

FOURTH BIENNIAL REPORT
OF THE
STATE FISH COMMISSION
OF
IOWA,

FOR THE YEARS 1879-80 AND 1880-81.

PRINTED BY ORDER OF THE GENERAL ASSEMBLY.

DES MOINES:
F. M. MILLS, STATE PRINTER.
1882.

REPORT OF THE STATE FISH COMMISSION.

To HIS EXCELLENCY, JOHN H. GEAR, *Governor of Iowa*:

I HAVE the honor, in compliance with our law, to report the doings of the Iowa State Fish Commission for the past two years.

The establishment, by a law of the last legislature, of a branch hatching establishment at Spirit Lake, in Dickinson county, the building of ponds for carp, and efforts necessary to be made in an attempt to introduce this now noted and extremely valuable fish into Iowa, and making plans, models, etc., of fish-ways, with the vast amount of correspondence which has grown out of the persistent and determined resistance to the enforcement of the fish-way law, passed by the last legislature, added to the numerous ordinary duties of the Fish Commission, have made the past two years a term of extreme activity.

So fully was the time occupied during the fall of 1880 that it was found impossible to attend to one of the most essential and important works for Iowa that has ever been undertaken by any fish commission, saving from destruction the millions of young native fish that usually die each fall in the drying up sloughs of the Mississippi, and planting them in the partially barren, but once fruitful waters of Iowa. This work, first begun by Iowa in the fall of 1876, has been highly commended by all who have given it fair consideration, and has been adopted by nearly all the Western States to a greater or less extent.

It was the intention of the Commission, in the fall of 1881, to give this work especial attention, but the first of September—the time for beginning the work, found the Mississippi River four feet and eight inches above low-water mark, and the water steadily increased until the last of October, when it stood nearly twenty-two feet above low-water mark—something never known at this time of the year before. This, while making the work spoken of impossible, makes it also nearly unnecessary, as it would enable the fish that usually die in the drying-up sloughs, to escape into the main river; but I deem it unfortunate that the work could not have been done in the fall of 1880, as it should cer-

tainly be done whenever a low stage of water would cause a loss of the fish.

The fish heretofore saved in this way and distributed through the waters of the State number nearly 5,000,000. If all these should live to be medium-sized fish of two and a half pounds each, they would make an aggregate weight of 12,500,000 pounds, or 6,250 tons; or if one in ten of them reach that size, which is quite probable, there would be 625 tons. Add to this the prospective product from breeding, and the value of the work may begin to be appreciated.

This report will of necessity be so voluminous that I shall not introduce very much evidence of the success of the work heretofore done in this State either from newspaper articles or private letters. In our last report ten pages of these evidences were published, to which those desiring information of this kind are referred. Ten times ten pages might be published in this volume of similar testimony, proving beyond doubt the success of the work. That it has been so is a positive fact. Several streams that never had a trout in them, until planted by the Fish Commission, are now good brook-trout streams. Black and striped bass, wall-eyed pike, crappies, sun-fish, channel cat-fish, eels, buffalo, and many other fish have been caught in many of our lakes, rivers and ponds, where none of the kind were ever known before they were planted, and the hook-and-line fishing has been generally improved in our inland waters by the work of planting fish.

Upon the fact that a few of these fish have been caught where never known before, we do not base a claim that the work has been profitable; but the catching of these fish prove that they have become established in waters that are suited and adapted for their future propagation and growth, and that they may in the future become valuable additions to the variety and number of the food supply of such waters, for all time to come, a result of which it would be hard to estimate the value in ordinary figures.

Fish-culture is too firmly established to need defense. Where it has been longest established, it is most generously supported the world over. Many to whom "ignorance is bliss," denounce it as a fraud and humbug as they ever have done every valuable work which has been undertaken since the world began; and many who fear that some personal right may be infringed, give it no favor; but there is not a whole-souled, intelligent man on the face of the earth who has given the subject a fair investigation, that I have ever heard of, who is not a firm friend and advocate.

The means and methods of fish-culture are justly subjects of criticism, and should be closely scrutinized; and those who have charge of them should be able to bear a fair amount of such scrutiny or give place to some one who can. Factious opposition may temporarily embarrass or hinder the progress, but the growing needs of so great a State as Iowa, and the good sound sense generated on her broad prairies and fertile soil, is a sure guarantee that these hindrances and embarrassments will be in no case more than temporary, and that the work will go on until every foot of her public waters is made to furnish its fair share of healthful food; and the culture of domesticated fish, wherever a few square feet of permanent water can be found, will be as common as the raising of fowls.

THE ADDITIONAL HATCHING-HOUSE AT SPIRIT LAKE, DICKINSON COUNTY.

It having been made my duty by chapter 156, laws of Eighteenth General Assembly, to supervise the work of the Assistant Fish Commissioner, I was called upon by the Governor in June, 1880, to select a site and furnish plans for an additional hatching-house in Dickinson county. The place selected is a narrow isthmus between Spirit Lake and East Okiboji. The necessary surveys being made, showed that Spirit Lake was four feet and one inch higher than Okiboji, giving the requisite and necessary fall for hatching purposes.

The house afterwards built, and now in good running order, is twenty by thirty feet in area, with an office and sleeping-room twelve by twelve feet. The foundation is at least two feet below low water mark in Spirit Lake, and above any ordinary level of Okiboji.

There are four hatching troughs, a distributing trough, a waste trough, a good liberal supply of lake trout and white fish, hatching trays, and all the needed apparatus for successfully carrying on a fair amount of work, all well and substantially made according to plans and specifications furnished by me and as required by chapter 156. Two hundred and fifty thousand salmon-trout and 500,000 white fish eggs, furnished by your Commissioner, were successfully hatched and distributed from this hatching-house in the spring of 1881; a further and full report of which will be found in the report of Assistant Commissioner Mosher.

Too much can scarcely be said in favor of Assistant Commissioner Mosher for his persistent and determined efforts to build and complete this work in spite of all obstacles interposed by the law and outside unfavorable circumstances; for only by a great amount of self-sacri-

fice and continued, persistent labor could it have been done. The practical and experimental work already done at this hatching-house demonstrate the fact that for the purpose of increasing most of our native fish, and all others that do not require spring water for their incubation, this house can and should be of vital importance to the fish interests of the State. Experiments made there under most unfavorable circumstances demonstrated the fact that most of our native fish can be artificially propagated under favorable circumstances to any extent desired, and that depleted waters can be re-stocked, and an abundance in other waters can be maintained at so limited a cost that it would be the height of folly to neglect or fail to have it done.

WHITE FISH.

Learning that the United States Commission had a supply of white fish eggs for general distribution at the hatching-house of Frank N. Clark, Deputy U. S. Commissioner, I arranged for a small supply of them for Iowa, and on January 15, 1881, delivered to A. A. Mosher, Assistant Fish Commissioner, at the additional hatching-house, 500,000. They were most successfully hatched. Owing to the unprecedentedly high water many of them escaped from the hatching-troughs into Okiboji Lake, and it was found impossible to keep them until they could be distributed to the lakes of northwestern Iowa as it had been arranged to do, but they were all safely put into the Okiboji and Spirit lakes.

The following is a report from Assistant Commissioner, A. A. Mosher, in regard to them:

SPIRIT LAKE, IOWA, June 10, 1881.

HON. B. F. SHAW, *Dear Sir*—The white fish eggs you brought here from Northville, Michigan, did splendidly. We hatched ninety-nine per cent of good, strong, healthy fish. In fact, after picking out those eggs injured by transportation, we hardly lost an egg. They were put into Okiboji and Spirit lakes, all alive and in good condition. Of 500,000 I don't think we lost over 3,000.

Yours truly,

A. A. MOSHER, *Assistant Fish Commissioner.*

If thought desirable these fish could be hatched and distributed in large quantities from this hatching-house as soon as our railroads give us fair facilities for their transportation, which will probably be very soon, as there are three roads now in process of construction to the lakes at this time; viz., B., C. R. & N., C., M. & St. P., D. M. & N. W., all of which will probably be running into Dickinson county another season.

LAND-LOCKED SALMON DISTRIBUTION, 1880.

DATE.	BY WHOM DISTRIBUTED.	IN WHAT WATERS.	NO.
1880.			
March	30/Walter Brown.....	Okiboji.....	14,000
April	9/B. F. Shaw.....	Clear Lake.....	14,000
April	9/B. F. Shaw.....	Shell Rock.....	5,000
April	14/B. F. Shaw.....	Storm Lake.....	7,000
April	14/B. F. Shaw.....	Twin Lakes.....	7,000
April	14/B. F. Shaw.....	Big Creek.....	2,000
April	14/B. F. Shaw.....	Skunk River.....	2,000

LAND-LOCKED SALMON DISTRIBUTION.

DATE.	BY WHOM DISTRIBUTED.	IN WHAT WATERS.	NO.
1881.			
April	4/B. F. Shaw.....	Col. J. Scott pond.....	1,500
April	4/B. F. Shaw.....	Lakes Missouri Valley.....	2,000
April	10/Geo. L. Gast.....	Le Clair pond.....	1,500
April	15/B. F. Shaw.....	Fayette county streams.....	3,000
April	15/B. F. Shaw.....	Allamakee county streams.....	3,000
April	26/B. F. Shaw.....	Emmet county lake.....	5,000

I have great hopes of the success of this fish in the better waters of Iowa, and as the United States Commission furnishes us the eggs free except the cost of transportation, it is costing little to try the experiment of establishing them. If it should prove successful they would constitute one of the most valuable additions possible to be made.

LAKE TROUT DISTRIBUTION, 1880.

