

133.—NOTES UPON FISH AND THE FISHERIES.

[Extracted from the official correspondence and compiled by the editor.]

SHIPMENT OF SOLES FROM ENGLAND TO NEW YORK, WITH GENERAL NOTES ON SOLES.—The following matter was communicated by Mr. E. G. Blackford, in a letter dated New York, November 5, 1885, and comprises information obtained from Mr. William Little, of 32 Scratton road, Southend, England, regarding the English soles. Mr. Little is the fisherman who attended this shipment of soles, caught by himself, from England to New York, which is referred to in the report proper of the Fish Commission Report for 1885, page xxxvii. The statement and notes are as follows:

The soles were caught in what is known as the Swin, on the borders of the North Sea, off Clackton. This locality is about 25 miles from the Thames River and from 1 to 5 miles from the shore, with sandy bottom and water from 3 to 6 fathoms deep. The fish, which were thought to be about six months old, were captured with a beam-trawl of about 1-inch mesh and about 27 score meshes to the beam. The vessel was a small trysail boat of about 14 tons, with a well, in which the fish were placed as soon as taken. Some of the fish had been in the well for several days before being placed in the cans. The soles were shipped at Havarick for Liverpool, being distributed in thirteen cans and five tubs. The cans held about 1 cwt. of water and the tubs about 2 cwts. each. The tubs were built expressly for carrying fish, and had been used for that purpose in sending fish to the London market. The water used was of a temperature of 43° F. The fish were ten hours on the road to Liverpool, where they arrived in excellent condition. Those in the cans were here transferred to four large tubs, each holding about 4 cwts. of water, which had been taken out at sea. These new tubs were rough, and had been used for beer previously. The soles were put on board the Cunard steamer Gallia, which sailed from Liverpool on Saturday, October 24, 1885, at noon. At 4 p. m., as soon as good clear water could be obtained, the water was changed on the fish by allowing a stream from the hose to flow gently into the tubs and overflow for a little time, care being exercised not to disturb the fish much. The water was again changed twice on Sunday, when the fish were still in good condition. Late Sunday afternoon a storm came up, lasting all night and part of the following day. For most of the time the storm was severe, and on Monday morning many of the fish were found thrown out of the tubs upon the deck, some of them being still alive. The motion of the water in the tubs must have been great, as most of the fish left in them were dead, owing to the pounding they had received against the sides, most

of the fish being bruised and scraped severely. Out of the six hundred that were shipped only nineteen were left alive, and of these the last two died on Thursday, October 29, when in mid-ocean.

Fishermen sometimes keep the soles, after taking them from the trawl, alive in the wells of their vessels for as much as eight or ten days before they are sent to market; and it is not a rare thing to find soles alive after lying for a day or two fully exposed on the wet boards at the bottom of the fishing-smack. This shows that they are not a particularly delicate fish. The fishing time for them is from April 1 to the early or middle part of October. Small ones are generally taken early in the season, and large ones later on. The largest soles are taken in the North Sea, in water deeper than 6 fathoms. They grow to about 18 inches in length. Very few other fishes are found on the same bottom where the soles are taken, but minnows and shrimps are often caught in the trawls with the soles. It is not certainly known upon what they feed. The spawning season is after June, or from the latter part of June on, as fish full of roe are taken in May, and others that are spent are taken in July, August, &c. Young of about 1½ inches in length have been taken in February. The soles come into the mouths of the rivers in spring and ascend as far as the water is sufficiently salty, and probably spawn there or along the shores. The temperature of the sea during summer is about 43° F. The price of soles in London ranges from 6*d.* per pound [12 cents], which is very low, to 7*s.* 6*d.* per pound [\$1.82], which is very high. The sole is considered the choicest fish in English waters. Among the fishermen it is generally fried.

FOOD FOR SOLES.—Mr. Fred Mather, under date of November 19, 1885, wrote:

I offered them soft clams to eat, and they took the pieces, but invariably ejected them. Then I considered the structure of their horizontal mouth, with teeth on the lower side, and it suggested an implement for pulling up sand-worms (*Arenicola piscatorium*). On following up this suggestion I found that the soles come out of the sand about dusk or a little before, and hunt for and greedily devour the sand-worms that they can find.

PRESERVING FISH WITH BORACIC ACID.—A Scotch firm of dealers in boracic acid as a fish preservative gives the following method for preserving various kinds of white fish, such as haddock, whiting, &c.:

The fish should be steeped (according to their size) from one to six hours in a solution of pure boracic acid, containing 7 ounces of the acid to every gallon of water used. After this treatment, pack in ordinary fish-boxes, and sprinkle slightly with a finely-powdered mixture of one-third boracic acid and two-thirds common salt. The moderate use of boracic acid in food may be regarded as even beneficial, while it is certainly not injurious.*

* For a mode of treating herring with boracic acid, see Bulletin for 1886, page 66.

