

since she became a resident of said hospital is not true; and, that being so, the charge of abortion also falls to the ground. The committee take this opportunity to state that the superintendent, Dr. Ranney, gave us every facility for making the examination at the hospital complete, and has shown an anxiety to have a thorough investigation of the scandal.

Your committee desire to call especial attention to the practice of sending criminals convicted of capital crimes, and confined in the penitentiaries of the state, who have become insane since their incarceration in prison, to the hospitals for insane. Many of them are murderers, and their destructive instincts are just as active as ever they were, and we believe that it is an imposition upon respectable, law-abiding people to have their friends sent to the hospital to be compelled to associate more or less with these vile criminals; and we suggest that upon the score of safety, and a proper consideration of the rights and feelings of other patients and their friends, this practice should be stopped, and a suitable ward provided in each penitentiary for the care and treatment of such cases.

The committee are pleased to see at their recent visits at Mt. Pleasant, that the airing courts are nearly completed, and they are of ample size, affording sufficient room for patients to exercise freely at will; they are also well shaded and inviting in appearance. Those at Independence have been in use for some months past, but they cannot be made so pleasant on account of the newness of the grounds and the lack of trees; and the hospital not being finished, only one of them can be now permanently located.

We notice with satisfaction the large number at this hospital who go out to work in the gardens and upon the farm, also, that very few are under any kind of personal restraint, and a still smaller number confined in the strong rooms.

The rules and by-laws adopted by the committee on April 14, 1875, are still in force as then adopted, and do not need to be here reprinted.

All of which is respectfully submitted.

S. B. OLNEY,
T. W. FAWCETT,
C. S. KINCAID,

Visiting Committee to the Iowa Hospitals for the Insane.

OCTOBER 1, 1877.

SECOND BIENNIAL REPORT

OF THE

STATE FISH COMMISSION

OF

IOWA.

BEING REPORTS FOR THE YEARS 1875-6 AND 1876-7.

DES MOINES

R. P. CLARKSON, STATE PRINTER
1877.

REPORT OF THE STATE FISH COMMISSION.

This report, which is required by law, I shall try to make as brief as possible, merely making a statement of what has been done since making the former report, where and what fish have been distributed, the expenditures, etc. As we had already distributed a large number of migrating fish, and sufficient time had not elapsed to test the success or failure of these efforts, it was thought best by the commissioner to turn our attention more particularly to the introduction of non-migrating and native fishes, and we have largely followed this course in the 1876 season's work. The work that it is thought promises the best results, is that of taking fish from the Mississippi river sloughs, where they die in great numbers every season, and planting them in good living water in different parts of the State. The following, written to Gov. Carpenter in the fall of 1874, although published in our first report, will explain when this work was undertaken, and where the fish are found:

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

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

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

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

"Yours very respectfully,

B. F. SHAW."

Section 3, chapter 70, laws of the Sixteenth General Assembly, reads as follows:

"That during the years 1876 and 1877 the fish commissioner shall have the power to expend one thousand dollars of the money hereinafter appropriated in facilitating the increase of the fish that are natives of this State—and in such ways and manner as in the judgment of said commissioner shall be most conducive to that end."

Acting upon this authority the commissioner chartered the small steamer "Fire Fly," (built originally for a hunting and fishing boat,) of her owner, H. Shuttleworth, Esq., and employing fishermen, and furnishing such things as would be necessary for such a trip, left New Albin, near the northern State line of Iowa, on the 7th of September, 1876. A detailed account of each day's work will be found in this report. An ordinary freight-car, obtained from the Chicago & Northwestern Railway Company for the purpose, was fitted up for use as an

aquarium-car to distribute the young fish. The arrangement of the car was very simple, but it answered the purpose admirably. Two large tanks, holding each about twelve barrels, were placed in one end of the car as high as they could be raised, and firmly fixed in position. A tin conductor, extending the full length of the car, was connected with the tanks by rubber-hose. Along each side of this conductor was inserted wooden faucets, eighteen inches apart. Beneath these the cans containing the young fish were placed, in such a manner that the water from the faucets ran into it in a constant stream at one end, and ran out of the other end through an opening covered with wire cloth. These cans were four feet long, eighteen inches wide, and twelve inches high. The water supply was taken into the casks directly from the railroad water-tanks, through an opening in the top of the car. To guard against accident from lack of water, it was so arranged that after the water had been once used it ran into a reservoir beneath the car, and by use of a pump and hose could be thrown back into the casks for use again, as many times as necessary. Air-pumps were also provided, but we found no necessity for their use.

A great many fish were distributed by the use of this car. An account of how many, when and where, will be found in another place. And here it is only justice to our railroads to state that the success of this enterprise is due largely to their kind assistance, without which we could have done nothing of the sort. Every railroad in the State rendered us as much or more assistance than we asked, putting our car into their trains—loaded or empty—moving it to any desired point, and stopping at streams, and assisting us in depositing our fish, or at their water-tanks for fresh supplies of water, and many other accommodations. The total distance traveled by the car was nearly four thousand miles, generally accompanied by the Commissioner and one or two assistants; and all this not only free, but with a hearty God speed to the enterprise; that was very encouraging to those who had the work in charge. Such liberality on the part of railroad corporations proves that if, as has been asserted, corporations have "no souls," they have at least enterprising, thinking heads that not only have the welfare of the roads at heart, but take a liberal interest in the general welfare of the country through which their roads pass. I can hardly find words to express my gratitude for their kind assistance, and will only hope that as they mete to "others it may be meted to them again." I also wish publicly to express my thanks for free passes granted the Commissioner from every road in the State when applied

for, as well as to several roads outside the State; also to express companies, especially the American, for carrying fish and empty fish cars free. This generous liberality on the part of companies has enabled us very greatly to extend the work beyond what could have been done without such assistance.

FISH DEPOSITED.

The following table shows the County, in what water, and the number of Bass, Croppies, Sunfish, Perch, Drumfish, Wall-eyed Pike, &c., deposited from Aquarium car from September 1 to October 31, 1876:

COUNTY.	IN WHAT WATER.	NO.
Clayton	Bloody run	500
Clayton	Turkey river	2,000
Chickasaw	Crane creek	500
Chickasaw	East Wapsie river	1,000
Chickasaw	Little Wapsie river	500
Chickasaw	Wapsie river	1,000
Chickasaw	Little Cedar river	500
Floyd	Little Floyd creek	500
Floyd	Cedar river	3,000
Floyd	Shellrock	1,000
Cerro Gordo	Lime creek	1,000
Cerro Gordo	Willow creek	1,000
Cerro Gordo	Clear Lake	7,000
Hancock	Iowa river and branches	4,000
Hancock	Boone river	2,000
Kossuth	Des Moines river	4,000
Dubuque	Little Maquoketa	1,000
Delaware	North Maquoketa	1,000
Delaware	Willow creek	1,000
Delaware	South Maquoketa	3,000
Buchanan	Buffalo	1,000
Buchanan	Wapsiepinicon	4,000
Black Hawk	Cedar river at Waterloo	3,000
Black Hawk	Cedar river at Cedar Fall	7,000
Butler	Beaver creek	2,000
Hardin	Iowa river	3,000
Hardin	South fork	1,000
Hamilton	Boone river	2,000
Webster	Des Moines river	7,000
Webster	Lizard creek	1,000
Calhoun	Twin lakes	3,000
Buena Vista	North Coon	1,000
Buena Vista	Storm lake	7,000
Cerrokee	Little Sioux	4,000
Clinton	Elk river	5,000
Clinton	At Preston	2,000
Clinton	Deep creek	3,000
Clinton	Sugar creek	2,000
Clinton	Pum creek	2,000
Jones	xford	2,000
Jones	Hale	2,000
Jones	Wapsie river	5,000
Jones	Walnut creek	4,000

FISH DEPOSITED—CONTINUED.

