SIXTH BIENNIAL REPORT.

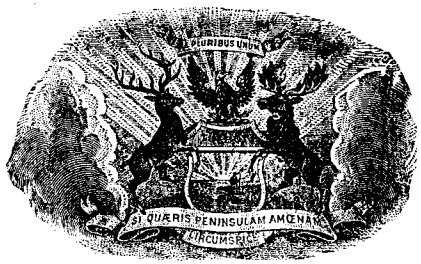
OF THE

STATE BOARD

OF

FISH COMMISSIONERS

FOR 1883-4, ENDING DECEMBER 1, 1884.



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1885.

STATE BOARD OF FISH COMMISSIONERS.

1885.

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REPORT.

To the Honorable RUSSELL A. ALGER,
Governor of the State of Michigan:

The State Board of Fish Commissioners respectfully submit to you, and through you as the Executive of the Commonwealth to the Legislature, and to the people of Michigan, the fifth biennial report of operations conducted by the Commissioners, under the law, in the artificial propagation and distribution of food-fishes; and, of such supervision of the general fishery interests of the State as they have been able to exercise with the means at their disposal for that purpose. This report covers the time from January, 1883, to December, 1884. The report submitted in the winter of 1883, while briefly bringing down accounts of the operations to March of that year, was hastily prepared (as it stated, for reasons then well understood), was not entirely satisfactory ty the Commissioners, nor did it do entire justice to the work. Partly on that account, but especially in virtue of their own intrinsic importance, and view of the rapidly growing interest of the people throughout the State in these matters, we earnestly call attention to the facts and suggestions contained in this report.

This Commission is charged by law with grave responsibilities respecting important State interests, which are not very generally understood or appreciated, but which relate to—

1. A large commercial industry, furnishing employment and a livelihood to many citizens of the State, in which a large capital and experience are invested, that has brought millions of dollars from other parts of the Union to increase the general welfare of and helped to develop the resources of this State.

2. Interests, that have close relations to healthful recreation by a large and rapidly increasing number of our citizens, many of whom have not the means or time to seek it further from their homes.

3. Interests, bound up with economic questions, as affecting the continued supply of nutritious and wholesome food to all classes of our citizens; and,

4. That require State control and regulation, as matters involving the exercise of general police powers, as well as quasi-criminal offenses, and civil rights.

5. Interests, finally, that in respect to their public character *are unique*, because, in general the places where this industry is carried on can never be the subject of any beneficial private ownership, and when the supplies are exhausted can never be restored to productiveness by private enterprise; so that serious diminution of this industry implies permanent loss, to its extent, to the State.

These interests and their permanent welfare require intelligent conside tion, and patient inquiry into all the facts and suggestions, based upon exp ence, that can be presented to the Legislature respecting them, in order t wise legislation may thriftily preserve and extend them, and with str justice to the public interests, as well as the private rights involved, cont and regulate them.

It may be convenient in treating of the matters properly falling within t province of this report, to group them under the following heads:

1. The extent and value of the fisheries.
2. The regulation and inspection of fisheries by law and State authority.
3. Artificial propagation and distribution of food fishes, the work of t Commissioners for the period covered by this report, and evidences of succe
4. The organization of the Commission and its transactions.
5. Schedules containing financial exhibit, inventories, and statistics.

I.—THE EXTENT AND VALUE OF FISHERIES.

The coast line of Michigan upon the great lakes and their connecting strait including the principal islands, is upwards of *two thousand miles*. Any one all familiar with the geography of the State knows there are a vast number lakes existing in the interior, besides the greatest abundance of rivers, grea and small. Of the extent and quality of water we need not discourse t intelligent citizens of Michigan. There is not a mile of that coast and rive line, nor an acre of that lake surface, that does not produce some variety o wholesome fish-food. The varieties of fish found in these waters are the ver best of all fresh water fishes that are supplied to the market. The abundanc and quality of our native fish have played a prominent part in the develop ment of the State, and helped largely to attract immigration hither b furnishing a cheap and accessible supply of food ready to the hand of th pioneer and his family before the farm was cleared, the pork and cattle grown, and long before a convenient market could be reached by quick and chea modes of transportation. The fish and game of Michigan have contributed very largely to the present prosperous condition of a great and rapidly grow ing State, and under intelligent regulation and wise State patronage the fisheries may be made to bear a still more useful part in the State's commercial greatness. That the importance of the fish product has been, to some extent, appreciated, is evidenced by the legislation of the State during the past twenty years, and the existence of an organized department of State government especially charged with its supervision and extension. Enough has been said in the former reports of the Commissioners, as well as in numberless public documents, of the capabilities of our waters and relative merits of our native fishes to require no further recital of them in this report.