FISHERY REGULATION IN MANCHOORIA.—The following notification to fishermen was issued in 1885 by the Russian Government. Dr. D. J. Macgowan forwarded a copy, which he had obtained from the Russian consul-general at Shanghai, China, as follows:

“*Fisheries in Manchooria*.—Every vessel going to fish in the waters of Russian Manchooria must go into the nearest harbor from the place where she has decided to fish, and obtain a permit from the official in charge of the harbor or port, and after she has filled up with fish she must return to the same harbor and declare the quantity of fish she has taken on board, and pay duty thereon at the rate of about 10 mex cents per picul,* to wit, 5 kopecks per pood, paper money (2 kopecks=1 mex cent; 36 pounds=1 pood). The same regulation is for seaweed, except that the duty is 5 kopecks per pood in gold. The regulation is intended for this year only.”

Dr. Macgowan adds that the northwestern coasts of the Pacific abound with fishes, both in-shore and deep-sea, beyond any other waters of the globe, and these fisheries are destined to enrich Eastern Siberia, to increase the food supply of nations, and to afford employment to the more enterprising of our Cape Cod countrymen, as their skill and daring are needed for developing the Manchoorian fisheries, and who, when unoccupied afloat, as they would be in winter, could act as hunters and lumbermen.

PREPARATION OF SHRIMPS IN CHINA.—Dr. D. J. Macgowan wrote from the United States consulate at Wenchow, China, August 20, 1885, that common shrimps, when captured, are boiled with a little salt and then sun-dried. The larger species (with shells fragile and crispy) are boiled with a dash of salt, sun-dried, beaten in stone mortars with wooden pestles, the mass being then placed in a winnowing machine (an ancient Chinese article, identical with patented ones in the West), when the chitinous integument is scattered out like chaff. It is a toothsome article, and fetches 40 cents per catty retail [30 cents a pound]. The best preparation of shrimps is a paste prepared by grinding between stones.

CARP WANTED IN TASMANIA.—Writing on August 19, 1885, Messrs. August Johnson and A. Marchant, of Circular Ponds, Mole Creek, Tasmania, said:

We have on our farms lagoons of about 3 acres, creeks and natural ponds, with a very mild climate, and if by your aid we could stock them with German carp you would have the hearty thanks of the whole colony, who would be benefited by it.

Will it be possible to forward to this country, from your breeding ponds, either the ova or live breeding fish of the German carp? It takes the San Francisco steamers about twenty-six days to Sydney, and from there we are about three days distant.

* One picul=133½ pounds, and 5 kopecks=about 3 cents.

The way in which your Government has provided for the people, and the way your fish-breeding establishments are managed, may well excite the admiration of other countries. We have in Tasmania a salmon commission which has been established for twenty-one years, and yet nothing is more scarce than fish, although Tasmania abounds with lakes, lagoons, and rivers.

PROTECTION OF SALMON IN OREGON.—Mr. B. F. Dowell, writing from Jacksonville, Oreg., on October 14, 1885, said :

Although for many years Oregon has passed laws for the protection of salmon, &c., I have known of only two prosecutions under these laws. In 1872 the legislature prohibited the erection of dams across any stream in which salmon or the migrating fish run, without erecting a ladder or fishway, under penalty of from \$50 to \$500; and the act gave justices of the peace jurisdiction over the offense. Under this act a man was indicted at The Dalles, found guilty, and fined \$50 and costs. Recently an action was begun in Jacksonville in a justice's court against E. S. and J. C. Trumble for erecting a dam across Rogue River, which it was alleged obstructed the ascent of salmon. On trial by jury they were found guilty and fined \$75 and costs. An appeal was taken and the case next tried in the circuit court. Here the contest was principally over the words "dam or way" in the statute, and whether the dam was high enough to obstruct the passage of the fish. The court charged the jury that if there was a sufficient open way for the fish to pass easily it would be sufficient, whether there was or was not a sufficient open way for the fish to pass up the river. The evidence was conflicting about an open way, and the jury found the defendants not guilty.

A PREPARATION FROM THE GIANT KELP OF THE PACIFIC.—In a letter from Port Townsend, Wash., October 10, 1885, Mr. James G. Swan speaks of an extract or preparation called algin, which he thinks can be made profitably from the giant kelp of the Pacific. He then cites an article by Mr. Stanford which says: "The evaporation is effected in a similar manner to that of gelatine, in thin layers on trays or slate shelves. Thus prepared the sodium alginate presents the form of thin, almost colorless sheets, resembling gelatine, but very flexible. It has several remarkable properties which distinguish it from all other known substances. It bleaches easily, and under pressure becomes very hard. It also makes good paper, tough and transparent, but with no fiber." It is stated also that in some districts of Japan this kelp paper is used as a cheap substitute for window-glass to light the dwellings of the poorer classes.

FISH KILLED BY SUFFOCATION.—Hon. John M. Pearson, writing from Godfrey, Ill., on November 2, 1885, said that in his artificial pond, fed entirely by surface water, he was successful in raising sunfish, crappies, and black bass, the crappie being regarded as the best pan-fish.

The winter of 1884-'85 was very long and cold, and though the ice was frequently cut, the holes quickly froze over. When the ice melted in spring the water was almost covered with dead fish, thousands having died from suffocation. Among the largest were a black bass, 16½ inches long, and weighing, when found, 3 pounds; a crappie, 15½ inches long, same weight; and a jack-salmon (*Stizostedion*), 14½ inches long.

