

for the same year: "There can be nothing more destructive of fish life than the depositing of sawdust in the rivers and lakes. It is said to absolutely kill all vegetation, and it is well known that in waters where there is no vegetation fish life is noticeably absent. Minute crustacea of various kinds feed upon the juices of the plants which are to be found at the bottom. These afford food for the smaller fish, and again these furnish food for others of larger size."

Such was the state of our knowledge in 1900, when at the suggestion of Professor Prince, I undertook some experiments at St. Andrews, N.B., for the purpose of ascertaining whether or not sawdust was injurious to fish life.

PART II.—EXPERIMENTAL.

The results of these experiments were published in the report of the Minister of Marine and Fisheries, Ottawa, in 1901, and went to show that brook trout were not injured by living for two weeks in a water tank largely filled with sawdust, so long as a copious supply of water was allowed to run into and out of the tank. These results were abundantly corroborated this summer (1902) in a series of experiments carried on for several weeks in the biological laboratory of Queen's University, Kingston. Perch, rock bass and black bass fry were all used. In fact, the tests this season were, if anything, more exacting than they were in 1900. The volume of pine and of cedar sawdust used was 20 per cent. of the whole volume of the tank, and both adult fish and black bass fry (these latter only about six weeks old and an inch long) were kept for four or five days in the mixture, without any apparent injury.

When, however, sawdust was allowed to lie in still water, or in very slowly running water, entirely different results were obtained. Then, the most disastrous effects followed the immersion of different animals in the poisonous mixture. Not merely did adult fish die in it, but fish eggs, fry, aquatic worms, small arthropods, animalcules and water plants. Nor was the cause of death due to suffocation from lack of oxygen, because when air was made to bubble rapidly through the solution the final results were the same, the only difference being that death was somewhat delayed. No one could paint too vividly the deadly effects of strong solutions of pine or cedar sawdust when soaked in standing water. Adult fish died in two or three minutes; fish eggs in a few hours; fry and minnows in from ten to fifteen minutes; aquatic worms and insects, eight to twenty-four hours; aquatic plants, a few days. Every living thing died in it, and if one were to judge of its