

A REPORT ON THE LAKES OF THE TIPPECANOE BASIN.*

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This paper presents the first section of the results of the survey of the Indiana lakes. The lakes herein described all lie in the Tippecanoe basin. This basin contains 1,890 square miles. The plan of the survey has been to construct a hydrographic map of the lakes; and to determine at critical levels the temperature together with the amount of oxygen, free carbon-dioxide, carbonates and plankton.

The following lakes have been mapped: Manitou, Yellow Creek, Beaver Dam, Silver, Plew, Sawmill, Irish, Kuhn, Hammon, Dan Kuhn and Ridinger.

Gas determinations and plankton collections have been made in the following lakes: Manitou, Yellow Creek, Pike, Eagle (Winona), Little Eagle (Chapman), Tippecanoe, Plew, Hammon (Big Barbee).

All of the lakes in this basin have been caused by irregularities in the great Erie-Saginaw interlobate moraine which was formed by the Erie and Huron-Saginaw lobes of the Wisconsin ice sheet. The basins are either kettle holes, irregularities in the ground moraine, channel lakes, or a combination of these.

In the lakes that we have mapped the area varies from 85,084 sq. M. in Sawmill lake to 3,265,607 sq. M. in Manitou. The volume varies from 284,716 cu. M. in the former to 9,787,024 cu. M. in the latter. Their maximum depth varies from 7.9 M. in Dan Kuhn lake to 22 M. in Yellow Creek lake. The average depth of Dan Kuhn lake is 2.588 M. and that of Yellow Creek lake is 10 M. These are the maximum and the minimum for the lakes mapped.

The bottom temperatures vary from 5.3° C. in Tippecanoe lake to 15° C. in Little Eagle (Chapman). The amount of wind distributed heat (i. e. in excess of 4° C.) has been calculated in gram calories per square centimeter of surface. This varies from 5,361 gram calories in Manitou to 10,563 calories in Yellow Creek lake.

The oxygen is always abundant in the epilimnion. In six observations it was found to exceed the saturation point at one or more levels. The

*A complete report of this work, with maps, tables, and other data, will be published as the July number of the Indiana University Studies for 1916.

oxygen is always reduced in the hypolimnion. The following lakes have no free oxygen in their lower levels: Hammon, Lingle, Little Eagle, Pike, Center and Webster.

All lakes that have been examined are hard water lakes. The maximum amount of carbon dioxide as carbonates varies in the different lakes from 27 cc. per liter to 60 cc. per liter. They are all increasingly acid in their lower levels, but in the epilimnion they are sometimes alkaline. This is due to photosynthesis.

The above statements in this discussion apply only to summer conditions.

No very general correlation has been found between the plankton and the dissolved gases. Some of the lakes are much richer in plankton than others. It seems probable at the present stage of the investigation that this is related to, and possibly caused by the varying amount of phanerogams that are produced in their littoral region.