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

Week beginning—	Washington	Madison	Lincoln	Chicago	New York	Fresno	San Juan	Fairbanks	Twin Falls	La Jolla	Miami	New Orleans	Riverside	Blue Hill	Newport	Friday Harbor	Cambridge	Albuquerque
	Gram-calories per square centimeter																	
	cal.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*
Oct. 29	254	199	290	137	202	345	472	47	243	303	228	--------	337	248	255	199	223	458
Nov. 5	278	217	253	179	203	292	536	76	236	159	318	308	252	229	251	62	222	300
Nov. 12	274	237	240	210	246	288	408	32	208	334	223	119	306	259	278	78	234	402
Nov. 19	114	105	184	76	127	256	453	12	191	292	313	316	292	119	142	121	124	314
Nov. 26	155	115	158	80	141	228	436	12	102	286	322	262	255	200	191	96	173	186
	Departures of daily total normals																	
Oct. 29	+7	+12	+50	−18	+20	+1	+21	+8	+21	−13	−92	--------	+32	+22	+9	+64	--------	--------
Nov. 5	+51	+47	+7	+43	+45	−13	+94	+39	+26	−135	−24	+15	−49	+22	−1	−47	--------	--------
Nov. 12	+76	+89	+31	+98	+111	+33	−32	+3	+42	+31	−108	−102	+9	+101	+70	−12	--------	--------
Nov. 19	−71	−27	−23	−42	0	+18	+11	−6	+34	+10	−18	+63	+18	−28	−11	+15	--------	--------
Nov. 26	−9	−10	−28	−12	+26	+6	−4	−1	−50	+17	+33	+38	−3	+39	+10	+1	--------	--------
	Accumulated departures since January 1																	
	+17,584	+12,348	+7,763	+19,026	+8,167	+763	+10,057	−1,386	−2,681	+3,822	−6,440	--------	−4,555	+3,591	+3,136	+5,957	--------	--------

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 hemisphere. For each day below longitude, latitude, area of spot or groups, 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.*		°	°	°	°				
Nov. 1	11 5	6662	−76	179	−7	75	436	12	G	U. S. Naval
		6661	−55	200	−18	58	145	10		
		6656	−4	251	−10	14	145	13		
		6657	+4	259	+5	4	630	39		
		6655	+11	266	+21	20	145	8		
		6652	+56	311	+13	55	97	1		
				(255)	(+4)		1,598	83		
2	11 8	6662	−63	178	−7	64	291	15	VG	Do.
		6661	−41	200	−18	46	194	13		
		(*)	−13	228	−17	24	48	4		
		6656	+9	250	−9	15	145	16		
		6657	+16	257	+5	17	679	45		
		6655	+24	265	+21	29	73	3		
		6652	+69	310	+13	67	97	2		
				(241)	(+4)		1,527	98		
3	11 16	6662	−49	179	−6	50	291	20	G	Do.
		6661	−28	200	−18	35	291	13		
		6663	−24	204	+20	28	24	3		
		6656	+23	251	−9	25	145	8		
		6657	+30	258	+5	30	630	20		
		6655	+37	265	+22	41	73	2		
		6652	+84	312	+14	83	97	1		
				(228)	(+4)		1,551	67		
4	12 37	6667	−75	139	+13	73	24	4	VG	Mt. Wilson
		6662	−35	179	−5	36	291	27		
		6661	−13	201	−17	24	242	35		
		6663	−9	205	+21	19	12	5		
		6665	−5	209	+13	10	12	1		
		6664	+2	216	−15	18	6	1		
		6656	+37	251	−9	38	97	3		
		6657	+44	258	+4	43	582	40		
		6655	+51	265	+21	53	73	4		
				(214)	(+4)		1,339	120		
5	13 2	6667	−60	141	+13	59	12	2	P	Do.
		6666	−39	162	−20	45	12	1		
		6668	−39	162	+9	38	48	4		
		6662	−21	180	−7	24	194	19		
		6661	+1	202	−17	20	242	10		
		6663	+4	205	+20	16	12	1		
		6664	+15	216	−16	24	12	1		
		6656	+51	252	−9	53	73	2		
		6657	+58	259	+4	57	436	18		
		6655	+63	264	+22	63	73	6		
				(201)	(+4)		1,114	64		