DATE.	BY WHOM DISTRIBUTED.	IN WHAT WATERS.	NO.
1880.			
May	15/J. J. Smart's employes...	Lakes in Sac county.....	20,000
May	30/Brown.....	Spirit Lake and Okiboji.....	45,000
April	9/B. F. Shaw.....	Clear Lake.....	25,000
April	9/B. F. Shaw.....	Shell Rock.....	10,000
April	9/B. F. Shaw.....	Cedar River.....	20,000
April	13/Rockwell.....	Twin Lakes.....	14,000
April	13/B. F. Shaw.....	Storm Lake.....	14,000
April	13/B. F. Shaw.....	Des Moines River.....	10,000
April	13/B. F. Shaw.....	Lakes Missouri valley.....	10,000
April	20/Judge Peak.....	Sand Lake.....	7,000
April	20/Judge Peak.....	Blue Lake.....	7,000
April	20/B. F. Shaw.....	Swan Lake.....	15,000
April	20/B. F. Shaw.....	Iowa River.....	10,000
May	4/B. F. Shaw.....	Big Creek.....	5,000
May	4/B. F. Shaw.....	Skunk River.....	5,000
May	4/B. F. Shaw.....	Tracy Park.....	3,000

The spawning of this fish in the fall of 1880 was the most unpropitious known in the history of fish culture. With the best efforts we could make, beginning on the 10th day of October on Lake Superior, we were able to secure only 750,000 eggs, and 400,000 of these were lost in the great storm of October 16th. The balance were successfully hatched at Anamosa and Spirit Lake. An account of the disposition of those hatched at Anamosa is herewith given:

LAKE TROUT DISTRIBUTION, 1881.

DATE.	BY WHOM DISTRIBUTED.	IN WHAT WATERS.	NO.
1881.			
April	4 Col. Scott.....	Nevada.....	1,500
April	4 B. F. Shaw.....	Lake near Council Bluffs.....	2,000
April	4 B. F. Shaw.....	Lake near Missouri Valley.....	2,500
April	10 Geo. L. Gast.....	Le Claire.....	1,500
April	15 B. F. Shaw.....	Allamakee county.....	3,000
April	20 B. F. Shaw.....	Fayette county.....	3,000
May	20 B. F. Shaw.....	Emmetsburg.....	15,000
June	9 B. F. Shaw.....	Lake north of Boone.....	5,000
June	9 B. F. Shaw.....	Ugden.....	3,000
June	16 B. F. Shaw.....	Near Le Claire.....	1,500

BROOK TROUT DISTRIBUTION, 1880.

DATE.	BY WHOM DISTRIBUTED.	IN WHAT WATERS.	NO.
1880.			
March	3 Representative Merton.....	Delaware county.....	5,000
March	9 Representative Hubbell.....	Decorah.....	30,000
April	9 B. F. Shaw and Senator Gaylord.....	Nora Springs.....	10,000
April	9 B. F. Shaw.....	Tributary Shell Rock.....	5,000
April	13 M. M. Moulton.....	Monticello.....	4,000
April	13 S. G. Van Anda.....	Manchester.....	10,000
April	14 B. F. Shaw.....	Lizard Creek.....	5,000
April	14 B. F. Shaw.....	Willow Creek.....	5,000
April	19 H. K. Soper.....	Glidden.....	7,000
April	28 Blodgett.....	Grashey.....	2,500
April	28 B. F. Shaw.....	Big Rock.....	3,000
1881.			
April	15 B. F. Shaw.....	Streams in Fayette county.....	4,000
April	20 B. F. Shaw.....	Streams in Allamakee county.....	5,000
April	20 B. F. Shaw.....	Streams in Clayton county.....	2,000

There are but few good brook-trout streams in Iowa, but there are a few as good as can be found in any part of the world. Some of them in which no trout had ever been known until planted by the Fish Commission, have demonstrated the success of trout-planting in

suitable waters beyond any question. They should be planted in every suitable stream in Iowa. Trout have been caught weighing three and one-half pounds, where no trout were ever known until after they had been planted by the State. A large stock of eggs will be laid down this fall for future distribution.

CARP.

According to Dr. Hessel, who has charge of the carp at the Washington carp-pond for the United States Fish Commission, carp have been cultivated in Europe since the year 1227. Some of these carp establishments cover an area of 20,000 acres, and bring to their owners an immense amount of income. From this long period of cultivation they have become thoroughly domesticated, and the families as diversified and as well defined as the various breeds of cattle. Three kinds have been introduced into the United States: the leather or scaleless, the minor, and the scale. Of these varieties, the first seems to be most esteemed, and the last the least of the three. They feed readily on vegetable food—potatoes, cabbage, lettuce, pursley, weeds, and on waste meats, garbage from the kitchen, malt, and nearly any kind of grain. They are hardy, enduring heat in water that would be fatal to any other fish, and to avoid the cold that would be fatal to any other kind of fish they hibernate or bury themselves in colonies in the muddy bottom of ponds and streams. They are rapid growers, specimens now in the carp-ponds—three and four years old—weighing ten to twelve pounds, while still more rapid growth is reported from many places in the United States, this country seemingly being more conducive to rapid growth than the German States from which they were imported. Of their quality for food it is reported that in Germany and Austria they bring better prices than any other fish, salmon and trout only excepted.

Mr. Blackford, the New York Fish Commissioner, who has been distributing carp in that State, says of this fish:

It is hardy and prolific, and is as good, if not better, eating than any other fish we have. They vary in size, often reaching thirty inches in length and eighteen pounds in weight. They are in season from October to April. The rapidity with which they grow is remarkable. A gentleman recently showed me two carp that grew in a pond near Brooklyn, from half an ounce to two pounds in ten and a half months.

Marsh and waste lands are easily prepared for their culture. Three ponds are required, one for breeding, one for growing carp, and one for wintering. The latter must be eight feet deep, the others

may be shallow. This fish bears the same relation to other fish that the domestic fowl does to other birds.

The three ponds spoken of by Mr. Blackford are only needed when class culture is undertaken; that is, where it is intended to keep the fish of different ages in separate ponds, which is the preferable course, but they are more frequently bred in single ponds and even in small pools, reservoirs, etc., in what is called mixed culture; and as they are not carnivorous this is quite a successful method of raising them.

Since the summer of 1880 there have been constructed on the State grounds near Anamosa, five carp-ponds, for class breeding of carp. These are, we think, as complete as can be. The water taken from the trout-ponds above can be let into the carp-ponds in any quantity desired, so that the temperature may be regulated in any one of them to suit the wants of the fish, and by a peculiar system of drainage, the water in any one of the ponds can be drawn off, either partially or entirely, without in any way interfering with the other ponds, thus enabling those in charge to handle the fish readily and with safety. There are now on hand, and in these ponds, a fine lot of breeding-fish, and the whole establishment is the most complete, we think, in this country. In the next few years it will be capable of furnishing to the waters of this State quantities of these valuable fish sufficient to fully stock both public and private waters.

The United States Commission, with only a few fish, has in the past few years distributed vast quantities. We have more fish and larger ones than that Commission had to begin with, and much better facilities than it had at that time. The carp being vegetable feeders and living upon food not used by our carnivorous fishes, will in no way interfere with or diminish those fishes, while their prolific breeding habits will furnish an immense additional amount of food for our bass and other fishes, while for shallow, muddy-bottomed lakes and streams, in which no other fish exist, they are a necessity. The error of permitting such barren waters to remain always barren, or to make them for all future time prolific with as fine a fish as the carp, is one that needs no argument.

As a sanitary measure the introduction of carp into stagnant waters is one of very great importance. The waste from water vegetation (*algæ*), that rises to the top and finally forms the green, decaying, malaria-producing matter, so often seen and dreaded in such waters, is, while in a sound, healthy form, one of the foods upon which the carp feeds and thrives, and thus, by producing good, healthy, fish food, in-

stead of malaria and disease, it may be made a "blessing in disguise." Hon. D. B. Long, Fish Commissioner of Kansas, writes to the "American Field" as follows:

Four months ago, about the first week in May, I put eight German carp into a pond. They were about three inches long at that time. To-day, September 10th, I captured seven of them, averaging in length sixteen inches, and four and one-half inches in depth. I believe they would average two pounds in weight. Considerable interest in the cultivation of this excellent variety of fish is manifested and applications for carp are received almost every day. I am convinced no better fish can be introduced into our Western waters than German carp.

D. B. LONG.

There are thousands of acres of shallow lakes and ponds in the central and northern portions of our State that are now entirely barren of fish, but that will in time be the most prolific fish producing waters in the State, while for those southern and other portions of the State that have no fish-producing waters, the introduction of the carp as a pond or domestic fish is their only hope, and I predict that in those portions of the State the time is not far distant when more attention will be given to their cultivation than is now given to domestic fowls. The carp in our State ponds, when put in last spring, were only four or five inches long, now (October 15) I should think they were thirteen to fifteen inches long, but as they are very shy, I can only judge by occasional glimpses of them.

November 5, 1881—Since the article on carp was written, the water in one of the State ponds, in which we have German carp, has partially cleared up, and we are very gladly surprised to find a few young carp, from two and one-half to three inches in length, in the pond. As the fish in this pond were only four or five inches long when put in the pond last spring, we had hardly hoped for any young carp this season. How many may be found when a final examination of the ponds is made, we cannot tell, but that these young fish have bred is full of promise of future good. As far as known, these are the first carp ever bred in Iowa.

SMELTS.

Experiments have proved that these valuable fish can be very successfully introduced into fresh water lakes. Living upon different food from our game fish, and being very prolific, their introduction into our waters would be a valuable work, as they are one of the best food-fishes, and would add largely to the capacity of our waters to produce the larger varieties of fish. As other commissions could more conveniently experiment with them near the home of the fish, it has been

thought best to wait and have the benefit of their experience before attempting to introduce them into Iowa waters.

