

April 28

? WHY THE WEATHER ?

Dr. Charles F. Brooks,
of Clark University,
tells:

HOW THE SUN'S HEAT IS MEASURED

To measure accurately the heat of the sun is a task of great difficulty, largely because of the variability of the atmosphere through which the sun's rays must pass. The sun's heat is computed in terms of the "solar constant", or the number of heat units which would be received every minute per unit area of a theoretical surface perpendicular to the sun's rays and outside of the atmosphere, with the sun at its average distance. As no one can get outside of the atmosphere it is necessary to estimate as closely as possible how much of the sun's heat is lost in passing through the atmosphere at any particular time.

The best location for an observatory for this work is a mountain top in an arid, cloudless region, preferably near the equator - conditions not calculated to promote the comfort of the observer. Two stations are now operated by the Smithsonian Institution, one in Arizona, the other in Chile. The Argentine Government is installing a third, and a committee of interested Australians a fourth.

In making the daily observations of the solar constant, two methods are employed, the so-called "long", or bolometer, method and the "short", or pyranometer, way. The bolometer separates a beam of sunlight into the spectral colors, and the heat of each portion of the spectrum is determined by an electrical device. Two observations are taken an hour or two apart, with the sun at different elevations. When the sun is lower, the light passes through a thicker layer of atmosphere than when it is higher, hence the difference between these two observations will show the amount of heat absorbed by a known thickness of the atmosphere, from which the total absorption may be computed. Unfortunately, there is no assurance that the atmosphere will not change in the period between observations. To eliminate this error the short method is used, in which only one observation is taken and the amount of absorption estimated from the whiteness of the area around the sun.

(Tomorrow: Variations in the Sun's Heat.)
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