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.*		°	°	°	°				
6	10 57	6668	−27	162	+10	27	48	7	VG	U. S. Naval.
		6662	−9	180	−7	13	194	22		
		6661	+13	202	−17	23	242	27		
		6663	+18	207	+19	23	48	2		
		6656	+63	252	−9	64	97	1		
		6657	+70	259	+5	69	436	15		
		6655	+77	266	+21	76	48	2		
				(189)	(+4)		1,113	76		
7	10 54	6669	−88	88	−20	88	12	1	VG	Do.
		6668	−12	164	+10	13	24	1		
		6662	+6	182	−7	11	145	15		
		6661	+28	204	−16	33	145	11		
		6663	+29	205	+19	33	97	12		
		6656	+78	254	−9	77	97	1		
		6657	+85	261	+4	85	388	5		
				(176)	(+4)		908	46		
8	11 26	6672	−80	82	+11	79	36	3	G	Do.
		6669	−75	87	−20	77	145	1		
		6671	−38	124	−10	40	36	5		
		6662	+20	182	−7	23	73	13		
		6661	+42	202	−17	46	145	15		
		6663	+43	203	+20	45	48	5		
				(162)	(+4)		483	42		
9	10 21	6672	−67	82	+10	66	170	7	G	Do.
		6669	−61	88	−20	64	97	4		
		6671	−23	126	−11	26	48	6		
		6670	+10	159	+13	13	48	6		
		6662	+33	182	−7	39	48	10		
		6661	+57	206	−17	60	48	4		
				(149)	(+4)		459	37		
10	11 26	6673	−68	68	−9	68	6	1	G	Do.
		6672	−53	83	+11	53	194	17		
		6669	−48	88	−20	53	61	3		
		6671	−9	127	−10	16	97	10		
		6670	+24	160	+14	25	145	21		
		6662	+47	183	−7	49	12	3		
		6661	+70	206	−16	72	48	1		
				(136)	(+3)		563	56		
11	10 53	6675	−83	40	+27	80	48	2	VG	Mt. Wilson.
		6673	−55	68	−9	56	97	30		
		6672	−39	84	+11	40	291	30		
		6669	−34	89	−21	40	24	2		
		6671	+7	130	−10	14	97	14		
		(*)	+10	133	+21	21	12	1		
		6674	+15	138	−19	26	24	4		
		6670	+43	166	+14	44	194	28		
		6661	+80	203	−16	80	24	2		
				(123)	(+3)		811	113		

