:08 a. m.	23	07	2.54	1.347	1.010	.835	.045	.049	.047	70.0	2.9	2.2	
0:11 a. m.	24	56	2.36	1.380	1.032	.866	.052	.050	.051	70.5	1.5	1.2	P_c
0:09 p. m.	24	57	2.36	1.371	1.015	.851	.049	.064	.056	70.3	1.7	1.5	P_c
Dec. 11, 1934													
2:23 a. m.	16	50	3.43	1.186	.901	.771	.049	.063	.056	61.1	1.8	1.1	P_c
0:33 a. m.	24	21	2.42	1.312	.971	.811	.050	.065	.058	68.5	2.9	1.1	
0:24 p. m.	24	33	2.40	1.317	.983	.806	.048	.046	.047	70.7	4.5	2.2	
Dec. 12, 1934													
0:13 a. m.	24	40	2.38	1.401	1.035	.842	.030	.025	.028	71.2	6.2	3.0	
0:15 p. m.	24	37	2.39	1.391	1.017	.851	.037	.062	.050	70.6	1.1	1.3	P_c; N_{TF} aloft
1:25 p. m.	21	50	2.68	1.330	.989	.819	.037	.044	.040	70.6	3.1	2.0	
Dec. 14, 1934													
2:08 a. m.	18	21	3.16	1.266	.974	.834	.054	.058	.056	67.3	3.6	1.6	P_c
1:37 a. m.	20	47	2.80	1.313	.996	.834	.047	.051	.049	67.6	2.0	1.9	
0:57 a. m.	23	12	2.53	1.349	.992	.821	.043	.049	.046	71.2	3.8	2.2	
0:36 a. m.	23	00	2.45	1,368	.998	.823	.033	.044	.038	74.1	5.7	2.7	
Dec. 15, 1934													
2:38 a. m.	15	04	3.79	1.266	.976	.833	.035	.045	.040	63.6	3.2	1.1	P_c
2:16 a. m.	17	13	3.35	1.313	.996	.838	.028	.039	.044	65.0	1.7	1.1	
0:18 a. m.	24	23	2.41	1.373	1.006	.836	.034	.051	.042	72.5	3.9	2.4	
0:16 p. m.	24	26	2.41	1.360	.999	.827	.040	.054	.047	70.7	2.7	2.2	
2:00 p. m.	18	56	3.06	1.240	.957	.788	.068	.031	.050	68.0	3.0	1.8	P_c
Dec. 18, 1934													
2:50 a. m.	13	18	4.28	1.237	.960	.808	.026	.029	.028	67.1	5.4	1.7	P_c
2:29 a. m.	15	55	3.61	1.280	.970	.805	.023	.022	.022	70.3	6.4	2.0	
1:46 a. m.	19	58	2.90	1.369	.994	.813	.....	.....	.....	.....	.....	.....	
0:10 a. m.	24	22	2.41	1.363	.995	.813	.035	.027	.031	75.4	7.4	3.1	
0:11 p. m.	24	21	2.42	1.366	.998	.810	.030	.032	.031	75.3	7.2	2.2	
Dec. 27, 1934													
2:35 a. m.	15	24	3.72	1.200	.923	.779	.044	.047	.046	62.1	2.3	1.9	P_c
2:13 a. m.	17	42	3.26	1.255	.946	.789	.037	.045	.041	66.3	3.7	1.8	
0:33 a. m.	24	00	2.45	1.384	1.002	.829	.030	.048	.039	72.9	4.1	2.6	
0:00 a. m.	24	25	2.41	1.379	.998	.814	.027	.033	.030	75.3	6.6	2.6	
1:41 p. m.	20	21	2.86	1,283	.948	.778	.028	.040	.034	71.0	7.2	2.6	P_c
Dec. 30, 1934													
2:43 a. m.	14	33	3.94	1.171	.898	.762	.043	.050	.046	61.2	2.8	1.4	P_c
2:21 a. m.	16	57	3.41	1.220	.937	.789	.042	.038	.040	65.7	4.8	2.0	
0:46 a. m.	23	32	2.50	1.384	1.019	.831	.030	.032	.031	74.5	5.5	2.7	
0:18 a. m.	24	28	2.40	1.384	1.019	.831	.037	.035	.036	73.1	4.1	2.5	P_c
Dec 31, 1934													
2:44 a. m.	14	31	3.94	1,273	.984	.827	.027	.028	.028	61.7	3.2	1.4	P_c
2:21 a. m.	17	12	3.35	1,328	1.012	.855	.053	.057	.055	67.0	1.8	1.5	
1:13 a. m.	22	32	2.60	1,409	1.036	.855	.027	.040	.034	73.0	2.8	2.0	
0:28 a. m.	24	26	2.41	1.414	1.047	.863	.036	.037	.036	75.0	4.5	2.7	
0:05 a. m.	24	40	2.38	1,424	1.050	.870	.035	.043	.039	73.4	2.4	2.1	
1:42 p. m.	20	34	2.82	1.349	.....	.828	.026	.....	.026	73.1	5.9	2.1	P_c

