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

Week beginning—	Washington	Madison	Lincoln	Chicago	New York	Fresno	Fairbanks	Twin Falls	La Jolla	Miami	New Orleans	Riverside	Blue Hill	San Juan	Friday Harbor	Ithaca	Newport
	Gram-calories per square centimeter																
	cal.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*
Apr. 30	525	637	572	573	446	691	383	569	583	451	462	545	442	672	504	474	457
May 7	*516	542	578	532	439	598	444	615	499	452	475	466	495	674	668	370	495
May 14	670	604	610	535	588	659	517	579	531	496	429	471	704	580	514	478	686
May 21	617	587	574	558	400	683	411	641	700	495	362	644	401	629	493	308	429
May 28	492	532	680	559	557	698	565	646	501	491	338	539	661	615	556	275	699
	Departures of daily totals from normals																
Apr. 30	+55	+190	+97	+177	+48	+60	−16	+51	+21	−59	+59	−6	−51	+55	−50	+92	−46
May 7	+61	+91	+123	+123	+44	−48	−6	+24	−61	−62	+70	−83	+4	+110	+108	−33	−25
May 14	+199	+124	+90	+106	+166	−9	+44	−27	+9	+2	+20	−39	+174	+77	−34	+25	+160
May 21	+112	+92	+19	+99	−45	+6	−38	−5	+195	−5	−52	+90	−127	+67	−68	−179	−115
May 28	−27	+34	+152	+85	+84	+10	+128	+49	−29	+23	−145	−12	+79	+33	0	−194	−33
	Accumulated departures since Jan. 1																
	+5,915	+4,669	+3,899	+6,888	+1,575	−581	−595	+119	+2345	+896	+5,019	−1,841	−840	+7,189	+1,907	−6,713	−1,547

*5-day mean.

POSITIONS AND AREAS OF SUN SPOTS

[Communicated by Capt. J. F. Hellweg, U. S. Navy (Ret.) Superintendent, U. S. Naval Observatory. Data from measurements at the U. S. Naval Observatory from plates obtained 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 visible hemisphere. For each day, below longitude, latitude, area of spot or group, and spot count, are given respectively the assumed longitude of the center of the disk, assumed latitude of the center of the disk, total area of spots 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
1939	*h m*		°	°	°	°				
May 1	11 12	6424	−88	78	+12	88	194	2	VG	U. S. Naval.
		6423	−80	86	−11	80	24	1		
		6422	−53	113	+22	59	24	2		
		6418	−49	117	+12	51	727	10		
		6414	−22	144	−23	29	97	6		
		6417	−19	147	−11	21	48	1		
		6413	−12	154	+22	27	24	3		
		6414	−11	155	−21	20	61	1		
		6417	−11	155	−10	13	85	1		
		6413	−5	161	+21	25	121	7		
		6415	−5	161	+12	16	145	16		
		6421	+3	169	−16	13	48	4		
		6410	+33	199	−11	34	145	2		
		6410	+39	205	−10	39	20	6		
		6412	+59	225	−15	60	174	6		
		6420	+59	225	+18	62	61	4		
		6407	+68	234	+30	73	824	16		
		6406	+72	238	−17	72	485	1		
		6408	+77	243	+6	78	97	1		
		6405	+80	246	+25	82	97	1		
				(166)	(−4)		3,501	91		
May 2	8 59	6424	−76	78	+11	77	582	12	VG	Mt. Wilson.
		6423	−69	85	−9	69	73	3		
		6422	−38	116	+22	46	291	16		
		6418	−37	117	+11	40	727	45		
		6414	−12	142	−23	23	145	3		
		6417	−7	147	−11	10	12	3		
		6414	−3	151	−21	18	145	14		
		6417	+1	155	−11	7	97	6		
		6415	+7	161	+11	16	36	6		
		6413	+8	162	+19	24	121	15		
		6421	+16	170	−18	22	36	28		
		6410	+37	191	−17	39	6	8		
		6410	+45	199	−11	45	97	4		
		6412	+68	222	−15	68	145	18		
		6420	+70	224	+16	72	97	11		
		6407	+82	236	+30	85	242	8		
		6406	+85	239	−17	85	194	2		
				(154)	(−4)		3,046	202		