COUNTY.	IN WHAT WATER.	NO.
Linn	Big creek	4,000
Linn	Springville	4,000
Linn	Indian creek	4,000
Clinton	Mill creek	4,000
Clinton	Brophy's creek	1,000
Clinton	Small creek	1,000
Clinton	Silver creek	4,000
Clinton	Wapsiepinicon river	5,000
Cedar	Clear creek	1,000
Linn	Big creek	1,000
Linn	Indian creek	3,000
Linn	Cedar river	4,000
Linn	Prairie creek	3,000
Benton	Sand creek	500
Tama	Salt creek	1,000
Tama	Otter creek	2,000
Tama	Iowa river	4,000
Marshall	Lynn creek	1,000
Story	Skunk river	5,000
Story	Squaw creek	2,000
Boone	Des Moines river	5,000
Greene	Fish lake	2,000
Greene	North Coon	3,000
Greene	Storm creek	1,000
Greene	'Coon river	2,000
Crawford	East Boyer	2,000
Crawford	Boyer	4,000
Harrison	Willow river	2,000
Pottawattamie	Key creek	1,500
Pottawattamie	Mosquito creek	1,500
Muscatine	East Sugar creek	2,000
Muscatine	West Sugar creek	1,000
Muscatine	Cedar river	5,000
Muscatine	Wapsienono creek	2,000
Johnson	Iowa river at Iowa City	5,000
Johnson	Clear creek	1,000
Johnson	Clear creek	2,000
Iowa	Amana society	2,000
Iowa	Iowa river at Marengo	1,500
Iowa	Big Bear creek	2,500
Poweshiek	Little Bear creek	3,000
Jasper	North Skunk river	4,500
Jasper	South Skunk river	4,500
Polk	Four Mile creek	2,000
Polk	Des Moines river	6,000
Dallas	'Coon river	4,000
Madison	Bulger creek	1,000
Guthrie	Stuart reservoir	2,000
Guthrie	North Middle river	2,000
Guthrie	South Middle river	1,500
Cass	Turkey creek	1,500
Cass	Troublesome creek	1,000
Cass	East Nishnabotna	3,000
Cass	Camp creek	500
Cass	Buck creek	500
Pottawattamie	Walnut creek	1,000
Pottawattamie	Middle Nishnabotna	3,000

FISH DEPOSITED—CONTINUED.

COUNTY.	IN WHAT WATER.	NO.
Pottawattamie.....	West Nishnabotna.....	3,000
Pottawattamie.....	Keg creek.....	500
Pottawattamie.....	Musquito creek.....	1,000
Des Moines.....	Long creek.....	500
Henry.....	Big creek.....	2,000
Henry.....	Skunk river.....	4,000
Jefferson.....	Big Cedar creek.....	3,000
Wapello.....	Des Moines river.....	6,000
Monroe.....	Cedar creek.....	3,000
Lucas.....	Churiton river.....	4,000
Clarke.....	White Breast.....	3,000
Union.....	Grand river.....	3,000
Union.....	Twelve Mile creek.....	2,000
Union.....	At Afton.....	2,000
Union.....	At Creston.....	3,000
Union.....	Platte river reservoir.....	2,000
Adams.....	Platte river.....	3,000
Adams.....	East Nodaway.....	3,000
Montgomery.....	Middle Nodaway.....	2,000
Montgomery.....	West Nodaway.....	2,000
Montgomery.....	East Nishnabotna.....	3,000
Montgomery.....	Walnut creek.....	1,000
Mills.....	Nishnabotna.....	3,000
Mills.....	Silver creek.....	3,000
Mills.....	Keg creek.....	3,000
Taylor.....	East fork.....	2,000
Total number distributed.....		319,000

One hundred large black and striped bass were placed in Village creek near Lansing, Allamakee county.

The fish enumerated in the foregoing table being so much larger than fish ordinarily distributed, some of them being large enough to spawn another season, will, it is thought, in a short time make a sensible increase in the number of fish in the various waters stocked with them, and being fish that are native to the waters, no doubt can exist as to their adaptability to our streams and lakes. The distribution of so many large fish involved a great amount of work, and probably could not have been accomplished anywhere else except along the Mississippi river. It was the intention of the commission to make the distribution as general and equal as possible over the state. And it was as far as practicable so done; but it was impracticable to reach some portions of the state, and these portions are usually traversed by the streams that were stocked, and will be directly benefited thereby. Much as we wished to continue this work in 1877, it was found necessary on account of lack of funds to carry on the work, to abandon the

project for the season. This was the more to be regretted as the season proved to be as favorable for the work as the previous one had been unfavorable. The water was lower than it had been for years, and as a consequence more than the usual number of fish were destroyed. A few experiments satisfied the commissioner that with the same labor performed last year more than double the number of fish could have been saved this year. Only about 50,000 have been distributed this season.

MEMORANDA OF MISSISSIPPI RIVER TRIP.

DATE.	WHERE AT WORK.	STATE OF WEATHER.	No. of fish caught.
1876.			
Sept. 4	Started for Dubuque this A. M. Stayed all night at Dubuque.....	Rainy.....	.....
Sept. 5, 6	At New Albin, getting ready for the final start.....	Rainy.....	.....
Sept. 7	Down the river.....	Rainy.....	10,000
Sept. 8	Ran into Lansing for repairs on engine.....	Rainy.....	15,000
Sept. 9	Above Lansing, camped at Mosquito slough for night and Sunday.....	Rainy.....	38,000
Sept. 10	Down stream, camp five miles below Lansing.....	Rainy.....	10,000
Sept. 11	Tied up at Harper's Ferry for the night.....	Rainy.....	30,000
Sept. 12	Camped eight miles below Harper's Ferry.....	Rainy.....	30,000
Sept. 13	Stopped at North McGregor for the night.....	Rainy.....	25,000
Sept. 14	Below McGregor; back to McGregor for the night.....	First pleasant day.....	25,000
Sept. 16	Below McGregor; back to McGregor for night and Sunday.....	Fair.....	35,000
Sept. 18	The commissioner and G. F. Slocum started with aquarium-car west over M. & S. P. Railroad, to Algona. Boat at Clayton to night.....	Fair.....	32,000
Sept. 19	Passed Glenn Haven. Tied up for the night in east channel opposite Guttenburg.....	Pleasant.....	43,000
Sept. 20	Passed Cassville and Turkey river. Commissioner and Slocum back to boat this P. M.....	Rainy.....	60,000
Sept. 21	Camp, seven miles above Dubuque.....	Fair.....	15,000
Sept. 22	Ran to Dubuque this P. M.....	Fair.....	50,000
Sept. 23	Commissioners S. C. Hall and E. R. Shaw started west with aquarium-car over Illinois Central Railroad. Stopped operations with boat for one week on account of high water and bad weather.....	.....	.....
October 2	Started for Dubuque this A. M. Spent the afternoon getting supplies for boat.....	.....	.....
October 3	Down the river; ran fifteen miles.....	Very windy.....	8,000
October 4	Passed Gordon's Ferry. Tied up at Bellevue.....	Very windy.....	55,000
October 5	Passed Sand Prairie. Tied up twelve miles below Bellevue.....	Windy and rainy.....	44,000
October 6	Passed Savannah. Tied up at Sabula for the night.....	Terrible wind-storm last night.....	48,000
October 7	Commissioner and Slocum started with aquarium car west, over Sabula, Ackley & Dakota Railroad. Boat tied up four miles below Sabula.....	Windy.....	35,000
October 8	Sunday.....	.....	.....
October 9	Got caught in wind-storm; could not manage the boat. Tied up for the day.....	.....	10,000
October 10	Ran to Lyons.....	Pleasant.....	50,000
October 11	At work opposite Clinton.....	Pleasant.....	60,000
October 12	Commissioner and E. R. Shaw started with aquarium-car for Connell Bluffs, over Chicago & Northwestern Railroad. Boat down stream.....	Pleasant.....	51,000

MEMORANDA OF MISSISSIPPI RIVER TRIP—CONTINUED.

DATE.	WHERE AT WORK.	STATE OF WEATHER.	No. of fish caught.
1876.			
October 13	Stopped at Cananche for the night.....	Fair.....	25,000
October 14	Tied up for the night three miles above Cordova.	Windy.....	75,000
October 15	Sunday.....	Windy.....	.....
October 16	ran one mile.....	Windy.....	100,000
October 17	ran to Davenport; passed Cordova, Princeton, Le Claire, Port Byron, Rapids City, Hampton, Valley City, Gilberttown, and Moine.....	Fair.....	50,000
October 18	Commissioner and Slocum started with aquarium car for Council Bluffs, over Chicago, Rock Island & Pacific railroad.....	.....	.....
October 19	passed Buffalo, Andalusia.....	Rainy.....	200
October 20	passed Jugtown, camped in Muscatine slough.....	Very Windy.....	55,000
October 21	ran to Muscatine; met Commissioner and Slocum.....	Windy.....	50,000
October 22	Sunday, ran down the river fourteen miles and tied up for the night.....	.....	.....
October 23	ran seventeen miles; passed New Boston and Port Lousa.....	Pleasant.....	125,000
October 24	ran eighteen miles; passed Keithburg and Aquawka.....	Windy.....	95,000
October 25	Made eight miles.....	Pleasant.....	120,000
October 26	Made Burlington this evening.....	Pleasant.....	100,000
	Total amount taken.....		1,574,200

The fish in the foregoing table are black, yellow, and striped bass, croppies, sunfish, perch, drum, wall eyed pike, river herring, skipjacks, and minnows, and were estimated at about 20,000 to the bushel; and were, except those accounted for in other ways in this report, turned into the Mississippi river.

This expedition had to contend against the highest water and the most rainy and stormy weather that has been known for several years, and has in our opinion demonstrated that, by co operation of the states along the Mississippi in saving the millions of fish that annually die in its sloughs, it could at a very small expense comparatively, soon be made the greatest and best fish-producing stream in the world.

