

THE HUDSON RIVER AS A SALMON STREAM.

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During the past twenty-five years to my personal knowledge, and probably for a longer period, there have appeared in various publications, from time to time, articles describing the Hudson River as an original salmon stream. Some have merely made the broad statement that the river once contained *Salmo salar*, and others in more explicit language have described the great quantities of salmon that once inhabited the stream, and deplored the fact that they had become extinct in the river. Almost without exception the sole foundation for the statement that the Hudson was once a natural salmon river rests upon an extract from the log of Henry Hudson, of the *Halfmoon*, who records that in 1609 he saw a "great store of salmons in the river" which now bears his name.

Within the past fifteen years a gentleman wrote to a newspaper published in a city on the bank of the Hudson declaring that his grandfather formerly caught large numbers of salmon in the Hudson, and for this reason it was a proper water to be restocked with the king of fresh-water fishes.

That old, old story, which originated in England or Scotland one or two hundred years ago, that apprentices and servants provided, when indentured to their masters, that they should not be required to eat salmon oftener than twice a week, has been transplanted to the banks of the Connecticut and has even been applied to the Hudson and its alleged salmon.

Nevertheless I maintain, and will show in this paper—as I believe, conclusively—that the Hudson was not originally a salmon stream, and that no salmon were ever found in it except possibly an estray from the Connecticut, until planted by the United States Fish Commission and the Fisheries Commission of the State of New York.

As to Hudson's declaration, or to be exact the declaration of Robert Juet, the master's mate of the *Halfmoon*, for he it was who wrote the journal—under date of September 3, 1609, he writes: "So wee weighed and went in and rode in five fathoms, oze ground, and saw many Salmons, and Mulletts and Rays very great. The hight is 40 degrees 30 minutes."

Under date of the 15th: "Wee ran up into the river, twentie leagues, passing by high mountains. Wee had a very good depth as thirteene fathoms, and great store of salmons in the river." A boat was sent out and with a net "ten great mullets of a foot and a half long apiece, and a ray as great as four men could hale into the ship" were taken.

Not a single salmon was captured at any time while the ship was in the river. The *Halfmoon* entered the mouth of the river September 3 and anchored inside Sandy Hook, and the next day, the 4th, the fishing was done. The ship ascended to the present site of the city of Hudson, and a boat's crew was sent up the stream to about where Waterford now stands, or a little north of the present city of Albany. The ship and its master returned and set sail for Europe on the 23d of September, so that all told Hudson was in the river twenty days in the month of September. Had there been salmon in the river he must have seen them between Sandy Hook and Waterford, and they would not have been in that portion of the river at that time, as their spawning habits would have taken them 50 miles farther up the river than Waterford, to Bakers Falls, to which point shad ran until stopped by the building of the Troy dam in 1825.

In some of the Canadian rivers there is a late run of salmon, the fish running as late as October, but this was not true of the Connecticut or of other New England salmon streams, nor has it proven true of the Hudson since it was stocked by artificial means. Hudson being an Englishman, and possibly more or less familiar with salmon in the rivers of his own country, and Juet being born at Limehouse, on the river Thames, where salmon were then common, it is perhaps fair to assume that seeing schools of large fish of some sort, one or the other associated them with the fish of his home waters and called them salmon in the log.

In a description of New Netherland, printed in Amsterdam, Holland, in 1671, occurs this sentence: "The streams and lakes, rich with fishes, furnish sturgeon, salmon, carp, bass, pike, roach, bleak, all sorts of eel, sunfish which resemble the bullhead in taste, and codfish which are caught near waterfalls." It will be observed that European common names are applied to the fishes, and doubtless the writer was familiar with the fishes of the old country and applied their names to the fishes in the new country that to him resembled those of the old. To this day codfish are not caught near waterfalls, and it is more than doubtful if salmon existed in the lakes and streams any more than bleak and roach.