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			°	°	°	°				
Nov. 12	11 4	6675	−70	40	+28	71	48	3	VG	Do.
		6676	−61	49	+6	60	73	10		
		6673	−43	67	−8	43	242	28		
		6672	−24	86	+11	25	485	52		
		6671	+20	130	−10	23	97	12		
		6674	+29	139	−19	36	12	2		
		6670	+58	168	+13	57	339	35		
				(110)	(+3)		1,296	142		
13	11 6	6675	−58	38	+29	61	97	1	G	U. S. Naval.
		6676	−46	50	+6	46	73	1		
		6673	−29	67	−8	31	291	11		
		6672	−11	85	+11	13	485	12		
		6671	+32	128	−10	33	48	1		
		6670	+70	166	+13	70	436	4		
				(96)	(+3)		1,430	30		
14	11 34	6677	−57	26	−16	60	73	5	G	Do.
		6675	−45	38	+29	50	73	1		
		6676	−32	51	+6	31	48	1		
		6673	−16	67	−8	19	388	16		
		6672	+2	85	+11	8	412	14		
		6671	+46	129	−9	47	12	1		
		6670	+82	165	+13	82	242	2		
				(83)	(+3)		1,248	40		
15	10 47	6679	−88	342	−8	88	388	1	G	Do.
		6677	−44	26	−16	48	339	21		
		6678	−33	37	−6	34	48	6		
		6675	−31	39	+28	39	97	1		
		(*)	−23	47	+6	22	24	5		
		6676	−17	53	+6	16	24	1		
		6673	−2	68	−8	10	388	19		
		6672	+15	85	+11	16	582	38		
				(70)	(+3)		1,890	92		
16	11 8	6679	−74	343	−8	75	388	2	VG	Do.
		6677	−29	28	−16	34	485	9		
		6678	−19	38	−6	22	48	6		
		6675	−19	38	+39	32	48	4		
		(*)	−5	52	+4	5	24	8		
		6676	−3	54	+7	5	24	1		
		6673	+12	69	−9	16	339	36		
		6672	+29	86	+11	30	582	48		
				(57)	(+3)		1,938	114		
17	10 48	6679	−60	344	−9	61	436	2	G	Do.
		6681	−31	13	+23	35	6	1		
		6677	−15	29	−16	24	582	20		
		6675	−6	38	+29	27	36	2		
		6678	−5	39	−7	11	12	5		
		6676	+11	55	+8	13	24	1		
		6673	+28	72	−10	31	121	23		
		6672	+41	85	+11	42	388	20		
				(44)	(+3)		1,605	74		
18	10 51	(*)	−50	341	+20	53	24	8	VG	Do.
		6679	−47	344	−8	49	388	1		
		6677	−2	29	−16	18	630	39		
		6675	+7	38	+28	27	24	3		
		6678	+8	39	−7	13	24	4		
		6676	+25	56	+7	26	24	1		
		6673	+41	72	−11	44	121	15		
		6672	+54	85	+10	55	194	18		
				(31)	(+2)		1,429	89		
19	10 53	6679	−33	344	−7	34	436	2	VG	Mt. Wilson.
		6681	−12	5	+22	23	6	2		
		6677	+13	30	−17	23	776	40		
		6675	+19	36	+28	33	24	1		
		6678	+23	40	−7	25	12	2		
		6673	+53	70	−11	54	73	8		
		6672	+68	85	+10	69	97	7		
				(17)	(+2)		1,424	62		
20	11 14	6679	−19	345	−7	22	242	3	VG	Do.
		6681	−2	2	+23	23	24	7		
		6677	+26	30	−17	32	873	28		
		6673	+67	71	−10	68	24	1		
		6672	+80	84	+10	80	48	2		
				(4)	(+2)		1,211	41		