ATLANTIC SALMON TAKEN IN POTOMAC RIVER.—About June 10, 1885, a fish was taken at Mattawoman Point, on the Potomac River, which proved to be the regular Atlantic salmon. As it was probably the first ever seen from the Potomac, the specimen is of great scientific interest. [From letter of Professor Baird to Mr. William E. Stuart, June 14, 1885.]

CONNECTICUT RIVER SALMON.—The first Connecticut River salmon of 1886 was received at Fulton Market the first week in February. It weighed 19½ pounds and retailed at \$1.75 per pound, making \$34.12 for the whole fish.

LANDLOCKED SALMON EGGS FROM LAKE SUNAPEE.—Mr. Elliott B. Hodge, superintendent of the State hatchery at Plymouth, N. H., writing on January 5, 1886, says: "I took a few thousand landlocked salmon eggs this fall from fish taken in Sunapee Lake. I think that these are the first eggs taken from these fish in waters that have been artificially stocked with them."

On December 9, 1885, a landlocked salmon was speared in Squam River, 34 inches in length, 9 inches in depth, and weighing 15 pounds. The fish was a male, and when taken was in poor condition, while in September the same fish would have weighed nearly 20 pounds. Much larger ones have been captured in Squam Lake. This illustrates the extraordinary growth of landlocked salmon in New Hampshire, where they have been a success in all waters adapted to their habits.

AMERICAN TROUT IN NORWAY.—In the years 1882-'83 the Norwegian inspector of fisheries imported, at the public expense, a parcel of ova of the American trout (*Salmo fontinalis*), with a view to introduce this fish into Norwegian waters, and the result has been so satisfactory that last autumn one of the hatching establishments near Christiania had some 30,000 young fish to offer for sale, which were then about two and a half years old. The result appears to have been welcomed with great satisfaction in Norway, as it proves that this fish is capable of increasing in almost stagnant waters, where the Norwegian trout cannot exist, though its size is smaller. As an example of the success of this experiment it may be mentioned that the Norwegian inspector of fisheries, Prof. A. Landmark, of Christiania, offers these ova at 10 shillings per thousand. [From Nature, April 29, 1886.]

LARGE CATFISH.—We catch an occasional catfish in the Missouri River of great size. I saw one that weighed 110 pounds. [F. W. Avery, Richland, Dak.]

LARGE CATCH OF POLLOCK.—Capt. S. J. Martin, in a letter dated Gloucester, Mass., November 11, 1885, wrote :

The vessels using cod gill-nets, 32 in number, are doing well catching pollock. The most pollock ever received at Gloucester have been landed during the last four weeks. They have been of very large size, averaging 22 pounds. I think these pollock have been on the ground a hundred years, or perhaps a great while longer, yet nobody knew it until the cod gill-nets were used. There will be 400 men getting a living by catching pollock and cod in gill-nets. The pollock of large size will not bite a hook. That has been tried this fall to everybody's satisfaction. I have not seen one pollock of that size taken with a hook. The handliners gave it up in disgust.

SHAD, POLLOCK, BILL-FISH, ETC., AT CAPE COD.—Under date of January 2, 1886, Mr. Vinal N. Edwards, who had just returned from a trip on Cape Cod, reports, from Wood's Holl, Mass., as follows :

Messrs. C. K. Sullivan and S. D. Rich, of the Northwestern Weir Company, at North Truro, caught in their traps this fall 86 white shad and about 200 hickory shad (*Clupea mediocris*). Capt. Thomas Smith, of the East Harbor Weir Company, said they caught 60 white shad and about 100 hickory shad. The seven weirs at North Truro each took similar or relative numbers. What they called deep sea shad were the common white shad (*Clupea sapidissima*). Some of the men say they catch about the same number every fall in November, while others say they never caught them before at this season. All the traps are set in 40 feet of water at high tide, and are about a mile from shore. Some of these shad brought in the market as much as \$1 apiece, as they were large and fat. Going over to Provincetown, the fish-trap men there said they caught about the same number of shad as at Truro. They say that eighteen or twenty years ago shad were very abundant in the fall, and large numbers were caught in the weirs and salted, selling for a good price during the winter, but not bringing much fresh, but that recently few have been taken, yet always more in fall than spring.

There was a good run of small pollock about 12 to 14 inches long, some of the traps taking as high as 200 barrels at a haul. Mr. C. K. Sullivan sent 75 sugar-barrels of them to Boston at one time and got \$5 a barrel. They had had the weir full every day for about two weeks, and had turned them all out, until one man shipped 5 barrels to try the market, and received \$7 per barrel. After that these fish were marketed, but they were striking off the coast then, so that comparatively few more were taken.

There was also a good run of bill-fish, some of the weirs being so full that the nets were let down on the bottom to turn the fish out. This was during the last of November, the run lasting about two weeks. As many as 500 barrels were thought to be on hand at one time. They were larger than usual, and would not go through the mesh of the net.

