

buildings in this country and on the state house of Illinois, and it has proved just as good and lasting as in Europe, and more durable in the last named building, than any other roof, as in the construction of the dome there has not been any working day without from four to five men all the time on said roof, and for months before, it was often used as a common passage for all the workmen, and for carrying material, without any perceptible effect. I can say, also, that it is the best looking roof of all, as may be seen in the state house of Illinois, where all the sheets are twelve feet long and two feet wide.

I estimate the value of the work necessary to place the building under roof at \$600,000.00, divided as follows:

Stone for inside and outside.....	\$158,500.00
Cutting of same, except cornice and caps.....	89,500.00
Cutting of cornice and caps.....	45,500.00
Setting of stone.....	31,550.00
Brick work.....	71,500.00
Iron columns and plates—cast.....	4,700.00
Wrought iron of second story and gallery.....	43,300.00
Wrought iron framing of roof and ceiling.....	41,000.00
Roofing and sheeting.....	31,700.00
Hard wood lumber.....	16,000.00
Carpenter's work.....	3,500.00
Rough lumber.....	4,000.00
Patterns for stone carving and iron casting.....	1,500.00
General labor.....	1,500.00
Fuel.....	1,800.00
Salaries, railroad track, stationery, and miscellaneous expense.....	26,000.00
Contingencies and materials to be prepared for the following year's work.....	28,150.00
	\$600,000.00

All of which is respectfully submitted.

A. H. PIQUENARD,  
*Architect Iowa State Capitol.*

DES MOINES, IOWA, December 16, 1875.

# FIRST REPORT

OF THE

# STATE FISH COMMISSIONERS.

OF IOWA,

FOR THE YEARS 1874 AND 1875.

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DES MOINES:  
R. P. CLARKSON, STATE PRINTER.  
1876.

## REPORT.

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TO HIS EXCELLENCY HON. C. C. CARPENTER, *Governor of Iowa* :

The Commissioners appointed by you under the authority of an act providing for a Board of Commissioners and defining their duties, approved March 19th, 1874, beg leave to present the following report :

At the last session of the legislature an Act was passed, creating the present Board of Commissioners, and another one appropriating three thousand dollars to advance the interests of fish culture in the State of Iowa. With this authority the Commissioners set to work to restore what had been lost and to enrich the waters of Iowa with new species of fish.

It has been proven that fish will acclimate themselves to the waters in which they are placed and in time form an almost entirely new species. In this way it is believed the so-called "Land Locked Salmon" were brought into existence.

The subject of Fish culture is comparatively new in the United States, but as population increases, and the demand for food increases, public necessity will call forth that interest which the subject demands.

The following, from an address upon the subject by Prof. Agassiz is so well put, and from so high an authority, that we cannot refrain from giving it.

"If any one thing characterizes civilized society over the less cultivated, the savage, it is what we term brain activity ; in stirring and pushing head work. Of course there follows a continuous strain upon our brains, as a community, and the brain must be fed. Feeding the brain is unavoidable, if you would have it perform its functions regularly. It needs a certain amount of phosphates ; what you put on your grass land, corn, and other crops, the common manuring phosphates pass into our food in another form, and by elaborate processes are digested, enter into our structure, and develop our brain. Permit me then to state what is no new fact—any chemist will tell it you that no article of food contains these phosphates which we need, in greater proportion than fish, and it is for this reason that they are especially recommended as a frequent article of diet.

"What we most need is plenty of fish, easily accessible, abundant in market, at cheap prices and used as daily food for all classes of our people. This truth has been so frequently asserted and demonstrated that I need not dwell upon it. For thirty years and more I have made this subject of much research and careful study, and am free to assert that no article of food more completely and readily repairs the losses and wastes of our cerebral organs than fish, and I need say nothing further introductory to that important branch of industry—pisciculture; the breeding and raising of fish for our tables."

In olden countries and in ancient times, fish were artificially raised, at a profit to the proprietors and to the great benefit of the people.

It is known that the Chinese have continued to artificially propagate fish for a period longer than the Christian era, and that one-tenth of the people of that densely populated empire now derive their subsistence from food gathered from the waters.

In ancient Egypt the revenues arising from Lake Mæris amounted to \$500,000 annually; and at one time were given to the queen for pin money.

In ancient Rome, Lucullus had fish ponds at Tusculum, which were connected by canals with the sea, and fed by streams of fresh water. Sergius Orata introduced the culture of oysters in the Lucrine Lake. In Lake Tuscaro, Italy, oyster culture has been carried on since the Roman Period.

The profit of the town of Commacchio, Italy, from a single pond now amounts from \$12,000 to \$15,000 annually. The modern art of fish culture, however, dates its commencement from the labors of Prof. J. J. C. Coste, of the College of France, in 1849.

Since that date all the European governments have given the matter the fullest attention, and have not hesitated to grant, at all times, all the money that could be profitably used in increasing the supply of food fishes. It is interesting to note the enormous value now attached to fishing rights on some of the Scotch salmon streams since the artificial propagation of that fish has been pushed to its legitimate capacities.

In the State of New York, where the results of an enlightened policy regarding fish culture are apparent to every one who has examined the subject, the people are delighted with it. To give an idea of what has been accomplished there already, we copy extracts from the reports of the Commissioners.

EXTRACT FROM THE REPORT OF THE NEW YORK COMMISSIONERS, 1872.

"Fish are wonderfully productive; with care, the waters can be made to supply the wants of mankind to as great an extent as the land, but the same common sense must be used in one case as in the other. Many kinds of fish have from ten thousand to a hundred thousand eggs to each pound of their weight; this food supply would be vastly useful to man were it economized and turned to the best account, and not be allowed to run to waste, be interfered with, or rendered inoperative, and practically cut off as a source of food for the world. Private individuals are everywhere assisting in the work, and fish-ponds are becoming almost as common as wheat-fields. A fish culturist's association has been formed; thousands of persons are making a business of breeding fish, but the public will not gain what it should, unless the Legislature is willing to carry into effect such rules as experience proves to be necessary. Migratory fish must be allowed to reach their appropriate spawning beds, and must be protected from disturbance when spawning; they must not be over-pursued until their ranks are once more replenished, and their artificial propagation must be conducted at general expense in rivers or lakes that are not private property, and which no single individuals own or can protect. We point with pride to what has been done during the few years past, with the small sum at our disposal, and we rely with confidence on a greater measure of success in the future. We are willing, gratuitously, to continue our labors, and ask the Legislature to extend the term of the commission, and to pass the act establishing a weekly close-time for shad that is submitted with this report.

"Very Respectfully,

HORATIO SEYMOUR,  
GEORGE C. COOPER,  
ROBERT B. ROOSEVELT,  
*Commissioners.*

SETH GREEN, *Superintendent.*"

EXTRACT FROM THE REPORT OF THE NEW YORK FISH COMMISSIONERS,  
FOR 1873.

"The commissioners are confident that in a short time the people of the country will rely upon restocking our waters, and not upon game laws, to keep up a full supply of fish for our markets. It is the cheapest and easiest way, and avoids the enforcement of laws which, in many cases, are deemed harsh and arbitrary. It is better and less expensive and troublesome to restock our streams frequently with minute fish, just hatched, than it is to enforce game laws, and then get but small and uncertain returns. A few spirited persons in each neighborhood can, in this way, keep their streams well filled, so that they will be sources of amusement for anglers, and of profit to the busy fisherman. The call for young fish at the hatching house is increasing very fast, and the whole subject of fish raising is better understood than it was, and is growing in public favor. It is now seen that if the principles we apply to the kindred subject of agriculture are used in this branch of food production, we shall soon have abundant and valuable returns."

Hon. Spencer F. Baird, United States Commissioner of fish and fisheries, in his reports, says: A few years ago the commissioner of fisheries of Connecticut undertook the business of hatching out shad, and has been turning out young fish year by year in increasing numbers.

The benefit of this action has been satisfactorily exhibited. Immense schools of shad were met at sea, bound for the Connecticut river, and the number of fine marketable fish actually taken in its vicinity was so great that they became a drug in the market, scarcely worth more than five or ten cents each. This condition of things was not of course very satisfactory to the fishermen nor the marketmen, who preferred larger profits with less trouble, but the boon to the people and consumers generally cannot be overestimated.

Premising with these statements, and being cognizant of the fact that the people of Iowa, through their newspapers, have been awakened to the importance of the subject, we propose to speak in detail of what has been accomplished.

Since the last session of the legislature, the laws enacted previous to 1874, and the laws enacted by the legislature in question, have been carried out and enforced to the full extent, or so far as the commissioners could influence their operation and use their power. The consequence is that in many of the fish streams of the State there has been a marked increase of food-fishes, and a general disposition on the part of the people to support the law. Fishways have been constructed, as will be shown hereafter; and many citizens have been so much interested as to start fish-ponds of their own under the advice of the Commissioners.

With the small appropriation of three thousand dollars, a hatching-house, 20x40 feet, two stories high, has been erected near Anamosa, in Jones county, under the supervision of Mr. Shaw, one of the commissioners. With that three thousand dollars the hatching-house has been erected, an assistant hired and paid, all the expenses have been paid, and a great number of fish have been distributed; and this day the property owned by the State is worth the amount of the appropriation expended.

The last General Assembly enacted a law requiring all dams erected after the passage of the act to have constructed fish-ways under the supervision of the Commissioners. So far, the law has been complied with, and fish-ways have been constructed according to the plans provided by the Commissioners.

Section 2, chapter 50, requires the Commissioners to examine and

report in regard to the comparative cost and value of the various improved fish-ways. This we have been doing, as far as we have been able, with the limited means at our command, and the difficulty of obtaining reliable practical information. So great a variety of opinion prevails in regard to the merits of the various fish-ways, even among the best authorities, and the matter is of so vital importance to the fish interests of Iowa, that we have been unable fully to determine in regard to the adoption of any one of them, until we have more fully investigated the subject. A favorable opportunity for this purpose is looked for at the meetings of the "International Association for the Protection of Game and Fish," this coming winter. This organization numbers several hundred persons, among whom are the most eminent fish-culturists, scientific persons, commissioners, and other gentlemen interested in the propagation of game and fish. It has the approval and support of the Smithsonian and other leading institutions of this country and will bring to the discussion of the subject an experience gathered from every state in the union. The cost of fish-ways in Iowa varies with the different kinds, the height of fall, amount of water, character of dam, and other circumstances from fifty to one thousand dollars.

In close connection with this branch of the subject, is the opinion of the Supreme Court of the United States, at the December term, 1872:

<p>"The Holyoke Water-Power Company, Plaintiff in Error, vs. Theodore Lyman and Edward A. Brackett, Commissioners on Inland Fisheries, etc,"</p>	}	<p>In error to the Supreme Judicial Court of the Commonwealth of Massachusetts.</p>
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"Mr. Justice Clifford delivered the opinion of the Court.

