SOLAR RADIATION AND SUNSPOT DATA FOR MARCH 1945

[Solar Radiation Investigations Section, I. F. Hand, in charge]

SOLAR RADIATION OBSERVATIONS

Explanations of the tables and references to descriptions of instruments, stations, and methods of observation, and to summaries of data, are given in the January 1944 REVIEW, page 43. A list of the pyrheliometric stations also is given on page 45 of the same REVIEW.

While measurements of total solar and sky radiation have been made at a large number of places during the last thirty years, very few measurements of total solar and sky radiation received on vertical surfaces have been obtained. Early in March two pyrheliometers were mounted on vertical surfaces, one facing East and the other South. These observations should enable the determination of the approximate amount of radiation reflected from ground surfaces, both snow-covered and snow-free. It is hoped that measurements on these vertical surfaces can be continued for at least a year.

These measurements and their ratios to the total solar and sky radiation received on a horizontal surface will be included in a new table, starting with an early issue.

TABLE 1.—*Solar radiation intensities during March 1945*

[GRAM-CALORIES PER MINUTE PER SQUARE CENTIMETER OF NORMAL SURFACE]

MADISON, WIS.

Date	Sun's zenith distance.										
	7:30 a. m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	1:30 p. m.
	75th mer. time	Air mass									75th mer. time
		A. M.				*1.0	P. M.				
	e.	5.0	4.0	3.0	2.0		2.0	3.0	4.0	5.0	e.
1945	mb.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	mb.
Mar. 1	4.8	0.57	0.61								5.8
Mar. 3	4.4			1.13	1.28	1.54	1.28				3.8
Mar. 7	2.0	.92	1.03	1.11	1.22	1.56					3.1
Mar. 10	4.2	.53	.66	.79	1.03	1.42					4.2
Mar. 12	4.0		.95	1.08	1.24	1.50					6.1
Mar. 13	4.2		.59	.74	.96	1.25					5.1
Mar. 21	3.3	.94	1.04	1.15	1.31	1.50					4.2
Mar. 22	4.4	.73	.84	.99	1.11	1.33					6.4
Mar. 27	9.8	.41	.53	.68	.96	1.23					9.4
Mar. 28	10.6	.42	.59	.83	1.07	1.46					8.1
Mar. 31	7.2	.74	.87	1.02	.95	1.42					7.8
Means		.66	.77	.95	1.11	1.42	(1.28)				
Departures		−.16	−.20	−.06	−.18	−.10	−.01				

LINCOLN, NEBR.

Mar. 1	5.1							0.96	0.82	0.66	6.4
Mar. 3	2.5	0.77	0.87	0.92	1.16	1.40	1.22				3.3
Mar. 7	2.0	.59	.75	.92	1.16	1.34					3.5
Mar. 8	4.6			1.03	1.18	1.30	1.22				4.8
Mar. 9	5.1						1.14	.90	.49		6.9
Mar. 12	5.1		.62	.85	1.07	1.35					4.8
Mar. 13	5.8			.79	1.01	1.30	.99				8.4
Mar. 15	12.6							.88	.77	.69	10.5
Mar. 17	6.6					1.38	1.29	1.11	1.01		7.2
Mar. 20	4.6	.87	.98	1.24	1.31	1.55	1.27	1.11	.96	.88	5.6
Mar. 21	4.8					1.40	1.22	1.03			6.4
Mar. 23	10.5				1.20						6.1
Mar. 26	7.8	.68	.85	1.05	1.24	1.40	1.19	.97	.77	.71	8.4
Mar. 27	10.2	.68	.79	.96	1.14	1.45	1.10				5.8
Mar. 28	5.6	.90	1.01	1.34	1.27	1.40					6.6
Mar. 29	6.1					1.42	1.12	.90	.71	.54	7.2
Mar. 30	6.9					1.47	1.24	1.08	.95	.81	7.8
Mar. 31	6.4				1.19	1.50					8.5
Means		.75	.84	1.01	1.18	1.40	1.18	.99	.81	.72	
Departures		−.08	−.09	−.08	−.09	−.11	−.09	−.09	−.12	−.09	

TABLE 1.—*Solar radiation intensities during March 1945*—Con.