POSITIONS AND AREAS OF SUN SPOTS—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
1939	*h m*		°	°	°	°				
May 3	8 58	6424	−62	79	+11	64	582	18	VG	Mt. Wilson.
		6423	−54	87	−8	54	145	12		
		6422	−24	117	+22	34	339	55		
		6418	−23	118	+11	28	727	50		
		6414	+1	142	−23	20	73	18		
		6414	+10	151	−21	20	36	19		
		6417	+14	155	−11	16	73	10		
		6415	+20	161	+12	25	6	2		
		6413	+20	161	+19	30	85	7		
		6410	+59	200	−11	59	97	6		
		6420	+32	223	+15	83	36	3		
		6412	+83	224	−14	83	194	4		
				(141)	(−4)		2,393	204		
May 4	10 59	6426	−76	51	+8	77	48	1	G	U. S. Naval.
		6424	−47	80	+11	49	436	10		
		6423	−41	86	−9	41	61	4		
		6418	−13	114	+14	21	436	21		
		6422	−12	115	+22	28	485	36		
		6418	−9	118	+11	17	339	9		
		6414	+15	142	−23	24	36	5		
		6414	+28	155	−20	33	12	1		
		6417	+29	156	−11	30	61	1		
		6413	+38	165	+19	44	109	7		
		6425	+47	174	−7	47	24	3		
		6410	+74	201	−11	74	145	1		
				(127)	(−4)		2,192	99		
May 5	11 31	6426	−63	50	+9	65	48	2	VG	Do.
		6424	−35	78	+10	37	97	16		
		6424	−31	82	+11	34	388	1		
		6423	−26	87	−9	26	121	12		
		6418	+2	115	+14	17	533	66		
		6422	+2	115	+23	26	533	42		
		6418	+6	119	+11	16	436	12		
		6417	+42	155	−10	42	48	1		
		6413	+50	163	+19	54	73	6		
		6425	+61	174	−7	67	6	1		
		6410	+80	193	−15	80	48	4		
		6410	+83	196	−11	83	48	1		
				(113)	(−4)		2,379	164		
May 6	10 58	6426	−50	50	+9	51	24	2	VG	Do.
		6424	−22	78	+10	26	97	16		
		6424	−18	82	+12	23	291	5		
		6423	−13	87	−8	14	71	13		
		6422	+15	115	+23	30	533	38		
		6418	+15	115	+14	22	533	70		
		6418	+20	120	+11	25	388	10		
		6417	+56	156	−9	50	61	1		
		6413	+63	163	+19	57	73	4		
				(100)	(−4)		2,071	159		

