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:

Agricultural Index
Subject index to a selected list of agricultural periodicals and bulletins. v. 6. 1931–1933. 1730 p. 1934.

Appleton, E. V.
On two methods of ionospheric investigation. Cambridge. 1933. p. 673–687. diagr. 26 c. (Reprint: Physical society. Proceedings. London. v. 45, part 5, no. 250, 1 September, 1933.)

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Bulletin. Leningrad. 1931–1932. 24½ cm. n. d. [Title also in Russian.]

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Illumination from sun and sky. Stockholm. 1933. 55 p. figs., pls. 22 cm. (Arkiv för matematik, astronomi och fisik. Utgivet av K. svenska vetenskapsakademien. Band 24 A, N:o 4.)

[Gerlands] Beiträge zur Geophysik
Sach- und Namen-Register zu Band 1–35, einschliesslich Ergänzungsbänden I–III und einem Ergänzungsheft. Leipzig. Akademische Verlagsgesellschaft M. B. H. 1933.

Bernheimer, Walter E.
Apparate und Methoden zur Messung der Gesamtstrahlung der Himmelskörper. Berlin. 1933. p. 407–501. illus., tabs., diagrs. 24½ cm. (Sonderabdruck aus dem Handbuch der Astrophysik, von G. Eberhand, usw. Band 1.)

Brevoort, M. J., & Joyner, U. T.
Aerodynamic characteristics of anemometer cups. Washington, D. C. 1934. 7 p. 12 pl., tab. 26½ cm. (National advisory committee for aeronautics. Technical notes. no. 489. Feb., 1934.)

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Publication no. 1 . . . Akron, 1933 . . . illus., (incl. plans). diagrs. 28 cm. (At head of title: The Daniel Guggenheim airship institute. Director of research, Theoror von Kármán.)

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Bulletin of the Hydrographic department, Imperial Japanese navy. v. 6 . . . Tôkyô. 1933 . . . 26 cm. tabs., diagrs.

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Measurements of vertical air currents in the atmosphere. (Technical memorandums. National advisory committee for aeronautics. no. 648. November, 1931.) Washington. 1931. 9 p. pls., diagrs. 26½ cm. (Zeitschirft für Flugtechnic und Motorluftschiffahrt. Vol. 22, no. 17, September 14, 1931. Verlag von R. Oldenbourg, München und Berlin.)

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SOLAR OBSERVATIONS

SOLAR RADIATION MEASUREMENTS DURING MAY 1934

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 below normal for May at all three Weather Bureau stations.

Table 2, on the other hand, shows the greatest excess ever recorded for a whole month; every station being above normal with the exception of Miami, Fla. The large amount of radiation received during May, together with the low amount of precipitation in the Middle West, are two of the largest factors in producing the drought and unusually heavy dust storms of the month.

Table 3 shows large turbidity factors which explain in large part the minus departures of direct solar radiation. It was impossible to measure the amount of dust in the air by the red and yellow component method as our tables are not comprehensive enough.

Polarization measurements obtained on 7 days at Washington give a mean of 46 percent, with a maximum of 58 percent on the 7th. At Madison measurements made on 12 days give a mean of 52 percent with a maximum of 61 percent on the 22d. All these values are below the May normals. The reading of 11 percent obtained on the 11th at Washington is the lowest ever recorded by this Bureau at any station and is owing to one of the greatest dust storms ever noted in that city.

TABLE 1.—*Solar radiation intensities during May, 1934*

[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*
May 5	10.21				0.74	1.14					5.56
May 7	12.68				1.04	1.32					11.38
May 8	4.75		0.75	0.94	1.07	1.38	1.13	0.84			5.16
May 11	12.24					.39					5.16
May 12	4.95				.96						4.57
May 18	8.81	0.40	.62	.74	.90	1.14					8.81
May 21	12.24	.62	.70	.84	.99	1.22					12.24
May 22	16.20				1.08						16.20
May 23	7.57					1.40					5.36
May 24	8.18			.68	1.08	1.26					5.79
May 28	6.02			.82	1.04	1.26					5.79
Means		(.51)	.69	.80	.99	1.17	(1.13)	(.84)			
Departures		−.12	−.02	−.02	+.00	−.09	+.22	+.05			

TABLE 1.—*Solar radiation intensities during May, 1934*—Contd.