In the fish-market at Provincetown I noticed a small-mouth flat-fish that looked like our common small-mouth flat-fish, but the back was dark brown, with orange-yellow spots all over, and it looked longer than the common flat-fish in proportion to its width, with a sharper nose.*

About Truro they did not catch any menhaden, though usually their weirs were full in the fall. About November 15 the Northwestern Weir Company caught 36 large horse-mackerel. The traps were taken up about December 15, but very little had been taken for the past fortnight.

SHAD CAUGHT IN NOVEMBER.—Mr. E. J. Cory, writing from Tiverton Four Corners, R. I., December 31, 1885, said: "In 1885 I caught a dozen or more of the common river shad; in 1884 I took three or four of them; and in 1883 I caught one, which I then noticed as something unusual. All were taken about November 15, in my traps located on the west side of Sakonnet River, about $1\frac{1}{2}$ miles from the mouth, near what is called Stony Brook. They were set in about 4 fathoms of water at ordinary tides, and about 250 yards from the shore. None of the other fishermen in this neighborhood, so far as I know, have caught any shad at this time of year." In 1886 Mr. Cory removed his traps about November 15, prior to which date he had caught no shad.

Mr. Vinal N. Edwards wrote from Wood's Holl, Mass., January 4, 1886: "I myself saw Lewis Edwards catch three such shad in a fish-trap at Hadley Harbor about November 1, 1885. They were very large."

DO SHAD SPAWN IN SALT OR BRACKISH WATER?—Experiments have been made, with apparently satisfactory results, which show that it is impossible to hatch and bring to maturity the eggs of shad in salt or brackish water. Nevertheless the impression has prevailed and still continues to prevail among the fishermen that shad will actually propagate in other than fresh water.

Mr. Frederick Kirtland, writing on this subject from Saybrook, Conn., November 23, 1886, says:

"Having been engaged in shad-fishing for many years at the mouth of the Connecticut River and along the adjacent shores of Long Island Sound, I have become satisfied, and others agree with me in this, that nearly, if not quite all, the shad we now catch along the shore of the sound are hatched and grown outside of the rivers, either in the sound at or near the mouths of the fresh-water streams, or perhaps some of them may enter these streams. One of my reasons for so believing is that the fishermen in West Brook, Clinton, and Madison, west of the mouth of the Connecticut River, during the spawning season in June, sometimes take 50 or 100 racer or spawned shad in a day, while the fishermen in and near the mouth of the river take almost none. It seems scarcely possible that these spawned fish should have come all the way down the river, escaping the nets and pounds, and then have

* Dr. T. H. Bean pronounced this flat-fish to be *Limanda ferruginea*.

come into the shore 10 or 12 miles from the river, but rather I think these fish deposited their spawn near where they were caught."

Also, Mr. W. B. Tully, writing from Saybrook, Conn., December 13, 1886, says:

"About 3 miles west of the Connecticut River is a small stream called Oyster River, which for the first mile is a salt water creek, and which has a dam less than 2 miles from its mouth, that prevents fish from ascending; yet shad were formerly caught in the deep holes of this stream, sometimes as many as one hundred at a haul. Several days before the nets near the Connecticut River take them, the fishermen 5 or 6 miles west of the river begin to catch shad that have deposited their spawn. Occasionally shad are taken near the mouth of the river in such condition that spawn runs freely from them, in which case it would be impossible for these fish to reach fresh water in which to deposit their spawn. The fishermen here believe that shad are hatched in salt or brackish water."

VARIATION IN NUTRITIVE VALUE OF OYSTERS.—In the Fish Commission Report of 1883, pages 486-488, are statistics of chemical analyses of different kinds of oysters. Those from Norfolk, Va., were secured in April, and the Norfolk dealers have called attention to the fact that at that time of the year their oysters are not in the best condition. So the figures given by Professor Atwater should not be taken as representing the nutritive value of Norfolk oysters at all times of the year. As it is not stated whether these were Lynn Haven oysters, worth \$2.50 per gallon, or Elizabeth River oysters, worth 50 cents per gallon, the dealers think less value should attach to the analyses. Probably the samples furnished to Professor Atwater were much poorer than would have been obtained in the autumn or winter. Of course there was no intention to do injustice to Norfolk oysters by taking them in an unfavorable season. Concerning the question as to why oysters should differ in nutritive value, Prof. John A. Ryder has explained in some of his reports that it is due to the amount of nutritive matter stored up as connective tissue in the body, mass, and mantle of the oyster. This tissue varies greatly in amount in different individuals in different seasons. At the end of the spawning season the oyster is exceedingly emaciated in flesh. If such samples were selected for analysis the result would doubtless be very different from the case of those selected when the oysters were in good condition as to flesh or fatness.

BELOSTOMA.—Dr. A. P. Gardner, of Dunning, Pa., has observed a large beetle (*Belostoma americanum*) seizing a fish 3 inches long and holding it fast. The beetle with its sharp claws goaded the fish until dead, then fed upon it, sucking blood or other matter from the fish. After drawing off his pond these beetles arose in the air in early evening and left the place, but when the pond was filled again plenty of them reappeared.