Atmospheric conditions during solar radiation measurements, Blue Hill Meteorological Observatory of Harvard University

Date and time from apparent noon	Air temperature	Wind (Beaufort scale)	Visibility; scale, 0–10	Sky blueness	Clouds and remarks
December 1934	°C.				
2; 0:45 a. m.	6.7	W 5	8+	9	4 Cu, Frcu, Stcu.
2; 2:21 p. m.	6.9	W 5	8+	6	Few Ci, Cist; 2 Frcu, Cu.
3; 3:34 a. m.	−16.1	NW 2	8	7	3 Ci, Few Acu.
4; 1:30 p. m.	5.0	NWxW 3	8	5	2 Acu, 1 Cu; moist haze.
4; 3:09 p. m.	8.3	W 6	9		Few Ci, 2 Acu, 1 Cu; lt. hz. Clouds 6° from sun.
5; 3:10 a. m.	2.1	WNW 6	9	9	Few Acu, few Frcu. Mount Monadnock completely visible.
5; 1:53 a. m.	3.3	WNW 6	9	10	Few Cu, Frcu.
5; 0:06 a. m.	4.4	NW 5	9		1 Cu, Frcu.
5; 1:51 p. m.	4.2	WNW 6	9	6	1 Cu.
8; 1:41 a. m.	−12.9	NW 5	8	7	1 Ci, Cist.
9; 0:23 a. m.	−12.2	WNW 3	9	6	6 Ci, Cist.
9; 2:39 p. m.	−9.2	NW 3	9	8	Few Cist.
11; 2:28 a. m.	−13.9	NNW 4	8	8	Few Stcu; moderate haze.
11; 0:07 a. m.	−11.9	NW 4	8–9	8	Light haze.
12; 3:18 a. m.	−10.7	NW 4	8–9	10	Few Ci. lt. haze to 3° alt.
12; 0:17 a. m.	−7.1	NW 3	9	10	Lt. haze to 3° alt.
12; 1:19 p. m.	−4.9	WNW 3	8–9	12	Lt. haze to 3° alt.
12; 3:20 p. m.	−3.2	WNW 3	8–9	6	3 Ci. in west.
14; 2:18 a. m.	−8.3	WNW 4	8–9	8	Lt. haze.
14; 1:08 a. m.	−4.4	W 4	8–9	10	2 Ci, Cicu; light haze.
15; 2:47 a. m.	−12.2	WNW 5	7–9	8	Few Cist, Frcu.
15; 0:10 a. m.	−8.9	WxN 5	8	8	Cist. 5° of sun; lt. haze.
18; 2:56 a. m.	−8.3	NW 6	9–10	10	0 clouds.
18; 1:26 a. m.	−4.6	NW 4	9	11	0 clouds.
18; 0:09 a. m.	−4.4	NW 5	8–9	10	0 clouds.
18; 2:39 p. m.	−0.6	NW 3	8–9	10	Few Ci, Cist; lt. haze.
20; 2:19 a. m.	2.2	W 8	7	6	6 Stcu, Frcu. Heavy water haze.
20; 0:27 a. m.	1.9	W 10	8–9	6	5 Cu, Frcu.
20; 3:54 p. m.	1.3	W 8	9	8	Few Cu.
24; 2:34 a. m.	±0.0	W 5	6	4	2 Cist, Cicu; heavy water haze.[1]
27; 2:33 a. m.	−11.1	WNW 8	9		0 clouds; light haze.
27; 0:32 a. m.	−10.6	WNW 7	9	4	Few Ci. on horizon.
27; 1:51 p. m.	−8.3	WNW 7	9		Few Ci.
30; 2:37 a. m.	−12.8	WxN 6	7–9	6	Few Frcu; no haze.
30; 0:36 a. m.	−10.0	WNW 7	8–9	6	Few Cu; no haze.
30; 3:31 p. m.	−7.8	NW 7	9	6	Few Ci; no haze.
31; 2:27 a. m.	−10.3	WNW 6	8–9	4	0 Clouds; light haze.
31; 0:21 a. m.	−5.6	NW 5	9	6	0 clouds; light haze.