"Rivers, though not navigable even for boats or rafts, and even smaller streams of water, may be and often are regarded as public rights, subject to legislative control, as the means for creating power for operating mills and machinery, or as the source for furnishing a valuable supply of fish, suitable for food and sustenance.

"Such water-power is everywhere regarded as a public right, and fisheries of the kind, even in waters not navigable, are also so far public rights that the legislature of the state may ordain and establish regulations to prevent obstructions to the passage of the fish, and to promote the usual and uninterrupted enjoyment of the right by the riparian owners.

"Proprietors of the kind, if they own both banks of the water-course and the whole soil over which the water of the stream flows, may erect dams extending from bank to bank to create power to operate mills and machinery, subject to certain limitations and conditions, and may also claim the exclusive right of fishery within their territorial

limits, subject to such regulations as the legislature may, from time to time, ordain and establish.

"Persons owning the whole of the soil constituting the bed and banks of the stream are entitled to the whole use and profits of the water opposite their land, whether the water is used as power to operate mills and machinery or as a fishery, subject to the implied condition that they shall so use their own right as not to injure the concomitant right of another riparian owner, and to such regulations as the legislature of the state shall prescribe.

"Where such a proprietor owns the land on one side only of the stream, his right to the land and to the use of the water, whether used as power to operate mills and machinery or merely as a fishery, extends only to the middle thread of the stream, as at common law, and is subject to the same conditions and regulations as when the ownership includes the whole soil over which the water of the stream flows.

"Authority to erect dams across such streams for mill purposes results from the ownership of the bed and the banks of the stream, or the right to construct the same may be acquired by legislative grant, in cases where the legislature is of the opinion that the benefit to the public will be of sufficient importance to render it expedient for them to exercise the right of eminent domain and to authorize such an interference with private rights for that purpose.

"Lands belonging to individuals have often been condemned for such purposes, in the exercise of the right of eminent domain, in cases where, from the nature of the country, mill-sites sufficient in number could not otherwise be obtained, and that right is even more frequently exercised to enable mill-owners to flow the water back beyond their own limits in order to create sufficient power or head and fall to operate their mills.

"Concomitant with the authority to erect such dams for such purposes over the beds of water courses, as resulting from the title to the banks and bed of the stream, is also the exclusive right of fishery, which also has its source in the same ownership of the soil, and the better opinion is that it is not divested or extinguished by any legislative act condemning the land to the use of another for mill purposes, unless the words of the grant conferring the authority to construct the dam plainly indicate that such was the intention of the legislature.

"Water-rights of the kind, whether the streams are used for mill purposes or merely as fisheries, are justly entitled to public protection, as they are in many cases of great value to the community where they exist, but they are the source of many conflicting interests which the state legislatures as well as the courts have found it difficult to adjust, as appears from the countless efforts which have been made in that behalf without complete success."

The state courts where the same questions have been presented decide in accordance with the opinion held by the supreme court. Indeed there can be no legal ground for dispute in the premises.

#### LIABILITY OF OWNERS OF DAMS TO BUILD FISHWAYS.

Every owner of a water-mill or dam holds it under the condition

that a sufficient passageway shall be allowed for the fish, and the limitation, being for the public benefit, is not extinguished by any neglect to compel compliance. *Stoughton vs. Baker*, 4 Mass. 522.

In the case of *Cottrill vs. Myrick*, 3 Fairfield 222, the court held that although for forty years no alewives had been known to surmount Damariscotta falls, if it were shown that they were ever accustomed to do so in a state of nature, the legislature might provide for the erection of a fish-way, and the owner of the premises could not recover damages. Whether it is competent for the legislature to provide for the removal of natural obstructions or for the erection of artificial facilities in the bed of a stream for the ascent of fish and the creation of a fishery where they could not otherwise pass, *quaere*; but streams in which alewives and certain other fish have been accustomed to ascend, are subject to the regulation of the legislature. No individual can prescribe against this right which is held to belong to the public.

Compare also *Bearce vs. Fossett*, 34 Maine 575.

The liability of mill-owners to construct fish-ways having been settled by decisions of the supreme court of the United States, and those of Massachusetts and Pennsylvania, it would seem advisable that regulations should be made for putting them in that will bear equally upon all and give us a uniform system, rather than to leave the matter to the uncertain and vexatious action of the common law, which will be the result of neglected action in this direction, already in some cases have the commissioners had to counsel the people to wait until this was done, and we are quite certain that a neglect to adopt some general plan will be the signal for a contest on their part, to compel the putting of them in under the common law decisions that must result disastrously to the mill-owners. Outside of the cost of putting them in, the damage to mill property need be but slight if properly adjusted, as fish pass up and down but very seldom, except when there is more than an ordinary stage of water.

It is evident that unless a general law is enacted, requiring fish ways on all the dams, the labors of the Commission will be of no avail. We would therefore suggest and strongly urge, that a law be enacted by the General Assembly requiring all owners of mill-dams to construct fish ways and thus make the requirement bear equally on all.

It is evident that unless fish-ways are made at each dam, the law will work injustice to some. It is impossible to carry out the object of a general improvement without the co-operation of all. Unless this

provision be carried out we will lose the benefit to some extent of what has already been begun. The right of the legislature being established to compel owners to erect fish-ways, and the necessity having already been set forth, there will be, we apprehend, no serious opposition to the carrying out of this great industrial scheme calculated to enhance the value of property in Iowa and to benefit the people. There may be some captious objections made but they will emanate from those who have not thoroughly studied the subject. The height and kind of the dam, exposure to floods, volume of water, character of bottom and banks, location of mill and race, &c., have all to be taken into consideration in making plans of an efficient fish-way; so much so that it would be necessary to see them before making plans, as these expenses would bear unequally upon mill-owners, and, as it is to the interests of all that the best and most efficient work possible should be done, we recommend that plans be furnished at the public expense.

The commissioners held their first meeting at Des Moines on the 8th day of May, 1874, and organized by electing S. B. Evans president, B. F. Shaw secretary and superintendent, and C. A. Haines treasurer. The superintendent was authorized to build a state hatching-house and attend to the practical work of the commission. The rules of the New York commission were adopted for the distribution of fish. For the purpose of superintending the erection of fish-ways and the laws regulating fishing, the state was divided into districts and assigned as follows:—north of Iowa Division of Illinois Central Railroad, C. A. Haines; south of said road, and north of C. R. I. & P. Railway, B. F. Shaw; and south of the C. R. I. & P. Railway, S. B. Evans.

After the examination of a large number of places for the purpose of establishing a hatching-house, a spring about two miles from Anamosa, up the Wapsie river, on a twenty-acre lot belonging to Col. Wm. T. Shaw, was selected. Having no authority to purchase land, or to take a title for the property in behalf of the state, agreement was made with him by the terms of which we are to pay him three hundred and sixty dollars in the fall of 1876, or to take a twenty-years' lease at a rental of thirty dollars per annum for the term of twenty years, as the legislature may deem best. We would recommend that suitable arrangements be made for the purchase of the property. Upon this property a hatching-house 20 by 40 feet square, two stories high, was erected. An excavation 3½ feet in depth, the full size of the building, was first made, and a good substantial stone wall put in this depth for a foundation. The building, a substantial frame, is high enough to

allow an eleven-foot story below, and an eight and a half one above. The outside is sided with good quality of stock boards, planed and battened. The inside below is lined with ship-lapped siding, and the interstices filled with saw-dust. The upper story is finished off, lathed and plastered, to accommodate the keeper's family. The whole building is lined with tarred paper, has floors of good matched flooring, and is covered with a number one shingled roof, and everything finished in the same way.

The spring, which affords about 450 barrels per day, was dug out and walled up ten feet in diameter to the height of 4½ feet, with an eight-inch brick and cement wall. The water is carried directly from the spring by a conduit into the distributing troughs inside the hatching-house, where are eighteen 16-foot hatching-troughs, zinc-lined reservoirs, and all the best and most approved appliances for hatching and distributing fish. Total cost of house and fixtures, \$1,300; 1,185,000 spawn are in the house at this time, just about exhausting the capacity; but this can be doubled with a very small expense, should it be thought best. Mr. G. F. Slocum has had charge of the house ever since it commenced running, and has most efficiently performed his duties. The total amount of spawn handled and fish distributed in the State, and spawn and fish on hand for distribution at the time of making this report, is as follows:

Shad in Des Moines river, June, 1874.....	100,000
Iowa varieties, distributed 1874.....	20,000
California salmon, 1874.....	300,000
Penobscot salmon, 1875.....	80,000
Brook trout, 1875.....	1,000
Shad in Des Moines river, June, 1875.....	90,000
Iowa varieties distributed, 1875.....	5,000
California salmon on hand.....	300,000
Lake trout on hand.....	835,000
White fish on hand.....	25,000
Lake trout eggs sent to Decorah.....	100,000
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	1,850,000
White fish lost by accident to reservoir.....	450,000
Trout lost by accident to reservoir.....	8,000
Land-locked salmon lost by disease.....	5,000
	<hr/>
	2,319,000

Of the value of this work we leave future results to speak, but, as the United States commissioners have done much to assist us, we wish to speak of the value of what has been done by them. They have furnished us, during the fourteen months past, 600,000 California, 80,000 Penobscot, and 5,000 land locked salmon spawn, at the price fixed by the Canadian government, at their hatching-house, for salmon eggs—\$40 per thousand, at which they have furnished several States. These 685,000 would amount to \$27,400, this, however, being an exorbitant price. An estimate of the cost of collecting salmon eggs along the Atlantic coast, during the past three years, would bring them above \$5 per 1,000, or \$3,425; add to this 190,000 shad, at the same rate, \$950; or a total of \$4,375. The lower figures would probably be below the commercial value of the fish and spawn.

It was found impossible to hire a superintendent whose abilities and knowledge of fish-culture would warrant us in putting him in charge of the work for less than \$1,000 per annum, a salary which for two years, added to the cost of the hatching-house, would be in excess of the appropriation and leave nothing to pay current expenses. Mr. Shaw finally, upon consultation, consented to take charge of the entire work, provided he could be paid five hundred dollars for his labors and services the first year, which was all that could conveniently be spared from the fund, and such additional amount for the last year as the legislature or commissioners should afterwards think just and proper. This plan was submitted to members of the executive council, and upon their approval was adopted.

It was the intention of the commissioners to confine their expenses within the appropriation, but a few errors in their calculations have overrun their estimates.

The express charges upon 300,000 California Salmon eggs, in 1874, was \$97. This season the charges upon 300,000 were about \$190. Mr. Shaw's expenses of trip for salmon trout eggs, was estimated at \$45; but delay on account of stormy weather, ran them up to \$100. These, and a few other under estimates, will leave a deficit in the running expenses of the institution of nearly \$300, up to the time of the meeting of the legislature.