GROWTH OF CARP.—On December 2, 1885, the size and weight of two young carp which were just 5½ months old, and which were reared at the carp ponds in Washington, were as follows, as reported by Dr. Hessel:

Measurements.	No. 1, mirror.	No. 2, leather.
Length from mouth to end of caudal fin..... inches..	12	12½
Vertical height (from dorsal to ventral fin)..... do.....	4	4
Circumference..... do.....	7½	8
Weight..... ounces..	17	18

The eggs were obtained by methods which fixed exactly the day of impregnation, which in this case took place on June 15, 1885.

VARIETIES OF GERMAN CARP.—The typical form of the species is what is known as full-scale carp. From this, fish-culturists, availing themselves of the tendency of all animals to break under domestication, and by exercising care in selection, have produced two well-defined varieties, namely, the mirror and the leather carp. In the mirror carp the scales are much larger and more irregular than in the full-scale fish, and portions of the skin are without scale covering. In the extreme form of variation, the leather carp, the scales have entirely disappeared. Between the scale, the mirror, and the leather carp there are an infinite number of intermediate forms, approximating more nearly to one or the other of these distinct varieties. Neither the mirror nor the leather variety can be maintained pure except by careful selection in breeding. It will be found that the progeny of either the mirror or the leather carp will present all the intermediate forms from scale to leather. From each generation it will be necessary to select those individuals for breeders which represent more nearly the form or variety which it is desired to perpetuate.

DISTINGUISHING THE SEX OF FISH.—Mr. Martin Metcalf, of Battle Creek, Mich., writing on February 13, 1886, says:

The experienced fish manipulator can detect the male fish of almost any family at sight, by reason of its smaller, cleaner, slenderer make, narrower and more pointed muzzle, distance between the eyes, and other inexpressible peculiarities, which when once recognized are almost unmistakable.

HOW TO CATCH CRAWFISH.—The following will be of use to carp culturists: (1) Take thirty to fifty osier twigs, or split white-ash sticks, according to the size used, and 3 feet in length, form a bundle of the whole and bind at each end with strong cord or wire, separate the twigs or splints in the center of the bundle by means of sticks 10, 15, and 20 inches long and forked at each end, so that when in place the trap will be spindle-like in shape, with the twigs evenly distributed about its circumference and center, and far enough apart to allow easy entrance for the fish, but from which they will not readily escape. Bait the inside with fresh meat of any kind, only see that it

is fresh and bloody if possible; set the same with the current in running water; if blood can be procured, pour a pint or so on the bait; it will taint the stream for a long distance. I have watched crawfish in great numbers follow up the track or scent thus made from 30 rods below the trap, and have known 6 and 8 quarts taken at a single lift. Should one desire a more substantial and comely rig, it can be made by driving a smooth, stout stick lengthwise through the center of the bundle, slide the tied ends down on the stick until the whole bulges to a diameter of 20 inches or more in the center, fasten the tied ends of the twigs to the center stick, put three hoops of proper size over the whole and fasten with fine copper wire. In order to make hiding places for the crawfish and so retain them in the trap, numbers of the twigs should also traverse it in various directions. [Dr. E. Sterling, Cleveland, Ohio.]

(2) Take an ordinary minnow-net, tie some fresh beef in the bottom, and drop it into the water where there are crawfish. You will soon have more than you have any use for. They will fasten greedily to the meat, and will not let go until taken off. [G. H. Morgan.]

(3) Great quantities of these crustacea are captured in lower Louisiana for the New Orleans market, where they are highly esteemed for making "gumbo," a dish prepared by the creole cooks. The method of capture is simple. A piece of cord two feet long is tied at one end to the middle of a light stick about a foot long. To the other end of the cord is securely tied a small bit of meat, usually fat bacon. An indefinite number of these machines, perhaps two dozen, may be used by one person. He tosses them out into the muddy ponds or "borrow pits," near the levees. He then wades gently through the pond with a pail or basket in one hand, and, visiting each line in turn, slowly raises it out of the water and drops the catch into the receptacle provided.

PRICE OF CARP IN GERMAN MARKETS IN 1884.—In no other place in Germany, and in the same time, is so much sea-fish eaten as in Hamburg. No place eats more carp than Hamburg, and carp bring there three-fourths more than the common sea-fishes. The price is always a middling one between salmon and such common sea-fishes as plaice, cod, &c.; while they sell a great deal higher than herring and shad. Bohemia and Galicia send great quantities of carp to the German markets.

In Berlin good carp cost 1 shilling (English) a pound, salmon 1½ shillings, mountain trout 2 and 2½ shillings, perch 7 and 8 pence, pike (*Esox lucius*) 8 and 9 pence, glass-eyed pike (*Lucioperca sandra?*) 1 shilling. This is nearly the compensation price at the great shops in Berlin, of course varying with offer and demand. For instance, very often at the open market one may buy now in Berlin capital salmon for 1 shilling or 1½ shillings a pound.

DO TADPOLES EAT CARP EGGS?—Prof. J. W. A. Wright, in a letter from Greensborough, Ala., June 16, 1886, stated that he had been in-

formed by an intelligent man much interested in carp-raising that many of the eggs of his carp had been eaten by tadpoles, after the hind legs of these tadpoles had begun to be pretty well developed, but before they lost their tails.

