

## 10.—NOTES ON THE CAPTURE OF ATLANTIC SALMON AT SEA AND IN THE COAST WATERS OF THE EASTERN STATES.

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In carrying out its most important function—the maintenance and increase of the supply of food-fishes—the U. S. Commission of Fish and Fisheries, in addition to direct efforts to increase the abundance of fishes naturally inhabiting our various rivers, lakes, and coast waters, has given considerable attention to the experimental introduction of fishes into regions or streams to which they were not native. The wonderful success which has followed the planting of shad and striped bass fry in the waters of the Pacific coast is well known. The results attending the recent attempts of the Commission to establish a run of salmon (*Salmo salar*) in some of the large rivers of the Atlantic coast have been so noteworthy in the case of the Hudson as to afford reasonable ground for expecting the early inauguration of a regular fishery, should the present rate of increase in the abundance of the fish be maintained. Similar striking results may also be anticipated in all the more northern streams of the east coast, including the Housatonic, Connecticut, and Merrimac, in which salmon were at one time found in abundance and are now taken in small numbers, if the ascent of the adult fish to the headwaters for the purpose of spawning is permitted and if sufficiently extensive fish-cultural operations are continued.

The primary purpose of this paper is to record some of the apparent results of salmon propagation in our rivers as shown by the occurrence of the fish at points on the coast or at sea more or less remote from the places where fry have been deposited. While an interesting and instructive compilation might be made of the instances of the capture of salmon in the Hudson, Delaware, Susquehanna, Potomac, and other rivers in which the fish has been acclimated, such a work is not necessary in view of the notice which has already been accorded the matter in the public press and in the reports of several of the State fish commissions, notably the New York commission.

So much yet remains to be learned regarding the lines of migration of the salmon to and from the rivers, its winter habitat, the existence of an “instinct of nativity” which is supposed to impel the return of the fish to the place where hatched, the extent of the coastwise distribution of salmon originally belonging in a given river, and numerous other practical and scientific questions, that the presentation of any data bearing on the occurrence of the fish outside of the rivers may be regarded as acceptable and timely.

In an interesting article on “Salmon at Sea,” communicated to the issue of Forest and Stream for February 18, 1892, Mr. A. N. Cheney, the well-known angling expert and writer on fish-cultural matters, discusses the question of the whereabouts of salmon

after they leave the rivers, and quotes the following from a previous contribution by himself on the subject:

There is a certain mystery about the habits and movements of the sea salmon, after it has left the fresh-water rivers in which it spawns and gone down to the sea, that never has been satisfactorily explained. One theory is that all the salmon of the rivers along a coast may journey down to the sea, and then move ultimately in one great body southward along the coast until they find water of suitable temperature, with an abundance of food, in which to spend their time in growing fat until the spawning instinct warns them to return, when they proceed northward, each river school entering its own particular river as the main school arrives opposite the river mouth. Another theory is that the salmon of each river, as they arrive at its mouth after descending from its headwaters, go out to sea sufficiently far to find the conditions of temperature and food which suit them, and there they remain, separate from the salmon of other rivers, until it is time for them to return to fresh water. Considering the certainty with which the salmon of any particular river return again to the stream of their birth, the latter theory seems the more tenable of the two.

Another object of this paper is to solicit correspondence from fishermen, especially those engaged in the coast and offshore fisheries, concerning the circumstances of the capture of salmon in their nets, and to bring to their attention the opportunity they will thus have of increasing the knowledge of the movements of the salmon, of aiding in the determination of the results of fish-cultural operations, and of ultimately if not immediately benefiting themselves by supplying information that will conduce to the most effective application of artificial methods. To this end it is the intention to send the paper to fishermen engaged in the mackerel, menhaden, and other sea fisheries, and to operators of pound nets, traps, and other shore appliances, with the hope that instances of the capture of salmon may be communicated to this Commission and notes on the size, condition, movements, etc., of the fish be furnished.

To aid in the identification of the salmon when caught by fishermen who have not previously met with the fish, a figure is presented.

In this connection mention may be made of the chinook or quinnat salmon of the Pacific coast (*Oncorhynchus chowicha*), fry of which have been extensively planted in eastern waters by the U. S. Commission of Fish and Fisheries. Up to and including the year 1880, about 12,000,000 fry were deposited in rivers and other waters tributary to the Atlantic. While a few relatively large examples have been taken, this office has no information to show that the attempts to acclimate this species on the Atlantic coast have as yet been successful. In 1891 a few thousand yearling salmon were placed in New York waters tributary to the sea. The possibility of the survival and growth of some of these and of the large early colonies prompts this reference to the matter and suggests the publication of the accompanying figure of the species, to afford a basis for distinguishing the two kinds of salmon, which closely resemble each other. To further aid in the identification of the two species the following key has been prepared:

Rays in anal fin, 9; scales between gill opening and base of tail, 120; branchiostegals (false gill openings), 11.....	ATLANTIC SALMON.
Rays in anal fin, 16; scales between gill opening and base of tail, 150; branchiostegals, 15 to 19.....	PACIFIC SALMON.