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									Local mean solar time
		A.M.					P.M.				
	e.	5.0	4.0	3.0	2.0	[1] 1.0	2.0	3.0	4.0	5.0	e.
	mm	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mm*
May 2	8.81	------	0.66	0.81	1.00	1.21	------	------	------	------	7.87
May 3	8.81	------	------	------	1.04	1.36	------	------	------	------	8.18
May 4	7.87	------	.63	------	1.01	1.53	------	------	------	------	10.97
May 5	9.83	------	------	------	1.06	1.33	------	------	------	------	10.59
May 7	6.76	------	.52	.64	.88	1.38	------	------	------	------	5.56
May 11	5.36	------	------	------	.92	1.38	------	------	------	------	5.16
May 14	6.50	------	------	------	------	1.46	------	------	------	------	6.76
May 15	5.16	------	.91	1.06	1.19	1.41	------	------	------	------	4.75
May 16	4.37	------	.73	.84	1.01	1.51	------	------	------	------	5.16
May 17	9.14	------	------	------	------	1.34	------	------	------	------	9.47
May 18	7.87	------	------	------	------	1.28	------	------	------	------	10.59
May 22	6.76	------	.73	.96	1.21	1.51	------	------	------	------	4.95
May 23	5.79	------	.80	.95	1.12	1.44	------	------	------	------	5.36
May 24	4.95	0.78	.87	.99	1.17	1.50	------	------	------	------	3.99
May 25	3.99	------	.82	------	------	------	------	------	------	------	4.17
May 26	4.57	------	.67	.84	.95	1.36	------	------	------	------	5.16
May 29	7.57	------	.59	.74	.94	1.30	------	------	------	------	10.21
Means	------	(.78)	.72	.87	1.04	1.39	------	------	------	------	------
Departures	------	+.01	−.07	−.14	−.06	+.03	------	------	------	------	------

TABLE 1.—*Solar radiation intensities during May, 1934*—Contd.

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	5.0	3.0	2.0	[1] 1.0	2.0	3.0	4.0	5.0	e.
	mm	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mm*
May 6	10.21	------	0.90	1.01	1.20	1.37	------	------	------	------	9.14
May 7	11.38	------	.84	1.00	1.18	1.42	1.10	0.84	------	------	11.38
May 8	12.24	------	.87	1.01	1.11	1.43	------	------	------	------	10.59
May 10	5.26	------	.49	.63	.87	1.22	.96	.74	0.56	0.45	4.75
May 15	4.19	------	.67	.85	1.06	1.38	1.04	.82	.68	.54	3.99
May 16	7.57	------	.76	.92	1.12	1.40	1.17	.97	.83	.71	5.79
May 17	8.18	------	.74	.91	1.15	1.38	1.15	.94	.79	.68	7.87
May 18	10.21	------	.77	.91	1.14	1.39	1.14	.91	.76	.63	9.14
May 19	9.83	------	.74	.89	1.11	1.33	------	------	------	------	9.14
May 23	6.76	------	------	.76	.97	1.22	------	------	------	------	6.27
May 25	4.57	------	------	------	------	------	------	.96	.81	.67	4.17
May 26	5.16	------	------	------	------	------	1.12	.92	.76	.64	7.57
May 28	6.27	------	------	------	------	------	.98	.77	------	------	9.47
Means	------	------	.76	.89	1.09	1.35	1.08	.87	.74	.62	------
Departures	------	------	−.02	−.04	−.03	−.03	−.02	−.03	−.07	−.07	------

NOTE.—Blue Hill data not received in time for this issue. Will be published as a late report next month.

