FIFTH BIENNIAL REPORT

OF THE

STATE FISH COMMISSION

OF

IOWA.

For the Years 1881-2 and 1882-3.

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REPORT OF THE STATE FISH COMMISSION.

To his Excellency, BUREN R. SHERMAN, *Governor of Iowa:*

BY section 1, chapter 175, Laws of the Nineteenth General Assembly, it is made my duty to report to you matters pertaining to the State Fish Commission on or before the 15th day of August.

By this change in the date of filing my report the term to be reported upon will not cover a full two years. And so the results of this season's work will be only partially shown.

I had hoped in the fall of 1882 to be able to take from the waters along the Mississippi river a goodly number of game fish, as had already been done on two preceding falls, to help stock such of the inland waters as might need such fish. But the high water prevented the work. And while this was to a certain extent a disadvantage to such waters as would have been furnished with the fish, it was to the same extent an advantage to the waters of the Mississippi, for the high water saved the fish that otherwise would have died, and in many cases enabled them to escape into the main waters of the river, and as the main object of these trips is to save such fish as in vast numbers perish in adjacent drying sloughs, there was of course no especial loss occasioned by being unable to do the work proposed.

As this work was originated in Iowa, it gives me great pleasure to note that it is being adopted by those States adjoining the Mississippi river; and the plan highly extolled by such commissioners as have been engaged in it, and commended by those who have observed its character and results. But as its objects have been fully explained in former reports, I will refer those who care to give it attention to them.

In the spring of 1882 arrangements were made by Assistant Commissioner Mosher and myself to try at the Spirit Lake hatching-house

what could be done in the way of artificial propagation of some of the fishes native to the lakes at that place. The work was only calculated to be experimental. We tried wall-eyed pike, bass, perch, pickerel and buffalo. Enough was done to prove that these fish can all be increased to any extent desired. With the wall-eyed pike we had enough success under difficulties to warrant us in saying that they could be artificially increased to any extent desired. The buffalo we succeeded in raising and keeping until fall. Michigan and the Canada Commissioners, I found later, succeeded in artificially hatching large numbers of the wall-eyed pike last season. Mr. James Nevin, who has been in charge of the Sandwich hatchery in Canada, and who had charge of this hatching, was in the spring of 1883 in charge of the Wisconsin hatchery, and as he had arranged to take wall-eyed pike eggs at Saginaw Bay or Bay City, where the fishermen catch during the spawning time (which occurs from the 20th of April to the middle of May), large quantities of the large yellow wall-eyes, there known by the local name of "pickerel." I accordingly made arrangements to accompany him and went to that place about the time above named with him. I succeeded in taking in a few days a very fine lot, about 2,500,000 eggs in good condition, and if I had come home with them at that time they would have been all right, but as I was anxious to secure a large supply, I concluded to make one more trip for them. It proved to be a very unfortunate trip for me as well as an unprofitable one for the eggs. I was caught out thirty miles from town in a severe northeast storm that lasted for several days. I and the party I was with were kept six days on a west shore, unable to get to town or away from the shanty at which we were. The incessant rain and cold wind, with the constant exposure and wet clothing, were almost too much for human nature to bear, and when I did finally get away it was with such a cold and cough as seriously threatened my life, and from the effects of which I have not fully recovered.

The delay caused by this necessitated the keeping of the eggs on the carrying trays about thirteen days from the time they were taken until they were put into the hatching jars. And it proved to be more than they were able to bear. Almost the whole lot were a loss, only a few of them hatching, and they were in so feeble condition that they could never amount to much.

The eggs taken by Mr. Nevin and his assistants at the same time

and place, and sent directly to Milwaukee, turned out finely, and I am certain that nothing but that unfortunate delay caused the loss of our eggs. I regret this loss very much, for I have great faith in the future of wall-eyed pike in Iowa waters, notably in Spirit and Okoboji lakes, and other lakes of the northwest. I much prefer the large or "American wall-eye," as it is called, to the small, or what is known as the Canada variety, which is the one now in the northwestern Iowa lakes. These latter never grow to weigh more than two and a half or three pounds, while the former are sometimes found weighing sixteen pounds or more.

Both varieties are found in the Mississippi river. Many of these fish were taken from the sloughs and distributed in the waters of the interior of the State. And when placed in waters where none were found before, they have in almost every instance been heard favorably from. I could publish many letters giving favorable accounts of them from almost every section of the State where there are favorable waters for them. Enough has been done with these fish to make it certain that they can be increased by the millions, and as their eggs can be so readily obtained, it is a work that commends itself.

The black bass cares for its own eggs and young, and I look upon these two fishes and the German carp, which I shall take occasion to consider at length further on, as the coming fish for the streams and most of the lakes of Iowa.

SALMON TROUT.

The salmon trout eggs of 1881 hatched out and were distributed in due time successfully, both at Anamosa and the Spirit Lake hatching-houses. A fine lot of the eggs of this fish were procured at Marquette, Michigan, on Lake Superior, in the fall of 1882, notwithstanding the weather was very rough and stormy, and were hatched out with a small percentage of loss, and distributed from the two hatching-houses. The Lake Superior trout are a very much better fish than those of any of the other lakes, and I am of the opinion that they will be a success and a great acquisition in the larger lakes of the northwestern portion of Iowa. In difference to the wishes of parties requesting these fish, and to try as an experiment whether they could or would succeed, I have for a short time past planted some of them in small lakes and streams. I am of the opinion that there are but a few of our best lakes in which they can be reasonably

expected to succeed, and that future plants of them should be confined to these waters.

Since the last report there have been distributed salmon trout from Anamosa hatching-house, as follows:

April	4, 1882, Scott, Nevada	1,500
April	4, 1882, Shaw, Council Bluffs	4,000
April	4, 1882, Shaw, Missouri Valley	4,500
April	10, 1882, Gast, Le Claire	1,500
April	15, 1882, Shaw, Fayette county	5,000
April	20, 1882, Shaw, Allamakee county	5,000
April	26, 1882, Shaw, Emmetsburg	15,000
June	9, 1882, Shaw, Wall Lake	5,000
June	10, 1882, Shaw, Twin Lakes	5,000
June	9, 1882, Shaw, Ogden	3,000
June	16, 1882, Shaw, Le Claire	2,500
June	21, 1882, J. Miller, Benton county	4,000
June	21, 1882, Watkins, Story county	7,000
February	1, 1883, Shaw, Burlington	7,000
February	20, 1883, Shaw, Loudon	24,000
May	23, 1883, Watkins, Story City	5,000
May	23, 1883, Watkins, Wall Lake	5,000
May	23, 1883, McPherson, Red Oak	7,500
May	23, 1883, Shaw, Nodaway river	5,000
May	23, 1883, Shaw, Nishnabotana	5,000
April	16, 1883, Slocum, Clear Lake	50,000
June	12, 1883, Shaw, Boonville	15,000
June	12, 1883, Shaw, Des Moines	40,000
June	12, 1883, Shaw, Cedar river	40,000
June	12, 1883, Shaw, Iowa river	25,000
		291,500

Salmon, trout, and white fish distribution from Spirit Lake hatching-house in 1881–2 500,000

Salmon, trout, and white fish distribution from Spirit Lake hatching-house in 1882–3 2,000,000

For more definite statement see report of Assistant Commissioner Mosher, attached hereto.

BROOK-TROUT.

These fish have probably shown more success for the small numbers that have been planted than any other fish that we have had anything to do with. The reason to my mind is clear. As there are

but few good brook-trout streams in Iowa, and they are comparatively small, so that the effects can readily be observed even when only a few fish have been planted, while the same number of fish put into a large stream or lake would hardly be observable. And again, many of the streams in which we have planted brook-trout never had a trout in them until they were planted, and when they are found afterward it is known to be the direct result of planting them.

Abundant and enthusiastic testimonials could be published from various sections of the State of the decided success that they have made.

Since last report there has been brook-trout distributed as follows:

April	15, 1881, Shaw, Fayette county	4,000
April	20, 1881, Shaw, Allamakee county	5,000
April	20, 1881, Shaw, Clayton county	5,000
April	20, 1881, Shaw, Delaware county	4,000
February	21, 1882, J. Miller, Benton county	5,000
March	11, 1882, O. Helbie, Otter Creek	10,000
March	11, 1882, J. Christman, Springville	5,000
March	11, 1882, Mr. Miller, Farley	10,000
March	18, 1882, Rusby, Indian Creek	10,000
March	18, 1882, Shaw, North Branch Creek	10,000
March	18, 1882, Watkins, Story City	4,000
April	11, 1882, Shaw, Clayton county	8,000
April	11, 1882, Shaw, Allamakee county	8,000
March	16, 1882, Shaw, Plum Creek; Delaware county	7,000
June	12, 1882, Shaw, Boonville	3,000
June	15, 1882, Shaw, Delaware county	6,000
June	18, 1882, Shaw, Allamakee county	4,000
June	27, 1882, Shaw, Linn county	4,000
		112,000

RAINBOW TROUT.

The reed-sided, rainbow or California trout is fast coming into favor. In the State of New York, where they have been more extensively bred than in any other eastern State, they have proven a great success, and the Commissioners of the State and Seth Green, Superintendent, very highly recommend them. They are very fertile, easily bred, and much more hardy than the brook-trout. For the head waters of nearly all the streams of Iowa, or at least of those that have their origin in springs, they would be of peculiar benefit, for as they can

live in water several degrees warmer than the brook-trout, they can occupy miles of these streams that could not be a home for the brook-trout. We have a fine lot of these fish that will be large enough to spawn in the spring of 1884, and as they spawn at a time when none of the others of the salmon family are spawning, they can have full attention. It is also to be hoped that the United States Commission from whom the supply now on hand come, can find it possible to furnish an increased supply in the future. I hope yet to see the time when this most excellent fish will be common to some portions of our Iowa streams. This fish is also of peculiar value as a pond fish for domestication. Hardy, a good feeder, of rapid growth and fine table qualities.

LAND-LOCKED SALMON.

The eggs of these fish are received from Grand lake stream, Maine, where they are taken by Hon. Charles Atkins, and are furnished free of charge, save for express charges, to the Iowa Fish Commission by the United States Fish Commission, by the courtesy of Hon. Spencer F. Baird, United States Fish Commissioner. If they could be made to succeed in our waters they would be a great acquisition thereto. There has been distributed as follows since last report:

April	4, 1882, by J. Scott, Nevada	1,500
April	4, 1882, by Shaw, Missouri Valley	4,000
April	4, 1882, by Shaw, Council Bluffs	4,500
April	10, 1882, by George Gast, Le Claire	1,500
April	15, 1882, by Shaw, Fayette county	3,000
April	20, 1882, by Shaw, Allamakee county	3,000
April	26, 1882, by Shaw, Emmetsburg	5,000
February	20, 1883, by Shaw, Loudon	8,000
April	16, 1883, by Slocum, Clear Lake	10,000
June	12, 1883, by Shaw, Boonville	2,000
	On hand at Anamosa	3,000
		45,500

SHAD.