ALBUQUERQUE, N. MEX.

Date	Sun's zenith distance.										
	7:30 a. m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	1:30 p. m.
	75th mer. time	Air mass									75th mer. time
		A. M.				*1.0	P. M.				
	e.	5.0	4.0	3.0	2.0		2.0	3.0	4.0	5.0	e.
	mb.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	mb.
Mar. 2	2.6		1.13								2.7
Mar. 3	3.0	0.98	1.07	1.18	1.32	1.60	1.42	1.35	1.33	1.29	3.0
Mar. 4	3.4	1.01	1.09	1.17	1.31	1.46					3.6
Mar. 6	2.3	1.02	1.14	1.24	1.37	1.64	1.47	1.44	1.35	1.32	3.2
Mar. 7	2.4	1.02	1.11	1.18	1.34	1.59	1.38	1.31	1.24	1.14	3.0
Mar. 8	2.0	.88	1.00	1.09	1.28		1.31	1.27	1.17	1.14	2.1
Mar. 9	2.0	1.08	1.16	1.25	1.34		1.44	1.41	1.36	1.34	3.0
Mar. 10	2.6	.92	.98	1.07	1.28	1.53	1.39	1.35	1.29	1.25	2.1
Mar. 11	2.6	.83	.89	1.06	1.21	1.43	1.41	1.34	1.31	1.31	2.9
Mar. 12	3.0			.56	.96	1.37	1.24	1.26	1.24	1.24	3.4
Mar. 16	4.4						1.35				2.5
Mar. 19	2.7	.98									2.9
Mar. 20	2.6	1.07	1.12	1.30	1.38		1.46	1.46	1.41	1.37	2.6
Mar. 21	2.7				1.10						2.5
Mar. 25	3.4				1.25		1.42	1.37	1.33	1.32	3.4
Mar. 26	3.6				1.15		1.44				2.7
Mar. 27	3.2						1.35	1.28	1.22	1.19	2.0
Mar. 28	2.4				1.26		1.47				2.5
Mar. 29	2.6	1.00	1.06								2.2
Mar. 31	2.4		1.01	1.12	1.26	1.47	1.41	1.35			3.2
Means		.98	1.06	1.11	1.25	1.52	1.39	1.35	1.30	1.26	
Departures		−.04	−.06	−.11	−.10	−.12	−.01	+.05	+.09	+.12	

BOSTON, MASS.

Mar. 1	5.1						1.29				4.0
Mar. 5	2.2	0.50	0.63	0.91	1.01						4.4
Mar. 8	2.3						.89				3.8
Mar. 9	3.3	.63	.83	.83	1.10		.82	0.82			3.3
Mar. 10	4.6		.35	.43							4.8
Mar. 13	5.3		.69	.91	1.20		1.26				4.6
Mar. 14	4.6				.42		1.02				5.3
Mar. 26	5.6			.89							8.4
Mar. 27	8.5			.82							9.8
Means		(.56)	.62	.80	.93		1.06	(.82)			

BLUE HILL, MASS.

