

MICHIGAN DEPARTMENT OF CONSERVATION

Fish Division

A HISTORICAL SKETCH

of the

INCEPTION OF FISH CULTURAL WORK IN THE UNITED STATES,

WITH A BRIEF OUTLINE OF OPERATIONS IN MICHIGAN.

The first published record of an attempt to produce fish by artificial methods in this country dates from the year 1855, when Rev. John Bachman, the naturalist who was associated with Audubon in his work on the quadrupeds of North America, read a paper before the State Agricultural Society, at Columbia, South Carolina, wherein he related his successful efforts when a boy, in the year 1804, in fertilizing and incubating the ova of the corporal (probably the fish known in Pennsylvania as the fall fish), and of the brook trout (*Salvelinus fontinalis*). He claimed that the eggs of both species were artificially fecundated and hatched, and that the trout attained some growth while held in ponds which he had constructed for the purpose.

The second attempt at fish culture by artificial means in the United States appears to have been undertaken in 1853, when Dr. Theodatus Garlick and Professor H. A. Ackley, of Cleveland, Ohio, began operations with the brook trout, the outcome of which was quite successful. In 1857 Dr. Garlick published a treatise on the artificial propagation of fish, which first appeared in a series of numbers of the Ohio Farmer, and was afterward gathered into a volume. To these gentlemen should be ascribed the merit of inaugurating interest in fish culture in this country.

It is recorded that e. C. Kellogg, of Hartford, Connecticut, and D. W. Chapman, of New York, began the artificial breeding of fish at Simsbury, Connecticut, in 1855, and the

results of their experience were given in a paper read before the Connecticut State Agricultural Society in the following year.

The first of the State governments to take up artificial fish culture was Connecticut, the legislature of which in 1857 passed an act making financial provision therefore. Its work during that early period including operations with the wall-eyed pike (Lucioperca americana), the lake trout (Salmo namaycush), the white fish (Coregonus albus), all of which were obtained from the nets of fishermen operating on Lake Ontario. Their eggs were taken, impregnated, and after being packed in layers of fine wet sand, were transferred to home waters, where they were said to have produced good results, large numbers of the young being in evidence early in the following spring. Work of this character was continued under State auspices the following year on a larger scale and with encouraging results.

In 1859 Mr. Stephen M. Ainsworth began operations with the brook trout, the fishing being obtained from a small stream at West Bloomfield, New York. In 1864 the first hatching house in this country large enough to demonstrate the importance of fish culture as a pecuniary investment was established at Caledonia Springs, near Rochester, New York, by Seth Green. Only a short time was required to provide its success financially, and from the interest aroused in its operation, through the medium of various newspapers and magazines, fish culture gained a great impetus and numerous plants soon sprang up, most of them dealing solely with the brook trout.

Among the more prominent of these early pioneers in the fish-cultural field in this country should be included the names of the renowned Seth Green, Dr. J. H. Slack, Livingston Stone, William Clift, S. H. Ainsworth, and N. W. Clark, whose son, Frank N. Clark, was associated with his father, and afterward rendered very valuable service in his capacity of superintendent of the federal fish-cultural work in Michigan.

In 1867 Dr. Slack purchased the plant at Bloomsbury, New Jersey, which had been founded by Thaddeus Norris, author of a work on fish culture, and within a few years he had converted it into a successful hatchery. In 1872 Dr. Slack published a manual on trout culture, embodying therein an accurate history of past fish-cultural work in the United States, with a list of the works written in English and French which related directly to practical fish culture. Dr. Slack also made a valuable invention in the nature of a tank for the transportation of fish.

In 1866 Livingston Stone took up the culture of trout at Charleston, New Hampshire, and in 1872 published as authoritative and very valuable manual on the subject.