HATCHING BROOK TROUT EGGS IN RHODE ISLAND.—On June 1, 1886, Mr. Henry T. Root, one of the fish commissioners of Rhode Island, writing from Providence, reported that the 10,000 brook trout eggs forwarded from Northville, Mich., had been hatched in a pure spring stream at Carolina, R. I., giving a trifle over 80 per cent of very strong fish, which were distributed in the waters of Rhode Island without any loss. The hatching record was as follows :

Date.	Temperature of water.	Dead eggs removed.	Date.	Temperature of water.	Dead eggs removed.
1886.			1886.		
January 28.....	38	100	March 1.....	41	23
January 30.....	40	99	March 3.....	40	10
February 1.....	40	78	March 5.....	42	15
February 3.....	38	105	March 10.....	44	26
February 5.....	37	110	March 13.....	46	11
February 7.....	38	110	March 15.....	48	7
February 9.....	40	109	March 18.....	44	10
February 11.....	42	144	March 22.....	48	19
February 13.....	40	96	March 25.....	40	12
February 15.....	40	139	March 29.....	47	17
February 17.....	40	103	April 3.....	48	32
February 19.....	40	53	April 9.....	52	15
February 21.....	34	34	April 15.....	52	18
February 23.....	41	33	April 20.....	52	267
February 25.....	38	20			
February 27.....	36	23	Total.....		1,928

A LARGE AMERICAN BROOK TROUT IN ENGLAND.—A very large American brook trout (*Salvelinus fontinalis*) was taken in England, on April 19, 1886, in the ponds of Mr. Basset, of Tehidy, near Camborne. It was 25 inches long and 7 inches deep, and weighed 9½ pounds, being one of a lot with which Mr. Basset stocked his ponds some nine years ago. This one was taken on a ground-line, but the fish is said to give excellent sport when taken on a trolling-bait, and it is an exceedingly voracious feeder. The knowledge that the brook trout can attain so great a size in a mere pond in England will probably be a surprise to many, as the weight recorded has rarely been exceeded anywhere. [From Forest and Stream, New York, May 27, 1886.]

A LARGE CALIFORNIA SALMON.—On May 25, 1886, a large salmon arrived in New York from the Columbia River, and lay on the slabs of Mr. E. G. Blackford in Fulton Market, labeled "The largest salmon ever caught." It then weighed 64 pounds, but it is said to have weighed 72 pounds when taken.

CHEAP MACKEREL.—Mr. Eugene G. Blackford made the following statement before the United States Senate Committee on Fisheries, in March, 1886:

"About the first of April (last year) the mackerel fleet struck an immense school of fresh mackerel, and they all loaded up and came into

New York, and there was at one time upward of 15,000,000 mackerel lying around the wharves in the vicinity of Fulton Market. Those mackerel were unloaded there just as fast as possible. Men, women, and children came from all parts of the city with baskets and the wagons of licensed venders, and there was no question about the price. They gave a basketful for 5 or 10 cents and would load a man's wagon for 25 cents. For the space of two or three weeks the poorer classes had the benefit of this immense catch of mackerel. They were distributed all through the city. Of course it was the means of a large class of people making money—not myself, although I am in the fish business. This glut of fish interfered with my business, so to speak, but for the people generally it was a great blessing, especially for the poorer class.

“The single fact, above stated, of itself, in regard to the mackerel fishery, is conclusive. That fishery has been prosecuted with all the perseverance and ingenuity and enterprise that the fishermen of our coast are capable of for one hundred years, and yet there is this enormous take, which goes to prove that man, as a factor, is of no account in depleting the waters of the ocean. Nature has provided for such an immense reproduction that man cannot, with all the many contrivances for catching fish, have any appreciable effect upon the total amount of fish in the sea. This view I came to from examining into the facts, although I had started in favor of protective legislation. Of the statistics that may be attainable with regard to, for instance, the mackerel fisheries, of which we have figures going back a hundred years or more, and for codfish and other sea-fishes, you will find that, notwithstanding the immense catch and large consumption both for food and for other purposes, these same fish in our markets to-day are just as plenty and just as cheap, and I think somewhat cheaper, because of the increased facilities for catching them.”

THE FIRST MACKEREL CATCH OF THE SEASON.—The schooner *Ellen M. Adams* reached Fulton Market, New York City, April 15, 1886, with the first catch of native mackerel for the season, the take being 28,000 fish, caught off Cape Henry. In Fulton Market the fish sold for 15 cents each, the extra large ones bringing 30 cents.

BLUEFISH ON THE COAST OF NOVA SCOTIA.—Mr. Thomas A. Rich, member of a wholesale fish-dealing firm in Boston, Mass., writing on July 16, 1886, stated that they had just received some fresh bluefish taken in a fish-trap at Barrington, Nova Scotia, and that the shipper reported large quantities on that coast, where they had not before been seen.

SHARK FISHING AT NANTUCKET.—Mr. Albert A. Gardner, of Nantucket, Mass., writing on July 13, 1886, stated that the primary object of shark fishing about Nantucket was sport, the boatmen taking out parties for this purpose. The profit arising from catching the sharks is of a secondary nature. The bait used in fishing is fresh fish, if possible; otherwise, a piece of salt pork is used. The only portions of the shark

having a value are the liver, for the oil it contains, and the jaw, which after being cleaned is worth from \$1 to \$7, according to size and quality. Many of the sharks taken are worthless, except for the oil contained in the liver, and are simply destroyed.