Some law protecting the fish in the Mississippi and Missouri rivers from seining, especially during spawning time, is an absolute necessity, as such fishing is gradually but surely diminishing their numbers, and will in time as effectually destroy them as it has those in our smaller interior streams. But such law, to be effective, must be one that will be common to all the states that border upon the rivers. For the purpose of arriving at some conclusions in this matter, and arranging a plan that shall look to just and needed legislation upon this subject, that shall be common to all the states interested, I invite an expression from the commissioners of these several states, and hope they will correspond with me upon the subject. Several instances

have come to knowledge of the commissioner where fishermen have taken from the waters of the Mississippi from 30,000 to 80,000 pounds of fish at a haul of the seine. This kind of fishing is surely and very rapidly destroying the fish, and has already produced disastrous effects upon the fishing. They also do some of the most profitable "hard-fish" fishing during the spawning season, and send the fish into market covered and reeking with their own spawn. It is to be hoped something will be done to remedy these evils.

At a meeting of some of the Western fish-commissioners, the question of protective fish laws for our great western rivers and lakes was under discussion, and I requested Prof. J. W. Milner, deputy United States commissioner, (who was present,) to make some examination of the subject, and report to me his views of the constitutionality and expediency of the general government taking and exercising control of such waters as were common to several States. After considering the matter at some length, he summarizes as follows:

"The point to be decided is in which must a law controlling the Mississippi fail. If it is to be decided by precedent and the whole previous history of fishing legislation, it will find its place with internal police laws; but, as Mr. Fairbank suggested in our conference the other day, the work of artificial propagation is a new interest, developing new exigencies, and requiring new legislation. So far as the interior ponds and waters are concerned, containing local species, the States must without doubt have entire control; but in a great stream of water like the Mississippi, and in the great lakes flowing through a dozen States, and containing migratory fishes, passing the entire length of the shore of all of them, State laws are necessarily inadequate, as experience proves that little of equity or reciprocity will be considered in legislating with regard to the fishing interest. The upper States may appropriate and expend money for the propagation of fishes which the lower States have it in their power to prevent almost entirely from ascending beyond their boundaries.

"The desire for general government legislation has been so generally expressed that it would be well if the State legislatures would call the attention of Congress to the matter. The whole question is in an undecided, little understood condition, and demands investigation and inquiry on the part of all interested.

"Yours truly,

"J. W. MILNER."

PROTECTIVE LAWS.

The laws protecting fish from illegal fishing during the spawning season, and with seines, has in a few localities been enforced, and in many others have been wantonly violated; and it was found impossible to enforce the law for the reason that the prosecuting attorneys of many districts when called upon to prosecute offenders as provided by section 4, chapter 50, laws of the 15th General Assembly, have for various causes assigned, failed to do so. Where these laws have been strictly observed, very beneficial results have been reported, and seen by the Commissioner and others. In the Wapsie river in Jones county, there has been a very marked increase in the numbers of bass; especially in the young "bass-fry," observable; so much so that all the old fishermen notice and speak of the fact, and some old fishermen who are not close observers, have, for the first time, learned what the young black bass were from the great numbers of them that have lined the river's edge. It is unreasonable to expect that great numbers of fish will be found in our limited waters if destructive net-fishing is continued, and people in violation of law are permitted to catch spawning fish out of season. As well might we expect to replenish our poultry yard by robbing every nest and allowing any and every one to trap the fowls. It is, therefore, to be hoped that our protective laws will be made more stringent, and so arranged that they can and will be enforced.

PENOBSCOT, OR ATLANTIC SALMON.

Our commission received 90,000 of this variety of salmon eggs, March 24, 1876, through the kindness of the U. S. fish-commissioner, from Buckport, Maine, where they were collected by Deputy U. S. Commissioner, Hon C. G. Atkins. They were successfully hatched with but a small loss, and finally distributed in the northwestern part of the state, principally in the lakes of that section. As stated in our former report, we hardly think this fish will succeed in our rivers as a migratory one, on account of its inability to endure a great amount of heat; but some very fine ones have already been caught in some of our lakes, where they have been unable to get out, probably of the lot distributed two years ago. That they will thrive wonderfully in cool water, even in confinement, is proven by the fact that Mr. H. Ruble, of North McGregor has about seven hundred in a small pond only two and a half years old that will weigh from two and a half to seven

pounds each. In view of this successful domestication of them, and their unparalleled growth, it is we think a fair presumption that they would be valuable fish in any of our lakes from which they could not migrate.

DISTRIBUTION OF PENOBSCOT SALMON.

DATE.	BY WHOM.	IN WHAT WATER.	NO.
July 14, 1876...	B. F. Shaw.....	Clear Lake.....	20,000
July 14, 1876...	B. F. Shaw.....	Marion Lake.....	10,000
July 14, 1876...	B. F. Shaw.....	Lakes in Emmet county.....	10,000
July 24, 1876...	B. F. Shaw.....	Storm Lake.....	20,000
July 24, 1876...	B. F. Shaw.....	Spirit Lake ..	10,000
July 24, 1876...	B. F. Shaw.....	Twin Lake.....	5,000
June 23, 1876...	L. D. B. tier.....	Boyer river.....	5,000

CALIFORNIA SALMON.

Since our report was made the California salmon, then on hand, have been distributed and an account of where and when will be found in this report.

During the season of 1876, so much of our time was devoted to other fish that nothing was done towards increasing our supply of these fish, except that the commissioner, through the kindness of the United States fish-commissioner, procured twenty-five thousand of Mr. Frank Clark, of Northville, Michigan, who was employed by the United States commissioner to hatch them. A portion of these were given to private parties, they paying a proportionate share of the expense of getting them from Michigan and one dollar per thousand for hatching them; those for public use were furnished by the commissioner free. Those heretofore distributed seem to be doing well in our waters, many reports of their capture in different parts of the state coming to our notice.

LAKE TROUT.

We have now in the hatching-house about 800,000 lake trout eggs, far enough developed so that their eyes are perceptible. We design to place the greater portion of them in the lakes of the state, but a small portion will be given to a few of our fish culturists, who desire them for the purpose of testing their value as a fish to raise in private ponds. Not over 5,000 will be given to any one person for this purpose.

Those raised last season at our hatching-house were mixed with the

California salmon and distributed with them and no separate account of their distribution was made. They are, when caught in good, clear, cold water, an excellent table-fish, and are very gamey; as their spawn is easily obtained in large quantities, they are probably the best and most available fish with which to stock our lakes. Several parties applied for eggs this season, but we were so late that it was with difficulty we procured enough for our own use. If those who desire eggs next fall will notify us in season, we will try to furnish them all they wish. Expense of packing and express charges on them will be the only expense.

CALIFORNIA SALMON AND LAKE TROUT DISTRIBUTION.

DATE.	BY WHOM DISTRIBUTED.	IN WHAT WATER.	No. distributed.
1875.			
Dec. 9	B. Van Steinberg.....	Deep creek and other waters.....	15,000
Dec. 11	E. R. Shaw.....	Wapsie.....	12,000
Dec. 21	Ferren.....	Upper Iowa and other waters.....	30,000
1876.			
Feb. 4	G. F. Slocum	Buffalo	10,000
Feb. 4	Rutherford	Big and Little Cedar	15,000
Feb. 17	T. V. West.....	Nishnabotany	10,000
Feb. 21	Irwin Peet.....	Clear creek.....	1,000
Feb. 21	B. F. Shaw.....	Cedar, Iowa, Des Moines, Skunk, &c.	25,000
Feb. 21	Ruggles.....	Walnut creek.....	10,000
Feb. 23	M. Remley.....	Iowa river.....	15,000
Jan. 14	Filer & Stapleton.....	Turkey and Volga.....	10,000
Jan. 15	J. Hall.....	White Breast, Grand river, Twelve Mile and Platte.....	25,000
Jan. 20	B. F. Shaw.....	Waters in vicinity of Council Bluffs.	70,000
Jan. 21	E. R. Shaw.....	Silver creek.....	5,000
March 1	B. F. Shaw.....	Des Moines river.....	15,000
March 2	B. F. Shaw.....	Boyer river, and lakes in vicinity of Missouri Valley	40,000
March 6	B. F. Shaw.....	Big creek, Skunk river.....	.....
	B. F. Shaw.....	Fox river and Cedar.....	.....
	B. F. Shaw.....	Chariton, White Breast, Nodaway, Nishnabotany, Walnut, Silver and Keg creeks.....	70,000
March 7	Kennedy & Poindexter	Cedar river.....	5,000
March 14	Senator Bailey.....	Wapsie	15,000
March 20	B. F. Shaw.....	Iowa, Boone, Des Moines, Sioux and Floyd rivers; Twin, Storm, Spirit, Okoboji and Crystal lakes.....	60,000
March 27	B. F. Shaw.....	Shell Rock and Beaver creeks, and West fork Cedar.....	15,000
March 29	B. F. Shaw.....	Lyman and Cedar creeks; Iowa and Des Moines rivers; Clear, Eagle, Crystal and Twin lakes.....	40,000
April 3	E. R. Shaw.....	Cedar river.....	10,000
		Total amount deposited.....	533,000

LAKE TROUT DISTRIBUTION.

