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SOLAR OBSERVATIONS

By IRVING F. HAND, Assistant in Solar Radiation Investigations

SOLAR RADIATION MEASUREMENTS DURING JUNE 1935

For a description of instruments employed and their exposures, the reader is referred to the January 1935 REVIEW, page 24.

Table 1 shows that solar radiation intensities averaged above normal at all three Weather Bureau stations.

With the exception of the western and southern stations, Fresno, Twin Falls, and Miami, table 2 shows an excess in the amount of total solar and sky radiation received on a horizontal surface. With the receipt of a new Eppley thermoelectric pyrheliometer, La Jolla again began regular measurements of total solar and sky radiation early in April. Values in gram-colories for the weeks beginning April 9, 1935, up to and inclusive of the week beginning with May 28, 1935, follow: 543, 525, 496, 620, 510, 553, 556, and 472 respectively. Beginning with this issue, these values will regularly appear in table 2.

Polarization measurements obtained on five days at Washington give a mean of 58 percent with a maximum of 60 percent on the 20th. At Madison, observations taken on five days give a mean of 62 percent with a maximum of 67 percent on the 7th. Both means are close to the respective normals for the stations for June, but in both cases the maximums are slightly below the June normals.

TABLE 1.—*Solar radiation intensities during June 1935*

[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*
June 1	7.19					1.36					5.79
June 5	9.47	0.52	0.60	0.82	1.16	1.42					7.87
June 6	10.59		.82	.96	1.12	1.40					8.81
June 12	12.24					1.24					10.59
June 13	15.11					1.32	1.06				9.47
June 20	9.47		.87	1.04	1.23	31.41					9.83
June 24	10.59		.71	.88							10.21
June 25	10.59				1.11	1.41					9.14
June 27	16.20				.87	1.16					15.65
June 28	15.65				.82						13.13
Means		.52	.75	.96	1.05	1.34	1.06				
Departures		−.05	+.08	+.18	+.11	−.10	−.12				

TABLE 1.—*Solar radiation intensities during June 1935*—Contd.

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*
June 4	7.87	------	0.44	0.70	0.98	1.19	------	------	------	------	8.18
June 7	7.29	------	.96	1.09	1.27	1.50	------	------	------	------	5.16
June 8	6.76	------	.95	1.07	1.25	------	------	------	------	------	6.02
June 11	12.24	------	------	------	------	1.30	------	------	------	------	13.61
June 12	10.59	------	------	------	------	1.40	------	------	------	------	12.24
June 13	13.61	------	------	------	------	1.47	------	------	------	------	16.20
June 20	8.18	------	------	1.13	------	------	------	------	------	------	8.81
June 22	9.83	------	.94	1.05	1.24	1.45	------	------	------	------	9.47
June 24	10.21	------	.85	1.03	------	------	------	------	------	------	9.47
June 27	15.11	------	------	.97	1.26	1.44	------	------	------	------	10.97
June 29	13.13	------	------	------	------	1.37	------	------	------	------	13.13
Means	------	------	.83	1.01	1.20	1.39	------	------	------	------	------
Departures	------	------	−.02	+.04	+.17	+.06	------	------	------	------	------

LINCOLN, NEBR.

June 3	8.81	------	.96	1.10	1.27	1.44	------	------	------	------	.704
June 4	6.76	------	.91	1.06	1.29	1.50	------	------	------	------	7.29
June 5	8.18	------	------	------	1.08	1.48	------	------	------	------	8.18
June 7	6.27	------	.90	1.06	1.36	1.50	------	------	------	------	5.79
June 11	10.59	------	------	------	------	------	1.17	1.05	0.89	0.77	8.81
June 13	14.60	------	.84	.91	------	------	------	.91	.75	------	16.20
June 19	10.27	.87	.99	1.11	------	------	------	------	------	------	9.57
June 22	12.24	------	.92	1.06	1.22	1.48	------	------	------	------	12.24
June 25	14.60	------	------	------	1.07	1.37	1.17	1.01	.84	------	14.10
June 26	11.81	------	------	------	------	------	1.22	1.04	.84	------	14.60
Means	------	.87	.90	1.05	1.22	1.46	1.12	.95	.78	.60	------
Departures	------	+.11	+.12	+.12	+.12	+.11	+.02	+.04	+.00	+.04	------

TABLE 1.—*Solar radiation intensities during June 1935*—Contd.

