

the average number of days since rain occurred is presented in Table 1.

Very slight correlation exists between sky color and the number of dust particles per cubic centimeter. This is probably explained by the fact that at Washington the dust particles consist principally of smoke of local origin, which does not extend to any considerable height.

The intensity of solar radiation increases with increase of depth of color of the sky, but the most rapid increase occurs with change in sky color from white to poor sky, and a small increase with change from poor to average sky. The increase from this point on is quite regular. It is thought that a longer series of measurements, which would tend to eliminate seasonal effects, would smooth out this apparent anomaly.

Generally speaking, there seems to be a fairly close relation between sky color and both relative humidity and vapor pressure. Unquestionably a longer series of measurements would intensify this relation. Unfortunately, however, the paucity of observations does not permit of dividing them into seasonal groups.

One of the most interesting facts brought to light by the table is the very close relation between sky color and the number of days since rain occurred. The reason is

apparent however, when we consider the efficiency of precipitation as a cleanser of the atmosphere.¹

Rapid indications of the vertical distribution of precipitable water and dust in the atmosphere might be made by matching the color of the sky against these cards during airplane flights. Unquestionably, at an altitude of 15,000 feet skies as dark, as that represented by card No. 12 would be observed, and probably even darker.

TABLE 1.—Relation between sky-color and other meteorological elements

Color scale	Visi- bility	Skylight polari- zation	Solar radiation at normal incidence, 2 air mass. Gr. cal. cm. ²	Number of dust particles per cubic centi- meter	R. H.	V. P.	Average number days since rain
	Miles	Per cent			Per cent	Inch	
4.....	16.5	52.9	1.02	883	52	0.228	2.5
5.....	24.8	60.3	1.18	594	53	.202	2.0
6.....	30.8	61.1	1.19	660	49	.126	1.8
7.....	37.2	62.5	1.26	528	44	.172	1.1
8.....	50.0	62.7	1.37	627	33	.031	0.0

¹ Kimball, Herbert H. & Hand, Irving F. 1924. Investigation of the dust content of the atmosphere. Mo. Wea. Rev. 52:133-141. Washington.

NEW DEFINITIVE SCALE FOR SOLAR-CONSTANT VALUES

The following letter explains a recent change made in the scale of solar-constant values published on the Washington Daily Weather Map:

SMITHSONIAN INSTITUTION,
Washington, D. C., June 27, 1927.

DEAR PROFESSOR MARVIN: A few days ago we mailed to the observers in Chile an entirely new set of tables of reduction of the short-method and long-method observations which are based on an exhaustive study of four years of the latest and best observations.

As the values hereafter are intended to be definitive, I have directed the inclusion of a horizontal factor to be applied to all values to reduce them to the scale of 1920, which is also, so far as we know, the scale of the Mount Wilson observations. You will recall that in my recent paper entitled "A Group of Solar Changes"¹ I indicated in Table 2 that the values as now being furnished appear to be 0.012 calorie below the scale of 1920. The new definitive reduction which is entirely independent of this estimate and is based upon different data, indicates for that differ-

ence approximately 0.014 calorie; that is to say, the difference between the earlier estimate and this final reduction is within one-tenth of 1 per cent of the value of the solar constant.

We have compared a large number of results based upon the new method of reduction with the results which have been daily furnished you for the last 16 months, and we find that the average accidental difference of daily values (the definitive new method as compared with the provisional method) comes out 0.004 calories, or two-tenths of 1 per cent.

You will be glad to know that the definitive reduction has been based on Montezuma data alone, just as if no other station in the world existed, and that the residual corrections for imperfections of the function-transmission curves and for uncertainty of allowances for atmospheric humidity—those final residual corrections, I say—are always less than 1 per cent and for about 75 per cent of the days are less than one-tenth of 1 per cent. If they were omitted altogether, the result would be negligible in monthly means.

When the telegrams begin to arrive on the new definitive scale, there will be a sudden jump of approximately 0.014 calorie on account of the reduction to the scale of 1920. Thereafter I anticipate there will be no further change.

Very truly yours,

C. G. ABBOT, Acting Secretary.

¹ Smithsonian Misc. Coll., vol. 80, No. 2.