The United States Commission have planted shad to quite an extent in the Mississippi river, and while they have not been caught at all points on the river, it is a well known fact that in some of the tributaries, notably the Ohio and Arkansas rivers, they have been caught in goodly numbers for several years, and a few have been caught in the lower portions of the Des Moines river. A few specimens have also been taken at different points on the Mississippi river. I think it is an established fact that the Mississippi will in time prove to be a shad river.

WHITE FISH.

The entire work of hatching the white fish has been done at Spirit Lake. The water, which is taken directly from the lake into the hatching-house, is so similar in character and temperature to that of the great lakes, that the eggs would thrive and hatch as well there as in the waters where they are naturally deposited. And as there are no suitable waters for these fish except the larger lakes of the northwest, they are when hatched at the most favorable point possible for distribution.

Several necessary improvements have been made at both of the hatching houses. At Spirit Lake the inflow pipe originally put in was found to be entirely insufficient and had to be taken out. In its stead we put in an eight-inch sewer pipe that now gives an abundant flow of water, sufficient to hatch as many eggs as shall at any time be desired. A new bulk-head, some new hatching-boxes, and a number of improved hatching-jars and hatching-cans have been supplied that will add much to the efficiency of the work.

At Anamosa six new carp ponds have been put in. This was found to be a necessity, as the water in the original ponds flowing directly from the trout ponds was found to be too cold, and owing to the heavy flow of water could never be heated enough to raise the water to a proper temperature for the carp to spawn in. They were almost too late to insure a great amount of success this year, although the carp are now breeding in some of them, and we hope to be able to report good success yet this season. But in any event the ponds are now ready for any future wants. Some new hatching-jars and cans have also been furnished at this house, and everything is in complete order for any future use that may be desired.

Of the practical results of the work of the Fish Commission in Iowa I think it will not be considered egotistical when I say that I have probably a much better knowledge than any other person in the State of Iowa, for I am every day in receipt of letters and marked newspaper articles upon this subject, and could, if I thought it would prove of any special value, publish enough evidences of its good effects to fill a volume as large as this report should be. But as this

has already been done in some of the former reports, I shall only say that I know that the bass of various kinds, croppies, sunfish, wall-eyed pike of both varieties, catfish, eels, trout, and many other kinds of fish have been established in many of the waters of Iowa, where they had never had a home until put there by the work of the Fish Commission. I might multiply evidence or give any amount of cases over the State where this is true, but will give but one instance. I think it was in 1875, I put a quantity of the striped bass in Spirit lake. Before that time no striped bass was ever seen in that system of waters. Last summer a minnow seine drawn for minnows on the south shore of this lake took at one haul over eighty young striped bass that would weigh from a few ounces to one pound and a quarter. And it is a common thing not only to catch the young fish when fishing for minnows but to catch grown ones weighing from two to four pounds in this lake. The successful introduction of any fish into waters not before inhabited by them is a work of great value; for as each variety of fish has peculiar habits of feeding, and takes varieties of food not taken by others, each new introduction adds (in so far as they take such food as but for their presence would be lost) to the capacity of such waters to supply food fish. And the introduction of various kinds of fish food such as cyclops, insects, snails, infusoria, etc., is a most valuable work where there are any fish that live upon such food; or where this kind of food is plentiful, the introduction of any kind of minnows, chub, dace, or other small fish is of extreme importance, for such food otherwise useless, would sustain large numbers of them while they in their turn would sustain a largely increased number of bass, wall-eyed pike, etc. In this way the introduction of carp, a vegetable feeding fish into many of our waters where vegetation grows in immense quantities will tend very largely to the increase of our better kinds of native fish by utilizing a heretofore useless source of food, and turning it indirectly through the medium of the carp into bass, wall-eyes, etc., upon which subject I shall have more to say in another portion of this report.

The work of fish breeding is being continually increased all over the world, and is awakening so great an interest that already two great international fishery expositions have been held, one at Berlin, in 1880, and another this season in England, that has been deemed of so great importance that almost if not all civilized nations have made especial appropriations and have sent Commissions to represent them and the interests they have in the matter, and the present exposition is one of the wonders of the present enlightened age. Where most has been done at fish culture the greatest results have followed, and those States that have been long and energetically engaged in it, are to-day rapidly increasing their work. The State of Michigan, one of the first, and I believe the first Western State to undertake the work and who have heretofore appropriated about fifteen thousand dollars per term of two years, this year makes it thirty thousand dollars. And commissions have been so rapidly established that I do not know of a State that has no commission, and that are not energetically engaged in the propagation and increase of fish.

Mistakes have been made, and sometimes portions of the work done have proven flat failures. But these experiences come to all new work, much less I think to fish culture than to any class of work of equal extent known to me. The experience gathered from these few failures, make them worth perhaps as much to the world as they would have been had they proven successful.

THE GERMAN CARP.

I have been frequently asked to write something for publication in regard to this (to Americans) new fish, that is being so extensively and rapidly introduced into all sections of this country, for private ponds and public waters. I have refrained from doing so because I knew personally almost nothing of them. So much importance is now attached to the results that are to follow the distribution of so many of these fish to so many people who know perhaps less, and whose opportunities for study and observation in this direction have not been equally good with mine, that I have felt it a duty to attempt to write something for this report, in hopes that it may prove of benefit to those who may attempt their culture. In doing so I shall have largely to borrow suggestions from those whose experience qualifies them to speak understandingly upon this subject, adding such suggestions as my own observation may lead me to make. It is an old maxim that "anything that is worth doing is worth doing well," and to nothing does this apply with more force than in domestic fish culture. More failures than successes have been made in this kind of work because of ill-advised, unscientific, badly laid plans. And thousands of dollars in losses and innumerable failures could have

been saved and made successful by the outlay of a little time and money in gathering a little intelligent knowledge of the work attempted.

Mr. F. Zents, in bulletin of United States Fish Commission, says, that "the original home of carp is Asia Minor and Persia, and that it was known to the Greeks and Romans, but it is impossible to say when it was introduced into south and central Germany, and into France. There is documentary evidence that it was cultivated in France as a pond fish as early as 1258, and about the same time in Germany. It was introduced into England in 1514, and into Denmark in 1660."

There are three principal varieties of carp, viz.: Scale carp, mirror carp, and leather carp. The first is covered with regular concentrically arranged scales. The mirror carp is thus named on account of the extraordinary large scales that run along the body of the fish in three or more rows. The leather carp has usually only one or two rows of scales along the upper or upper and lower margins of the body, the rest of the body being a soft velvety skin. The mouths are toothless, lips very thick, and they have four barbels depending from the upper jaw.

Of the quality of carp for food Prof. Hessell says: "If the carp were a fish of inferior quality, its sale would doubtless be limited to the sea-port towns of north Germany and the principal cities of central Europe, as Vienna, Berlin, and Paris. In the latter city, in spite of the abundant supply of salt water and different fresh water fish, the carp is even preferred to these, and with the exception of trout and salmon, it frequently commands a price three times as high as that of all the rest. I maintain my assertion that the carp, whether it be scale, mirror, or leather, is one of the most excellent fresh water fishes." It is estimated that 500,000 pounds of carp are consumed annually in Berlin alone. Prof. Baird (than whom there is no better authority) says: "It is a fish adapted to the farmers' ponds and mill-dams. It represents among the finny tribe the place occupied by poultry among birds. Where there is quiet water, with muddy bottom and abundant vegetation, there is the home of the carp; there it will grow with great rapidity, sometimes attaining a weight of three or four pounds in as many years. It is a vegetable feeder, and not dependent on man for its sustenance. As an article

of food the better varieties rank in Europe with the trout, and bring the same price per pound."

Sylvester Scott, a carp raiser of California, says: "They are a fine fish to eat."

Levi Davis, of Forestville, California, says: "They are a cheap and excellent food, the quality of which I consider equal to the trout."

Alfred LaMotte, of the Cenni Fish Propagating Company, Sonoma, California, says: "Its table qualities are good, not equal, of course, to the brook-trout, but superior to most of our river fishes."

Much has been said about the quality of fish, as to flavor, when they are to be raised in stagnant, marshy, or muddy ponds. My own opinion is that the quality of carp or any other fish raised in such ponds could not equal in flavor a fish raised in pure running water, but one of the best qualities attributable to this fish is that their habits tend very largely to purify still water ponds, by eating the ripening water vegetation and other matter that usually, by decay, tends to make it foul, and I believe that a pond well filled with carp would never become foul.

And besides, it is a fact that fish that have attained any unpleasant, muddy, or mouldy flavor on account of the quality of the water, may be very much improved, and in fact their quality made good, by placing them in pure water for a few days before they are to be used. The soft, despised, midsummer sucker, from a hot, stagnant pond, if put into cold spring water for a few days, will be as hard and firm of flesh as in mid-winter, but would be killed by the too sudden change.

The ability of the carp to endure heat and cold is one of its chief merits as a pond fish, and makes it available for almost any kind of a pond. It is fully able to stand a much greater degree of heat than is ever known in any ponds or other still waters in the climate of this latitude, and in ponds a few feet deep, with muddy bottoms, their safety from cold is assured. In such ponds, in extremely cold weather, they hybernate, or pass the time in the mud bottom of the ponds in a kind of sleep, stupor, or suspended animation, in the same manner as frogs, turtles, etc.

Dr. George Wigg, of Clay Center, Mo., writes to Prof. Baird as follows: "I have a German carp in my office, frozen stiff six times in one month, yet each time, after six hours, came out all right." I know from my own experience that they will stand severe cold much

more than any other fish I have ever handled, but I have found it unprofitable to handle them much in winter.

The fertility of the carp is one of its merits. Dr. Rudolph Hessell, who has charge of the United States carp ponds at Washington, has been familiar with the carp during his lifetime, and is probably the best authority on carp in this country, says: "A fish weighing from four to five pounds contains on an average 400,000 to 500,000 eggs. Other statements figure still higher." They spawn in this latitude from the first of May to last of August. Their eggs are very glutinous, and adhere to grass, aquatic plants, brush, wood, etc., to hatch; and those that fall upon the ground are probably lost.

The time of hatching would be from six to fifteen days, according to the temperature of the water. The food-sack is soon absorbed, in warm water much quickest, when the little ones seek their own food. As carp are not carniverous they will not destroy their own young for food, and probably the only way in which they would be likely to destroy their own eggs would be by eating the vegetation upon which any eggs might have been deposited.

Carp grow very rapidly, their growth being probably four or five times as great as the trout, and in the Southern States their growth has been phenomenal. It differs in growth according as it inhabits warm or cold water, the length of the warm or cold season, and the plentifulness of natural food, or the supply of artificial food if fed by hand. Some of the fish now in the ponds at Washington, imported only a short time since, will weigh from twelve to sixteen pounds, and some now in the State hatching-house at Anamosa, only two years old, are from ten to twenty inches in length.

They live to exceedingly great age, from one hundred to two hundred years, and grow to from fifty to one hundred and fifty pounds, according to different authors. But this, of course, only in exceptional cases. A carp of sixteen pounds would be considered a large one ordinarily, and probably for food purposes from three to six pounds would be the most economical sizes, and better for food purposes.