BLUE HILL, MASS.

Date	Sun's zenith distance										
	8 a. m.	78.7°	75.7°	70.7°	60.0°	0.0°	80.0°	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*
June 1	9.6	------	------	------	------	------	1.13	------	------	------	8.8
June 2	9.6	------	0.86	1.02	1.19	1.42	1.20	------	------	------	7.4
June 3	9.6	------	------	------	------	1.40	------	------	------	------	8.6
June 7	11.11	------	------	------	.91	.97	.78	------	------	------	11.1
June 12	11.1	------	------	------	------	1.14	.85	------	------	------	7.9
June 13	11.1	------	------	------	1.06	1.15	1.02	------	------	------	9.6
June 14	7.9	------	------	------	------	1.40	------	------	------	------	6.8
June 16	9.9	------	------	------	------	------	1.22	------	------	------	8.2
June 17	12.8	------	------	------	.82	1.07	------	------	------	------	14.7
June 23	10.7	------	------	------	1.02	1.24	------	------	------	------	8.8
June 24	11.5	------	------	.87	1.10	1.34	------	------	------	------	9.2
June 26	11.5	------	------	1.17	1.25	1.33	------	------	------	------	10.3
June 27	14.3	------	------	------	1.00	1.18	.96	------	------	------	13.2
June 28	15.8	------	------	------	1.01	1.32	------	------	------	------	7.9
June 30	15.8	------	------	------	.79	1.12	.89	------	------	------	13.7
Means	------	------	.86	1.02	1.02	1.24	1.01	------	------	------	------

*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	Fairbanks	Twin Falls	La Jolla	Miami	New Orleans	Riverside	Blue Hill	Friday Harbor	Ithaca	San Juan
	Gram-calories per square centimeter															
1935	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*
June 4	467	441	530	406	288	746	478	702	332	461	370	606	273	593	436	624
June 11	528	438	481	496	567	761	546	665	584	542	399	589	597	512	568	773
June 18	489	382	543	399	392	779	454	716	580	349	465	575	473	577	280	803
June 25	542	395	570	427	566	773	442	546	589	365	384	524	697	536	639	671
	Departures from weekly normals															
June 4	−28	−70	−20	−28	−128	+96	+22	+121	−102	−66	−76	+43	------	------	------	------
June 11	+31	−63	−56	+59	+20	+51	+47	+24	+150	+63	−49	0	------	------	------	------
June 18	−5	−140	−26	−57	−139	+56	−66	+13	+95	−134	+51	−30	------	------	------	------
June 25	+12	−138	−28	−5	+9	+52	−35	−110	+86	−154	−20	−77	------	------	------	------
	Accumulated departures on July 1, 1935															
	−2,842	−8,610	−8,190	+1,358	+2,625	+2,086	+1,617	+1,064	------	−2,275	−952	−4,172	------	------	------	------