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			°	°	°	°				
Nov. 21	11 5	6682	−73	278	−13	73	291	2	VG	Do.
		6679	−6	345	−7	10	291	3		
		6681	+14	5	+22	24	145	25		
		6677	+41	32	−17	45	1,067	40		
				(351)	(+2)		1,794	70		
22	11 8	6682	−68	270	−12	69	24	3	F	Do.
		6682	−62	276	−13	63	267	2		
		6679	+9	347	−7	12	291	4		
		6681	+30	8	+21	35	158	18		
		6677	+55	33	−17	57	1,067	12		
				(338)	(+2)		1,807	39		
23	11 37	6684	−87	237	−1	87	12	1	VG	U. S. Naval.
		6682	−56	268	−12	57	24	1		
		6682	−48	276	−13	50	242	2		
		6683	−25	299	−19	32	24	2		
		6679	+21	345	−7	23	485	9		
		6681	+42	6	+21	45	242	23		
		6677	+68	32	−17	70	1,067	15		
				(324)	(+2)		2,096	53		
24	11 29	6684	−64	247	−1	65	97	17	VG	Do.
		6682	−41	270	−12	44	48	2		
		6682	−35	276	−13	38	218	4		
		6679	+33	344	−7	34	485	8		
		6685	+35	346	+15	37	12	5		
		6681	+55	6	+21	56	291	21		
		6677	+79	30	−17	77	1,067	15		
				(311)	(+2)		2,218	72		
25	10 50	6684	−47	251	−2	48	97	10	G	Mt. Wilson.
		6682	−29	269	−13	33	48	9		
		6682	−22	276	−13	26	194	12		
		6679	+47	345	−7	50	291	2		
		6685	+50	348	+15	52	36	8		
		6681	+69	7	+21	70	194	13		
				(298)	(+2)		860	54		
26	13 00	6687	−37	247	−7	38	36	4	G	Do.
		6684	−32	252	−3	33	97	11		
		6682	−14	270	−13	21	36	4		
		6682	−7	277	−13	16	170	7		
		6686	−3	281	−5	7	121	9		
		6679	+60	344	−6	61	291	9		
		6685	+66	350	+15	67	24	6		
		6681	+80	4	+24	80	145	4		
				(284)	(+2)		920	54		
27	12 9	6687	−23	248	−7	24	36	8	VG	U. S. Naval.
		6684	−19	252	−3	20	121	12		
		6690	−14	257	−9	17	12	5		
		6689	−9	262	+6	11	24	9		
		6682	−2	269	−13	19	48	13		
		6682	+6	277	−13	15	121	2		
		6686	+8	279	−5	11	48	9		
		6688	+28	299	−17	33	36	4		
		6679	+74	345	−6	75	194	1		
				(271)	(+1)		640	63		
28	10 32	6687	−10	249	−9	14	121	6	P	Do.
		6684	−6	253	−3	8	145	8		
		6682	+20	279	−12	24	121	2		
		6686	+21	280	−3	22	48	2		
		6688	+40	299	−16	44	12	2		
				(259)	(+1)		447	20		
29	10 50	6687	+3	249	−8	9	315	32	G	Do.
		(*)	+3	249	−3	2	73	7		
		6684	+10	256	−3	11	73	1		
		6682	+32	278	−13	34	73	1		
		6686	+37	283	−4	38	6	1		
				(246)	(+1)		540	42		
30	15 16	6687	+20	250	−8	23	582	39	G	Do.
		6684	+26	256	−3	26	73	2		
		6682	+48	278	−13	52	73	1		
				(230)	(+1)		728	42		

Mean daily area for 30 days=1,233.

*=not numbered.
VG=very good; G=good; *F*=fair; P=poor.

PROVISIONAL SUNSPOT RELATIVE NUMBERS FOR NOVEMBER 1939

[Dependent alone on observations at Zurich]

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

November 1939	Relative numbers	November 1939	Relative numbers	November 1939	Relative numbers	November 1939	Relative numbers	November 1939	Relative numbers	November 1939	Relative numbers
1	*a* --	11	*Eac* --	21	*d* 67	9	*Ec* 40	19	*Mc* 75	29	*a* 43
2	*Eac*? --	12	82	22	*a 65	10	*Mc* 46	20	50	30	43
3	72	13	--	23	62						
4	61	14	*Eac* 98	24	*Ec* 61						
5	*a* 58	15	*a* 87	25	58						
6	62	16	*d* 111	26	---						
7	*a* 66	17	---	27	*Mac* 62						
8	*Ec* 37	18	*b* 103	28	61						

Mean, 24 days=65.4.
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

During November 982 radiosonde and airplane observations were made in the United States, Alaska, Canal Zone, Hawaii, and the West Indies. Of these, 819 were radiosondes, with 96, 88, 71, and 36 percent reaching 5, 10, 15, and 18 kilometers, respectively. Tables 1 and 1a show these observations, while pressures, temperatures, and resultant winds for 5,000 feet (1.5 kilometers), 3, 4, and 5 kilometers, are shown on charts VIII, IX, X and XI, respectively. Chart XII gives the isentropic data for November; tables 2 and 3 list the winds; and table 4 indicates the tropopauses. Effective November 15, 1939, the hour of all radiosonde observations was advanced to 1 a. m., 75th meridian time.