Their exceeding fertility, and their extreme shyness, will probably often cause a pond to be overstocked without the knowledge of the owner or manager, and so the whole stock of fish in the pond would suffer and be dwarfed for the want of food and space. Unless carefully attended to and continuously watched, owing to this fact, and

the difficulty of catching them, I have fears that it will often be one of the worst difficulties to contend with. I shall probably refer to these points again in writing of ponds and their structure.

The carp in feeding habits are almost omniverous, but will live entirely upon vegetation and a vegetable food, such as cabbage, lettuce, boiled corn, potatoes and other vegetables. Soaked grain, malt, etc., is its preference. I have kept our carp a whole summer on parsley, or pusly as it is often called, pulled up from the garden. From this they will eat all the soft leaves when the roots and uneaten stalks can be taken out. The refuse from the table, crumbs of bread, cake, etc., pieces of meat cut fine, and the refuse from slaughter-houses also cut fine, and many other things, make cheap and easily obtainable food for the carp. They should never be overfed for if so the remains will often decay, poison the water with foul gasses and frequently produce some of the worst kinds of fungus, all of which is detrimental, if not positively dangerous to the fish. In ponds where there are but few fish and plentiful food, it would be unprofitable instead of beneficial to feed the fish, and they will thrive and keep in better condition without. And of course it is in such ponds where the fish can feed and grow in large numbers without the care and cost of feeding, that the greatest profit to the carp raiser will accrue.

In all small still-water ponds, reservoirs and other small bodies of water, natural and artificial, where no other fish could live, the carp makes it possible for the owners to raise fish enough for their own use, and probably some to spare for their neighbors.

In larger ponds, sloughs, lakes, rivers, etc., where bass, wall-eyed pike and other carniverous fishes can and do live, the carp will be, to my mind, a source of greater profit to the general public than in any other place or way. The reason of the scarcity of these fishes named in most of our Iowa waters, is not because the water is not suited to the fish, but because suitable food for these fish is not found in sufficient quantities in the waters. A bass or a wall-eyed pike will not take a young bass or wall-eyed pike for food when they can procure any of the soft-rayed finned minnows or other soft-rayed finned fish. The strong, sharp-spined fins of the young bass and wall-eye, and their hard, scaley armor are at such times their safe-guard. But, unfortunately, the soft-finned fish are too scarce in most of our waters, and after the young minnows are gone the large fish have no choice but to take the young bass and wall-eye or starve.

And we who have watched them know that in the fall of each year the small bass have been wonderfully thinned out, while a few large bass are found whose stomachs and overgrown size tell us but two well what has become of the little fellows. These waters abound in vegetation and other food upon which the carp, without trespassing upon the food of the other fish, can and will live and thrive. Their hardy natures fit them to endure the heat of summer and cold of winter, and their cunning will protect them from destruction, for it is almost an impossibility to catch them in nets even in enclosed ponds. And their fertility will by the great number of eggs deposited and young carp bred, furnish an immense amount of food, and every young carp so produced will take the place of a young bass as food for the larger fish. Leaving out of sight the question of the quality of carp for human food, I believe their introduction into public waters, by making the now useless mass of vegetation that annually grows and decays in our waters, indirectly through them, available as food for the other fishes, will accomplish more for fish culture, or rather for the increase of our food fishes, than any work that has ever been done. If I had ever so fine a natural or artificial pond that I knew would make a good home for bass, and that I desired to stock with fish, I would first stock it fully with carp. Afterward, if for any reason I preferred the bass, or if I desired both carp and bass I would introduce them, believing that by first stocking my pond with carp I had indirectly, as before shown, provided for my bass an ample supply of food. As the bass deposit their eggs in nests and guard both the nests and young fish for a short time, they would not be injured by the presence of the carp, and the carp, by their exceeding fertility would be likely to more than hold their own.

I think a few carp put into a trout pond where trout are regularly fed, would be of great benefit. Trout will not eat food from the bottom of the pond, and so large quantities of food is not only lost in feeding but is a great damage by the poisonous effects upon the water and fish in decaying. The carp would take this food from the bottom and turn it to a useful purpose.

They would not breed in such waters as such waters as a trout could live in, and they would grow quite slow comparatively, but probably much faster than the trout, and the character of the water would insure them to be of fine flavor and firm texture. They have a habit of working upon the bottom of ponds to such an extent as to

keep a small pond with a number of carp continuously roily, and so I would not advise to put too many in a small trout pond, where it is desirable to have always pure, clear water.

We have at the State hatching-house now nine ponds calculated for breeding ponds, wintering ponds and nurseries; also about fifty of the scale, leather and mirror carp large enough for breeders. These ponds were not finished until about three weeks ago, which makes it rather late for this season's crop. I counted one day last week fifty-five young carp in one of the ponds, and we hope to get quite a number yet. Another season we shall be in first class condition for breeding them. The pond in which they have been kept, a wintering pond, has so much spring water running into it that the water did not get warm enough to allow of their spawning, and it was impossible to have the other ponds ready sooner.

I wish before leaving this part of the subject to impress upon the minds of all who may desire carp, that it would be very unwise to put the young fish that you will be likely to get into ponds that contain bass, wall-eyed pike, perch, sun-fish, bull-head, or any other carnivorous fish whatever, for if the young fish themselves were not destroyed, their eggs and probably quite largely their young would be lost. Make a small pond in such cases, where the carp can be kept separate until they have a sufficient size to insure their safety, or until you have enough young carp so that the loss of a few will not materially interfere with your work. Even minnows of any kind may destroy carp eggs, and should be kept out of the ponds.

The value of a fish-pond, or rather its capacity to produce carp food would depend upon the character of the soil. Clay or sandy soil would produce but little. Peat and loam would produce large quantities of vegetable matter. So also would the wash from any soil, while a rocky bottom would produce little except insect and animal life.

Some of the first considerations and of vital importance in laying out ponds are, the amount of water, the power to control and regulate the supply and discharge of sand, and to guard them against floods and surface water.

Ponds are made according to location by excavation or embankment, or by both excavation and embankment. Embankments should be three times as wide at the base as they are to be high. That is, an embankment that is to be five feet high should be at the base fif-

teen feet wide and five feet wide on the surface, thus giving a five-foot slope on each side of the dam, or making the slopes at an angle of forty-five degrees with the base of the dam.

Loam or clay are the best materials for a dam, and if good sand can be had, it would be well to put a few layers from one to two inches thick of this into the dam. This will effectually prevent craw-fish from working into or through the dam, as they cannot make their holes in clean sand.

In making the embankment the earth should be packed in some way. If a team and scraper is used this will be tolerably well done by the tramping of the team. Unless well packed it should be left to settle before water is put in the pond.

The location of the ponds should be carefully considered. They should be so situated that there could be no possibility of their being washed out or badly overflowed by heavy or sudden storms. In ravines they should be so situated that flood water would pass around one side of them, and where there is any great amount of water-shed above the ponds to gather rain-fall, they should be so constructed that only so much of the water as is needed for pond supply can enter the ponds. A flood of water would be likely to very much endanger the washing out of the dam, or it might carry out with it the fish, or with the wash of the country above the ponds deposit so much in the ponds as to seriously endanger the fish by the poisonous gases evolved by decay. The water supply for carp ponds may frequently be taken from some small or even a large stream, by going far enough above the location designed for the pond to run a ditch or race from the stream into the pond, at an elevation high enough above the stream to insure its safety.

The carp is possessed of much more intelligence than ordinary fish. They are said to have six times as much brain as any of our fishes. Old encyclopædias call them the "fox of the waters." I have tried unsuccessfully for half a day to get some of them from a small pond with a seine. On this account and for the purpose of being able to know what is in your ponds at stated times, and also to regulate the supply of fish, as to numbers, and to take from or leave in the larger or smaller fish as the occasion may require, it is almost a necessity to be able to control the water running into and also to run off the water from the ponds.

The draining of the ponds is of course only possible when there is

a portion of the surrounding country lower than the lowest point in your ponds that you desire to drain, in which case they may be drained by a drain-pipe put into the embankment when the ponds are built, or it may be done with a syphon. If a drain is put in, it should be made secure by putting sheet piling or mason work around the drain-pipe at one or two points in the embankment. All drains, races, overflows, or other points where the water runs in or out of the ponds, should have gates or other devices to shut off the flow of water, and also should each have a wire screen (coal-tarred) or some grate, to prevent the egress or ingress of fish.

And for additional security there should be a sluice-pit abundantly screened, at the outlet of each drain to guard against any accidental escape of the fish. To drain with a syphon, have a piece of hose sufficiently long to reach from the lowest point in the pond desired to drain, to some point outside the pond that is a little lower than the pond. Put a large hood of wire-cloth upon the upper end of the hose to prevent escape of fish. Begin at that end of the hose and sink it gradually beneath the water toward the other end of the hose, to insure the escape of all the air before the outer end has taken any water. When the hose is completely filled, cork or plug the outer end firmly. Draw this end of the hose out of the pond to the point where the water is to be discharged, keeping the inside end of the hose below the surface of the water in the pond. When the hose is in the proper position pull out the cork, and the water should flow. When any wire-cloth, iron grate, or other iron is used about the ponds, they should be thoroughly coal-tarred quite often or they will be quite apt to rust out and permit the fish to escape. Use brass, copper, or galvanized wire in preference, although a little more expensive at first, it costs less in time and is much safer.

The bottom of all ponds should be the lowest at point of egress for the water, or where the water enters the escape pipe, and should have a gradually ascending bottom to near the surface of the water at the edges of the pond, so that as the water is drawn out of the pond the fish will be gathered into one pool.

It is quite important to be able to put a small stream of fresh water into the pond when being drained off, especially if there are great numbers of fish, and they are to be kept there any length of time. If this is not possible, they should be rapidly removed to fresh water or they would be smothered in the mud.

The overflow of water from the pond in ordinary stages would be much better if taken from the bottom or near the bottom, which can be arranged by having a sort of stand-pipe box admitting the water at the bottom and permitting it to run out at the top into the overflow. This will keep moss, leaves, and other floating matter from clogging the screens, if they are placed in the top of the box, as nothing could get into the pipe unless it first went to the bottom.

Deciduous trees around ponds are to be strictly avoided; their falling leaves get into the ponds and in decay make the water poisonous and filthy. They clog up the screens to your drains and overflows, and are a decided nuisance in various ways. No trees of any kind should obstruct the sun from shining directly into the water of breeding ponds, and even in ponds exclusively for growing carp. They would hinder the growth by keeping the water cooler. If you desire trees about your ponds plant only evergreens (as their spines do not blow into the water) and upon the north sides of your ponds, where they will not shade.