Immediately after the organization of the board the secretary wrote to the proper officers of the different railroads stating that we would soon have large numbers of young fish to distribute without sufficient means to accomplish the work, and that in our opinion the distribution of them along their lines of road would enhance the value of

property, induce settlement, fishing, and excursions along their lines to so great an extent that they would lose nothing by assisting us with transportation over their roads. The response was universally favorable, and to this intelligent and liberal policy on the part of the roads, a large measure of our success is due. In all our traveling with young fish and spawn, we have univervally met with the kindest attentions from officers and employes, assistance in changing the water, help in handling, and accomodations in getting on and off trains at the most convenient places, and best of all a hearty "God speed" to encourage us in our work.

To continue the work already commenced efficiently; and to introduce such varieties from the East as would require to be transported in aquariums, such as eels, smelt, alewives, etc; to save from loss and plant in our inland streams and in the Mississippi and utilize the millions of young fish that are annually destroyed; and to place Iowa in pisciculture, as she is in many other things, in the front ranks, would require an appropriation of \$15,000, the same as given by Michigan, New York, and other states, and the commissioners ask an appropriation of not less than \$10,000.

The first sum named \$15,000, or \$7,509 per annum, if made for the next decade would be at a nominal rate of less than five mills per capita per annum, and less than five cents per capita for the whole ten years; a sum so insignificant, in comparison with the results that would follow the economical and judicious use of such an appropriation for this length of that time, that there should be no hesitancy in making it.

And here it is but proper for the commissioners to say that this is no experiment, that fish-culture is an assured fact, that those states which moved earliest in the matter are already enjoying its benefits, and that the day is not far distant when you will justly remember with pride that you inaugurated the movement in this state by calling the attention of the legislature to its importance in one of your messages to that body.

#### FISH CULTURE

Is so little understood by the masses of our people that it is deemed advisable to give a brief description of the methods of culture in this report. The following from the very able and exhaustive report of Hon. Geo. H. Jerome, secretary and superintendent of the Michigan Fish Commission, is so well written as to need no comments from us:

"This being the first of our Reports, I deem it not only proper, but important to describe and explain in a brief and general way, the art or science by which fish-producing results are secured, and shall speak of it rather as an art than a science.

"Fish-culture or fish production is an industrial art, requiring labor, and practice and skill to produce sought for results. It is as distinctively an art as is glass or iron manufacture, or fruit production, or stock breeding, or farming, requiring certain appliances and adaptations to the obtaining of ends, the same in the one case as in the other. Not, perhaps, one of the "liberal" or "fine" arts, yet the century may not close ere the adjectives "liberal" and "fine," shall not inaply qualify our rising and cherished art. It has already progressed far enough to have become the subject of innumerable patents and copyrights,—confirmation strong that it is no weakling in aspiration and promise.

"Its claim is an augmented food-production and supply—by means of which a valuable article of food, almost indispensable to a proper bone and brain development, may be doubled, trebled, quadrupled, quintupled. This is fish culture in theory. In scientific practice it involves a study of the waters to know at what point reformation may begin and to what just limit it may be carried,—a study of the fishes, to know their worth, spawning seasons, peculiar habits and necessities,—an investigation of the causes of their decrease or increase, as the case may be,—a complete knowledge of one and all of those essentials that antedate birth, development, and the reproduction of valuable animal life. Then follows the manual work,—the preparation of ponds, races, hatching-houses, supply troughs, hatching boxes, egg-trays, partition screens, egg-nippers, pans, dippers, brushes, feathers, *et cetera*. The master workman, whatever his trade or occupation, will see to it that his chest of tools is full and in order. Next comes the procurement of the breeding fish, male and female, to be obtained if possible without any bodily injury, healthy, vigorous parents always preferred. The fish obtained, the fish-culturist, guided by observation and experience, will quite readily detect in the gravid fish those signs that precede and denote the mature spawner. Carefully noticing the premonition indications, the porcelain pan or tin pan is brought to the place of operation, containing but very little, if any water, the viscid fluid that accompanies the flow of the ova affording sufficient moisture. Formerly water was used but it is now generally discarded, it being thought to have the effect of drowning the spermatozoa or life principle of the milt. The spawner is then caught, gently seized and held (if small, one person is sufficient, but if very large two or more persons are required) in an oblique perpendicular position, the vent being directly over the pan. If ripe which means a mature condition of the ova, the eggs will often flow into the vessel by the mere force of gravity or muscular contraction, without any hand pressure or manipulation whatever; but if not so yielding up her spawn, a slight pressure with the thumb and fingers along the abdomen will cause the ova to be extruded. This process, once or twice repeated, in a majority of cases, will secure the entire yield. The fish is now returned to the water in almost as good condition as when taken from it, for the whole process has not occupied more than from twenty to forty seconds.

"The male fish—or milt, as he is termed by pisciculturists—is now taken from the tub or trough near at hand, held in a similar position, and the manipulator, by a gentle pressure along the lower portion of the abdomen, will discover, providing the fish is ripe, an extrusion into the vessel containing the ova of a few drops of a creamy, whitish substance, termed milt, spermatozoa, or fertilizing fluid. The fish is returned to the water, no pain or injury having resulted. A very little water is poured into the pan or porcelain vessel, and the contents gently stirred with a feather, or tremulously shaken in a manner to give the ova a rotary motion, and very soon all or nearly all the eggs will have become impregnated, vitalized. The pan is now allowed to stand a few minutes. The eggs meanwhile are undergoing great changes. Prior to the introduction of the milt, or zoosperms, the eggs were in a manner agglutinated and in a floccid condition. Now they have become enlarged, are more translucent; each egg, no longer coherent, is an individuality, and by one of those mysterious processes, by which Nature works, are become hard to the touch, so that they will roll about like shot on a smooth surface. Here now we have the vivified germ, the embryo fish. In this state they are taken, cleansed in one or two waters, and carefully placed upon a bed of gravel or upon wire cloth trays, and with a feather evenly distributed over the surface, the object of such spreading being to allow the clear, living water to come continually in contact with all the eggs, well oxygenized water being as essential to a normal, healthy development of the embryo as it is material to the life and growth of the fish in its subsequent stages. Now, with pure and perpetually running water, filtered if necessary by one or more flannel screens, with clean tools, clean surroundings and with clean hands, we enter upon the work of incubation, labor lasting five, ten, twenty, forty, eighty, one hundred and twenty days or even longer, depending upon species and upon quality and temperature of water. Dead eggs, easily distinguished, whenever discovered, are to be at once removed, as they produce a byssus that sends out its clammy, fibrous arms, like Hugo's devil-fish, to destroy every living egg within their reach, and all sediment and substances of every sort foreign to the before-named conditions of their health and growth are to be sedulously guarded against. The eyes first appear, then a faint embryonic structure, and soon after a dim outline of the "coming" fish may be seen, growing more and more visible each day, until some morning you see the wreck of a habitation floating down the current, and a tiny creation, most unmistakably alive, settled down amid the interstices of the gravelly bed, or meshes of the wire tray, a third or a half or perhaps three-fourths of an inch in length. About the most perceivable thing of this new birth is a bag or sac attached to the belly of the fish. This sac with the *sulmo quinnat* is of a rich pinkish color, resembling one or two drops of blood encased in a semi-transparent membranous bag. At birth it is larger than the fish itself, rendering all movements of the new comer exceedingly awkward and clumsy. This is the umbilical vesicle, or yolk sac,—Nature's store-house for the supply and sustenance of the fish during its tender infancy. Until this sac is absorbed the fish will eat nothing—seems to desire nothing but to be "let alone," content with the pabulum stored in its little knapsack, from which it daily, hourly draws that nourish-



ment, the provision and pottage of birthright. Day by day the sac becomes smaller, till it can scarcely be perceived with the naked eye.

Then the fish begins to move about as if in quest of something to satisfy its hunger. This yolk sac with the salmon and trout and some other species lasts from thirty to forty days; with other varieties not so long. During the existence of the umbilical vesicle the fish are known as alevins, afterwards, up to certain periods of growth, minnows or fry. The sac being absorbed, the fry should be fed two or three times a day,—or oftener in limited quantities will do no hurt. Various kinds of food are given. Bonny clabber, the yolk of an egg boiled, calf's or beef's heart boiled hard and grated, liver of any kind except hog's liver, chopped or grated so fine as to become of the consistence of thick blood, mixed with a little sweet cream, is the practice at our State Fishery. Now, under proper care and feeding, the fish will come on rapidly, so that in a few days or weeks they are in a condition suitable to be removed from their hatching troughs and planted in those lakes and rivers, there to grow and to bear testimony that fish culture is neither a myth nor a phantasm, but an ocular, tangible and gustable reality.

"Such, in general outline, is practical fish culture. The limits of this report will not, of course, permit a statement of all the methods and processes of the art that obtain in the treatment of different species, differing as they do in different countries, and even with different establishments of our own county. They are, however, mainly differences of detail, and not of principle or essence. Nor can I enter upon a description, nor even an enumeration of the inventions, contrivances and appliances made and in use to secure what are thought to be more certain and better results, many of which have been and are used to great advantage, and to them fish culture is indebted largely for its advanced position among the arts and sciences.

"From the foregoing observations respecting fish culture will follow, not inappropriately, a statement of the labor and work performed. And from such statement it will be seen that much of the labor of the Commission has been devoted to the introduction of foreign varieties, such introduction being regarded both practicable and desirable. And in this view the older fish States and the United States Fishery Commission have not only concurred, but in furtherance of such object have lent a hearty aid and co-operation."

CALIFORNIA SALMON.—(*Salmo quinnat.*)

This fish, which is a native of the west coast of North America, is being very largely introduced, through the efforts of the United States commission, into the waters of the Eastern, Southern, and Mississippi river States. Millions of their eggs are annually furnished the commissioners of the various states, and it is a generally received opinion among the fish-culturists, and those who have given the matter attention, that their habits peculiarly fit them for their new homes. They differ from the Penobscot salmon, (*Salmo Salar.*) being much heavier for the same length of fish, flesh more highly colored—nearly a deep red, and in flavor fully equal if not superior.

We received 150,000 eggs of this fish from Deputy United States Commissioner Stone, of Redding, California, October 1st, 1874, and 150,000 October 12th, 1874, an account of our success with these, and when and where they were planted, will be found in another part of this report, in a report to Hon. Livingston Stone, Deputy United States Fish Commissioner, of April 7th, 1875. We also received from the United States Commission, on the 6th day of October, 1875, another lot of 300,000 eggs, which are now nearly all hatched, and will soon be ready for distribution. From this lot we have not lost, up to the making of this report, over 16,000 from all causes.

Of the welfare of the little California strangers planted last winter, we have reliable knowledge, having frequently seen and caught them, and almost daily hear from them, through individuals who have seen them, through newspaper articles, and by letter.