POSITIONS AND AREAS OF SUN SPOTS—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
1939	h m		°	°	°	°				
May 7	12 36	6431	−78	8	−3	78	170	1	F	U. S. Naval.
		6430	−74	12	+10	76	97	1		
		6429	−71	15	+14	74	109	1		
		6426	−36	50	+9	38	12	1		
		6428	−9	77	+10	16	24	5		
		6424	−3	83	+12	15	291	1		
		6428	+1	87	+9	12	36	6		
		6423	+3	89	−7	6	6	5		
		6422	+29	115	+23	39	436	18		
		6418	+29	115	+14	34	436	30		
		6418	+33	119	+11	36	339	1		
		6417	+69	155	−9	69	48	1		
				(86)	(−4)		2,004	71		
May 8	11 14	6432	−80	354	−6	80	388	1	G	Do.
		6431	−64	10	−3	64	145	1		
		6429	−63	11	+15	67	109	2		
		6430	−60	14	+10	62	73	1		
		6424	+3	77	+10	13	36	5		
		6424	+9	83	+13	18	315	1		
		6428	+15	89	+9	19	24	3		
		6422	+42	116	+24	49	485	28		
		6418	+43	117	+14	46	485	50		
		6418	+46	120	+11	48	339	4		
		6417	+83	157	−9	83	36	1		
				(74)	(−3)		2,435	97		
May 9	11 4	6432	−70	351	−9	70	24	5	VG	Do.
		6432	−69	352	−6	69	279	15		
		6433	−66	355	−22	67	36	10		
		6429	−51	10	+13	53	36	6		
		6431	−50	11	−3	50	182	2		
		6429	−47	14	+15	50	71	8		
		6430	−47	14	+9	49	71	7		
		6424	+21	82	+13	26	291	6		
		6424	+21	82	+10	24	97	10		
		6428	+30	91	+10	33	61	5		
		6422	+54	115	+25	60	436	20		
		6418	+54	115	+15	56	533	35		
		6418	+59	120	+12	61	388	3		
				(61)	(−3)		2,505	132		
May 10	11 19	6432	−56	351	−7	56	339	12	G	Do.
		6433	−51	356	−21	53	145	7		
		6431	−38	9	−3	38	158	2		
		6429	−34	13	+13	37	145	15		
		6430	−32	15	+9	34	194	15		
		6434	+2	49	+27	29	61	6		
		6424	+35	82	+14	39	291	1		
		6424	+35	82	+10	36	194	10		
		6428	+43	90	+10	45	97	6		
		6422	+69	116	+24	73	339	6		
		6418	+70	117	+14	73	970	15		
				(47)	(−3)		2,933	95		
May 11	12 7	6438	−80	314	−18	80	121	1	VG	Do.
		6432	−42	352	−7	42	194	26		
		6437	−42	352	+17	46	18	1		
		6436	−40	354	−15	42	24	4		
		6433	−37	357	−22	40	145	10		
		6431	−24	10	−3	24	109	4		
		6429	−20	14	+13	25	97	12		
		6430	−19	15	+9	22	194	16		
		6434	+15	49	+27	33	97	8		
		6424	+47	81	+10	49	121	18		
		6424	+48	82	+14	50	291	1		
		6428	+57	91	+10	59	97	9		
		6435	+67	101	+11	69	24	4		
		6418	+83	117	+14	84	436	6		
		6423	+86	120	+23	88	194	5		
				(34)	(−3)		2,162	125		
May 12	11 27	6438	−68	313	−18	69	61	3	F	Do.
		6437	−29	352	+17	35	18	1		
		6432	−29	352	−7	29	121	9		
		6436	−26	355	−15	28	109	3		
		6433	−25	356	−22	31	158	13		
		6431	−10	11	−3	10	73	6		
		6429	−7	14	+13	18	61	3		
		6430	−7	14	+9	14	109	7		
		6439	−3	18	−2	3	71	6		
		6434	+27	48	+26	39	145	1		
		6424	+60	81	+11	62	24	4		
		6424	+61	82	+13	64	242	3		
		6428	+79	100	+10	80	97	3		
				(21)	(−3)		1,289	62		