[1] 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	Miami	New Orleans	Riverside	Blue Hill	Mount Washington
	Gram-calories per square centimeter														
1934	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*
Apr. 30	456	526	515	480	430	686	465	433	513	611	465	390	597	481	------
May 7	588	418	535	413	546	695	467	433	587	600	441	256	587	584	------
May 14	488	609	678	593	447	750	402	451	702	666	268	313	647	513	------
May 21	488	580	663	628	474	612	426	366	589	623	436	419	574	525	------
May 28	579	574	608	578	562	723	425	529	530	642	429	565	607	502	------
	Departures from weekly normals														
Apr. 30	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------
May 7	−2	+79	+37	+94	+36	+81	+88	+53	−15	+181	−50	+39	------	------	------
May 14	+144	−26	+78	+46	+178	+73	+87	+25	+61	+130	−76	−90	------	------	------
May 21	+21	+131	+140	+181	+52	+102	−14	+11	+80	+202	−236	−41	------	------	------
May 28	−13	+89	+99	+181	+59	−54	−36	−85	−43	+111	−60	+19	------	------	------
	+60	−77	+88	+125	+125	+38	−53	+93	−82	+165	−75	+97	------	------	------
	Accumulated departures on June 3														
	−567	+1,890	+4,788	+7,504	+7,231	+4,214	−1,659	−406	+3,220	+9,163	−1,176	+4,466	------	------	------

TABLE 3.—*Total, I_m, and screened, I_y, I_r, solar radiation intensity measurements, obtained during May 1934 and determinations of the atmospheric turbidity factor, β, and water-vapor content, w= depth in centimeters, if precipitated*

American University, Washington, D.C.

Date and hour angle	Solar altitude	Air mass	I_m	I_y	I_r	βI_{m-r}	βI_{y-r}	β_{mean}	$\frac{I_{w=0}}{1.94}$ (Percentage of solar constant)	$\frac{I_{w=0}-I_m}{1.94}$ (Percentage of solar constant)	w
1934											
May 7	° ′	m	gr. cal.	gr. cal.	gr. cal.						mm
4:44 a.	25 04	2.35	1.008	0.750	0.592	0.071	0.045	0.058	69.2	16.2	70
4:39 a.	26 00	2.28	1.043	.753	.594	.056	.048	.052	70.6	15.8	65
4:16 a.	30 30	1.96	1.046	.764	.595	.074	.048	.061	72.3	17.2	100
4:12 a.	31 17	1.92	1.061	.767	.597	.068	.046	.057	73.6	17.8	110
3:18 a.	41 41	1.50	1.127	.805	.620	.078	.040	.059	77.4	18.1	120
3:13 a.	42 39	1.48	1.147	.806	.620	.068	.038	.053	78.6	18.3	130
2:38 a.	49 07	1.32	1.191	.809	.620	.056	.042	.049	81.0	18.5	160
2:32 a.	50 11	1.30	1.201	.811	.620	.051	.039	.045	81.7	18.5	180
May 11											
0:16 a.	68 39	1.07	.288	.198	.159	Impossible to compute; air so dusty.[1]					
0:12 a.	68.46	1.07	.285	.198	.159	Do.					
May 12											
4:16 a.	31 17	1.92	.982	.712	.593	.118	.120	.119	62.8	11.7	120
4:12 a.	32 03	1.88	.992	.713	.595	.118	.130	.124	62.3	10.6	100
May 18											
4:59 a.	23 47	2.48	.782	.615	.501	.090	.108	.099	59.2	18.2	
4:55 a.	24 30	2.40	.821	.615	.509	.079	.127	.103	59.2	15.9	
4:52 a.	25 06	2.37	.827	.616	.512	.078	.180	.129	55.0	11.4	(2)
3:19 a.	43 07	1.46	1.027	.717	.517	.035	.023	.029	82.5	28.5	
3:16 a.	43 41	1.45	1.014	.718	.519	.040	.024	.032	82.0	28.6	100

[1] See account of dust storm this same issue.
[2] Greater than 100.
Atmospheric conditions during turbidity measurements.
May 17, Temp. 22° C., wind, NW-18; Vis. 12 miles.
May 11. Temp. 20° C., wind, N-16; vis. 1 mile. Greatest amount of dust ever meas ured by this Bureau in Washington.
May 12. Tem. 19° C., wind, NW-13. Vis. 20 miles. Light dust in streaks. Clouds, p.m.
May 18. Temp. 25° C., wind, NW-12. Vis. 12 miles.