The following are some of the many things heard from them:

"CLERMONT, Oct. 30th, 1875.

The little salmon you put in the Turkey are growing finely,  
WM. LARRABEE."

A. C. Ferrin of Decorah writes that, out of 15,000 California salmon, planted in ponds in that vicinity, not over twenty-five have died, they are in a flourishing condition.

The Iowa Falls *Sentinel* says:

"Last winter the State fish commissioner sent several installments of California salmon for colonization in the Iowa river. Ad Wells put a lot of them into the large spring which flows into the river from his stone quarry. On Monday he brought a bucket containing several handsome specimens of the scaly foreigners. They have grown finely, and are apparently at home in Iowa waters."

"MAQUOKETA, July 31st, 1875.

*Dear Sir:*—While catching minnows to fish with at Williams' mill, one mile east of town, I took some twenty-five or thirty California salmon. They seemed to be doing well, and were very lively, and entirely at home. Mr. Britton, the miller, tells me he fed them all winter on bread crumbs, and could see them every day.

Yours,

L. C. WALTER."

Of their success in Iowa, the commissioners have no doubt. One objection has been, the distance of Iowa from salt water. A correspondence writing from Eldo, Nevada, says: "This stream is one of the many that form the head waters of the Columbia river, and to this point, 1,800 miles from its mouth, the salt water salmon come

"in myriads to spawn." In California, several years ago, the commissioners stocked Lake Merced, and several other inland lakes, with salmon; and this year they have been taken with hook and line in great abundance. They are reported to be more gamy, of equal flavor, about the same length, but not so heavy as those who have access to salt water.

Should they succeed as a migratory fish, their value to Iowa would be incalculable, inasmuch as after the first eighteen months of their existence, they derive all the material of their growth from the ocean, never, like other game fishes, destroying the other inhabitants of our rivers. They would, therefore, add very materially to their fish producing capacity.

BROOK TROUT.—(*Salmo Fontinalis*.)

This—"Fisherman's Pride"—is too well known to need any comments from us. He is a native of the northeastern part of Iowa, originally found in the tributaries of the Upper Iowa river, and some other streams, in large numbers; but the perseverance of fishermen, and improved appliances of civilization used for destroying them, even during their spawning season, have so diminished their numbers that stories of large strings of trout are quite mythical. Some of the eastern states, where large appropriations for fish-culture have been made, are turning their attention to restocking their streams with trout, but most of the states are leaving this branch of fish-culture more to private enterprise.

A few spawn were procured from the private trout farm of H. Ruble, North McGregor, but owing to the severe cold weather of last winter, which cracked the walls of the reservoir at the hatching-house, cutting off our supply of water, only about 800 of them were saved. These were put into a stream near Anamosa, where in the future, should they thrive, by an arrangement with the owners of the land, we will be permitted to procure spawn from them. There are many good trout-streams in Iowa, and it is to be hoped that at no very distant day they will be filled with this luscious game fish. The requisites for a good trout-stream are good, pure, rapidly running water, that does not freeze too much in winter, and does not rise above 75 degrees Fahrenheit in summer.

PENOBSCOT OR ATLANTIC SALMON.—(*Salmo Salar*.)

Has only been found on this continent in the British Provinces and the New England states, and while in character and general habits, similar to the California salmon, is generally supposed to be unable to endure a more southern climate. For this reason it is thought not so likely to succeed as a migratory fish in Iowa waters; while the probabilities are that confined in our inland lakes it would soon assume the characteristics of the land locked salmon (*salmo sebago*.) We received from Deputy United States Commissioner Chas. G. Atkins, March 13th, 1875, of Bucksport, Maine, 80,000 eggs, which were successfully hatched and distributed, as will be seen by reference to report made to him, August 1st, 1875, a copy of which will be found in this report.

LAND-LOCKED SALMON.—(*Salmo sebago*.)

Are inhabitants of Scebec and Sebago lakes, the River St. Croix and its lakes, and some other waters of Maine and some of the British Provinces. In habits, except that they are not migratory, and general appearance, except that they are much smaller, weighing from two to fifteen pounds, they closely resemble the Atlantic salmon. This fish is thought, by reason of the similarity of the character of water in which it is found to those of Iowa, its gaminess and excellent flavor, to be peculiarly adapted to our wants. Five thousand eggs were received from the United States Commission March 28th, 1875. They were hatched with the loss of only 200, which, considering the long distance they were shipped, was a very decided success; but in two weeks after hatching they were attacked with dropsy of the food-sack, and in a few days were every one of them dead.

Instances of similar fatality with this disease have been known but are very rare, and among all of our works on fish-culture, and a very extensive correspondence upon this subject with the best authorities, no cause or remedy for the disease has been given. The commissioners, however, have a theory in regard to it, the correctness of which remains for the future to prove. We hope our next efforts in this direction, which we expect to be on a larger scale, will prove more successful.

LAKE OR SALMON TROUT.—(*Salmo namycush salmo siskawiti*)

Is an inhabitant of all the great lakes, is found in several of the smaller lakes of the northern states and British America, and is a very valuable food fish wherever found. The great numbers of them taken by the fishermen of the great lakes, gives the facility for taking their spawn in large quantities, and has induced several of the state commissioners to undertake their propagation. Our commission made an effort to procure spawn last year, which proved unavailing, as it was too late in the season before it was possible to make the effort. This season another effort proved more effective, and enabled the superintendent to lay down in the hatching-house at Anamosa, 835,000 eggs, and to send 100,000 eggs to the Northern Iowa Piscatorial Association, at Decorah, where they are to be hatched out and distributed.

WHITE FISH.—(*Coregonus albus*.)

Is a member of the salmonidae family, but, unlike all other members of the family, is in no sense of the word a game fish. It is seldom caught with a hook, and while undeniably one of the very best fish upon the continent, it has been thought advisable to do but little towards introducing it into Iowa waters until the question of the propriety of permitting seining in our inland waters had been more fully considered. We have about 50,000 spawn now in the hatching-house, far enough advanced so that their eyes can be plainly seen.

SHAD.—(*Alosa sapidissima*.)

As to the value of shad as a food fish, there is no argument needed, and the probabilities and possibilities of introducing them into Western waters have been so ably argued by Hon. Spencer F. Baird, United States Commissioner, in his report to Congress, that we give his statement entire.

"The Yangtze-kiang, in which the shad is most abundant, is the largest river in China, having a length, as estimated, of 3,314 miles; and the shad are said to ascend almost to its source. This is a fact of very great importance in connection with the enterprise of stocking the Mississippi river and its tributaries with shad, since the distance from its mouth to the attainable waters of all the tributaries, excepting the Upper Missouri, is much less than that traversed by the shad of China. Indeed, a distance of about 1,500 miles from the mouth of the Mississippi would probably cover the extreme limit which the shad could probably reach."

"It was uncertain whether shad could be multiplied in the waters west of the Alleghanies; but the cost of the experiment was so trifling, compared with the benefits to result from a satisfactory solution of the question, that it was deemed best to make the trial.

"I have already referred to the discovery of shad in the Alabama river, whether the result of Dr. Daniel's experiments already detailed or not; and I am assured by reliable testimony that they are found at the present time in other streams of Alabama. Of this I am well satisfied, having actually received a specimen from W. Penn Yonge, of Spring Villa, Alabama, taken at Elba, Alabama, and preserved in alcohol, and distinguishable in not the slightest particular from the shad of the eastern coast. I have also the assurance of Dr. Lawrence of their capture at the Hot Springs of the Onachita; of Dr. Middleton Goldsmith, at the falls of the Ohio, near Louisville, and of Dr. Turner, in the Wabash river of Indiana and Illinois, and in the Neosho river, of Kansas."

"Shad, in their ascent of the Mississippi river, would have no falls and no current of inconvenient strength to overcome, and it would seem no more difficult for them to swim up the river than to sweep along in schools from one part of the coast to the other. Although they do not feed in fresh water, the privation of food for several months would be no serious inconvenience, as fish are frequently longer than that without sustenance. Starting, as they could, full of fat, the moderate expenditure required for this period of time would still leave enough to supply the substance for the ripening of the eggs and the milt. For these reasons I am entirely satisfied, as are most persons who have given attention to the subject, that shad introduced into the upper waters of the Mississippi may be taken there again in the same vicinity as mature fish; provided, of course, that they are not destroyed or intercepted. And, even should the entire range of the Mississippi and its main tributaries be too much for them, the uncertainty diminishes as we reduce the distance from the gulf; and we may consider success assured in the shorter rivers, emptying directly into the gulf and in the lower waters of the Mississippi and Missouri, at least from the mouth to the Ohio.

"One great argument in favor of the attempt to introduce the shad, as well as species of salmon, into the Mississippi river and its main tributaries, is the general absence of dams as compared with the waters of the Atlantic coast. There is, even now, nothing to prevent fish from running up to a great distance, even to places where excellent opportunities for spawning can be had.

The question has been asked whether, admitting that the shad and salmon can live and propagate in the waters of the Mississippi valley, they will not find the Gulf of Mexico too shallow and hot for them. To this we have satisfactory reply that the recent researches of the coast survey show, directly outside the mouth of the Mississippi, an immense area where the depths range from 1,200 to 6,000 feet. The temperature below 600 feet ranges from 35° to 29°, even in summer, due, probably, to the intrusion of the cold water from the Atlantic region in passing along the floor of the Atlantic Ocean.

The question of food, of course, does not come into account, as we have already explained that the shad does not feed in the fresh water;

the examination of, we might almost say, millions of stomachs of fish, taken above the mouths of rivers, revealing nothing whatever in the way of food, or in a very few instances only. Four cases only have come to my knowledge where any food was detected, and that only within a short distance of salt water. Once returned to the ocean the shad feed voraciously; and although extremely thin and emaciated when emerging from the rivers, they soon fatten up."

Nothing has been done by the Commission except to use our influence with the United States Commissioner for the introduction of shad into Iowa waters, but we have in this way succeeded in having put into the Des Moines river, in 1874, 100,000, and in 1875, 90,000 young shad. It was thought best to put them all into one stream, as owing to the well-known habits of all migratory fish to return to their original hatching grounds for the purpose of spawning, if the experiment proves successful, we would sooner have a source of supply for spawn in our own State.

Three years ago, 22,000 young shad were put into the Mississippi river at the falls of St. Anthony. A two-year old one was caught last season at Clinton, Iowa, and two others have been caught at different points in the Mississippi river this season; proving at least that some of them are still living, and it is confidently hoped that next year the season of their anticipated return, may prove the success of shad-culture in Western rivers.

