TABLE 1.—*Monthly and annual temperature departures, 1931*

District	January	February	March	April	May	June	July	August	September	October	November	December	Average
New England	+1.1	+1.7	+3.6	+2.7	+1.6	+0.8	+2.0	+1.4	+3.4	+3.7	+6.4	+3.7	+2.7
Middle Atlantic	+2.5	+2.9	−0.7	+0.1	+0.1	+0.6	+2.9	+0.7	+5.1	+3.4	+7.7	+7.2	+2.7
South Atlantic	+0.5	+1.1	−4.1	−1.4	−1.7	+0.9	+2.7	+0.1	+4.1	+2.8	+6.5	+8.5	+1.7
Florida Peninsula	−3.1	−1.8	−5.4	−1.8	−0.1	+0.5	+1.6	+0.9	+0.4	+0.9	+1.7	+8.3	+0.2
East Gulf	−0.4	+1.1	−5.4	−1.9	−2.8	+1.7	+1.4	−1.2	+4.1	+3.5	+6.8	+8.2	+1.3
West Gulf	+2.2	+3.7	−5.5	−3.9	−3.6	+0.9	+0.6	−1.2	+4.5	+5.9	+6.5	+3.0	+1.1
Ohio Valley and Tennessee	+3.0	+4.3	−4.3	−0.1	−2.7	+2.0	+3.1	−0.4	+5.2	+3.3	+9.0	+8.4	+1.3
Lower Lakes	+2.6	+4.4	+1.2	+1.8	0.0	+0.9	+4.0	+1.7	+5.5	+4.2	+9.1	+6.7	+3.5
Upper Lakes	+6.4	+9.6	+2.2	+2.1	−0.5	+3.1	+4.2	+1.7	+6.1	+5.4	+8.7	+8.1	+4.8
North Dakota	+16.4	+20.4	+3.7	+3.8	−0.5	+5.5	+2.6	+1.5	+5.1	+4.6	+3.9	+9.1	+6.3
Upper Mississippi Valley	+9.4	+11.6	−0.3	+2.3	−3.0	+5.3	+3.8	+0.7	+6.9	+5.3	+9.2	+10.3	+5.1
Missouri Valley	+11.1	+12.8	−1.1	+1.7	−2.5	+6.7	+3.6	+0.8	+7.5	+4.6	+5.3	+7.8	+4.9
Northern Slope	+10.1	+11.0	+1.2	+1.5	+0.9	+5.5	+3.2	+2.6	+3.4	+2.8	−2.4	+1.1	+3.4
Middle Slope	+6.8	+8.2	−4.0	−1.0	−2.6	+4.9	+2.6	−0.1	+7.9	+4.7	+1.8	+5.6	+2.9
Southern Slope	+1.7	+3.8	−5.4	−4.1	−3.9	+1.6	0.0	−0.6	+6.4	+5.5	+2.7	−0.1	+0.6
Southern Plateau	+1.4	+2.4	+1.2	+3.1	+2.8	+1.4	+3.9	+0.8	+2.2	+2.9	−1.9	−2.6	+1.5
Middle Plateau	+0.2	+3.6	+0.2	+2.3	+3.3	+3.9	+6.1	+3.5	+1.0	+3.8	−4.3	−5.1	+1.5
Northern Plateau	+3.5	+2.1	+0.6	+0.6	+4.2	+2.0	+4.1	+3.2	+1.1	+1.6	−4.1	−3.3	+1.3
North Pacific	+5.4	+3.0	+2.3	+3.6	+4.0	+0.9	+2.0	+0.6	+1.0	+1.0	−2.4	−0.4	+1.8
Middle Pacific	+2.0	+3.5	+3.7	+4.1	+5.4	+1.5	+4.2	+1.3	−0.3	−0.6	−2.9	−1.8	+1.7
South Pacific	+3.9	+4.1	+5.8	+6.0	+5.7	+2.3	+6.3	+4.6	+1.3	+2.6	−2.0	−1.1	+3.3
United States	+4.1	+5.4	−0.5	+1.0	+0.2	+2.5	+3.1	+1.1	+3.9	+3.4	+3.1	+3.9	[1] +2.6

[1] Annual departure.

