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Progress Report for the summer of 1949.

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The major part of the summer was spent in learning and practicing the techniques for determining dissolved inorganic phosphorus and total phosphorus in a sample of water. In addition, facility was gained in the use of the Klett Summerson photoelectric colorimeter.

During the summer, the following things were also done:

A calibration curve was determined for iron determinations using the photoelectric colorimeter.

A calibration curve was determined for plant pigment determination using the photoelectric colorimeter. This was done because in the future pigment will be extracted from phytoplankton samples and analysed colorimetrically.

Several samples of water were centrifuged and the pigment extracted from the phytoplankton by means of acetone. The pigment was analysed colorimetrically with the Klett to see if the Klett could give satisfactory results. It did so, and therefore will be used in all pigment determinations.

Much time was spent reading the literature pertaining to phosphorus determinations of lake water

Qualitative plankton hauls were made and some of the samples were examined under the microscope for the purpose of reviewing some of the species present in Douglas Lake.

DISCUSSION REGARDING PHOSPHORUS INVESTIGATION

Various methods of determining dissolved phosphorus were tried. It was important to find a method that would show amounts of phosphorus as low as .001 p.p.m. All of the methods, involved the addition of solutions of ammonium molybdate and stannous chloride to the sample of water to bring out a blue color ( the color of the phosphorus ion ). The density of the blue color was compared to a color standard made up of known phosphorus concentration. The "various methods " as stated above, refer to differences in concentrations of ammonium molybdate and stannous chloride reagents. One of the methods tried is described in S.M.W.A. Another is one that was used by Robinson and Kemmerer, and a third is one described by Ohle in 1939. The latter is the one that was found most satisfactory for detecting small amounts of phosphorus.

For determination of total phosphorus, where digestion of the sample was required, the Robinson Kemmerer method was tried as also was the method described in S.M.W.A. The latter proved to be satisfactory and was a much simpler method.

The colors were compared first, visually in Nessler tubes, however later, the comparisons were made in the Klett Summerson photoelectric colorimeter.

Much time was spent in repeating analyses of similar waters to get practice in obtaining consistent results. With regards to the calibration of the Klett , it was found that .001 p.p.m. deflected the galvanometer needle approximately 2 scale divisions.

Rather than calculate a " permanent " coefficient, to be used without necessitating the preparation of any phosphorus standards, it proved to be more accurate to prepare one standard solution of known phosphorus content and compare its reading on the Klett with the Klett reading of the unknown. The ratio between the Klett readings of the known and unknown solutions equals the ratio of their concentrations.

$$\frac{\text{Klett reading of unknown}}{\text{Klett reading of known}} = \frac{\text{concentration of unknown}}{\text{concentration of known}}$$

Plans for the coming fall session.

The investigation of Lake Lansing chemical and physical conditions will be resumed but it is hoped that more data will be collected than has been in the past. Amongst the routine analyses, phosphorus will be determined and also pigment will be extracted from plankton samples and measured.

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Vertical series of phosphorus analyses taken from South Fishtail Bay  
Saturday August 6th 1949.

DEPTH	Total P	Dissolved P	Organic P
0	.015	.003	.012
10	.013	.003	.010
13	.019	.003	.016
16	.019	.007	.012
18	.028	.010	.018
20	.045	.010	.035

$$\left\{ \begin{array}{l} \text{Organic P} = \\ \text{total P} - \text{dissolved P} \end{array} \right.$$