GRAYLING.—(*Thymallus Tri-color.*)

Of the grayling but very little is known. In fact it is but a short time since it was known that this fish, so highly prized in European countries, had a home on this continent. Since his discovery in Michigan, it has been claimed that they are found in the tributaries of the Red River of the north, and also in Colorado. The following is from the Michigan Report, by Hon. Geo. H. Jerome, Superintendent:

"Eminent fish-culturists and naturalists have for some time been at work, and are still at work, to draw the Grayling forth from his long seclusion, in the hope of determining his position and value in ichthyic and aquacultural science. I think all will agree that this work is not yet satisfactorily completed. But as respects his gamyness and beauty there seems to be no dissenting opinion. All, fish-culturists and amateur sportsman, learned and unlearned, come away from his haunts praising with one accord his fine pluck and great personal attractions, the standard of comparison being generally the Speckled Trout, and all know that no such comparison is at all *apropos* except upon the assumption of real and demonstrable merit. In gamyness the equal of the Brook Trout, and in form, coloring, grace, motion, the peer of all the tribes, appears to be the well settled judgment of all who have made

his acquaintance. This is about the extent of their agreement. And since unanimity happily exists to that extent, whatever may be said outside the limit of such concord of views may be adjudged partial and partisan, I shall not, therefore, touch on any of those points or questions upon which there may be and doubtless is an honest difference of judgment. Thankful that so good a fish State is the possessor of so distinguished a member of the fin family, a brief general description will be in order.

"The markings of this fish are peculiar and unique, being as beautiful as rare. The large first dorsal, while giving character to the whole fish, is of itself a marvel of beauty. At its lower extremity are tints and colorings not unlike the plumage of the peacock. But perhaps the more wonderful attraction of the dorsal fin lies in the fish's habit of using it. When the fish is in repose the fin droops and rests on the back, having the appearance of being folded. But when commencing to move, especially if the movement be angular, almost instantaneously the dorsal becomes distended, the front part rigid, and the back part waving like a flag in a strong wind. At such times the fin is very beautiful, and is altogether the most noticeable thing about the fish. And from this resemblance, by no means a remote resemblance, to a flag, has come, most probably, that other name by which the fish is known, *thymallus signifer*, the flag-fish, or standard-bearer. The ventral fins, too, are strongly marked. Bars of different color and shadings run laterally, and cover the entire surface of the fins. Now add to the foregoing a delicately proportioned head, a handsome and a wonderfully expressive eye, dark brown spots or patches along the anterior sides and above the lateral line, a most symmetrical outline and figure, united with great grace and facility of motion, and you have a fish the most attractive and remarkable of the American fauna. As a beautiful and gamy species the amateur sportsman need go no farther to gratify his taste or his ambition. But as a food fish for the people, —a variety to be entered upon the catalogue of piscicultural industry, for the stocking of private or public waters, in the hope of an increased food supply, on this question there is a divided opinion,—one party inclining to the belief that in the Michigan Grayling we have the *ne plus ultra*, while another party, equally certain and zealous, think as a food-producing species but little reliance can be placed upon him."

To this we wish to add that as they spawn in the spring, when but few of our more valuable fish spawn, it would give the fish-culturist an opportunity to propagate them during his leisure season, and the fisherman the advantage of having a fish in his prime condition during the spawning season of the trout.

THE SMELT.—(*Osmerus Mordax.*)

Has been successfully introduced into some of the eastern fresh-water lakes, and it is thought would be a valuable addition to ours—not only as a valuable food fish, but on account of its prolificness it would furnish food for our game-fishes, living upon a different class of food

from them, which they would utilize, to be again converted into larger fish.

WALL, OR GLASS-EYED PIKE, PIKE PERCH—(*Stezostedium Americanum*.)

Is erroneously called a salmon by a great majority of fishermen in this State, and pickerel by those of Michigan. There are two distinct varieties of them in our waters: one, called Jack Salmon, the most common and very abundant, especially in Spirit and other northwestern lakes, is never caught of more than four or five pounds weight; while the large yellow wall-eye has been caught weighing twenty pounds. They are fine flavored, predatory in their habits, multiply much more rapidly than the black bass, but are not so generally adapted to all character of waters; are worthy of attention for suitable waters; and can be had from the sloughs of the Mississippi, as suggested in regard to other varieties, at proper seasons of the year.

BLACK BASS.—(*Grystes Nigricaus*.)

Is a native of Iowa, and is found in almost every stream of any size, although of late years, owing to the want of protection laws, and the barbarous habit of catching these fish in large numbers just before and during their spawning season, they have been nearly exterminated in some of the smaller streams, and terribly thinned in many of the larger ones. This fish is, in the opinion of your commissioners, one of the noblest of the fresh water fishes, equaled by none except the salmon family, only half appreciated at home, but held in so high esteem in some parts of the country, that as high as five dollars has been paid for these for the purpose of stocking ponds, and to this work they are very peculiarly adapted, making nests in suitable places, and both parents vigilantly and patiently guarding the ova and the young fry until they are able to care for themselves. They are sometimes shamefully taken advantage of by the unprincipled fish pirates, who torment them while guarding their nests, with red flannel cloth, or anything that will attract their watchful care until they seize the hook; in this way destroying not only the parents but the whole colony. They are one of the most gamy fish known, scarcely if at all excelled by that prince of fish, the salmon; when of the same size, are free biters, and for courage and endurance are unequalled, fighting indomitably until the very last moment and coming from the water with a peculiarly defiant look of the eye that

seems to say "I will get away from you yet." Those of them caught in pure running water of our inland streams or lakes have but few if any superiors as a table fish, as is universally agreed by all authorities.

But little success has been achieved in artificial propagation of the black bass, or in fact with any of the spine-rayed fish. This, however, is of but little moment to us, as we have them in millions hatched, and ready for transportation to any waters which it is thought advisable to stock with them. The following letter from the superintendent to Governor Carpenter, tells how this work can very effectually be done with very little expense:

"Governor Carpenter, Dear Sir:—A matter of so grave import, relating to the preservation of our most valuable fish, has come so forcibly to my notice during the last year, and especially in the last few days, that I have thought best to call your attention to the facts.

"It is a well known fact to those who have studied the habits of fish, that all varieties of bass push out into our sloughs during the months of May and June to deposit their spawn. The parent fish guard their nests faithfully, keeping away all intruders until the young brood are hatched, thus insuring in most cases a large supply of their young. So far but little if any improvement could be made by the interference of the fish-culturist, but here the trouble commences, as the water begins to fall and get clear the parents leave the young in the shoal water where they are safer from the rapacity of large fish, and seek greater security for themselves in deeper water, the water falls, and communication with the river is cut off, and soon what was living water becomes a succession of small ponds, then mudholes, then dry land. I have long held the theory that a great many fish are in this way destroyed, and during the past year I have been testing the matter practically, and I will give you the result of my last effort, made on last Monday, in the sloughs of the Mississippi river at Clinton. I selected one out of a dozen mudholes that were in sight in the bed of a dry slough, that is, a slough that was all dry except three holes.

The one selected was about thirty feet long, twenty feet wide in its widest part, and about fourteen inches deep. With a minnow seine twenty feet long we made two hauls and took out over a thousand young black bass, yellow bass, striped bass, croppies, sunfish, catfish, and other valuable varieties. Other trials at this and also at other times resulted similarly, and I am certain that with a corps of men and proper appliances, millions of these valuable young fish could be taken from these sloughs and put into our now nearly depleted waters. They are from one to four inches long, and are abundantly able to take care of themselves wherever they might be put, so that they only have an abundant supply of water. It is sad to think that these millions of young fish that would soon make our waters abound with valuable food, are all doomed to almost certain destruction. The ponds are muddied by the efforts of turtles, muskrats, mink, snakes and other animals to catch them; they are the prey of cranes, pelicans, geese, ducks, snipe and other birds, and then what escape these dangers, are

killed by extreme heat and stagnation of the water, or by its entirely drying up. I have heard it objected that these fish, if put into the river, would again run into the sloughs and be subjected to the same dangers. I think it a sufficient answer, that but very few, if any, fish more than six months old, are caught from these sloughs, and it would be as impossible to run into them as it is for them to run out.

"Had the Commissioners money enough at their disposal to be able to do any efficient service, I should appeal to my colleagues to undertake this work at once, but as we have but limited means to carry out the work already undertaken, I will have to content myself with calling your attention, and through you the attention of the people, to a subject which I feel largely affects the interest of every citizen of the State.

"Yours very respectfully,

"B. F. SHAW."

#### ROCK BASS, WHITE BASS, CROPPIES, SUN FISH, ETC.

Are all natives, and are all valuable for the particular waters to which they are adapted. What has been said in regard to propagation and introduction of black bass applies to all these varieties.

In evidence that they may be successfully transplanted a few thousand were put in the Wapsie at Anamosa in the summer of 1874, and this season, 1875, several of the striped bass and croppies have been caught, and a great number of their young brood observed in the sloughs. They have never been known here before.

#### THE EEL.—(*Anguilla Bostonienses*.)

There is perhaps no fish in regard to the value of which there is so much difference of opinion as this one. Its warmest friends, however, are generally found among those who are the most intimate with it, and where it is found in the greatest abundance, while a great many objections may be traced to a prejudice against it on account of its general appearance. How they are reproduced, whether viviparous or oviparous, is a question that has never been answered. All that is known is that they come up into the streams from the large bodies of water in innumerable quantities, and are the most easily colonized by transplanting when young, of all fish known. Only a few years since 3,800 young eels were placed in the Fox river, and now Dr. Pratt, of Elgin, state commissioner of Illinois, reports that they abound in the Fox river to such an extent that water-wheels have been stopped by them, in their downward migration.

In the latter part of June or first of July, 1873, about 60 young eels were procured at Clinton from the aquarium car of Seth Green on

its way to California, by Mr. G. P. Dietz, and placed in the mouth of the Buffalo river at Anamosa. Last fall Mr. Cord, at Metcalf & Cord's Mill, found young eels in great numbers while making repairs upon the flume of the mill, about one-fourth of a mile below where planted; and this summer several eels 18 inches long have been taken here, evidently some of the same lot.

Leaving out of the question their value for food, they, together with catfish, are invaluable as scavengers, being to the water of the same benefit that the buzzard, crow, and other scavenger birds and animals are to the land. Living upon such food as is utterly refused by all other fish, they have been aptly called "hogs of the waters;" and unlike the hog, they turn into valuable food very much that if left in the water would be not only valueless but absolutely injurious. Thus living upon a different class of food from other fish, their introduction into Iowa waters would just so much increase their food-producing power.