Blue Hill Meteorological Observatory of Harvard University

Date and hour angle	Solar altitude	Air mass	I_m	I_y	I_r	βI_{m-r}	βI_{y-r}	βmean	$I_{w=0}$ (Percentage of solar constant)	$I_{w=0}-I_m$ (Percentage of solar constant)	w
1934											
May 1	° ′		gr. cal.	gr. cal.	gr. cal.						mm
2:44 a.m.	45 33	1.40	1.341	0.929	0.765	0.068	0.080	0.074	76.2	6.5	2.7
1:43 p.m.	54 55	1.22	1.328	.914	.724	.063	.073	.068	79.4	9.9	10.1
May 5											
2:59 a.m.	43 49	1.44	1.112	.761	.625	.118	.172	.145	65.8	10.5	10.2
1:01 a.m.	60 53	1.14	1.173	.799	.647	.125	.181	.153	69.9	8.4	6.0
May 6											
2:59 a.m.	44 43	1.42	1.373	.908	.733	.037	.090	.064	78.6	6.5	2.6
3:19 p.m.	40 30	1.54	1.270	.902	.705	.054	.035	.044	79.7	13.1	31.0
May 8											
1:43 a.m.	56 35	1.19	1.424	.973	.798	.046	.105	.076	78.8	4.1	1.2
1:02 p.m.	61 33	1.13	1.440	1.032	.832	.082	.058	.070	80.0	4.4	1.5
3:40 p.m.	37 05	1.65	1.310	.942	.770	.066	.077	.072	73.5	4.7	1.4
May 9											
3:56 a.m.	34 20	1.77	1.239	.869	.701	.054	.075	.064	73.7	8.6	4.5
1:56 a.m.	55 55	1.20	1.263	.870	.714	.100	.160	.130	68.9	2.6	1.0
0:57 p.m.	63 26	1.12	1.328	.913	.739	.061	.107	.084	78.6	8.9	8.0
May 11											
1:59 p.m.	54 52	1.22	.272	.193	.161	------	------	------	------	------	------
May 12											
3:43 a.m.	37 15	1.65	1.185	.856	.711	.101	.127	.114	67.0	4.7	1.4
May 13											
2:53 a.m.	46 17	1.38	1.316	.939	.758	.080	.077	.078	76.0	6.7	2.8
1:31 a.m.	59 15	1.16	1.338	.957	.756	.075	.054	.064	80.8	10.4	10.1
May 16											
4:30 p.m.	29 06	2.06	1.228	.909	.747	.068	.067	.068	69.7	5.0	1.5
5:33 p.m.	17 33	3.30	.893	.705	.583	.084	.071	.078	56.7	9.6	4.3

TABLE 3.—*Total, I_m, and screened, I_y, I_r, solar radiation intensity measurements, obtained during May 1934 and determinations of the atmospheric turbidity factor, β, and water-vapor content, w= depth in centimeters, if precipitated*—Continued