SHAD FISHING ON THE SAINT JOHN'S RIVER, FLORIDA.—Mr. Joseph Shepard, collector of customs at Saint Mary's, Ga., writing on April 19, 1886, inclosed a letter from Mr. C. L. Robinson, from which the following notes are taken:

The shad season on the Saint John's is from December 1 to about April 8. When they come in they are fat and go into all parts of the river; but on their return to the ocean in June and July, they are very poor and keep low in the deep water, following the channel. Only a small portion of them return, and it is thought that the most die of exhaustion and are devoured by alligators and larger fish. The young shad go down to salt water early in summer, when they are about 1½ inches long.

The first fishing done here specially for shad, was by Captain Waterhouse, of Connecticut, two years before the war. Since the war a considerable business has grown up, till, in the season of 1873-'74, it was estimated that 500,000 were shipped from the Saint John's, mostly to Savannah, from which place they were distributed to various points north.

Our fishermen think that the shad have always been about as abundant as now in the Saint John's, but that the appliances for capturing them have been improved from year to year and more persons have engaged in the business. In this river a net of 4½-inch mesh is mostly used, while in the Connecticut one of 5½-inch mesh is used, as the shad caught here are not so large as those of the Connecticut River.

NOTE ON THE FISHERIES OF SAINT MARY'S RIVER.—April 19, 1886, Mr. Joseph Shepard wrote that the passenger steamer Martha, running on the Saint Mary's River, carried, during the fishing season of 1886, 279 sturgeon, estimated to average 60 pounds each, dressed, consigned to New York by the Mallory steamers, *via* Fernandina, Fla. The steamer Martha also carried for this market and Fernandina about 1,200 shad.

During the season there were also shipped from Fernandina, in 4-gallon cans, about 600 gallons of shrimps, being boiled first and the heads pulled off. A small sloop also fished for sturgeon on the Satilla River, and shipped them north *via* Brunswick, Ga.

REGULATING THE LAKE FISHERIES.—At the meeting of the Michigan fishermen, held in Detroit, resolutions embodying the following propositions were adopted:

(1) That a law should be enacted creating a sufficient number of fish inspectors or wardens to properly inspect each portion of the fishing coast and enforce such regulations and laws as may now or hereafter be in force.

(2) Demanding the passage of a law to punish any fisherman or fish-dealer who catches or has in his possession fish so small as to be unmarketable.

(3) That pound-nets for the catching of whitefish should not be less than $3\frac{1}{2}$ inches in the pot; and that pound-nets for catching herring should have a $2\frac{1}{2}$ -inch mesh on the sides and a 3-inch bottom; such herring-nets to be used only between the first day of September and the close of the year.

(4) That discretionary power should be vested in the proper State fishery officers to authorize the use of smaller twine than that prescribed as the legal size, under what may seem to them proper conditions, times, and places.

(5) That a law be passed to prohibit and punish fouling the waters of the State with mill refuse, fish offal, or other substances injurious to fish.

A committee on permanent organization was appointed; also one to draft laws embodying the above declarations for presentation to the next legislature; one to call the attention of our Senators and Representatives to the importance of the fishing interests of the State; and one to petition Congress to impose a duty on Canadian fresh fish and to remove the duty on gilling-twine. [From the Commercial, Port Huron, Saint Clair County, Michigan, March 3, 1886.]

NOTE ON FISHERIES OF ALASKA.—Mr. Peter French, collector of customs at Sitka, Alaska, in a letter dated May 25, 1886, stated that salmon and halibut are brought to Sitka from the "Redoubt," 8 miles south, for shipment to San Francisco. Herring are taken in scows to the oil-works at Killisnoo. Fish and fish-oil are shipped by the regular monthly steamer from all points in Southeastern Alaska. Small boats and canoes are generally used for fishing purposes. The fishing to the westward is done principally by vessels that come up from San Francisco under fishing licenses. The fishing establishments in Southeastern Alaska are Cape Fox, Naha Bay, Kassan, Howcan, Red Bay, Wrangel, Killisnoo, Pyramid Harbor, and Willoughby's Cove.

THE FISHERIES OF ALASKA.—Lieutenant Schwatka says: In its cod fisheries, Alaska is undoubtedly destined to lead the world, if supply and accessibility are worth anything in computation. The shallow shores of East Behring Sea and the submarine plateaus extend in almost every direction from Alaskan shores and simply swarm with cod-fish. To compare them with the Atlantic banks would be like comparing the population of China with that of Hudson's Bay Territory. The waters adjacent to the Alaskan coast have some fine grounds for whale fishing, which are now being occupied for that purpose, and which are yielding about \$1,000,000 per annum. But in addition to this vast plateau of whale and cod fishing ground lying off the Alaskan coast, the rivers which run far up into the interior of the country literally swarm with salmon during every season. The Yukon, the Kuskokwim,

and the Kowak are all large rivers emptying into Behring Sea; in fact, the Yukon is one of the largest rivers in the world, and is now reported as having a navigable length of 2,000 miles, and through its whole course there is always an abundance of salmon in the proper season, and well up the other two rivers named the same condition exists. The general atmospheric conditions, however, are vastly different over the inland portion of Alaska from what they are over the coast country and the adjacent waters, but it is not likely that it will ever be necessary to establish fisheries on any of these streams at any considerable distance above their mouths. A limited number of fisheries are now in operation at the mouth of the Yukon River, and there are yet plenty of good sites for the establishment of more of them, and as the business is steadily growing and enlarging there seems to be no doubt but that a vast fishing trade will yet grow up and flourish at the mouth of the great rivers.