#### CAT-FISH.—(*Rinolodus Catus*.)

Are abundant in the Mississippi, Missouri, and other large rivers of the state. There are several varieties, known as Mud-Cat, Black Cat, Yellow Cat, Channel Cat, Silver Cat, etc., and in the smaller streams, lakes, ponds, and even mud-holes, are found the Mud or Bull Pont, some times in quite large numbers. The large ones, as the Mud or Yellow Cat, when caught in foul or stagnant water, where a great proportion are caught, are not considered an excellent food fish, while the Silver or Channel Cat, more generally caught in purer running water, has a much better reputation, and when caught in good, pure spring water, has but very few superiors; accounting for the high esteem in which it is held by some, while it is almost abhorred as food by others. They are a hardy fish, able to endure great extremes of heat and cold, having been known to live in ponds after they had been frozen solid in winter, and in ponds that have been dried up during the heat of summer until barely enough thick, hot, muddy water was left to cover them. With these characteristics it is thought they may be of very great value for stocking the thousands of small shallow lakes and ponds in the interior of Iowa, that owing to the extreme temperatures to which their water is subjected, can never successfully be made the home of other fish. Should they succeed, they would be of excellent flavor during the latter part of winter and the spring months, and

would furnish a supply in sections where fish are now scarcely ever seen.

THE PICKEREL.—(*Esox Suscinus*.) and the MUSKENONGE, OR, LONGNOSE.  
—(*Esox Nobilior*.)

Known in different sections as Muskillunge, Masquelonge, and Mas-kinonge, are both found in our waters; should properly be called fresh-water sharks, are much worse than worthless; and in our opinion destroy ten times the amount of better fish for every pound they furnish. The sooner they are annihilated the sooner can their places be filled with greater numbers and better varieties of fish.

ANAMOSA, IOWA, April 7th, 1875.

HON. LIVINGSTON STONE, *Deputy United States Fish Commissioner* :

DEAR SIR :—In the matter of the California salmon eggs furnished by the United States Commission to the Commissioners of Iowa, I have the honor to report as follows :

The first consignment of 150,000 eggs was received October 1st, 1874. From this lot we picked out 10,000 dead eggs up to the 12th day of October, at which date the second consignment of 150,000 eggs was received. From this lot were picked out 12,000 dead eggs up to October 19th. These losses of 22,000 eggs were caused by transportation. From this time until the eggs were completely hatched the loss was only 14,950, or less than five per cent. of the whole amount, and some of these from injuries in transportation, but principally from ordinary contingent causes. The eggs when received were placed in the hatching troughs at a temperature of 48 degrees Fahrenheit, as soon as the temperature of the eggs (which was much higher) could be sufficiently reduced. The temperature of the water during the extreme cold weather ran down to 44 degrees, and has varied from 44 to 48 degrees since the eggs were received. The main cause of loss in transportation, I think, was heating. I enclose with this a statement of the date, number, by whom distributed, destination, and water stocked.

Very respectfully yours,

B. F. SHAW,  
*Secretary Iowa Fish Commission.*

DISTRIBUTION OF CALIFORNIA SALMON FROM ANAMOSA, IOWA.

DATE.	NO.	BY WHOM.	DESTINATION.	WATER STOCKED.
1874.				
Dec. 2	400	J. Russell.....	Des Moines.....	Des Moines river.
" 5	3500	C. A. Haines.....	Waterloo.....	Cedar river.
" 8	7000	B. F. Shaw.....	Monticello.....	Maquoketa river.
" 11	7000	B. F. Shaw.....	Maquoketa.....	Maquoketa river.
" 12	3000	B. F. Shaw.....	Marion.....	Indian creek.
" 12	12000	B. F. Shaw.....	Cedar Rapids.....	Cedar river.
" 15	2500	B. F. Shaw.....	Farley.....	Little Maquoketa.
" 15	3500	B. F. Shaw.....	Epworth.....	Little Maquoketa.
" 15	300	Dr. Litts.....	Fredericksburgh.....	Bloody run.
" 15	5700	B. F. Shaw.....	McGregor.....	Des Moines river.
" 18	15000	C. A. Haines.....	Fort Dodge.....	Iowa river.
" 18	10000	C. A. Haines.....	Iowa Falls.....	Cedar river.
" 18	100	M. Wilhelm.....	Tipton.....	.....
" 27	5000	E. R. Shaw.....	Charlotte.....	.....
" 28	5000	B. F. Shaw.....	Clinton Junction.....	.....
" 28	4000	B. F. Shaw.....	Dixon.....	Big Rock creek.
" 28	4000	B. F. Shaw.....	Big Rock.....	Big Rock creek.
" 28	4000	B. F. Shaw.....	Anamosa.....	Wapsipinecon river.
1875.				
Jan. 4	2000	B. F. Shaw.....	Worthington.....	Maquoketa river.
" 4	700	B. F. Shaw.....	Waukon.....	.....
" 5	6000	T. West.....	Atlantic.....	Nishnabotany river.
" 6	400	B. F. Shaw.....	Delhi.....	Maquoketa river.
" 6	400	B. F. Shaw.....	Hopkinton.....	Maquoketa river.
" 6	4600	B. F. Shaw.....	Delaware.....	Spring creek.
" 6	600	B. F. Shaw.....	Greeley.....	Volga river.
" 6	14000	B. F. Shaw.....	Fayette.....	Volga river.
" 11	11000	B. F. Shaw.....	Ottumwa.....	Des Moines river.
" 12	10000	B. F. Shaw.....	Des Moines.....	Des Moines river.
" 12	500	B. F. Shaw.....	.....	Brown's creek.
" 12	500	B. F. Shaw.....	.....	Coon river.
" 18	7000	B. F. Shaw.....	Anamosa.....	Wapsipinecon river.
" 18	21000	B. F. Shaw.....	Oxford.....	Wapsipinecon river.
" 27	21000	B. F. Shaw.....	Wilton.....	Cedar river.
" 27	21000	B. F. Shaw.....	Iowa City.....	Iowa river.
" 27	21000	B. F. Shaw.....	Springville.....	.....
" 27	21000	B. F. Shaw.....	Walker.....	.....
" 27	21000	B. F. Shaw.....	Independence.....	Wapsipinecon river.
" 27	21000	B. F. Shaw.....	Maynard.....	Volga river.
" 27	21000	B. F. Shaw.....	Clermont.....	Turkey river.
Feb. 1	200	Shaw and Haines.....	Manchester.....	Maquoketa river.
" 1	9500	Shaw and Haines.....	Webster City.....	Boone river.
" 1	10000	Shaw and Haines.....	Pomeroy.....	Twin Lakes.
" 1	10000	Shaw and Haines.....	Storm Lake.....	Storm Lake.
" 1	10000	Shaw and Haines.....	Cherokee.....	Little Sioux river.
" 1	5000	Shaw and Haines.....	Lemars.....	Floyd river.
" 1	5000	Shaw and Haines.....	Sioux City.....	Floyd river.
" 13	8000	B. F. Shaw.....	Tipton.....	Rock creek.
Mar. 6	4000	G. F. Stocum.....	Linn county.....	Storm spring.
" 10	8000	A. C. Ferrin.....	Decorah.....	Upper Iowa river.
Apr. 7	5000	On hand at the Hatching House.		
	258700	Total number on hand and distributed.		
	10000	Dead eggs from 2d to 12th October.		
	12000	Dead eggs from 12th to 19th October.		
	14950	Dead eggs after 19th October.		
	5000	Dead fish lost at Hatching House and in transportation.		
	300650	Total eggs received as above.		

ANAMOSA, IOWA, August 15th, 1875.

HON. CHAR. G. ATKINS,

Deputy United States Fish Commissioner:

Dear Sir:—In regard to the Penobscot salmon eggs, furnished by the United States Commission to the Commissioners of Iowa, I have to report:

The 80,000 eggs received March 13th, 1875, and immediately laid down in ordinary hatching-troughs, we picked out dead eggs as follows:

March 14, 1875.....	2,500
March 16, 1875.....	2,000
March 19, 1875.....	500
March 25, 1875.....	800
March 26, 1875.....	700
April 1, 1875.....	500
April 8, 1875.....	450
Distributed up to July 15, 1875.....	70,250
Fish on hand at this date, and dead fish.....	2,550
	80,000

I enclose with this final account of distribution of the fish, including date, number, by whom, destination and water stocked.

Very respectfully yours,

B. F. SHAW,

Secretary and Superintendent Iowa Fish Commission.

## DISTRIBUTION OF PENOBSCOT SALMON FROM STATE HATCHING HOUSE.

DATE.	NO.	BY WHOM.	DESTINATION.	WATER STOCKED.
1875.				
May 14	400	B. F. Shaw	Dubuque.....	Little Maquoketa river
" 11	2600	B. F. Shaw	Dubuque.....	Little Maquoketa river
" 26	250	Col. Peters	Delhi.....	Maquoketa river.
June 6	10600	D. W. Crawford	Council Bluffs.....	Cedar River
" 6	4000	B. F. Shaw	Cedar Rapids.....	Shell Rock and Clear Lake.
" 10	25000	B. F. Shaw	Waverly, Nora & Clear Lake.....	Decorah & West Union.
" 17	15000	B. F. Shaw	Decorah & West Union.....	Des Moines and Coon Rivers.
" 22	5000	B. F. Shaw	Des Moines.....	North Maquoketa river
July 2	2000	B. F. Shaw	Worthington.....	South Maquoketa river
" 2	2000	B. F. Shaw	Manchester.....	Bear creek.
" 3	1000	L. W. Stuart	Mill pond 2 miles north Monmouth.....	Bear creek branch.
" 3	1000	L. W. Stuart	Wm. Preston's spring.....	Bear creek branch.
" 3	1000	L. W. Stuart	Dr. Hubbard's spring.....	Bear creek branch.
" 3	500	L. W. Stuart	Mr. Straddard's spring.....	Bear creek branch.
" 3	500	L. W. Stuart	S. J. Perc's spring.....	Bear creek branch.
	70250	Total number distributed.		
	7100	Lost in hatching.		
	2000	Young fish died and on hands August 15th, 1875.		
	80000	Total eggs received from United States Commissioners.		