POSITIONS AND AREAS OF SUN SPOTS—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
1939	h m		°	°	°	°				
May 13	10 38	6441	−84	284	+9	85	145	1	F	Mt. Wilson.
		6438	−54	314	−19	56	71	10		
		6432	−14	354	−8	15	121	30		
		6433	−11	357	−22	21	170	32		
		6436	−10	358	−16	17	97	11		
		6440	0	8	+9	12	97	7		
		6431	+4	12	−3	4	71	9		
		6430	+7	15	+8	14	97	8		
		6429	+9	17	+12	17	121	10		
		6439	+10	18	−3	10	145	12		
		6434	+39	47	+26	47	70	14		
		6424	+74	82	+10	76	24	4		
		6424	+75	83	+12	78	242	1		
				(8)	(−3)		1,471	149		
May 14	12 15	6441	−70	284	+8	72	109	1	F	U. S. Naval.
		6438	−40	314	−19	43	48	1		
		6432	0	354	−8	6	121	10		
		6433	+1	355	−19	16	18	1		
		6433	+3	357	−22	19	145	22		
		6436	+3	357	−15	13	121	12		
		6440	+14	8	+10	19	194	10		
		6431	+18	12	−2	18	73	5		
		6429	+21	15	+13	26	97	11		
		6430	+21	15	+9	24	145	8		
		6439	+25	19	−1	25	121	9		
		6434	+56	50	+26	62	36	5		
		6442	+63	57	+18	68	48	1		
				(354)	(−3)		1,276	96		
May 15	11 17	6441	−57	284	+8	59	121	1	VG	Do.
		6438	−26	315	−18	29	73	2		
		6443	−23	318	+17	30	24	3		
		6432	+13	354	−7	14	73	10		
		6436	+15	356	−19	22	6	1		
		6433	+16	357	−22	24	242	40		
		6436	+17	358	−15	20	121	11		
		6440	+27	8	+10	30	194	30		
		6431	+31	12	−2	31	36	2		
		6429	+33	14	+13	37	73	7		
		6430	+35	16	+9	37	48	4		
		6439	+40	21	−1	40	73	1		
		6434	+68	49	+27	74	73	10		
		6442	+79	60	+19	82	194	14		
				(341)	(−3)		1,351	136		
May 16	11 21	6441	−43	285	+9	45	121	1	F	Do.
		6438	−11	317	−17	18	61	1		
		6443	−10	318	+17	20	24	1		
		6432	+27	355	−6	28	61	4		
		6433	+29	357	−22	35	339	25		
		6436	+30	358	−14	32	73	5		
		6440	+40	8	+10	42	242	15		
		6431	+45	13	−2	45	12	1		
		6429	+47	15	+13	49	36	4		
		6430	+48	16	+10	50	36	2		
		6439	+55	23	+1	55	36	1		
				(328)	(−3)		1,041	60		
May 17	11 12	6415	−78	237	−16	78	218	1	VG	Do.
		6441	−30	285	+9	32	170	1		
		6438	+2	317	−19	17	73	8		
		6444	+35	350	+19	40	6	6		
		6432	+39	354	−6	40	12	4		
		6433	+42	357	−21	46	533	30		
		6436	+45	0	−15	47	36	5		
		6440	+54	9	+11	55	242	30		
		6431	+58	13	−2	58	24	2		
		6429	+59	14	+14	61	18	1		
		6430	+62	17	+9	63	145	22		
		6439	+68	23	+1	69	36	5		
				(315)	(−2)		1,513	115		
May 18	11 8	6447	−78	224	+17	78	242	2	G	Do.
		6445	−64	238	−16	65	218	1		
		6441	−17	285	+9	19	109	2		
		6446	+4	306	+14	16	36	5		
		6438	+15	317	−17	21	73	7		
		6433	+56	358	−21	59	388	10		
		6440	+66	8	+12	68	145	15		
		6431	+70	12	−2	70	12	1		
		6440	+74	16	+9	76	145	8		
		6430	+75	17	+8	77	97	1		
				(302)	(−2)		1,465	52		

