

No. 447

A Science Service Feature

Oct. 16

? WHY THE WEATHER ?

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LAKES TURNING OVER

At this season when there is much less turning over in the atmosphere than during the summer, convection, or overturning, is going on vigorously in lakes, perhaps bringing up disagreeable tastes and odors from the water near the bottom of our reservoirs. During the summer, the surface temperatures of most lakes in the northern United States and southern Canada rose into the 70s, while in the largest and deepest lakes the temperature at the bottom remained at 39 degrees Fahrenheit, the temperature of fresh water at its maximum density. In shallower water bodies, the lower levels were penetrated by the summer heat and still have a temperature well above 39.

Now, as water at the surface cools, it becomes heavier, sinks, and is replaced by warmer water from below. This repeated night after night until eventually the temperature of the lake becomes 39 degrees Fahrenheit throughout. This takes longest where the water is deepest. Thereafter, as the surface water cools it expands becoming lighter than the water below and remains at the top. Finally it freezes - first where shallowest. During the winter, the water next to the ice is 32 degrees Fahrenheit, while that at the bottom is 39 degrees. When spring comes the process is reversed - overturning taking place through the layer below 39 degrees till the surface reaches that temperature, then the warmer, lighter water remains on top unless disturbed by the wind.

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(Tomorrow: Lingering Warmth of Shores)

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