TABLE 2.—*Precipitation departures, monthly and annual, 1931*

District	January	February	March	April	May	June	July	August	September	October	November	December	Sum
New England	−0.4	−1.0	+0.7	−0.2	+0.8	+2.1	+0.5	+0.1	−0.4	0.0	−2.1	−0.2	−0.1
Middle Atlantic	−1.4	−1.4	+0.1	−0.3	+0.9	−0.4	+0.6	+1.0	−1.2	−1.4	−1.9	−1.1	−6.5
South Atlantic	−1.2	−1.8	−0.2	−0.4	+0.6	−2.4	−0.3	−0.4	−3.0	−2.5	−1.9	+2.3	−11.2
Florida Peninsula	+2.4	+0.7	+3.8	+3.0	−0.9	−5.0	−1.2	−0.7	+5.3	−1.1	−1.3	+0.4	+5.4
East Gulf	−1.4	−1.9	−1.2	−1.7	−0.9	−2.8	+1.4	+0.7	−2.9	−0.9	−1.6	+3.9	−9.3
West Gulf	+0.6	+1.2	0.0	−0.7	−2.2	−1.2	+0.2	−0.3	−2.5	−0.6	+0.1	+2.2	−3.2
Ohio Valley and Tennessee	−2.6	−0.6	−1.4	−0.2	−0.5	−0.8	+0.5	+0.4	+0.4	−0.1	+0.1	+1.7	−3.1
Lower Lakes	−0.5	−1.0	−0.5	+0.3	+0.2	−0.7	−0.4	−0.6	+0.3	−0.7	−0.4	0.0	−4.0
Upper Lakes	−0.7	−0.8	+0.2	−1.1	−0.3	0.0	−0.6	−0.8	+1.4	+0.2	+1.1	−0.3	−1.7
North Dakota	−0.4	−0.1	+0.3	−1.2	−1.0	−1.4	+0.4	−0.2	+0.2	+0.3	−0.1	−0.1	−3.3
Upper Mississippi Valley	−1.0	−0.6	−0.1	−0.8	−1.1	−0.1	−1.1	+0.1	+0.9	+0.5	+3.0	+0.6	+0.3
Missouri Valley	−0.6	−0.2	0.0	−0.9	−0.5	−2.0	−1.2	+1.0	+0.2	−0.2	+3.2	+0.9	−0.3
Northern Slope	−0.6	−0.3	0.0	−0.6	−1.2	−0.9	−0.3	−0.6	0.0	−0.3	+0.2	−0.3	−4.9
Middle Slope	−0.4	+0.2	+0.6	+0.3	−0.8	−1.6	−1.4	−0.2	−0.6	−0.6	+2.5	−0.3	−2.3
Southern Slope	+1.0	+0.9	+0.1	+0.9	+0.1	−0.8	−0.8	−0.4	−2.4	+1.1	+0.8	+0.7	+1.2
Southern Plateau	−0.3	+0.7	−0.2	+0.8	−0.3	+0.2	−0.8	+0.8	+0.6	−0.2	+0.6	+0.1	+2.0
Middle Plateau	−0.6	−0.4	−0.5	+0.1	−0.5	−0.1	−0.1	−0.1	+0.1	−0.2	+0.6	+0.2	−1.5
Northern Plateau	−0.5	−0.7	+1.1	−0.6	−1.2	−0.2	−0.4	−0.4	0.0	−0.2	+0.1	+0.8	−2.2
North Pacific	0.0	−1.7	+1.5	−0.3	−1.3	+0.3	−0.6	−0.6	+0.9	0.0	−0.9	+0.8	−1.9
Middle Pacific	−0.2	−2.4	−2.0	−1.3	−0.1	+0.3	0.0	0.0	−0.5	−0.5	0.0	+3.7	−3.0
South Pacific	+1.1	+0.5	−1.9	+0.8	+0.3	+0.3	0.0	0.0	−0.1	−0.6	+0.9	+2.3	+3.6
United States	−0.4	−0.5	0.0	−0.2	−0.5	−0.8	−0.3	−0.1	−0.2	−0.4	+0.1	+0.9	−2.4

BIBLIOGRAPHY

C. FITZHUGH TALMAN, in charge of Library

RECENT ADDITIONS

The following have been selected from among the titles of books recently received as representing those most likely to be useful to Weather Bureau officials in their meteorological work and studies:

American national red cross.
Texas tornadoes and storms of May, 1930. 6 p. m. 28 cm. [Manifolded.]

Bentley, W. A., & Humphreys, W. J.
Snow crystals. 1st ed. New York. 1931. ix, 227 p. incl. front., illus. plates. 31½cm.