Blue Hill Meteorological Observatory of Harvard University—Continued

Date and hour angle	Solar altitude	Air mass	I_m	I_y	I_r	βI_{m-r}	βI_{y-r}	βmean	$I_{w=0}$ (Percentage of solar constant)	$I_{w=0}-I_m$ (Percentage of solar constant)	w
1934											
May 18	° ′		gr. cal.	min.	cm²						
3:29 a.m.	40 30	1.50	.992	.720	.594	.170	.190	.180	60.4	8.1	4.1
2:04 a.m.	55 10	1.22	1.166	.823	.667	.133	.151	.142	70.0	3.4	0.9
1:35 p.m.	59 41	1.16	1.249	.906	.718	.121	.078	.100	76.0	10.4	16.0
May 19											
4:03 a.m.	34 34	1.76	1.218	.874	.709	.066	.076	.071	68.5	4.2	1.1
2:23 a.m.	52 27	1.26	1.302	.901	.714	.079	.056	.068	79.1	10.4	14.7
0:51 a.m.	65 02	1.10	1.211	.847	.670	.120	.116	.118	72.2	8.3	6.3
1:26 p.m.	61.07	1.14	1.354	.935	.733	.068	.050	.059	81.7	10.3	14.0
May 22											
1:51 a.m.	58 02	1.18	1.213	.838	.670	.162	.179	.170	78.1	14.0	49.0
0:51 a.m.	65 36	1.09	1.232	.838	.661	.100	.114	.107	76.3	11.1	23.0
1:57 p.m.	57 01	1.19	1.262	.879	.683	.075	.056	.066	80.5	13.9	48.0
May 23											
1:44 a.m.	59 09	1.17	1.319	.878	.688	.036	.056	.046	83.2	13.5	44.5
May 24											
3:54 a.m.	36 52	1.66	1.257	.873	.714	.058	.050	.054	76.5	10.0	9.3
3:22 a.m.	43 02	1.46	1.312	.894	.720	.046	.081	.064	77.1	7.7	3.8
1:31 a.m.	61 15	1.14	1.326	.923	.726	.066	.056	.061	81.9	11.8	28.0
0:40 a.m.	61 42	1.13	1.254	.880	.697	.100	.081	.090	77.6	11.3	24.0
3:31 p.m.	41 05	1.52	1.188	.828	.673	.091	.118	.104	70.3	7.5	3.4
May 27											
2:43 a.m.	59 29	1.16	1.249	.865	.698	.100	.116	.108	75.2	9.1	8.3
0:05 p.m.	69 02	1.07	1.360	.950	.758	.076	.083	.080	80.0	8.0	6.1
4:00 p.m.	35 03	1.74	1.145	.840	.678	.086	.083	.084	70.3	9.7	7.7
May 30											
0:39 a.m.	67 55	1.08	1.142	.826	.658	.170	.100	.135	73.2	12.7	40.0
5:06 p.m.	24 11	2.43	.626	.513	.394	.187	.108	.148	50.7	17.6	-----
May 31											
3:38 a.m.	40 31	1.54	.938	.691	.558	.174	.175	.174	60.6	10.9	14.0
2:40 a.m.	50 59	1.28	1.040	.765	.614	.179	.160	.170	65.7	11.5	20.0
1:09 a.m.	64 57	1.10	1.161	.814	.639	.130	.117	.124	74.1	12.6	34.0
0:09 p.m.	69 35	1.06	1.197	.819	.650	.115	.115	.115	75.9	12.4	34.0