In 1867 Mr. N. W. Clark started a trout hatchery at Clarkston, Michigan, and conducted it successfully for a few years, when his attention became wholly engrossed in the propagation of other fishes. Through Mr. Clark's active interest in fish culture and his continued contributions to the press of Michigan he developed a widespread interest in the subject, and this was largely influential in bringing about judicious and efficient action on the part of the government of that State for the multiplication of the food fishes of its waters.

Previous to 1866 the efforts in fish culture in America were in the main devoted to the culture of the brook trout, but during the fall of that year Atlantic salmon propagation was entered into by the Canadian authorities on Lake Ontario, and also by the State of New Hampshire, the eggs for the State's work being obtained from collections made in New Brunswick waters. About this time active fish-cultural work was taken up by all of the New England States exceptions Vermont, and by the State of New York Pennsylvania, New Jersey, and California.

The act of Congress approved February 9, 1871, carrying with it an appropriation of \$5,000 for the establishment of the United States fish commission, did not contemplate fish-cultural work, but provided simply for an inquiry into the causes of the growing scarcity of the commercial fishes, with the view of adopting such remedial measures as might appear to be effective. Propagation as a means of restoring the fisheries was given no serious attention until the following year.

At a meeting of the organization known as the American Fish culturists' Association, held in Albany, New York, in 1872, it was suggested that steps be taken to induce the United States Government to cooperate with the association in its great project of building up the shad, salmon, and other valuable fisheries of the country. After due deliberation a committee, of which Mr. George Sharp Page was chairman, was delegated to lay the matter before Congress and exert all influence in its power to bring about favorable action. The outcome of the efforts of this committee was the enactment of a measure appropriating \$15,000 to be placed at the disposal of the United State Commissioner of Fisheries for the purpose of taking up the propagation of fish. This fund was provided early in June, 1872, and before the end of that year several fish-cultural stations had been fitted up and the Fish Commission was actively engaged in the propagation of the shad, Atlantic salmon, chinook salmon, and white fish.

From that small beginning the fish-cultural work of the federal government has branched out and grown to its present proportions. The early investigations undertaken by Professor Spencer F. Baird, the Commissioner, and his assistants soon demonstrated that artificial propagation was the most effective means to apply for the upbuilding of the fisheries, and the work was pushed to the utmost limits of the facilities at their disposal. So efficiently did the Commissioner and his assistants labor in devising fish-cultural methods and in applying them to the practical work of maintaining and increasing the supply of food fishes that at the International Fisheries Exhibition held in

Berlin in 1880 the grand prize was awarded to the Commissioner as "the first fish culturists in the world," and at the International Fisheries Exhibition held in London in 1883 the statement was made by Professor Huxley that he "did not think any nation at the present time had comprehended the question of dealing with fish in so thorough, excellent, and scientific a spirit as the United States".

On July 1, 1903, the existence of the United State Fish Commission as an independent organization under the Government ceased and it was incorporated as a bureau under the new Department of Commerce and Labor under the terms of the act of Congress approved February 14, 1903. As a bureau its activities and usefulness were not lessened in any degree. On the contrary the growth and expansion of the federal fish-cultural work have proceeded steadily and uninterruptedly and the beneficial results have become widespread.

The fish-cultural operations of the United States Bureau of Fisheries in 1919 were conducted at 40 permanent hatcheries and 102 subhatcheries and egg-collecting stations. Its distributions of fish and fish eggs for that year amounted to 5,431,725,000, and embraced more than forth valuable food species. Of this output, 306,293,200 represented migratory food fishes of Atlantic coastal streams, 1,1567,334,300 the commercial fishes of the Great Lakes, 3,569,095,000 the food fishes of the Atlantic Coast, 176,707,500 the salmons of the Pacific seaboard, and the remainder the fishes of minor interior waters. At least 95 per cent of the Bureau's present output consists of the commercial species and a large percentage of these are hatched from eggs which, under natural conditions, would be lost. Distributions of fishes suitable for stocking public waters or restocking depleted ones are made in every State in the Union and Alaska, while thousands of small lakes and pond, the majority of them located on farms, are stocked with black bass, crappie, and other desirable species. Six specially designed cars are now employed b y the Bureau for the distribution of the product of its

hatcheries, and during the past fiscal year there were 523,537 miles of railroad travel in the work of shipping their output.