Ponds, to have carp grow rapidly, should have plenty of shoal water; a depth running from six inches to three feet is much better than deeper, as in this depth vegetation, insects, worms, larvæ, etc., develop and grow much more rapidly. It is, however, necessary, if fish are to winter in the same pond, to have much deeper water, unless there is to be a continuous in and outflow. For a still water wintering pond the deeper a portion of it is, the better. If there be plenty of mud in the bottom of ponds, in which the carp can bury itself during its period of hybernation or winter sleep, a depth of five feet might answer and bring them safety, but a greater depth would please me much better. If spring water can be run steadily into the pond during the winter the depth is of much less consequence.

In draining ponds great care should be taken to have it done slowly, so that the fish may not be too badly frightened, to gather in the deeper portions. They are quite likely to bury themselves in the mud of any part of the bottom when they take a sudden alarm, and might be left there to smother and die.

The location and form of ponds should be such as to add to the beauty of the surroundings and to the comfort, convenience, and pleasure of the owners. They may be needed to supply ice, or if stock be kept they may be useful as a reservoir to supply water. Of

course, these points are to be duly settled by those who plan them, and their great importance should not be overlooked.

Carp can be kept and fed, and made to grow rapidly, in reservoirs, tanks, small ponds, or other small bodies of water, during summer, that would not be safe from freezing during winter, and they are often so kept in the old countries. Stock fish for such a purpose would have to be procured annually from some carp breeder. But carp raising proper is properly divided into promiscuous and class breeding; the first, promiscuous breeding, is where the lake, pond, or body of water in which the fish are raised, cannot be controlled so as to be able to keep carp of various ages, sizes and varieties by themselves; and class culture consists in having each variety, age and size in ponds separated from others, and would require breeding or hatching ponds, nursery ponds for young fish, and stock or feeding ponds. The hatching ponds need not be large; the main requisites are: that it should be shallow, should not be shaded, that the water should stand at a high temperature, and that there should be abundant vegetation for the spawning fish to attach their glutinous eggs. It should, during spawning time, be closely watched, and everything about it should be quiet, so the fish may not be disturbed. All kinds of water fowls will destroy their eggs, and these, and turtles, frogs, snakes, and other fish enemies, should be kept out of the ponds; and the carp should be fed liberally to keep them from eating the vegetation upon which the eggs are deposited, as thereby they would destroy many of their own eggs. The spawning fish should be put into the ponds early, as the early young fish will be much the larger and finer fish in the fall.

The main or principal ponds will be likely to prove to be more or less profitable, according to their size and ability to produce a greater or less quantity of good, suitable carp food, for undoubtedly the cheaper, less troublesome, and most profitable carp raising is where they can procure abundant food for themselves. But where they are to obtain their own food great care should be taken not to have the ponds overstocked, for the general testimony is that when carp are once stunted in their growth they never recover from it. It is the general testimony that ponds in this country grow food much more abundantly than in the old countries, and an acre of water should never have more than four thousand young fish, and this number is reduced in the old countries to six hundred or seven hundred large fish, say from three to ten pounds. Experience must determine the

proper numbers, but it should always be remembered that if a pond be overstocked in numbers it will always be at the expense of size and quality of fish.

The first carp were introduced into California by a Mr. Poppe, of Sonoma, who, in 1872, arrived there with five of the smallest of a shipment of eighty-three that he tried to import from Germany. The five, he reports, were about the size of a small steel pen, and he arrived there with them in August, 1872. In May, following, they were fifteen inches long, and in 1875, two of them weighed sixteen pounds each. The cause of this extraordinary growth was the warmth of the water, some of the springs from which the water flows standing at eighty-six degrees, Fahrenheit. Mr. Robt. Poppe, in 1880, gives a list of a large number of men who have been engaged in carp culture in California. I have taken pains to write to some of them, making inquiries about the value (in their opinion) of the carp as a food fish, and of carp raising as an acquisition to farm work. I append the replies of three of them, and will state that they represent almost precisely what is represented by all who have kindly answered my letters.

LENNI FISH PROPAGATING COMPANY,
GLEN ELLEN P. O., SONOMA, CAL., April 15, 1883.

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

Dear Sir—Your favor of March 30 reached me a few days ago. In reply would say that the carp is a very profitable fish for the general raiser. It will thrive where other fish will not; and as to its table qualities is good, not equal, of course, to the trout, but superior to most of our river fish. Their increase and growth under favorable auspices is very good. I have had them reach sixteen inches in length in one season. With abundant vegetation in the ponds and water of uniform height, so that the eggs deposited along the margin are not subjected to exposure, they are pretty sure to thrive. Mud-turtles, water-snakes, toads, frogs, etc., are prejudicial to success, but these are easily killed off in the spring. Any farmer having one inch of water supply need never want for carp on his table.

Yours truly,

ALFRED V. LAMOTTE.

CLOVER DALE, CAL., April 22, 1883.

B. F. SHAW:

Dear Sir—I am in receipt of your letter. I have been raising carp four years. I commenced with seven fish. The first year's increase was several thousand, and they have increased very fast ever since. They grow very fast; one year olds are from five to six inches long, and my three year olds are from fourteen to eighteen inches long. They are a fine fish to eat; are

hardy and easily raised, and do not eat their young. They do not require much food. In the summer months we feed them bread crumbs, boiled potatoes, boiled wheat, vegetables, and milk curds. The curds are good for the young fish. We are raising them in great quantities on the coast. They are long-lived and grow to great sizes in the old country.

Yours truly,

SYLVESTER SCOTT.

FORRESTVILLE, May 2, 1883.

MR. B. F. SHAW:

Dear Sir—Your letter of inquiry is at hand in regard to carp culture. I am one of the first propagators of them in the United States, but not the importer. I am an American back-woodsman and know nothing about them save what I find in United States reports and newspapers, and my own experience, which I think is best of all. I do not know whether I fully comprehend your question about the desirability of the work. If you have reference to my opinion, I must say I find it interesting, instructive, and amusing. This alone more than pays for all trouble. Then, again, if properly managed, they are the source of very cheap and excellent food, the quality of which I consider equal to the trout. The greatest drawback I find is they increase too fast, and the American people are too avaricious to thin them out, so as to keep them from being dwarfed; but give them a ow and their growth is not surpassed. This is the worst and about the only drawback. With new beginners it is all numbers, and not size or quality. When we become thoroughly acquainted with and properly understand their management, they will be a great source of very cheap and excellent food. They are, therefore, a desirable acquisition, and the work is worthy of being stimulated and pushed forward.

Yours truly,

LEVI DAVIS.

Mr. Robt. A. Poppe, who, I understand, is a nephew of Mr. J. A. Poppe, the importer of the carp, but who is since deceased, says of the carp: "The carp on Mr. Poppe's farm are usually fed, and indeed almost wholly, on curd from the dairy. They show fondness for barley, wheat, corn, beans, peas, and coagulated blood." Mr. Poppe was accustomed to say, "they would eat anything a hog would." In most ponds they find most of the food on the bottom, such as vegetable matter, fungers, and other substances. The items of expense for food is, at the most, very small on a farm, for anything will do that perhaps but for their presence would go to waste.

There are hundreds of acres of marsh and waste lands in California, which, by a little labor, could be prepared for the culture of the carp. An acre devoted to this purpose is the most profitable investment a farmer could make. Any one making the experiment will acknowledge beyond a doubt that the money necessary was never in-

vested to a better purpose. Besides supplying the market, there is a delicious dish for home consumption.

Upon the theory of the great fertility and rapid growth of the German carp, according to reliable authors, in a short time a pond lightly stocked would be so well filled with young fish as to need to be very much reduced in numbers, and, owing to the fact that only a few small young fish were as yet obtainable for distribution, and so only a very few of these young fish could be sent to any one locality. And if these were put into our lakes and rivers, among the pike, pickerel and other carnivorous fishes, they would be likely to fall a prey to them, or in case they escaped would be likely, in these wide waters, to become separated, and only in very rare cases ever be likely to breed. While if the same numbers were put into private protected ponds they would not be exposed to these dangers, and would be kept together, so that there would be protection and increase in numbers. It was thought upon consultation of the Fish Commissioner with the executive council late in the fall of 1881 to adopt the following plan for the distribution of any carp received from the United States for distribution or that should be bred by the State Commission, as being the least expensive, quickest and most effective way to stock the public waters of the State, besides being of immense value to the people by the encouragement and help given to the domestic culture of fish. The plan adopted is to furnish a proportionate number of young carp to any person in Iowa who will build a suitable pond for their cultivation, or who has a natural one that is adapted to such use, and who will agree to take good care of them and further agree that for a period of five years after they begin to breed they will plant one third of the increase in the public waters of Iowa. The fish will be furnished as fast as they can be procured for distribution in the order of applications on file. The following is the agreement and receipt for fish that we expect the party receiving them to make to the Fish Commissioner upon receipt of the fish, and is a copy of one such agreement now on file in this office:

Received of the Iowa Fish Commission, twenty German leather carp. I agree to care for the above carp, and to deposit in the public waters of the State of Iowa, under the direction of the State Fish Commissioner, as great a number as above receipted for, and also one third of the increase of said carp. The deposit in the public waters to begin as soon after breeding as the fish arrive at the proper age and size to deposit and to continue for five years thereafter.

Greeley, April 30, 1883. SAMUEL LEWIS.

It will sometimes occur to those desiring fish that on account of the impossibility of draining their ponds, or more especially natural lakes that are frequently filled with weeds and other obstacles to drawing a seine, that it would be impossible for them to do what is required of them in this agreement. What it is desired and expected is that in such cases an honest endeavor will be made to carry out as far as can be the spirit of the agreement. And it is hoped that all who have been assisted to stock their private ponds with carp at a time when they could be had from no other source, except from the general or the State government, and at a nominal cost will show their sense of the obligation by planting as plentifully as possible tneir surplus broods of fish in the waters of the State, remembering that it was more especially for this purpose that they received their stock.

I am very much impressed that the introduction of carp into Iowa is to be of great benefit, both to those who may desire to raise them in private ponds, and to the public. I believe they can be raised with much less labor, time and expense, and with much greater certainty than chickens, and will, I believe, in time be as common to be seen upon the farm. And they have only to be introduced into our public waters to insure an abundant supply, for the great quantities of vegetable and other food contained in them will make them a suitable home. And I feel quite confident that the bass, wall-eyed pike, etc., will be many times increased by their introduction.

To Prof. Baird, United States Fish Commissioner, the best posted man upon questions of practical fish culture in this, or perhaps any country, the people of the United States owe a debt of gratitude for the introduction of the German carp. Through the United States Fish Commissioner, all the carp now in the eastern portion of the United States, have been procured, and those that have been so far distributed in Iowa have been procured from them, and so great is my faith in them that I believe that their introduction will alone be worth more to this country than the total expenses of the Commissioner to this time. And I will go further and say that their introduction and distribution in Iowa waters will in time be worth more than the total cost of the State work.

CARP DISTRIBUTION.

