At Madison no polarization measurements were made during the month on account of the presence of ice and snow.

TABLE 1.—*Solar radiation intensities during January, 1928*

[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] 1.0	2.0	3.0	4.0	5.0	e.
	mm.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mm.*
Jan. 4	1.52	0.75	0.86	1.05	1.29	1.58		1.15	1.01	0.92	0.96
Jan. 10	3.63	0.94	0.98	1.08	1.27	1.52		1.13	1.02	0.89	3.81
Jan. 11	3.99				1.29			1.05			6.27
Jan. 12	3.81	0.70	0.84	1.00	1.20	1.43					4.17
Jan. 20	2.49				1.30			1.15			2.26
Jan. 21	0.91						1.30				0.86
Jan. 23	1.88	0.87	0.98	1.12	1.32	1.54	1.35	1.09	0.93	0.87	2.16
Jan. 25	2.49			1.09	1.33						2.36
Jan. 26	2.06						1.37	1.14	0.96		3.99
Jan. 27	1.68				0.92		1.14	0.87	0.67		1.88
Jan. 30	1.19		0.65	0.86							1.37
Means		**0.82**	**0.86**	**1.03**	**1.24**	**1.52**	**1.29**	**1.08**	**0.92**	**0.89**	
Departures		**+0.09**	**+0.01**	**+0.03**	**+0.01**		**+0.06**	**+0.05**	**+0.05**	**+0.10**	

MADISON, WIS.

Jan. 3	0.79			1.21				1.26			1.07
Jan. 4	1.32							1.06			1.88
Jan. 21	0.91		1.10	1.23	1.39			1.24			1.12
Jan. 23	1.96	0.98	1.07								3.99
Jan. 25	1.24	0.93	1.16	1.27							1.52
Jan. 28	0.48		1.17	1.30							0.71
Jan. 30	1.37							1.05			1.52
Means		**(0.96)**	**1.12**	**1.25**	**(1.39)**			**1.15**			
Departures		**+0.00**	**+0.04**	**+0.02**	**+0.03**			**−0.06**			

LINCOLN, NEBR.

Jan. 3	0.58	0.97	1.10	1.24	1.41						1.24
Jan. 5	1.45								0.93	0.78	4.75
Jan. 8	3.00							1.29	1.17	0.99	3.63
Jan. 14	3.99	0.89	0.92	1.23							4.75
Jan. 19	3.15	0.94	1.18	1.24				1.03	0.88	0.72	2.06
Jan. 20	0.71	1.12	1.24	1.40	1.54	1.70		1.38	1.24	1.11	0.51
Jan. 21	0.96	0.79	1.02	1.18	1.43	1.71	1.43				1.60
Jan. 22	1.96						1.43				2.26
Jan. 23	2.62		0.92								3.99
Jan. 24	1.32			1.29	1.44			1.23	1.08	0.99	1.52
Jan. 25	1.19			1.12	1.45		1.46	1.27	1.16	1.05	1.19
Jan. 26	0.71		1.08	1.20							0.66
Jan. 27	1.37	1.10	1.22	1.32							1.19
Means		**0.97**	**1.08**	**1.25**	**1.45**	**(1.70)**	**1.44**	**1.24**	**1.08**	**0.94**	
Departures		**+0.04**	**+0.03**	**+0.07**	**+0.07**		**+0.02**	**+0.07**	**+0.03**	**+0.01**	

[1] Extrapolated.

TABLE 2.—*Solar and sky radiation received on a horizontal surface*

[Gram-calories per square centimeter of horizontal surface]

Week beginning—	Average daily radiation						Average daily departure from normal		
	Washington	Madison	Lincoln	Chicago	New York	Twin Falls	Washington	Madison	Lincoln
1928									
Jan. 1	179	136	211	113	130	117	−27	−1	+25
Jan. 8	164	128	192	83	77	151	−9	−21	−4
Jan. 15	146	127	167	73	127	199	+14	−35	−34
Jan. 22	221	211	241	118	150	192	+38	+23	+19
Excess or deficiency since first of year on Jan. 28							+112	−238	+42

POSITIONS AND AREAS OF SUN SPOTS

[Communicated by Capt. C. S. Freeman, Superintendent U. S. Naval Observatory]

[Data furnished by Naval Observatory, in cooperation with Harvard, Yerkes, and Mount Wilson Observatories]

(The differences of longitude measured from central meridian, positive west. The north latitudes are plus. Areas are corrected for foreshortening and are expressed in millionths of sun's visible hemisphere. The total area, including spots and groups, is given for each day in the last column)

