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																
1937	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*
July 2	476	659	713	518	471	744	427	--------	531	457	444	576	586	690	602	583	575
July 9	418	653	632	382	391	663	538	609	625	531	440	595	464	543	645	383	483
July 16	459	666	666	--------	492	691	396	621	451	543	477	528	561	658	648	517	558
July 23	525	608	591	536	504	651	416	537	455	411	439	483	511	651	652	417	545
	Departures from weekly normals																
July 2	−35	+125	+118	+49	+16	+35	−15	--------	--------	−51	+36	−41	+38	--------	+28	+57	--------
July 9	−75	+17	+44	−71	−58	−31	+46	+8	--------	+6	+39	−5	−64	--------	+79	−132	--------
July 16	−24	+141	+79	--------	+61	+26	−12	+14	--------	+24	+56	−44	+50	--------	+6	+15	--------
July 23	+35	+95	+35	+68	+74	+9	−15	−31	--------	−74	+64	−56	+5	--------	+37	−61	--------
	Accumulated departures on July 29																
	−1,561	+3,850	+714	+1,024	−4,284	+3,773	+1589	--------	--------	−6,244	+6,671	−3,416	−686	--------	+140	−3,539	--------

POSITIONS AND AREAS OF SUN SPOTS

[Communicated by Capt. J. F. Hellweg, U. S. Navy (Ret.), 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]

Date	Eastern standard time		Mount Wilson group number	Heliographic: Diff. in longitude	Heliographic: Longitude	Heliographic: Latitude	Area: Spot	Area: Group	Total area for each day	Observatory
1937	*h.*	*m.*		°	°	°				
July 1	11	6	5433	−62.0	292.5	+15.0	--------	97	--------	U. S. Naval.
			5431	−5.0	349.5	+16.0	--------	242	--------	
			5430	+23.0	17.5	+17.5	--------	73	--------	
			5423	+46.0	40.5	−17.0	194	--------	--------	
			5419	+61.0	55.5	−11.0	--------	194	800	
July 2	11	9	5436	−79.0	262.2	+17.0	97	--------	--------	Do.
			5435	−62.0	279.2	+12.0	6	--------	--------	
			5433	−50.0	291.2	+14.0	--------	48	--------	
			5434	−24.5	316.7	+10.5	24	--------	--------	
			5432	−16.0	325.2	−14.0	24	--------	--------	
			5431	+10.0	351.2	+16.0	--------	436	--------	
			5423	+59.0	40.2	−17.5	145	--------	--------	
			5419	+74.0	55.2	−12.0	145	--------	925	
July 3	10	26	5436	−65.0	263.4	+16.5	36	--------	--------	Do.
			5435	−48.0	280.4	+12.0	--------	48	--------	
			5433	−38.5	289.9	+14.0	--------	48	--------	
			5437	−29.0	299.4	−19.0	--------	24	--------	
			5431	+23.0	351.4	+16.0	--------	582	--------	
			5423	+70.0	38.4	−17.5	194	--------	932	
July 4	10	44	5440	−85.0	230.0	−19.0	--------	242	--------	Do.
			5436	−52.0	263.0	+16.5	36	--------	--------	
			5435	−34.0	281.0	+11.0	--------	97	--------	
			5439	−31.5	283.5	−10.0	--------	24	--------	
			5433	−24.5	290.5	+14.0	--------	73	--------	
			5437	−14.0	301.0	−19.0	--------	48	--------	
			5431	+36.0	351.0	+16.0	--------	485	1,005	
July 5	11	47	5440	−70.0	231.2	−20.0	--------	630	--------	Mt. Wilson.
			5436	−40.0	261.2	+17.0	48	--------	--------	
			5435	−21.0	280.2	+12.0	--------	291	--------	
			5439	−16.0	285.2	−10.5	--------	12	--------	
			5433	−9.5	291.7	+14.0	12	--------	--------	
			5437	+1.0	302.2	−19.0	--------	48	--------	
			5431	+50.0	351.2	+17.0	--------	485	1,526	
July 6	13	52	5445	−81.0	205.8	−9.0	194	--------	--------	U. S. Naval.
			5444	−78.0	208.8	+10.0	388	--------	--------	
			5440	−56.0	230.8	−20.0	--------	776	--------	
			5441	−31.0	255.8	+22.0	--------	145	--------	
			5436	−26.0	260.8	+17.5	36	--------	--------	
			5435	−6.0	280.8	+12.0	--------	388	--------	
			5437	+18.0	304.8	−19.0	--------	36	--------	
			5443	+31.0	317.8	+12.0	--------	12	--------	
			5442	+35.0	321.8	−9.0	--------	48	--------	
			5431	+63.0	349.8	+17.0	--------	533	2,556	
July 7	11	15	5447	−85.0	190.0	+15.5	194	--------	--------	Do.
			5446	−79.0	196.0	−15.0	97	--------	--------	
			5445	−68.0	207.0	−8.0	97	--------	--------	
			5444	−65.0	210.0	+10.5	388	--------	--------	
			5440	−45.0	230.0	−19.0	--------	582	--------	
			5441	−19.0	256.0	+23.0	--------	485	--------	
			5436	−14.0	261.0	+18.0	36	--------	--------	
			5435	+7.0	282.0	+12.5	--------	485	--------	
			5437	+28.0	303.0	−18.0	--------	145	--------	
			5431	+74.0	349.0	+17.0	--------	388	2,897	