NAME.	POST-OFFICE ADDRESS.	COUNTY.	Number.	WHEN SUPPLIED.
William G. Allen	Columbus City	Louisa	12	1880.
W. Andrews	Des Moines	Polk	6	August 20, 1882.
M. L. Andrews	New London	Henry	7	June 14, 1882.
L. Alford	Waterloo	Black Hawk	12	June 28, 1882.
M. L. Andrews	New London	Henry	20	November 15, 1882.
Frank Allyn	Keokuk	Lee	20	November 15, 1882.
William Brazleton	Monticello	Jones	12	June 27, 1882.
W. B. Brown	Spirit Lake	Dickinson	20	May 17, 1882.
E. Beers	Mount Pleasant	Henry	7	June 14, 1882.
W. B. Brown	Spirit Lake	Dickinson	20	November 16, 1882.
T. B. Blake	Scranton	Greene	20	November 14, 1882.
John N. Boling	Stanwood	Cedar	20	December 30, 1882.
J. A. Bishop	Muscatine	Muscatine	20	November 15, 1882.
R. N. Baker	Muscatine	Muscatine	20	November 15, 1882.
G. W. Bradford	Black Moor	Ringgold	20	November 17, 1882.
O. K. Bergland	Lake Mills	Winnebago	20	November 15, 1882.
A. Brockett	Atlantic	Cass	20	March 23, 1883.
A. H. Browns	Murray	Clarke	20	March 23, 1883.
W. W. Baker	Chariton	Lucas	20	April 2, 1883.
M. T. Burroughs	Cherokee	Cherokee	20	April 2, 1883.
E. A. Brown	Solon	Johnson	20	April 2, 1883.
Samuel Bower	Cedar Rapids	Linn	20	April 2, 1883.
C. K. Brown	Brighton	Washington	20	April 22, 1883.
Nathaniel Brown	Russell	Wayne	12	April 17, 1883.
R. L. Blaksley	Russell	Wayne	12	April 17, 1883.
J. E. Campbell	Fairfield	Jefferson	7	June 14, 1882.
E. J. Currier	Harlan	Shelby	12	June 14, 1882.
L. S. Coffin	Fort Dodge	Webster	10	June 28, 1882.
William Cook	Cedar Rapids	Linn	12	June 28, 1882.

V. L. Chester	Garden Grove	Decatur	20	November 15, 1882.
Joel E. Campbell	Fairfield	Jefferson	20	November 14, 1882.
E. J. Currier	Harlan	Shelby	20	November 14, 1882.
L. S. Coffin	Ft. Dodge	Webster	20	November 14, 1882.
C. C. Carpenter	Ft. Dodge	Webster	20	November 14, 1882.
F. D. Clark	Postville	Allamakee	20	April 2, 1883.
David Crowley	Chariton	Lucas	20	April 2, 1883.
R. J. Couch	De Witt	Clinton	20	April 9, 1883.
Geo. H. Champlin	Chariton	Lucas	20	April 22, 1883.
C. H. Clark	Russell	Wayne	12	April 17, 1883.
D. M. Clark	Russell	Wayne	12	April 17, 1883.
E. F. De Long	Beacon	Mahaska	10	June 20, 1882.
W. A. Day	Blakesburg	Wapello	20	March 25, 1883.
W. S. Dungan	Chariton	Lucas	20	April 2, 1883.
M. W. Davis	Iowa City	Johnson	20	March 22, 1883.
To rent March 22, 1883, lost by	Express Company.			
M. W. Davis	Iowa City	Johnson	12	June 12, 1883.
H. J. English	Newell	Buena Vista	10	June 28, 1882.
Eno & Son	Indianola	Warren	20	November 16, 1882.
A. S. Faville	Mitchell	Mitchell	12	1880.
J. W. Frazier	Salem	Henry	7	June 14, 1882.
G. W. Frank	Corning	Adams	20	1882.
J. W. Frazier	Mt. Pleasant	Henry	20	November 14, 1882.
Geo. B. Flood	Farmington	Van Buren	20	March 23, 1882.
Chas. Fitch	Clarksville	Butler	20	April 2, 1883.
Osmond Frisette	Lake Mills	Winnebago	20	April 22, 1883.
Wm. Gates	Nevada	Story	7	June 6, 1882.
Geo. L. Gast	Le Claire	Scott	20	1882.
W. A. Gray	Albia	Monroe	7	June 14, 1882.
M. Gilbert	Nora Springs	Floyd	20	November 15, 1882.
Geo. L. Gast	Le Claire	Scott	20	November 16, 1882.
Wm. Gates	Nevada	Story	20	November 14, 1882.
T. N. Garriot	Fremont	Mahaska	20	April 2, 1883.
A. A. Gardner	Lost Nation	Clinton	20	April 22, 1883.
John L. Gritman	Springville	Linn	20	May 11, 1883.
J. C. Hawkins	Mt. Pleasant	Henry	10	1880.
A. Hattenberger	Dubuque	Dubuque	20	1881.
Jacob Haas	Decorah	Winneshiek	20	1882.
Jacob Haas	Decorah	Winneshiek	20	January 7, 1882.

CARP DISTRIBUTION—CONTINUED.

NAME.	POST-OFFICE ADDRESS.	COUNTY.	Number.	WHEN SUPPLIED.
Jacob Hawkins	Mt. Pleasant	Henry	10	June 14, 1882.
James Holland	Mt. Pleasant	Henry	7	June 14, 1882.
G. W. Hayzlett	Waterloo	Black Hawk	....	June 28, 1882.
James Holland	Mt. Pleasant	Henry	20	November 15, 1882.
W. H. Hoffmeister	Ft. Madison	Lee	20	December 8, 1882.
George F. Hilton	Keokuk	Lee	20	1882.
M. P. Hoffman	Redding	Ringgold	20	March 23, 1883.
J. S. Hoffman	Redding	Ringgold	20	March 23, 1883.
J. D. Hasbrauk	Humeston	Wayne	20	March 23, 1883.
George O. Hilton	Keokuk	Lee	12	April 22, 1883.
William Hughes	Corydon	Wayne	12	April 17, 1883.
John Iclen	Riverside	Washington	20	November 22, 1882.
L. L. Iverson	Locust Lane	Winneshiek	12	June 11, 1883.
John Johnson	Lisbon	Linn	10	1880.
George Jellick	Atlantic	Cass	20	March 23, 1883.
L. W. Jones	Russell	Lucas	10	April 2, 1883.
W. O. Kulp	Davenport	Scott	12	1880.
C. F. Klise	Clarinda	Page	7	June 14, 1882.
L. W King	Nevada	Story	7	June 6, 1882.
Henrich Knaw	Corning	Adams	20	1882.
C. F. Klise	Clarinda	Page	20	November 15, 1882.
L. W. King	Nevada	Story	20	November 14, 1882.
William Kitch	Mt. Pleasant	Henry	20	April 2, 1883.
W. A. Kitterman	Ottumwa	Wapello	20	April 2, 1883.
J. W. Lane	Centerville	Appanoose	20	November 16, 1882.
N. M. Letts	Lettsville	Louisa	20	November 14, 1882.
E. T. Lemert	Albion	Marshall	20	November 18, 1882.
George W. Long	Delaware Center	Delaware	6	March 16, 1883.
R. M. Lehew	Mt. Pleasant	Henry	20	April 2, 1883.
Samuel Lewis	Greeley	Fayette	20	April 30, 1883.
J. C. Laing	Russell	Wayne	17	April 17, 1883.

W. A. Mynster	Council Bluffs	Pottawattamie	12	April 17, 1880.
Isaac Muncie	Jesup	Buchanan	12	June 28, 1882.
Isaac Muncie	Jesup	Buchanan	20	June 7, 1882.
Henry Meyer	Beulah	Clayton	10	June 5, 1882.
Howard Moore	Linevilie	Wayne	20	1881.
S. H. Mallory	Chariton	Lucas	7	June 14, 1882.
C. E. Morris	Coon Rapids	Carroll	20	November 15, 1882.
Wm. B. May	Riverview	Lyon	20	November 15, 1882.
J. R. McDonald	Conway	Taylor	20	November 14, 1882.
N. T. McMasters	Postville	Allamakee	20	April 2, 1883.
T. N. Mast	Ottumwa	Wapello	20	April 2, 1883.
L. R. McWhinney	Creston	Union	20	April 2, 1883.
S. McPherson	Atlantic	Cass	10	March 22, 1883.
A. B. Noble	Chariton	Lucas	20	April 2, 1883.
C. A. Preston	Hale Village	Jones	6	1881.
Wm. F. Pumphrey	Fairfield	Jefferson	7	June 14, 1882.
Albert Powers	Pulaski	Davis	10	1882.
Wm. F. Pumphrey	Fairfield	Jefferson	20	November 14, 1882.
S. G. Pickett	Charles City	Floyd	20	April 2, 1883.
S. C. Quint	Carroll	Carroll	18	June 20, 1882.
Wm. G. Rowland	Muscatine	Muscatine	20	1881.
J. Ross	Nevada	Story	7	June 6, 1882.
A. W. Rankin	Drakeville	Davis	8	June 8, 1882.
T. J. Rose	Nevada	Story	7	November 14, 1882.
B. F. Shaw	Anamosa	Jones	7	1880.
Lamport Schneiht	Dubuque	Dubuque	20	January 11, 1882.
E. R. Shaw	Cedar Rapids	Linn	12	1880.
George Schlapp	Fort Madison	Lee	20	November 15, 1882.
Wm. Sunday	Nevada	Story	7	June 6, 1882.
John Scott	Nevada	Story	7	June 6, 1882.
Wm. Sunday	Nevada	Story	20	November 14, 1882.
John Scott	Kellerton	Ringgold	20	March 23, 1883.
J. Schlotterbeck	Knoxville	Marion	20	April 2, 1883.
Thomas Spencer	Chariton	Lucas	20	April 2, 1883.
E. H. Seales	Russell	Wayne	12	April 17, 1883.
George Steck	Russell	Wayne	12	April 17, 1883.
Peter Thorson	Ossian	Winneshiek	20	February 14, 1882.
Peter Thorson	Ossian	Winneshiek	20	December 6, 1881.
J. W. Tracy	Mt. Pleasant	Henry	7	June 14, 1882.

CARP DISTRIBUTION—CONTINUED.

NAME.	POST-OFFICE ADDRESS.	COUNTY.	Number.	WHEN SUPPLIED.
A. C. Tude & Co.	Elkport	Clayton	12	April 11, 1882.
J. W. Tracy	Mount Pleasant	Henry	20	November 15, 1882.
Wm. Thompson	Fern Valley	Palo Alto	20	November 14, 1882.
J. M. Terry	Fairfax	Linn	20	November 22, 1883.
N. L. Van Sandt	Clarinda	Page	11	June 14, 1882.
N. L. Van Sandt	Clarinda	Page	20	November 15, 1882.
Wm. H. Vallean	Decorah	Winneshiek	20	November 15, 1882.
Wilkes Williams	Postville	Allamakee	10	1881.
Wilkes Williams	Postville	Allamakee	12	January 7, 1882.
J. F. Wilson	Fairfield	Jefferson	7	June 14, 1882.
Geo. Wilson	Boonville	Dallas	20	November 15, 1882.
M. C. Wood	Conway	Taylor	20	November 14, 1882.
E. E. White	Lincoln	Polk	20	March 28, 1883.
C. H. Watkins	Story City	Story	20	March 20, 1883.
H. A. Wonn	Drakesville	Davis	20	April 2, 1883.
Only nine received, eleven missing				
S. White & Co	Vinton	Benton	20	April 2, 1883.
M. V. Whitney	Waucoma	Fayette	20	April 2, 1883.
S. J. York	Mount Auburn	Benton	20	April 22, 1883.

