conditions were relatively stable with moderate increase in temperature, but during the last decade there was a change to decidedly unsettled weather and general rains.

The most important depressions, all crossing the extreme southern region, were mapped on the 21st to 23d, 25th to 26th, and 28th to 30th.

Anticyclones, advancing from southern Chile toward Argentina, were mapped in the following periods: 1st to 5th, 11th to 13th, and 14th to 21st. In the period 6th to 9th an antarctic HIGH crossed the continent in a northerly direction.—*Translated by W. W. R.*

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RECENT ADDITIONS

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SOLAR OBSERVATIONS

SOLAR AND SKY RADIATION MEASUREMENTS DURING OCTOBER, 1930

By HERBERT H. KIMBALL

For reference to descriptions of instruments and exposures, and an account of the method of obtaining and reducing the measurements, the reader is referred to this volume of the REVIEW, page 26.

Table 1 shows that solar radiation intensities averaged close to the normal intensity for October at Washington, D. C., and Lincoln, Nebr., and slightly below normal at Madison, Wis.

Table 2 shows an excess in the total solar radiation received on a horizontal surface directly from the sun and diffusely from the sky at Washington, New York, Fresno, and La Jolla, and a slight deficiency at Chicago, Madison, and Lincoln. The excess was marked at Washington.

Skylight polarization measurements obtained at Washington on six days during the month give a mean of 52 per cent and a maximum of 55 per cent on the 4th. At Madison, measurements obtained on four days give a mean of 54 per cent and a maximum of 61 per cent on the 10th. The values for both stations are considerably below the corresponding October averages for the respective stations.

TABLE 1.—*Solar radiation intensities during October, 1930*

[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] 1.0	2.0	3.0	4.0	5.0	e.
	mm.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mm.*
Oct. 1	6.27	0.77	0.87	1.67	1.16						5.36
Oct. 2	5.79	0.70	0.80	1.08	1.24	1.48	1.22	1.03	0.92	0.80	4.95
Oct. 3	6.27				1.09						6.27
Oct. 4	6.76				1.08		1.18	1.05	0.90	0.75	4.95
Oct. 6	6.02	0.85	0.96	1.08	1.24	1.56					5.79
Oct. 7	6.76	0.67	0.78	0.81	1.03	1.27					5.79
Oct. 11	10.21	0.50	0.63	0.77	0.90						9.83
Oct. 17	11.81			0.71							10.21
Oct. 18	5.36	0.78	0.93	1.08							3.45
Oct. 20	2.16	0.76	0.96	1.08	1.33		1.22				1.96
Oct. 22	3.45	0.66	0.78	0.91	1.08	1.34					3.45
Oct. 23	4.95			0.91							3.30
Oct. 24	6.50	0.67		1.06	1.21						4.37
Oct. 28	7.57			1.03							6.76
Oct. 30	5.16	0.62	0.71	0.91	1.05						4.75
Oct. 31	4.17	0.49	0.64								3.81
Means		0.68	0.81	0.96	1.13	1.41	1.21	(1.04)	(0.91)	(0.78)	
Departures		−0.07	−0.02	+0.01	+0.01	±0.00	+0.09	+0.11	+0.11	+0.07	

TABLE 1.—*Solar radiation intensities during October, 1930*—Con.

[Gram-calories per minute per square centimeter of normal surface]

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.*
Oct. 8	9.47			0.95	1.07						11.38
Oct. 10	13.13		0.54	0.66	0.98		1.07				16.20
Oct. 11	12.68	0.49	0.61	0.78	0.96		1.04				9.47
Oct. 13	11.38			0.83							10.97
Oct. 17	3.30	0.86		0.99	1.31						2.06
Oct. 21	2.36						1.40				3.45
Oct. 22	2.74			1.03							2.87
Oct. 24	4.57		0.98	1.11	1.36	1.59					3.45
Oct. 25	3.30		0.92	1.05	1.18		1.20				3.99
Means		(0.68)	0.76	0.92	1.14	(1.59)	1.18				
Departures		−0.09	−0.16	−0.12	−0.05		−0.01				

Lincoln, Nebr.