POSITIONS AND AREAS OF SUN SPOTS—Continued

Date	Eastern standard time		Mount Wilson group number	Heliographic: Diff. in longitude	Heliographic: Longitude	Heliographic: Latitude	Area: Spot	Area: Group	Total area for each day	Observatory
1937	*h.*	*m.*		°	°	°				
July 8	11	7	5454	−81.0	180.8	−10.5	218	--------	--------	U. S. Naval.
			5453	−79.0	182.8	+11.0	--------	24	--------	
			5452	−75.0	186.8	−11.0	--------	436	--------	
			5447	−70.5	191.3	+15.0	242	--------	--------	
			5446	−66.0	195.8	−15.0	--------	242	--------	
			5445	−56.0	205.8	−8.5	97	--------	--------	
			5450	−56.0	205.8	+9.0	--------	48	--------	
			5444	−50.5	211.3	+10.0	339	--------	--------	
			5440	−31.0	230.8	−19.5	--------	533	--------	
			5441	−7.0	254.8	+23.0	--------	582	--------	
			5441	−2.0	259.8	+21.5	436	--------	--------	
			5436	−1.0	260.8	+18.5	24	--------	--------	
			5449	+5.0	266.8	+12.0	--------	24	--------	
			5435	+19.0	280.8	+12.5	--------	582	--------	
			5437	+40.0	301.8	−19.0	--------	218	4045	
July 9	12	1	5455	−79.0	169.1	−16.0	--------	679	--------	Do.
			5453	−68.0	180.1	+13.0	--------	194	--------	
			5454	−64.0	184.1	−10.0	291	--------	--------	
			5452	−61.0	187.1	−10.0	--------	339	--------	
			5447	−58.0	190.1	+15.0	242	--------	--------	
			5446	−50.0	198.1	−14.0	--------	170	--------	
			5451	−41.0	207.1	−14.0	--------	36	--------	
			5445	−40.5	207.6	−8.0	145	--------	--------	
			5450	−40.5	207.6	+9.5	--------	121	--------	
			5444	−38.0	210.1	+10.5	291	--------	--------	
			5440	−18.0	230.1	−19.5	--------	436	--------	
			5441	−6.0	242.1	+23.0	--------	679	--------	
			5436	+11.5	259.6	+19.0	24	--------	--------	
			5441	+12.5	260.6	+21.5	533	--------	--------	
			5449	+20.0	268.1	+13.0	--------	12	--------	
			5435	+32.0	280.1	+13.0	--------	436	--------	
			5437	+55.0	303.1	−19.5	--------	170	4,798	
July 10	11	2	5456	−76.0	159.4	+25.0	97	--------	--------	Do.
			5455	−69.0	166.4	−16.5	--------	485	--------	
			5453	−53.0	182.4	+14.0	--------	339	--------	
			5454	−51.0	184.4	−10.5	291	--------	--------	
			5459	−49.0	186.4	+20.5	--------	24	--------	
			5452	−48.0	187.4	−10.0	--------	291	--------	
			5447	−43.0	192.4	+15.0	339	--------	--------	
			5446	−38.0	197.4	−14.0	194	--------	--------	
			5445	−28.5	206.9	−8.0	121	--------	--------	
			5451	−28.5	206.9	−12.5	--------	97	--------	
			5450	−28.0	207.4	+9.5	--------	388	--------	
			5444	−24.0	211.4	+10.5	291	--------	--------	
			5440	−5.0	230.4	−19.0	--------	412	--------	
			5458	+0.5	235.9	+10.5	--------	24	--------	
			5441	+21.0	256.4	+23.0	--------	1600	--------	
			5457	+21.0	256.4	−30.0	--------	24	--------	
			5436	+25.0	260.4	+19.0	24	--------	--------	
			5435	+47.0	282.4	+13.0	--------	388	--------	
			5437	+69.0	304.4	−20.0	--------	291	5,720	
July 11	12	3	5460	−69.0	152.6	+30.0	24	--------	--------	Do.
			5456	−63.0	158.6	+26.0	--------	73	--------	
			5455	−55.0	166.6	−17.0	--------	436	--------	
			5454	−38.0	183.6	−11.0	218	--------	--------	
			5453	−38.0	183.6	+13.0	--------	242	--------	
			5452	−33.0	188.6	−12.0	--------	194	--------	
			5459	−33.0	188.6	+20.0	--------	24	--------	
			5447	−29.0	192.6	+14.0	315	--------	--------	
			5446	−23.0	198.6	−14.5	194	--------	--------	
			5450	−15.0	206.6	+9.0	--------	436	--------	
			5445	−13.0	208.6	−9.0	97	--------	--------	
			5451	−13.0	208.6	−13.0	--------	48	--------	
			5444	−11.0	210.6	+10.5	291	--------	--------	