New Netherland is bounded "on the south by Virginia, northeast by New England, north washed by the river Canada, and on the coast by the ocean." Besides codfish at the waterfalls and salmon in the streams and lakes, the writer found that "New Netherland hath, moreover, a wonderful little bird scarcely an inch long, quite brilliant in plumage, and sucking flowers like the bee; it is so delicate that a dash of water instantly kills it. When dried it is preserved as a curiosity." The humming bird is a little larger now and more hardy, but the description is perhaps as accurate as the statement that codfish are taken at waterfalls and salmon in lakes within the boundaries as given of New Netherland.

In 1680 Jasper Danker and Peter Sluyter, members of the society of Labadists in Holland, visited this country, and they record of the Mohawk, a tributary of the Hudson: "There are no fish in it, except trout, sunfish and other kinds peculiar to rivers, because the Cahoos stop the ascent of others." They dined in state "with Madam Rensselaer, at Albany, and had to eat exceedingly good pike, perch and other fish," but no salmon.

New York had salmon streams on the north, flowing into the St. Lawrence, Lake Champlain, and Lake Ontario, for I have found laws for their protection enacted in 1801 and later, and mentioning the Oswego, Grass, Racket, St. Regis rivers, and Fish

and Wood creeks, as well as other streams. A law enacted in 1801 provided that no dams should be erected on streams flowing into Lakes Ontario, Erie, or Champlain to prevent salmon from following their usual course up said streams, and when dams were erected they should be provided with what are now called fishways, to enable the fish to pass over the obstruction. There is every indication that the lawmakers of the last of the last century and the first of this understood fully the value of the fish in the waters of the State as food and threw every possible safeguard around them, but there is no record of a law protecting salmon in the Hudson until 1771, when it was enacted:

Whereas it is thought that [if] the fish called salmon, which are very plenty in some of the rivers and lakes in this and the neighboring colonies, were brought into Hudson's River, they would, by spawning there, soon become numerous, to the great advantage of the public.

And whereas a number of persons in the county of Albany propose to make the experiment and defray the expense attending the same: In order that the good design may be more effectually carried into execution, it is conceived necessary that a law should be passed for prohibiting the taking and destroying the fish for a term of years.

This act was signed by John, Earl of Dunmore, and in less than a month after, viz, April 2, 1771, the common council of Albany passed the following resolution: "Resolved by this board, that a letter be sent to William Penturp for to come down and agree with the corporation, if he can undertake to bring live salmons into Hudson's River." There is no record, however, that anything was actually done under this resolution to stock the Hudson with salmon.

Samuel Latham Mitchill, professor of natural history in Columbia College, New York, wrote in the Transactions of the Literary and Philosophical Society of New York, in 1815: "There is no steady migration of salmon to this river. Though pains have been taken to cherish the breed, salmon has never frequented the Hudson in any other manner than as a stray."

In 1857 Robert L. Pell, of Pelham, Ulster County, petitioned the legislature to construct fishways in the Hudson, and offered to stock the river with salmon without expense to the State. There is no evidence that the State accepted the proposal of Mr. Pell, and certainly the fishways were not built.

I believe it unnecessary to quote further from old records and laws to prove that the Hudson River was not originally a natural salmon stream. The evidence is chiefly of a negative character, but I am of the opinion that it is conclusive.

What has been done to make the Hudson a salmon stream has been done within the past twenty-five years, and I will rehearse the operations of the national and State fish commissions to this end as briefly as possible. Beginning with 1873, and continuing for three years after, the Fish Commission of New York planted in the tributaries of the Hudson a quantity of fry of the Pacific salmon, hatched from eggs furnished by the United States Fish Commission. Several hundred thousand fry were planted, but so far as known, after going to sea as smolts, not a single fish returned to the river, and this is true also of other plantings of this species of salmon in other Atlantic coast rivers.

In 1891 the late Col. Marshall McDonald, then United States Commissioner of Fisheries, requested me to make an examination of some tributaries of the Upper Hudson with a view to making a plant of yearling quinnat salmon. He was thoroughly convinced that the attempt to stock the Atlantic rivers with the fry of this fish was an abject failure, but at the Wytheville station of the Commission in

Virginia rainbow trout from California had been established in the hatchery stream by planting fingerling fish after plantings of fry of this species of fish had failed, and he desired to try a like experiment with the salmon also from the Pacific coast. I selected several streams in Vermont, tributary to the Battenkill River, which in turn flows into the Hudson. The streams were free from everything injurious to young salmon and there were no natural or artificial obstructions in them. Later, I went to Vermont with one of the United States Fish Commission cars and planted several thousand yearling (California) salmon in the streams selected for the purpose. Not one of them has ever been heard of since they went down to the sea.

