BIBLIOGRAPHY

C. FITZHUGH TALMAN, in Charge of Library

RECENT ADDITIONS

The following have been selected from among the titles of books recently received as representing those most likely to be useful to Weather Bureau officials in their meteorological work and studies:

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SOLAR OBSERVATIONS

SOLAR RADIATION MEASUREMENTS DURING JANUARY, 1933

By IRVING F. HAND, Assistant in Solar Radiation Investigations

For a description of instruments employed and their exposures, the reader is referred to the January, 1932, REVIEW, page 26.

Table 1 shows that solar radiation intensities averaged above normal for January at Washington and Madison, and slightly below at Lincoln.

Table 2 shows an excess over the normal in the total solar radiation received on a horizontal surface at the larger cities of Washington, Lincoln, Chicago, New York, and Pittsburgh, and a deficiency at all other stations.

Table 3 shows slightly greater values of the turbidity factor, β, than in December.

Polarization observations made at Washington on four days give a mean of 58 per cent with a maximum of 64 per cent on the 30th. These are about normal values for the month. No measurements were made at Madison due to the presence of ice and snow.

TABLE 1.—*Solar-radiation intensities during January, 1933*

[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	*1.0	2.0	3.0	4.0	5.0	e.
	mm.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mm.*
Jan. 6	3.99	0.83	0.99	1.10	1.39			1.24			2.26
Jan. 10	3.00	.84	.89	1.09	1.26						3.81
Jan. 16	3.63				1.26						3.81
Jan. 20	3.00	.92	1.02	1.19	1.40						1.78
Jan. 23	7.29				1.05						5.56
Jan. 24	4.75				1.24		1.29				3.15
Jan. 30	2.36	.91	1.08	1.18	1.32						2.16
Jan. 31	3.63	.75	.89	1.03	1.22						4.57
Means		.85	.97	1.12	1.27		(1.29)	(1.24)			
Departures		+.11	+.12	+.10	+.04		+.06	+.20			
Madison, Wis.											
Jan. 5	2.74							1.06			3.45
Jan. 23	3.30		1.12	1.26	1.38			1.07			3.15
Means			(1.12)	(1.26)	(1.38)			(1.06)			
Departures			+.08	+.06	+.05			−.09			

TABLE 1.—*Solar-radiation intensities during January, 1933*—Con.

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

Lincoln, Nebr.

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	*1.0	2.0	3.0	4.0	5.0	e.
	mm.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mm.*
Jan. 3	3.15							1.17			3.81
Jan. 5	3.30							1.04			3.63
Jan. 7	2.87	.93	.98	1.21							3.15
Jan. 9	2.87	.94	1.08	1.21							4.57
Jan. 19	3.15	.99	1.12	1.27							2.49
Jan. 22	5.16	.99	1.12	1.25							4.17
Jan. 23	3.30		.89	1.14				1.15	.95	.89	3.99
Jan. 25	2.87		.92	1.12	1.37			1.21	1.06	.93	3.30
Jan. 27	2.36	1.01	1.13	1.28							2.62
Means		.95	1.03	1.21	(1.37)			1.14	(1.00)	(.91)	
Departures		+.01	−.02	+.03				−.03	−.04	−.02	

*Extrapolated.

TABLE 2.—*Average daily totals of solar radiation (direct+diffuse) received on a horizontal surface*

Week beginning—	Washington	Madison	Lincoln	Chicago	New York	Fresno	Pittsburgh	Fairbanks	Twin Falls	La Jolla	Gainesville	Miami	New Orleans
	Gram calories per square centimeter												
1933	*Cal.*	*Cal.*	*Cal.*	*Cal.*	*Cal.*	*Cal.*	*Cal.*	*Cal.*	*Cal.*	*Cal.*	*Cal.*	*Cal.*	*Cal.*
Jan. 1	214	145	215	144	156	101	134	7.0	163	242	103	251	172
Jan. 8	155	137	192	147	127	168	119	7.7	170	246	65	251	144
Jan. 15	182	126	162	116	155	124	132	7.5	144	162	185	266	208
Jan. 22	160	115	235	70	141	197	67	16.6	161	204	168	332	158
	Departures from weekly normals												
Jan. 1	+60	+13	+29	+60	+50	−45	+30		−5	+6	−119	−37	
Jan. 8	+2	−3	+3	+60	+21	+11	+16		−11	+13	−144	−34	
Jan. 15	+19	−32	−36	+20	+39	−58	+25		−46	−71	−13	−23	
Jan. 22	−17	−68	+12	−38	+7	−9	−42		−27	−43	−51	+9	
	Accumulated departures on January 28												
	+448	−630	+56	+714	+819	−707	+203		−623	−665	−2,289	−595	