Bongards, H.
Lambrechts graphische Psychrometertafel für starkbewegte Luft. Luftgeschwindigkeit ≧2 m. p. s. n. p. n. d. chart (folded.) 22½ x 26½ cm.

Hannay, A. M., *comp.*
Influence of weather on crops: 1900–1930. A selected and annotated bibliography. [Washington. 1931.] 246 p. 23½ cm. (U. S. Agric. dept. Misc. pub. no. 118.)

Lindskog, Erik.
On the geographical distribution of fog in Sweden. n. p. n. d. 94 p. figs. 25 cm. (Georg. annaler. H. 1, 1931.)

Mellor, H. B., & others.
Studies of ultra-violet in daylight. 17 p. illus. 23 cm. (Paper presented before the silver anniv. conven. of the Illum. engin. soc., Pittsburgh, Pa., Oct. 13–16, 1931.)

Nichols, L. H.
Fourth report to the Quebec forest industries association, limited. The burning of settler's slash and meteorological conditions in the province of Quebec during 1931. Quebec. 1931. 22 p. plates. charts. 28 cm.

Peppler, W.
Ergebnisse der mehrjährigen Messungen der Ortshelligkeit am Bodensee. p. 157–189. figs. 23 cm. (Sonderab.: 57. Hefte der Schrift. des Ver. für Gesch. des Bodensees und seiner Umgebung.) (Arbeiten der Drachenstation am Bodensee.)

Prochnow, Oskar.
Wolken. Berlin. [c. 1931.] 32 p. illus. 21 cm. (Die Brehm-Bücher Bd. 9.)

Schaffers, V.
Le paratonnerre et ses progrès récents. Louvain. 1931. 87 p. 25 cm. (Extr.: Revue des ques. sci., t. 99 et 100. mai et juil. 1931.)

Sherlock, R. H., & Stout, M. B.
Annemometer for a study of wind gusts. [Menasha.] 1931. 38 p. illus. plate (fold.) 23 cm. (Engin. research bull., no. 20, May, 1931. Univ. Mich.)

Wagner, A.
Zur Aerologie des indischen Monsuns. Leipzig. 1931. p. 196–238. figs. 22 cm. (Sonderdr.: Gerlands Beitr. zur Geophys., Bd. 30 (1931).)

Wulf, Oliver R.
Determination of ozone by spectrobolometric measurements. Washington. 1931. 12 p. figs. plates. 24½ cm. (Smith. misc. coll., v. 85, no. 9.)

SOLAR OBSERVATIONS

SOLAR RADIATION MEASUREMENTS DURING DECEMBER, 1931

By HERBERT H. KIMBAL, in charge, solar radiation investigations

For a description of instruments and their exposures, the reader is referred to the January, 1931, REVIEW, page 41.

Table 1 shows that solar radiation intensities averaged above the normal values for December at Washington and Madison and close to normal at Lincoln.

Table 2 shows an excess in the total solar radiation received on a horizontal surface at Chicago, New York, and Miami as compared with the December normals for the respective stations; close to normal at Pittsburgh, and a deficit at Washington, Madison, Lincoln, Twin Falls, Fresno, Gainesville, and La Jolla. The last line in the table gives annual departures in percentages of annual totals.

Skylight polarization measurements made on 4 days at Washington give 61 for the mean percentage of polarization, with a maximum of 65 per cent on the 2d and 6th. At Madison, polarization measurements made on three days early in the month give a mean of 72 per cent with a maximum of 77 per cent on the 1st. These are above the corresponding averages for each station in December.

TABLE 1.—*Solar radiation intensities during December, 1931*

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

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.*
Washington, D. C.											
Dec. 2	2.49	0.79	0.98	1.09	1.31			1.12	0.95	0.85	2.74
Dec. 7	3.15		1.00	1.18	1.36			1.12	0.86	0.75	2.26
Dec. 15	3.30	0.90	1.06	1.11	1.33			1.06	0.83	0.58	2.87
Dec. 16	3.81		0.97	1.13	1.38						2.74
Dec. 23	8.18	0.93									6.02
Means		0.87	0.99	1.13	1.34			1.10	0.88	0.73	
Departures		+0.08	+0.09	+0.06	+0.11			+0.06	−0.03	−0.06	
Madison, Wis.											
Dec. 1	2.49				1.42						1.96
Dec. 2	2.87			1.23							3.00
Dec. 3	3.30	0.95	1.04	1.18							3.15
Dec. 7	1.37			1.34				1.26			1.24
Dec. 14	2.36	1.10	1.15	1.10							2.26
Means		(1.02)	(1.10)	1.21	(1.42)			(1.26)			
Departures		+0.06	±0.00	±0.00	+0.07			+0.02			
Lincoln, Nebr.											
Dec. 1	2.36	1.05	1.13	1.29				1.23	1.09	0.88	3.30
Dec. 2	3.00			1.20				1.23	1.12	1.02	4.17
Dec. 11	6.50		0.99	1.19				1.25	1.11	1.00	3.81
Dec. 14	2.26	0.90	1.09	1.26				1.23	1.11		3.00
Dec. 15	2.62	0.79	1.04	1.10				1.21	1.07	1.05	3.30
Dec. 16	3.15	0.84	0.99	1.15				1.15	1.04		3.63
Means		0.90	1.05	1.20				1.22	1.09	0.99	
Departures		−0.04	−0.01	−0.02				+0.02	+0.02	+0.03	