The above is from the second biennial report of the Iowa Fish Commission.

The following is from the report of the Vermont Fish Commission:

We are especially gratified to be able to report that most delicious winter fish, the smelt, has been fully established in every lake into which they have been placed and heard from. Fortunately the people living near the lakes where smelt are growing and multiplying have not yet found out their nature, value, or their haunts, and we know of no destruction of them save by an occasional fisher, who has taken them at the mouth of some cool incoming brook, in nets for the purposes of bait.

When they come to be established wherever there is a fit lodgment for them, that event alone will fully pay for all the expenses incurred since the formation of the Commission.

FISH-WAYS.

CHAPTER 123.

AN ACT to provide for the further enforcement of chapters 80 and 188, of the acts of the Seventeenth General Assembly, in relation to the construction and attachment of fish-ways to dams.

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

SECTION 1. That within thirty days after the passage and publication of this act, each clerk of the board of supervisors, in any county in this State in which there is any dam constructed across any stream therein, shall notify the State Fish Commissioner of the height of each dam in his county, the width of the stream where the dam is constructed, the character of the foundation upon which each dam rests, and shall give to him all other information necessary to convey to said Commissioner an intelligent understanding of the situation and location of each dam in said county.

SEC. 2. That within thirty days after the receipt of said notice, the State Commissioner shall acknowledge the same by mail, and within thirty days from that date the said Commissioner shall send through the United States mail, or by express, to the clerk of the said board of supervisors, plans and specifications, also one model for each county to be retained by the auditor for reference, suitable for the construction of a fish-way for each dam reported as aforesaid, and the expenses connected therewith to be paid by the county receiving the same, and the said clerk shall, immediately on the receipt of said plans and specifications, cause a notice to be served in the same manner as required for the service of original notices and returned to the auditor for preservation; which notice shall be directed to the owner, agent or party in charge of the dam, and which shall inform said owner, agent or party that model, plans and specifications are in his office, subject to his inspection, for the construction of a fish-way to said dam, and that, unless he consult the same and comply therewith within sixty days, the county will proceed to construct the same, and the costs and penalties

therefor will be made a taxlien on the entire premises on which such dam is situated.

SEC. 3. If, within sixty days after the service of said notice, the owner, agent or party in charge shall fail to construct and attach a fish-way to such dam, as required by the Commissioner, then the county board of supervisors shall immediately proceed to construct and attach the same, and when so constructed and attached, the original cost and twenty per cent thereon as a penalty shall be entered upon the taxbooks of the county, and shall be a lien on said property, to be collected in the same manner as provided by law for the collection of other taxes.

SEC. 4. To carry out any of the provisions of this act, the county board of supervisors may issue county warrants for the payment of such expenditures and expenses, and when the said taxes are paid the said warrants and all accrued interest thereon shall be refunded to the county, and the balance, after paying the clerk and State Commissioner and board of supervisors for their services and for the service of said notice, shall be paid over to the county treasurer to become a part of the school fund of the county.

SEC. 5. Some one of the county board of supervisors, in the first week in April and September of each year, shall visit each dam in his county, to which fish-ways are attached, and require the party in charge to keep the same in good repair, and if he fails or for any reason shall neglect to repair the same within ten days after notice so to do, the said supervisor shall immediately cause the needed repairs to be made at the expense of the county, and costs thereof, with a penalty of twenty-five per cent added, shall become a lien on the premises, and shall be collected as other taxes are collected against the property.

SEC. 6. The said clerk and State Fish Commissioner and board of supervisors shall keep an accurate and itemized account of their expenditures, and report the same under oath to the county board of supervisors at any regular meeting, and the said board shall thereupon allow such reasonable compensation for their services as they may consider reasonable and just, to be paid out of any money in the county treasury not otherwise appropriated.

SEC. 7. Any person who shall kill, trap, ensnare, detain, or in any manner molest the free and unmolested passage of any fish within one hundred yards of any dam, or in their transit through any fish-way attached or belonging thereto, shall be adjudged guilty of a misdemeanor, and upon conviction thereof shall pay a fine for each offense of not less than five nor more than fifty dollars, and five dollars to the complaining witness, together with costs of prosecution, including an attorney fee not exceeding ten dollars, and stand committed until the same are fully paid; and when said fine shall be collected the same shall be paid over to the county treasurer, to become part of school fund.

SEC. 8. If any member of any board of supervisors shall, by vote or act, neglect or refuse to enforce the provisions of this act, he shall be adjudged guilty of a misdemeanor, and upon the complaint of any person before any justice of the peace having jurisdiction thereof, if he be convicted he shall pay a fine of not less than twenty nor more than one hundred dollars and costs for each offense, and when collected

the same shall be paid over to the county treasurer to become a part of school fund of the county.

SEC. 9. Nothing in this act shall be construed to repeal any part of chapters 80 and 188 of the acts of the Seventeenth General Assembly of the State of Iowa.

SEC. 10. This act, being deemed of immediate importance, shall take effect and be in force from and after its publication in the *Iowa State Register* and *Iowa State Leader*, two newspapers published in the city of Des Moines, Iowa.

Approved, March 25, 1880.

I hereby certify that the foregoing act was published in the *Iowa State Register*, April 1, and in the *Iowa State Leader*, April 6, 1880.

J. A. T. HULL, *Secretary of State.*

The foregoing law was passed by the Eighteenth General Assembly. It was introduced by Senator Gaylord, and embodied his views upon the subject.

There are some features in this law that I hold of doubtful policy. One is that it is so rigid in its construction that it compels the putting in of a fish-way into every dam, whether there is any necessity for it or not. There are many small streams in the State, through the waters of which no fish are ever known to pass; and, as the dams on such streams interfere with no public rights, the law imposes a burden upon the owners of the dams on such streams without, in the smallest manner, benefiting the public. In my opinion it would have been well in streams rising in any county to permit the board of supervisors to determine as to the necessity of putting in fish-ways in streams rising in such county. There are, also, many dams so constructed that in an ordinary stage of the water fish could pass readily in the streams. From both these causes I have received many communications from the parties interested, asking me to relieve them from putting in fish-ways. As the law gave me no authority to determine such cases, I have had to refer them to their boards of supervisors who, although endowed with no authority, would, being upon the ground, have a better knowledge of the facts in the case; and being charged with the enforcement of the law such boards were the only bodies whose actions would directly affect the complainants.

Another serious embarrassment was the fact that as Commissioner the law required me to make plans for all dams without sufficient information being required in the reports of county auditors to give a definite idea of what would be required. As a consequence, I was compelled to adopt some general plan that could be made to meet almost any requirements. The plan adopted was a pool-and-fall plan, as

already adopted by Michigan, Minnesota, and several other States. It would, of course, be impossible to make a model of a fish-way (as required by the law to be sent to each county in the State) that could be put in every dam. The model adopted and sent out to the counties was the same that was before the Seventeenth and Eighteenth General Assemblies, and can be seen, by anyone interested, in the various county auditors' offices. It consists of an arrangement of pools (in a substantial case twelve feet square), in a spiral stairway form, with enough pools and falls to overcome the height of fall of the dam in which the structure is to be placed, and so arranged that the issue of water from the fish-way is directly at the foot of the dam, where it would be readily found by any fish seeking to find a way around or above the dam.

The Augusta Fish-way—Messrs. C. G. Atkins, and Everett Smith, civil engineer, met at Augusta, July 23, 1879, at request of the Commissioners of Fisheries, and determined upon the form and site of a fish-way adapted to the requirements of the location. August 19, 1878, the corporation owning the dams was served with plans and specifications, and notice to build in accordance therewith, by the Commissioners of Fisheries. No steps were taken by the corporation, however, toward building the fish-way, either in 1878 or 1879. In February, 1880, said corporation presented to the legislature a petition, stating that said plans required an expensive and complicated structure, and one that would endanger the safety of the dam, and asking to be relieved of the requirements to build it. An engineer was then employed as an expert to examine the dam and fish-way plans. The petition was then withdrawn, and an agreement made on behalf of the corporation to build the fish-way in accordance with said plans and specifications, as nothing better could be offered in substitution, nor any modifications suggested.

The height of the Augusta dam is about eighteen feet above the surface of the water below. The total cost of the protecting pier, of preparing the foundation, and the fish-way itself was \$9,400. Less than one-half of this sum was expended upon the structure that forms the fish-way proper.

To make this general plan of fish-way available where it was impossible to follow the model, the following instruction, with others, was attached to each plan sent out:

SECTION 6. Where it is impossible to preserve the form of fish-way as shown by lithograph plans and model, some other form of position of pools may be made; but the length, breadth, and depth of pools, and the same height of fall, must be preserved, and the last or bottom pool must empty its water near the foot of the dam.

The Commissioner was of the opinion that, with the assistance of the lithograph plans, the model, and the instructions attached to the plans, it would be found possible for a good mechanic to put an efficient fish-way into any dam.

Attached to the lithographic plans were instructions to assist the mechanic in building, and also the following general instructions:

1. In building fish-way it should be remembered that the owners of dams are required by law to keep them in repair, and that any temporizing will be at the expense of the builders, and an injury to the efficiency of the fish-way.

The case or caisson may be built of timber and plank, as shown by lithographs, of two-inch plank in crib work, as shown by model, or where there is no danger of their destruction by overflow of ice or flood-wood, the simple pools may be substantially covered with boards or plank.

2. The foundation must be firm, and where there is danger of washing out beneath the structure, piling should be driven to a sufficient depth to insure its safety; and to the foundation, face of dam, and side of stream, the fish-way should be firmly anchored.