POSITIONS AND AREAS OF SUN SPOTS—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
1939	h m		°	°	°	°				
May 19	11 6	6447	−63	226	+17	66	242	2	F	U. S. Naval.
		6445	−50	239	−16	52	194	4		
		6448	−25	264	−13	28	73	5		
		6441	−3	286	+9	9	109	1		
		6446	+18	307	+14	23	12	1		
		6438	+29	318	−17	32	48	6		
		6433	+68	357	−21	69	339	8		
				(289)	(−2)		1,017	27		
May 20	10 32	6447	−50	226	+16	52	242	5	G	Do.
		6445	−38	238	−16	41	170	7		
		6448	−12	264	−12	16	48	7		
		6441	+10	286	+9	15	97	1		
		6438	+42	318	−16	45	48	2		
		6449	+54	330	−8	55	6	1		
		6433	+83	359	−20	83	145	7		
				(276)	(−2)		756	30		
May 21	11 54	6452	−69	193	+29	73	121	2	G	Do.
		6451	−40	222	−10	41	194	20		
		6447	−36	226	+16	39	170	2		
		6450	−26	236	+29	40	36	3		
		6445	−22	240	−17	27	291	9		
		6448	+2	264	−12	10	85	5		
		6441	+24	286	+9	26	73	1		
		6438	+56	318	−16	58	48	2		
		6449	+68	330	−9	68	194	4		
				(262)	(−2)		1,212	48		
May 22	11 11	6456	−78	171	−19	79	97	2	F	Do.
		6452	−57	192	+29	63	97	5		
		6451	−25	224	−10	26	436	15		
		6447	−22	227	+16	28	145	2		
		6445	−10	239	−17	18	218	3		
		6453	+7	256	−6	8	24	1		
		6441	+37	286	+9	39	73	2		
		6449	+79	328	−8	79	97	2		
				(249)	(−2)		1,187	32		
May 23	11 6	6457	−76	160	+19	78	145	1	VG	Do.
		6456	−66	170	−19	67	127	4		
		6452	−42	194	+28	50	73	1		
		6452	−42	194	+24	48	24	1		
		6451	−13	223	−10	16	485	40		
		6447	−10	226	+16	20	145	4		
		6445	−6	230	−20	20	6	1		
		6445	+2	238	−16	15	182	3		
		6453	+19	255	−5	24	6	2		
		6441	+49	285	+9	50	85	2		
				(236)	(−2)		1,278	59		
May 24	10 53	6458	−79	143	−16	79	61	1	G	Do.
		6457	−62	160	+20	65	121	2		
		6556	−51	171	−18	54	194	10		
		6552	−30	192	+27	40	170	8		
		6451	+1	223	−10	8	582	25		
		6447	+2	224	+16	17	121	3		
		6445	+7	229	−20	20	36	2		
		6445	+16	238	−17	22	145	4		
		6441	+63	285	+8	64	73	1		
				(222)	(−2)		1,503	56		
May 25	13 46	6458	−66	142	−17	68	48	2	F	Do.
		6457	−49	159	+19	52	121	2		
		6456	−39	169	−18	42	436	3		
		6452	−17	191	+26	31	194	15		
		6447	+15	223	+17	23	121	4		
		6451	+16	224	−10	19	388	20		
		6445	+31	239	−17	35	145	2		
		6441	+78	286	+9	79	6	1		
				(208)	(−2)		1,459	49		