[1] Extrapolated.

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

[Gram-calories per square centimeter]

Week, beginning	Washington	Madison	Lincoln	Chicago	New York	Twin Falls	Pittsburgh	Gainesville	Fresno	La Jolla	Miami	Fairbanks
	Average daily totals											
1931	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*
Dec. 3	156	115	110	90	112	103	85	142	163	220	376	2.0
Dec. 10	133	113	156	112	85	163	78	187	170	250	367	1.5
Dec. 17	118	74	137	90	83	118	82	189	169	188	364	1.2
Dec. 24	137	66	87	64	160	101	65	204	122	202	274	1.7
	Departures from weekly normals											
Dec. 3	+8	−6	−55	+18	+22	−37	+5	−76	−14	−42	+73	
Dec. 10	−5	+1	−1	+40	−5	+37	+10	−22	+2	−10	+69	
Dec. 17	−22	−47	−33	+13	−12	−10	+15	−14	+8	−69	+86	
Dec. 24	−5	−58	−88	−16	+58	−51	−19	−36	−25	−36	−4	
	Departures from annual normals											
Gr. cal./cm.²	−1,750	+1,965	−445	+2,938	+2,893	−5,846	−1,420		+1,718			
Percentage	−1.4	+1.2	−0.3	+3.2	+3.1	−3.9			+1.1			

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	
1931	*h m*	°	°	°			
Dec. 1 (Mount Wilson)	13 50	+47.0	311.5	+13.0		9	
		+67.0	331.5	+10.0		137	146
Dec. 2 (Naval Observatory)	10 30	No spots					
Dec. 3 (Naval Observatory)	10 33	No spots					
Dec. 4 (Mount Wilson)	12 0	−63.0	162.9	+12.0		67	67
Dec. 5 (Naval Observatory)	10 35	No spots					
Dec. 6 (Naval Observatory)	10 23	−76.0	124.4	+12.0	31		31
Dec. 7 (Naval Observatory)	10 36	−54.0	133.1	+11.5		170	170
Dec. 8 (Naval Observatory)	12 47	−40.0	132.8	+11.5		278	278
Dec. 9 (Yerkes Observatory)	15 9	−28.5	129.9	+10.4	5		
		−27.7	130.7	+11.7		138	
		−27.7	130.7	+10.6	17		
		−27.6	130.8	+10.0	17		
		−26.1	132.3	+10.0	3		
		−25.2	133.2	+13.8	5		
		−25.1	133.3	+13.0	3		
		−25.1	133.3	+12.2		14	
		−22.8	135.6	+12.5	107		
		−21.6	136.8	+11.9	210		519
Dec. 10 (Naval Observatory)	10 17	−38.0	109.8	+4.0		62	
		−14.0	133.8	+11.0		340	402
Dec. 11 (Naval Observatory)	11 20	−23.0	111.0	+4.0		154	
		−1.0	133.0	+11.0		401	555
Dec. 12 (Yerkes Observatory)	14 18	−10.2	109.1	+4.3	7		
		−9.7	109.6	+5.3	5		
		−9.3	110.0	+4.1	2		
		−6.3	113.0	+4.3		48	
		−5.4	113.9	+4.7	22		
		+10.5	129.8	+10.2	88		
		+11.1	130.4	+11.0	2		
		+11.9	131.2	+11.2	2		
		+13.6	132.9	+11.7		169	
		+16.6	135.9	+12.2	37		
		+17.7	137.0	+12.4	37		419
Dec. 13 (Mount Wilson)	11 30	+4.0	111.6	+5.0		41	
		+26.0	133.6	+12.0		298	339