TABLE 3.—*Total, I_m, and screened, I_y, I_r, solar radiation intensity measurements, obtained during June 1935 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}	$\frac{I_{w=o}}{1.94}$ (Percentage of solar constant)	$\frac{I_{w=o}-I_m}{1.94}$ (Percentage of solar constant)	w	Air-mass type
June 20, 1935	°	′	*m*	*gr. cal.*	*gr. cal.*	*gr. cal.*						*mm*	
4:49 a. m.	27	52	2.14	1,191	0.862	0.681	0.034	0.040	0.037	74.8	10.9	10.2	NPC
4:44 a. m.	28	09	2.07	1.205	.864	.684	.030	.044	.037	78.6	14.0	35.0	
4:03 a. m.	36	46	1.67	1.278	.911	.705	.018	.021	.020	83.3	15.4	35.0	
3:59 a. m.	37	33	1.64	1.286	.917	.707	.017	.021	.019	83.9	15.5	35.0	
June 25													
2:30 a. m.	54	30	1.23	1.311	.892	.688	.054	.058	.056	80.6	10.7	10.4	NP
2:24 a. m.	55	48	1.21	1.308	.892	.688	.058	.064	.061	85.2	10.4	10.3	
2:12 a. m.	58	01	1.18	1.331	.896	.701	.062	.054	.058	81.1	10.3	10.2	
2:09 a. m.	58	34	1.17	1.333	.896	.701	.062	.058	.060	80.9	10.3	10.2	
1:06 a. m.	61	40	1.07	1.380	.932	.716	.068	.068	.068	81.3	9.0	9.7	
0:53 a. m.	70	50	1.05	1.371	.932	.716	.072	.070	.071	81.2	9.4	9.7	

Atmospheric conditions during turbidity measurements:
June 20. Temp. 15° C., wind, NW. 12; visibility, 50 miles; polarization, 60.4 percent; blueness of sky, 6.
June 25. Temp. 16° C., wind, NW. 10; visibility, 30 miles; polarization, 59.8 percent; blueness of sky, 5.

BLUE HILL METEOROLOGICAL OBSERVATORY OF HARVARD UNIVERSITY

June 1, 1935													
4:34 a. m.	30	14	1.98	1.105	0.792	0.641	0.066	0.079	0.072	69.0	10.5	7.1	P_A
3:05 a. m.	46	36	1.38	1.267	.871	.693	.047	.072	.060	78.8	11.6	10.4	
1:09 a. m.	65	10	1.10	1.366	.921	.728	.045	.071	.058	82.2	9.8	12.7	
0:15 a. m.	69	33	1.06	1.361	.916	.718	.032	.042	.037	81.8	9.6	9.2	
2:51 p. m.	49	03	1.32	1.292	.888	.698	.041	.053	.047	81.5	13.0	11.0	
June 2													
3:07 a. m.	46	18	1.38	1.250	.857	.688	.064	.098	.081	75.3	13.0	11.0	N_{PC}
June 7													
3:02 a. m.	47	31	1.35	0.928	.672	.544	.185	.195	.190	62.1	12.5	10.7	N_{PC} becoming T_M
4:17 p. m.	33	47	1.79	.844	.625	.512	.152	.149	.150	60.3	15.4	8.3	
June 12													
1:34 a. m.	62	37	1.12	1.047	.748	.614	.199	----------	.199	65.7	5.0	10.2	N_{PC}
0:29 a. m.	69	58	1.06	1.130	.797	.640	.160	.179	.170	69.9	9.8	12.4	
3:21 p. m.	44	23	1.43	1.109	.782	.637	.113	.154	.134	67.4	8.4	9.5	
June 13													
3:22 a. m.	44	13	1.43	1.095	.795	.635	.148	.115	.132	67.7	8.5	9.6	N_{PC}; T_A Aloft
2:54 a. m.	48	18	1.33	1.075	.770	.620	.141	.152	.146	67.6	10.4	10.5	
1:28 a. m.	70	20	1.06	1.125	.792	.625	.200	.194	.197	67.3	7.5	12.5	
4:49 a. m.	28	12	2.11	.989	.730	.602	.113	.128	.120	60.1	7.5	6.3	
June 14													
0:30 a. m.	70	30	1.06	1.356	.911	.715	.045	.073	.059	82.5	13.5	13.7	N_{PC}
4:40 p. m.	29	52	2.00	1.158	.814	.643	.041	.070	.056	72.9	11.3	7.9	
June 17													
4:42 a. m.	29	54	2.00	.807	.609	.495	.181	.156	.168	54.7	11.8	7.1	N_P
3:12 a. m.	46	09	1.39	.990	.718	.569	.101	.143	.122	69.6	16.9	10.7	
June 23													
4:00 a. m.	37	23	1.64	1.084	.777	.626	.091	.100	.096	69.6	11.9	8.7	N_{PC}
3:21 a. m.	44	34	1.42	1.104	.787	.629	.103	.120	.112	70.7	11.9	10.0	
2:58 a. m.	48	41	1.33	1.124	.790	.639	.118	.150	.134	69.1	9.3	10.4	
1:41 a. m.	69	25	1.07	1.198	.824	.653	.150	.162	.156	71.1	7.3	12.4	
June 24													
4:52 a. m.	27	46	2.14	1.075	.825	.632	.064	.014	.039	75.0	17.7	7.0	N_P
2:55 a. m.	42	20	1.48	1.250	.870	.685	.045	.050	.048	79.4	11.9	9.7	
June 26													
4:58 a. m.	26	38	2.23	1.190	.848	.675	.032	.032	.032	77.1	13.7	6.5	N_P
June 27													
2:59 a. m.	48	31	1.33	1.108	.788	.629	.120	.135	.128	75.1	16.0	10.7	T_G
3:17 p. m.	35	14	1.73	1.050	.737	.606	.101	.152	.126	64.1	9.1	7.9	
5:15 p. m.	23	30	2.50	.843	.636	.520	.114	.123	.118	56.0	11.1	5.6	
June 28													
4:12 a. m.	35	05	1.74	1.100	.785	.630	.081	.100	.090	69.3	10.7	8.0	N_P
2:59 a. m.	48	31	1.33	1.225	.840	.668	.078	.100	.089	75.0	9.7	10.4	
0:16 a. m.	70	49	1.06	1.307	.886	.700	.109	.195	.152	71.9	2.2	9.6	
June 30													
4:43 a. m.	28	17	2.10	.775	.600	.500	.183	.181	.182	51.0	9.7	6.6	T_A & N_P; change at 8 a. m.
3:00 a. m.	48	15	1.34	.931	.678	.552	over .200	over .200	over .200	61.0	11.4	10.6	
3:24 p. m.	43	52	1.44	1.061	.744	.606	.181	.176	.178	64.6	8.1	9.4	