Mar. 1	5.1	0.90		1.14			1.39	1.18	1.07		3.6
Mar. 4	3.3						1.41		1.06	0.93	3.0
Mar. 5	1.6	.94					1.28	1.09	.97		3.5
Mar. 8	2.1			1.14			1.29				3.0
Mar. 9	3.0	.91	1.00	1.11	1.24		1.17				3.0
Mar. 11	4.2						1.22	.99	.85	.72	4.0
Mar. 13	5.3	.72	.82	1.04	1.32				.99		4.6
Mar. 14	3.8						1.01	.74		.43	4.8
Mar. 18	6.9									.87	4.9
Mar. 24	5.6				1.27	1.54	1.27	1.11	.98	.90	4.8
Mar. 25	5.3	.93	1.04	1.16	1.28			1.04	.91	.80	6.4
Mar. 26	6.1	.70	.81	.97			1.06	.87			7.2
Mar. 27	9.8	.64	.75	.88	1.06						11.8
Mar. 28	7.2		.71	.79	.94	1.31	.98	.80	.65	.53	12.7
Mar. 29	11.4				1.03			.78	.60		12.3
Mar. 30	11.4						1.25	1.05	.95	.83	6.6
Means		.82	.86	1.03	1.16	(1.42)	1.21	.96	.90	.75	
Departures		−.07	−.11	−.07	−.08	−.01	−.03	−.11	−.06	−.10	

Ratio, Boston-Blue Hill on comparable dates

		0.61	0.84	0.86	0.90		0.82				

*Extrapolated.

TABLE 2.—*Daily totals and weekly means of solar radiation (direct+diffuse) received on a horizontal surface*

[Gram-calories per square centimeter]