TABLE 3.—*Solar radiation measurements, and determinations of atmospheric factor, β, Washington, D. C., January, 1933*

[Values in italics have been interpolated]

Date and solar hour angle	Solar altitude, *h*.	Air mass, *m*.	I_m	I_y	I_r	β	Blueness of sky	Atmospheric dust particles per cubic centimeter	Notes. Skylight polarization, P., clouds, etc.
1933									
Jan. 6			*gr. cal.*	*gr. cal.*	*gr. cal.*				
3:23 a	12–23	4.59	0.896	0.717	*0.622*	0.065		499	
3:18 a	13–06	4.34	.931	*.720*	.627	.065			
2:51 a	16–43	3.45	1.041	*.843*	.681	.065			
2:45 a	17–28	3.30	1.064	.846	*.706*	.075			
2:42 a	17–50	3.24	1.069	*.871*	.711	.080			
2:36 a	18–35	3.12	1.089	.877	*.715*	.080			
1:55 a	23–05	2.54	1.291	*.931*	.759	.040			
1:50 a	23–25	2.51	1.298	.937	*.763*	.040			
0:40 a	27–54	2.14	1.350	.948	*.771*	.035			
0:36 a	28–02	2.12	1.367	*.951*	.775	.035	5		P=54.6.
1:31 p	24–49	2.38	1.343	*.894*	.723	.020			
1:37 p	24–46	2.38	1.320	.897	*.726*	.025			
2:09 p	21–41	2.69	1.254	.882	*.737*	.030			
2:16 p	20–51	2.80	1.268	*.885*	.729	.030			
Jan. 10									
3:13 a	14–14	4.02	.863	*.700*	.582	.080		401	
3:09 a	14–46	3.86	.888	.705	*.585*	.075			
2:31 a	19–38	2.96	1.096	.822	*.691*	.030			
2:27 a	20–06	2.89	1.114	*.825*	.694	.025			

TABLE 3.—*Solar radiation measurements, and determinations of atmospheric factor, β, Washington, D. C., January, 1933*—Con.

[Values in italics have been interpolated]

Date and solar hour angle	Solar altitude, *h*.	Air mass, *m*.	I_m	I_y	I_r	β	Blueness of sky	Atmospheric dust particles per cubic centimeter	Notes: Skylight polarization, P., clouds, etc.
1933									
Jan. 10			*gr. cal.*	*gr. cal.*	*gr. cal.*				
0:47 a	28–12	2.11	1.228	*0.901*	0.726	0.070			
0:41 a	28–24	2.10	1.254	.906	*.729*	.065			
Jan. 16									
0:24 a	29–54	2.01	1.254	*.963*	.774	.080		758	
0:21 a	29–58	2.00	1.260	.967	*.777*	.080			
1:11 p	27–55	2.14	1.127	.911	*.744*	.130			
1:15 p	27–31	2.16	1.137	*.914*	.747	.130			
Jan. 20									
3:19 a	15–10	3.77	1.037	.804	*.660*	.055		1157	
3:13 a	15–42	3.64	1.042	*.808*	.663	.055			
2:53 a	18–28	3.13	1.180	*.873*	.711	.040			
2:50 a	18–50	3.08	1.190	.876	*.714*	.040			
2:11 a	23–32	2.50	1.264	.914	*.750*	.045			
2:07 a	23–55	2.46	1.269	.921	.753	.045			
1:07 a	28–58	2.06	1.385	*.967*	.774	.030			
103 a	29–14	2.05	1.403	.970	.778	.025			Cirri.
Jan. 23									
0:04 a	31–40	1.90	1.062	.851	*.588*	.090			
0:08 p	31–38	1.90	1.048	*.856*	.591	.100			

TABLE 3.—*Solar radiation measurements, and determinations of atmospheric factor, β, Washington, D. C., January, 1933*—Con.

