SOLAR OBSERVATIONS

SOLAR AND SKY RADIATION MEASUREMENTS DURING JANUARY, 1926

By HERBERT H. KIMBALL, Solar Radiation Investigations

For a description of instruments and exposures and an account of the method of obtaining and reducing the measurements, the reader is referred to the REVIEW for January, 1924, **52**:42, January, 1925, **53**:29, and July, 1925, **53**:318.

From Table 1 it is seen that solar radiation intensities averaged slightly above January normals at Washington and Lincoln, and slightly below at Madison.

Table 2 shows that the total solar and sky radiation received on a horizontal surface averaged close to the January normal at Washington and decidedly below the normal at the other two stations.

Skylight polarization measurements were not made at either Washington or Madison on account of the presence of snow on the ground at both stations during most of the month.

TABLE 1.—*Solar radiation intensities during January, 1926*

[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: A. M.					P. M.				Local mean solar time
	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.*
Jan. 2	3.30	0.56	0.67	0.91	1.21						3.15
6	8.81						1.18	1.06			7.87
11	1.60	0.70	0.83	1.23							2.62
16	2.62		0.77	0.96							3.45
19	5.79	0.70	0.77	0.93	1.20		1.20				4.57
28	1.60	0.89	1.10	1.21	1.37		1.32				0.79
29	0.64		1.11	1.15	1.29		1.25				1.02
Means		0.71	0.88	1.06	1.27		1.24	(1.06)			
Departures		−0.03	+0.04	+0.06	+0.04		+0.02	+0.03			

*Extrapolated.

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TABLE 1.—*Solar radiation intensities during January, 1926*—Con.

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: A. M.					P. M.				Local mean solar time
	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.*
Jan. 7	1.52	1.10	1.22	1.24							1.68
9	1.68	0.91	1.03	1.16	1.30						1.96
13	1.68			1.33							1.24
15	1.45	1.13	1.21	1.34				1.23			1.88
18	3.00							1.20			2.87
22	0.51		1.14	1.26	1.39			1.24	1.09		0.86
23	0.79	0.85	0.98	1.13							1.45
25	1.37							0 97			1.68
28	0.36	1.09	1.23	1.35	1.53			1.31			0.43
29	0.91		0.70	0.90	1.14						2.36
Means		1.02	1.07	1.21	1.34			1.19	(1.09)		
Departures		+0.05	−0.01	−0.03	−0.02			−0.03	−0, 04		

Lincoln, Nebr.

Jan. 11	1.60	1.16	1.27	1.35	1.54			1.40	1.26	1.15	1.09
13	2.49							1.22	1.11	0.99	3.81
14	3.81	1.06	1.19	1.32				1 34	1.20		4.17
17	3.30								1.02	0.88	4.57
18	3.15							1.09	0.99	0.96	4.37
22	0.58			1.16	1.11			1.06	0.89	0.73	1.24
23	1.78	0.93	1.08	1.22	1.37			1.18	0.90	0.83	2.87
24	2.06			1.13							1.68
29	3.15	0.94	1.02	1.18	1.39						4.37
Means		1.02	1.14	1.23	1.35			1.22	1.05	0.92	
Departures		+0.10	+0.11	+0.06	−0, 02			+0, 02	+0.01	+0.01	

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

[Gram-calories per square centimeter of horizontal surface]

Week beginning—	Average daily radiation: Washington	Madison	Lincoln	Chicago	New York	Average daily departure from normal: Washington	Madison	Lincoln
1926	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*
January 1	144	102	122	29	71	−9	−40	−67
8	165	166	162	65	80	+6	+14	−37
15	147	147	206	50	77	−21	−20	−4
22	201	192	223	71	108	+22	+6	−5
Deficiency since first of year on January 28						−14	−280	−791

A STUDY OF THE SMOKE CLOUD OVER WASHINGTON, D. C., ON JANUARY 16, 1926

By IRVING F. HAND

The smoke cloud which covered Washington, D. C., on January 16, 1926, furnished an excellent opportunity to study the effect of city smoke. Eye observation and actual quantitative measurements of atmospheric pollution were made at both the central office of the Weather Bureau, which is located about 2 miles west of the Capitol, and at the American University, about 3 miles northwest of the Weather Bureau. The former point is about 80 feet above sea level, while the latter is 300 feet higher.

The regular 8 a. m. dust count made at the university gave 876 particles per cubic centimeter, or about one-half the average for the month. The sky was cloudless, the winds light and variable, and visibility slightly above average, hills in Maryland 10 miles to the west being visible. With a minimum temperature of 23° F., householders not only stoked their fires earlier, but used larger quantities of fuel, both of which, together with the favorable meteorological conditions, added materially to the accumulation of smoke over the city.

By 10 o'clock the smoke had become so dense in the business section that artificial lighting was necessary in both office buildings and on the streets. At this time the smoke could be seen from the university campus rising above the city with a flattish and irregular dome-shaped head. Upon being apprised of the unusual conditions in the city, the writer at once went to central office, but unfortunately passed through the densest part of the cloud on the way.

A measurement made at central office at 11:20 a. m., or about an hour after the passage of the smoke cloud,