

A Science Service Feature

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? WHY THE WEATHER ?

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By Dr. Charles F. Brooks
of Clark University

DAILY SOLAR CONSTANT

Since the beginning of the year there has appeared on the Washington Daily Weather Map of the U. S. Weather Bureau on most days a statement of the "Provisional solar constant of radiation as determined at the Montezuma (Chile) station of the Astrophysical Observatory, Smithsonian Institution." On the map for Sept. 4, for example, the value for Sept. 3 was given as 1.929 calories, satisfactory. Such a figure is without significance to most people who see the weather map, but it is of fundamental importance to the weather of the world, for this number represents the intensity of solar radiation measured in terms of its heating effects as it reaches the earth's outer atmosphere.

The value presented Sept. 4, 1.929 calories, was obtained by observing the heating effect of the sun at the summit of Mt. Montezuma in tropical Chile, 10,000 feet above sea level, and by allowing for a small amount of loss in the intensity of sunshine in coming through the thin air before reaching this mountain top. It means that if a perfect absorber, like a sooty surface, were exposed at right angles to the sun's rays outside the atmosphere, and if the earth were at average distance from the sun, a square centimeter of the surface would absorb enough radiation in one minute to raise the temperature of a gram of water 1.929 degrees Centigrade. The value from Aug. 14 to Sept. 3 ranged from 1.932 to 1.915, or slightly below the average for several years, 1.938. The word "satisfactory", means that the conditions for determining the solar constant were satisfactory, and, therefore, that the error of the final result is probably small. Sometimes "unsatisfactory" conditions occur when the sky is hazy. Heavier clouds occasionally preclude observation altogether.

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