[1] From this date, on blue sky observations made with comparison card shielded from direct rays of the sun.

POSITIONS AND AREAS OF SUN SPOTS

[Communicated by Capt. J. F. Hellweg, U. S. Navy, Superintendent U. S. Naval Observatory. Data furnished by the U. S. Naval Observatory in cooperation with Harvard and Mount Wilson Observatories. The difference in longitude is measured from the central meridian, positive west. The north latitude is positive. Areas are corrected for foreshortening and are expressed in millionths of the sun's visible hemisphere. The total area for each day includes spots and groups]

Date	Eastern standard time		Heliographic: Diff. in longitude	Heliographic: Longitude	Heliographic: Latitude	Area: Spot	Area: Group	Total area for each day	Observatory
1934	h	m	°	°	°				
Nov. 1	13	18	−73.0	161.3	+23.5		201	201	U. S. Naval.
Nov. 2	13	29	−58.5	162.5	+23.0		216	216	Do.
Nov. 3	11	7	−45.5	163.7	+23.0		139	139	Do.
Nov. 4	12	52	−32.0	163.0	+23.0		93	93	Do.
Nov. 5	11	18	−18.5	164.2	+23.0		69	69	Do.
Nov. 6	11	16	−6.0	163.5	+23.0		54	54	Do.
Nov. 7	11	18	+11.0	167.3	+22.0	35		35	Do.
Nov. 8	14	22	+26.0	167.4	+22.0	31		31	Do.
Nov. 9	11	42	+39.5	169.2	+22.0	31		31	Do.
Nov. 10	11	2	+53.5	169.9	+23.5	91		91	Harvard.
Nov. 11	14	4	+65.0	167.1	+22.0	10		10	U. S. Naval.
Nov. 12	11	8		No spots					Do.
Nov. 13	13	28		No spots					Do.
Nov. 14				No spots					Harvard.
Nov. 15	11	7		No spots					U. S. Naval.
Nov. 16	11	15		No spots					Do.
Nov. 17	11	29		No spots					Do.
Nov. 18	12	19		No spots					Do.
Nov. 19	11	21		No spots					Do.
Nov. 20	11	7		No spots					Do.
Nov. 21	12	0		No spots					Mount Wilson.
Nov. 22	13	40		No spots					U. S. Naval.
Nov. 23	11	0		No spots					Mount Wilson.
Nov. 24	11	14		No spots					U. S. Naval
Nov. 25	11	42		No spots					Do.
Nov. 26	12	45	−1.0	264.1	−34.0		16	16	Mount Wilson.
Nov. 27	18	30	+12.0	260.7	−20.0		15		Do.
			+16.0	264.7	−35.0		7	22	
Nov. 28	12	50	+23.0	261.7	−19.0		20		Do.
			+39.0	277.7	−20.0		210	230	
Nov. 29	12	15	+14.0	239.8	−27.0		52		Do.
			+38.0	263.8	−19.0		21		
			+52.0	277.8	−20.0		116	189	
Nov. 30	12	10	+28.0	240.6	−28.0		93		Do.
			+51.0	263.6	−20.0		36		
			+65.0	277.6	−21.0		46	175	
Mean daily area for 30 days								53	