3. The water inlet should be so placed that the top will be level with the lowest point of overflow of the dam, in such manner that the first waste water will flow through the fish-way. It should be six inches deep and controlled by a gate, to save water, in low water, and to permit no more water to enter than can be carried through the opening from one pool to another.

4. The mouth of the inlet to the fish-way should not open against, but at right angles to the current of overflow of dam, as shown only in lithograph plans, to prevent flood-wood from choking up the fish-way.

5. Where there is no abutment above fish-way, and where it will be subject to overflow, the cover should be of sufficient strength to carry any floating ice or flood-wood safely over the structure. It can be made of two-inch plank, four, six, eight, ten or twelve inches wide, set on edge and spiked together, and timber or plank should be placed above the fish-way, and extending above it and down into the water in such manner as to carry all floating objects over the top.

6. Where it is impossible to preserve the form of fish-way as shown by lithographs and model, some other form of position of pools may be made, but the length, breadth and depth of pools, and same height of fall, must be preserved, and the last or bottom pool must empty its water near the foot of the dam.

7. The plans and model represent the fish-way as located on the right bank of the stream (looking up stream) with spiral form of pools turning against the sun. To adapt it to the other bank, the form is simply reversed and will turn with the sun.

8. Owing to the fact that measurements of any dam made by different parties at different points on the dam would be unlikely to agree, and the further fact that frequently the fish-way could not be placed at the point where the measurement was taken, it was impracticable to make plans from the the reports that would be adapted to

the requirements of each particular case. It was, as a consequence, necessary to make general plans that would be adapted to dams of various heights.

In making measurements it should be remembered that the top of the inlet should be level with the lowest point of overflow of the dam, and that the bottom of inlet is six inches lower still than that; also, that there is one more fall than pools in each fish-way.

For example, in a five pool fish-way there are six falls. Supposing these each to be eight inches, the falls would equal four feet. Add six inches, depth of inlet, and it would give four feet and six inches as the height of dam from low water to lowest point of overflow.

To the heights given below add six inches for depth of inlet in each case.

☞ The model and one copy of lithograph should be kept in charge of the county auditor, where they can readily be referred to.

B. F. SHAW, *Fish Commissioner*.

Many objections have been made to these plans, but they have invariably come from those whose interests seem to make the whole fish-way law objectionable, and have always been to some point that had been fully considered before. It has always been my ardent desire, and I have given much time, study and labor to furnish a plan that would be, first, efficient; second, cheap; and third, durable. The plans sent out embody my best ideas.

It is easy to find fault, but it would be more useful to suggest improvements in the plans or some better plan than the one adopted; but as the objectors have universally been those who would prefer to have no fish-ways put in, they have uniformly failed to make any suggestions for improvement.

Accompanying this is a table showing date of report, by whom made, number of dams, date of sluicing, model and plans, etc.

The law not coming into the hands of the various county auditors until some time after its passage, and the duties required by the law being new and little understood, caused much delay in making the required reports and in the work. Many of the millers refused to comply, and so caused much embarrassment to the various boards of supervisors.

Among other correspondence in regard to the enforcement of the law was the following letter from the auditor of Wapello county, which, with the opinion of the Attorney-general, is herewith submitted:

AUDITOR'S OFFICE, OTTUMWA, IOWA, }
 October 20, 1880. }

HON. B. F. SHAW, *Fish Commissioner, State of Iowa.*

DEAR SIR—In the matter of constructing a fish-ladder to the dam at this place, I wish to say to you that on the 7th day of August last past I issued a notice to the Ottumwa Water-power Company, in accordance with the law, to construct a fish-ladder to their dam, and placed the same in the hands of Sim Chaney, sheriff of the county, for service. On the 9th day of the same month it was returned served. The said Water-power Company have employed counsel, and their attorney, Mr. Wm. McNatt, informs me verbally that they refuse to comply with the law, and that the said fish-law is unconstitutional. I am instructed by the president of our board of supervisors to ask you to procure the opinion of the Attorney-general of the State and transmit it to us in time for the November meeting of the board, with any suggestions or instructions you may desire to give us in the premises.

Respectfully yours,

M. L. GODLEY,
Auditor of Wapello County, Iowa.

The above was submitted to the Attorney-general, and the following is his opinion in reply thereto:

WASHINGTON, IOWA, }
 November 24, 1880. }

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

DEAR SIR—In answer to your letter of the 12th inst., I will say that in my opinion chapter 123 of acts of Seventeenth General Assembly is *not* unconstitutional. A statute is never by the courts held to be in conflict with the federal or State constitution unless such conflict is *clear* and certain. Our branch of the State government; to-wit, the General Assembly, has passed on its constitutionality by enacting it. The question is *not a new one*. While our courts have not passed on it, other courts of last resort have, and held similar statutes not liable to the objection of unconstitutionality. With these decisions you are familiar.

Yours very truly,

J. F. McJUNKIN, *Attorney-general.*

As much has been said and written in regard to the constitutionality and injustice of the law, I take the liberty, instead of discussing the law any farther, to attach hereto a protest of one miller against the fish-way law, published in the Anamosa *Eureka*, and a review of and reply to the same, published in the same paper, written at the request of the editor.

A PROTEST AGAINST FISH-WAYS BY A MILLER—RESPONSE BY FISH COMMISSIONER, SHAW, CITING SEVERAL DECISIONS IN RELATION THERETO—THE PROTEST.

OXFORD MILLS, September 20, 1880.

EDITOR EUREKA—You will oblige me much if you will give me space in your valuable paper to express my views in relation to a law passed by the Eighteenth General Assembly of the State of Iowa.

Chapter 123, section 3, of said law reads: "If within sixty days after the service of a notice by the sheriff of the county, the owner, agent, or party in charge shall fail to construct and attach a fish-way to such dam, as required by the Commissioner, then the county board of supervisors shall immediately proceed to construct and attach the same; and when so constructed, the original cost and twenty per cent thereon, as a penalty, shall be entered upon the taxbook of the county and shall be a lien on said property, to be collected in the same manner as provided by law for the collection of other taxes."

Section 4 reads: "To carry out any of the provisions of this act, the county board of supervisors may issue county warrants for the payment of such expenses, and when the taxes are paid, the warrants and all accrued interest thereon shall be refunded to the county, and the balance after paying the clerk, State Commissioner, and board of supervisors for their services, etc., the proceeds to be paid over to the county treasurer, and will become a part of the school fund."

To this the Fish Commissioner adds, on his own responsibility, with all the dignity that belongs to his office, in his notice to mill-owners: "No temporizing or temporary work will do, as it will be at the mill-owners' expense, as the law requires him to keep it in constant repair."

Mr. Editor, I am a citizen of these United States and desirous of showing willing obedience to the laws thereof. I derived my title to my land from the United States government, clear of any and all incumbrance, without any reservation of erecting or upholding fish-ways for the benefit of other parties. Therefore I claim protection from the United States from imposition and unjust laws. Neither the State of Iowa nor any other State has any right to pass any law that will annoy, hamper, endanger, or depreciate the value of any man's property without paying him in full for all damages he may sustain. If the people of the State of Iowa want to preserve the fish, what claims have they on the mill-owners to compel them to be at all the expense? Does it benefit the miller more than the farmer, or any one else? Do they consider the miller an intruder? Do they prefer cat-fish and wall-eyed pike to the manufacturing interests of the State? Is so, why don't they pass a law that will give them the power to destroy all the mill-dams in the State and give the fish a chance? They have just as much right to pass a law of this kind as they have to pass the other.

What benefit does the miller derive from this heavy expenditure of money? You rarely find the miller with a fish-pole in his hand.

It is not this class of men who reap the benefits from the fish law. For my own part I would give considerable money if there were not a fish in our rivers. They are the cause of bringing a parcel of lazy loafers to our fishing grounds, from the country and the towns, who destroy the surrounding property, tearing down and burning fences, and desecrating the sabbath-day, to the annoyance of quiet, peaceable, and law-abiding citizens. Of course there are a few exceptions to this rule. Is it for a class of men and boys like this that the millers are required to be at from \$300 to \$500 expense in erecting a fish-way to preserve the fish, and contribute to their pleasure? Not alone this amount of expenditure, but they are required to keep this annoyance and incumbrance in perpetual repair, no matter whether it is carried out by any flow of ice and logs that passes over the dam—which will be the case nine times out of ten—or whether it carries out the dam as well.

Heretofore the mill-owners of the State of Iowa have been well protected in their rights by the enactment of good, sound laws on water privileges; and for this reason Iowa stands second to no grain manufacturing state in our Union, as the reports from the late millers' convention at Cincinnati will show. Is it possible that all the protections we have heretofore enjoyed is to be destroyed by some wild fish fanatic who cares more for a wall-eyed pike or a sun-fish than he does for all the manufacturing interests of the State? Let the millers of the State rise in their might and defend themselves against such unjust and arbitrary laws, as they have done heretofore in such cases of imposition, and they will undoubtedly come out victorious.

If this fish law can be enforced, then the next law I expect to see enacted will be one requiring every farmer who owns 160 acres of land on the line of any railroad throughout the State of Iowa to build, grade, and lay a track the entire length of his farm at his own expense. Not only this, but the law will require him to keep it in constant repair, at the risk of losing the balance of his farm if he does not comply with all the requirements of the law, whether from unwillingness or inability. All these benefits he is expected to donate to the travel of the general public. Why not enact and enforce a law of this kind. One can be as easily enforced as another. I can see no difference.