POSITIONS AND AREAS OF SUN SPOTS—Continued

Date	Eastern standard time	Mount Wilson group number	Heliographic: Diff. in longitude	Heliographic: Longitude	Heliographic: Latitude	Area: Spot	Area: Group	Total area for each day	Observatory
1937	*h. m.*		°	°	°				
July 11	12 3	5440	+8.0	229.6	−19.5		412		U. S. Naval.
		5462	+10.5	232.1	−31.0		12		
		5457	+33.0	254.6	−30.0		24		
		5441	+34.0	255.6	+23.0		1406		
		5436	+39.0	260.6	+19.0	12			
		5461	+63.0	284.6	−12.5	48			
		5435	+64.0	285.6	+13.0		339		
		5437	+80.0	301.6	−20.0	97		4,942	
July 12	10 59	5464	−86.0	123.0	+19.0	97			Do.
		5463	−80.0	129.0	+12.0		242		
		5456	−51.0	158.0	+25.5		73		
		5455	−41.0	168.0	−17.0		291		
		5454	−26.0	183.0	−11.0		194		
		5453	−25.0	184.0	+13.0		145		
		5452	−19.0	190.0	−12.0		145		
		5459	−19.0	190.0	+19.0		12		
		5447	−16.0	193.0	+13.5	267			
		5446	−11.0	198.0	−15.0	145			
		5450	−1.0	208.0	+8.0		436		
		5451	0.0	209.0	−13.0		24		
		5445	0.0	209.0	−8.0	73			
		5444	+1.5	210.5	+10.5	315			
		5440	+21.0	230.0	−19.5		412		
		5458	+26.0	235.0	+11.0	12			
		5441	+47.0	256.0	+23.0		1406		
		5457	+50.0	259.0	−28.5		24		
		5436	+51.0	260.0	+18.5	6			
		5435	+80.0	289.0	+11.0		242		
		5461	+80.0	289.0	−13.0	97		4,658	
July 13	11 3	5467	−85.0	110.7	+15.0	194			Do.
		5465	−80.0	115.7	−15.0		339		
		5466	−80.0	115.7	+11.0	485			
		5464	−70.5	125.2	+20.0	97			
		5463	−69.0	126.7	+12.5		436		
		5456	−37.0	158.7	+25.0		36		
		5455	−25.0	170.7	−17.0		291		
		5454	−11.5	184.2	−11.0	194			
		5453	−11.0	184.7	+13.0		145		
		5452	−4.5	191.2	−12.0		145		
		5447	−2.0	193.7	+12.0	267			
		5446	+2.0	197.7	−16.0	121			
		5451	+11.0	206.7	−15.0		24		
		5445	+13.0	208.7	−9.5	61			
		5450	+13.0	208.7	+8.0		485		
		5444	+15.0	210.7	+10.0	315			
		5440	+35.0	230.7	−20.0		412		
		5457	+38.0	233.7	−31.0		24		
		5441	+59.0	254.7	+23.0		1,309		
		5462	+61.0	256.7	−30.0		48	5,428	
July 14	8 47	5469	−82.0	101.7	−22.0	145			Mt. Wilson.
		5467	−74.0	109.7	+16.0	242			
		5465	−69.0	114.7	−16.0		339		
		5466	−67.0	116.7	+12.0		194		
		5463	−60.0	123.7	+12.5		485		
		5464	−59.0	124.7	+20.5	121			
		5456	−24.0	159.7	+25.0		24		
		5455	−11.0	172 7	−16.0		194		
		5454	+2.0	185.7	−11.0	194			
		5453	+4.0	187.7	+13.0		97		
		5468	+7.0	190.7	−12.0		48		
		5452	+8.0	191.7	−13.0	73			
		5447	+10.5	194.2	+13.0	194			
		5446	+16.0	199.7	−16.0	97			
		5451	+25.0	208.7	−16.0		24		
		5445	+28.0	211.7	−9.5	36			
		5450	+28.0	211.7	+9.0		436		
		5444	+29.5	213.2	+11.0	242			
		5440	+54.0	237.7	−19.0		388		
		5462	+56.0	237.7	−31.0	6			
		5457	+70.0	253.7	−30.0		48		
		5441	+75.0	258.7	+24.0		1,309	4,936	
July 15	11 25	5469	−67.0	102.1	−22.0	121			U. S. Naval.
		5467	−59.0	110.1	+14.0	194			
		5465	−54.0	115.1	−16.0		242		
		5466	−51.0	118.1	+10.0		218		
		5464	−44.0	125.1	+20.0	145			
		5463	−41.0	128.1	+12.0		582		
		5455	+1.0	170.1	−17.0		97		
		5454	+17.0	186.1	−10.5	194			
		5453	+18.0	187.1	+13.0		97		
		5468	+20.0	189.1	−12.0		73		
		5447	+24.5	193.6	+13.0	170			
		5446	+30.0	199.1	−15.0	73			
		5450	+40.0	209.1	+9.5		436		
		5444	+41.0	210.1	+10.0	218			
		5440	+65.0	234.1	−19.5	291			
		5462	+69.0	238.1	−21.5	97			
		5441	+84.0	253 1	+24.0		485	3,733	
July 16	10 38	5469	−53.5	102.8	−22.0	97			Do.
		5467	−45.5	110.8	+14.5		97		
		5465	−40.0	116.3	−15.5		194		
		5466	−37.0	119.3	+10.5		145		
		5463	−31.0	125.3	+11.0		170		
		5464	−30.5	125.8	+20.0	73			
		5463	−26.0	130.3	+12.5		485		