Oct. 7	10.97					1.39	1.18				10.21
Oct. 8	11.38			0.97	1.15	1.43	1.19	0.99	0.83	0.72	13.13
Oct. 9	13.13						1.18	0.96	0.84	0.73	14.10
Oct. 10	13.13	0.79	0.91	1.04	1.23	1.47	1.24	1.08	0.97	0.87	11.81
Oct. 17	3.15			1.19	1.37			1.17	1.04	0.94	2.06
Oct. 19	1.60						1.41	1.20	1.10	1.01	1.52
Oct. 21	2.74		0.91	1.04							2.87
Oct. 23	3.81			1.09	1.35				1.04	0.93	5.16
Oct. 25	5.79	0.92	1.02	1.16	1.30		1.27				7.04
Oct. 27	5.56	0.80	0.89	1.14	1.30	1.48	1.30	1.13	1.00	0.89	4.57
Oct. 28	4.37		1.09	1.22	1.39						3.30
Oct. 29	3.63		1.10	1.20	1.34						3.99
Oct. 30	2.49		1.05	1.21	1.40			1.22	1.08	0.96	2.62
Oct. 31	2.06				1.35		1.32				2.62
Means		0.84	1.00	1.13	1.32	1.44	1.26	1.11	0.99	0.88	
Departures		−0.03	+0.05	+0.03	+0.04	−0.04	+0.01	+0.03	+0.04	+0.04	

[1] Extrapolated.

TABLE 2.—*Total solar radiation (direct + diffuse) received on a horizontal surface*

[Gram-calories per square centimeter]

Week beginning	Average daily totals									
	Washington	Madison	Lincoln	Chicago	New York	Pittsburgh	Gainesville	Fresno	La Jolla	Miami
Oct. 1	486	204	275	163	332	249	460	442	374	502
Oct. 8	320	234	303	199	221	200	402	387	377	459
Oct. 15	395	196	270	162	209	211	441	393	241	349
Oct. 22	368	229	312	152	176	160	390	368	284	407
	Departures from weekly normals									
Oct. 1	+155	−65	−48	−42	+79	----	----	+11	+12	----
Oct. 8	+17	−12	+2	+10	−16	----	----	−23	+59	----
Oct. 15	+113	−25	−30	−9	+1	----	----	+12	−29	----
Oct. 22	+98	+23	+39	−2	−12	----	----	+27	+30	----
Accumulated departures on Oct. 28	+8,638	+1,155	−2,100	+560	+1,260	----	----	−2,115	−1,526	----

POSITIONS AND AREAS OF SUN SPOTS

[Communicated by Capt. J. F. Hellweg, Superintendent United States Naval Observatory. Data furnished by Naval Observatory, in cooperation with Harvard, Yerkes, Perkins, and Mount Wilson Observatories. The differences of longitude are measured from central meridian, positive west. The north latitudes are plus. Areas are corrected for foreshortening and are expressed in millionths of sun's visible hemisphere. The total area including spots and groups, is given for each day in the last column]

Date	Eastern standard civil time		Heliographic			Area		Total area for each day
			Diff. long.	Longitude	Latitude	Spot	Group	
1930	*h*	*m*	°	°	°			
Oct. 1 (Naval Observatory)	10	45	−10.5	117.6	−3.5	------	154	------
			+8.0	136.1	+6.0	108	------	262
Oct. 2 (Naval Observatory)	11	3	+3.5	118.2	−4.0	------	185	------
			+21.5	136.2	+6.0	93	------	278
Oct. 3 (Naval Observatory)	10	47	+17.0	118.6	−4.0	------	123	------
			+34.5	136.1	+6.0	93	------	216
Oct. 4 (Naval Observatory)	10	42	−80.5	8.0	+6.5	------	278	------
			−45.5	43.0	−5.0	2	------	------
			+31.0	119.5	−4.0	93	------	------
			+48.0	136.5	+6.0	77	------	450