DATE.	BY WHOM DISTRIBUTED.	IN WHAT WATERS.	NO.
1877.			
Jan. 12	Col. Lubbers.....	Clinton county.....	5,000
Jan. 12	Col. Lubbers	Deep creek.....	5,000
Jan. 25	Mr. Dobson	Geneva Fr. Co.....	5,000
Jan. 25	Mr. Millar.....	Muscatine slough	5,000
Jan. 25	Mr. Millar.....	Muscatine slough	5,000
Feb. 12	Mr. Shaw	Little Maquoketa	5,000
Feb. 12	Mr. Shaw	North fork	5,000
Feb. 1	Mr. Shaw	St. Joseph s	5,000
Feb. 12	Mr. Shaw	Catfish creek	5,000
Feb. 19	Mr. Shaw	Volga river	5,000
Feb. 19	Mr. Shaw	Rock creek	5,000
Feb. 19	Mr. Shaw	Stevenson's lake.....	20,000
March 3	Mr. Shaw	Clear creek	5,000
March 7	Mr. Shaw	Hinde creek	5,000
March 7	Mr. Shaw	Cedar river	5,000
March 13	Mr. Shaw	Parkersburg	7,500
March 13	Mr. Shaw	Twin Lakes.....	7,500
March 13	Mr. Shaw	Lake at Fonda.....	7,500
March 13	Mr. Shaw	Spirit and Okoboji lakes	15,000
March 13	Mr. Shaw	Silver lake.....	10,000
March 13	Mr. Shaw	Storm lake	25,000
March 13	Mr. Shaw	Boone river.....	7,500
March 13	Mr. Shaw	Iowa river.....	7,500
March 20	Mr. Shaw	New Hampton.....	7,500
March 20	Mr. Shaw	Clear lake	15,000
March 20	Mr. Shaw	Little Wall lake.....	25,000
March 20	Mr. Shaw	Elm lake.....	
March 20	Mr. Shaw	Ida lake	15,000
March 20	Mr. Shaw	Twin Sisters' lake.....	
March 20	Mr. Shaw	Medium and others	7,500
March 20	Mr. Shaw	Lakes near Emmettsburg.....	
March 20	B. F. Shaw	Lost Island lakes	7,500
March 20	B. F. Shaw	Eagle lakes	7,500
March 20	B. F. Shaw	Deep creek	3,500
March 20	B. F. Shaw	Boone county lakes.....	7,500
March 20	B. F. Shaw	Wall lake.....	7,500
March 20	B. F. Shaw	Council Bluffs.....	6,000
March 20	B. F. Shaw	Avoca	2,000
March 20	B. F. Shaw	Greene county.....	6,000
March 20	B. F. Shaw	Onawa	3,000
April 20	B. F. Shaw	Indian creek.....	3,000
April 20	B. F. Shaw	Nishnabotnas	10,000
		Total number distributed.....	303,500

LAND LOCKED SALMON.

A few thousand spawn of this highly valued fish were obtained from the United States commissioner in 1876. They came from Mr. C. F. Atkins, deputy United States commissioner, Maine. They were hatched at the State hatching house in due time; but as the number was too small to be likely to produce any valuable results by general distribution, it was thought best to keep them where their spawn would be available when they became matured fish. Arrangements were accordingly made with Mr. Henry Ruble, of North McGregor, to keep them, and they are now in one of his ponds, doing well.

I am in correspondence with the United States commissioner upon the subject, and hope to be able to procure a large supply of spawn this season.

Ten thousand of this variety were also received in the spring of 1877,—were duly hatched and disposed of in same manner as in 1876.

BROOK TROUT.

A few were hatched in the spring of 1875, and a few hundred were placed in a spring brook near Anamosa. They have grown finely, and in the fall of 1876 a young lad, while fishing for minnows, caught several six inches long and innocently, without knowing what they were, took them home. This was reported to me personally by the lad's father. Several have been caught in 1877, from four to seven inches long. Eighty thousand eggs were procured from the fish farm of H. S. Dousman, Wisconsin, in January, 1877. They were very successfully hatched, and distributed in such waters in the State as it was thought would best test the practicability of stocking some of our down streams with this delicious fish. There are but few good trout-streams in Iowa, but what we have should be generously stocked and well protected by law and the people until they have become well populated.

BROOK TROUT DISTRIBUTION.

DATE.	BY WHOM DISTRIBUTED.	IN WHAT WATERS.	NO.
1877.			
March 3	B. F. Shaw	Clear creek	500
March 20	B. F. Shaw	Cluckasaw county	5,000
March 23	B. F. Shaw	Copper creek	3,000
March 27	B. F. Shaw	Marshall county	2,000
March 27	B. F. Shaw	Scranton	4,000
March 27	B. F. Shaw	Carroll county	4,000
March 27	B. F. Shaw	Vail	4,000
March 27	B. F. Shaw	Downville	4,000
March 27	B. F. Shaw	Woodbine	2,000
March 27	B. F. Shaw	Legan	2,000
March 27	B. F. Shaw	Missouri Valley	2,000
March 27	B. F. Shaw	Sioux City	4,000
March 27	B. F. Shaw	Pottawattamie	12,000
March 27	B. F. Shaw	Harrison and Crawford counties .....	.....
March 27	B. F. Shaw	Avoca	2,000
April 20	B. F. Shaw	Otter creek	3,000
April 20	B. F. Shaw	McClond's creek	3,000
May 1	B. F. Shaw	Dubuque	2,000
May 11	B. F. Shaw	Monmouth	3,000
May 11	B. F. Shaw	Grove Lake	3,000
May 29	B. F. Shaw	Mills	500
June 4	B. F. Shaw	Dutch creek	3,000
June 6	B. F. Shaw	Spring Branch	5,000
June 6	B. F. Shaw	State Hatchery	5,000
June 6	J. F. Shaw	Little Maquoketa	3,000
		Total distribution	81,000

THE GRAYLING.

Is reported by those who have tried their propagation as being easily and surely manipulated, and being spring spawners enable the fish-culturist to give them attention when but few valuable fish are claiming attention. It is the intention of the commissioner to join with the Michigan commissioner in trying to secure a supply of their spawn next season, and it is thought they will be well adapted to some of the smaller rivers and largest creeks in this state.

SHAD.

While in Holyoke, Mass., on the Connecticut river, for eels, about the 20th of June, 1876, arrangements were made with A. M. Hager, the gentleman in charge of the United States shad hatching operations at that point, by which it was agreed that the United States commissioner would furnish our state 150,000 of the Connecticut river shad

at Chicago, provided we would receive them there. Accordingly pursuant to notice we (G. F. Slocum and myself) met the party in charge of the shad at Chicago on the 15th of July, 1876, and took them from there to Des Moines, where, on the morning of July 16th, they were safely deposited in the Des Moines river. As the introduction of shad into Iowa is looked upon as an experiment, it was thought best to place them where those of 1874 and 1875 were placed. This lot makes 350,000 that have been placed in the Des Moines river, to-wit: 110,000 in 1874, 90,000 in 1875, and 150,000 in 1876.

It has been the opinion of most of the writers upon shad, that they returned from the sea to their native rivers, when three or four years old; and it was confidently expected that those planted in western waters in 1872 would be heard from in 1876. In May and June, 1877, shad were reported as being caught in several places, the most notable case being at Louisville, Kentucky, upon the Ohio river, where the catch during the run was reported at from forty to one hundred per day. The following letter from United States commissioner Baird is interesting in this connection:

"WASHINGTON, May 15th, 1877.

"*Editor Forest and Stream, and Rod and Gun:*

I have now very great pleasure in informing you that I received to-day a very fine specimen of a FOUR POUND GENUINE WHITE SHAD, taken at Louisville, Kentucky, a few days before, and forwarded to me by Packard Thomas, Esq., and Mr. Griffith, of the Kentucky fish commission,—a direct result from the efforts made by the United States fish commission, in accordance with a law of Congress, to stock the Western rivers with shad.

"You will observe, by referring to the report of the United States commission, that in June, 1872, Seth Green, by order of and at the expense of the United States commission, planted 30,000 young shad in the Allegheny river at Salamanca, New York, and 25,000 in the Mississippi river, near St. Paul; and that in July, Rev. Mr. Clift, of Pogueonoc, Connecticut, also in behalf of the United States fish commission, placed what he estimated at 200,000 young shad in the Allegheny, at Salamanca, and a small number in the Cuyahoga, as well as a supply in the White river, at Indianapolis, 2,000 being carried as far as the Platte at Denver. In the following year, 1873, about 160,000 shad were placed in Greenbrier and New rivers, in West Virginia, and about 55,000 in the Monongahela, in Pennsylvania, and the Wabash, in Indiana; and these may or may not have contributed toward the supply met with at Louisville. The latter is possible, if the assumption of a four-year period be correct. If five years be required, then we must look to the stock of 260,000 in 1872 exclusively.