With proper fixtures and improvements there is no doubt but that the catching and curing of salmon and codfish can be carried on cheaper here than can be done on any other fishing grounds in the world. In the Alaskan waters the general quality of the fish taken is rather inferior to the fish of the same kinds that are caught on the Atlantic fishing-grounds. They are also reported to be inferior in quality to the Columbia River salmon. A main point involved in the development of this branch of industrial pursuit in Alaska will be the matter of finding consumptive demand for all the salmon and codfish that could be packed in the Alaskan waters more cheaply than such fish can be packed at any other fishing-grounds in the world. It has been the expectation, when all the transcontinental lines of railway get into full operation, that a largely increased movement of Pacific coast salmon and codfish towards the central portion of the country will be developed. With the completion of the Canadian Pacific Railway, it is fair to calculate that this road, with the Northern Pacific road, will be abundantly able to supply all the western half of the Mississippi Valley with fish of the kinds here spoken of at lower prices than they can be furnished from any other source. The expense of shipping canned fish from the mouth of the Yukon River to either Coal Harbor, Port Moody, or Victoria will be light. From any of these points articles can be shipped by rail to any part of the United States.

FISH-CULTURE IN NEW ZEALAND.—Alexander J. Rutherford, honorary secretary of the Wellington and Wairarapa Acclimatization Society, writing from Parliament Buildings, Wellington, April 19, 1886, says that the United States reports on fish-culture are a great boon to those in these islands, who are trying to stock the inland waters with fine varieties of fish. In South Island, the acclimatization societies have been very successful in introducing the brown trout (*Salmo fario*), but in North Island there has been much apathy, and it is only of late years that they have been able to do good work. Some years ago a number

of *Salmo quinnat* were liberated in a few of the rivers, and now doubtful fish are frequently taken, but no one seems to be able to identify them with certainty. *S. fontinalis* do remarkably well in captivity, but are not being seen as yet in the streams in which they have been liberated.

In many of the large rivers the *S. fario* has changed its habits very much, growing very rapidly (2 pounds a year), and frequently in brackish and sea water, where it becomes in appearance very like a sea trout (*Salmo trutta*), and frequently weighs 20 pounds and upwards.

The rivers are teeming with fish-food, larvæ, flies, and millions of a small native smelt (*Retropinna*), as well as various forms of *Galaxias* which force the growth of imported *Salmonidæ* wonderfully. This excess of food seems to alter their habits and appearance very much.

The water that supplies the hatchery at Masterton is an overflow from a river that filters underground through a gravel formation for some miles, coming out of a terrace with a strong flow. Hatching operations have been very successful in this water, though during the summer the temperature has sometimes reached 59° F. As they can at pleasure turn on the stream water, full of insects, they have been able to rear fish in the ponds with but little loss.

The Government is trying to import herring, crabs, lobsters, and other valuable marine life.

PENOBSCOT SALMON PLANTED.—In February, 1885, 100,000 Penobscot salmon eggs were sent from Bucksport, Me., to Mr. E. B. Hodge, Plymouth, N. H., where they arrived February 20. During hatching 765 eggs died. These, together with a loss of 634 young fish, left 98,601 young to be planted. Of these, 5,000 were planted in the Mohawk River, at Colebrook, Coos County, N. H.; 15,000 in the Oliverian River, at Haverhill, Grafton County, N. H.; 10,000 in the Lower Ammonoosuc River, at Littleton, Grafton County, N. H. (all tributaries of the Connecticut River); and the remaining 68,601 were planted by the Vermont commissioners in eight tributaries of the Connecticut.

LANDLOCKED SALMON PLANTED.—On March 28, 1885, Mr. E. B. Hodge received at Plymouth, N. H., from Grand Lake Stream, Maine, 25,000 landlocked salmon eggs, of which but 13 were found to be dead. During the hatching 375 more were lost, which with 725 young fish that died made a total loss of 1,113. The remainder were planted June 18, 1885, in Clyde River, Derby, Vt., about five miles from Lake Memphremagog.

MACKEREL MOVEMENTS.—John F. Holmes, keeper of Gurnet's Life-Saving Station, wrote on September 18, 1885, that during the previous four weeks very few large bodies of mackerel had been seen, but there were more or less broken schools that had remained there during the summer. On Tuesday, September 15, large schools of mackerel made their appearance, followed by about twenty vessels of the mackerel fleet. He thought that these mackerel were part of the eastern school on their way south. On September 20 the body of mackerel appeared to have passed by.