If the people of the State of Iowa want to stock their rivers with fish, why not levy a general State tax for the purpose of erecting these fish-ways and keeping them in repair, at the same time giving the mill-owner a guarantee that any damages he may sustain from the erection of such fish-way will be promptly paid by the State, or the county in which the mill-dam is located. The State has no more claim on the mill-owner in this respect than it has on the farmer, mechanic, or any other class of men. I think it is the duty of the press throughout the State to come out boldly and denounce all such unjust laws.

JUSTICE.

THE RESPONSE.—After giving the law, the correspondent, who evidently, from what is written, is a mill-owner, gives what appears to be his earnest, honest sentiments, and states quite fully what he thinks

to be the grievances to which dam-owners are subjected by the fish-way law. Being a good argument from his point of view, it deserves a careful and candid consideration at the hands of the public.

He says first: "I am a citizen of the United States, and desirous of showing willing obedience to the laws thereof. I derived my title from the United States government, clear of any and all encumbrance, without any reservation of erecting or upholding fish-ways for the benefit of other parties," and claim protection from any law that will hamper, endanger, or depreciate the value of my property, without payment in full for all damages sustained.

The writer overlooks the fact that he is but one of several hundred that have obtained titles exactly alike from the general government to the banks of the Wapsipicon River, and that by making the river impassable for fish he has been depreciating the value of their property, thereby doing individually to all these parties just what he now complains the State should not do to him.

"We hold these principles to be well settled by usages and decisions—so many that we find it impossible in a short article to quote but a very few of them:

1. In any grant from the public to individuals, any privilege which is not expressly granted is withheld.
2. A river is a public way.
3. The right to the water and fish in a stream is a joint one to all the owners, and must be so used by each as not to unreasonably interfere with the rights of others.
4. The passage of fish in a river is a public right.
5. The legislature has the right to make such laws as will protect the public from injury by an improper use of any of these public rights.

To partially prove the correctness of these positions we will submit a few decisions.

Every owner of a dam holds it on condition or limitation that a sufficient and reasonable passage way shall be allowed for fish. This limitation, being for the benefit of the public, is not extinguished by any inattention or neglect in compelling the owner to comply with it. *Stoughton v. Baker*, 4 Mass., 528.

In that case there was neglect to build a fishway from 1634 to 1789; but it was held that the duty continued.

The preservation of fisheries is for the benefit of the public. The right to have the fish pass up a river is a public right. The right to catch the fish is in the owners of the soil; but the right to have the fish there, so that they can be caught is a public right. *Commonwealth v. Essex Co.*, 13 Gray, 247.

The grant of privileges and exemptions to a corporation is strictly construed against the corporation, and in favor of the public. Nothing passes but what is granted in clear and explicit terms. *Ohio Life Insurance Co. v. Debolt*, 16 Howard, 435.

Ownership of the banks and bed of a stream gives to the proprietor the exclusive right of fishery opposite his land, as well as his right to use the water to create power to operate mills; but neither the one nor the other, nor both combined, confer any right to erect obstructions in a stream to prevent the free passage of fish up and down the

river at their accustomed seasons, as such obstructions would impair and ultimately destroy all such rights owned by other proprietors both above and below the obstruction on such stream.

Such water-power is everywhere regarded a public right, and fisheries, even in waters not navigable, are so far public rights that the legislature may ordain and establish regulations to prevent obstructions to the passage of fish, and to promote the usual and uninterrupted enjoyment of the right by riparian owners. *Commissioners v. Holyoke Water Power Co.*, Supreme Court of United States, December Term, 1872.

This Holyoke case is the most noted that has ever been determined in this country, and was especially favorable to the dam-owners, as a moment's glance at what was claimed by the defendants will show.

It was claimed for them, as has been claimed by our correspondent, that they had a good title from the government, and so were entitled to use their property as they saw fit.

It was claimed that they had used the water-power, as they were using it, for a long period of time and so had obtained the right to use it by statute of limitation.

It was claimed that they had expended \$2,000,000 in improving their power, and so it was against public policy to compel them to put in a fish-way. Also, that they had paid owners of fishing or riparian rights above their dam \$20,000 for those rights and that that fact should relieve them.

But more especially it was claimed that *they had a special charter permitting them to build just such a dam as they had built from the State legislature.*

We have not time or space to go over this case, but will simply say that all that was claimed for the defense was proved or admitted; that it was argued by eminent counsel, both before the Supreme Court of Massachusetts and the Supreme Court of the United States, that on August 31, 1872, the Supreme Court of Massachusetts entered a decree against the defendants, compelling them to put in a fish-way; that upon appeal to the Supreme Court of the United States, the decree was affirmed at the December term, 1872, and that the owners were compelled to put in a fish-way. We could cite dozens of decisions bearing upon the question, and in all our reading know of no one decision that has not borne in the same direction. So we consider the question virtually settled, so far as the courts are concerned.

The Judiciary Committee of the House and Senate of the Seventeenth General Assembly of Iowa, composed of the best legal talent, so determined and reported, after a full investigation, when this law was before them for their action.

Outside of this question of law there is one of right or "justice." Originally all the purchasers of property along a stream pay the same price for their lands. Fish were abundant along the streams, and are the property of the joint owners. One man builds a dam that effectually stops the passage of fish; but, as they are plenty, no one objects. The mill-power brings wealth to the owner, until he boasts of its value. The dam brings barrenness of fish to the stream, until the mill-owner,

scorning the little that is left, says: "I would give considerable money if there were not a fish in our river."

Now those who have suffered these losses ask those who have assumed to own all there was of value along the river, and in so doing nearly destroyed their neighbors' rights, to so use the privileges they are enjoying as to permit the fish to pass up the streams through the waste water that flows over their dams, in order not to entirely annihilate the fish—knowing full well that what they ask will only partially restore to them their rights, but being willing to suffer this much rather than to injure in the least the water-powers that furnish the motive power for an industry which is fully and justly appreciated.

The fair discussion of this question would occupy more space than we have at our command, but we think that what we have said covers the case fully, where the builders own the land wholly upon which their dams are built. But, it might be added, in meandered streams, like the Wapsipinicon, a portion of the land upon which the dams are built—that is the bed of the stream—has never been bought or sold, and belongs as justly to the poorest person in these United States as to the parties who assume to own the dams that are built upon them; and there is no question as a matter of fact, but that an action for their entire removal could be sustained in the proper courts, if sufficient cause were shown for so doing.

What we have written is in the kindest of feelings toward mill-owners, but is what we believe to be the facts and the law in the case, and what is being demanded by the masses of our people at the hands of the owners of dams.

The Fish Commissioner claims to have made plans of fish-ways, as far as he was able, so that they shall not interfere with the water-powers (as they only use the waste water) and that, in his opinion, they will add strength to the dam, while they are as cheap as durability and efficiency will permit.

B. F. SHAW.

While I feel the importance of this fish-way work, the results of the operations of the present law for the past two seasons have seemed clearly to indicate that the masses of the people care but little about it. So small a number of fish-ways has been put in that it seems quite clear the law is in advance of public sentiment; else the officers whose duty it was to enforce it would have more promptly attended to their duties, as they would have been compelled to do by public sentiment. The full benefits of a fish-way law can only be had by putting in fish-ways in every dam in a stream; putting in one once in a while is hardly worth the trouble and expense, and unless some method can be devised to have them put into all dams on a stream, I would be in favor of putting in none, or, in other words, it would be best in my opinion to devise some method of putting in all needed fish-ways or abolishing the law.

If the law is considered too burdensome upon a particular class, and is not in force for that reason, I am of the opinion that the benefits to be derived from fish-ways are so great that the public can much better afford to pay the cost of putting them in and maintaining them, than to do without them in some of our better fish streams.

Following find a statement of counties reporting under the law, by whom report was made, date of report, number of dams in county, and date of sending models and plans.

STATEMENT.

COUNTY.	BY WHOM MADE.	Date of report.		Number of dams.	Date of sending model and plans.
		1880.	1881.		
Adair	D. W. Marquart	Sept. 3	4	3	Sept. 27
Adams	M. H. Southwick	Sept. 3	3	3	Sept. 15
Allamakee	S. R. Thompson	Feb. 2	9	2	Feb. 4
Appanoose	J. C. Crawford	Aug. 30	1	30	Sept. 15
Audubon	Thomas Walker	June 24	3	24	July 31
Benton	Not reported.				
Black Hawk	D. W. Foote	Aug. 9	8	9	Aug. 20
Boone	Thos. S. Boyd	Sept. 30	1	30	Oct. 4
Bremer	H. Rust	July 27	4	27	Aug. 4
Buchanan	Geo. B. Warne	June 14	7	14	July 31
Buena Vista	Robert Camming	Aug. 28	2	28	Aug. 30
Butler	J. W. Spencer	Aug. 5	7	5	Aug. 20
Calhoun	A. N. Jack	Aug. 2	1	2	Aug. 7
Carroll	H. E. Russell	July 22	3	22	Aug. 4
Cass	W. Crisman	Aug. 30	5	30	Sept. 15
Cedar	E. M. Elliott	Aug. 30	8	30	Sept. 15
Cerro Gordo	H. H. Shepard	April 22	6	22	July 31
Cherokee	W. B. Chick	Aug. 30	4	30	Sept. 15
Chickasaw	E. P. Sheffield	July 17	4	17	July 31
Clarke	F. M. Kyle	Sept. 9		9	No dams.
Clay	A. T. McCargar	Aug. 2	3	2	Aug. 7
Clayton	J. M. Leach	Aug. 5	8	5	Aug. 20
Clinton	J. J. Florney	Aug. 2	7	2	Aug. 7
Crawford	A. D. Motoney	Oct. 20	5	20	Nov. 27
Dallas	Not reported.				
Decatur	W. S. Stevens	Aug. 30		30	No dams.
Davis	W. J. Sullivan	Sept. 10	4	10	Sept. 15
Delaware	J. B. Boggs	June 22	13	22	July 31
Des Moines	Not reported.				
Dickinson	S. L. Pillsbury	Sept. 13	3	13	Sept. 27
Dubuque	T. C. Murphy	Oct. 8	19	8	Nov. 27
Emmet	Not reported.				
Fayette	J. H. Larkin	July 28	28	28	July 31
Floyd	J. S. Trigg	Sept. 6	7	6	Sept. 15
Franklin	C. L. Clock	Sept. 10	1	10	Sept. 15
Fremont	A. P. Stafford	Oct. 8	6	8	Nov. 13
Greene	Andrew Watts	Sept. 22	5	22	Sept. 27
Grundy	C. W. Gibson	Aug. 27		27	No dams.
Guthrie	J. W. Foster	Sept. 30	10	30	Oct. 2
Hamilton	F. E. Landus	June 15	6	15	July 31
Hancock	M. L. Fuller	Aug. 21	1	21	Aug. 27
Hardin	S. Whited	July 30	9	30	Aug. 7
Harrison	Abner Stein	Aug. 29	7	29	Aug. 30
Henry	R. Lelew	Sept. 16	5	16	Sept. 27
Howard	J. E. Peck	Sept. 17	7	17	Sept. 27
Humboldt	A. McLaughlin	Aug. 28	2	28	Sept. 15
Ida	W. P. Evans	Aug. 28	2	28	Sept. 15
Iowa	J. G. Berstler	Aug. 12	8	12	Aug. 25
Jackson	W. C. Gregory	July 29	22	29	Aug. 4
Jasper	Not reported.				