"In view of what is now believed to be an axiom—that fish always return for the purpose of spawning to the places whence they started as young fish—

it is to the Salamanca and White river supply of 1872, and to that perhaps of tributaries of the Ohio just mentioned of between four or five hundred thousand in number, that we must look for the Louisville fish. According to the reports of Messrs. Thomas and Griffiths, for some considerable time forty or fifty shad have been taken daily at Louisville by a drag-seine, said not to exceed thirty or forty yards long, and that in the shoaler water of only three or four feet, while the regular steamboat channel is ten or twelve yards deep, and two hundred and fifty yards wide.

"I do not overlook the fact that Tailor shad (*Pomoolbus Mediocri*) is a native of the waters of the Mississippi valley, as it is to those of the Atlantic coast; and have more than once been disappointed in the receipt of specimens from different parts of the West, believed to be genuine white shad, but which proved on examination to be nothing but the miserable TAILOR. And when the announcement of the present transmission was made from Louisville, I hardly dared expect to see, as I did, the genuine *Alosa Sapidissimi*.

"Very truly yours,

"SPENCER F. BAIRD, *Commissioner*.

WHITE FISH.

In corresponding with United States Commissioner Baird I learned that Frank Clark, of Northville, Michigan, was hatching white fish for the United States commissioner, and that Iowa could have one hundred and twenty-five thousand of them as her share, provided we would take them there. I accordingly went to Northville for them, about March 1st, 1876. Took them via Chicago, Milwaukee, and Prairie du Chien to Clear Lake, Cerro Gordo county, where they were all deposited. It was thought best, as the number of fish was not large, to deposit them in one place as this would more thoroughly and quickly test the practicability of transplanting them.

While the white fish is not a game fish, and could only be successfully caught with seines, which in our limited waters would hardly be permissible; still the fact that they live upon food different from that of the game fishes, and breed abundantly, makes them well worthy of favorable notice and introduction as food for our game-fishes, aside from the fact that they are one of the choicest table-fish. An effort was made by the commissioner to procure a quantity of spawn this fall, (1876) but owing to the time spent upon our river fish and lake trout it proved too late in the season, and was unavailing. It is hoped that another season may secure a large quantity. We have a few thousand in the hatching-house for the purpose of experimenting upon.

EELS.

Section 2, chapter 70, of the session laws of 1876, authorizes the commissioner to procure live eels for the waters of Iowa. After extensive correspondence with noted fish authorities of the different States, it was deemed best to try to procure the needed supply from Niagara Falls, the Hudson river, New York, or the Connecticut river at Holyoke, Massachusetts. Accordingly, May 1st, 1876, the commissioner with two assistants, started for Castleton, the site of Seth Green's New York State shad hatching camp. Arriving there, arrangements were entered into by which Mr. Green's party was to furnish us 200,000 young eels at one dollar per 1,000, which they expected to be able to procure for us in a few days, and we hoped to be able to procure the balance wanted—300,000—ourselves. It was then about the time that the annual migration of eels up the river begins, and it was hoped they would soon commence to run; but the weather continued cold with heavy rains, and muddy water in the streams, and it was not until June that we made the catch. The season unfortunately proved an unfavorable one for our work, and was the first one, according to the testimony of Seth Green and his men, and other reliable gentlemen, since they commenced operations on the river, in which it was impossible to take any needed quantity. Their failure to run was attributed to the cold, backward, and rainy season.

The cold water probably restrained them from running up the stream until their size and age made them too timid to run along the banks in the usual manner while the soiled water protected them from the observation of their enemies in the streams, and obviated the necessity of keeping in the shallow water for safety. At any rate, very much to our disappointment, and only after long continued, and persevering efforts, were we enabled to procure one-fifth of what we expected to get. But finally, on the 25th of June, we had secured what was estimated at 100,000 at Troy, and left with them for Iowa. In the meantime we had men at various places trying to get them, and our own men went to Niagara Falls, where a few might have been procured, but of too large a size for transportation. I went myself to the Potomac and Delaware rivers, but found the time too late there; also to the Connecticut river at Holyoke, Massachusetts, where I found the same state of things as upon the Hudson. At Camp Green, where they usually secure as many as they have a mind to, they took about 9,000, and of course we got none of the 200,000 they were to furnish

us. We arrived in Iowa with the eels in fine condition, but arriving about the time of the great storm we found the railroads in the northern part of the state so badly torn to pieces that they were impassable, and the fact that the eels had been kept in confinement nearly as long as they could with safety, compelled us to distribute them immediately. As the Northwestern road was running, I determined to go across the state, and distribute them as evenly as possible in the main streams crossed by that road, relying upon their habits of migration for their more general distribution.

They were as fairly as could be divided, and put in the following rivers and creeks:

Maquoketa river, Jackson county; Bear creek, Jackson county; Silver creek, Clinton county; Wapsie river, Clinton county; Big Creek, Cedar county; Indian creek, Cedar county; Cedar river, Cedar county; Prairie creek, Benton county; Salt creek, Tama county; Otter creek, Tama county; Iowa river, Tama county; Linn creek, Marshall county; Skunk river, Story county; Squaw creek, Story county; Des Moines river, Boone county; Coon river, Greene county; Middle river, Carroll county; West Coon river, Carroll county; East and Main Boyer rivers, Crawford counties; Milton creek, Harrison county; Musquito creek, Pottawattamie county; Keg creek, Pottawattamie county; Nishnabotna river, Pottawattamie county; Turkey river, Clayton county; Iowa river, Allamakee county.

If they multiply in Iowa waters as they have been known to do other wheres, they will soon be a common fish with us. Of the sixty eels spoken of in our first report as having been planted in the Buffalo near Anamosa in 1873, I have heard of as many as a dozen being caught with hooks and lines during the past summer in the immediate vicinity, and they were from twenty to twenty-four inches long.

PRIVATE FISH PONDS.

When our commission was first organized, there were but one or two private fish farms in Iowa. There are now at least a dozen in successful operation; and the amount of correspondence in regard to this kind of work received by the commissioner shows definitely that the interest in it is continually increasing, and in a few years will take a place as one of the most valuable producing interests of the state. To this end it should and has so far received such encouragement from the commission as it is able to give without prejudice to the public inter-

ests. Every inch of pure spring water in Iowa should be judiciously used in the profitable raising of salmon and trout for table use or for market. Many locations, especially in the southern and western parts of the state, that are not adapted to trout or salmon raising, are well adapted to culture of carp. So little is known of this fish in this country, that the following from Mr. Poppe, a successful breeder, is thought of sufficient interest to warrant its publication:

SONOMA, CAL., Feb. 12th 1876.

DEAR SIR:—I would respectfully call your attention to a possible, but as yet undeveloped source of profit to farmers in the United States, viz: carp raising. In Germany thousands of pounds of this favorite fish are raised and sold every year. The farmers there who are engaged in pisciculture have from five to seven ponds. The smallest is the breeding pond, from which the others are stocked. The contents of one pond are sold every year. Large numbers of fish are floated down the rivers and canals in large boxes, pierced with holes, through which the water passes in and out; thus delivering the carp to the consumer alive and fresh. They are a fish that need but little attention, are hardy, prolific, and excellent on the continent. Their food may consist of wheat, barley, corn, peas, bran, blood, sour milk, or in fact almost anything. When well fed they will grow one inch per week for the first two or three months, after which they will grow slower in length, but increase rapidly in weight. It will not do to breed them in ponds where any game fish are kept, as they will eat the young carp. In speaking of the growth and increase of these fish I probably can do no better than give my individual experience. I arrived here direct from Reinfeldt, Holstein, in August, 1872, with five small carp six inches long. The fish were in a very precarious condition, one dying as I placed it in the water. In the following May the original carp had grown to sixteen inches in length, and the young fish amounted to over three thousand. Every fish that I can possibly send to market here sells readily at one dollar per pound. Farmers who have natural facilities on their places for making ponds, and who have access to canals or rivers communicating with large cities, can greatly increase their income with but small trouble and expense. There ought to be one person in every county who would raise choice carp as stock fish to sell to others to fatten for their own tables. It would be a cheap but sumptuous food and at the same time very convenient, as they are ready to be eaten at all times of the year.

Sonoma, Sonoma Co., California.

J. A. POPPE.

As these fish are vegetable feeders, they would economize a vast amount of food entirely unused by our native fish, and if successfully acclimatized would largely increase the food producing capacity of our waters. Our commission have promises of a supply from the United States Commission, and hope it may soon be procured.

