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NOTES ON A NEARLY COMPLETE KILL OF THE DOMINANT

AQUATIC PLANT SPECIES OF THIRD SISTER LAKE

by

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As part of a limnological investigation of a small lake, Third Sister Lake, a survey of the insect fauna living upon the submerged vegetation is being carried out over a two-year period. During the summer periods of the work the samples are being taken in the heavy beds of Potamogeton amplifolias and the invertebrate fauna of these samples tabulated. This plant species, Potamogeton amplifolias, represents approximately 90 per cent of the submerged vegetation of the lake. This is estimated on the basis of the area occupied and the density of these beds. The collection of plant material was carried on during the summer of 1939 and resumed as soon as this plant put in its appearance in the spring of 1940, about the first week of June. The plant beds made rapid growth progress for the first three weeks of June and assumed nearly normal maximum size for this lake. During the last week of June the water became quite warm (78°F.) and large masses of algae were seen floating in the lake. It was at this time that an unusual growth was seen on and about the leaves of the plants. This growth increased rapidly and by the first week in July had enveloped the entire individual plant with a transparent, gray-green veil. As far

as could be determined every plant of this species in the lake was so affected. This covering was not found on any other plant species. Small beds of Potamogeton natans and P. zosteriformis were not affected in any way. This growth continued until the entire submerged plant zone, with the exception of the small patches of other species, appeared to be veiled with it. The stems and leaves maintained their position in relation to the original plant and to the lake bottom, probably due to the buoyancy of the algal mass incorporated in or constituting the plant covering. A plant hook thrown into the middle of what appeared to be a heavy bed of plants and dragged through them would come up bare or at most with a few strands of rotten plant material. The plants became a dead brown color with no green showing. This condition was reached about the 20th of July. From this time until late August the plants gradually fell apart, the lower leaves going first and finally the only remaining part of the plant was the center stem and many of these decomposed. Decomposition of the stem was from the top toward the bottom. Following the complete loss of the leaves, there was a dormant period during which there was no signs of life in this plant species in the entire lake. This lasted about ten days and then small leaves began to appear on the tips of the few remaining erect stems. There were no signs of any new stems or plants coming from seeds, winter buds, or rootstocks. The only new life of the plants was the new leaves arising from the old stems. Growth of these leaves was rapid and new leaves appeared on the stem until the individual plants assumed a nearly normal appearance with the exception that they were much shorter than normal for this lake. This was perhaps due to the fact that nearly all of the stems had suffered some decomposition at the tips before

regeneration set in. The beds continued to grow until the turnover period, about the middle of November. At this time the original plant beds were outlined but there was only about 1/3 of the normal plants present in the lake.

Causative Organism

Unfortunately the plant material collected during the early part of the summer and early stages of killing was not saved as no such kill could have been anticipated. Plant material was collected and saved as soon as it was suspected that the plants were being affected. This material has been examined and several species of algae identified, most common among these was Rhizoclonium and Bulbochaete. None of the algae found are known to be parasitic or attack higher plants, and inquiry fails to disclose any knowledge of such a condition occurring on such a large scale. The plant material was examined by Dr. Sparrow of the Botany Department who is an authority on fungi. Dr. Sparrow failed to find any fungi on the material and nothing recognizable as the causative agent. The covering of the plants was quite transparent and it does not seem that light penetration to the plants was cut off enough to account for the complete kill.

Effect Upon the Lake

At this time it is impossible to attribute any definite effects of this plant kill on the entire lake. There can be little doubt that the effects upon the lake were manifold and perhaps far reaching. The material collected on plant-inhabiting and bottom dwelling organisms has not been worked up at this time, so no attempt to correlate this part of the

limnological problem with the abnormal plant condition of the summer can be made. It is doubtful that any definite statement as to the effect of the plant kill upon the invertebrate fauna can be made as too little is known about the normal fluctuations of the populations. General observations indicate that the aquatic insects normally inhabiting this species of plant were living on the bottom in the area formerly occupied by the plant beds. These insects have now taken up their normal habitat on the plant leaves. These organisms did not return to the plants as soon as the leaves appeared, but were first found to have returned to the plants when the plants were again fully leaved. These plants offer little protection until nearly full grown.

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