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Absorption of Light in the Okoboji Lakes

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Other animals which showed little or no sensitivity to rotenone were: *Cambarus inununis*, the water snails (*Physa halei* and *Limnia stagnalis*), aquatic insects of the families Corixidae and Notonectidae, and water mites (Hydrachnidae). Gill breathing animals were more sensitive to rotenone than air breathers. A concentration of 1:500,000 was lethal to tadpoles of *Rana pipiens* within eight hours, but metamorphosed animals could tolerate the same concentration for 24 hours. In general, the more exacting the oxygen requirements of the fish, the more sensitive it was to rotenone. It was found that rotenone was rapidly decomposed in water from West Okoboji and that a solution as strong as 1:100,000 was apparently harmless after 48 hours.

A gross examination of the gills of normal and derristreated fish showed a marked difference in blood supply. The gills of poisoned fish were pale pink instead of bright red, and this indicates that suffocation was due to decreased circulation of blood through the gill filaments. The beat of the heart remained strong, and it is probable that death was due to a vaso-constrictor action of the alkaloid.

The concentrations of the drug which killed fish were too dilute to affect other animals, except for the microcrustacea. These plankton animals were killed within one to four hours by concentrations that were lethal to bullheads in 24 hours. It is concluded that derris root, if carefully used, may be useful in removing undesirable fish from a lake, provided that the fish with which the waters are to be restocked do not depend upon the microcrustacea of the plankton for their food.

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ABSORPTION OF LIGHT IN THE OKOBOJI LAKES

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In August 1938 the absorption of light was measured at various depths in the Okoboji Lakes by means of a photronic cell and a tungsten filament lamp which were mounted behind glass windows in separate metal housings so that a parallel beam of light passed through one half meter of water before striking the photronic cell. This apparatus could be lowered to any desired depth, and the

transmission at that depth could be measured with a microammeter. This was converted to percentage transmission through one meter by comparison with a similar reading taken with the apparatus in air.

After the formation of the thermocline in Lake West Okoboji the transmission per meter was about 30 per cent for the upper 10 meters, rose sharply between 12 and 13 meters to 46 per cent, remained about constant to 17 meters, rose sharply to 74 per cent at 18 meters, then gradually to 81 per cent between 22 and 28 meters. Below 28 meters the transmission dropped to about 70 per cent. These data are being studied in relation to the distribution of plankton.

The average transmission of Lake East Okoboji was about 0.0002% per meter and varied only slightly with depth.

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