POSITIONS AND AREAS OF SUN SPOTS—Continued

Date	Eastern standard time		Heliographic: Diff. in longitude	Heliographic: Longitude	Heliographic: Latitude	Area: Spot	Area: Group	Total area for each day	Observatory
1934	h	m	°	°	°				
Dec. 1	12	40	+40.0	239.2	−28.0		31		Mount Wilson.
			+65.0	264.2	−20.0	12			Do.
			+80.0	279.2	−20.0	15		58	
Dec. 2	11	26	+54.0	240.7	−27.5		77	77	U. S. Naval.
Dec. 3	14	25	+65.0	236.9	−28.0		210	210	Mount Wilson.
Dec. 4	11	39	+79.0	239.2	−27.0		93	93	U. S. Naval.
Dec. 5	11	14		No spots					Do.
Dec. 6	11	38	+53.0	186.9	−23.0		131	131	Do.
Dec. 7	11	22	+66.0	186.9	−23.0		147	147	Do.
Dec. 8	11	58	+78.0	185.3	−23.0		108	108	Do.
Dec. 11	11	15		No spots					Do.
Dec. 12	11	11		No spots					Do.
Dec. 13	11	30		No spots					Do.
Dec. 14	11	16		No spots					Do.
Dec. 15	11	15		No spots					Do.
Dec. 16	11	15		No spots					Mount Wilson.
Dec. 17	12	0		No spots					Do.
Dec. 18	11	30		No spots					U. S. Naval.
Dec. 19	10	35		No spots					Mount Wilson.
Dec. 20	11	0	−41.0	268.7	+25.0		98		Do.
			+35.0	344.7	+18.0		4	102	
Dec. 21	11	40	−25.0	271.2	+26.0		62	62	U. S. Naval.
Dec. 22	12	6	−34.0	248.8	−23.0	31			Do.
			−15.5	267.3	+26.0	15			
			−11.0	271.8	+26.5		77	123	
Dec. 23	11	40	−50.0	219.9	−26.0		31		Do.
			−21.0	248.9	−23.0		62		
			+0.5	270.4	+26.0		62	155	
Dec. 24	10	30	−73.0	184.3	−22.0	7			Mount Wilson.
			−55.0	202.3	−29.0		4		
			−39.0	218.3	−26.0		27		
			−14.0	243.3	−27.0		4		
			−9.0	248.3	−22.0		8		
			+10.5	267.8	+25.0		84	134	
Dec. 25	11	38	−40.0	203.6	−29.0	62			U. S. Naval.
			−23.0	220.6	−25.5		46		
			+28.0	271.6	+27.0	54		162	
Dec. 26	13	59	−59.0	170.1	−23.0		93		Do.
			−28.0	201.1	−29.5		139		
			+40.5	269.6	+28.0	31		263	
Dec. 27	11	2	−47.0	170.6	−23.0		93		Do.
			−16.0	201.6	−30.0		108		
			+52.0	269.6	+28.0	16		217	
Dec. 28	13	41	−31.5	171.4	−22.5		69		Do.
			−1.5	201.4	−30.0		123		
			+66.0	268.9	+28.0	15		207	
Dec. 29	13	4	−23.0	167.1	−27.0	16			Do.
			−15.0	175.1	−22.0		46		
			+15.0	205.1	−29.5	46			
			+27.0	217.1	−28.5		23	131	
Dec. 30	13	5	+0.5	177.5	−22.0		113		Mount Wilson.
			+28.0	205.0	−30.0		56		
			+40.0	217.0	−29.0		44	213	
Dec. 31	12	50	+15.0	178.9	−22.0		22		Do.
			+21.0	184.9	−25.0		2		
			+40.0	203.9	−29.0	44			
			+54.0	217.9	−28.0		11	79	
Mean daily area for 29 days.								92	

PROVISIONAL SUN-SPOT RELATIVE NUMBERS FOR DECEMBER 1934

(Dependent alone on observations at Zurich and its station at Arosa)

[Data furnished through the courtesy of Prof. W. Brunner, Eidgen. Sternwarte, Zurich, Switzerland]

December 1934	Relative numbers	December 1934	Relative numbers	December 1934	Relative numbers
1	28	11	0	21	
2	21	12	0	22	21
3	12	13	0	23	
4	14	14	0	24	*a*27
5	*Wc*14	15		25	*Ecc*50
6	10	16	0	26	39
7	13	17	0	27	29
8	11	18	0	28	*a*34
9	0	19		29	32
10	0	20	*Ec*15	30	*a*37
				31	30

Mean: 27 days=16.2.

a=Passage of an average-sized group through the central meridian.
c=New formation of a center of activity; E, on the eastern part of the sun's disk; W, on the western part; M, in the central circle zone.