Date	Washington, D. C.	Madison, Wis.	Lincoln, Nebr.	East Lansing, Mich.	New York, N. Y.	Fresno, Calif.	Fairbanks, Alaska	Columbia, Mo.	Boston, Mass.	Nashville, Tenn.	Twin Falls, Idaho	La Jolla, Calif.	Riverside, Calif.	Blue Hill, Mass.	Portland, Maine	Ithaca, N. Y.	Newport, R. I.	State College, Pa.	Put-in-Bay, Ohio	East Wareham, Mass.	Davis, Calif.	Tooele, Utah	Boulder, Colo.
	cal.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*
Feb. 26	30	440	412	90	23	443	90	164	54	60	398	442	518	75	94	38	71	51	32	100	407	547	474
Feb. 27	182	367	214	264	245	168	21	191	215	56	383	169	154	227	303	97	186	267	292	194	412	476	440
Feb. 28	33	364	270	138	100	413	54	354	353	117	383	270	90	383	407	260	------	90	101	337	453	384	406
Mar. 1	434	356	256	328	384	397	56	252	360	342	328	401	328	413	420	397	394	412	417	401	230	451	220
Mar. 2	173	131	22	29	137	443	70	46	166	136	159	192	496	133	95	92	------	124	48	130	458	296	60
Mar. 3	59	459	399	222	89	129	100	297	158	52	192	217	227	142	70	150	------	176	191	125	143	211	389
Mar. 4	226	362	280	364	357	438	115	274	402	199	286	148	74	413	444	------	------	474	417	374	363	258	282
Mean	**162**	**354**	**265**	**205**	**191**	**348**	**72**	**225**	**244**	**137**	**304**	**263**	**269**	**255**	**262**	**172**	------	**228**	**214**	**237**	**352**	**375**	**325**
Departure	**−115**	**+82**	**−41**	**−11**	**−68**	**−5**	**−55**	**−31**	**+16**	**−103**	**+16**	**−121**	**−76**	**−35**	------	**−55**	------	**−7**	**−23**	**−41**	**+28**	------	------
Mar. 5	58	100	221	260	176	441	95	58	359	184	440	389	535	402	401	342	366	160	329	411	419	500	142
Mar. 6	85	257	254	38	38	477	98	157	50	226	317	430	517	54	92	31	30	76	42	42	379	275	370
Mar. 7	157	481	426	411	220	484	138	472	139	64	381	470	530	141	434	377	141	123	441	138	452	543	467
Mar. 8	442	285	433	211	414	485	132	485	356	405	325	484	530	422	458	421	420	481	364	448	450	509	466
Mar. 9	363	416	399	186	394	471	84	400	345	440	416	481	522	439	462	245	424	363	306	408	483	559	448
Mar. 10	319	495	370	194	119	448	74	474	185	395	382	444	512	232	325	68	251	169	253	------	424	549	467
Mar. 11	432	91	505	249	418	461	40	120	338	413	357	390	491	346	438	------	337	470	403	------	402	561	436
Mean	**265**	**304**	**373**	**221**	**254**	**467**	**94**	**310**	**253**	**304**	**374**	**441**	**519**	**291**	**373**	**247**	**281**	**263**	**305**	**289**	**430**	**499**	**400**
Departure	**−45**	**+6**	**+46**	**−12**	**−20**	**+67**	**−50**	**+4**	**+7**	**+34**	**+27**	**+18**	**+105**	**−6**	------	**−12**	**−18**	**−2**	**+43**	**+8**	**+68**	------	------
Mar. 12	292	506	457	396	146	442	231	512	127	45	292	183	403	167	210	419	254	137	416	232	278	599	457
Mar. 13	493	458	444	386	448	231	237	500	430	360	320	305	156	412	465	426	459	463	486	474	477	274	239
Mar. 14	410	290	125	346	340	155	148	392	402	331	154	183	166	422	439	308	427	434	416	426	122	232	356
Mar. 15	354	126	312	189	117	387	222	482	350	112	380	201	367	344	392	26	198	357	260	254	427	247	183
Mar. 16	427	433	255	350	248	174	257	421	166	368	340	348	368	147	145	328	160	395	443	156	89	623	505
Mar. 17	319	423	511	260	256	443	247	554	311	180	159	205	149	333	336	174	368	232	286	318	303	194	338
Mar. 18	354	424	377	385	384	553	257	257	456	405	346	528	542	430	485	458	423	448	486	411	527	422	346
Mean	**378**	**380**	**354**	**330**	**277**	**341**	**228**	**445**	**320**	**257**	**284**	**279**	**307**	**321**	**353**	**306**	**327**	**352**	**399**	**324**	**318**	**370**	**346**
Departure	**+58**	**+65**	**+9**	**+65**	**−2**	**−62**	**+31**	**+111**	**+61**	**−42**	**−47**	**−106**	**−77**	**+27**	------	**+72**	**+30**	**+64**	**+97**	**+35**	**−82**	------	------
Mar. 19	415	242	133	137	174	504	264	76	153	287	452	517	563	173	135	87	226	176	308	203	338	653	540
Mar. 20	348	239	530	34	303	225	279	60	341	238	224	533	586	318	180	58	331	289	58	331	110	588	508
Mar. 21	196	568	531	427	29	123	266	550	15	54	403	358	184	26	47	21	33	59	240	28	553	601	511
Mar. 22	58	513	443	435	45	73	285	539	67	527	321	297	149	75	91	46	59	111	528	92	91	569	238
Mar. 23	507	456	495	365	427	524	206	513	168	365	100	527	456	150	234	328	235	371	462	171	556	266	506
Mar. 24	444	266	286	368	530	534	302	319	473	306	452	551	606	478	510	509	504	545	426	492	486	617	319
Mar. 25	474	179	443	289	460	167	349	170	489	306	441	531	584	506	538	513	500	533	470	519	84	642	562
Mean	**349**	**352**	**409**	**294**	**281**	**307**	**279**	**318**	**244**	**298**	**342**	**473**	**447**	**247**	**248**	**223**	**270**	**298**	**356**	**262**	**317**	**562**	**455**
Departure	**+7**	**+18**	**+30**	**−4**	**−58**	**−139**	**+58**	**−7**	**−46**	**−31**	**−57**	**+21**	**+45**	**−122**	------	**−77**	**−127**	**−27**	**+17**	**−59**	**−141**	------	------
Mar. 26	477	430	540	231	416	339	295	583	472	462	89	550	467	478	476	432	503	510	215	497	459	298	557
Mar. 27	518	533	538	437	328	475	314	580	373	543	104	557	629	383	423	247	362	418	491	394	400	384	582
Mar. 28	521	572	570	407	398	487	231	525	438	497	312	527	538	457	491	489	477	535	522	480	518	591	367
Mar. 29	450	417	509	61	425	449	283	355	456	327	367	539	578	465	499	377	472	436	154	459	621	649	437
Mar. 30	469	369	524	315	504	580	229	208	499	376	519	554	625	461	492	541	491	547	327	455	618	671	551
Mar. 31	410	562	551	265	218	585	271	585	97	370	340	572	606	103	106	209	155	350	283	99	617	650	465
Apr. 1	552	561	550	352	511	631	292	------	527	108	411	121	489	532	568	421	526	548	399	528	650	343	58
Mean	**485**	**483**	**540**	**295**	**400**	**506**	**281**	**423**	**409**	**383**	**306**	**488**	**562**	**412**	**436**	**388**	**427**	**478**	**342**	**416**	**555**	**512**	**431**
Departure	**+131**	**+127**	**+161**	**−22**	**+71**	**+35**	**−5**	**+20**	**+61**	**+8**	**−63**	**−3**	**+149**	**+29**	------	**+92**	**+54**	**+116**	**−21**	**+40**	**+40**	------	------

