

## 108.—SALMON IN THE HUDSON RIVER.

By A. N. CHENEY.

Ever since the beginning of artificial fish-culture there has been considerable discussion as to whether the Hudson ever was a natural salmon river, where the salmon regularly came from the sea for the purpose of spawning, and several attempts have been made to make its headwaters a spawning-ground for salmon at the present. When Henry Hudson, in 1609, sailed up the river he reported a "goodly store of salmon"; but with the exception of this statement, there is now no evidence that salmon ever ascended this river, and the few occasional fish that have been found were probably stragglers from the Connecticut. In fact, it must have been as impossible three centuries ago for salmon to reach the headwaters of the Hudson for the purpose of spawning as it is now—perhaps more so, owing to the absence of modern fishways. Cohoes Falls, near the mouth of the Mohawk, and Baker's Falls, at the great bend of the Hudson just below Glens Falls, must have kept the fish away from their suitable breeding-grounds. It is possible, of course, that salmon may have spawned in some of the small tributaries, or in the river itself below Baker's Falls; for it is stated on good authority that salmon spawn in the Restigouche River, of Canada, within a few miles of tide-water, and some instances are related of their spawning in brackish water at the head of the tide; but this is not at all likely, nor would such spawning suffice to keep the river stocked.

It is well known that salmon, in order to reach suitable spawning-grounds, will ascend falls of surprising height and surmount obstacles that would turn back any other fish. Some time ago the authorities in Norway caused some experiments to be made to ascertain the limit of the leaping powers of salmon. It was found that some fish jumped over a vertical barrier of 16 feet, while the average jump was 12 feet.

Between 1873 and 1876 the New York fish commission planted 156,000 California salmon fry (*Salmo gairdneri*) in the headwaters of the Hudson, and nearly 100,000 on Long Island. Few, if any, of these fish were ever afterwards heard from; and it is supposed that the water of the rivers of the Atlantic coast south of 41 degrees of latitude is too warm for this species from the Pacific slope. In 1880 the State of Vermont made a small plant of Atlantic salmon fry (*Salmo salar*) in the Battenkill, which flows from Vermont into the Hudson north of Troy, and this planting may account for the salmon taken in the Hudson in 1884. Natural obstructions, however, prevent these salmon from returning to the place where they were planted.

It was determined by the U. S. Fish Commission a few years ago, when the obstacles that had previously stood in the way of the ascent

of fish were being overcome, to plant salmon fry in the headwaters, where they would find suitable and abundant food; and if they returned as mature fish through the waters of the lower part of the river the success of the experiment would be assured. Since 1882, accordingly, more than a million and a half of fry have been planted in the Hudson by the U. S. Fish Commission. As ordinarily these salmon go down stream to salt water at 2 years of age, and 2 years later return to spawn, it was expected that some would come back in 1886, as the first plant thus made was in 1882. That they did so is evidenced by the catch of 3 salmon, weighing from 10 to 13 pounds each, in the river below the Troy dam.\*

A few days ago, during a freshet in the Hudson, two of the young salmon planted in the headwaters of the river were taken in the flume of a mill two miles above here, and replaced in the stream to go on their way to the sea. One weighed one-half and the other three-fourths of a pound, which shows very encouraging growth. The point where they were taken is three miles below Clendon Brook, which is the lowest tributary of the Hudson in which young salmon have been planted.

In October, 1885, at the request of Prof. S. F. Baird, I caught a few of the plant of 1884, then about 18 months old, and forwarded them to Washington. These young salmon were from 6 to 8 inches long, covered with fine silver scales and dotted with carmine and black. When they go to sea a few months later the carmine dots disappear, but the black spots remain and are found on the adult salmon. During the past summer I did not see in Clendon Brook (where they were planted) any that I considered of the plant of 1884; still, some may have been there, as all of one year's hatching do not go to sea at the same time. Some salmon grow much faster than others, and in one can of yearling fish (all hatched at the same time) I found that they ran in size from 2½ to about 6 inches. One of the salmon that were taken in 1885 contained ripe milt. In the summer of 1886 I reported that the plant of 1884 seemed to have gone to sea, and undoubtedly most of them had; but probably some of the slow growing fish of 1884 remained and could not be distinguished from those of 1885. In July last I took specimens of the plant of 1885, which were almost as large as the eighteen months' fish of the year before.

By these experiments Professor Baird has showed that salmon planted in the headwaters of the Hudson will endeavor to return there to spawn; and all that there seems to be lacking to make the Hudson a salmon river are means for the fish to get back to their spawning-grounds and laws for their protection. The obstacles are being overcome by means of fishways; but at present there is no protection for the Atlantic salmon in this State, as heretofore there have been no salmon to protect.

GLENS FALLS, N. Y., *December 27, 1886.*

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\* See notice of this in the Fish Commission Report for 1885, p. 110.