I am very frequently asked for evidences of the success of fish culture. They are so numerous and general that every reading man is thoroughly posted in regard to it. Local papers, leading dailies and weeklies, magazines, scientific, literary and sporting papers, are all bearing testimony to the success of fish culture throughout the world; while in no one of them can be found evidence that tends to prove that efforts in this direction have been a failure. Nearly all the States and provinces of North America have their fish commissioners, and from their reports come words of cheer and encouragement; while those that have been engaged longest in the work show their faith by largely increasing their works. The state of New York appropriates three times the amount, annually, that our commission has had in the four years' appropriations, or, twelve times as much as Iowa. Michigan, Ohio, and Wisconsin, from three to four times as much; while the British Provinces expend nearly as much as the total amount appropriated by the states.

From the Connecticut and other Eastern rivers, which had become entirely depleted of salmon, and also the Hudson, Delaware, Potomac, and others of the Southern rivers where the salmon have never been known heretofore, there comes frequently, news of their capture, some of them weighing as high as twenty four pounds; and the fact that those rivers can be stocked with California salmon is assured.

In Canada abundant success has been achieved with the salmon work. In Wilmot creek, that had been depopulated, thousands now return annually to their spawning grounds. The Canadian government now has five salmon hatching houses in successful operation. Shad hatching has been a success in all prominent streams from Carolina to the Connecticut river, and the immense numbers of white fish and lake trout being hatched in the great lake States proves the confidence the people have in the success of this branch of fish culture. In Iowa the first fish were planted only three years ago. As it takes from four to ten years to mature fish, it follows that no mature fish have as yet rewarded us for our work; but evidences that those planted are doing well are numerous. L. D. Butler, of Woodbine, writes, March 23, 1877:

"The California salmon planted in our streams last February, a year ago, are now from seven to nine inches long. One of the former plant was caught that weighed one and a half pounds."

A. A. Mosher, of Spirit Lake, writes, March 13, 1877:

"The fish you sent us last year are doing wonderfully well; they are now about seven inches long, and take to these waters."

Large numbers of letters and newspaper paragraphs of this kind are in the possession of the commissioner, and these are given only as samples, while great numbers of people have borne personal testimony to having seen and caught the young fish. John Millar procured of the United States commission, through the aid of our commission, five thousand young California salmon for his private fish ponds. During the summer a flood washed them out into the Muscatine slough. About the middle of August, the commissioner, with Mr. Millar and others, visited the slough in the vicinity of the creek that runs from his ponds into the slough, and found it alive with the young salmon, which were feeding on insects upon the surface of the water. This gave us a splendid opportunity to observe them. They were then about five to six inches long, and the most active and energetic fish I have ever seen, while the number seen gave evidence that the greater part of the five thousand were still alive, and their activity and hearty eating shows favorable conditions. The salmon being migratory are supposed to leave before they have attained a large size, but that is not always the case as we have evidence to prove. Mr. E. Bush, station agent, reports the catching of a dozen salmon weighing two and a half pounds each in the north fork of the Maquoketa. The principal of the high school at Marion, reports catching a half dozen weighing from one and a half to two pounds each. Dr. French reports having seen one that had been caught at Davenport that would weigh two and three-fourths pounds. George Brown caught two in the Wapsie that would weigh one and a half pounds each. L. D. Butler reports the catch of some that would weigh one and a half to two pounds, in the Boyer river; and a great many instances have been known of their being caught weighing from one and a half to two and three-fourths pounds.

Mrs. H. Ruble has in her pond at North McGregor a number of Penobscot salmon three years old, some individuals of which will, it is estimated, weigh ten pounds. They have never been out of the pond they are now in, and notwithstanding their continual confinement in fresh water are perfectly healthy and hearty, and as fine a sight as it is possible to conceive of. Our work with brook trout, *salma fontinalis*, has until this season been quite limited and has been treated of under the head of "BROOK TROUT." I am very often asked if they can be made a success in Iowa. Mr. N. K. Fairbanks, a public-spirited gentleman of Chicago, (whose liberality in generously stocking Geneva Lake at his own expense deserves public commendation,) informs me that a small spring stream emptying into the lake became accidentally

stocked two or three years ago. This season he took with hook and line, from one pool, fifteen half pound trout, and only de-listed because he did not wish them wantonly destroyed. He also states that a large number had been taken from the lake weighing from three-fourths of a pound upwards. In visiting Mr. Dousman's fish-farm, in crossing a spring brook not a mile from his ponds, I observed as many as fifty trout, from four to six inches long, lying under the bridge. They had escaped from his ponds and had stocked the brooks in the vicinity. These streams are in every respect similar to those in the Northern portion of Iowa. Eels are increasing in numbers very rapidly, and I have reports of the capture of more this season in Iowa than in all our previous history; and the same ratio of increase will soon fill our streams. The 100,000 distributed last season will soon be heard from, and putting them into all the large streams will insure a more general stocking of all our waters with them. With shad it takes five years, as proven by this season's experience, for them to return, and our first planting was only three years ago. Of course no return of mature fish could be expected, but the evidence given under the head of "shad," proves conclusively that it may be made a success. What success with shad and herring would mean, will be best shown by quoting from the United States commissioner's report. He says, (page 17):

"In further illustration of the results that may be looked for from a judicious and systematic prosecution of the work of propagating the food fishes, we may refer to the Potomac River, in which from six to ten million pounds of shad and herring are taken during the spring months alone. There is no reason why any stream in the United States having direct communication with the Gulf of Mexico, or either ocean, may not be made to abound in an equal degree, with these and other fishes; and in view of the aggregate of animal food that may be derived from a number of such streams, the importance of this work can hardly be over estimated."

And in a marginal note he says:

"Large, however, as is the present yield of herring and shad in the Potomac river, it is a mere fraction of that which prevailed less than fifty years ago. *Martin's Gazetteer* of Virginia and the District of Columbia, published in 1835, states that the number of fisheries on the Potomac in the previous year was 150, and that in six weeks time 22,500,000 shad and 750,000 herring were taken in this river. Allowing an average of three pounds each for the shad, and three-fourths of a pound for the herring, we have the enormous aggregate of 630,000,000 pounds of food taken from a single river in six weeks' time alone, not including the immense quantity of striped bass or rock fish, sturgeon, and other fish that doubtless belonged to the catch. These

statistics, large as they appear, are corroborated by the older fishermen of the Potomac."

From the best information obtainable, eels were not found in the Mississippi and tributaries originally. They have been planted in the tributaries of the Ohio, Fox, Illinois, Mississippi, Wapsie and Elkhorn rivers, and in the Illinois canal in small numbers. The oldest planting of which we have authentic information, was in the Illinois canal and river, twenty-eight years ago. The eels were brought around the lakes in a steamboat. The plants above enumerated, (and probably many we have never heard of have been made since,) and the large numbers of these fish that have been caught in the Mississippi and its tributaries this season—1877—are evidence of the great success of these small beginnings, and we look with confidence for good results from the 100,000 put into Iowa waters last season.

Of our success with native fishes, it is more difficult to write. There are some cases, however, where our success has been so well defined that it is only fair to presume that our efforts are being crowned with success. In 1872, before the State work was begun, the present commissioner put 2,000 young fish, principally white and grass bass, into the Wapsipinicon river, near Anamosa. A few of these have been caught here, and quite a number of small ones have been seen this season. The majority of them, however, have, from all the evidence, found their way up the river. September 14, 1877, Hon. S. G. Van Anda, of Manchester, wrote me as follows:

"A party of us caught three hundred bass, pickerel, and silver bass at Quasqueton, the best hook fishing I have ever had in the State. The silver bass of the Wapsipinicon are a new fish there, I think, and a very fine fish, but we have none in our streams."

Mr. Logan, of Logan, states that he caught a dozen white bass at Independence, some time in October, and that a great many of them are being caught there. Other gentlemen testify to catching numbers of these fish in this stream, where they were not known before. The same results have followed in several of our lakes, where new varieties of native fish have been introduced. If such results follow planting a few silver bass in the Wapsie in 1872, we are warranted in anticipating grand results from the planting of a million and a half of similar fish in 1876. Council Bluffs and Omaha papers bear testimony to the success of the accidental planting of fish in the Elkhorn river from Mr. Livingston Stone's car.

John Hall, Creston, October 23, 1877, writes:

"The fish you left with us have done finely. I have not seen any California salmon since last spring. I suppose they keep in deep water. They were doing well the last I saw of them. The bass, sunfish, croppies and catfish have done splendidly. I have had a fine chance to observe them. The boys from town have taken thousands of them out this summer. The public road runs across the reservoir, and I have seen the bridge and dyke completely covered with boys fishing, and I think they have taken out eight or nine hundred in a day. They were small, of course, as they are young yet. I learn that in the Nodaways and Nishnabotany, there are a great many more small fish this year than usual."

Much more might be added, but enough has been shown to prove that the small appropriations made during the past four years, amounting to a small fraction of a cent per capita for the whole time gives promise of being a wise investment. Valuable improvements have been made at the hatching house during the past season. The bottom of the hatching-room was excavated two feet, and a good cement floor put in. Several of the hatching-troughs have been replaced by new and improved ones, increasing the capacity to at least 2,500,000. Some reservoirs have been put in for keeping fish, and the upper rooms finished off for a dwelling. The building has been thoroughly painted and many improvements put upon the grounds and out buildings.

