## DEPARTMENT OF THE NAVAL SERVINI

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are approximations, it is believed to be reasonably certain that the system of storage basins would have an aggregate impounding capacity of not less than five billion cubic feet.<sup>1</sup> It will be evident that the economic advantage accruing from such pools of dependable character cannot be lightly esteemed. In relation to mussel life there would be not only the addition of new flood areas, but also no doubt the improvement of the bed of the streams back of these areas. In these lake-approximations, or riverlakes as they have been called, admirable conditions should be afforded for the particularly valuable shell *L. luteola*. Not only does this shell work up well into buttons but it also lends itself readily to artificial propagation on a commercial basis. Although it is rare to find shells of commercial value in lakes, these river-lakes form a natural habitat for the above mentioned mussel. For example, Lake Peoria, a lake expansion in the Illinois R. forms at present probably the best mussel producing district in the United States. As the young mussels are parasitic on fish in the early stage of their life history, it would of course be necessary to construct effective fish-ways at these dams.

Further, by a study of tables 1 and 2 it will be seen that there are considerable stretches in the river where apparently suitable mussel areas obtain. If mussels are not found here in a survey, the fault will probably be due to flood conditions prohibiting their development in these areas. If such is the case, flow-regulation should overcome the unfavourable environment.

## FOOD, A FACTOR OF THE ENVIRONMENT.

In the discussion of favourable environments, due consideration must be given to the food problem. This is doubtless the most important factor in the environment of the mussel, and it is unfortunate that no extensive work has been done along this line. Actual records of stomach contents of fresh-water mussels are rare. Records of analysis show that among the microscopic forms, minute plants, diatomaceae and other algae, constitute a part of the food of the mussels. With reference to the food habits, Professor Clark and Dr. Wilson report in part, as follows: "The stomach contents of mussels taken from the main current of the St. Mary's, St. Joseph, and Maumee rivers were rather noteworthy for their paucity of organic material. Through the large mass of muddy matrix filling the stomach were usually scattered a few Scenedesmus, various diatoms, and an occasional Pediastrum or Cosmarium." Dr. Petersen, a Danish ecologist and Director of the Danish Biological Station, has fully demonstrated that the tine dust-like detritus forming a thin top layer of bottom deposits constitutes a large part of the food of the oyster and other mollusks. Dr. Jensen, Petersen's colleague, concluded after investigating the source of the detritus that its origin is primarily from sea plants, broken down until it assumes the fine dust like form. It has been suggested<sup>2</sup> that the "large mass of muddy matrix" referred to by Clark and Wilson was probably the kind of material described by Petersen as "dust-fine detritus." Although large bivalves may not be able to avail themselves of the layer of dust-fine detritus, it is no doubt taken in by water currents. Dr. Jensen also examined the water by centrifuging, and obtained material identical with the top layer of bottom deposits. In Oneida lake the surface of the bottom deposits, in bays and quiet bodies of water, is reported to be of precisely the character described by Dr. Petersen. It would, indeed, be very interesting to establish the relationship between stomach-contents of different species of mussels and the nature of the river bed in which they do, or do not thrive. It would, no doubt, lead to valuable information with regard to the choice and the establishment of new areas for their development. It may be found that the food

<sup>&</sup>lt;sup>1</sup> Sixth Annual Report, Hydro-Electric Power Commission of Ontario, 1916,

<sup>&</sup>lt;sup>2</sup> Relation of Mollusks to Fish in Oneida Lake, by Frank Collins Baker, University of Syracuse, N.Y., July, 1916.