Numerous instances might be cited of the taking of salmon in the waters of the Atlantic coast in recent years. Their occurrence in the traps and pound nets is in fact so common that it would hardly be entitled to notice at this time were it not for the circumstance that in regions in which salmon were already known there has been a decided increase in the number observed outside the rivers, and that the fish is now being taken in localities in which it was not previously found.

Instances of the capture of salmon in the coast waters of Maine are naturally numerous, and without significance so far as the purposes of the present paper are concerned. The existence of two important salmon rivers, the Kennebec and the Penobscot, affords an easy explanation of the presence of salmon on the shores on either side of the mouths of those streams. In the report of the U. S. Commission of Fish and Fisheries for 1872-73 Mr. Charles G. Atkins, now superintendent of the salmon-rearing establishment at East Orland, Me., and an authoritative writer on the Atlantic salmon, contributes some notes on its occurrence in the sea adjacent to Penobscot Bay and at Richmond Island, near Portland. These cases, however, have little bearing on the subject in hand, as Mr. Atkins suggests in a recent letter.

A special inquiry, personally conducted on Matinicus, Monhegan, and other islands lying far off the Maine coast, and special researches there made with appropriate apparatus, would doubtless disclose many interesting facts regarding the salmon of a practical and scientific nature. A few apparently unrecorded notes concerning the fish among islands off the island of Mount Desert may be given, which are probably indicative of what may be expected in other sections.

Mr. W. I. Mayo, who has fished herring brush-weirs at the Cranberry Isles for many years, and is a life-long fisherman in that section, communicates the intelligence that salmon were first observed about those islands in 1888. On June 17 a salmon, weighing 20 pounds, was taken in a herring weir, and on June 19 another, weighing 19 pounds, was caught. On July 14 of the same year 6 salmon, weighing 4 to 6 pounds apiece, were secured, but were liberated on account of their size. During the four years intervening between 1888 and 1893 none was taken around these islands, but in June of the latter year they reappeared. On June 11 a salmon weighing 15 pounds was taken in a weir, and on various occasions during that month a number weighing 12 to 15 pounds each were caught by boat fishermen on trawl lines fished for cod. The trawls were baited with herring and set on the bottom in rather deep water. Mr. Mayo states that these were the first salmon ever taken on trawl lines in that region. The Cranberry Isles lie off the southeastern part of Mount Desert Island, and are about 25 miles east from Penobscot Bay and about 35 miles in a straight line from the mouth of the Penobscot River.

On the Massachusetts coast salmon are now regularly taken each year at most of the important pound-net and trap fisheries. The largest numbers are caught in Cape Cod Bay. A State law prohibits the taking of salmon in nets and requires the return to the water alive of all fish so caught. This makes the fishermen diffident about giving information and renders difficult the determination of the abundance of the fish.

On June 6, 1879, the Cape Ann Advertiser, of Gloucester, contained the following note:

A 10-pound salmon was taken from a weir off Magnolia Thursday night. This is the first salmon caught off Cape Ann for over thirty years. On Saturday morning three more large salmon were taken. The fishermen are highly elated at the prospect of salmon-catching.

During the past five or six years a few salmon have been taken almost every season in the vicinity of Gloucester, the average annual catch being 4 to 6 fish. In 1888 the State fish commissioners reported the capture of 18 salmon in traps at Manchester and Gloucester. In 1893, 13 traps in the neighborhood of Gloucester took 5 salmon.