[Values in italics have been interpolated]

Date and solar hour angle	Solar altitude, h.	Air mass, m.	I_m	I_y	I_r	β	Blueness of sky	Atmospheric dust particles per cubic centimeter	Notes: Skylight polarization, P., clouds, etc.
1933									
Jan. 24			*gr. cal.*	*gr. cal.*	*gr. cal.*				
2:38 a	21-08	2.76	1.107	*.853*	.693	.070			
2:28 a	20-22	2.61	1.139	.856	*.699*	.070			
2:04 a	25-04	2.36	1.145	.870	*.703*	.080			
0:52 a	30-38	1.96	1.241	*.945*	.711	.070	4		P=55.8.
0:44 a	30-59	1.94	1.274	*.945*	.714	.065			
0:04 a	31-54	1.89	1.276	.945	*.747*	.075			
0:00 noon	31-54	1.89	1.300	.945	*.748*	.070			
1:08 p	29-45	2.01	1.292	.916	*.746*	.065			
1:12 p	29-30	2.02	1.303	*.918*	.747	.060			
2:08 p	24-39	2.39	1.200	*.907*	.705	.055			
2:12 p	24-13	2.43	1.203	.970	.708	.055			
Jan. 30									
3:28 a	15-28	3.70	1.067	*.964*	.702	.065		355	
3:17 a	16-31	3.49	1.150	.967	*.704*	.040			
2:30 a	23-31	2.50	1.200	.948	*.786*	.045			
2:24 a	24-15	2.43	1.216	*.951*	.789	.045			
1:41 a	28-56	2.06	1.355	.999	.814	.060			
1:33 a	29-21	2.04	1.310	1.015	.817	.085			
Jan. 31									
3:36 a	14-27	3.97	.909	.717	*.606*	.070		389	
3:31 a	15-14	3.77	.906	.720	.609	.080			
3:08 a	18-39	3.11	1.016	*.802*	.655	.080			
3:02 a	19-30	2.98	1.029	.804	*.658*	.085			
3:42 a	22-15	2.63	1.032	.846	*.693*	.115			
2:34 a	23-16	2.51	1.126	*.847*	.697	.080			
2:03 a	26-54	2.21	1.174	*.885*	.711	.085			
1:58 a	27-24	2.17	1.174	.888	*.712*	.085			
1:22 a	30-35	1.96	1.221	.897	*.723*	.080	5		P=58.3.
1:18 a	30-53	1.94	1.243	.900	.726	.075			

POSITIONS AND AREAS OF SUN SPOTS

[Communicated by Capt. J. F. Hellweg, Superintendent United States Nava Observatory. Data furnished by Naval Observatory, in cooperation with Harvard, Perkins, 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	
1933	$h.$	$m.$	°	°	°			
Jan. 1 (Naval Observatory)	12	29	No spots.					
Jan. 2 (Naval Observatory)	11	40	No spots.					
Jan. 3 (Naval Observatory)	13	23	−70.0	328.1	+11.0	185		185
Jan. 4 (Naval Observatory)	11	3	−74.0	313.3	+11.0		185	
			−59.0	328.3	+11.0	170		355
Jan. 5 (Naval Observatory)	14	6	−59.0	313.5	+10.0		154	
			−44.0	328.5	+10.0	154		308
Jan. 6 (Naval Observatory)	12	15	−46.0	314.3	+9.0	93		
			−32.0	328.3	+10.0	154		247
Jan. 7 (Mount Wilson)	12	50	−32.0	314.9	+9.0	110		
			−18.0	328.9	+11.0	126		236
Jan. 8 (Naval Observatory)	13	1	−18.0	315.6	+10.0	123		
			−4.0	329.6	+11.0	154		277
Jan. 9 (Mount Wilson)	13	50	−5.0	315.0	+9.0	109		
			+9.0	329.0	+11.0	166		275
Jan. 10 (Naval Observatory)	11	55	+8.0	315.8	+10.0		154	
			+22.0	329.8	+11.0	139		293
Jan. 11 (Perkins Observatory)	15	40	+20.0	312.6	+11.0	70		
			+32.0	324.6	+11.0	70		140