In its endeavor to hatch and plant fish in sufficient numbers to compensate for the depletion of the natural supply through the fisheries and to develop new fisheries wherever possible the Bureau's operations have been of material benefit in most cases, and some fisheries have through its efforts been saved from extinction. The Bureau has also been very successful in acclimatizing valuable food fishes in waters to which they are not indigenous, and in rescuing fishes from overflowed lands in the Mississippi Valley where the recession of the flood waters would leave them stranded to die. Its work is carried on independently, or, in cases where public interest dictates, in cooperation with the States, practically all of which now have fully organized and active fish and game departments. The fish-cultural activities of many of the States are very extensive, and some of them have at various times rendered cooperative assistance to the federal fisheries department which has enabled it to greatly extend the scope and magnitude of its work.

One of the most important branches of the Bureau's fish-cultural operations is that having for its object the conservation of the commercial fisheries of the Great Lakes. In connection therewith four main hatcheries are operated, together with numerous auxiliaries, and efforts are made to efficiently cover all fishing grounds where fish in spawning condition are taken. The eggs thus secured are developed in the most conveniently located hatchery, and the young are planted in the fry stage on the spawning grounds on or near which the fish are taken by the commercial fishermen.

The Bureau's fish-cultural work in the State of Michigan is directed from its main station at Northville, in Wayne County, though most of the eggs of the commercially valuable species are now incubated at the recently constructed hatchery at Charlevoix,

in the northern part of the southern peninsula, on account of its close proximity to the to the more important spawning grounds of the lake trout and white fish.

The Northville station was established in 1874 as a private enterprise by Mr. N. W. Clark, formerly of Clarkston, Michigan. The water supply consisted of the present large spring and several minor springs, the whole giving a flow of about 700 gallons per minute. On this site Mr. Clark constructed a series of ponds and raceways and built a one-store frame hatchery 30 by 80 feet, equipping it with hatching apparatus of his own invention, which was afterward to be universally known as the Clark hatching box and tank.

Until 1880 the plant was operated as a private enterprise by Mr. Clark and his son, Frank N. Clark, and most of its product was sold to the federal and the Michigan State governments. During that period the United States Fish Commission secured a lease of the property and engaged the services of Mr. Frank N. Clark to superintend its operations. This arrangement was continued in force until 1890, when the plant was purchased by the Commission, together with ten acres of the adjoining land, the whole constituting the station reservation as it now exists. Mr. Clark continued to serve as its superintendent until his death in December 1910.

By 1893 the fish-cultural work of the station had become too extensive for the water supply available, and an additional supply of two thousand gallons per minute was obtained by constructing a dam across the stream flowing through the reservation at a point about twenty-five hundred feet west of the hatchery, and conveying the water thereto through a fifteen hundred foot pipe line. In 1897 the old hatchery constructed by Mr. Clark senior was razed, the old residence was moved to the rear of the reservation, and the buildings now occupying the site were constructed. A series of six large ponds was constructed in 1904, with the view of undertaking the propagation of the small-

mouth black bass, and since that time three more ponds have been added, increasing the pond-cultural area to five acres.

From the time of the leasing of the station in 1880 to the end of the fiscal year 1918 all lake trout eggs collected in Michigan waters were carried in the Northville hatchery until the eye spots developed, and were then shipped to one of the station's northern auxiliaries where the fry were hatched and liberated on the adjacent spawning grounds. Of these auxiliaries there are two belonging to the federal government, - one at Alpena and one at Charlevoix, Michigan. The hatchery at the latter place was until quite recently of very limited capacity, and as all of the eggs could not be properly cared for at these auxiliaries, the surplus stock was developed in a part of the Sault Ste. Marie hatchery, the use of which was given without charge by the Michigan fisheries authorities.

