TABLE 3.—*Solar radiation measurements, and determinations of atmospheric turbidity factor, β, Washington, D. C., December, 1932*

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									
Dec. 20			*gr. cal.*	*gr. cal.*	*gr. cal.*				
3:11 a	13–18	4.28	0.870	0.654	*0.585*	0.050		668	
3:06 a	13–58	4.10	.903	*.660*	.589	.045			
2:43 a	16–52	3.41	.972	*.773*	.636	.055			
2:39 a	17–24	3.31	.992	.779	*.640*	.055			
2:27 a	18–47	3.08	1.032	*.795*	.657	.055			
2:23 a	19–17	3.00	1.040	*.798*	.658	.055			
1:18 a	25–04	2.35	1.187	.880	*.710*	.045			
1:13 a	25–23	2.33	1.196	.883	*.713*	.040			
0:30 a	27–19	2.17	1.228	*.895*	.704	.035			
0:26 a	27–23	2.17	1.241	.898	*.707*	.030	6		P=63.2.
Dec. 22									
3:13 a	13–00	4.37	1.002	.785	*.657*	.030		*1,090	
3:09 a	13–32	4.22	1.028	*.788*	.660	.030			
2:32 a	18–10	3.18	1.170	*.878*	.712	.025			
2:25 a	18–58	3.06	1.185	.883	*.715*	.025			
0:50 a	26–54	2.22	1.311	*.935*	*.752*	.020			
0:46 a	26–53	2.20	1.328	*.936*	.505	.020	7		P=63.0.
Dec. 29									
3:03 a	14–33	3.93	.838	.643	*.553*	.060		863	
2:57 a	15–18	3.74	.861	*.648*	.556	.060			
1:11 a	25–54	2.28	.959	*.747*	*.620*	.105			
1:05 a	26–07	2.27	.987	.752	*.624*	.095			
0:24 a	27–38	2.15	1.138	*.826*	.669	.055			
0:19 a	27–43	2.14	1.155	.829	*.672*	.050	4		P=52.4.

*Local smoke.

POSITIONS AND AREAS OF SUN SPOTS

[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	
1932	*h.*	*m.*	°	°	°			
Dec. 1 (Naval Observatory)	11	31	−46.0	69.0	+5.0		216	216
Dec. 2 (Naval Observatory)	13	21	−31.0	69.8	+5.0	------	123	123
Dec. 3 (Naval Observatory)	10	54	−20.0	68.9	+5.0	------	93	93
Dec. 4 (Naval Observatory)	12	47	No spots.			------	------	------
Dec. 5 (Naval Observatory)	11	40	No spots.			------	------	------
Dec. 6 (Naval Observatory)	11	5	−83.0	326.3	+10.0	370	------	370
Dec. 7 (Naval Observatory)	10	41	−71.0	325.4	+10.0	370	------	370
Dec. 8 (Naval Observatory)	11	40	−57.0	325.6	+10.0	370	------	370
Dec. 9 (Naval Observatory)	10	14	−43.0	327.3	+10.0	432	------	432
Dec. 10 (Mount Wilson)	12	0	−29.0	327.1	+10.5	609	------	609
Dec. 12 (Perkins Observatory)	12	35	+2.0	331.5	+10.0	------	90	90
Dec. 13 (Mount Wilson)	14	15	−9.0	306.4	+11.0	------	10	------
			+12.0	327.4	+10.0	506	------	516
Dec. 15 (Naval Observatory)	10	50	+37.0	327.9	+10.0	------	293	293
Dec. 16 (Naval Observatory)	11	25	+51.0	328.4	+10.0	------	401	401
Dec. 17 (Mount Wilson)	13	50	+56.0	319.0	+9.0	6	------	------
			+66.0	329.0	+10.0	------	440	446
Dec. 18 (Naval Observatory)	13	13	+67.0	317.0	+9.0	------	123	------
			+80.0	330.0	+10.0	------	370	493
Dec. 19 (Perkins Observatory)	13	35	+72.0	308.6	+10.5	------	90	90
Dec. 20 (Naval Observatory)	10	46	+86.0	311.0	+12.0	------	309	309
Dec. 21 (Mount Wilson)	12	15	+89.0	300.0	+12.0	------	103	103
Dec. 22 (Naval Observatory)	10	53	No spots			------	------	------
Dec. 23 (Naval Observatory)	11	1	No spots.			------	------	------
Dec. 24 (Perkins Observatory)	14	50	No spots.			------	------	------
Dec. 25 (Perkins Observatory)	15	0	No spots.			------	------	------
Dec. 26 (Perkins Observatory)	14	10	No spots.			------	------	------
Dec. 27 (Mount Wilson)	12	25	+20.0	151.9	+8.0	------	49	49
Dec. 28 (Perkins Observatory)	16	20	No spots			------	------	------
Dec. 29 (Naval Observatory)	11	17	+50.0	156.2	+8.0	31	------	31
Dec. 30 (Mount Wilson)	12	15	+62.0	154.5	+6.0	------	50	50
Mean daily area for December								195

PROVISIONAL SUN-SPOT RELATIVE NUMBERS FOR DECEMBER, 1932

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

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

December, 1932	Relative numbers	December, 1932	Relative numbers	December, 1932	Relative numbers	December, 1932	Relative numbers	December, 1932	Relative numbers	December, 1932	Relative numbers
1		6	*d* 8	11	15	16	13	21	0	26	0
2	13	7	10	12	*b* 22	17	18	22	0	27	*Mc* 10
3	13	8	11	13	23	18	20	23	0	28	10
4	10	9	13	14	16	19	19	24	0	29	9
5	8	10	13	15	15	20	16	25	0	30	9
										31	8

Mean: 30 days=10.7.

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 December were above normal over the Lake region and southern stations and below normal over the western and northern stations. (Table 1.) The largest positive departures occurred over Atlanta and the largest negative departures over Ellendale.

The mean free-air relative humidities were above normal except at Omaha where the negative departures increased with elevation. The largest positive departures occurred at the southern stations.

Free-air resultant wind directions in the lower levels were close to normal except in the southeastern states where the resultants showed pronounced southerly components. At the higher levels the resultant directions were close to normal except on the Pacific coast where they showed pronounced northerly components. Resultant velocities in most cases were greater than normal at all levels.