POSITIONS AND AREAS OF SUN SPOTS—Continued

Date	Eastern standard time	Mount Wilson group number	Heliographic: Diff. in longitude	Heliographic: Longitude	Heliographic: Latitude	Area: Spot	Area: Group	Total area for each day	Observatory
1937	*h. m.*		°	°	°				
July 16	10 38	5455	+17.0	173.3	−15.5		61		U. S. Naval.
		5454	+29.0	185.3	−9.5	145			
		5468	+30.0	186.3	−11.0		291		
		5453	+31.0	187.3	+12.0	48			
		5447	+38.0	194.3	+13.0	97			
		5446	+41.0	197.3	−13.0	48			
		5450	+53.0	209.3	+9.5		339		
		5444	+53.0	209.3	+10.5	194			
		5440	+79.0	235.3	−19.0		194	2,678	
July 17	11 1	5472	−79.0	63.8	−13.5		388		Do.
		5471	−75.0	67.8	+5.5	145			
		5469	−40.0	102.8	−22.0	97			
		5467	−33.0	109.8	+14.0	109			
		5465	−27.0	115.8	−15.0		218		
		5466	−25.0	117.8	+11.0		145		
		5464	−19.0	123.8	+20.0	97			
		5463	−12.0	130.8	+13.0		679		
		5455	+30.0	172.8	−15.0	48			
		5454	+41.0	183.8	−9.5	121			
		5468	+43.0	185.8	−12.0		242		
		5453	+45.0	187.8	+13.0	48			
		5447	+51.0	193.8	+13.5	97			
		5446	+56.0	198.8	−14.0	48			
		5444	+66.0	208.8	+10.5	121			
		5450	+67.0	209.8	+10.0		242	2,485	
July 18	13 45	5473	−71.0	57.1	−20.0		48		Do.
		5472	−65.0	63.1	−14.5		485		
		5471	−59.5	68.6	+6.0	121			
		5469	−26.5	101.6	−22.0	97			
		5467	−18.0	110.1	+14.0	97			
		5465	−11.0	117.1	−16.0		121		
		5466	−10.0	118.1	+11.0		97		
		5464	−3.0	125.1	+20.0	97			
		5463	+1.0	129.1	+13.0		970		
		5455	+44.0	172.1	−15.0	24			
		5454	+57.0	185.1	−9.5	121			
		5468	+58.0	186.1	−11.0		194		
		5453	+61.0	189.1	+13.0	36			
		5470	+67.0	195.1	+9.0	36			
		5447	+69.0	197.1	+14.0	97			
		5450	+78.0	206.1	+10.5	194			
		5444	+80.0	208.1	+10.5	242		3,077	
July 19	11 18	5474	−70.0	46.2	−22.0		145		Do.