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

Date and time from apparent noon	Air temperature	Wind Beaufort scale	Visibility (scale 0-10)	Sky-blueness	Cloudiness and remarks
June 1935	° C.				
1; 4:08 p. m.	13.9	NNE 4	8-9	10	3 Acu, few Cu.
2; 3:18 a. m.	16.7	NE 4	9	10	Few Cu.
2; 0:33 a. m.	19.4	E 3	8-9	10	Few Ci, 1 Cu, light haze.
2; 2:35 p. m.	20.0	NE 3	9	9	3 Ci, few Cu.
7; 3:18 a. m.	16.1	W 2	6	7	3 Ci, light fog and heavy water haze.
7; 2:22 p. m.	22.8	S 5	8	7	2 Acu, 3 Cu, heavy water haze.
7; 4:00 p. m.	21.7	S 5	8	8	Few Ci, few Cu, heavy water haze
12; 3:27 a. m.	18.9	SW 2	7	6	5 Acu, Cu, Stcu, mod. water haze.
12; 0:45 a. m.	23.3	W 3	7	6	Few Acu, few Cu, mod. water haze.
12; 3:04 p. m.	23.3	W 5	8	9	3 Cu, mod. water haze.
13; 3:17 a. m.	19.4	W 1	7	9	3 Acu, few Cu, heavy water haze.
13; 0:38 a. m.	28.9	S 2	8	7	5 Cu, heavy water haze.
13; 2:27 p. m.	28.9	WNW 3	8	7	6 Cu, mod. water haze.
13; 4:23 p. m.	27.2	W 3	8	9	3 Cu, light water haze.
17; 3:15 a. m.	21.1	SW 5	8	8	10 Cist, very thin, mod. haze.
22; 3:13 a. m.	22.2	S 5	8	8	6 Acu Cu, light water haze.
23; 4:41 a. m.	15.6	W 4	8	10	Few Acu, light haze.
23; 3:15 a. m.	21.7	W 3	8	9	1 Acu, light haze.
23; 2:36 p. m.	25.0	SW 4	8	8	2 Acu, 3 Cu, light haze.
24; 3:19 a. m.	18.3	WNW 4	8	10	Few Ci, few Cu, light haze.
24; 0:36 a. m.	26.1	W 3	8	9	Few Ci, 6 Cu, light haze.
27; 3:16 a. m.	21.7	S 3	8	9	1 Ci, 2 Acu, heavy haze.
27; 0:01 p. m.	26.1	S 4	8	8	3 Ci, 3 Cu, mod. haze.
27; 2:55 p. m.	26.1	S 6	8	7	3 Ci, mod. haze.
28; 3:18 a. m.	21.7	W 1	7	9	4 Ci, mod. haze.
28; 0:35 a. m.	27.2	N 2	8	9	4 Ci, few Cu, light haze.
30; 3:22 a. m.	22.2	SSW 3	7-8	9	No clouds, heavy haze.
30; 2:20 p. m.	28.9	W 4	8	6	6 Cu, light haze.

