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PARADOXICAL ICE FORMATION

The belief prevails among fishermen at certain places on the Great Lakes that the surface ice of the lakes increases in thickness faster when the temperature is around zero Fahrenheit than when it is many degrees below zero, and this belief is not without foundation.

The rate of growth of the ice layer, except as affected slightly by the thickness of the latter, is proportional to the rate at which the water loses heat through the ice cover above it, and this, in turn, is proportional to the difference in temperature between the upper and lower surfaces of the ice. The temperature of the lower surface, which is in contact with unfrozen water, is always, in the case of fresh water, 32 degrees. If the upper surface is in direct contact with the air, it assumes a temperature near that of the latter, and under such circumstances the colder the air the faster the ice grows.

In extremely cold weather, however, there is usually much "steaming" of the open, deep water. In other words, a fog of ice needles is formed, and a light breeze may spread this over the ice. This fog, like fogs in general, checks the loss of heat from the surface below it by radiating heat downward and thus partially offsetting what the ice radiates upward. Besides exercising this effect, the fog often deposits on the ice a sheet of finely powdered snow, which, as it is a very poor conductor of heat, insulates the ice and thus quite effectively checks the loss of heat.

A demonstration of this paradoxical process, with definite figures, was published by W.J. Humphreys in the February, 1932, number of the Monthly Weather Review (Washington).

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