

SECTION I.—AEROLOGY.

SOLAR AND SKY RADIATION MEASURED AT WASHINGTON, D. C., DURING MAY, 1915.

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[Dated: Washington, D. C., June 10, 1915.]

In Table 1 are summarized the measurements of the intensity of direct solar radiation made by the Weather Bureau at the American University<sup>1</sup> during May 1915. A Marvin pyrheliometer was employed in making measurements. The sky was generally unfavorable for this work, as the occasions were rare when some clouds were not present. However, a measurement of 1.45 calories per minute per square centimeter of normal surface, obtained shortly after noon of the 27th, is the highest ever obtained at Washington in the month of May. On other days the intensities were generally below the average for May.

Sky-light polarization, measured at a point 90° from the sun and in his vertical, with the sun at zenith distance 60°, averaged 50 per cent. with a maximum of 53 per cent, which is 4 per cent below the average maximum for May.

In Table 2, column 2 gives the daily totals of solar and sky radiation received on a horizontal surface at the American University. The measurements were made with a Callendar recording pyrheliometer in the manner described in this REVIEW for March, 1915, 43:100. Column 3 of Table 2 gives the departures of these daily totals from the daily normals published in the same number of the REVIEW, p. 108, Table 4.

TABLE 1.—Solar radiation intensities at Washington, D. C., during May, 1915.

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

Date.	Sun's zenith distance.										
	0.0°	48.3°	60.0°	66.5°	70.7°	73.6°	75.7°	77.4°	78.7°	79.8°	80.7°
	Air mass.										
	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0
1915 A. M.	Gr-cal.	Gr-cal.	Gr-cal.	Gr-cal.	Gr-cal.	Gr-cal.	Gr-cal.	Gr-cal.	Gr-cal.	Gr-cal.	Gr-cal.
May 1.....	1.20	1.02	1.07	0.96							
2.....	1.22	1.03	1.07	0.96							
3.....	1.15	1.03	0.93	0.85	0.78	0.70	0.65	0.59	0.54	0.50	
6.....	1.19	1.06									
10.....		1.04	0.83	0.64	0.59						
15.....			0.70								
18.....		1.18	1.04	0.92							
23.....		1.17									
24.....		1.21	1.12								
27.....	1.46	1.36	1.27	1.18	1.09	1.03	0.99				
31.....		1.27									
Means.....	(1.33)	1.20	1.09	0.92	0.86	0.80	(0.84)	(0.65)	(0.59)	(0.54)	(0.50)
P. M.											
May 4.....	1.33										
10.....		1.17	1.02	0.87	0.78	0.69	0.60	0.52			
27.....	1.46	1.33	1.25	1.17	1.10	1.02	0.96	0.89	0.81		
Means.....	(1.40)	(1.25)	(1.14)	(1.02)	(0.99)	(0.86)	(0.78)	(0.70)	(0.81)		

The "Percentage of possible sunshine," and the "Average cloudiness," given in columns 5 and 6 of

<sup>1</sup> For a description of instrumental exposures and methods of observation see this REVIEW, December, 1914, 42: 648.

Table 2, have been taken from the records of the observatory at the central office of the Weather Bureau.

The above data show more than the average cloudiness, less than the average sunshine, and solar radiation below the average intensity for the month, during May, 1915, and especially during the last two decades.

TABLE 2.—Daily totals and departures of solar and sky radiation at Washington, D. C., during May, 1915.

[Gram-calories per square centimeter of horizontal surface.]

Date.	Daily total.	Departure from normal.	Excess or deficiency since first of month.	Percentage of possible sunshine.	Average cloudiness.
	Gr-cal.	Gr-cal.	Gr-cal.	Per cent.	0-10
May 1.....	458	-36	-36	46	7
2.....	507	8	-28	82	4
3.....	433	-71	-99	43	6
4.....	375	-134	-233	31	7
5.....	496	-78	-311	71	6
6.....	578	60	-251	98	3
7.....	319	-201	-452	24	10
8.....	388	-134	-586	14	9
9.....	636	112	-474	100	1
10.....	564	38	-436	93	3
11.....	529	-7	-443	93	6
12.....	71	-458	-901	0	10
13.....	533	8	-898	66	5
14.....	565	64	-834	77	2
15.....	526	-6	-840	92	6
16.....	251	-284	-1,121	6	8
17.....	273	-259	-1,380	25	8
18.....	457	-75	-1,455	53	6
19.....	606	74	-1,381	93	5
20.....	183	-349	-1,730	0	10
Decade departure.....			-1,294		
21.....	355	-177	-1,907	37	8
22.....	432	-109	-2,007	61	7
23.....	627	95	-1,912	99	4
24.....	340	-192	-2,104	25	9
25.....	618	116	-1,988	79	3
26.....	343	-188	-2,176	14	9
27.....	757	226	-1,950	100	0
28.....	508	-23	-1,973	37	7
29.....	99	-431	-2,404	0	10
30.....	206	-324	-2,728	0	10
31.....	677	147	-2,581	90	3
Decade departure.....			-851		
Total deficiency since first of year			-1,672		

CONFIRMATORY EXPERIMENTS ON THE VALUE OF THE SOLAR CONSTANT OF RADIATION.<sup>1</sup>

By C. G. ABBOT, F. E. FOWLE, and L. B. ALDRICH.

[Presented to the National Academy of Sciences, Apr. 27, 1915.]

We have made hitherto nearly 1,000 determinations of the intensity of solar radiation outside the atmosphere at mean solar distance, termed the solar constant of radiation. The mean value found is 1.93 calories per square centimeter per minute. Langley's spectro-bolometric method was employed. This consists in determining the distribution of the energy in the solar spectrum at different solar zenith distances, and thereby computing coefficients of atmospheric transmission suitable to determine the energy curve outside the atmosphere. The bolometric measurements are reduced, in terms of standard 15° calories per square centimeter per minute, by the aid of comparisons made each day of observation with stand-

<sup>1</sup> Reprinted from Proceedings, National Academy of Sciences, Washington, June 15, 1915, 1: 331-333.