POSITIONS AND AREAS OF SUN SPOTS—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
1939	h m		°	°	°	°				
May 26	11 35	6463	−74	122	−17	75	36	4	G	U. S. Naval.
		6458	−51	145	−17	53	24	2		
		6462	−41	155	−10	42	12	4		
		6457	−38	158	+20	42	121	4		
		6461	−32	164	−10	23	12	1		
		6456	−27	169	−18	31	436	15		
		6452	−3	193	+26	27	170	10		
		6460	+14	210	−9	16	12	2		
		6451	+27	223	−10	28	485	15		
		6447	+30	226	+15	34	61	3		
		6445	+43	239	−17	46	121	1		
		6459	+61	257	−9	62	85	2		
				(196)	(−1)		1,575	63		
May 27	10 51	6466	−80	103	+11	80	145	3	G	Do.
		6465	−76	107	+7	76	533	2		
		6464	−61	122	+21	64	6	1		
		6463	−58	125	−17	60	73	5		
		6462	−27	156	−11	28	73	9		
		6457	−24	159	+19	31	121	2		
		6456	−14	169	−19	23	194	12		
		6452	+10	193	+26	29	73	9		
		6451	+41	224	−10	42	388	20		
		6447	+42	225	+15	45	24	4		
		6445	+57	240	−17	59	121	2		
		6459	+72	255	−9	72	85	2		
				(183)	(−1)		1,836	71		
May 28	12 1	6469	−79	90	−7	79	242	4	G	Do.
		6468	−74	95	−17	75	48	1		
		6466	−67	102	+11	68	61	5		
		6465	−63	106	+7	64	485	4		
		6464	−50	119	+23	55	48	6		
		6463	−42	127	−16	45	12	6		
		6462	−13	156	−12	17	97	7		
		6457	−9	160	+19	22	109	3		
		6456	0	169	−19	18	121	19		
		6456	+5	174	−20	20	97	7		
		6467	+18	187	−10	20	6	4		
		6452	+21	190	+24	32	194	30		
		6451	+55	224	−10	56	388	6		
		6447	+58	227	+15	60	6	4		
		6445	+70	239	−16	70	97	1		
				(169)	(−1)		2,011	107		
May 29	10 57	6471	−78	78	+13	79	242	1	VG	Do.
		6470	−76	80	−21	79	485	10		
		6469	−67	89	−7	67	170	8		
		6468	−61	95	−17	63	48	2		
		6466	−59	97	+10	60	145	10		
		6465	−49	107	+7	50	485	5		
		6464	−37	119	+21	42	48	6		
		6463	−29	127	−16	33	73	5		
		6462	−1	155	−11	10	61	8		
		6457	+2	158	+20	21	109	5		
		6456	+11	167	−19	21	291	35		
		6456	+19	175	−20	26	73	3		
		6452	+33	189	+25	41	339	30		
		6451	+63	219	−10	64	36	2		
		6447	+69	225	+14	70	12	5		
		6451	+72	228	−11	72	291	1		
		6445	+81	237	−17	82	24	1		
				(156)	(−)		2,932	137		
May 30	11 33	6470	−64	79	−21	66	485	6	F	Do.
		6471	−63	80	+14	65	291	1		
		6469	−52	91	−7	53	145	7		
		6473	−48	95	−18	50	6	1		
		6468	−46	97	−17	49	24	4		
		6466	−46	97	+10	47	73	7		
		6465	−39	106	+7	40	388	6		
		6463	−14	129	−16	20	12	3		
		6457	+17	160	+20	24	97	2		
		6456	+27	170	−19	32	242	10		
		6456	+32	175	−20	37	24	1		
		6452	+46	189	+24	51	242	13		
				(143)	(−1)		2,029	61		

POSITIONS AND AREAS OF SUN SPOTS—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
1939	h m		°	°	°	°				
May 31	10 35	6470	−51	79	−21	54	436	21	VG	U. S. Naval.
		6471	−49	81	+13	51	242	6		
		6469	−38	92	−8	39	145	7		
		6473	−35	95	−12	37	97	7		
		6466	−34	96	+10	35	48	15		
		6468	−33	97	−17	57	12	3		
		6465	−23	107	+7	25	388	20		
		6464	−10	120	+22	25	12	6		
		6463	−3	127	−15	16	6	3		
		6472	+27	157	−22	33	12	2		
		6457	+20	159	+20	35	97	2		
		6457	+35	165	+19	40	12	3		
		6456	+39	169	−19	43	145	14		
		6452	+59	189	+25	46	339	23		
				(130)	−1		1,991	132		

Mean daily area for 31 days, 1,865.
Plate quality: F, fair; G, good; VG, very good.

PROVISIONAL SUNSPOT RELATIVE NUMBERS FOR MAY 1939

[Dependent alone on observations at Zurich]

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

May 1939	Relative numbers	May 1939	Relative numbers	May 1939	Relative numbers
1	*Ec* 163	11	101	21	*EWcc*
2	*aad* 157	12	*EEcc*	22	
3	*133	13	*Maac* 121	23	*a*
4	141	14	*aad*	24	*Eac* 106
5	*ab* 124	15	139	25	
6	115	16	118	26	97
7	*add* 133	17	*d* 93	27	*d* 104
8	*d*	18	*d* 79	28	*ad* 138
9		19	79	29	*add* 172
10	*EMcc* 128	20		30	157
				31	146

Mean, 22 days=124.7.

