CORRECTED SOLAR-CONSTANT VALUES, MONTEZUMA, CHILE, FROM MAY 27 TO AUGUST 24, 1927, INCLUSIVE

(Corrections furnished by Dr. C. G. Abbot, Assistant Secretary, Smithsonian Institution, Washington, Oct. 28, 1927)

Due to an error in computing at the Montezuma station, the solar-constant values, telegraphed and published on the daily Washington Weather Map for the above period, should be discarded and the following substituted:

	May [1]	June [1]	July [1]	August [1]
1		1.937 S.—	1.930 S.	1.940 S.
2		1.931 S.	1.932 S.	1.945 S.
3		1.939 S.—	[2]	1.940 S.
4		1.931 S.	[2]	1.940 S.
5		1.933 S.	1.935 S.—	1.942 S.
6		[2]	[2]	1.942 S.
7		1.935 S.	1.921 U.	1.946 S.
8		1.930 S.	1.924 S.	[3]
9		1.929 S.	[2]	1.940 S.
10		1.927 S.	1.936 S.	1.941 S.
11		1.929 S.	1.931 S.	1.934 S.—
12		1.927 S.	[2]	[2]
13		1.935 S.	1.924 S.	[2]
14		1.931 S.	1.930 S.	1.938 S.
15		1.924 S.	1.927 S.	1.947 S.
16		1.933 S.—	1.928 S.	1.943 S.
17		[2]	1.933 S.	1.943 S.
18		[2]	1.931 S.	1.947 S.
19		[2]	1.930 S.	1.933 S.
20		[2]	1.933 S.	1.942 S.
21		[2]	1.933 S.	1.931 S.
22		1.932 S.—	1.925 S.	1.934 S.
23		1.925 S.	1.931 S.	1.932 S.
24		1.924 S.	1.948 S.	1.935 S.
25		1.927 S.	1.952 S.	
26		1.929 S.	1.950 S.—	
27	1.930 S.	1.925 S.	1.947 S.	
28	1.923 S.	1.929 S.	1.945 S.	
29	1.934 S.	1.927 S.—	1.937 S.	
30	1.926 S.	1.927 S.	1.945 S.	
31	1.922 S.		1.944 S.	

CORRECTED DECADE MEANS

1–10		1.932	1.931	1.942
11–20		1.930	1.930	1.941
21–31	1.926	1.927	[1] 1.945	1.941

[1] Values from and after July 24 are reduced by the new definitive method. Earlier values are provisional and average 0.014 calories lower. The decade mean July 21–31 has been corrected to the definitive scale.
[2] Cloudy.
[3] Too dry to reduce.

AEROLOGICAL OBSERVATIONS

By W. R. STEVENS

Free-air temperatures for September were near normal at all aerological stations. There was a tendency, however, toward positive departures, except at Ellendale and Groesbeck, the latter station having negative departures at all observed levels.

Relative humidities were slightly above normal at Broken Arrow and Royal Center, and slightly below at Due West, Groesbeck, and Washington.[a]

Vapor-pressure departures were unimportant.

In general, resultant winds were near normal; at Ellendale, however, an easterly component prevailed in the lower levels where normally there is a westerly component. Winds of southerly component prevailed quite generally up to an altitude of 1,500 meters over most of the United States, except in the Atlantic and East Gulf States and in certain regions of the Pacific Coast States. At 3,000 and 4,000 meters winds of southerly component were general west of the Mississippi River and winds of northerly component to the east. The month was quite notably free of winds of high velocity, even at Rocky Mountain stations.

A single-theodolite pilot balloon observation was made at Groesbeck on the afternoon of the 14th to an altitude of 18 km. While the occurrence of squalls soon after the completion of the ascent prevented verification, there seems, however, to be no doubt as to its accuracy. The wind velocity varied between 1 and 9 m. p. s. to an altitude of 14 km., the highest velocity, 15 m. p. s., being at 17.5 km. The direction turned with altitude from SE. at the surface, through W, N, E., and finally to SE. again, a complete turning of 360°.

The kite flights at Ellendale on the 17th and 18th and at Royal Center on the 18th and 19th are of considerable interest inasmuch as they depict conditions before and after the passage of a cold front. In neither case did the greatest fall in temperature occur at the surface. At Ellendale the greatest fall, 17.1° C., occurred at 900 meters m. s. l., or about 450 meters above the surface. At Royal Center the greatest fall, 16.0° C., appeared at 1,900 meters m. s. l., or about 1,700 meters above the surface. The above facts point to the possibility that, as a HIGH moves farther and farther to the east or south, the greatest fall in temperature takes place at higher and higher altitudes as a result of more rapid heating of the surface-air layers than of those aloft.

Two excellent observations were obtained in the center of an area of high pressure on the 25th and 26th at the Naval Air Station at Washington. Observations under these conditions are comparatively rare since kite flights can not ordinarily be made when the crest of the HIGH is over the station. The free-air conditions on these dates are shown in the following table:

25th					26th				
Time	Altitude	Temperature	Humidity		Time	Altitude	Temperature	Humidity	
			Relative	Vapor pressure				Relative	Vapor pressure
	Meters	° *C.*	%	*mb.*		*Meters*	° *C.*	%	*mb.*
9:22 a. m.	7	22.1	51	13.58	8:23 a. m.	7	15.0	79	13.48
	250	19.9	47	10.93		250	14.1	77	12.39
	500	17.6	43	8.66		500	13.0	73	10.94
	750	16.5	37	6.95		750	12.5	64	9.28
	1,000	15.4	32	5.90		1,000	12.8	51	7.54
	1,250	14.2	26	4.21		1,250	13.1	37	5.58
	1,500	13.0	22	3.30		1,500	13.4	24	3.69
	2,000	10.3	16	2.00		2,000	12.7	10	1.47
	2,500	10.0	8	0.98		2,500	10.2	6	0.75
	3,000	7.9	2	0.21		3,000	7.7	2	0.21

It is of interest to investigate the free-air observations in relation to the tornado that occurred at St. Louis on the 29th. On the morning of this date a LOW of considerable intensity was centered over eastern Nebraska and Kansas—Concordia, 29.34 inches. This LOW had developed over Wyoming during the previous day as a secondary to a disturbance centered over Alberta. The aerological chart shows a current of warm, humid, southerly air flowing rapidly up the Mississippi Valley with a SW. wind at higher altitudes. Farther to the west there was a WNW. wind aloft. It seems probable from the few observations available that the WNW. wind overran the warm, moist Gulf air producing a cold front aloft at which violent convection would take place. The kite flight at Royal Center, about 300 miles northeast of St. Louis, on the morning of the 29th is indicative of the potential instability existing over the Middle West, the lapse rate of 0.70 for the layer 2,145–2,897 meters being superadiabatic for moist air.

[a] Naval Air Station, D. C.