Date	Eastern standard civil time	Heliographic			Area		Total area for each day
		Diff. long.	Longitude	Latitude	Spot	Group	
1928	*h. m.*	°	°	°			
Jan. 1 (Naval Observatory)	11 39	−66.0	354.7	−9.0	77		
		−32.0	28.7	−9.5	31		
		−29.5	31.2	−6.5	25		
		−28.0	32.7	−8.5	278		
		−22.0	38.7	−7.0		31	
		−7.0	53.7	−14.5		93	
		−6.5	54.2	−18.0		62	
		−2.0	58.7	−15.0		62	
		+36.5	97.2	+8.5		62	
		+68.0	128.7	+13.0		93	
		+75.0	135.7	+12.5	185		999
Jan. 2 (Naval Observatory)	11 54	−59.0	348.4	+11.0	31		
		−53.5	353.9	−9.0	62		
		−24.0	23.4	−12.0		62	
		−19.0	28.4	−8.5		15	
		−15.5	31.9	−8.5	278		
		−8.0	39.4	−7.5		15	
		+1.5	48.9	−14.5	15		
		+4.0	51.4	+11.5		31	
		+8.5	55.9	−18.5		108	
		+9.0	56.4	−15.0		62	
		+13.0	60.4	−17.0		46	
		+32.0	79.4	−34.0	12		
		+49.0	96.4	+10.5		46	783
Jan. 3 (Naval Observatory)	11 51	−71.0	323.2	−17.5		62	
		−45.5	348.7	+10.5		31	
		−39.5	354.7	−9.5	46		
		−11.5	22.7	−11.0		62	
		−5.5	28.7	−8.5	9		
		−2.0	32.2	−8.5	309		
		+22.0	56.2	−17.0		340	
		+28.0	62.2	−15.5		46	905
Jan. 4 (Naval Observatory)	11 59	−58.5	322.5	−18.0		154	
		−32.0	349.0	+10.5	31		
		−26.5	354.5	−9.5	46		
		−6.0	15.0	+12.0	9		
		+2.0	23.0	−11.0		46	
		+8.5	29.5	−8.0	12		
		+12.5	33.5	−8.5	293		
		+20.0	41.0	−7.5		15	
		+36.5	57.5	−17.0		262	
		+41.0	62.0	−15.5		15	883
Jan. 5 (Naval Observatory)	11 47	−74.0	293.9	+14.0		77	
		−45.5	322.4	−18.5		185	
		−18.0	349.9	+10.0	31		
		−12.0	355.9	−9.5	46		
		+7.5	15.4	+11.0		77	
		+15.5	23.4	−12.5		46	
		+21.5	29.4	−8.5		15	
		+26.5	34.4	−8.5	293		
		+49.0	56.9	−17.5		216	986
Jan. 6 (Naval Observatory)	11 45	−60.0	294.8	+14.0		77	
		−55.0	299.8	+12.5	46		
		−31.5	323.3	−18.5		185	
		−4.5	350.3	+10.0	31		
		+1.5	356.3	−9.5	46		
		+21.0	15.8	+10.5		108	
		+39.5	34.3	−8.5	293		
		+63.0	57.8	−17.5		185	971
Jan. 7 (Naval Observatory)	11 48	−50.0	291.6	+11.0		77	
		−46.0	295.6	+14.0	31		
		−40.5	301.1	+12.0	22		
		−17.0	324.6	−18.5		185	
		+9.5	351.1	+10.0	15		
		+15.0	356.6	−9.5	31		
		+31.5	13.1	+10.5		62	
		+37.5	19.1	+10.0		77	
		+52.5	34.1	−8.5	340		840
Jan. 8 (Naval Observatory)	11 42	−73.0	255.4	−9.0	31		
		−36.5	291.9	+10.0		46	
		−27.0	301.4	+12.5	6		
		−8.0	320.4	−19.5		25	
		−1.0	327.4	−18.0		123	
		+3.0	331.4	−6.5		46	
		+16.5	344.9	+12.0		18	
		+22.5	350.9	+11.0		15	
		+28.0	356.4	−9.5	15		
		+46.0	14.4	+10.5		77	
		+49.0	17.4	−15.0	9		
		+51.0	19.4	+10.0		93	
		+67.0	35.4	−8.0	278		782