The mean free-air pressures at 5,000 feet (chart VIII) were lowest over the northeastern United States (Mount Washington, N. H., 840 millibars), the northern Great Lakes region (Sault Ste. Marie, Mich., 845 millibars), and thence northeastward over Canada (Newfoundland, 833 millibars). Pressure was lowest, however, in Alaska (Fairbanks and Juneau, 825 and 832 millibars, respectively). Mean pressures were relatively low along the Pacific coast, but the highest occurred over the central Rocky Mountain region, the South, and the Southeast (Durango, Colo., San Antonio, Tex., and Pensacola, Fla., 855 millibars).

At 3 kilometers (chart IX) the distribution showed a statistical LOW over Sault Ste. Marie, Mich., (699 millibars), and a HIGH over Pensacola, Fla. (714 millibars). Mean pressure continued relatively lower over the Pacific slope, but again the lowest pressure of the month occurred over Alaska (Fairbanks, 678 millibars).

Charts X and XI show the mean pressures at 4 and 5 kilometers, respectively. In the United States the lowest pressure persisted over Sault Ste. Marie, Mich., while the southern high-pressure area became definitely centered over Miami, Fla. Low pressure continued over Alaska, with Fairbanks having the lowest during November (592 and 514 millibars at 4 and 5 kilometers, respectively).

Above 5 kilometers the lowest pressures for the country were located over Sault Ste. Marie, Mich.; the pressures at Buffalo, N. Y., being only slightly higher. However, the lowest pressures noted during the month still persisted over the Alaskan stations, where Fairbanks was consistently lower than Juneau at all levels (decreasing steadily from a difference of 11 millibars less at 6 kilometers to 3 millibars less at 15 kilometers). The highest pressure in all upper levels prevailed at Miami, Fla., although relatively high pressures were found over the Southwest.

In the lower levels November mean free-air pressures were higher than during the preceding month. Maximum differences were noted at the surface, but these decreased slowly with altitude until no differences between the 2 months existed at 1.5 and 2 kilometers over the East and Southeast; at 2.5, 3, and 4 kilometers over the South, Southwest and Pacific States; and from 6 to 11 kilometers over the northern Rocky Mountain region. Above these levels the November pressures were lower than during the preceding month. This situation was particularly outstanding at 8, 9, 10, and 11 kilometers, where, in several instances, the current month was as much as 10 millibars lower. Above these levels the pressure differences decreased with altitude until the November pressure was from 1 to 2 millibars less than during October.

At stations where radiosonde observations have been conducted for a full year a comparison of November pressures with those recorded in the corresponding month of 1938 showed that consistently higher pressures prevailed during the current month at all levels over Omaha, Nebr., and Bismarck, N. Dak., (the latter being compared with Fargo, N. Dak.) But Nashville, Tenn., Okland, Calif., Oklahoma City, Okla., and Sault Ste. Marie, Mich., showed current pressures to be higher at all levels up to 4, 5, 6, and 9 kilometers, respectively, and lower than in 1938 at all levels above. At Washington, D. C., the current year and month showed lower pressures above 2 kilometers.

Mean relative humidity for November was generally high in the lower levels and, in some cases, continued into the upper levels. High humidity at all levels was noted over Sault Ste. Marie, Mich., Washington, D. C., Miami, Fla., Buffalo, N. Y., and Shreveport, La., while relative humidities were lowest over Oakland, Calif., San Diego, Calif., Bismarck, N. Dak., Medford, Oreg., and Oklahoma City, Okla. Juneau, Alaska, recorded the greatest percentage of mean relative humidities at all levels.

In the United States the temperatures at 1.5 kilometers (chart VIII) were lowest over Sault Ste. Marie, Mich., and highest over Miami, Fla., and San Diego, Calif. At this level the temperature over all of the country, except the Great Lakes region and New England, was above freezing (0° C.). However, at Fairbanks and Juneau, Alaska, the lowest temperatures were recorded (−12.6° C. and −4.5° C., respectively). Similar conditions prevailed at 3, 4, and 5 kilometers (charts IX, X, and XI, respectively), with the exception that Miami, Fla., became considerably warmer than San Diego, Calif., and freezing temperatures spread farther over the South.