POSITIONS AND AREAS OF SUN SPOTS—Continued

[Communicated by Capt. J. F. Hellweg, Superintendent United States Naval Observatory. Data furnished by Naval Observatory, in cooperation with Harvard, Perkins, 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	
1933	$h.$	$m.$	°	°	°			
Jan. 12 (Naval Observatory)	13	30	+4.0	284.6	+8.0		31	
			+36.0	316.6	+10.0	123		
			+49.0	329.6	+11.0	139		293
Jan. 13 (Perkins Observatory)	15	0	+5.0	271.7	+5.0		45	
			+34.0	300.7	+15.0		50	
			+46.0	312.7	+11.0	70		
			+59.0	325.7	+11.0	70		235
Jan. 14 (Mount Wilson)	12	0	+20.0	275.1	+3.0		53	
			+51.0	306.1	+15.0		74	
			+62.0	317.1	+10.0	85		
			+75.0	330.1	+11.0	171		383
Jan. 15 (Naval Observatory)	13	16	+33.0	274.2	+3.0		37	
			+66.0	307.2	+14.0		62	
			+76.0	317.2	+10.0	108		207
Jan. 16 (Naval Observatory)	10	43	+46.0	275.5	+2.0		19	19
Jan. 18 (Harvard Observatory)			No spots.					
Jan. 19 (Perkins Observatory)	13	15	No spots.					
Jan. 20 (Naval Observatory)	11	5	No spots.					
Jan. 22 (Naval Observatory)	16	25	No spots.					
Jan. 23 (Naval Observatory)	10	20	No spots.					
Jan. 24 (Naval Observatory)	10	44	No spots.					
Jan. 28 (Naval Observatory)	10	47	−58.0	13.4	+6.0		31	31
Jan. 29 (Naval Observatory)	11	19	−44.0	14.0	+5.0		154	154
Jan. 30 (Naval Observatory)	10	56	−79.0	326.0	+12.0	123		
			−33.0	12.0	+4.0		50	
			−26.0	19.0	+5.0		77	250
Jan. 31 (Naval Observatory)	11	5	−88.0	303.8	+16.0	247		
			−64.0	327.8	+12.0		108	
			−15.0	16.8	+6.0		216	571
Mean daily area for January								172

PROVISIONAL SUN-SPOT RELATIVE NUMBERS FOR JANUARY, 1933

(Dependent alone on observations at Zurich and its station at Arosa)

[Data furnished through the courtesy of Prof. W. Brunner, University of Zurich, Switzerland]

January, 1933	Relative numbers	January, 1933	Relative numbers	January, 1933	Relative numbers
1	0	11	17	21	0
2	0	12	*Mc* 26	22	0
3	*d* 7	13	37	23	0
4	14	14	32	24	0
5	17	15	27	25	0
6	17	16	14	26	0
7	19	17	7	27	0
8		18	0	28	*Ec* 9
9	*a*	19		29	10
10	*a* 18	20	0	30	
				31	*a* 35

Mean: 27 days=11.3.

a=Passage of an average-sized group through the central meridian.
b=Passage of a large group or spot through the central meridian.
c=New formation of a center of activity: E, on the eastern part of the sun's disk; W, on the western part; M, in the central zone.
d=Entrance of a large or average-sized center of activity on the east limb.

AEROLOGICAL OBSERVATIONS

[Aerological Division, W. R. Gregg, in charge]

By L. T. SAMUELS

Free-air temperatures during January averaged decidedly above normal except at San Diego, where small negative departures occurred. (See Table 1.) The largest positive departures occurred in the lower levels at Omaha and Washington. Relative humidities averaged close to normal at most stations, with the greatest deviations occurring at Omaha where the departures were negative.

In harmony with the large positive temperature departures, the monthly free-air resultant wind directions contained either greater southerly or smaller northerly components than normal at the corresponding stations. In most cases the resultant velocities were above normal. At 3,000 meters elevation and above, however, but little deviation from the normal directions occurred.

Airplane observations were made daily throughout the month at the Weather Bureau stations, with the exception of the 21st at Chicago when, dense fog continued all day.