STATEMENT—CONTINUED.

COUNTY.	BY WHOM MADE.	Date of report.		Number of dams.	Date of sending model and plans.
		1880.	1881.		
Jefferson	J. E. Williams	Oct.	4		
Johnson	A. Medowell	May	1	Nov.	13
Jones	R. Dott	July	27	5 July	31
Keeokuk	T. F. McCarty	Aug.	9	11 Aug.	4
Koshuth	C. W. McGhie	July	31	8 Aug.	20
Lee	C. M. Primean	Aug.	9	1 Aug.	27
Linn	S. Daniels	Sept.	16	1 Sept.	27
Louisa	J. B. Ebbony	Aug.	10	13 Aug.	29
Lucas	Not reported.	Aug.	30	No dams.	
Lyons	J. M. Webb	Sept.	6	2 Sept.	15
Madison	A. L. Tallis	Feb.	11	2 March 1881.	4
Mahaska	S. B. Waters	Oct.	19	8 Nov. 1880.	27
Marion	Not reported.				
Marshall	R. Estabrook	Aug.	30	6 Sept.	15
Mills	S. C. Osborn	Aug.	10	5 Aug.	29
Mitchell	J. R. Prime	July	22	10 Aug.	4
Monona	J. A. McCasky	July	5	3 July	31
Monroe	E. A. Canning	Aug.	20	No dams.	
Montgomery	S. M. Thompson	Sept.	10	8 Sept.	15
Muscantie	R. H. McCampbell	Sept.	17	1 Sept.	27
O'Brien	Not reported.				
Oceola	W. M. Moore	Aug.	28	No dams.	
Page	Wm. Alexander	Sept.	1	7 Sept.	15
Palo Alto	J. J. Robbins	Aug.	30	1 Sept.	15
Plymouth	A. M. Duns	June	24	4 July	31
Pocahontas	A. O. Garlock	Aug.	28	No dams.	
Polk	Geo. W. Bristow	June	15	2 July	31
Pottawattamie	Not reported.				
Poweshiek	Not reported.				
Ringgold	J. C. Askren	Oct.	6	1 Nov.	13
Sac	Not reported.				
Scott	J. Winklers	July	27	1 Aug.	4
Shelby	J. H. Louis	Aug.	12	2 Aug.	25
Sioux	J. E. Wray	Sept.	14	6 Sept.	27
Story	J. R. Hays	Sept.	7	2 Sept.	15
Tama	R. G. McIntyre	Aug.	11	3 Aug.	21
Taylor	H. P. Long	Sept.	9	1 Sept.	15
Union	F. M. Emerson	Aug.	31	3 Sept.	15
Van Buren	John Whitten	June	16	3 July	31
Warren	M. L. Godley	April	2	1 July	31
Wapello	W. F. Warthen	Oct.	9	3 Nov.	9
Washington	W. J. Eggleston	Sept.	14	7 Sept.	27
Wayne	Thos. Elder	Sept.	1	No dams.	
Webster	John Haire	Aug.	31	2 Sept.	15
Winnebago	Chas. Isaacs	Aug.	30	No dams.	
Winneshek	Not reported.				
Woodbury	Not reported.				
Worth	O. D. Eno	Aug.	11	3 Aug.	21
Wright	Z. C. Bradshaw	Sept.	1	1 Sept.	15

EXPENSES OF IOWA FISH COMMISSION.

From October 1, 1879, to October 1, 1881.

DATE.	Number of voucher.	IN WHOSE FAVOR AND ON WHAT ACCOUNT.	Amount.
1879.			
Oct. 18	553	American Express Co., express	9.35
Nov. 30	554	Watters & Co., fish food for October and November	6.00
Nov. 30	555	Otis Perfect, labor	1.13
Nov. 21	556	Steam Tug Eaton, fishing	18.00
Nov. 21	557	F. Troegly, taking fish eggs	8.00
Nov. 21	558	J. Geary, express wagon	6.75
Nov. 21	559	J. Cassid, taking fish eggs	14.00
Nov. 21	560	Axtell House, board	9.75
Nov. 29	561	American Express Co., express	2.60
Nov. 21	562	Steamer Pottawattamie, fishing	18.00
Sept. 18	563	G. H. Highby, turpentine and coal	2.50
Nov. 29	564	J. H. Williams, salt	1.35
Nov. 29	565	Needham & Burritt, livery	8.00
Nov. 30	566	G. F. Stocum, labor, October and November	100.00
Nov. 30	567	Mrs. G. F. Stocum, labor	6.75
Nov. 10	568	Benton & Lewis, lumber	1.50
Nov. 29	569	B. F. Shaw, cash expenses	74.80
Nov. 21	570	J. O. Koefe, picking eggs	2.63
Nov. 14	571	Livingston Stone, transportation of eggs	23.25
Dec. 11	572	George Bemrose, labor	1.00
Dec. 12	573	B. F. Smittle, one-half cord wood	2.00
1880.			
Jan. 10	574	W. M. Skinner, sundries	8.05
Jan. 15	575	J. G. Cadworth, tinSmith	8.25
Jan. 9	576	Needham & Burritt, livery	4.50
Jan. 15	577	Watters & Co., fish feed	4.50
Jan. 15	578	G. F. Stocum, labor, one and one-half months	75.00
Jan. 17	579	Wm. Wallace, labor	3.38
Jan. 15	580	B. F. Shaw, cash expenses	23.85
Jan. 8	581	H. F. Dousman, 100,000 brook-trout eggs	200.00
March 1	582	G. F. Stocum, labor	78.80
March 1	583	Watters & Co., fish feed	4.50
Feb. 5	584	Needham & Burritt, livery	7.50
March 1	585	American Express Co., express	4.95
March 1	586	B. F. Shaw, cash expenses	9.25
March 1	587	W. Cunningham, ice for fish transportation	1.75
April 5	588	American Express Co., express	13.85
April 8	589	C. H. Mongar, printing	4.50
May 1	590	Needham & Burritt, livery	7.50
April 30	591	J. G. Cadworth, tin and repairs	4.40
May 1	592	Watters & Co., fish feed	6.00
May 1	593	B. F. Shaw, cash expenses	79.85
May 1	594	G. F. Stocum, labor, etc.	110.50
May 1	595	Anamosa Water Works Co., two bibb cocks	2.00
June 2	596	Needham & Burritt, livery	3.00
June 20	597	J. N. Lewis, lumber	8.25
June 10	598	Stickney & Harriman, hardware	5.20
June 30	599	Watters & Co., fish feed	6.00
June 30	600	G. F. Stocum, labor, May and June	103.80

EXPENSES OF IOWA FISH COMMISSION—CONTINUED.