The experiment of stocking the Hudson with Atlantic salmon (*Salmo salar*) was begun in 1882, at which time 225,000 fry were planted in small streams tributary to the head of the river about 260 miles above Sandy Hook. Nothing was heard from this plant until 1886, or four years after, when adult fish returned to the river weighing from 9 to 16 pounds, and ascended to Troy, where they were stopped by the State dam. Every year since, with one exception, plants of salmon fry or yearlings have been made in the river, and every year adult fish have been captured in the lower river by the nets of fishermen.

One thing has been proven to my satisfaction beyond peradventure by these experiments. The young of the *Salmo salar* when planted in the Hudson do not go to the sea until they are two years old, and they return from the sea when they are four years old. If I should make this statement before a European audience I would be accused of rank heresy, and possibly right here in Tampa delegates to the National Fisheries Congress will desire to know what proof I have of this assertion. I planted salmon fry in a trout stream tributary to the Hudson which had never contained salmon, and it was two years before they arrived at the smolt stage and took their departure for the sea in silvery livery. Selecting another stream I made a like plant, and it was two years before the parr put on the smolt dress and turning their tails to the sea drifted down with the current. During the past fourteen years I have planted *salar* fry in various streams, and always, when in a new stream where they could be watched that no mistake would be made, they have remained for two years before going to sea.

Since the first plant of *salar* fry a total of 3,486,000 have been planted in the Hudson River, this number including 12,000 yearlings. All the eggs were furnished by the United States Fish Commission and came from the Penobscot River in Maine. For a number of years after the initial plant the United States paid all the expenses of hatching and distributing the young fish, but later the Government furnished the eggs and the Fisheries, Game, and Forest Commission of New York hatched and planted the fish at the expense of the State.

It is of record that in one year over 300 adult salmon, from 10 to 38 pounds each, were taken in nets in the Lower Hudson, every fish taken contrary to law. It is true that some salmon taken in nets are released by the fisherman, but the high price offered for Hudson River salmon in the New York markets sorely tempts a fisherman to kill such salmon as may be taken in his net, instead of releasing them uninjured, as the law directs. Fishways have been erected in the Hudson by the State at Troy, Mechanicsville, and Thomsons Mills, but other fishways must be built before the river is open to the fish from the sea to the pure water of the upper river where the salmon would naturally go to find spawning-grounds. The Cohoes Falls on the Mohawk is

to-day as much of a bar to the upward migration of salmon as when Jasper Danker made the entry in his journal in 1680, which I have quoted. Baker Falls, on the main river, has been supposed to be one of the causes why salmon never frequented the river at the time they ran into the Connecticut. These falls stopped the shad and and it has been said that they would stop salmon. Possibly they would, but I visited the falls with the late Commissioner McDonald and we were both of the opinion that it was possible for salmon to surmount them on the proper stage of water.

Why the Hudson was not originally a salmon stream when the Connecticut, a neighboring river, was, I shall not attempt to explain. It may have been that Cohoes and other falls on the main river and its tributaries operated as a bar to keep them from their proper spawning-grounds, but one thing has been fully demonstrated: The Hudson River of to-day, with its sewage from towns and poisons from mills and factories, does not deter salmon from entering from the sea once the fry are planted in its headwaters, and with fishways in all the obstructions, natural and artificial, it could be made a self-sustaining salmon river if the netters would obey the law, while the State fisheries commission aided nature in keeping up the supply of young fish by artificially hatching the eggs. Colonel McDonald told me on more than one occasion that if the Hudson were open to salmon, and proper efforts were made to keep up the supply of young fish, and netting regulations were enforced, the river would from its salmon add \$100,000 a year of profit to the State financially, while largely augmenting the food supply.

GLENS FALLS, NEW YORK.