		5473	−60.0	56.2	−20.0	24			
		5472	−53.0	63.2	−14.5		630		
		5471	−46.0	70.2	+6.5	97			
		5469	−14.0	102.2	−22.0	97			
		5467	−6.0	110.2	+14.0	97			
		5466	+1.0	117.2	+11.0	48			
		5465	+2.0	118.2	−16.0		48		
		5464	+7.5	123.7	+19.5		145		
		5463	+14.5	130.7	+13.0		824		
		5455	+58.0	174.2	−16.0	24			
		5454	+70.0	186.2	−10.5	73			
		5468	+71.0	187.2	−12.0		145		
		5447	+79.0	195.2	+12.5	97		2,494	
July 20	10 53	5474	−56.0	47.2	−21.0		145		Mt. Wilson.
		5473	−46.0	57.2	−19.5	12			
		5472	−38.0	65.2	−14.0		630		
		5471	−31.5	71.7	+7.0		73		
		5475	−22.0	81.2	−23.0		24		
		5469	0.0	103.2	−22.0	97			
		5467	+11.0	114.2	+15.0	73			
		5466	+16.0	119.2	+12.0	48			
		5465	+19.5	122.7	−15.0		36		
		5464	+23.0	126.2	+20.5		194		
		5463	+30.0	133.2	+13.0		776		
		5455	+71.0	174.2	−16.0	18			
		5454	+86.0	189.2	−10.0	48		2,174	
July 21	10 53	5477	−87.0	3.0	+29.0	145			U. S. Naval.
		5474	−45.0	45.0	−21.0		97		
		5476	−32.0	58.0	+11.0		48		
		5473	−31.5	58.5	−19.0	12			
		5472	−26.0	64.0	−13.0		630		
		5471	−20.0	70.0	+8.0	61			
		5475	−9.0	81.0	−23.0		48		
		5469	+11.0	101.0	−12.0	97			
		5467	+21.0	111.0	+14.0	73			
		5466	+27.0	117.0	+11.0	36			
		5465	+30.0	120.0	−14.0		12		
		5464	+33.0	128.0	+19.5		121		
		5463	+42.0	132.0	+12.5		727	2,107	
July 22	10 59	5477	−78.0	358.7	+29.5		1212		Do.
		5474	−31.0	45.7	−21.5		48		
		5473	−19.0	57.7	−19.5	12			
		5476	−17.0	59.7	+10.0		48		
		5472	−13.0	63.7	−14.0		679		
		5471	−6.0	70.7	+7.5	36			
		5475	+3.0	79.7	−22.0		48		
		5469	+25.0	101.7	−21.0	145			
		5467	+35.0	111.7	+14.0	61			
		5466	+39.0	115.7	+10.0		48		
		5465	+43.0	119.7	−14.0		12		
		5464	+46.0	122.7	+20.0		97		
		5463	+54.0	130.7	+13.0		630	3,076	