The foregoing list of distributions is as accurate as I could get the record, and is in the main correct, but as a portion of the fish were forwarded direct to the parties from the United States Commissioner, at Washington, without immediate notice to me, they may in a few minor points not be absolutely correct as to date or number of fish.

It will be observed that in several cases duplicate lots of carp have been sent to parties. This occurred by a want of definite understanding between the State and United States Commission as to where the shipments should be made from, the applications having been made to the State, and by the State forwarded to the United States Commission. A portion of the carp were sent in bulk to the State Commission to be distributed to applicants, while a portion of them were shipped direct to applicants, in separate lots, from Washington. A definite understanding will prevent like mistakes in future shipments.

CARP APPLICATIONS.

NAME.	POST-OFFICE ADDRESS.	COUNTY.	DATE OF APPLICATION.
C. L. Harris	Algona	Kossuth	January 1, 1883.
Jno. R. Shaffer	Fairfield	Jefferson	January 1, 1883.
A. T. Lawrence	Volga City	Clayton	January 1, 1883.
Rudolph Reichman	Toledo	Tama	January 15, 1883.
F. D. DeLong	Beacon	Mahaska	January 1, 1883.
C. H. McCune	Solon	Johnson	January 15, 1883.
L. L. Iverson	Locust Lane	Winneshiek	January 1, 1883.
C. S. Bennett	Cedar Rapids	Linn	January 15, 1883.
J. G. Brown	Vancleve	Marshall	January 16, 1883.
L. Ralyea	Vinton	Benton	January 16, 1883.
Jno. Lafferty	Mt. Pleasant	Henry	January 16, 1883.
A. M. Cornwell	New London	Henry	January 16, 1883.
Wm. Hughes	Corydon	Wayne	January 16, 1883.
L. R. McWhinney	Creston	Union	January 16, 1883.
J. H. Fugard	Newton	Jasper	January 16, 1883.
A. Carrier	Newton	Jasper	January 16, 1883.
P. F. Stockwell	Chester Center	Poweshiek	January 16, 1883.
L. Newman	Carson	Pottawattamie	January 16, 1883.
D. Noffinger	South English	Keokuk	January 16, 1883.
E. S. Whitney	Gilmore City	Pocahontas	January 16, 1883.
S. Miller	South Amana	Iowa	January 16, 1883.
M. A. Moore	LeMars	Plymouth	January 16, 1883.
E. A. Scales	Russell	Wayne	January 16, 1883.
Nathaniel Brown	Russell	Wayne	January 16, 1883.
J. G. Laing	Russell	Wayne	January 16, 1883.
C. H. Clarke	Russell	Wayne	January 16, 1883.
R. L. Blakesley	Russell	Wayne	January 16, 1883.
Geo. Steck	Russell	Wayne	January 16, 1883.
Wm. Hughes	Corydon	Wayne	January 16, 1883.
D. M. Clarke	New York	Wayne	January 16, 1883.

W. E. Bagley	Lincoln	Polk	February 1, 1883.
J. W. Blythe	Burlington	Des Moines	February 1, 1883.
N. S. Hubbell	Cromwell	Union	February 1, 1883.
W. Coe	Crawfordsville	Washington	February 1, 1883.
John Hall	Waukon	Allamakee	February 22, 1883.
E. Messenger	Chariton	Lucas	February 22, 1883.
R. E. Benton	Wapello	Louisa	
A. T. Lawrence	Volga City	Clayton	February 22, 1883.
S. P. Bausman	Lenox	Taylor	March 6, 1883.
J. W. Towner	Towner's Lake	Polk	March 10, 1883.
Wm. Fellows	Leando	Van Buren	March 17, 1883.
Marion Belknap	Anamosa	Jones	March 17, 1883.
J. C. Hawkins	Cincinnati	Appanoose	March 26, 1883.
E. F. Brockway	Ainsworth	Washington	March 26, 1883.
B. Van Steinberg	Preston	Jackson	March 30, 1883.
J. P. Thompson	Kirkville	Wapello	March 30, 1883.
Leonard Hammerschmeidt	Homestead	Iowa	April 14, 1883.
G. W. Furgeson	Council Bluffs	Pottawattamie	April 14, 1883.
J. B. Henderson	Cedar Rapids	Linn	April 14, 1883.
August Schmidt	Davenport	Scott	April 14, 1883.
J. Throckmorton	Derby	Lucas	April 14, 1883.
N. T. Burroughs	Cherokee	Cherokee	April 14, 1883.
A. L. Powers	Pulaski	Davis	April 14, 1883.
Wm. Plank	Pulaski	Davis	April 14, 1883.
Dr. Wm. Shelton	Pulaski	Davis	April 22, 1883.
Fred Froelich	Beulah	Clayton	April 22, 1883.
O. P. Anderson	Osceola	Clarke	April 22, 1883.
T. B. Myers	Bloomfield	Davis	April 24, 1883.
W. T. B. Allen	Sioux City	Woodbury	April 24, 1883.
M. Pebler	Libertyville	Jefferson	April 24, 1883.
M. L. Anderson	Mt. Pleasant	Henry	April 24, 1883.
Wm. Harrison	Mt. Pleasant	Henry	April 24, 1883.
J. C. Bradstreet	Clarion	Wright	April 25, 1883.
J. W. Tracy	Mt. Pleasant	Henry	April 25, 1883.
Thompson Watkins	New London	Henry	April 25, 1883.
Wm. Fritz	Blakesburg	Wapello	April 25, 1883.
M. M. Snider	Cambridge	Story	May 26, 1883.
C. Hover	Murray	Clarke	June 19, 1883.
Theo. Nachtwey	Lansing	Allamakee	June 19, 1883.

CARP APPLICATIONS—CONTINUED.

NAME.	POST-OFFICE ADDRESS.	COUNTY.	DATE OF APPLICATION.
E. Shofenberg	Manning	Carroll	June 19, 1883.
D. S. McKee	Fairfield	Jefferson	June 19, 1883.
G. Helgerson	Elliott	Montgomery	June 19, 1883.
Seth Bishop	Central City	Linn	June 19, 1883.
A. N. Gow	Martinsburg	Keokuk	July 2, 1883.
E. Moss	Birmingham	Van Buren	July 2, 1883.
Frank Allyn	Keokuk	Lee	July 21, 1883.
J. E. Logan	Lineville	Wayne	July 16, 1883.
E. H. Heaton	Big Mound	Lee	July 16, 1883.
Wm. King	Bethlehem	Wayne	July 20, 1883.
O. S. Templer	Jewell Junction	Hamilton	July 20, 1883.

COPY OF PETITION TO FISH COMMISSIONER FROM CITIZENS OF DICKINSON COUNTY.

MILFORD, April 5, 1883.

To B. F. SHAW, *State Fish Commissioner:*

We, the undersigned, citizens of Dickinson county, Iowa, desire to have placed and maintained across the outlet to East Okoboji lake in said county an obstruction to the passage of fish.

The fish run out of said outlet over the dams in immense numbers, and are unable on account of the height of dams to return, and are a loss to the lakes and to the State.

We therefore ask that in accordance with section 6, chapter 50, Laws of Fifteenth General Assembly, as amended by section 3, chapter 70, Laws of Sixteenth General Assembly, you will order that such obstruction be put in and maintained.

H. M. Shipman, Milford.
J. A. Ellis, Milford.
J. C. Guthrie, Milford.
J. A. Wilcox, Milford.
M. Trisler, Milford.
Seth H. Brown, Milford.
E. L. Brownell, M. D., Spirit Lake.
W. M. Smith, Spirit Lake.
A. W. Osborn, Spirit Lake.
D. R. Barmore, Spirit Lake.
W. F. Carlton, Spirit Lake.
Dooley & Satchwell, Spirit Lake.
A. M. Johnson & Co., Spirit Lake.
J. W. Cory, Spirit Lake.
W. A. Sidall, Spirit Lake.
S. T. Day, Milford.
Charles A. Dawson, Milford.
E. S. Hall, Milford.
K. K. Wilcox, Milford.
P. Rasmusson, Milford.
T. S. Foster, Milford.
E. D. Carlton, Spirit Lake.
J. M. Dimond, Spirit Lake.
C. C. Perrin, Spirit Lake.
J. C. Bell, Spirit Lake.
A. B. Funk, Spirit Lake.
Dickinson County Bank, by George E. Pearsoll, Cashier, Spirit Lake.
W. F. Pillsbury, Spirit Lake.
Newell & Kirk, Spirit Lake.
Wm. H. Bailey, Spirit Lake.

ANAMOSA, Iowa, April 17, 1883.

In the matter of petition of citizens of Dickinson county, it is hereby ordered that the petition be granted, and that the obstruction to the passage of fish in the outlet to East Okoboji lake may be put in and maintained in the dam at Milford, as asked for in said petition.

B. F. SHAW, *Fish Commissioner.*

Fish run over the dam in the outlet to the Okoboji and Spirit lakes at Milford during the spawning time in immense numbers, and have done so for years past. Owing to the extreme height of the dam they are unable afterward to return, and so they are left in large quantities in unsuitable waters, and the lakes are being rapidly drained of fish from this cause. It was thought that either a fish-way should be put

into the dam, or some way devised to stop the fish from going over the dam, and as there are still other dams below over which some portion of the fish pass, if the fish-way plan was adopted they would need to be put into these dams as well as the one at Milford. For this reason it was thought to be more feasible to stop the passage-way for fish over the dam with a fish-rack. And as the dam at that point, owing to the great surface of the lakes, is never very heavily overflowed, this was rendered much more easy than would be the case with ordinary streams. As there was no means at the disposal of the Commissioners, the C., M. & St. P. and the B., C. R. & N. railway companies kindly agreed to put in the necessary work, the consent of the owners of the dam at Milford having been first obtained. Section 6, chapter 50, Laws of the Fifteenth General Assembly, as amended by section 3, chapter 70, Laws of the Sixteenth General Assembly, gives power to the Fish Commissioner to order such obstruction to the passage of fish.

Upon the petition of the citizens of Dickinson county, and at the request and agreement of the above railroad companies, I made the order that the obstruction might be put in and maintained as petitioned for. I also made a model of such an obstruction or fish-rack as to my mind was best adapted to the work required, which was approved of by the companies. Work upon it was delayed until it was too late to be of any service this season, but I have the assurance of the officers of the companies that it shall be attended before it is needed again.