Positions and areas of sun spots—Continued

Date	Eastern standard civil time	Heliographic			Area		Total area for each day
		Diff. long.	Longitude	Latitude	Spot	Group	
1928	h. m.	°	°	°			
Jan. 9 (Yerkes)	13 40	−23.0	291.0	+9.0	100		
		+13.0	327.0	−16.0	100		
		+56.0	10.0	+13.0	145		
		+65.0	19.0	+12.0	145		
		+78.0	32.0	−5.0	575		1,065
Jan. 10 (Naval Observatory)	12 35	−72.5	229.1	+18.0		62	
		−47.0	254.6	−9.5	15		
		−27.5	274.1	−10.0		108	
		−10.5	291.1	+10.0		77	
		−6.0	295.6	+9.0		77	
		+17.0	318.6	−18.0	108		
		+22.5	324.1	−7.5		31	
		+71.0	12.6	+10.5		77	
		+79.0	20.6	+10.0		77	632
Jan. 11 (Naval Observatory)	11 50	−63.0	225.9	+17.0	15		
		−58.0	230.9	+17.5	40		
		−33.5	255.4	−9.5	6		
		−17.5	271.4	−15.0		31	
		−17.0	271.9	−12.0		77	
		−13.5	275.4	−10.0		247	
		+2.0	290.9	+9.5		123	
		+7.5	296.4	+9.0		62	
		+39.5	328.4	−18.5	123		
		+47.5	336.4	−7.5		15	739
Jan. 12 (Naval Observatory)	11 52	−50.0	225.7	+17.0		31	
		−44.0	231.7	+17.5	37		
		−20.0	255.7	−9.5	31		
		−4.0	271.7	−12.5		216	
		+1.5	277.2	−10.0	154		
		+15.5	291.2	+9.5		93	
		+21.5	297.2	+8.0		62	
		+52.5	328.2	−19.0	123		747
Jan. 13 (Naval Observatory)	13 53	−35.0	226.4	+18.0		31	
		−29.0	232.4	+18.0	31		
		+10.0	271.4	−12.5		216	
		+17.0	278.4	−9.5	154		
		+29.0	290.4	+10.0		77	
		+34.0	295.4	+8.0		62	
		+67.5	328.9	−19.0	123		694
Jan. 14 (Naval Observatory)	13 35	−55.5	192.9	+16.0		31	
		−23.0	225.4	+16.0	3		
		+20.5	268.9	−10.5	22		
		+21.0	269.4	−17.0		93	
		+25.0	273.4	−11.5		15	
		+27.0	275.4	−14.5		93	
		+29.5	277.9	−10.5	123		
		+42.0	290.4	+7.5		77	
		+49.0	297.4	+7.5		77	
		+79.0	327.4	−19.0	123		657
Jan. 15 (Naval Observatory)	13 31	−85.0	150.3	+13.5		247	
		−44.5	190.8	+15.5		46	
		−40.5	194.8	+17.0		31	
		−32.0	203.3	+15.0		31	
		−25.0	210.3	−17.5		6	
		+37.0	272.3	−15.0		93	
		+39.0	274.3	−10.0		154	
		+55.0	290.3	+8.0		62	
		+62.0	297.3	+8.0		123	793
Jan. 17 (Naval Observatory)	12 19	−72.0	137.6	+17.0	525		
		−61.0	148.6	+16.0		586	
		−54.0	155.6	+15.0	31		
		−18.5	191.1	+15.5		46	
		−10.0	199.6	+18.0		31	
		−7.0	202.6	+15.0	31		
		+59.0	268.6	−17.5		40	
		+66.0	275.6	−10.0	154		
		+67.0	276.6	−12.5	62		1,506
Jan. 18 (Yerkes)	11 45	−56.0	141.0	+15.0	380		
		−44.0	153.0	+12.0	480		860
Jan. 19 (Mount Wilson)	12 30	−72.0	111.2	+5.0		205	
		−39.0	144.2	+15.0		972	
		+20.0	203.2	+15.0		3	
		+87.0	270.2	−11.0	130		1,310
Jan. 20 (Naval Observatory)	11 52	−59.0	111.3	+7.0		185	
		−30.5	139.8	+17.0		494	
		−19.0	151.3	+15.5		463	1,142
Jan. 21 (Naval Observatory)	11 47	−46.0	111.2	+7.0		185	
		−17.0	140.2	+17.0		401	
		−5.5	151.7	+16.0		370	956
Jan. 22 (Naval Observatory)	11 35	−47.5	96.7	+9.0		31	
		−32.5	111.7	+7.0		216	
		−4.5	139.7	+17.0		278	
		+6.0	150.2	+16.0		309	834
Jan. 23 (Naval Observatory)	11 45	−83.0	47.9	−20.0	309		
		−32.5	98.4	+8.5		93	
		−19.5	111.4	+7.0		309	
		+7.0	137.9	+17.5		170	
		+19.0	149.9	+16.5		309	
		+21.0	151.9	−8.0		15	1,205