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 measure 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			Area		Total area for each day	Observatory
			Diff. in longitude	Longitude	Latitude	Spot	Group		
1935	h.	m.	°	°	°				
June 1	11	15	−44.0	275.8	+26.0		62		U. S. Naval.
			−8.0	311.8	−30.5		185	247	
June 2	10	36	−31.0	276.0	+27.0		62		Do.
			+6.0	313.0	−30.5		340	402	
June 3	12	40	−21.0	271.5	+28.0	17			Mount Wilson.
			+20.0	312.5	−30.0		691	708	
June 4	12	15	−87.0	192.6	+28.0	100			Do.
			−8.0	271.6	+27.0	4			
			+31.0	310.6	−30.0		496		
			+80.0	359.6	−26.0	18		618	
June 5	11	4	−70.0	197.0	+28.0		62		U. S. Naval.
			+46.0	313.0	−31.0		340	402	
June 6	11	39	−59.0	194.5	+29.0		85		Do.
			+58.0	311.5	−31.0		278	363	
June 7	11	3	−48.0	192.5	+29.0		62		Do.
			+70.0	310.5	−31.5		247	309	
June 8	12	55	−64.0	162.2	−27.0		66		Mount Wilson.
			−49.0	177.2	+28.5		11		
			−32.0	194.2	+28.0	100			
			−19.0	207.2	−32.0		109		
			+85.0	311.2	−30.0		40	326	
June 9	14	1	−44.0	168.4	−26.0		77		U. S. Naval.
			−41.5	170.9	−36.0		31		
			−18.0	194.4	+29.0		69		
			−4.0	208.4	−31.5		247	424	
June 10	11	38	−30.0	170.5	−26.0		46		Do.
			−30.5	170.0	−35.0		39		
			−25.0	175.5	+27.0		39		
			−20.0	180.5	+26.0	15			
			−8.0	192.5	+28.5		39		
			+9.0	209.5	−31.0		247	425	
June 11	12	0	−54.0	133.1	+29.0		86		Mount Wilson.
			−19.0	168.1	−25.0		8		
			−19.0	168.1	−35.0		41		
			−5.0	182.1	+27.0	4			
			+9.0	196.1	+28.0	8			
			+22.0	209.1	−32.0		205	352	
June 12	11	0	−42.0	132.4	+30.0		62		U. S. Naval.
			+4.5	178.9	+28.0		62		
			+35.0	209.4	−30.5		154	278	
June 13	11	10	−29.0	132.1	+29.5		93		Do.
			+18.0	179.1	+28.0		69		
			+46.0	207.1	−30.0		62	224	