In December, 1891, a salmon weighing 28 pounds was caught on a cod trawl line set near Halfway Rock, off Salem Harbor, Mass.; Mr. William Deunett, of Gloucester, who secured the fish, reports that he sold it for \$46. Mr. Samuel Wiley, of Gloucester, in September, 1893, caught a salmon at sea off Gloucester on a trawl line fished for hake. These are the only instances that have been reported of the capture of salmon on a hook in the vicinity of Gloucester. ~~As the trawl lines in question were set on the bottom at a depth of 20 or 25 fathoms, the fact that these two fish at least were swimming on the bottom may be considered established.~~

Relatively large numbers of salmon have recently been taken in the pound nets of Cape Cod Bay. Capt. Atkins Hughes, of North Truro, one of the best-informed and most reliable fishermen in the region, informs us that at North Truro, the principal pound-net center in the bay, about 70 large salmon have been annually caught for two or three years. The fish are taken throughout the entire pound-net season, but are most common in the early part of the fishing year (May and June). Some fish weighing 25 to 28 pounds have recently been caught. For two or three years he has noticed in the pound nets in October large numbers of young salmon, about 6 inches long; each net probably takes one or two barrels of these annually; he had never observed these small fish before in his long fishing career in that region. In 1893, however, rather less than the usual number of large salmon were observed, and very few of the small fish mentioned were taken.

Mr. Vinal N. Edwards, of the Fish Commission station at Woods Holl, Mass., states that in September, 1892, when he visited the Cape Cod region, a great many salmon were being taken in the pound nets. They weighed 4 or 5 pounds apiece. At one pound-net fishery in Provincetown he saw enough salmon to fill two sugar barrels.

Concerning the occurrence of salmon in the Cape Cod region, Mr. Cheney, in the article previously mentioned, quotes Hon. Eugene G. Blackford, of New York, as follows:

We get every winter a few fish from the Atlantic coast that are evidently part of the schools of fish that run up into the Kennebec, Penobscot, and other eastern rivers. During November and December we had about 15 to 20 fish, weighing from 12 to 24 pounds each, that were caught in the mackerel nets in the vicinity of Provincetown and North Truro, Mass. These nets are set out from the Cape in very deep water. During the past two or three weeks we have received several specimens of very handsome salmon from Maine, where they have been caught by the smelt fishermen in their nets when they have been fishing for smelt. I think these catches of salmon go very far to prove that the schools of fish are not very far off from our shores during the time that they are not found in the rivers, and that both shad and salmon, when they leave our rivers, do not go either east or south, but are within 100 miles or so of the rivers where they were spawned. The fish are remarkable in being in splendid condition and perfect in form and appearance.

Mr. Cheney thinks the salmon taken off Cape Cod belong in either the Merrimac River or the Penobscot River; and, as in the year in question fish were being caught at the mouth of the Penobscot at the same time they were being taken at Cape Cod, he thinks it probable that the fish in the latter region were from the Merrimac.

In the pound-net fishery of the northern coast of New Jersey the recent capture of salmon has been a subject of much interest to the local fishermen and of considerable importance to fish-culturists and naturalists.

For a number of years a few salmon have, from time to time, been taken in Sandy Hook Bay, but within the past two or three years there has been an increase in the number caught. At Belford, the principal fishing center in the bay, Mr. M. C. Lohsen states that some have been taken weighing from 12 to 40 pounds, and that in

the spring of 1893 more than the usual number were caught in the pound nets. Mr. Harry White, of the same place, never took salmon in pound nets prior to 1891; he secured 1 that year and 2 in 1892, but failed to get any in 1893. Other fishermen, however, obtained one or two fish. The average weight of the salmon taken here is 12 to 15 pounds; the largest caught by Mr. White weighed 17½ pounds. Small ones, weighing half a pound each, are sometimes observed. It is only during the month of May that salmon are noticed on this shore. One weighing 16 pounds, taken in a pound net at this place in 1891, sold for \$11; the following year two, with a combined weight of 23 pounds, sold for \$15.98.

In the vicinity of Long Branch, we are informed of the recent capture of a number of salmon in the pound nets set directly in the ocean. Mr. Ed. Hennessey, of North Long Branch, reports that in 1892 two salmon and in 1893 one salmon were taken in his pound; they weighed from 10 to 15 pounds each. In April, 1891, Messrs. Gaskins and Hennessey, of the same place, secured a salmon in their pound; this was the only one they ever took. Messrs. W. T. Van Dyke & Co., pound-net fishermen of Long Branch, communicate the following instances of the taking of salmon by them in 1893: May 10, 1 salmon weighing 9½ pounds; May 11, 1 salmon weighing 13½ pounds; May 17, 1 salmon, and May 18, 1 salmon, weight not given. Messrs. West and Jeffrey, pound-net fishermen at Long Branch, report that in 1892 they caught 2 small salmon. In 1893, 3 fish were taken, as follows: May 10, a salmon weighing 19 pounds; May 18, 1 weighing 12 pounds; May 20, 1 weighing 10 pounds. Mr. Henry F. Harvey, who fishes a pound net at Mantoloking, N. J., about 35 miles south of Sandy Hook, communicates the information that in May, 1893, 2 salmon weighing 10 or 12 pounds each were taken at that place. None had ever before been caught there.