Positions and areas of sun spots—Continued

Date	Eastern standard civil time	Heliographic			Area		Total area for each day
		Diff. long.	Longitude	Latitude	Spot	Group	
1928	h. m.	°	°	°			
Jan. 24 (Mount Wilson)	14 30	−85.0	31.2	−6.0	402		
		−74.0	42.2	−13.0		133	
		−70.0	46.2	−20.0		705	
		−70.0	46.2	−27.0		20	
		−18.0	98.2	+9.0		142	
		−5.5	110.7	+6.0		401	
		+33.0	149.2	+15.0		638	
		+40.0	156.2	−10.5		104	2,545
Jan. 25 (Naval Observatory)	11 50	−70.0	34.5	−8.0	278		
		−61.0	43.5	−16.0		154	
		−59.5	45.0	−21.0	463		
		−59.5	45.0	−28.0		31	
		−37.0	67.5	−22.5		15	
		−9.0	95.5	+8.0		46	
		−2.0	102.5	+8.5		93	
		+8.0	112.5	+6.0		185	
		+33.5	138.0	+16.0		154	
		+41.5	146.0	+15.0	77		
		+48.0	152.5	+14.5	278		
		+50.0	154.5	−10.0		93	1,867
Jan. 26 (Naval Observatory)	11 54	−57.0	34.3	−8.0	247		
		−47.5	43.8	−16.0		93	
		−47.0	44.3	−22.0		432	
		−22.0	69.3	−22.0		31	
		+4.0	95.3	+8.5	31		
		+13.5	104.8	+8.5		123	
		+20.5	111.8	+6.0		185	
		+47.5	138.8	+16.5		154	
		+54.0	145.3	+15.5	62		
		+60.0	151.3	+14.5		309	
		+63.0	154.3	−10.0		93	1,760
Jan. 27 (Naval Observatory)	11 50	−43.0	35.2	−8.0	278		
		−34.0	44.2	−16.0		77	
		−33.5	44.7	−22.0		401	
		−8.0	70.2	−21.5		31	
		+20.5	98.7	+8.5		77	
		+28.0	106.2	+8.5		139	
		+34.0	112.2	+5.5		154	
		+59.5	137.7	+17.0		154	
		+66.0	144.2	+15.5	77		
		+73.0	151.2	+15.0		247	1,635
Jan. 28 (Mount Wilson)	14 45	−28.0	35.4	−8.0		359	
		−21.0	42.4	−16.5		45	
		−19.0	44.4	−21.5		999	
		+8.5	71.9	−20.5		25	
		+10.0	73.4	−10.0		69	
		+47.0	110.4	+10.0		502	
		+85.0	148.4	+19.0	40		2,039
Jan. 29 (Naval Observatory)	11 50	−17.0	34.9	−8.0		309	
		−7.5	44.4	−22.0		247	
		+20.5	72.4	−21.0		31	
		+21.0	72.9	−10.5		93	
		+55.0	106.9	+8.0		309	
		+61.0	112.9	+7.0		108	1,097
Jan. 30 (Yerkes)	16 1	−2.0	34.0	−8.0	250		
		+9.0	45.0	−23.0	550		
		+32.0	68.0	−11.0	140		
		+38.0	74.0	−12.0	240		
		+70.0	106.0	+7.0	720		1,900
Jan. 31 (Naval Observatory)	12 8	−69.5	315.9	−16.5	46		
		−44.5	340.9	+14.5		31	
		+8.5	33.9	−11.0		15	
		+11.0	36.4	−8.0	185		
		+20.0	45.4	−22.0		309	
		+45.0	70.4	−10.0		9	
		+49.0	74.4	−20.5		15	
		+50.5	75.9	−11.0	77		
		+83.0	108.4	+8.0		309	996
Mean daily area for January							1,138

PROVISIONAL SUN-SPOT RELATIVE NUMBERS FOR DECEMBER, 1927

[Data[1] taken from Jour. Terrestrial Mag. and Atmospheric Electricity, September-December, 1927, p. 174]

December	Relative numbers	December	Relative numbers	December	Relative numbers
1		11		21	17
2		12	52(?)	22	
3		13		23	33
4		14		24	59
5		15	19(?)	25	60
6		16		26	31(?)
7		17	16	27	52
8	71	18	10	28	
9		19	8	29	
10		20		30	
				31	

[1] Prof. Wolfer's values.

Number of observations, 12; mean, 35.6.