## STATEMENT OF EXPENDITURES ON ACCOUNT OF APPROPRIATION FOR FISH COMMISSIONERS.

VOUCHER DATE.	No.	IN WHOSE FAVOR.	ON WHAT ACCOUNT.	AM'T.
1874.				
Mar. 24.	1	T. S. Barnard	Hatching boxes.....	\$ 3.25
2 June 3.	2	H. Wicher	Live boxes.....	1.50
" 10.	3	Karakat & Turpening	Printing and lettering bbls.....	2.50
July 2.	4	S. Brown	Drayage on fish.....	2.00
" 5	John Amos	Fish barrel.....	2.25	
" 18.	6	T. S. Smith	Teaming.....	22.00
" 14.	7	W. C. Merrin	Furnishing fish.....	15.00
" 8	Hale, Adams & Co.	Ironing fish-barrel.....	2.00	
Aug. 1.	9	R. F. Shaw	Expenses from May 5th to August 5th.....	48.95
" 4.	10	P. Collins	Writing-desk.....	5.15
" 5.	11	W. S. Benton	Lumber for hatching boxes.....	12.97
" 6.	12	A. Hitchen	Hardware and fish-cans.....	18.57
Sept. 3.	13	R. O. Peters	Surveying.....	2.00
" 6.	14	William Cook	Laborer.....	6.12
" 11.	15	R. McDonalds	Abstract of titles.....	2.00
" 12.	16	James Caffrey	Laborer.....	19.75
" 25.	17	H. Newberger	Carpenter.....	16.00
" 28.	18	Needham & Burritt	Teaming.....	3.90
" 27.	19	W. Rosenkrans	Laborer.....	8.50
" 28.	20	John Althen	Mason.....	10.49
" 29.	21	R. Northey	Lime.....	6.00
" 30.	22	L. L. Burlingame	Mason.....	18.50
Oct. 1.	23	W. S. Benton	Lumber.....	428.21
" 21	Chastfield & Smith	Hardware and cement.....	12.75	
" 1.	25	C. H. Bingham	Carpenter.....	27.50
" 1.	26	G. F. Slocum	Carpenter.....	19.08
" 1.	27	Samuel Chamberlain	Teaming.....	1.00
" 1.	28	B. Brown	Mason.....	21.50
" 1.	29	E. Clark	Lathing.....	7.00
" 1.	30	Pat. McKeon	Laborer.....	18.50
" 1.	31	A. Hutchen	Hardware.....	31.26
" 1.	32	B. F. Shaw	Cash expenses.....	12.40
" 1.	33	H. Wicher	Door and window frames.....	12.00
" 1.	34	American Express Co.	Express on salmon spawn.....	37.45
" 14.	35	Pat. McKeon	Teaming spawn.....	12.00
" 24.	36	M. Crane and 5 other boys	Picking fish eggs.....	4.65
" 27	Fred Curry	Picking fish eggs.....	5.25	
Nov. 1.	38	A. Rose	Laborer.....	5.89
" 1.	39	A. Curry	Picking fish eggs.....	3.15
" 22.	40	Emma Ross & M. Richards	Picking fish eggs.....	1.00
" 24.	41	L. L. Burlingame	Mason.....	38.40
" 25.	42	Cash expenditures	Procuring spawn.....	163.00
" 30.	43	Charles Ross & M. Richards	Picking fish eggs.....	7.75
" 30.	44	W. M. Skinner	Sundries.....	13.49
Dec. 1.	45	A. Hutchen	Hardware, labor, etc.....	17.20
" 1.	46	C. H. Bingham	Carpenter.....	85.25
" 1.	47	G. F. Slocum	Carpenter and foreman.....	55.25
" 1.	48	Samuel Chamberlain	Teaming.....	11.75
" 1.	49	Mrs. G. F. Slocum	Picking fish eggs.....	5.25
" 1.	50	W. S. Benton	Lumber, windows, etc.....	24.07
" 1.	51	Needham & Burritt	Teaming and livery.....	24.00
" 1.	52	Kendall Parker	Teaming.....	1.50
Dec. 1.	53	Carter & Son	Curtains and fixtures.....	3.25
" 1.	54	J. J. McGuire	Spring bulbs.....	1.25
" 4.	55	A. J. Curry	Picking eggs.....	3.25
" 5.	56	Smith & Hull	Four hundred brick.....	3.20
" 7.	57	Kendall Parker	Use of team.....	1.50
1875.				
Jan. 5.	58	A. Ross	Work on spring.....	3.00
" 16.	59	Cash expenses	Distributing fish, &c.....	45.95
" 16.	60	James Cleveland	Work getting ice.....	1.15
" 16.	61	G. F. Slocum	Work at hatching, &c.....	65.50
Feb. 29.	62	B. F. Shaw	Services and labor, May 5th to Feb. 5th.....	373.00
Jan. 25.	63	Chatfield & Smith	Hardware.....	2.80
Feb. 3.	64	C. A. Haines	Expenses.....	5.00



## STATEMENT—CONTINUED.

VOUCHERS.		IN WHOSE FAVOR.	ON WHAT ACCOUNT.	AM'T.
Date.	No.			
1874.				
Mar. 15.	65	Am. Express Co.	Express	15.00
19.	66	W. U. Telegraph Co.	Tel. to Bangor, Maine.	2.00
31.	67	Needham & Burritt	Livery and teaming	34.00
31.	68	A. Huchon	Hardware and labor.	27.50
31.	69	G. F. Slocum	Labor	60.35
31.	70	B. F. Shaw	Cash expenses	56.30
31.	71	Am. Express Co.	Express	4.00
31.	72	D. Gerber	Teaming	2.25
31.	73	J. I. Van Ness	Ice tongs	2.50
Apr. 15.	74	N. Leun	Brush-hook	2.00
30.	75	H. W. Jenny	Trotting fish barrel	1.25
May 5.	76	Henry Griffin	Boat	5.00
29.	77	E. Booth & Son	Printing	1.50
30.	78	Needham & Burritt	Teaming and livery	9.00
29.	79	G. F. Slocum	Labor and fish-food	51.00
29.	80	Cash expenses	Teaming	13.00
29.	81	E. Courtwright	Cash expenses	3.00
June 1.	82	B. F. Shaw	Services and labor Feb. 15 to May 15	125.00
8.	83	E. Booth & Son	Printing	.75
29.	84	J. I. Van Ness	Iron for boat	1.85
30.	85	B. F. Shaw	Cash expenses	44.85
30.	86	G. F. Slocum	Labor	25.00
30.	87	Needham & Burritt	Teams	5.00
30.	88	Shaw & Son	Cash expenses	5.00
July 2.	89	Needham & Burritt	Teaming and livery	10.25
2.	90	B. F. Shaw	Cash expenses	3.50
2.	91	G. F. Slocum	Labor	9.20
Aug. 15.	92	Huggins & Belknap	Teaming	33.00
15.	93	W. M. Skinner	Supplies	2.00
Sep. 15.	94	G. F. Slocum	Labor	7.15
15.	95	Needham & Burritt	Teaming and livery	57.85
15.	96	B. F. Shaw	Cash expenses	14.55
Oct. 27.	97	Eugene E. Carr	Labor	32.85
27.	98	American Express Co.	Express	5.50
		Total amount expended		190.30
				2969.15

## Statement of amounts received by the Fish Commissioners on account of Appropriation for Fish Culture:

1874.			
Aug. 6.	By requisition on auditor of state		
Oct. 1.	By requisition on auditor of state	\$ 136.24	
Oct. 15.	By requisition on auditor of state	84.00	
Oct. 15.	By requisition on auditor of state	57.45	
Dec. 1.	By requisition on auditor of state	300.00	
1875.			
Jan. 16.	By requisition on auditor of state	286.93	
Feb. 23.	By requisition on auditor of state	118.45	
Apr. 1.	By requisition on auditor of state	375.00	
May 31.	By requisition on auditor of state	205.80	
June 25.	By requisition on auditor of state	85.75	
July 1.	By requisition on auditor of state	85.75	
Aug. 3.	By requisition on auditor of state	125.00	
Sep. 15.	By requisition on auditor of state	87.51	
Oct. 27.	By requisition on auditor of state	53.70	
		111.90	
		185.80	
	Total amount received	\$ 2,969.15	
	Total amount of appropriation	\$ 3,000.00	
	Total amount as expended above	2,969.15	
	Balance in treasury of state	.85	

## FISH LAWS OF IOWA.

## Private, Local and Temporary Acts.

## CHAPTER 74.

AN ACT to provide for furnishing the rivers and lakes of the State with fish and fish swawn.

*Be it enacted by the General Assembly of the State of Iowa:*

SEC. 1. There is hereby appropriated the sum of three thousand dollars, which amount shall be under the control of the Executive Council, to be used by the Fish Commissioners of the State, in such amounts as in the judgment of said Executive Council, and upon the representation of said Fish Commissioners, may be deemed necessary to place in the lakes and rivers of Iowa, in such manner as the interests of the States may require, any fishes or impregnated fish spawn that may be furnished said Fish Commissioners by the United States, or in any other way free of expense to the State.

Approved March 18th, 1874.

## General and Public Acts.

## CHAPTER 50.

AN ACT to provide for the appointment of a board of Fish Commissioners for the construction of fish-ways, for the protection and propagation of fish; and to repeal sections 4052 and 4053, and to amend section 4054.

SECTION 1. *Be it enacted by the General Assembly of the State of Iowa,* That the Governor of the State is hereby authorized and required to appoint three competent persons who shall be known as the State Fish Commissioners, who shall hold their positions for the period of two years, and any vacancies occurring in said commission by death, resignation or otherwise, shall for the unexpired term, be filled by the appointment and commission of the Governor. The general duties of the said commissioners in addition to other duties prescribed by this act, shall be to forward the restoration of fish to the rivers and waters of this State, and to stock the same with fish as they may be supplied with means for that purpose by the United States Fish Commissioners and by societies and individuals interested in the propagation of fish in the waters of the State.

SEC. 2. It shall be the duty of the fish commissioners to make an examination of the various improved fish ladders, fish ways, and of

the methods necessary to be used to secure the passage of migratory fish up through or over the dams now constructed in the State, and to report at the next General Assembly, through the Governor, the cost of construction of the various improved methods with the applicability thereof to the streams of the State, with such other information as in their judgment may be proper, with the cause or causes of the decrease of fish in the streams of the State, and the means that must be used to secure fish in abundance therein; and to report also, what arrangements it will be necessary to make with the owners of mill dams now constructed, to secure the construction of fish ways in such dams without doing injustice to the owners of such dams, and to report generally such facts in connection with the construction of fish ways and the stocking of the streams of the State with fish as in their opinion may be needed for the information of the General Assembly.

SEC. 3. Said fish commissioners shall receive in full compensation for their services, two hundred dollars each per year, and no more, which salary shall be paid out of the State Treasury from any money therein not otherwise appropriated.

SEC. 4. It shall also be the duty of said fish commissioners to see that the provisions of this act are enforced, and for that purpose they shall have the right to call to their assistance any prosecuting attorney to prosecute all violations of this act in the judicial district where such violation occurs.

SEC. 5. It shall be the duty of any person or persons, or corporations hereafter erecting or constructing any dam in any of the rivers within the State, or their tributaries accessible to migratory fishes, to put in or upon the same, fish-ways, under the direction and approval of said fish commissioner, without which every such dam shall be deemed a public nuisance, and liable to be abated upon the information of any one complaining; and the person or persons constructing a dam in violation of this section, shall be liable to a fine of ten dollars for each day such dam shall be continued without a fish-way, such as shall be required by the commissioners under this act.