An amount of fish that would astonish any one not familiar with the facts are each winter killed with spears through the ice in the lakes. And to any one at all interested in the preservation of the fish now there, it must be a source of deep regret, as such a destruction, if long continued, will certainly rapidly deplete their numbers, and make this fisherman's paradise a comparatively barren waste of waters. I think the better sentiment of the people in the vicinity of the lakes will ask the Legislature by petition to pass such laws as will put a stop to this wanton destruction, and I am in hopes the necessary relief may be given by laws for that purpose.

STATEMENT OF EXPENSES OF IOWA FISH COMMISSION

from October 1, 1881, to July 1, 1883.

DATE.	Number.	IN WHOSE FAVOR.	ON WHAT ACCOUNT.	AMOUNT.
1881.				$
November	15	706 Mrs. N. R. Cone	Copying	6 60
November	27	707 Wm. Genett	Taking fish-eggs	20 00
November	27	708 Ariol Porter	Taking fish-eggs	17 50
November	27	709 Levi Buffett	Taking fish-eggs	17 50
November	27	710 Ogden Sweet	Outfit for taking fish-eggs	8 71
November	27	711 Ward Brothers	Floating boxes, etc	9 45
November	27	712 E. Bell	Taking fish-eggs	12 50
November	27	713 J. Valentine	Taking fish-eggs	12 50
November	27	714 J. C. Cregier	Taking fish-eggs	18 00
November	27	715 Hibbard & German	Board	27 75
November	30	716 American Express Co	Express	10 00
November	30	717 Durr & Rugee	Lumber	20 34
November	30	718 W. M. Skinner	Stationery, etc	11 03
November	30	719 J. S. Perfect	Supplies for hatching-house	5 38
November	30	720 Barrett & Alderman	Livery	6 00
November	30	721 S. A. Pope	Carpenter work	15 00
November	30	722 A. Heitchen	Hardware	9 50
November	30	723 H. Hollenbeck	Labor	6 25
November	30	724 G. F. Slocum	Labor, October and November	115 50
November	30	725 Mrs. G. F. Slocum	Labor, picking fish-eggs	6 00
November	30	726 B. F. Shaw	Cash expenses, October and November	49 85
November	30	727 Wm. Richards	Teaming	1 50
November	30	728 Watters & Co	Fish-feed, October and November, 1881	6 00
November	30	729 Pat Sullivan	Cutting and splitting wood	1 50
November	30	730 R. Mott	One cord hickory wood	5 75
			Requisition December 1, 1881, for	$ 418 81

STATEMENT OF EXPENSES—CONTINUED.

DATE.	Number.	IN WHOSE FAVOR.	ON WHAT ACCOUNT.	AMOUNT.
1881.				
December 16	731	August Winstroum	Labor on carp-ponds	$ 10 00
December 16	732	Alex. Winstroum	Labor on carp-ponds	10 00
December 20	733	J. G. Cudworth	Tin, labor, pipes, etc.	5 55
December 30	734	Watters & Co.	Fish-feed, December, 1881	3 00
December 30	735	G. F. Slocum	Labor, etc., December, 1881	60 00
December 30	736	Mrs. G. F. Slocum	Labor, etc., December, 1881	5 00
December 30	737	B. F. Shaw	Cash expenses	15 25
December 30	738	Durr & Rugee	Lumber	1 82
December 14	739	S. A. Pope	Lumber and labor	1 50
		Requisition December 31, 1881, for		$ 112 12
1882.				
January 6	740	American Express Co	Express	4 25
January 12	741	H. F. Dousman	240,000 brook-trout eggs	400 00
		Requisition January 25, 1882, for		$ 404 25
January 31	742	B. F. Shaw	Cash expenses	67 80
January 28	743	H. F. Dousman	Trout-eggs	75 00
January 26	744	J. Lubbers	Trout-eggs	60 00
January 31	745	Burrett & Alderman	Livery	9 00
January 31	746	S. A. Pope	Boxes	1 00
January 31	747	Mrs. G. F. Slocum	Picking fish-eggs	6 00
January 31	748	Mrs. L. Smith	Picking fish-eggs	4 88
January 31	749	G. F. Slocum	Labor, etc., January, 1882	57 25
January 19	750	American Express Co	Express	7 30
		Requisition January 31, 1882, for		88 23
March 6	751	United States Express Co	Express	2 35

March 25	752	American Express Co	Express	5 50
March 15	753	C. H. Monger	Printing envelopes	2 00
March 15	754	Shaw & Dutton	Salt	2 00
March 31	755	Mrs. G. F. Slocum	Labor	6 75
March 31	756	G. F. Slocum	Labor, February and March, 1882	107 00
February 1	757	Watters & Co	Fish feed, January, 1882	3 00
1881.				
December 31	758	Wm. Skinner	Rubber bulbs and bands	1 60
1882.				
February 24	759	Anamosa Eureka	Printing	11 40
February 20	760	J. G. Cudworth	Fish-cans and repairs	12 00
March 11	761	Burrett & Alderman	Livery teams	8 00
March 7	762	J. S. Perfect	Carp feed, etc	1 80
March 31	763	Watters & Co	Fish feed, February and March, 1882	6 00
March 31	764	Jones County	Rent of office one year	18 00
March 31	765	B. F. Shaw	Cash expenses, February and March	23 55
		Requisition March 31, 1882, for		$ 210 95
May 22	766	United States Express Co	Express	15 95
April 8	767	Gilbert Hubbard & Co	Nets, etc	21 23
May 22	768	E. Booth & Son	Printing	9 30
May 25	769	American Express Co	Express	1 90
April 1	770	O. M. Chase	Four hatching-jars	12 00
May 31	771	B. F. Shaw	Cash expenses	52 75
May 31	772	Milton Smith	Labor	16 25
May 15	773	G. F. Slocum	Labor, April and May	109 75
May 15	774	Wm. Richards	Teaming	2 00
May 31	775	Durr & Rugee	Lumber	12 51
May 31	776	W. A. Cunningham	Ice	4 00
May 31	777	Watters & Co	Fish feed	6 00
May 15	778	A. Heitchen	Hardware	5 00
April 20	779	Burrett & Alderman	Livery	4 50
May 27	780	C. & N. W. Railway	Freight	52
		Requisition May 31, 1882, for		$ 273 66
June 16	781	James Reed	Labor on ponds	10 50
June 23	782	Will Barker	Labor on ponds	25 50
July 31	783	G. F. Slocum	Labor, June and July, 1882	105 03

STATEMENT OF EXPENSES—CONTINUED.

DATE.	Number.	IN WHOSE FAVOR.	ON WHAT ACCOUNT.	AMOUNT.
1882.				
July 31	784	J. G. Cudworth	Tinware and repairs	$ 25 65
July 31	785	B. F. Shaw	Cash expenses	73 25
July 26	786	Booth & Son	Printing	2 00
July 10	787	G. B. Carpenter	Tent and awning	40 53
July 31	788	J. G. Parsons	Livery	8 00
July 31	789	Burrett & Alderman	Livery	1 50
July 31	790	Watters & Co	Fish-feed, June and July	6 00
July 31	791	Durr & Rugee	Balance on lumber account	3 20
July 31	792	Stickney & Harriman	Sundries, hardware	3 83
July 31	793	Carter & Son	Musquito-bar	30
		Requisition July 31, 1882, for		$ 305 29
September 30	794	B. F. Shaw	Cash expenses	84 77
September 30	795	Watters & Co	Fish feed, August and September	6 00
September 30	796	Morris Graves	Six busheles of lime	1 80
September 30	797	E. Brown	Two and a half days mason-work	6 25
September 30	798	M. P. Sigworth	Paints, oils, etc	6 65
September 30	799	J. S. Perfect	Sundries	3 25
September 30	800	S. A. Pope	Carpenter	9 00
September 30	801	Durr & Rugee	Lumber	2 70
September 30	802	Carter & Son	Cotton-flannel	1 25
September 30	803	B. F. Smith	Brick, 725	5 80
September 30	804	A. Heitchen	Hardware	10 33
September 30	805	G. F. Slocum	Labor, etc., August and September	111 00
September 30	806	Wm. Wallace	Fifteen days work on ponds	15 00
September 30	807	J. G. Parsons	Livery	2 00
		Requisition September 30, 1882, for		$ 265 80

			Musquito bar	40
October 9	808	George Storey	Hatching-boxes, etc	9 60
October 17	809	Hager & Johnson	Taking fish-eggs	24 00
October 30	810	H. W. Welcher	Two ten-gallon cans	6 40
October 30	811	B. Neidhart & Co	Board of men taking fish-eggs	150 65
October 30	812	Mrs. M. H. Volk	Pay for water	14 90
December 17	813	Marquette Water-works	Taking and picking fish-eggs	10 50
December 16	8134	W. M. Dorris	Turpentine, etc	2 70
December 27	814	M. P. Sigworth	Galvanized iron piping and labor	12 15
December 13	815	J. G. Cudworth	Fish feed, brooms, etc	5 70
October 23	816	J. S. Perfect	Fish feed, October, November and December	9 00
December 31	817	Heisey & Cunningham	Legal-cap, oakum, etc	1 35
December 31	818	W. M. Skinner	Express	1 05
December 27	819	United States Express	One hundred and five feet four-inch tile	4 00
November 1	820	C. C. Niles	Wire-cloth	1 60
	821	J. D. Powers	Lumber	5 44
November 15	822	Durr & Rugee	Two hundred and fifty feet eight-inch sewer-pipe	37 60
September 20	823	Monmouth M. and Manufacturing Co	One cord hickory wood for office	5 00
December 28	824	James Joslin	Cutting and carrying wood	1 50
December 28	825	O. Beardslee	Assistance in taking eggs	15 00
December 18	826	Steam-tug Marquette	Assistance in taking eggs	15 00
December 18	827	Steam-tug Rose	Assistance in taking eggs	5 00
December 18	828	Steam-tug Hays	Cash expenses	56 15
December 31	829	B. F. Shaw	Livery	2 00
December 31	830	J. G. Parsons	One hundred and ten tin pails	22 00
December 31	831	United States Fish Commission	Labor and cash expenses	183 00
December 31	832	G. F. Slocum	Livery teams	6 00
December 31	833	Burrett & Alderman	Printing	3 00
December 31	834	C. H. Monger		$ 608 09
		Requisition December 31, 1882, for		
1883.				1 50
January 18	835	H. Jamison	Labor	6 50
January 30	836	August Wistrom	Labor on ponds	6 10
January 29	837	American Express Co	Express on fish-eggs	3 00
January 29	838	Shaw & Dutton	Salt and fish-feed	4 50
March 1	839	H. Burrett	Livery	114 04
March 1	840	G. F. Slocum	Labor, January and February, 1883	9 00
March 1	841	J. Swanson	Wood for fish-house	2 65
March 1	842	M. P. Sigworth	Turpentine, etc	

STATEMENT OF EXPENSES—CONTINUED.