The work of stocking the waters of a great section of country two or three hundred miles square, like that of Iowa, with fish, necessarily involves a vast amount of labor; and with the light force at our command must take considerable time; and, if any person or section feel that they have been slighted, we beg to say to them that it is not so because we wish it so, but because we have been unable to do more than we have done with the means at hand. The many encouraging letters from all parts of the state have been very welcome, and even once in a while a scolding one has been taken as an evidence of the deep interest of the writer in a subject of great importance to his section. And we cordially invite correspondence upon the subject, which we shall at all times answer at the first possible moment, and shall at any and all times be very grateful for any co-operation in the work. The good effects of our present law protecting fish from seining, (and during their spawning season) have been felt effectively during the past season. It is the testimony of all fishermen in all parts of the state, as far as we have heard from them, that the hook fishing has proved better than at any time for the last ten or fifteen years.

Respectfully submitted,

B. F. SHAW, *Commissioner.*

STATEMENT OF EXPENDITURES OF THE FISH COMMISSIONER.

Table with columns: DATE OF VOUCHER, Number of voucher, IN WHOSE FAVOR, ON WHAT ACCOUNT, Amount. Includes entries for 1875 and 1876, such as A. Curry, E. M. Stickney, and John Forall.

STATEMENT OF EXPENDITURES—CONTINUED.

Table with columns: DATE OF VOUCHER, Number of voucher, IN WHOSE FAVOR, ON WHAT ACCOUNT, Amount. Includes entries for 1876 and 1877, such as Samuel Chamberlain, J. B. denk offer, and Fred Winnaus.

STATEMENT OF EXPENSES—CONTINUED.

DATE OF VOUCHER.	Number of Voucher.	IN WHOSE FAVOR.	ON WHAT ACCOUNT.	Amount.
1877.				
Nov.	25	231 Albert McCray	Labor	\$ 3.50
Dec.	30	235 E. R. Shaw	Labor two months, Nov. & Dec.	60.00
Dec.	30	240 B. F. Shaw	Salary two months, Nov. & Dec.	200.00
Nov.	25	237 Thad Barnard	Labor	3.75
Nov.	25	233 E. Brown	Mason	7.50
Nov.	25	239 Mark Pell	Labor	18.00
Dec.	30	240 G. F. Slocum	Labor, Nov. & Dec. & boarding.	180.80
Dec.	30	241 Needham & Burritt	Teaming and livery	14.25
Dec.	27	242 B. F. Shaw	Cash expenses	121.22
Dec.	31	243 H. Witcher	Carpenter work	11.79
Dec.	31	244 E. Walker	Carpenter work	3.75
Nov.	23	245 R. A. Markham	Teaming	2.00
1877.				
January	1	246 Frank Baum	Expenses	2.65
January	4	247 W. Brown	Teaming	1.25
January	1	248 B. F. Smith	Brick	4.80
Feb.	1	249 E. R. Shaw	Labor	30.00
Feb.	1	250 G. F. Slocum	Labor	50.00
Feb.	1	251 B. F. Shaw	Salary	10.00
Feb.	1	252 W. M. Skinner	Sundries	19.70
Feb.	1	253 Needham & Burritt	Livery	8.75
Feb.	1	254 American Express Company	Express	6.00
Feb.	1	255 O. Buringame	Labor	10.00
Feb.	1	256 B. F. Shaw	Cash expenses	20.50
Feb.	25	257 H. F. Dausman	80,00 trout spawn	16.00
Feb.	24	258 L. O. Gale	Glass frame ink stand	2.50
Feb.	24	259 D. Kibert	Staining, varnishing, etc.	1.00
Feb.	27	260 H. Rubie	Seventeen trout eggs	31.00
March	1	261 H. C. Metcalf	Two months' rent—mice	3.00
March	1	262 G. F. Slocum	Labor, teams and feed—Feb	55.00
March	1	263 E. R. Shaw	Labor—February	30.00
March	1	264 B. F. Shaw	Cash expenses—February	23.05
March	1	265 B. F. Shaw	Salary—February	100.00
March	1	266 Needham & Burritt	Teaming	1.25
April	1	267 Wm. Brown	Teaming	1.50
April	1	268 B. F. Shaw	March salary	100.00
April	1	269 E. R. Shaw	March labor	30.00
April	1	270 G. F. Slocum	Feed and labor	15.00
April	1	271 B. F. Shaw	Cash expenses	44.40
April	1	272 Watters & Co.	Fish feed	3.00
April	1	273 American Ex. Company	Express	4.50
April	1	274 Jones county	Rent of office	9.00
April	1	275 Needham & Burritt	Teams	1.55
May	1	276 B. F. Shaw	April salary	100.00
May	1	277 E. R. Shaw	April labor	30.00
May	1	278 G. F. Slocum	Fish feed and labor—April	52.00
May	1	279 Gale & Haly	Glass and sundries	2.35
May	1	280 Anamosa Eureka	Printing	2.00
May	1	281 Needham & Burritt	Teaming	7.25
May	1	282 B. F. Shaw	Cash expenses	8.65
May	1	283 American Ex. Company	Express	5.55
June	1	284 Anamosa Eureka	Envelopes and printing	3.00
June	1	285 G. F. Heald	Materials and labor	1.51
June	1	286 Needham & Burritt	Team and livery	7.00
June	1	287 W. M. Skinner	Stationery and paints	3.05
June	1	288 B. F. Shaw	Cash expenses	7.72
June	1	289 B. F. Shaw	May salary	100.00
June	1	290 E. R. Shaw	May labor	30.00
June	1	291 G. F. Slocum	May, fish team and board	51.50
June	1	292 A. Heitche	Hardware, &c.	21.09
June	1	293 Albert McCray	6 1/2 days' labor	6.75
June	1	294 Frank Baum	2 1/2 days' labor	2.50
June	30	295 B. F. Shaw	Salary for June	100.00
June	30	296 E. R. Shaw	Labor for June	30.00
June	30	297 G. F. Slocum	Labor for June	50.00
June	30	298 Watters & Co.	Liver for fish feed	4.00
June	31	299 Needham & Burritt	Livery	1.50
June	30	300 B. F. Shaw	Cash expense	15.15
June	17	301 N. R. Cone	Teaming	6.50
June	2	302 Benton & Lewis	Lumber	4.63
June	20	303 S. Ireland	Labor, self and team	3.00
June	4	304 W. Brown	Hauling lumber	1.25

STATEMENT OF EXPENDITURES—CONTINUED.

DATE OF VOUCHER.	Number of voucher.	IN WHOSE FAVOR.	ON WHAT ACCOUNT.	Amount.
1877.				
July	31	305 B. F. Shaw	July salary, 1877	100.00
July	31	306 G. F. Slocum	July labor, 1877	50.00
July	31	307 E. R. Shaw	July labor, 1877	30.00
July	20	308 Needham & Burritt	Livery	1.50
July	20	309 F. Baum	Labor	.75
July	20	310 B. Huggins	Materials and labor	2.20
July	31	311 Anamosa Eureka	Paper and printing	5.25
July	31	312 J. Parsons	Teaming to date	8.00
July	31	313 B. F. Shaw	Cash expenses	2.90
July	31	314 Stickney & Harriman	Axe and helve	1.40
July	31	315 A. McCray	Labor	1.25
August	28	316 W. M. Skinner	Sundries	4.01
Sept.	1	317 Needham & Burritt	Livery	1.50
Sept.	1	318 Geo. F. Heald	Labor and glass	4.65
Sept.	1	319 G. F. Slocum	Labor, August	50.00
Sept.	31	320 E. R. Shaw	Labor, August	30.00
Sept.	31	321 B. F. Shaw	Salary, August	100.00
Sept.	31	322 B. F. Shaw	Cash expenses	8.00
October	1	323 A. Heitche	Hardware and labor	10.75
October	1	324 George F. Heald	Glass and labor	1.85
October	1	325 Needham & Burritt	Teaming	4.75
October	1	326 Wm. Brown	Teaming	1.25
October	1	327 John Parsons	Teaming	1.75
October	1	328 G. F. Slocum	Labor, September, 1877	50.00
October	1	329 E. R. Shaw	Labor, September, 1877	30.00
October	1	330 B. F. Shaw	Salary, September, 1877	100.00
Total amount expended.....				\$8,055.09

STATEMENT OF AMOUNTS RECEIVED BY THE FISH COMMISSIONER ON ACCOUNT OF APPROPRIATION FOR FISH CULTURE.

