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SOLAR OBSERVATIONS

SOLAR RADIATION MEASUREMENTS MADE DURING MARCH, 1929

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For references to descriptions of instruments and exposures, and to an account of the method of obtaining and reducing the measurements, the reader is referred to this volume of the REVIEW, page 26.

Table 1 shows that solar radiation intensities averaged above normal values for March at Washington and below normal values at Madison and Lincoln.

Table 2 shows an excess in the total radiation received on a horizontal surface at Chicago, and a deficiency at Washington, Madison, and Lincoln.

Skylight polarization measurements obtained on five days at Washington give a mean of 62 per cent with a maximum of 68 per cent on the 29th. These are above the corresponding averages for March at Washington. At Madison measurements obtained on the 28th gave 73 for the percentage of skylight polarization, which is considerably above the average for that station in March.

TABLE 1.—*Solar radiation intensities during March, 1929*

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

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.
Washington, D. C.											
Mar. 1	4.17				1.02						3.45
Mar. 3	3.15				1.28	1.55	1.27	1.07	0.86	0.72	3.00
Mar. 6	2.62	0.87	0.93	1.15	1.35		1.17				2.87
Mar. 7	1.52	0.98	1.08	1.20	1.34	1.49					2.06
Mar. 8	1.37	0.69	0.85	1.01	1.13	1.30					1.60
Mar. 11	2.36						1.41	1.10	1.00	0.85	2.87
Mar. 16	7.87			1.05	1.25						6.27
Mar. 18	2.87	0.87	0.92	1.07	1.19	1.45	1.26	0.98	0.88	0.77	2.87
Mar. 24	9.87					1.19					11.81
Mar. 26	12.68				0.95						10.59
Mar. 27	4.57		0.88	0.99	1.19	1.44					4.17
Mar. 29	3.45			1.18	1.38	1.47					2.62
Means		0.85	0.93	1.09	1.21	1.41	1.28	1.05	0.91	0.78	
Departures		+0.12	+0.12	+0.14	+0.06	−0.02	+0.15	+0.11	+0.11	+0.08	
Madison, Wis.											
Mar. 5	1.96	0.87	0.94	1.07	1.27	1.53					2.74
Mar. 7	0.91		1.10	1.25	1.41	1.59	1.41				1.45
Mar. 9	1.07			1.28	1.42	1.57	1.42				1.19
Mar. 14	5.79						1.13				7.87
Mar. 18	4.57		0.88	0.97	1.11		1.16				4.57
Mar. 26	3.63				1.15	1.46					3.30
Mar. 27	4.39						1.06				3.45
Mar. 28	4.17	0.96	1.07	1.19	1.33	1.55	1.26				3.00
Means		(0.92)	1.00	1.15	1.28	1.54	1.24				
Departures		−0.06	−0.04	−0.03	−0.03		−0.05				
Lincoln, Nebr.											
Mar. 5	3.63			1.10							4.75
Mar. 6	4.17		0.86	0.96	1.25						3.45
Mar. 7	2.62	0.86	1.01	1.16							2.87
Mar. 13	4.37			1.00	1.16	1.37	1.27	1.05	0.90	0.75	3.81
Mar. 14	3.63	0.58	0.71	0.99	1.14						4.17
Mar. 16	4.17		1.00	1.15	1.31	1.49		1.11	1.01	0.92	4.37
Mar. 17	3.81						1.25	1.11	0.94	0.84	4.17
Mar. 19	4.17				1.40						3.30
Mar. 26	3.45						1.21	1.08	0.75	0.56	2.36
Means		(0.72)	0.90	1.06	1.25	(1.43)	1.24	1.09	0.90	0.77	
Departures		−0.13	−0.05	−0.03	−0.04		0.04	+0.00	−0.04	−0.05	

[1] Extrapolated.

TABLE 2.—*Total solar radiation (direct+diffuse) received on a horizontal surface*

[Gram-calories per square centimeter]

Week beginning—	Average daily radiation							Average daily departure from normal				
	Washington	Madison	Lincoln	Chicago	New York	Twin Falls	Fresno	Washington	Madison	Lincoln	Chicago	New York
1929	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.
Feb. 26	166	216	291	190			428	−121	−70	−53	+1	
Mar. 5	414	307	396	259			329	+94	+13	+43	+63	
Mar. 12	277	294	356	230			388	−49	−28	−18	+22	
Mar. 19	313	202	349	194			459	−44	−125	−57	−28	
Mar. 26	348	399	352	260			563	−2	+36	−51	+24	
Excess or deficiency since first of year on Apr. 2								+91	−1,015	−2,828	+973	

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 are 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	
1929	h. m.	°	°	°			
Mar. 1 (Naval Observatory).	11 50	−83.5	129.4	−10.0	247		
		−6.0	206.9	−10.0		15	
		+7.0	219.9	−8.5	93		
		+26.0	238.9	+7.0		108	
		+33.5	246.4	−14.5	9		472
Mar. 2 (Yerkes)	12 36	−80.3	119.0	−8.8		100	
		−74.4	124.9	−7.2		250	
		−69.4	129.9	−9.7		100	
		+20.8	220.1	−9.7		75	525
Mar. 3 (Naval Observatory.)	11 41	−64.0	122.6	−7.5		525	
		−56.5	130.1	−10.0	154		
		+34.5	221.1	−8.5	31		
		+35.5	222.1	+15.0		46	
		+51.0	237.6	+7.5		108	864
Mar. 4 (Harvard)	10 43	−77.5	96.5	−9.0		550	
		−47.0	127.0	−8.0		673	
		+48.5	222.5	−9.5	24		
		+51.5	225.5	+15.5		78	
		+66.0	240.0	+7.0		80	1,405
Mar. 5 (Yerkes)	10 2	−78.0	83.2	−10.2		400	
		−72.7	88.5	−8.1		75	
		−67.8	93.4	−10.1		600	
		−67.7	93.5	−7.8		150	
		−43.5	117.7	−8.1		50	
		−35.7	125.5	−7.1		300	
		−31.5	129.7	−9.9		60	
		+64.4	225.6	+15.4		100	1,735
Mar. 6 (Naval Observatory).	11 59	−62.0	84.9	−3.5	31		
		56.5	90.4	−10.0		648	
		−23.0	123.9	−7.0		309	
		−17.5	129.4	−10.0		77	
		−9.5	137.4	−15.5		31	
		+73.5	220.4	−8.5	6		
		+78.0	224.9	+16.0		139	1,241
Mar. 7 (Naval Observatory).	11 57	−78.5	55.3	+7.5	93		
		−42.5	91.3	−9.5		756	
		−9.0	124.8	−7.0		278	
		−5.5	128.3	−10.5		77	
		+3.5	137.3	−15.5		25	
		+44.5	178.3	+15.5		46	1,275
Mar. 8 (Naval Observatory).	11 38	−66.0	54.8	+7.5	62		
		−28.0	92.8	−9.5		756	
		+5.0	125.8	−7.0		401	
		+19.0	139.8	−15.5	12		
		+60.5	181.3	+15.5	46		1,277
Mar. 9 (Naval Observatory).	12 26	−62.5	44.7	+23.0		77	
		−52.5	54.7	+7.5		46	
		−13.5	93.7	−9.0		648	
		+19.0	126.2	−8.5		401	1,172
Mar. 10 (Naval Observatory).	11 47	−62.0	32.3	−7.0		93	
		−50.5	43.8	+23.0		62	
		−39.5	54.8	+7.5	31		
		−0.5	93.8	−9.0		679	
		+32.0	126.3	−8.0		355	1,220