POSITIONS AND AREAS OF SUN SPOTS—Continued

Date	Eastern standard time	Mount Wilson group number	Heliographic: Diff. in longitude	Heliographic: Longitude	Heliographic: Latitude	Area: Spot	Area: Group	Total area for each day	Observatory
1937	h. m.		°	°	°				
July 23	11 12	5477	−64.0	359.3	+30.0		1309		U. S. Naval.
		5474	−19.0	44.3	−21.0	36			
		5476	−5.0	58.3	+10.5		97		
		5472	+1.0	64.3	−14.0		582		
		5471	+8.5	71.8	+7.5	24			
		5469	+39.0	102.3	−21.0	97			
		5467	+48.0	111.3	+14.0	36			
		5465	+59.0	122.3	−15.0		36		
		5463	+69.0	132.3	+13.0		533	2,750	
July 24	11 11	5477	−51.0	359.1	+30.5		1503		
		5476	+9.0	59.1	+10.0		121		Do.
		5472	+13.0	63.1	−14.5		485		
		5471	+21.0	71.1	+7.5	12			
		5469	+51.0	101.1	−21.0	97			
		5463	+85.0	135.1	+12.0		533	2,751	
July 25	13 32	5477	−37.5	358.1	+30.5		2182		Do.
		5479	−17.5	18.1	+15.5		24		
		5478	+21.0	56.6	−19.0	16			
		5476	+24.0	59.6	+9.5		242		
		5472	+28.0	63.6	−15.0		485		
		5469	+65.0	100.6	−21.0	97		3,046	
July 26	12 20	5481	−82.0	300.9	+29.5	242			Do.
		5477	−25.0	357.9	+31.0		2763		
		5479	−4.0	18.9	+15.0		48		
		5478	+35.0	57.9	−18.5	6			
		5476	+38.5	61.4	+9.5		194		
		5472	+41.0	63.9	−14.0		679		
		5469	+79.0	101.9	−21.0	97		4,029	
July 27	11 13	5483	−79.0	291.4	−12.0		291		Do.
		5481	−70.0	300.4	+29.0	194			
		5477	−13.0	357.4	+31.0		2763		
		5479	+9.0	19.4	+15.0		36		
		5476	+51.0	61.4	+9.0		242		
		5472	+55.0	65.4	−15.0		679	4,205	
July 28	11 7	5484	−68.0	289.2	+7.0	24			Do.
		5483	−65.0	292.2	−12.0		388		
		5481	−59.0	298.2	+29.0	194			
		5485	−54.0	303.2	−22.0		24		
		5477	−1.0	356.2	+33.0		2521		
		5479	+22.5	19.7	+15.0		36		
		5476	+65.0	62.2	+10.0		194		
		5472	+68.0	65.2	−15.0		533	3,914	
July 29	11 26	5486	−70.0	273.8	−17.0		145		Do.
		5484	−53.0	290.8	+7.0	6			
		5483	−52.0	291.8	−11.0		533		
		5481	−46.0	297.8	+29.0	242			
		5485	−39.0	304.8	−21.0		97		
		5477	+3.0	346.8	+34.0		1406		
		5477	+19.5	3.3	+29.0		1115		
		5479	+40.0	23.8	+14.0	12			
		5476	+74.0	57.8	+9.0	194			
		5472	+79.0	62.8	−15.0		485	4,235	
July 30	11 6	5489	−80.0	250.8	+24.0		970		Do.
		5487	−56.0	274.8	+15.0	16			
		5486	−55.5	275.3	−15.5		73		

