

XIV.—ADDITIONAL REPORTS RELATIVE TO THE HATCHING AND PLANTING OF THE PENOBSCOT SALMON.

A—NEW HAMPSHIRE.

CONCORD, N. H., *June 14, 1873.*

DEAR SIR: The salmon-eggs received from Mr. Atkins were hatched at Meredith with a loss of about 30 per cent., and have been turned out in the head-waters of the Merrimack, at Woodstock, Thornton, West Campton, Campton, and Plymouth, together with most of those hatched by the Massachusetts commission, which I have just turned out for them—about 160,000 in all. I placed them in the main stream at those points, believing that there are less enemies in the main stream, in proportion to the territory, and better hiding-places on the cobble bottom, than in the small streams, to say nothing of the nearer approach to their natural condition in the ordinary natural way of breeding in our streams.

I think I wrote you in relation to the hatching and turning into Winnipiseogee and Sunapee Lakes 150,000 whitefish, hatched from eggs procured at Missisquoi Bay last fall. This is the fourth year we have hatched more or less of this species of fish, all of which have been put into the same waters, with the view of showing some results as soon as possible.

Last winter or early spring, I procured some of the whitefish from Winnipiseogee for you, but they were not in good condition; and thinking I could get some better specimens, I did not send them, and I have not been able to get any of them since. I will endeavor to give you both varieties next fall, when they can be caught freely.

I have been very busy, and have had no time to prepare a paper for you on the subject of whitefish-hatching, &c., but may be able to do so at some future time.

I expect soon to carry some eggs or young fry of the shad from North Andover, below the Lawrence dam, to Winnipiseogee Lake, where thousands have been deposited within the past five or six years.

I shall soon commence operations with the black bass, and hope to be able to stock several waters with them this season.

I have the honor to be, respectfully, yours,

WM. W. FLETCHER,
Commissioner.

Prof. S. F. BAIRD,

United States Commissioner of Fish and Fisheries.

B—NEW JERSEY.

SIR: I have the honor to report that the share of the spawn of the Maine salmon awarded to the State of New Jersey, amounting to forty thousand, were shipped by Mr. Atkins per express February 25, of the present year, and arrived at Troutdale March 1.

On being unpacked, they were found to be in excellent condition, the entire loss being not over one per cent., by far the least percentage of loss of any lot of spawn ever received at Troutdale. This I attribute to the method of packing adopted by Mr. Atkins, which consists in placing fine gauze above and below each layer of eggs, the netting being attached to a wire ring. The weight of the superincumbent mass is thus evenly distributed over the spawn, and they can also be unpacked, cleaned, and placed in the hatching-troughs with much greater facility. There is but little doubt but that many eggs are destroyed by the rough handling rendered necessary in unpacking and cleaning them when packed in the ordinary manner.

The entire forty thousand were unpacked and placed upon the grilles of my hatching-troughs in less than an hour.

Few spawn died after unpacking, though some were lost by the premature bursting of the shell of the egg, an accident of common occurrence, but of which I have not as yet been able to ascertain the cause.

The trays were examined twice daily, and the young removed to the nursery-trough, on the bottom of which fine gravel, thoroughly boiled to free it from any dirt, had been placed. The *alevin* stage was short, the sac having disappeared by April 20. The young were then fed upon beef's-heart freed from all fibrous particles, reduced to a fine pulp in a chopping-machine run by water-power, sifted through a fine screen of wire gauze, and fed them drop by drop through a bulb-syringe. The tedium of this process may be imagined when I state that nearly three hours were occupied in feeding the lot. This is the most critical period in the existence of the young fish, and the greatest care and patience are required.

On the adjournment of the legislature of the State of New Jersey, without making any appropriation for the use of the commissioners of fisheries, I at once wrote you in regard to the final distribution of these fishes. Acting under your advice, they were placed in streams as follows: May 1, 18,000 were placed in a pond containing no other fishes, and communicating by a small rivulet with the Muscouetcong Creek, a tributary of the Delaware; May 2, 15,000 were placed in Salmon Run, at the head-waters of the Raritan River; May 14, about 2,500 were placed in two streams upon the southern coast of Long Island.

Hoping that the above will meet with your approbation, I am, sir, respectfully, yours,

J. H. SLACK, M. D.

Prof. S. F. BAIRD,

United States Commissioner of Fish and Fisheries.

C—PENNSYLVANIA.

SALMON-HATCHING ON THE DELAWARE.