DATE.	Number.	IN WHOSE FAVOR.	ON WHAT ACCOUNT.	AMOUNT.
1883.				
March 1	843	J. S. Perfect	Sundries	$ 2 55
March 1	844	Thomas L. Parker	Fifty-seven and a half M. Br. trout-eggs	115 00
March 1	845	Heisey & Co	Fish feed, January and February	6 00
March 1	846	S. A. Pope	Ten shipping-boxes	2 00
March 1	847	R. Mott	One cord hickory wood	5 50
March 1	848	B. F. Shaw	Cash expenses, January and February	71 45
March 1	849	United States Express	Express on trout-eggs	10 55
		Requisition March 1, 1883, for		$ 360 34
March 17	850	O. M. Chase	Four hatching-jars	13 25
1882.				
October 13	851	B. F. Smith	One hundred brick	80
1883.				
March 27	852	American Express Co.	Express	2 30
April 16	853	E. F. Walker	Model of fish-rack	1 75
May 9	854	S. Bernard	Board and labor	19 00
May 9	855	Wm. Morin	Board and labor	17 00
June 11	856	J. S. Perfect	Merchandise for hatching-house	5 20
March 17	857	A. Heitchen	Hardware	2 56
April 30	858	Durr & Rugee	Lumber	10 37
May 29	859	Walters & Storey	Scap-net material	70
June 1	860	L. Kaufman	Fish feed	3 00
April 21	861	H. Hollenbeck	Labor on ponds	7 88
May 8	862	J. Murphy	Labor on ponds	7 50
May 9	863	B. Batterson	Labor on ponds	5 25
June 6	864	W. Barker	Labor on ponds	7 50
May 31	865	H. Powers	Labor on ponds	2 68
June 1	866	G. F. Slocum	Labor	170 00
June 1	867	A. Atkinson	Blacksmithing	75

April 26	868	J. G. Cudworth	Hardware and labor	12 35
June 10	869	H. Burrett	Livery	5 60
June 10	870	B. F. Shaw	Cash expenses	127 45
June 8	871	T. Lilly	Board	14 32
April 26	872	S. A. Pope	Labor	5 00
April 1	873	Heisey & Coe	Fish feed	3 00
June 1	874	Wm. Cunningham	Ice	4 50
April 1	875	Jones County	Rent of office	18 00
		Requisition June 11, 1883, for		$ 467 66
May 9	876	Paul Geduke	Ice and care wall-eyed pike-eggs	2 50
June 29	877	James Murphy	Work on carp-ponds	24 00
June 26	878	J. Rinard	Work on carp-ponds	5 35
June 18	879	W. S. Barker	Work on carp-ponds	13 13
June 19	880	Anamosa Eureka	Printing	11 45
June 9	881	Cudworth & Osborn	Hardware	5 55
June 28	882	W. M. Skinner	Paper	3 70
June 27	883	H. H. Burrett	Livery	7 50
June 30	884	B. F. Shaw	Cash expenses	32 50
June 30	885	G. F. Slocum	Labor and team, June	53 00
June 30	886	L. Kaufman	Fish feed, June	1 50
		Requisition June 30, 1883, for		$ 160 18
1882.				
April 1	1	A. A. Mosher	Hire and board of man, etc	117 85
		Requisition September 2, 1882, for		$ 117 85
September 2	2	A. A. Mosher	Hire and board of man, one month	60 00
October 4	3	A. A. Mosher	Extra help on ditch, etc	20 00
October 4	4	A. A. Mosher	Four hundred and eleven feet two-inch plank	8 63
October 3	5	C. E. Renken	Sundries	5 80
May 27	6	Dickinson County Journal	Stationery	7 75
October 3	7	E. L. Stowe	Hardware	3 30
October 4	8	T. F. Smith	Bolts and blacksmithing	2 00
October 3	9	D. L. Riley	Lumber	36 10

STATEMENT OF EXPENSES—CONTINUED.

DATE.	Number.	IN WHOSE FAVOR.	ON WHAT ACCOUNT.	AMOUNT.
1882.				
October 6	10	L. E. Holcomb	Work on ditch and grounds	$ 100 00
October 6	11	Z. Chick	Work with team	3 75
		Requisition October 10, 1882, for		$ 247 33
November 10	12	D. L. Riley	Lumber	21 38
November 10	13	D. L. Riley	Lumber	25 05
November 10	14	A. A. Mosher	Sundries for hatching-house	3 42
November 10	15	A. A. Mosher	Expenses Lake Superior to Spirit Lake	6 00
November 10	16	W. Weed	Team, work and board	9 50
1883.				
January 2	17	F. B. Arey	Work and board, three months	80 00
1882.				
November 10	18	G. L. Chick	Labor and board	9 00
November 13	19	E. L. Stowe	Hardware	2 65
October 10	20	L. E. Holcomb	Hardware, freight, and team work	71 00
		Requisition January 2, 1883, for		$ 228 00
March 2	21	A. A. Mosher	Hire and board of F. B. Arey, two months	53 33
		Requisition March 8, 1883, for		$ 53 33
1883.				
May 15	22	F. B. Arey	Labor and board, two months and eight days	61 09
May 15	23	A. A. Mosher	Traveling expenses and work	10 75
May 15	24	W. W. Stowe	Hardware	7 10

				7 85
April 29	25	A. A. Mosher	Sundries	5 10
May 15	26	F. W. Barron	Lumber	
		Requisition May 15, 1883, for		$ 91 89
			Total	$ 4,613 78

RECAPITULATION OF AMOUNTS DRAWN FROM STATE TREASURY.

December 1, 1881	$ 418.81
December 31, 1881	112.12
January 25, 1882	404.25
January 31, 1882	288.23
March 31, 1882	210.95
May 31, 1882	273.66
July 31, 1882	305.29
September 30, 1882	265.80
December 31, 1882	608.09
March 1, 1883	360.34
June 11, 1883	467.66
September 2, 1882	117.85
October 10, 1882	247.33
January 2, 1883	228.00
March 8, 1883	53.33
May 15, 1883	91.89
June 30, 1883	160.18
Total	$ 4,613.78
Amount on hand at date of last report, October 1, 1881	2,265.04
Appropriated by last General Assembly	5,000.00
Total	$ 7,265.04
Expended October 1, 1881, to June 30, 1882	4,613.78
Balance on hand, July 1, 1883	$ 2,651.26

Duplicate itemized bills are filed and can be found in the office of the Auditor of State and of the State Fish Commissioner. The original receipts for money paid out are on file in the office of the Fish Commissioner and duplicates of same in the office of the Auditor of State.

All bills are audited and allowed by executive council before the money is drawn from the State treasury.

ANAMOSA, IOWA, August 8, 1883.

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.

Subscribed in my presence by said B. F. Shaw, and by him sworn to before me this eighth day of August, 1883.

[SEAL] J. H. CHAPMAN,
Clerk District Court, Jones county.

Our appropriations are too small to do a heavy work that would tell very rapidly in Iowa waters, and in my humble judgment should be increased.

I call attention to the report of Assistant Commissioner Mosher, attached hereto, who has had charge of the successful hatching and distribution of fish from the hatching-house at Spirit Lake.

Respectfully submitted,

B. F. SHAW,
Fish Commissioner.

REPORT OF THE ASSISTANT FISH COMMISSIONER, FOR THE YEARS 1881–1883.

HON. B. F. SHAW, *Fish Commissioner:*

Below please find my report, made in accordance to previous understanding. The year 1882 this hatching-house turned out only about 500,000 fish of all kinds, principally salmon, trout, and white fish. These were all put into the lakes here. During the spring of 1882 some very valuable experiments were made successfully; then, in connection with yourself, we found that the raising of wall-eyed pike, with the proper appliances, would be an easy matter, and the only drawback to the thoroughly successful development of the industry of raising native fish to restock the waters of our State, lies in the fact that that our appropriation is so meager that but little can be done as matters are at present. Suffice it to say that, in my humble opinion, there is not a doubt but that with a proper outlay all the streams and lakes of this State could be easily stocked with bass, wall-eyed pike, and other native game fish.

Last fall a new pipe was laid in this hatching-house, eight inches in diameter, making an ample supply of pure water, at an outlay of less than $200. This water supply is inexhaustible, having some twenty miles square of water to draw from; and if a sufficient number of ponds could be put in for the purpose of keeping fish for propagation, the result would be of great advantage to the State at large.

The hatch of last winter, 1882–3, was almost unprecedented of the salmon trout and white fish, over ninety-seven per cent were hatched out; all strong, healthy fish. The whole amount thus hatched amounted to nearly 2,000,000, which, with the exception of 30,000 taken to Estherville, Emmet county, and put into Eagle lake, and some 40,000 put into the outlet of Clear lake, at Mason City, were

all put into Spirit lake and the Okobojies. Large quantities of silver or striped bass are now being caught in Spirit lake and the Okobojies; these were put in here by yourself some six or seven years ago. They are splendid game and No. 1 eating; they range now from one pound to four. Parties have caught as high as forty or fifty in an hour or so fishing. They bite best in the latter part of May and June, although numbers are caught all through the season. They are easily domesticated, and make nice pets; no fish do better in confinement. Black bass are increasing slowly in these lakes. While writing about bass, from observation I am led to believe that if a few were put into ponds with proper bottoms they would propagate of themselves and without much trouble; by this I mean small ponds, twenty feet square or so.

This report will be necessarily short, as this place is new and not sufficiently developed as yet to make much show on paper or otherwise. I would suggest that the law for the time for taking pike with a hook be changed so as to allow fishing at least fifteen days earlier, as ordinarily here they are all through spawning in the fore part of May.

There is one thing I wish to call attention to, and that is: With our present appropriation the Commission can accomplish but little. Could the Commission go ahead and not be trammeled by parsimoniousness, the results would be of lasting benefit to the State.

So far as this house is concerned, with your valuable counsel and assistance it has more than succeeded, and is now an established fact. One matter I forgot to mention, and your suggestions to me are worthy of being fully carried out. Buffalo-fish can be hatched out with little trouble and in countless numbers. These, while not very good for eating, would, if put into the lakes and rivers of Iowa, prove a valuable addition to the food supply of our game fishes.

Your report will be more elaborate and cover many points undoubtedly which should be in this, consequently I shall be brief.

Living here as I do, and knowing of the fearful destruction of our fish during the winter months, they being destroyed at the rate of from fifty to two hundred tons every winter in this county alone, it becomes our duty, as well as the duty of every one interested, to ask that early legislation be had on this matter, and a stop be put to such work. The Commission cannot contend against such odds, do as much as it may.

Below find list of expenditures for the time passed since the appropriation was divided between the two hatching-houses.

All of which is respectfully submitted for your approval,

A. A. Mosher,
Assistant Fish Commissioner.

Spirit Lake, Iowa, August 8, 1883.

REPORT

OF THE

JOINT COMMITTEE

OF THE

TWENTIETH GENERAL ASSEMBLY

OF THE

STATE OF IOWA,

APPOINTED TO VISIT THE

STATE HATCHING HOUSE

LOCATED AT

ANAMOSA.

PRINTED BY ORDER OF THE GENERAL ASSEMBLY.

DES MOINES:
GEO. E. ROBERTS, STATE PRINTER.
1884.