SEC. 6. No person shall place, erect or cause to be placed or erected across any of the rivers, creeks, ponds or lakes within the State, any dam, seine, net, weir fish dam or other obstruction in such manner as shall hinder or obstruct the free passage of fish up or down through such water or water courses; and from and after the passage of this act it shall be unlawful for any person to use any seine or net for the purpose of catching fish, except minnows, in any of the waters of the State, the meshes of which seine are less than two inches; and no person shall be permitted to seine any fish except during the months of July, August and September, except minnows.

SEC. 7. Any person found guilty of the violation of the provisions of section six of this act, shall, on conviction before a justice of the peace of the township in which he resides, or where the offense be committed if arrested therein, be fined not less than ten nor more than fifty dollars for the first offense, and for the second or any subsequent offense, not less than twenty dollars, and shall stand committed till such fine be paid.

SEC. 8. No person shall place in any of the waters of the State any lime, ashes, drug or medicated bait, with intent thereby to injure, poi-

son or catch fish. Any person violating the provisions of this section shall be punished as provided in section seven of this act.

SEC. 9. It shall not be lawful to fish with nets or any other method of entrapping fish, except with hook and line, or spear in the ordinary manner of fishing, within half a mile of any dam in which there is or may be constructed a fish-way, for the purpose of the passage of fish up and down any stream in the State. Any person found guilty of the violation of the provisions of this section shall, on conviction, be fined as provided in section 7 of this act.

SEC. 10. Sections 4052, 4053, and all after the word dollars in the eighth line of section 4054, are hereby repealed.

SEC. 11. This act being deemed of immediate importance shall take effect and be in force from and after its publication according to law, in *The Daily State Register*, and *Daily Iowa State Leader*, newspapers published in Des Moines, Iowa.

Approved March 19, 1874.

The above is a full, true and complete copy of the enrolled act on file in my office.

JOSIAH T. YOUNG,  
*Secretary of State.*

SECTION 4054, Code.—Any person who shall go upon the premises of any person or corporation, whether enclosed or not, and shall be found seeking to take, by any means whatsoever, except a hook and line, any fish, shall be deemed guilty of trespass and may be prosecuted in the name of the State of Iowa, by any person in possession of said premises before any Justice of the Peace, or other court of competent jurisdiction, and fined in any sum not less than Five nor more than Fifty Dollars.

The foregoing are all the laws of Iowa now in force, in regard to fish and fishing.

We suggest that Section 6, Chapter 50, be amended by adding after the words "Such waters or water courses," "Unless otherwise ordered "by the Commissioners."

The necessity for this will be fully shown by the following letter from Col. Vestal. Other similar cases have come under our notice:

"STORM LAKE, IOWA, May 12, 1875.

B. F. SHAW Esq., *Anamosa, Iowa:*

DEAR SIR:—I have a peculiar fish question to submit for your consideration. Our lake is now quite high; the water is running out, and with it thousands of fish. The citizens made up a purse and we put a screen across the outlet to prevent the escape of fish. A few nights ago it was torn out by certain parties interested in the capture and sale of fish, and we are threatened with prosecution under sections 6 and 7, of Chapter 50 of the laws of the Fifteenth General Assembly, if we

replace it. The fish are running out by the thousands, and are captured with pitch-forks while floundering in the grass and weeds. It seems that our legislators never entertained the idea that fish would run out of the lakes by the ton and never return or make efforts to get back. Come and see us or write what to do in the present emergency. The fish are going, and if we threaten to stop them we are threatened with prosecution under the very law intended to protect fish, and encourage fish culture.

Very truly,

W. L. VESTAL."

We would also strike out from Section 7, Chapter 50, the words "of the township in which he resides, or where the offense be committed if arrested therein."

Allow the Commissioners to take fish in any public waters, at any time and by any method, for purposes of propagation, or for transportation to other public waters.

Protection for the young fish planted by the Commissioners against willful destruction for a term of years.

Persons propagating and raising fish entirely upon their own premises, should own them as absolutely as they do fruit or stock, and should be as well protected against trespassers.

The deep interest awakened in the subject of fish-culture, and the anxiety of the people to gain information, as evidenced by the very extensive correspondence with the secretary, and the difficulty of obtaining such information, must be our excuse for the length of this report.

Respectfully submitted,

S. B. EVANS,  
B. F. SHAW,  
C. A. HAINES,  
Commissioners.

## DIRECTIONS.

*In delivering* spawn and living fish from the State hatching-house the following rules have to be obeyed exactly:

*Only public* waters, and no private ponds, can be supplied.

The impregnated spawn of Salmon trout and White Fish can be sent only in October to such places as have conveniences for hatching it. Living Salmon Trout and White Fish can only be delivered at Anamosa; and all persons wanting living fish of any kind must send a man for them, as there are numerous lakes and rivers to stock, and the means at the disposal of the commissioners are too small to justify the attempt to deliver fish at the expense of the State. To avoid jealousy and dissatisfaction, no exception will be made to this rule. The expenses of the person coming for the fish will be express charges and traveling expenses.

Young White Fish are in condition to transport from the 1st to the 10th of February; Salmon Trout from the 10th of February to the 1st of March. Bass, Pike, Perch, Mullett, Buffalo, Catfish, Bullheads and other fish can be delivered at Anamosa at any time when they are on hand.

Milk cans are used for carrying white Fish and Salmon Trout; cans, clean barrels and tubs are suitable for carrying other kinds of fish. A five-gallon milk can will carry two thousand White Fish, or one thousand Salmon Trout; or from ten to fifty of the other fish above named, according to their size.

*All communications* must be addressed to the Superintendent, B. F. Shaw, Anamosa, and must describe particularly the waters to be stocked, giving their names, locations and sizes, and stating whether the ponds have rocky, sandy or muddy bottoms, or have eel-grass, flags and pond-lilies. It should also be stated what kinds of fish are found in the lake or river.

The Wall-Eyed Pike, Rock Bass, White Bass, Black Bass, White Fish and Salmon Trout are suited to clear waters with rocky bottoms, where the crawfish and similar food is found; and Yellow Bass, Perch, Mullett, Buffalo, Catfish, Bullheads and Eels are better adapted to muddy bottoms, where flags and pond-lilies abound.

*All fish* should be deposited as near the head of the lake as possible, so they will not go into the outlet before they become familiar with the waters. The young fish should be deposited during the night, when most large fish do not feed, and will find hiding places before morning.

B. F. SHAW, *Superintendent.*

COMMISSIONERS OF FISHERIES FOR THE DIFFERENT  
STATES.

*United States.*

Prof Spencer F. Baird.....Smithsonian Institute, Washington, D. C.

*Dominion of Canada.*

W. F. Whitcher.....Ottawa.

*Alabama.*

Charles S. G. Doster.....Montgomery.  
Robert Tyler.....Montgomery.  
D. R. Hundley.....Courtland.

*California.*

B. B. Redding.....Sacramento.  
S. R. Throckmorton.....San Francisco.  
J. D. Farwell.....San Francisco.

*Connecticut.*

William M. Hudson.....Hartford.  
Robert G. Pike.....Middletown.  
James A. Bill.....Lyme.

*Illinois.*

Dr. Pratt.....Elgin.

*Iowa.*

B. F. Shaw.....Anamosa.  
Sam. B. Evans.....Ottumwa.  
Chas. A. Haines.....Waterloo.

*Maine.*

E. M. Stillwell.....Bangor.  
Henry O. Stanley.....Dixfield.

*Maryland.*

T. B. Ferguson.....Baltimore.  
P. W. Downes.....Denton.

*Massachusetts.*

Theodore Lyman.....Brookline.  
E. A. Brackett.....Winchester.  
Asa French.....South Braintree.

*Michigan.*

John J. Bagley.....Detroit.  
Andrew J. Kellogg.....Allegan.  
George Clark.....Ecorse.

*Minnesota.*

David Day.....St. Paul.  
A. W. Latham.....Excelsior.  
Horace Austin.....St. Paul.

*New Hampshire.*

Oliver H. Noyes.....Henniker.  
John S. Wadleigh.....Laconia.  
A. C. Fifield.....Enfield.

*New Jersey.*

J. R. Shotwell.....Rahway.  
G. A. Anderson.....Trenton.

*New York.*

Horatio Seymour.....Utica.  
Robert B. Roosevelt.....New York City.  
Edward M. Smith.....Rochester.

*Ohio.*

John H. Klippart.....Columbus.  
John Hussey.....Lockland.  
E. T. Sterling.....Cleveland.

*Pennsylvania.*

H. J. Reeder.....Easton.  
B. L. Hewitt.....Holidaysburgh.  
J. Duffy.....Marietta.

*Rhode Island.*

Newton Dexter.....Providence.  
Alfred A. Reed, Jr.....Providence.  
John H. Barden.....Scituate.

*Vermont.*

M. C. Edmunds.....Weston.  
M. Goldsmith.....Rutland.

*Virginia.*

William B. Ball.....Mid Lothian.  
Asa Wall.....Winchester.

*Wisconsin.*

A. Palmer.....Boscobel.  
William Welch.....Madison.  
P. R. Hoy.....Racine.

## A REQUEST.

As it is of very great importance that the Commission keep pace with their work, and be informed as early as possible of the success or non-success of all efforts to stock the waters of the state, it is specially requested that any person who has information concerning the fish planted in either the rivers or lakes, will forward the same to the undersigned, or what will be still better, publish the item or information in the home newspaper, and send a marked copy to the Superintendent.

B. F. SHAW,

*Secretary and Supt., Anamosa, Iowa.*

## REPORT

*To the Sixteenth General Assembly of the State of Iowa.*

Your committee, appointed to visit the State Fish Hatching House at Anamosa, respectfully report as follows:

On the day of January, 1876, we visited the hatching house, which is situated about three miles from Anamosa, in a northwesterly direction, on a twenty-acre tract of land, well protected by hills and a thick growth of young timber. The house is a substantial frame building, forty feet in length by twenty in width, and supplied with water from a large spring of clear, cold water, which is conducted through pipes into the hatching-troughs in the basement of the building.

As far as your committee are able to judge, the supply of water now sufficient to hatch and support, till ready for distribution, about two millions of fishes annually, and that the capacity can be greatly increased by additional excavation, so as to place the hatching-troughs in the base of the building nearer on a level with the natural outlet of the spring, and that this improvement can be made at an expense not exceeding three hundred dollars.

The commissioners, as shown by their report, distributed in the public waters of the State during the years 1874-5, over a quarter of a million of the different varieties of fish that are supposed to be best adapted to our climate and water courses, and from the best evidence that your committee have been able to obtain from various persons representing different portions of the State where the different varieties have been sent, they seem to be as thrifty and doing as well as in the waters from which they were originally taken.

There are now on hand and ready for distribution, about five hundred thousand, consisting mostly of the California salmon and lake trout varieties; these should at once be distributed throughout the several counties in the State, so as to enable the commissioners to secure a like number of other and different varieties for distribution in the fall months of the present year.