On March 22, 1873, by previous arrangement I received from Charles G. Atkins, Bucksport, Me., 40,000 salmon-eggs, forwarded by order of Spencer F. Baird, the United States commissioner of fisheries, to be hatched for the Delaware. I had already in position two wooden troughs, each 15 feet long and 2 feet wide in the clear, the bottoms covered to the depth of an inch with fine gravel, at Heitzman Spring, two miles above Easton, on the New Jersey side. This is a copious spring, flowing from limestone strata, a volume of about 600 gallons per minute, and the brooks, with rapids and pools, discharging, after a course of 150 yards, into the Delaware. The eggs were received with but slight loss (only 305) in transportation. The sudden transition, however, from water nearly as low as the freezing-point to spring-water at 51°, forced the hatching to such extent that there was great mortality in the embryos, many perishing with their heads and shoulders protruding from the eggs. A careful record kept by the person who had charge of the troughs shows a loss of 14,978 eggs and *alevin* from the time they were received until the last of them were discharged from the troughs—a period of about six weeks. The fry were allowed gradually to escape into the brook, as their yolk-sacs were absorbed, and at which time they commenced feeding. There are numerous large limestone-springs flowing into the Delaware in the neighborhood just at the water's edge, some of which are only seen at a very low stage of water. The fry will, therefore, find a suitable temperature in this part of the river. These, (say 25,000 fry,) with the 13,000 previously placed in a tributary of the Delaware, will, I trust, afford an opportunity to solve the problem whether the true salmon (*S. salar*) can be acclimated to this fine river.

THADDEUS NORRIS.

D—OHIO.

DEAR SIR: The salmon-eggs were put in the hatching-troughs at Castalia the 17th of March, and by the 1st of April 90 per cent. were out. Some of the eggs were developed 24 hours after reaching the spring. From the 1st of April to the 1st of May not over a hundred fish were lost. As they fed well at this time, the fish were placed, a few daily, in the large pond to care for themselves. This pond is of about 15 acres and contains an abundance of food; the usual temperature of the river is about 45° Fahrenheit; clear as crystal and deep, with shallow margins, on which numerous aquatic plants abound.

As there are no fishes inhabiting these waters, save small-sized species and the stickleback, I do not see but what the little salmon will have it their own way. There are at present about four thousand in the

pond. I do not think it worth while to send any more salmon-eggs to this State unless it be in the way of experiment, as this is the only water suited to their development. It discharges itself after a course of six miles into the Sandusky Bay, thence into Lake Erie. It has four dams in this short distance, and I doubt if a law could be passed at present to oblige the construction of fishways.

E. STERLING.

Professor S. F. BAIRD,

United States Commissioner of Fish and Fisheries.

E—WISCONSIN.

An arrangement was made with Mr. H. F. Dousman, of Waterville, Wis., to afford two troughs in his hatching-house for the care of the salmon-ova to be supplied for the State of Wisconsin. As the Eastern States had assumed the expense of the care of the eggs and the distribution of the young fish from the hatching-house to the waters in which they were to be placed, it was thought desirable that the Western States should show a like amount of public spirit, though they were not as well prepared, having neither fishery commissioners nor funds appropriated for the purpose of fish-hatching. Several gentlemen of Wisconsin were consulted by letter and in person, and a bill appropriating \$500 for the purpose was presented to the State legislature and passed, affording more than sufficient means to carry out the work for the season. Among those who were active in obtaining the appropriation were Dr. J. W. Hoyt, president of the Wisconsin Academy of Science and Art; Dr. I. A. Lapham, of Milwaukee; and Hon. L. J. Farwell, of Madison.

The first lot of spawn, 9,000 eggs, was received March 3, in very good condition, only 100 dead ones being found among them. A second lot came to hand on the 10th of the month, about 18,000 eggs, and with 350 dead ones. A third lot of 13,000 arrived March 19, with 1,000 of them dead. The spawn were received at Milwaukee and cared for between that place and Waterville, under the direction of Dr. I. A. Lapham.

Mr. Dousman was in correspondence with Mr. Atkins, of Bucksport, Me., with reference to the care of the eggs, and gave them his personal care and attention. On the 13th of March, the first young fish made its appearance, and before the last of the month all of the first lot were hatched. By the 1st of April, the second lot were also hatched, and within a few days all of the eggs remaining good were hatched.

Mr. Dousman started with 7,000 young fish on the 16th of April for the Menomonee River, and on the 17th turned them into the stream. They were put into the river at a rapids where the bottom was rocky, and which he deemed a favorable place for the young salmon.

This river was selected, after considerable discussion, as one of the more favorable streams on the Lake Michigan side of the State for the purpose. The Kewaunee River, of Kewaunee County, Wisconsin, was selected as another favorable stream, and on the 25th of the month Mr. Dousman started with all the remainder of the young fish, but 1,000, which were placed in Oconomowoc Lake.

A telegram from the steamboat agent announced the departure of a boat for Kewaunee the next day, and the young fish were brought into the city and put aboard the steamer. Before the steamer had left the dock, a stiff breeze from the eastward had closed the mouth of the river with floating ice, and all navigation from the port was stopped for several days.

In a letter of May 3, Mr. Dousman writes:

"The fish did very well until Sunday night, when they began to die, and on Monday morning about half of them were dead. I at once went to see Dr. Lapham, and we agreed that there was no use to try and get anywhere with them by rail, as they would probably all die; and the only chance to get any good out of them was to put them into the Milwaukee River.

"I accordingly took them up the river about five miles, to a very nice place in some rapids, and turned them loose.

"Those that were left seemed to be in very good condition and swam off quite lively.

The condition of navigation this spring was all that prevented a very gratifying success in the planting of salmon in the Wisconsin rivers; and although something may be expected from the few thousand fish put into these two streams, it would be advisable, if practicable, to make a larger experiment this fall.