DATE.	Number of voucher.	IN WHOSE FAVOR AND ON WHAT ACCOUNT.	Amount.
1880.			
June	2	601 James Murphy, labor.....	\$ 2.62
June	2	602 J. S. Perfect, sundries.....	2.60
June	2	603 B. F. Shaw, cash expenses.....	11.90
June	10	604 Carter & Son, material for nets.....	.70
June	15	605 American Express Company, express.....	1.45
June	12	606 E. Booth & Son, printing.....	1.75
July	5	607 Geo. Bemrose, cutting two hundred yards sod.....	4.00
August	31	608 Additional Penetrator, 2 6-10th barrels cement.....	3.30
July	31	609 Jones county, one year rent of office.....	18.00
July	31	610 Frank Baum, five days' work.....	5.00
August	24	611 J. G. Cudworth, pipes for carp ponds.....	66.30
August	13	612 Wm. Skinner, sundries, etc.....	9.71
August	31	613 Walters & Co., fish feed.....	6.00
August	31	614 B. F. Shaw, cash expenses.....	60.80
August	31	615 Benton & Lewis, lumber.....	77.90
August	31	616 Milton Smith, labor.....	42.25
August	31	617 J. Rathburn, labor.....	17.00
August	31	618 James Murphy, labor.....	7.19
August	31	619 George Smith, labor.....	15.25
August	31	620 W. Grassfield, labor.....	1.00
August	31	621 G. F. Slocum, labor, June, July, and August.....	151.80
Sept.	6	622 American Express Company, express.....	4.00
Sept.	6	623 E. L. Lebt, labor.....	4.00
Oct.	4	624 S. C. Hall, labor.....	4.10
Dec.	15	625 George Smith, labor.....	9.50
Oct.	4	626 Clancy & Son, goods.....	3.35
Oct.	22	627 Wm. Skinner, goods.....	6.16
Dec.	31	628 G. F. Slocum, labor, Sept., Oct., Nov., and Dec.....	207.05
Sept.	1	629 George Smith, labor.....	5.25
Sept.	3	630 Milton Smith, labor.....	5.25
Dec.	20	631 J. G. Cudworth, hardware, etc.....	21.45
Nov.	11	632 Needham & Burritt, livery.....	7.50
Nov.	22	633 Walters & Co., fish feed.....	6.00
Sept.	22	634 Benton & Lewis, lumber.....	15.08
Nov.	29	635 A. Hetchen, hardware.....	15.27
Nov.	24	636 J. S. Perfect, carp feed, etc.....	1.20
Nov.	8	637 H. Mayhew, board and labor.....	54.10
Nov.	8	638 Sanborn & Winters, taking fish eggs.....	15.00
Nov.	9	639 Cooley & Lavaque, transportation.....	26.00
Nov.	9	640 E. R. Shaw, labor.....	49.94
Nov.	24	641 J. Courtney, board.....	16.00
Dec.	10	642 D. J. Cushman, board.....	15.50
Dec.	30	643 George Bemrose, cutting wood.....	2.25
Dec.	30	644 R. Mott, one cord hickory wood.....	5.50
Dec.	18	645 Durr & Rogee, lumber.....	1.89
Oct.	25	646 S. A. Pope, carpenter.....	39.75
Dec.	30	647 B. F. Shaw, cash expenses.....	157.15
Nov.	18	648 Chicago, Milwaukee & St. Paul Railway, freight.....	4.40
Dec.	31	649 Watters & Co., fish feed.....	6.00
Nov.	15	650 Stickney & Harriman, hardware.....	7.52
1881.			
Jan.	28	651 J. Stubbers, trout eggs.....	67.50
Feb.	28	652 American Express Company, express.....	6.05
Feb.	28	653 Watters & Co., fish feed.....	6.00

EXPENSES OF IOWA FISH COMMISSION—CONTINUED.

DATE.	Number of voucher.	IN WHOSE FAVOR AND ON WHAT ACCOUNT.	Amount.
1881.			
Feb.	28	654 B. F. Shaw, cash expenses.....	\$ 61.17
Feb.	28	655 Needham & Burritt, teaming.....	3.50
Feb.	28	656 G. F. Slocum, labor, etc.....	110.50
March	12	657 American Express Company, express.....	15.05
March	26	658 J. Lubbers, trout eggs.....	10.00
March	31	659 Watters & Company, fish feed.....	3.00
March	31	660 B. F. Shaw, cash expenses.....	7.00
March	31	661 G. F. Slocum, labor.....	83.00
April	1	662 Durr & Rogee, lumber.....	.63
April	10	663 S. A. Pope, carpenter.....	5.00
May	31	664 Watters & Company, fish feed.....	21.00
May	31	665 Cadworth & Ascutt, tin work.....	61.00
May	31	666 Clinton Lumber Company, lumber.....	23.73
May	31	667 Frank B. Arey, labor and board.....	25.00
May	24	668 George W. Baxter, kerosene.....	4.50
May	27	669 A. A. Mosher, supplies.....	7.00
May	25	670 W. W. Reynolds, board.....	15.00
May	31	671 B. F. Shaw, cash expenses.....	57.87
May	31	672 Jones county, rent of office one year.....	20.00
May	31	673 James Buckner, one month's labor.....	20.00
May	31	674 G. F. Slocum, labor, etc.....	103.00
June	14	675 C. H. Mougier, printing.....	2.50
June	17	676 C. M. & St. P. Ry., freight.....	.95
July	2	677 J. Murphy, labor.....	2.50
July	16	678 S. A. Pope, carpenter.....	8.00
July	25	679 S. A. Pope, carpenter.....	2.50
Jan.	25	680 Anamosa Enureka, printing.....	2.15
June	16	681 Clinton Lumber Company, lumber.....	11.29
June	16	682 A. Hetchen, hardware.....	4.91
July	30	683 J. Johnson, board.....	12.50
August	1	684 Watters & Company, fish feed.....	6.00
August	1	685 G. F. Slocum, labor.....	100.00
July	27	686 E. Booth & Son, printing.....	7.25
July	22	687 B. F. Shaw, cash expenses.....	24.30
July	21	688 Burritt & Alderman, livery.....	9.50
August	31	689 Watters & Company, fish feed.....	3.00
August	22	690 B. F. Shaw, cash expenses.....	14.19
August	31	691 Henry Wistrom, labor.....	6.25
July	30	692 Cadworth & Ascutt, hardware.....	3.25
August	31	693 G. F. Slocum, labor.....	50.00
August	22	694 Durr & Rogee, lumber.....	18.75
August	21	695 Burritt & Alderman, livery.....	6.00
Sept.	28	696 Burritt & Alderman, livery.....	1.50
Sept.	23	697 Durr & Rogee, lumber.....	22.79
Sept.	30	698 Watters & Company, fish feed.....	3.00
Sept.	30	699 Clinton Wire Cloth Company, wire cloth.....	12.60
Sept.	30	700 B. F. Shaw, cash expenses.....	31.95
Sept.	30	701 C. & N. W. Ry., freight.....	.55
Sept.	30	702 Clancy & Son, eighteen yards cloth.....	2.70
Sept.	30	703 Peter Swanson, labor.....	1.25
Sept.	30	704 John Johnson, labor.....	16.25
Sept.	30	705 G. F. Slocum, labor.....	50.00

\$3,433.04

To pay the foregoing amount of \$3,433.04 requisitions were drawn on the State Treasurer from time to time as follows:

December 4, 1879.....	\$ 341.36
January 15, 1880.....	330.53
March 1, 1880.....	53.41
May 1, 1880.....	53.34
May 1, 1880.....	228.60
June 30, 1880.....	143.37
August 31, 1880.....	489.40
December 31, 1880.....	715.16
April 1, 1881.....	252.72
April 1, 1881.....	88.05
June 1, 1881.....	306.73
August 6, 1881.....	214.35
August 31, 1881.....	101.33
October 1, 1881.....	141.69
Total.....	\$3,433.04

The balance on hand, as shown by last report, was \$848.30, but on settlement with State Auditor the actual amount on hand October 1, 1879, was found to be \$698.30; appropriated by chapter 100, acts of the Eighteenth General Assembly, \$5,000; total, \$5,698.30; deduct amount expended, \$3,433.04; balance on hand undrawn October 1, 1881, \$2,265.26.

At the end of each one, two or three months, as the case requires, duplicate certified, itemized bills of our Fish Commission accounts are made and forwarded to the Executive Council, whose duty it is to examine, audit and allow. Such amounts as are found correct the amount so allowed is then drawn upon the State Auditor's warrant, paid over to the claimants and duplicate receipts taken, one of which is sent to State Auditor and one kept in the office of the Fish Commissioner.

These receipts, together with a fully itemized account of every bill shown in the foregoing statement of accounts can be found either in the Auditor's office or in the office of the State Fish Commissioner.

ANAMOSA, IOWA, October 15, 1881.

B. F. Shaw, being duly sworn, on oath says that the foregoing accounts of the Fish Commissioner with the State of Iowa is true, as he verily believes.

B. F. SHAW, *Fish Commissioner.*

Subscribed in my presence by said B. F. Shaw, and by him sworn to before me, this 31st day of October, 1881.

[L. S.]

J. H. CHAPMAN, *Clerk District Court.*
B. H. WHITE, *Deputy.*

Respectfully submitted.

B. F. SHAW, *Fish Commissioner.*

LIST OF FISH COMMISSIONERS.

The following list of fish commissioners is taken from *Forest and Stream* and *Rod and Gun* of September 29, 1881:

OFFICIAL LIST OF FISH COMMISSIONERS.

The expirations of the terms of office are indicated by the dates in parenthesis. Where no date is given the term is indefinite.

