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SOLAR OBSERVATIONS

SOLAR AND SKY RADIATION MEASUREMENTS

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INSTRUMENTS AND EXPOSURES

In the MONTHLY WEATHER REVIEW for January, 1924, 52:42, will be found references to descriptions of instruments and exposures, and an account of the method of obtaining and reducing the measurements. To the statement then made it should be added that thermoelectric recording pyrheliometer No. 8 was installed at the New York Meteorological Observatory, Central Park, New York City, on April 16, 1924. The receiver is placed on the parapet of the tower of the observatory, south of the wind vane and other instrumental supports, so that it is freely exposed to the sun from sunrise to sunset. The wind vane and support cut off a small fraction of the radiation from the northern sky, however.

The elevation of the receiver above sea level is 156 feet (48 meters), the latitude is 40° 46' north, and the longitude 73° 53' west. In winter, with light winds, the atmosphere over Central Park may become filled with rather dense smoke. In summer, and especially with a brisk west or north west wind, the smoke is light.

The normals from which are obtained the departures of the mean radiation values in Table 1 include the measurements for the current month, as heretofore. Those for Table 2 include measurements to the end of 1924 only. For Madison, for January to March, inclusive, they are based upon records covering 13 years, and for the remaining months, 14 years; for Washington, from January to October, 10 years, and for the remaining two months, 11 years; for Lincoln, the records generally cover 8 years, although there have been some interruptions. At Chicago and New York the records are too short to give reliable weekly normals.

MEASUREMENTS DURING JANUARY, 1924

From Table 1 it is seen that the departures are small and irregular at all three stations. Table 2 shows a deficiency in the incoming radiation, due to unusual cloudiness. No skylight polarization measurements of value were obtained at either Washington or Madison, as the ground was mostly covered with snow at both stations throughout the month.

TABLE 1.—Solar radiation intensities during January, 1925

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

Date	Sun's zenith distance										Noon	
	Air mass											
	A. M.					P. M.						
	e.	5.0	4.0	3.0	2.0	*1.0	2.0	3.0	4.0	5.0		e.
Jan. 5	mm. 2.62	cal. 0.85	cal.	cal.	cal. 1.10	cal. 1.34	cal.	cal.	cal. 1.17	cal. 0.84	cal. 0.67	mm. 3.99
6	3.15				1.10	1.34	1.04	0.98	0.84	0.72	0.62	3.45
7	2.62	0.64	0.75		0.84	1.13						3.68
13	3.63							0.98				4.37
21	2.36			1.19	1.37	1.65	1.44	1.26	1.08	0.96		2.36
22	3.30				1.21							4.37
23	1.12					1.57	1.40	1.27	1.12	1.03		1.45
24	1.37				1.19							1.52
28	0.74	1.03	1.15	1.25	1.35	1.44	1.21	1.11	0.95	0.83		0.81
30	2.49	0.28	0.37	0.69	1.07		1.23					2.16
Means		0.70	0.76	1.01	1.24		1.25	1.16	0.94	0.82		
Departures		-0.04	-0.08	+0.02	+0.01		+0.03	+0.07	+0.07	+0.04		

Madison, Wis.										
Date	1.45	1.15	1.24					0.63		1.88
Jan. 8	1.45		1.15	1.24						1.88
9	2.16							0.63		2.00
13	1.52		0.85	1.03						1.45
20	2.62							1.26	1.19	3.15
22	2.74				1.45					2.36
27	0.51	1.05	1.15	1.29		1.48				0.91
31	3.30				1.12					4.57
Means		(1.05)	1.05	1.19	(1.28)			(0.94)	(1.19)	
Departures		+0.09	-0.03	-0.05	-0.06			-0.23	+0.06	

Lincoln, Nebr.											
Date	2.49							1.29	1.16	1.01	2.87
Jan. 5	2.49							1.29	1.16	1.01	2.87
6	2.36		0.99	1.09				1.23	1.11	0.84	3.15
8	1.88	0.73	0.80	0.98				1.10	1.02	0.85	2.26
12	1.52							1.28	1.03	0.89	1.45
13	1.32							1.08	0.90		1.96
17	1.07		1.02	1.15							1.96
19	2.02							1.18	0.97		3.00
20	3.45							1.45	1.28	1.14	2.26
Means		(0.73)	0.94	1.07				(1.45)	1.21	1.05	0.92
Departures		-0.18	-0.08	-0.10				+0.17	+0.02	+0.01	+0.01

* 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	Washington	Madison	Lincoln
Jan. 1	cal. 152	cal. 111	cal. 202	cal. 56	cal. 87	cal. -1	cal. -31	cal. +18
8	100	141	177	79	91	-59	-11	-22
15	144	176	214	81	102	-24	+9	+4
22	204	183	198	91	152	+25	-3	-30
Excess or deficiency since first of year on Jan. 28						-413	-252	-245