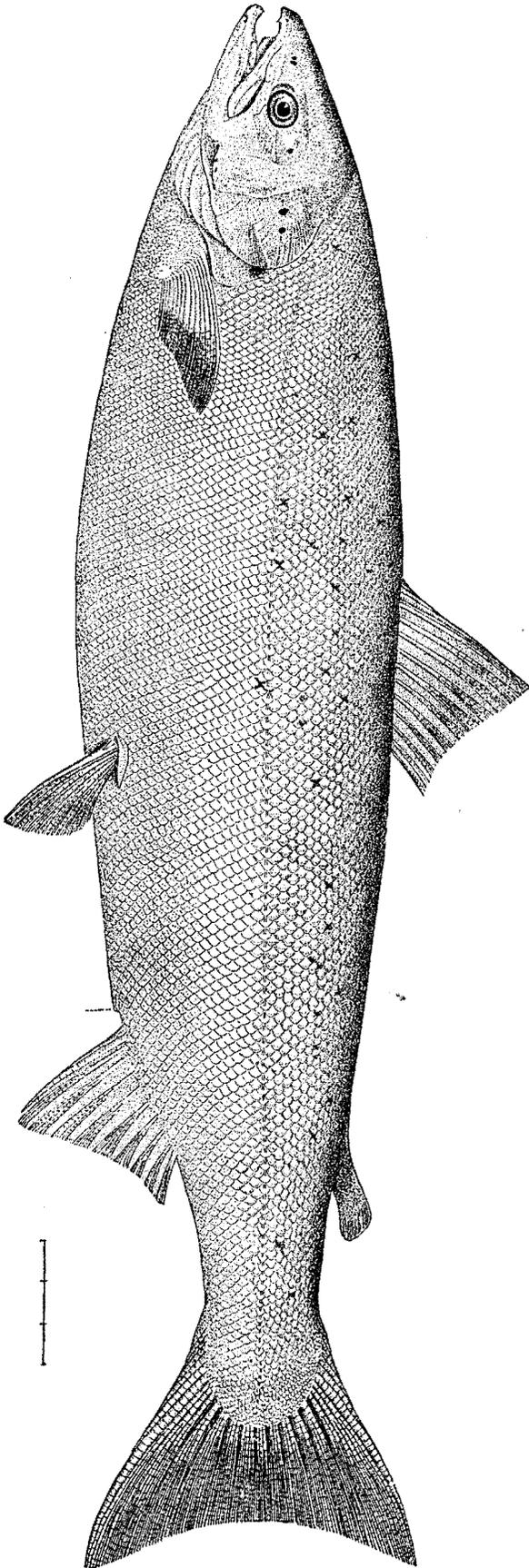
One of the most interesting facts at hand concerning the oceanic occurrence of the salmon has been noted in a previous paper in this Bulletin,\* but may be again referred to in order to make the present article more complete. Instances of the capture or observation of salmon far out at sea or even at relatively short distances from land are very rare and are entitled to publication whenever noted. About April 10, 1893, the mackerel schooner *Ethel B. Jacobs*, of Gloucester, Mass., was cruising for mackerel off the coast of Delaware. When in latitude 38°, at a point about 50 miles ESE. of Fenwick Island light-ship, the vessel fell in at night with a large body of mackerel, and the seine was thrown round a part of the school. Among the mackerel taken was an Atlantic salmon weighing 16 pounds, which Capt. Solomon Jacobs, who was in command of the schooner, sent home to Gloucester. Capt. Jacobs informs us that the fish was fat and in fine condition. Some of the crew told the captain that there was another salmon in the seine, but it escaped over the cork line as the seine was being "dried in." The light-ship mentioned is about 10 miles off the coast, so the place where these salmon were taken was about 60 miles from the nearest land.

The foregoing is the only instance known to this Commission of the capture of salmon so far at sea on the coast of the United States or of the taking of salmon in a purse seine with mackerel under any circumstances. Capt. S. J. Martin, the veteran fisherman of Gloucester, Mass., has never known of another such occurrence, and a special inquiry conducted by him among the mackerel fishermen of that port failed to disclose the knowledge among them of a similar case. >

\* Extension of the Recorded Range of Certain Marine and Fresh-water Fishes of the Atlantic Coast of the United States.



THE ATLANTIC SALMON (*Salmo salar*).



THE PACIFIC SALMON (*Oncorhynchus cloroides*)