- Canada*—W. F. Whitcher, Ottawa, Ontario.
New Brunswick—W. H. Venning, Inspector of Fisheries, St. John.
Nova Scotia—W. H. Rogers, Inspector of Fisheries, Amherst.
Prince Edward Island—J. H. Duvar, Inspector of Fisheries, Alberton.
British Columbia—Alex. C. Henderson, Inspector of Fisheries, Victoria.
-
- The United States*—Prof. Spencer F. Baird, Washington, D. C.
Alabama—C. S. G. Doster, Prattville; D. B. Huntley, Courtland.
Arizona—John J. Gosper, Prescott, (1884); Richard Rule, Tombstone (1884); Dr. J. H. Taggart, Yuma (1884).
Arkansas—N. B. Pearce, Osage Mills; James Hornbrook, Little Rock; John E. Reardon, Little Rock.
California—S. R. Throckmorton, San Francisco (1883); B. B. Redding, San Francisco (1883); J. D. Farwell, Niles, Alameda Co., (1883).
Colorado—W. E. Sisty, Brookvale, (1883).
Connecticut—Dr. W. M. Hudson, Hartford (1882); Robert G. Pike, Middletown (1882); G. N. Woodruff, Sherman (1884).
Georgia—J. T. Henderson (Commissioner of Agriculture and *ex officio* Commissioner of Fisheries), Atlanta (1882); Dr. H. H. Carey, superintendent of Fisheries, La Grange (1882).
Illinois—N. K. Fairbank, President, Chicago (1882); S. P. Bartlett, Quincy (1884); S. P. McDoel, Aurora (1884).
Indiana—Calvin Fletcher, Spencer, Owen county.
Iowa—B. F. Shaw, Anamosa (1882); A. A. Mosher (Assistant for N. W. portion), Spirit Lake (1882).
Kansas—D. B. Long, Ellsworth (March, 1883).
Kentucky—Wm. Griffith, President, Louisville; Dr. S. W. Coombs, Secretary, Bowling Green; P. H. Darby, Princeton; John B. Walker, Madisonville; Hon. C. J. Walton, Munfordville; Hon. J. A. Steele, Versailles; W. C. Price, Danville;

- Dr. W. Van Antwerp, Mt. Sterling; Hon. J. M. Chambers, Independence, Kenton county; A. H. Goble, Catlettsburg.
Maine—Henry O. Stanley, Dixfield (1883); E. M. Stilwell (Assistant Commissioner), Bangor (1883).
Maryland—T. B. Ferguson (of Baltimore), Massachusetts Ave., Washington, D. C. (1882); Thomas Hughlett, Easton (April, 1882).
Massachusetts—Theodore Lyman, Brookline (1881); E. A. Brackett, Winchester (1884); Asa French, South Braintree (1881).
Michigan—Eli R. Miller, Richland (1883); A. J. Kellogg, Detroit (1885); Dr. J. C. Parker, Grand Rapids (1887).
Minnesota—1st District—Daniel Cameron, La Crescent (1883); 2d District—Wm. W. Sweney, M. D., Red Wing (1883); 3d District—Robert Ormsby Sweeney, President, St. Paul (1883).
Missouri—Hon. Silas Woodson, St. Joseph (1882); John Reid, Lexington (1882); J. G. W. Steedman, 2,803 Pine Street, St. Louis (1882).
Nebraska—R. R. Livingston, Plattsmouth; H. S. Kaley, Red Cloud; W. L. May, Fremont.
Nevada—H. G. Parker, Carson City (1882).
New Hampshire—Albina H. Powers, Plymouth (1882); Luther Hayes, Milton (1886); Dr. Edward Spaulding, Nashua (1886).
New Jersey—Dr. B. P. Howell, Woodbury, Gloucester county (1883); Maj. E. J. Anderson, Trenton (1883); Theo. Morford, Newton, Sussex county (1883).
New York—Hon. R. Barnwell Roosevelt, 78 Chambers Street, New York; Edward M. Smith, Rochester; Richard U. Sherman, New Hartford, Oneida county; Eugene G. Blackford (Fulton Market, New York City), 809 Bedford Avenue, Brooklyn.
North Carolina—S. G. Worth, Morgantown.
 [Mr. Worth is acting as Commissioner and Superintendent, there being' no special Fish Commissioner recognized in the State. The department is under the general supervision of the Commissioner of Agriculture, Hon. Montford McGehee, Raleigh.]
Ohio—L. A. Harris, Cincinnati (1884); C. W. Bond, Toledo (1884); H. C. Post, Sandusky (1884).
Pennsylvania—Hon. H. J. Reeder, Easton, Northampton county (1881); Hon. Benj. L. Hewit, Hollidaysburg, Blair county (1881); James Duffy, Marietta, Lancaster county (1881); John Hummel, Sellingsgrove, Snyder county (1881); Robt. Dalzell, Pittsburgh, Allegheny county (1881); G. M. Miller, Wilkesbarre, Luzerne county (1881).
Rhode Island—Newton Dexter, Providence (1883); John H. Barden, Rockland 1883; Alfred A. Reed, Jr., Providence (1883).
South Carolina—A. P. Butler (Commissioner of Agriculture and *ex officio* Commissioner of Fisheries), Columbia.
Tennessee—W. W. McDowell, Memphis (1883); Geo. F. Akers, Nashville (1883); H. H. Sneed, Chattanooga (1883).
Texas—J. H. Dinkins (term unknown).
Utah—Prof. J. L. Barfoot, Curator Deseret Museum, Salt Lake City.

Vermont—Dr. M. Goldsmith, Rutland (1881); Charles Barrett, Grafton (1882).

Virginia—Col. M. McDonald, Berryville (1882).

West Virginia—H. B. Miller, Wheeling (1885); C. S. White, Romney (1885);

N. M. Lowry, Hinton (1885).

Wisconsin—The Governor, *ex officio*, Madison (1882); Philo Dunning, President,

Madison (1885); C. L. Valentine, Secretary and Treasurer, Janesville (1887); J. V.

Jones, Oshkosh (1886); John F. Antisdel, Milwaukee (1885); Mark Douglas, Mel-

rose (1887); C. Hutchinson, Beetown (1886).

Wyoming Territory—Henry B. Rumsey, Red Buttes, Albany county (term un-

known). *Deputies*—Dr. M. C. Barckwell, Cheyenne (term unknown); Otto

Gramm, Laramie (term unknown).

STATE SUPERINTENDENTS OF FISHERIES OR HATCHERIES.

Canada—S. Wilmot, Superintendent of Fisheries, Newcastle, Ontario.

California—John G. Woodbury, San Leandro.

Connecticut—H. J. Fenton, Poquonnock; George Jelliffe, Westport.

Georgia—Dr. H. H. Cary, La Grange.

Iowa—G. F. Slocum, Anamosa; A. A. Mosher, Spirit Lake.

Kentucky—J. Griffith, Louisville.

Maryland—Frank Behler, Druid Hill Park, Baltimore.

Michigan—J. G. Portman, Pokagon; Oren M. Chase, Detroit.

Minnesota—S. S. Watkins, Red Wing.

Missouri—Charles H. Brownell, St. Joseph.

Nevada—H. G. Parker, Carson City.

New Hampshire—A. H. Powers, Plymouth.

New York—Seth Green, Rochester; Monroe A. Green, Mumford.

North Carolina—S. G. Worth, Morgantown.

Ohio—D. Y. Howell, Toledo.

Pennsylvania—John Creveling, Marietta; Seth Weeks, Corry.

Rhode Island—J. H. Barden, Ponegansett.

South Carolina—C. J. Huske, Columbia.

Virginia—W. F. Page, Lynchburg.

Wisconsin—M. T. Bailey, Madison.

APPENDIX.

REPORT OF ASSISTANT FISH COMMISSIONER.

SPIRIT LAKE, IOWA, October 20, 1881.

HON. JOHN H. GEAR, *Governor of Iowa*:

SIR—Herewith I submit my first report as Assistant Fish Commissioner of this State.

On the 25th of August, 1880, I received notice from you that I would be commissioned as Assistant Fish Commissioner upon my erecting a suitable hatching-house in Dickinson county, and have it in running order in time for the fall supply of eggs. Upon the receipt of your communication I went immediately at work upon the house on the isthmus between Spirit Lake and East Okoboji. The house is twenty by thirty feet; ten foot posts, with office attached twelve by twelve, all in good shape, and warm and comfortable. This house gets its supply of water from Spirit Lake through a galvanized iron pipe four inches in diameter; the flow of water is equable and free, temperature during winter months $33\frac{1}{2}$ degrees. I have facilities for hatching 2,000,000 white fish eggs, or from 500,000 to 700,000 trout eggs.

On the 18th of December, 1880, Mr. Shaw brought up 200,000 Superior Lake trout eggs, and on or about the 18th of January, 1881, he brought up 500,000 white fish eggs. Of the first, I hatched out somewhat over ninety per cent; of white fish eggs, about all hatched out; we did not lose over 3,000 at the most. The above fish were put in the lakes here, this branch house having no facilities for distribution. They were all in good condition, and very lively.

Last spring Mr. Shaw came up here and stayed about a month experimenting on our native fish eggs. The result of our operations satisfied us that we can hatch pike, bass, buffalo, perch, and the like, with very little trouble, in fact none at all scarcely.

Should the legislature see fit to make a small appropriation, so that a few ponds could be made, we can hatch out millions of the above named fish at very small expense.

The success of this institution is due in a great measure to Commissioner Shaw; he has proved himself in fact a *worker*, and acting by his advice I have made a perfect success of the matter so far. A general appropriation by the legislature for the Commission of a reasonable amount would return to the people of this State a value worth an hundred fold. With the experience we have had with native fish I am satisfied we can in a short time stock the entire waters of the State, provided, however, our work and the results are protected by proper legislation in the way of providing a free passage to and from the various waters, and also preventing promiscuous slaughter while spawning, and even at any other time.

At the branch house at this place there is a fair complement of

material for hatching purposes. The ditch conducting the water through the house is about seventy rods long, and from three to ten feet deep, partly boxed (it all should be). The whole work has cost about \$1,300, mostly paid out by myself. The people assisted freely whenever they could leave their work to do so. I have all the bills for the work, which I keep as vouchers to show what has been expended. Take it all in all the work here has proved an entire success, and only needs development to insure a new era in the piscicultural interests of the State.

In conclusion I would again refer to the assistance I have received from Mr. Shaw. The good results so far I attribute to his earnest endeavors to assist me. We are now catching considerable quantities of silver bass, deposited several years ago by Mr. Shaw as a game-fish. They cannot be excelled anywhere, and for the table the equal to any fish except trout. The above is but a short digest of my doings as Assistant Fish Commissioner. The work speaks for itself, and is open for inspection by the people of Iowa at any time. Hoping this report may prove satisfactory, the same is respectfully submitted to you to act your pleasure upon it.

A. A. MOSHER,

Assistant Fish Commissioner of Iowa.

P. S. I would further state that there is no limit to the water for use in this house.

MOSHER.