

## XXVI.—REPORT ON THE PROPAGATION OF PENOBSCOT SALMON IN 1883-'84.

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The work at the Penobscot Station in Bucksport and Orland was conducted in all respects after the methods of former years. The collection of breeding salmon was commenced June 7 (about the usual date) and completed June 30. The total number purchased was 431, of which 28 died in the transporting cars before reaching the inclosure. The salmon were larger than ever before experienced at this station. They averaged 18 pounds in weight. Those taken by other fishermen in all parts of Penobscot River and bay were of similar size, which is entirely unprecedented in the history of the salmon fishery of this river. The salmon purchased by the station averaged 13.04 pounds in 1882; 16.55 pounds in 1881; and 13 pounds in 1880.

During the summer the mortality was unusually great, 133 being found dead, and three more unaccounted for at the end of the season. The original number inclosed having been 403, the percentage of loss was therefore 34. In 1882 it was but 24 per cent.; in 1881 it was 29 per cent., and in 1880 it was but 14 per cent. It will be seen that we have suffered great losses in the years when the salmon were large, and the heaviest loss of all is experienced in the present year when they are the largest ever known. It may be added that it has been a matter of common observation at the Penobscot Station since its inception that the large salmon are much more susceptible to injury from handling than the smaller specimens. However, this does not touch the first cause of the mortality in the inclosure, which it now seems probable, is connected with high water temperature. In support of this view may be mentioned the fact that the deaths in the cars, during transportation, always occur during very warm weather, when the temperature of the surface-water becomes much elevated.

Of the 403 salmon originally impounded, but 267 remained, and came to hand at the breeding season. The crop of eggs would have been a small one had it not been for two circumstances: 1st, the extraordinary size of the fish; and 2d, the unusual proportion of female fish, of which there were 207 out of 403, or 78 per cent., the highest percentage experienced.

The spawning operations occupied from October 29 to November 7.

There were taken 2,535,000 eggs in good condition, an average yield of 12,000 from each female.

Of defective eggs there were taken out at the regular pickings, performed for the most part weekly during their stay in the hatchery, a total of 45,659, and 69,950 unfertilized were discovered by means of concussion and removed just before shipment. The total losses prior to shipment were, therefore, 115,609, or 4.6 per cent. of the original number, leaving for shipment 2,420,000 healthy eggs. A *pro rata* division gave to the United States 1,370,000; to Maine, 700,000; to Massachusetts, 350,000.

The eggs reached the stage for transportation in January, and between January 30 and March 17 they were all dispatched in the usual manner and transported to their destinations with entire success.

The eggs falling to the share of the United States were assigned as follows:

To the Cold Spring Harbor hatchery, New York.....	500,000
To the Central Station, Washington, D. C.....	100,000
To the New Hampshire commissioners .....	100,000
To the Massachusetts commissioners .....	100,000
To the Maine commissioners.....	540,000
To Northville, Mich .....	30,000

The half million assigned to the Cold Spring Harbor hatchery were forwarded in three shipments, and reached their destination with a loss of but 229. The net result of incubation was 448,739 fish, of which 5,000 were retained in a rearing pond, to be planted hereafter (in November, 1884) in some tributary of the Hudson. The bulk of the fry were planted between April 30 and May 27. In Loon Lake, tributary to Schroon River, were placed 40,000; the same number in Tutbill and Beaver Dam brooks, tributary to Salmon River; the remainder, 363,739, were placed in several small streams in Warren County, tributary to the Hudson.

The package of 100,000 eggs addressed to the Central Station was forwarded thence to the Wytheville (Virginia) hatchery, and only 26 were found to be dead on unpacking. The superintendent, Mr. Seagle, said of them: "These eggs are *perfectly faultless*, so far as I can see; much the best lot I have ever received here." The losses during incubation were about 2,000. Of those hatched, 50,000 were planted in Oswego River, New York.

The eggs falling to Massachusetts, together with those assigned by the United States to Massachusetts and New Hampshire, amounting in all to 550,000, were forwarded to the joint hatchery of those States, at Plymouth, N. H. The aggregate losses *en route* were only 153. The incubation was conducted with slight loss, and all the fry planted in June in the Pemigewasset River, a tributary of the Merrimac, in the towns of Compton, Plymouth, Thornton, and Woodstock.

The eggs received by the Maine commissioners, 1,240,000 in number,

were forwarded to four hatching stations within the State: Norway, Weld, Enfield, and Dennysville. Of the 300,000 sent to Norway, but 6 eggs died *en route*. They were hatched with little loss and were planted: 50,000 in the Little Androscoggin, a tributary of the Androscoggin, at Norway, and the remaining 250,000 also in Norway in Crooked River, a tributary of Sebago Lake. Of the 200,000 sent to Weld, 45 died in the packing case, 1,835 in incubation, and 12 in transportation of fry. Of the fry, 75,000 were planted at Weld in Webb's River, a tributary of the Androscoggin, and 123,000 in brooks tributary to Sandy River, a branch of the Kennebec. To Enfield were sent 700,000 eggs, of which 130 died in the packing case. The incubation was conducted without serious loss, and the fry obtained were planted in the Penobscot and tributaries as follows: In the Penobscot, at Medway, 270,000; in the Mattawamkeag, at Bancroft, 85,000; in the Piscataquis, at Dover, 24,000; in the Mattawamkeag, at Island Falls, 24,000; in the mouth of the Piscataquis, at Howland, 70,000; in the Mattawamkeag, at the village of the same name, 215,000. Of the 40,000 sent to Dennysville, only 2 eggs died on the way, 100 died during incubation, and 39,500 were planted in Denny's River in the town of Dennysville.

The lot of 30,000 sent to Northville, Mich., went through with the loss of but 3 eggs on the road. In the course of incubation and development 105 eggs and 632 fish were lost, and 29,260 young fish were planted at the headwaters of Huron River, in Oakland County, Michigan.