Positions and aoeas of sun spots—Continued

Date	Eastern standard civil time		Heliographic			Area		Total area for each day
			Diff. long.	Longitude	Latitude	Spot	Group	
1930	*h*	*m*	°	°	°			
Oct. 5 (Naval Observatory)	10	47	−71.0	4.3	+7.0	------	772	------
			+42.5	117.8	−4.0	------	93	------
			+62.0	137.3	+6.5	93	------	958
Oct. 6 (Naval Observatory)	10	42	−58.5	3.6	+7.5	------	880	------
			+57.0	119.1	−3.5	------	77	------
			+75.0	137.1	+6.5	62	------	1,019
Oct. 7 (Naval Observatory)	10	43	−45.0	3.9	+8.0	------	679	------
			+71.0	119.9	−3.0	62	------	741
Oct. 8 (Naval Observatory)	12	32	−29.5	5.2	+8.0	------	772	772
Oct. 9 (Naval Observatory)	10	53	−81.5	300.9	+12.0	15	------	------
			−17.5	4.9	+7.5	------	694	709
Oct. 10 (Naval Observatory)	10	48	−65.5	303.8	+11.5	------	68	------
			−4.0	5.3	+7.5	------	756	824
Oct. 11 (Naval Observatory)	11	1	−52.5	303.4	+11.5	------	71	------
			+9.5	5.4	+7.5	------	509	580
Oct. 12 (Naval Observatory)	10	35	−61.5	278.5	−11.5	3	------	------
			−38.0	305.0	+10.5	------	139	------
			+23.0	6.0	+7.0	------	401	543
Oct. 13 (Naval Observatory)	12	20	−23.5	305.4	+10.5	------	185	------
			+38.0	6.9	+7.5	------	324	509
Oct. 14 (Perkins Observatory)	12	47	−2.0	313.3	+10.0	93	------	------
			−9.5	305.8	+12.0	155	------	248
Oct. 15 (Naval Observatory)	10	53	+3.5	306.8	+11.0	------	154	------
			+66.0	9.3	+6.5	------	170	324
Oct. 16 (Naval Observatory)	10	36	+17.0	307.2	+10.5	------	46	46
Oct. 17 (Naval Observatory)	10	48	+33.5	310.5	+10.0	------	12	12
Oct. 18 (Naval Observatory)	10	41	+9.0	272.8	+4.0	------	9	------
			+40.0	303.8	+13.5	------	46	------
			+47.5	311.3	+10.5	------	6	61
Oct. 19 (Naval Observatory)	10	45	+52.0	302.6	+13.5	------	93	93
Oct. 20 (Naval Observatory)	10	56	+65.0	302.3	+14.0	------	77	77
Oct. 21 (Naval Observatory)	12	4	+78.5	302.0	+14.0	37	------	37
Oct. 22 (Naval Observatory)	10	36	−80.0	131.1	−5.5	185	------	------
			+23.5	234.6	−20.5	3	------	188
Oct. 23 (Naval Observatory)	11	5	−66.5	131.2	−5.5	185	------	------
			+37.5	235.2	−20.0	------	9	194
Oct. 24 (Naval Observatory)	13	43	−70.0	113.0	−11.5	6	------	------
			−53.0	130.0	−6.0	------	278	------
			−44.5	138.5	+7.5	3	------	287
Oct. 25 (Naval Observatory)	13	15	−38.5	131.6	−5.5	------	324	------
			+27.5	197.6	+5.0	------	65	389
Oct. 26 (Naval Observatory)	11	12	−26.0	132.0	−5.5	------	293	------
			+40.0	198.0	+5.0	------	123	416
Oct. 27 (Naval Observatory)	11	40	−29.5	115.1	−10.0	------	56	------
			−13.0	131.6	−6.0	------	108	------
			+53.5	198.1	+5.5	------	154	318
Oct. 28 (Naval Observatory)	10	49	−38.5	93.4	−5.0	3	------	------
			−18.5	113.4	−6.5	------	31	------
			−15.5	116.4	−19.0	------	37	------
			+0.5	132.4	−60.5	------	386	------
			+67.5	199.4	+5.0	------	170	627
Oct. 29 (Mount Wilson)	12	0	−5.0	113.0	−7.0	------	52	------
			−2.0	116.0	−11.0	------	32	------
			+7.0	125.0	−7.0	------	24	------
			+16.0	134.0	−6.0	------	360	------
			+85.0	203.0	+6.0	------	21	489
Oct. 30 (Naval Observatory)	10	38	+8.0	113.6	−6.5	------	123	------
			+12.5	118.1	−10.5	------	93	------
			+25.5	131.1	−6.5	------	386	602
Oct. 31 (Naval Observatory)	11	18	0.0	92.0	−8.0	------	6	------
			+23.0	115.0	−6.0	------	154	------
			+25.5	117.5	−10.5	------	62	------
			+38.5	130.5	−6.5	------	355	577
Mean daily area for October								414

PROVISIONAL SUN-SPOT RELATIVE NUMBERS, OCTOBER, 1930 [1]

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

October, 1930	Relative numbers	October, 1930	Relative numbers	October, 1930	Relative numbers
1	26	11	53	21	8
2	a 30	12	48	22	d --
3	26	13	56	23	18
4	d 30	14	38	24	12
5	--------	15	a 32	25	Mc 29
6	43	16	24	26	28?
7	39	17	11	27	Ec 63
8	37	18	22	28	b --
9	22	19	22	29	b --
10	Ebc 59	20	11	30	49
				31	47

Mean (27 days) = 32.7.

[1] Dependent alone on observations at Zurich and its station at Aroza.

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 large or average-sized center of activity: E, on the eastern part of the sun's disk; W, on the western part; M, in the central zone.
d = Entrance of a large or average-sized center of activity on the east limb.