DATE.	ON WHAT ACCOUNT.	AMOUNT.
1876.		
March 15	By requisition on Auditor of State.....	\$ 716.40
April 15	By requisition on Auditor of State.....	141.98
April 28	By requisition on Auditor of State.....	700.00
June 26	By State.....	100.00
July 1	By State.....	361.16
Aug. 1	By State.....	264.80
Aug. 15	By State.....	250.00
Aug. 18	By State.....	437.50
Aug. 18	By State.....	100.00
Aug. 31	By State.....	327.41
Aug. 31	By State.....	300.00
Sept. 30	By State.....	701.45
Oct. 14	By State.....	100.00
Nov. 1	By State.....	596.18
Nov. 7	By State.....	100.00
1877.		
Jan. 1	By State.....	821.63
Feb'y 2	By State.....	413.95
March 1	By State.....	254.80
April 2	By State.....	252.50
May 1	By State.....	207.80
June 1	By State.....	237.61
July 1	By State.....	216.03
Aug. 1	By State.....	103.25
Sept. 1	By State.....	19.19
	Total amount received.....	\$8,162.64
	Unexpended balance of old appropriation.....	.85
	Amount of appropriation.....	8,750.00
	Total.....	8,750.85
	Total amount drawn as above.....	8,162.64
Sept. 30	Balance in State Treasury.....	588.21
Sept. 30	Amount in the hands of commissioner.....	250.00
Sept. 30	Balance on hand.....	838.21
	Expenses for September, not shown in Auditor's report....	202.35
	Total.....	635.86

ANAMOSA, IOWA, October 13, 1877.

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

B. F. SHAW, *Commissioner.*

Subscribed in my presence, by the said B. F. Shaw, and by him sworn to before me this 13th day of October, A. D. 1877.

[L. s.]

B. H. WHITE,
Clerk District Court.

By J. H. CHAPMAN, *Deputy.*

An itemized detailed account of expenses is filed with the auditor of state monthly, and may be seen there, or in the office of the commissioner at Anamosa.

ADDENDA.

The law of 1876, requires the commissioner to make report to the Governor on or before the 15th of November of each year. This the commissioner found it impossible to do in full on account of the many duties connected with the different branches of the work commenced by the commission that needed immediate attention. In correspondence with Gov. Kirkwood upon the subject he suggested that the commissioner should make a sworn financial report as required by law, on or before November 15, and complete the report as soon as the exigencies of the case would permit. This course was adopted, but when the report was finally finished it was so late in the season that it was thought best to publish it in connection with the report of 1877. The question was submitted by the commissioner to the Executive council, and the following shows their action in the matter.

B. F. Shaw, fish commissioner of the State of Iowa, came before the executive council, and made a statement, in substance as follows: That in the matter of report required by section five, chapter seventy of the laws of the sixteenth general assembly, he, the said commissioner, did, on or before November 15th, 1876, make to the executive council a sworn statement, showing amount of money expended, and for what purpose, by him in the year 1876, but that he was unable to make a further and more full report giving such general information on the subject of fish-culture as he should think proper, within the time required by said section 5. Said commissioner states that he was unable to fully comply with the law as aforesaid for the reason that at and during the time he should have been making his said report he was compelled to be absented from the State procuring fish and spawn, and that he was otherwise so occupied with the performance of the duties of his office as to render it impossible for him to comply in making full report in time required by said section without allowing the fish interest of the State to suffer; and said commissioner now asks that he have the consent of the executive council to make his reports for the year 1876 and 1877, as a consolidated statement to be filed with the executive council on or before the 15th day of November, 1877; and the executive council, being satisfied with the statements of said commissioner, hereby consents that he shall file his reports consolidated, as he requests, on or before November 15, 1877.

I certify the above is true copy of a minute adopted by the executive council of Iowa, February 15, 1877, in relation to matter of Fish commissioner's reports, as shown by the records of my office.

JOSIAH T. YOUNG,

Secretary of State and ex-officio Secretary of Executive Council.

FISHWAYS.

Chapter 50, laws of the Fifteenth General Assembly, made it the duty of the Fish Commissioners "to examine and report in regard to fishways, and methods necessary to be used to secure the passage of migratory fish up, through, or over the dams now constructed in the State."

There is a growing sentiment in favor of fishways, and a general dissatisfaction with all dams that obstruct the free passage of fish up and down our streams, a feeling among the masses that the barrenness of our streams is attributable to the fact that fish cannot pass up again after their fall migration in search of deeper water, or after being carried down by heavy floods, very frequently taking the form of a complaint that portions of a stream that once have been a favorite resort for fish have been ruined by building impassable dams.

The commissioner is in receipt of very many letters asking him to compel the proprietors to put in *fishways*. There is no question but that these dams are a decided injury to some localities, and that when they are located between the breeding grounds and winter-quarters, even of our native or non-migratory fish, they in a great measure depopulate such streams, and in such streams as we hope to make a home for the migratory fish, it will be an absolute necessity to provide means for their passage over all dams.

The laws of the Fifteenth General Assembly, chapter 50, section 5 compels any person building a dam, after the passage of the law, to put in a suitable fishway, and persons who have built dams since that time without such fishway, are liable, upon complaint of any one before the proper authorities, to a fine of ten dollars per day for the time so used without one, and to have such dam declared a nuisance and abated as such. This law has proved well nigh abortive from the fact that people living in the vicinity where such dam is being built and are the proper persons to see that the law is complied with and make complaint in cases of violation—refuse to act as they can see no use of a fishway in one dam while the whole length of the stream above and below is obstructed with impassable dams. By the decision of the United States supreme court, I think it is well established that any mill owner can be compelled, upon prosecution, to put in a fishway, or in other words that no one has a right under the common law to prevent the free passage of fish up or down any stream. This question was discussed in the first report of the commission at some length, and I shall not at this time go over it again.

Fishways are not a new invention; there are successful fishways that have been in use a long period of time and have fully demonstrated their usefulness; but most if not all that have been in use are open to some serious objection for general adaptation to all the streams in Iowa.

What is the best fishway? and shall we compel the building of them in all dams? are two questions that are seriously engaging the attention of the law-makers of many of our States at the present time. Many of the States have compelled the putting of fishways into certain streams or dams, under specified conditions, but as far as I know, the State of Michigan is the first to compel the putting of them into all dams at the expense of the dam owners, the township authorities to determine where and how, and the State Commissioners to furnish plans for the same.

Conceding the utility and absolute necessity for fishways in order to have them generally adopted, put in and kept in running order, they must meet the following requirements: 1st—Cheapness. They must not cost so much as to be overburdensome upon the dam owners. 2d—Durability. They must be compact, strong and indestructible by floods, floodwood, or floating ice. 3d. They must not use water enough to seriously interfere with the water-power. 4th. They must retain the principles of the old successful fishways or introduce new ones that will be equally as good. 5th. The outlet for the water or entrance for the fish into the fishway, shall be where the fish in trying to pass the dam will naturally run into it, and in water sufficiently deep to permit them to enter at the lowest stage of water.

A failure in a fishway to meet any of the foregoing requirements would so prejudice the public against them that it would be difficult to enforce any law to compel them to be put in. Having a due regard to these facts, I have been, as thoroughly as my time would permit, studying the subject for the past few years, and in so doing have visited as many fishways as I have been able to, and have procured and read, as far as possible, all that I have heard of being written upon the subject, and have sought for information by an extensive correspondence with those whose experience has given them the best opportunities for forming correct ideas upon the subject.

Among all the fishways visited, and plans suggested, I have found none that I have not thought open to one or more of the serious objections heretofore named. When applied to our Iowa streams, I have embodied my own views of a fishway in some plans that together with

a model of the same will be at the service of the General Assembly, and with them I refer the matter to our law makers, hoping it may receive careful and mature consideration.

The plan of fishway heretofore referred to has been adopted by the Michigan Fish Commission and a competent examining board for introduction into all the dams in Michigan under their law, and having been selected by this board from among all the plans submitted to them for adoption, and after mature deliberation, adds materially to our confidence in its merits.

SUMMARY OF WORK FOR 1876 AND 1877.

1876. Native Fish Distributed.....	1,574,200
1876. Salmon and Lake Trout.....	533,000
1876. Shad.....	100,000
1876. White Fish.....	125,000
1876. Eels.....	100,000
1876. Penobscot Salmon.....	80,000
1876. Land Locked Salmon.....	5,000
1876. Native Fish distributed from car.....	319,000
1877. Lake Trout distributed.....	303,500
1877. Native Fish distributed.....	50,000
1877. Brook Trout distributed.....	81,000
1877. Shad distributed.....	150,000
1877. California Salmon distributed.....	25,000
1877. Land Locked Salmon distributed.....	10,000
1877. Fish on hand at Hatching House.....	10,000
1877. California Salmon on hand at Hatching House.....	100,000
1877. Lake Trout Eggs on hand at Hatching House.....	1,750,000
Total.....	5,315

REPORT
OF THE
JOINT COMMITTEE
OF THE
SEVENTEENTH GENERAL ASSEMBLY
OF THE
STATE OF IOWA,
APPOINTED TO VISIT THE
STATE FISH HATCHING HOUSE,
LOCATED AT
ANAMOSA.

DES MOINES:
R. P. CLARKSON, STATE PRINTER,
1878