Atmospheric Conditions During Solar Radiation Measurements

Date and hour angle from apparent noon	Air temperature	Wind	Visibility	Sky blueness	Clouds and remarks
May 1934	° C				
1, 2:00 p.	20.0	SW. 4	7	6	3 ci; mod. haze.
5, 2:45 a.	16.7	SW. 3	7	6	0 cld.; dense haze, fog clearing.
6, 1:53 a.	21.7	W. 4	8	6	4 ci. and ci. cu.
3:09 p.	26.7	W. 5	8	6	7 ci. and ci. cu.; wind gusty.
8, 3:17 a.	8.9	WNW. 3	9	6	Few ci. and cu.; ci film over sun.
1:33 p.	15.6	NW. 4-5	8	6	Few ci and cu.
3:40 p.	15.0	NW. 4-5	9	6	Few cist. and cu.; wind gusty.
9, 3:13 a.	10.0	W. 2	8	4	Few cist.; conditions good.
11, 2:11 p.	22.2	SW. 6-7	4	------	Dust storm, cu. and acu. seen faintly.
12, 2:55 a.	8.9	NW. 3-4	5	4	2 cist., 2 cu. Possibly thin cist. over sun.
13, 2:59 a.	9.4	NW. 2	9	6	Cist. in the east, conditions excellent.
16, 3:43 p.	13.9	NW. 4	9	8	Ci. in east and west; ci. film near sun; gusty.
18, 3:23 a.	15.0	NW. 2	7	4	0 clds.
1:39 p.	17.8	NW. 6	7	4	Few ci., few cu.; ci. film at end of obs.
19, 2:21 a.	13.3	NW. 2	8	6	Ci. low in west; conditions good.
1:53 p.	18.9	W. 3	8	6	Ci. or smoke film over sun.
22, 0:39 a.	25.6	S. 6	7	------	
0:23 a.	25.6	S. 6	7	6	Few ci. and acu.; wind gusty.
23, 1:37 a.	16.1	NW. 2	7	6	1 cist., 1 cu.
4:59 p.	18.3	WNW. 6	7	6	1 acu.; lt. haze, gusty.
24, 3:19 a.	13.3	NW. 2	8	6	2 ci.; ci. film.
3:11 p.	20.0	W. 4	8	4	4 cu.
5:17 p.	19.5	W. 3	8	4	1 cist., 1 ast., 3 acu.
27, 2:55 a.	14.4	NNE. 1	8	6	0 clds.; mod. haze, gusty.
1:28 a.	14.4	NE. 3	8	6	Few ci.; mod. haze, gusty.
0:05 a.	16.7	ExN. 4	9	5	1 ci., few cu.
2:01 p.	17.2	ExN. 1	9	3	2 ci.; lt. haze.
3:57 p.	17.8	NE. 2	9	3	1 ci.; lt. haze.
30, 0:25 a.	23.9	WNW. 1	8	5	1 cu., few st. cu.; mod. haze.
31, 3:08 a.	23.9	SW. 4	7	5	2 acu.; thick haze.
1:06 a.	26.1	W. 5	6	------	Few cu.; thick haze.
0:06 p.	26.7	W. 5	7	------	2 cu., I acu.; gusty.
1:52 p.	27.2	WSW. 6	7	------	5 ci., 1 cu.; thick haze; sun obscured ci.

POSITIONS AND AREAS OF SUN-SPOTS

[Communicated by Capt. J. F. Hellweg, U.S. Navy, Superintendent U.S. Naval Observatory. Data furnished by the U. S. Naval Observatory in cooperation with Harvard and Mount Wilson Observatories. The difference in longitude is measured from the central meridian, positive west. The north latitude is positive. Areas are corrected for foreshortening and are expressed in millionths of the sun's visible hemisphere. The total area for each day includes spots and groups]

NOTE.—Owing to the fact that many reports were missing at the time of going to press, the complete May 1934 data will be published in the next (June) issue of the REVIEW.—Editor.

PROVISIONAL SUN-SPOT RELATIVE NUMBERS FOR MAY 1934

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

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

May 1934	Relative numbers	May 1934	Relative numbers	May 1934	Relative numbers
1	7	11	10	21	29
2	0	12	7	22	34
3	0	13	*d* 15	23	*a* 33
4	*Mc*–	14	21	24	23
5	17	15	26	25	19
6	*a* 21	16	25	26	17
7	26	17	*d*–	27	9
8	34	18	41	28	16
9	23	19	46	29	8
10	19	20	*a* 37	30	0
				31	0

Mean: 29 days—19.4.

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

AEROLOGICAL OBSERVATIONS

[Aerological Division, D. M. Little, in charge]

By L. T. SAMUELS

Free-air temperatures during May averaged above normal at all stations listed in table 1 except Pensacola where negative departures occurred at all levels. Exceptionally large positive temperature departures occurred at the northern stations. Free-air relative humidities averaged mostly below normal.

Free-air resultant wind directions were more northerly than normal over most southern stations and were more southerly than normal over the extreme northwest (table 2). Elsewhere the resultant directions were generally close to normal. The resultant velocities were close to normal except at a number of southern stations where they were mostly below normal.

TABLE 1.—*Free-air temperatures and relative humidities obtained by airplanes during May 1934*

TEMPERATURE (°C.)

