

A Science Service Feature

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? WHY THE WEATHER ?

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By Dr. Charles F. Brooks
of Clark Univeristy

THE WET BULB TEMPERATURE

For most of the time the indications of the ordinary thermometer satisfy our needs for temperature knowledge, but in muggy weather or when we go swimming the air temperature does not nearly tell the story of our comfort or discomfort. Then the indications of a wet bulb thermometer help. A wet bulb thermometer is simply a thermometer the bulb of which is covered with a thin piece of wet cloth. White muslin is commonly used. When the muslin is dry the thermometer behaves much like an ordinary one and shows approximately the air temperature. But when it is wet, evaporation lowers the temperature of the bulb. The process of evaporation requires a considerable amount of heat, for much energy is required to separate the molecules of water that are in contact in the liquid state but individually free in the gaseous state.

The drier the air, the more rapidly will evaporation and its attendant cooling take place, and the more will the wet bulb temperature be depressed below the air temperature. Evaporation would lower the temperature of the wet thermometer bulb indefinitely were it not for a compensatory return flow of heat from the surrounding air. The cooler the wet surface becomes the less rapid is the evaporation and the more rapid the receipt of heat. A point is reached where the increasing income of heat by conduction and radiation from the air equals the decreasing rate of loss of heat by evaporation from the bulb; so there the temperature stops falling and the thermometer indicates what is known as the wet-bulb temperature. It is this temperature we tend to feel when in a perspiration or when emerging from the water.

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SCIENCE SERVICE,
21st and B Sts.,
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