POSITIONS AND AREAS OF SUN SPOTS—Continued

Date	Eastern standard time	Mount Wilson group number	Heliographic: Diff. in longitude	Heliographic: Longitude	Heliographic: Latitude	Area: Spot	Area: Group	Total area for each day	Observatory
1937	h. m.		°	°	°				
July 30	11 6	5484	−39.5	291.3	+8.5	24			
		5483	−38.0	292.8	−11.0		388		
		5481	−34.0	296.8	+30.0	194			
		5485	−28.0	302.8	−21.0		73		
		5477	+16.0	346.8	+33.5		1406		
		5477	+34.0	4.8	+29.5		1067		
		5479	+54.0	241.8	+14.0	16		4,227	
July 31	13 6	5489	−66.0	250.5	+23.0		1454		U. S. Naval.
		5488	−64.0	252.5	+30.0	194			
		5487	−42.0	274.5	+15.0		73		
		5486	−41.0	275.5	−14.0		85		
		5484	−25.0	291.5	+8.0	48			
		5483	−22.0	294.5	−11.0		388		
		5481	−20.0	296.5	+30.0	194			
		5485	−11.0	305.5	−21.0		73		
		5477	+29.5	346.0	+34.0		1309		
		5477	+48.0	4.5	+29.5		970	4,788	

Mean daily area for 31 days, 3,256.

PROVISIONAL SUNSPOT RELATIVE NUMBERS, JULY 1937

[Dependent along on observations at Zurich and its station at Arosa]

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

July 1937	Relative numbers	July 1937	Relative numbers	July 1937	Relative numbers
1	*a* 69	11	*Wac* 202	21	150
2	*Ec* 91	12	*ad* 223	22	*d* 145
3	74	13	*a* 188	23	*a* 139
4	*Mcd* 65	14	*aad* 215	24	126
5	91	15	*a* 204	25	124
6	*Ecd* 108	16		26	*d* 115
7	*a* 143	17	*d* 152	27	*d* 143
8	*Wcd* 185	18	*b* 167	28	*b* 124
9	*bd* 181	19	*a* 155	29	*Ebc* 128
10	192	20	*Ec* 149	30	*d* 139
				31	131

Mean, 30 days=143.9.

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 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*: 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 LOYD A. STEVENS

Mean free-air data, based on airplane weather observations made during the month of July 1937, are given in tables 1 to 3.

The mean free-air temperatures were generally below normal at all levels over the region east of the Rocky Mountains and near normal or slightly above elsewhere. The greatest negative departures occurred over Wright Field in the lower levels (−3.9° C. at 2 kilometers) and over Norfolk in the higher levels (−3.7° C. at 5 kilometers). The greatest positive departure (+2.0° C.) occurred over Spokane at 1 kilometer. The highest temperatures occurred over Oklahoma City at 0.5 and 1 kilometer, and over El Paso from 1.5 to 5 kilometers. At 5 kilometers, however, the temperature over El Paso was only 0.1° C. higher than over San Diego. There was, therefore, a gradual shifting of the statistical center of highest temperatures, toward the west, with altitude. There were two statistical centers of low temperatures located over Seattle and Sault Ste. Marie, respectively; the former having the lower temperatures at all levels except at 5 kilometers where they were equal in value. In general the mean free-air temperatures for July were higher at all levels than in June by 3° to 6° C. over the northern part of the country and by 1° C. over the extreme southern part. The greatest increase occurred at Oakland at 1 kilometer where the temperature for July (24.7° C.) was 8.2° C. higher than that for June (16.5° C.). At Kelly Field, however, the temperatures for July were slightly lower than for June at all levels above 1 kilometer. The same was true at Barksdale Field above 2 kilometers.

The mean free-air relative humidities at all levels were, in general, above normal over the northern part of the country east of the Rocky Mountains and below normal over the western Rocky Mountains and Pacific coast regions and in portions of the southeastern part of the country. The greatest negative departures (−10 percent) occurred over El Paso from 1.5 to 2.5 kilometers and the greatest positive departure (+12 percent) occurred over Norfolk at 3 kilometers.

The mean free-air barometric pressures and equivalent potential temperatures for the month are shown in table 3. In general there was an increase in the average pressure