Accumulated Departures on Apr. 1, 1945

+252	**+2,660**	**−1,589**	**−966**	**−175**	**+14**	**−875**	**+105**	**+1,127**	**−2,303**	**−2,541**	**−2,184**	**+2,044**	**−1,022**	------	**+511**	**−1,365**	**+3,129**	**+994**	**−21**	**−588**	------	------

POSITIONS, AREAS, AND COUNTS OF SUNSPOTS FOR MARCH 1945

By LUCY T. DAY

[Equatorial Division, U. S. Naval Observatory]

[Communicated by Commodore J. F. HELLWEG, U. S. N. (Ret.) Superintendent, U. S. Naval Observatory.] All measurements and spot counts were made at the Naval Observatory from plates taken at the observatories indicated. Difference in longitude is measured from the central meridian, positive toward the west. Latitude is positive toward the north. Areas are corrected for foreshortening and expressed in millionths of Sun's hemisphere. For each day, under longitude, latitude, area of spot or group, and spot count are included assumed longitude of center of the disk, assumed latitude of center of the disk, total areas of spot and groups, and total spot count.

Date	Eastern standard time	Mount Wilson group No.	Heliographic: Difference in longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Area of spot or group	Spot count	Plate quality	Observatory
1945	*h m*		°	°	°	°				
March 1	10 34	7725	+4	124	−14	8	24	3	F	U. S. Naval.
		7725	+9	129	−16	12	24	2		
		7725	+13	133	−17	17	61	3		
				(120)	(−7)		109	8		

See footnotes at end of table.

POSITIONS, AREAS, AND COUNTS OF SUNSPOTS FOR MARCH 1945—Continued

Date	Eastern standard time	Mount Wilson group No.	Heliographic: Difference in longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Area of spot or group	Spot count	Plate quality	Observatory
1945	*h m*		°	°	°	°				
2	12 14	7729	−83	23	−15	83	679	1	P	U. S. Naval.
		7725	+17	123	−18	21	24	1		
		7725	+25	131	−15	26	12	1		
		7725	+27	133	−17	29	73	3		
				(106)	(−7)		788	6		
4	13 52	7729	−54	25	−15	54	533	1	F	Do.
		(*)	−37	42	−14	37	6	2		
		7728	+57	136	−17	57	36	1		
		7727	+64	143	−28	65	36	1		
				(79)	(−7)		611	5		
5	12 45	7729	−42	24	−15	42	533	1	†	Mt. Wilson.
		7728	+70	136	−17	71	24	1		
		7727	+77	143	−28	77	12	1		
				(66)	(−7)		569	3		