Altitude (meters) m.s.l.	Boston, Mass.[1] (6 meters)		Cleveland, Ohio[2] (246 meters)		Dallas, Tex.[3] (146 meters)		Norfolk, Va.[4] (3 meters)		Omaha, Nebr.[5] (300 meters)		Pembina, N.Dak.[6] (243 meters)		Pensacola, Fla.[4] (2 meters)		San Diego, Calif.[4] (5 meters)		Washington, D.C.[4] (2 meters)	
	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal
Surface	13.7	(7)	11.4	(7)	17.8	(7)	19.2	+0.5	15.8	(7)	7.8	(7)	21.1	−1.4	19.2	+0.9	16.0	−1.6
500	12.9	(7)	14.8	(7)	20.7	(7)	17.5	−0.2	17.4	(7)	10.8	(7)	19.6	−1.0	16.5	+1.9	15.3	−0.3
1,000	11.1	+3.1	14.1	+4.2	18.3	+1.7	15.8	0.0	17.7	+5.7	12.1	+4.0	17.2	−0.8	16.9	+2.5	14.2	+0.6
1,500	8.3	+3.4	11.3	+4.1	15.5	+0.8			15.1	+5.9	9.7	+4.2						
2,000	5.5	+3.3	8.4	+3.7	13.1	+0.8	10.3	+0.2	12.2	+5.6	7.0	+4.3	11.0	−1.6	14.0	+2.4	9.1	+0.5
2,500	3.3	+3.6	5.8	+3.5	9.9	+0.3			9.0	+5.1	3.9	+4.1						
3,000	0.8	+3.7	3.0	+3.2	7.2	+0.6	4.4	+0.1	5.9	+4.9	0.4	+3.3	5.4	−2.0	8.6	+2.4	4.3	+1.1
4,000	−4.6		−2.3	+3.6	1.6	+1.2			−1.7	+3.1	−6.1	+2.8	−0.8	−2.2	2.2	+2.3		
5,000	−11.2		−8.9	+2.9	−4.8	+0.5			−9.0	+1.7	−12.8	+2.0	−7.5	−1.8				

RELATIVE HUMIDITY (PERCENT)

Surface	69	(7)	73	(7)	85	(7)	77	+6	63	(7)	73	(7)	88	+7	68	0	70	+4
500	60	(7)	58	(7)	67	(7)	70	+8	60	(7)	61	(7)	83	+7	73	−2	61	+1
1,000	55	−16	51	−13	68	−1	62	+6	53	−9	51	−9	80	+11	58	−3	54	−2
1,500	55	−20	48	−14	66	+8			52	−10	49	−11						
2,000	58	−18	48	−10	61	+12	59	+6	50	−10	49	−10	77	+20	36	−2	52	−3
2,500	57	−14	47	−5	62	+17			49	−9	50	−8						
3,000	56	−9	48	0	56	+11	54	+3	48	−10	52	−5	70	+24	30	+2	48	−3
4,000	50		43	−2	41	−5			49	−10	55	+2	65	+31	30	+4		
5,000	50		41	−3	30	−23			48	−14	55	+4	61	+31				

Times of observations: Weather Bureau, 5 a.m.; Navy, 7 a.m.; and Massachusetts Institute of Technology, 8 a.m., E.S.T.

[1] Airplane observations made by M.I.T.; departures based on normals obtained from kite observations made at Blue Hill Meterological Observatory; Annals of the Astronomical Observatory of Harvard College (1904), vol. LVIII, pt. I, p. 59.
[2] Temperature departures based on normals determined by extrapolating latitudinally those of Royal Center, Ind., and Due West, S.C. Humidity departures based on normals of Royal Center, Ind.
[3] Temperature departures based on normals determined by interpolating latitudinally those of Groesbeck, Tex., and Broken Arrow, Okla. Humidity departures based on normals of Groesbeck, Tex.
[4] Naval air stations.
[5] Temperature and humidity departures based on normals of Drexel, Nebr.
[6] Temperature departures based on normals determined by extrapolating latitudinally those of Ellendale, N.Dak., and Drexel, Nebr. Humidity departures based on normals of Ellendale, N.Dak.
[7] Surface and 500-meter departures omitted because of difference in time of day between airplane observations and those of kites upon which the normals are based.