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

AEROLOGICAL OBSERVATIONS

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

By B. FRANCIS DASHIELL

The results of 690 individual upper-air observations made during May by airplanes and radiosonde in the United States, Canal Zone, Hawaii, Canada, Bermuda and the north Atlantic, are shown in tables 1 and 1a. Mean atmospheric pressures, temperatures, and resultant winds are indicated on charts VIII, IX, X, and XI. Isentropic data are shown on chart XII. Tables 2 and 3 present upper-air wind data and table 4 gives the mean altitude of the tropopause. A detailed description of these charts and tables will be found in the January 1939 issue of the MONTHLY WEATHER REVIEW.

In the lower levels where observations are made by radiosonde and airplanes, many flights reached all levels. Of the 320 airplane observations made in the United States proper, 80 percent reached 5 kilometers. But, of all the 311 radiosonde flights launched at the surface, 98 percent reached 5 kilometers. And, in the higher levels, 92, 79, and 25 percent of all flights reached 10, 15, and 20 kilometers, respectively. Means were computed for the 22-kilometer level over Nashville, Tenn., Omaha, Nebr., and Washington, D. C., while a few individual flights went even higher; 25 kilometers over St. George's, Bermuda, and 24 kilometers over Omaha, Nebr.

The May mean free-air pressure, temperature (° C.), and humidity, given in table 1a, also includes radiosonde observations for the first time from Barksdale Field, Shreveport, La., and the United States Coast Guard cutters *Champlain* and *Chelan*, when located at Halifax, Nova Scotia, or in an area at sea lying between latitudes 40° and 44° N. and longitudes 47° and 53° W.

A low mean-pressure area prevailed to the north and east of the Great Lakes, then northeastward indefinitely toward Hudson Bay and Newfoundland. However, the lowest pressure in the United States at 1.5, 3, 4, and 5 kilometers, was centered over Sault Ste. Marie, Mich. But it was found that pressures far to the east, over Halifax, Nova Scotia, were still somewhat lower. On the other hand, pressure was higher east of Halifax, Nova Scotia, for observations by Coast Guard ships at sea (table 1a) revealed pressures that were from 2 to 3 millibars higher than those recorded over Sault Ste. Marie, Mich., at all levels. The highest pressures were located in the south, being centered generally over St. George's, Bermuda, and Pensacola, Fla.

During May low mean pressure prevailed over Fargo, N. Dak., up to 1.5 kilometers; over Sault Ste. Marie, Mich., up to 16 kilometers; and over both stations from 17 to 20 kilometers. The highest mean pressure from the surface up to 1.5 kilometers predominated over St. George's, Bermuda, and then at Pensacola, Fla., up to 5 kilometers. Highest pressure then was located over St. George's, Bermuda, at 5, 6, 7, and 8 kilometers, being exceeded by Shreveport, La., at 9, 10, and 11 kilometers, and Nashville, Tenn., at 12, 13, 14, 15, 16, 17, and 18 kilometers, and Washington, D. C., at 19, 20, 21, and 22 kilometers.

The pressure differences between the LOW and HIGH areas at Halifax, Nova Scotia, and Bermuda increased steadily with altitude, varying from 7 millibars at 0.5 kilometer to 19 millibars at 5 kilometers. Similar differences between the two pressure extremes within the United States (Sault Ste. Marie, Mich., and Pensacola, Fla.), showed slightly smaller increases with altitude, ranging from 5 to 14 millibars at 0.5 to 5 kilometers, respectively.

Mean free-air temperatures (° C.) during the current month were seasonally warmer than in April at all radiosonde stations in the lower levels, but slightly colder than those recorded in April at the upper levels, with the exception of Oakland, Calif. At Fargo, N. Dak., the mean temperature at 17 kilometers (—61.8° C.) was the lowest recorded over that station since October 1938.

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