POSITIONS AND AREAS OF SUN SPOTS—Continued

Date	Eastern standard time		Heliographic			Area		Total area for each day	Observatory
			Diff. in longitude	Longitude	Latitude	Spot	Group		
1935	h.	m.	°	°	°				
June 14	11	9	−17.5	130.3	+29.5		93		U. S. Naval.
			+37.0	184.8	+27.0	31			
			+60.0	207.8	−30.0		46	170	
June 15	10	36	−71.0	63.9	−20.0	93			Do.
			−63.0	71.9	+16.0		62		
			−5.0	129.9	+29.5		31		
			+48.0	182.9	+27.0		31		
			+70.0	204.9	−31.0	8		225	
June 16	12	54	−64.0	56.4	−19.0		139		Do.
			−43.0	77.4	+15.0	46			
			+9.0	129.4	+29.5	23			
			+61.0	181.4	+27.0		93	301	
June 17	11	7	−86.0	22.1	−19.0	31			Do.
			−51.0	57.1	−19.0		108		
			−29.5	78.6	+15.0		31		
			+69.5	177.6	+27.5	46		216	
June 18	11	12	−70.0	24.9	−19.5	93			Do.
			−36.0	58.9	−19.5		123		
			−14.0	80.9	+14.0	31		247	
June 19	12	0	−59.0	22.2	−19.5	226			Mount Wilson.
			−25.0	56.2	−19.0		260		
			−2.0	79.2	+15.0		39	525	
June 20	11	8	−44.5	23.9	−19.0	123			U. S. Naval.
			−17.5	50.9	−17.5		31		
			−10.0	58.4	−19.5		123		
			+10.5	78.9	+15.0		31	308	
June 21	8	45	−59.5	357.0	−28.0	8			Mount Wilson.
			−31.0	25.5	−19.5		249		
			−1.0	55.5	−17.0		54		
			+25.0	81.5	+15.0	4			
			+59.5	116.0	+31.0		18	333	
June 22	11	0	−18.0	24.0	−19.5	123			U. S. Naval.
			+47.0	89.0	+15.0	31		154	
June 23	10	58	−80.0	308.8	−24.5	154			Do.
			−5.0	23.8	−19.5	154			
			−6.0	22.8	−20.0	10		318	
June 24	11	12	−69.0	306.4	−26.0		432		Do
			+8.5	23.9	−19.5	123		555	
June 25	11	11	−61.0	301.2	−30.0		31		Do.
			−55.0	307.2	−24.5		586		
			+22.0	24.2	−19.5	123		740	
June 26	11	8	−49.0	300.0	−31.0		39		Do.
			−42.0	307.0	−25.0		648		
			+35.0	24.0	−19.5	139		826	
June 27	11	4	−37.5	298.3	−31.0		39		Do.
			−30.0	305.8	−24.5		617		
			+49.0	24.8	−19.5	139		795	
June 28	11	4	−23.0	299.6	−30.5		62		Do.
			−21.0	301.6	−22.0	93			
			−16.0	306.6	−24.0		617		
			+61.0	23.6	−19.5	123		895	
June 29	10	37	−10.5	299.1	−31.0		31		Do.
			−9.0	300.6	−22.0		93		
			−4.0	305.6	−24.0		556		
			+73.0	22.6	−19.5	69		749	
June 30	13	0	+3.0	298.0	−29.0		30		Mount Wilson.
			+11.0	306.0	−24.0		956	986	
Mean daily area for 30 days.								447	

PROVISIONAL SUN-SPOT RELATIVE NUMBERS FOR JUNE 1935

[Dependent alone on observations at Zurich and its station at Arosa]

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

June 1935	Relative numbers	June 1935	Relative numbers	June 1935	Relative numbers
1	34	11	*Ec* 74	21	50
2	*b* 39	12	66	22	*a* 35
3	34	13	55	23	*d* 29
4	34	14	41	24	*a* 38
5	*d* 31	15	*d* 49	25	44
6	41	16	42	26	51
7	25	17	38	27	56
8	*Ec* 46	18	*d* 41	28	52
9	*Ec* 60	19	38	29	45
10	*b* 73	20	67	30	*b* 42

Mean, 30 days=45.7.

a=Passage of an average-sized group through the central meridian.
b=Passage of a large group or spot 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.
d=Entrance of a large or average-sized center of activity on the east limb.