Since the construction in 1918 of the commodious and up-to-date hatchery at Charlevoix, with its hatching capacity of 60,000,000 lake trout eggs and 100,000,000 white fish eggs, the Bureau's work with these species in Michigan waters is being prosecuted there; it is the intention to utilize the Northville station from now on for the production of brook trout, rainbow trout, and small-mouth black bass, to meet the heavy demands for stocking interior waters of the surrounding region.

With the view of providing additional hatching facilities for the large quantities of white fish eggs available the Alpena auxiliary of the Northville station was constructed and equipped in 1882. From that time until 1899 it was regarded as an important center for the propagation and distribution of white fish. With the continued expansion of the work, however, the hatching facilities at Alpena became inadequate, and owing to the remoteness of the station from the then extensive white fish spawning grounds in the Detroit River, it was decided to transfer the base of white fish operations to Detroit. At that time the Detroit State hatchery was not in use, the State authorities having

concluded during the year to discontinue the propagation of commercial fishes, leaving that branch of the work to be covered by the federal fisheries service. The hatchery at Detroit was therefore leased from the State and equipped with a double battery of hatching jars, with a capacity for 225,000,000 white fish eggs or 900,000,000 pike perch eggs. Thereafter until the year 1918 the Detroit hatchery was used exclusively for the propagation of these species. At that time it was dismantled and turned back to the State, with the intention of concentrating all future white fish propagation in Michigan at the newly equipped Charlevoix station. In taking this step the Bureau was influenced solely by the changed natural conditions. The profitable white fish fishery which had heretofore existed at Grassy Island, in the Detroit River, was almost completely destroyed by the dredging operations conducted by the government for the opening of a deep waterway; and, with the opening up and gradual development of new fisheries farther north, the site at Detroit had become isolated from the principal source of supply for eggs.

The output of the commercial fishes of the Great Lakes region, including white fish, lake trout, and pike perch from the United States fish hatcheries in Michigan from the time of the establishment of fish-cultural work in that State in 1880 to the close of the fiscal year 1919 amounted in round numbers to 5,794,452,000. The output of these species by decades was as follows:

From 1880 to 1889.....	573,692,000
1890 to 1899.....	311,212,000
1900 to 1909.....	2,484,746,000
1910 to 1919.....	2,424,802,000

In addition to its work with the commercial species, the Northville station has hatched and distributed to applicants in Michigan many hundreds of thousands of brook trout, rainbow trout, and small-mouth black bass. The fishes which have been

propagated and distributed in small numbers to supply the demands for them include steelhead trout, landlocked salmon, grayling, yellow perch, and sunfish.

No state has a more efficient fish commission than Michigan. The act approved April 19, 1873, provided for a board of fish Commissioners and appropriated \$7,500 for operations in that year and a like sum for the following year. Active practical work was immediately begun and has been continued without interruption to the present time. From its modest beginning it has grown until at present it has six modern, well-equipped hatcheries. That Michigan has remained in the forefront as a Paradise for anglers has been due in large measure to the replenishment of her many splendid streams and lakes with millions of trout, bass and other fishes from the state hatcheries.

A history of fish-cultural work in Michigan would not be complete without giving credit to Mr. N. W. Clark of Clarkson, as the real father of the enterprise in the state. Much of his time and no small amount of his means were given to research in fish-culture and the development of the first hatchery in Michigan which he established at Clarkston in the winter of 1867. It was his able address before the legislature of Michigan on the artificial propagation of fish and the restocking of the public waters of the state, delivered at Lansing February 28, 1871, that resulted in the passage of the act establishing the Michigan Fish Commission. Also an address on artificial breeding of fish and their habits, which he delivered before the Detroit Scientific Association in 1875, had much to do in arousing general interest in the subject.

Written by Miss Stilwell
Division of Fish Culture
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Fish Division - jg