We were forced to go to the Legislature two years ago with the confession that we knew very little of the value of the fisheries to the State from any reliable resources. We are now somewhat better furnished in this respect, but are still far from having the definite and exact information that would enable us to present this branch of the subject as it deserves.

There is enough information at hand to recommend, as we do further on, a systematic method of regulation and inspection of the fisheries under State control, a most important feature of which scheme would be to secure a full and reliable *fishery census*. In the act of June 2, 1883, making appropria-

tion to the Commissioners for the current two years, a provision was inserted requiring "all fishermen residing in this State to furnish to the Superintendent of Fisheries a full report of the amount and value of their catches for each season." While this was regarded as a step in the right direction, and very thankfully received, it was considered that the reports would not be generally, or very willingly, or intelligently made, unless the fishermen understood its purpose and were urged to compliance by an agent of the Commission. Accordingly we had prepared by the Secretary a blank form of report (a copy of which is given in the appendix), and employed Mr. John S. Brubaker, of Emmet county, as the agent to visit the fishermen along the coast, explaining the law and its purpose, and distributing the blanks, with directions as to their being filled out. The Commission and its employés have also been industrious in seeking opportunities to secure compliance with the requirements of the law. Mr. Brubaker worked from October, 1883, until the last of January in the following year, visiting in that time nearly every important fishing station on the Upper Peninsula, and from Grand Traverse around the Straits of Mackinaw and the Eastern coast as far as Detroit. The condition of our funds forbade further prosecution of the work at that time, and we have not since had sufficient means at our disposal to resume it.

The part of the coast not visited was from Grand Traverse Bay along the Lake Michigan shore to Indiana, and from Port Huron to Detroit, down the Detroit River, and our coast of Lake Erie. To the parts not visited blanks were sent with instructions as to their being filled, and requests made that they be filled out and returned.

This was the first effort that had ever been made by State authority to gather fishery statistics. The statute under which it was done is a crude one, and while the work done by Mr. Brubaker was admirably performed by him, the time was short for preparation, the means limited, and for that reason the agencies employed altogether insufficient for the purpose. Still, the results were quite as good as could reasonably be expected, and amply repaid the outlay. The material obtained was sufficient to demonstrate beyond question the important results which would follow from a completely organized and thoroughly prosecuted effort for a *fishery census*.

The information thus obtained, or to be obtained by such a complete fishery census, cannot possibly interfere with, or prejudice, the business of any fisherman. The tables are not for the purpose of publishing any one's private business. The figures showing the volume of any one's business and the amount of receipts is as safe in the hands of the Commissioners and their officers, as in the hands of his ordinary clerks. We think it best to say this publicly, because one or two men made such objection. Only the totals are published. The fact that Mr. Smith, for instance, makes out of his fishery $100 or $10,000 a year, is of no consequence, and of itself possesses no interest for the fishery officers or the public. But that the fisheries on the Detroit river produce annually a given number of pounds of white fish, pickerel, sturgeon, etc., worth a given number of dollars, is a matter of public concern; and that cannot be known unless we know just the amount of fish taken by the different fishermen along that river, and the price at which their product is sold, and the methods used in capturing the fish. But why should the State or the public wish to know any such facts?

First, To know whether these men are using up *this public supply of food* by illegal means.

Second, To know whether these fisheries are of sufficient value and importance to warrant the state in keeping them up by artificial means, and the proportion of State assistance they should have relatively to other fisheries.

There are other reasons, but these are the principal ones. The fishermen generally, so far as they took any notice of the matter, showed great interest in the success of the undertaking, and responded promptly and intelligently with the information required by law, as well as with that requested by the Commissioners, beyond the requirements of the act. But all did not respond. It is estimated by the agent that about two-thirds of all the fishermen of the State reported, leaving about one third of the total catch for the year 1883 unreported. Mr. Brubaker also estimates from the reports, and his personal observations, that the catch of 1883 was only about one-half of an average season's catch. No reports were received from Lake St. Clair, and none from Detroit river. Several important points on Lakes Michigan and Huron also were not reported. Eighty complete reports in all were received. Out of the eighty reports, sixty-nine commented on the relative size of the season's catch, where it was less than an average attributing it to the fact of its having been a bad, stormy season. Many of them reporting the loss of nets by the autumn storms. The storms being the worst at the very time when the spawning white fish were coming on to the grounds, and at the time the largest catches of the season would ordinarily be made. The comments on the season were as follows:

Unfavorable	50
Very unfavorable	3
Favorable	3
Medium	2
Average	2
Below average	1
Poorest ever known	1
One-half catch	1
One-third catch	1
Very poor	2
Fair	3
	69

On the Detroit river, the catch of white fish was less than one-third of the average. In the absence of reliable statistics for former years, it is impossible to state the exact proportion of the catch of 1883. But from such an overwhelming majority-declaration that the seasons catch was unfavorable as compared with average yields, taken with the more extravagant statements of disparity by a number, we are perfectly safe in concluding that the proportion stated above on the agent's authority is not only a fair and reasonable one, but probably considerably within the truth. Below is given the results of eighty reports. In the first column will be found the common names of the fish classified, in the second the total in pounds, in the third the average price at the boats as sold to the dealers, in the fourth the value at such prices.

REPORTS OF FISHERIES, 1883.

FISH.	POUNDS.	Average Price. Cents.	VALUE.
1. Whitefish	5,686,291	4¾	$270,098 68
2. Lake trout	5,065,072	3¾	189,940 20
3. Herring	1,760,890	2	35,217 80
4. Bass	144,732	2	2,894 64
5. All other kinds	1,499,704	2⅓	34,833 10
	14,156,689		$532,984 42

NOTE.—One report, not included above, gave a total of over 6,000,000 pounds, but not classified. At the average prices given above it would add $177,000 to this amount, making a total reported of $709,984.42.

From the same reports the number of gill nets is given as 14,456, measuring 473,529 fathoms in length, or in feet 2,841,174, about 350 miles; the number of pound or trap nets 371; steamers, 18; sail boats, 294; pound net boats, 153; skiffs or canoes 41, and the number of men employed 1,151. The total weight of fish is over 7,000 tons.

Incomplete as these tables are, they furnish material well worth considering. If to the total of pounds given in the table, 14,156,689, we add the amount given in the note, 6,000,000, we have, say in round numbers, 20,000,000 pounds of fish. Now, the prices given above are the very lowest *first cost prices*. If we take the figures at which the same, or a large part of it, is sold to the consumers, it will represent a much larger amount. Five and six cents per pound are the lowest prices that we know of to consumers, and they are frequently twelve and fifteen cents; we are speaking, of course, of commercial fish, not of brook trout and grayling. We do not care to give speculative figures in an official report, but any one may readily see that the prices of the official table, if slightly altered, will produce a total in value considerably beyond one million dollars. This product of fish also is used in very different ways. An increasing amount is year by year consumed at home fresh. There is also an increasing demand for salt fish at home, as well as for dried and smoked fish. The larger amount is sold, some fresh, to other markets—we mean out of the State—some salted for special trade east, south, and west, and some exported smoked. All that goes out of the State brings back money to the State. The greater part of that will be pretty broadly diffused, because it goes to buy and repair all sorts of implements, build and repair boats and houses, buy provisions, and pay wages.

In September, 1884, not having sufficient funds to employ an agent for visiting the fishing stations, the Commissioners prepared a circular letter asking for some general information about the fisheries. These were mailed with post paid envelopes for return, and sent to fishermen and to some others who had been fishermen, or from peculiar circumstances had knowledge of fishery matters. The particular points we wished information upon were:

1. Whether *the average size* of the fish caught was increasing or decreasing.
2. Whether the *general product in pounds* increased or decreased.
3. The same as to *the extent of ground* fished.
4. Whether more or fewer *men, boats, and nets* were employed than formerly.

Please observe that these are vital points with respect to the continuance of the fishing industry in the immediate future, and also as bearing on the question of whether the State should do *anything* to foster and promote it, either by regulation laws, or artificial propagation. If the fisheries are producing more fish of marketable size each year, the supply keeping pace with the demand, and the product a fair one for the amount of ground fished, and the men and equipment employed, then it is doubtful if the State should interfere at all, certainly it should not unless it were to extend it, and thereby benefit the public by increasing the production to cheapen this kind of food. If on the other hand the fisheries formerly used have been, and are being rapidly depleted and rendered unproductive, the vastly increased area of the fishing operations is year by year extending the exhausted ground, and the public interest is suffering from the scarcity of fish food and its consequently enhanced cost, then the state should interfere to preserve an industry which brings wealth to the State at large, by proper regulations of the methods of fishing; and by artificial means, if they be practicable, to restore exhausted grounds and to stay the waste of the remainder. Now these questions just referred to bear directly upon this subject. For, if the average size is decreasing, the product decreasing or fairly maintained, the extent of ground rapidly increasing, and the number of steamboats and nets used also increasing, then the fisheries are being exhausted. The white fish is the most valuable of our fishes. It is marketable if averaging about two pounds. If they are taken weighing from one-fourth pound to one pound they are worth from 0 up to 2 cents per pound; if they weigh from 1½ pounds upwards, they are worth from 4 to 6 cents per pound, at first cost. These prices, it must be remembered, are the wholesale prices received by the fishermen, whether from the market men or from the great dealers; and they are mostly sold to and handled by the latter. The fish that bring, say 5 cents per pound, are sold to the consumer at from 8 to 12 cents per pound, and often in late years as high as 15 cents. There is one further consideration, if the price to the consumer is gradually rising, it is evident that the supply is not keeping up with the demand. In answer to these four questions we give the answers we have received from twenty-four intelligent fishermen from different parts of the State. They are as follows:

1. *The average size of fish.*—Three say it is stationary; three say it is increasing; *eighteen* say it is decreasing.

2. *The general product in pounds.*—Three say it is increasing; *twenty-one* say it is decreasing.

3. *The extent of grounds fished over.*—One says it is less than formerly; five say it is the same; *eighteen* say it is increasing rapidly.

The man who says it is less is referring to a fishing ground that has been ruined by the refuse from saw-mills, and to a village where ten years ago nine crews fished and now but one remains.

Several say the area fished has increased in five years about *three* times in extent, owing to the use of steamboats.

4. *Whether more or fewer men, boats, and nets are employed.*—Four say less; *twenty* say more.

This does not fairly represent the answers, for the majority of those who say more, qualify the assertion by saying the same number of men, or less, are used, but the number of nets has been increased immensely by the increased use of steamboats. The United States fishery census shows that in

Lake Michigan alone the number of gill nets increased from 450 in 1870 to 24,599 in 1879, and during the same period the number of steam tugs increased from 4 to 30; during the same time, almost the entire fishing grounds of Wisconsin were utterly destroyed, so that by 1880 more than two-thirds were actually abandoned, even by the scavenger fishermen who fished to clean the bones of ruined fisheries.

On the Michigan shore of Lake Michigan, during the same period, many of the grounds most conveniently accessible shared the like fate.

We are informed by a fisherman who has had large experience on the Fox and Beaver Islands, that the value of the catch at the Beavers is annually $150,000, and the catch on the main shore from Charlevoix around to Cheboygan is as much more; that the number of the fishermen and dealers on the same ground is nearly 500, and the capital invested $250,000. He also says of his locality that the average size of fish is greatly reduced, that the general product in pounds is about the same, that the extent of grounds has increased and that more nets and boats are used than formerly, and that the product in pounds has only been kept up by taking immense numbers of young fish from one-third to one pound in weight.

The locality of the varying reports with reference to the favorableness or unfavorableness of the season of 1883 is interesting. The only reports that said the season was "favorable" were on the south shore of the Upper Peninsula, east of Manistique, where the coast would be more or less protected from north and northeast or northwest winds. From Saginaw Bay and other points on Lake Huron, the Beavers, all east shore of Lake Michigan, Grand Traverse Bay, Detroit River, Lake Superior except about Marquette, the reports were very much alike, "unfavorable."

We close this branch of our subject by quoting from an article by Mr. Charles W. Smiley, an assistant of the United States Fish Commissioner, published in April, 1882, which appeared in the United States Fish Commission Bulletin, volume 1, for 1881, as follows:

"From the statements of Mr. J. W. Milner, who visited the fisheries of the great lakes in 1871, and whose report was published by the United States Fish Commission, and by comparison with investigation made in 1879 by Mr. Ludwig Kumlein, under the auspices of the Fish Commission and tenth census, the following facts appear:

"I. The total number of pounds of fish obtained from the great lakes in 1879 was equal to or greater than the yield of any years in the first part of the decade.

"II. The apparatus for capture has increased in effectiveness enormously, probably 500 per cent. The increased effectiveness was produced by the introduction of finer meshes in nets, the addition of steam tugs, the increase of pound nets, and very great increase in the number of gill nets in use. The number of fishermen also increased.

"III. The average size of the white fish and trout taken greatly diminished during the decade.

"IV. A considerable number of valuable fishing places became seriously or wholly exhausted. New places were sought out and the supply thus kept up.

"V. From these few facts the following conclusion is drawn: The perfection which the apparatus has attained, the diminution in the size of the fish taken, the exhaustion of numerous localities, and the fact that fishing is pressed under these circumstances enough to keep up the maximum supply,

indicate that, in the natural order of events, remarkable diminution, if complete collapse, is to be anticipated in the coming decade.

"VI. The natural order of events may be averted by regulation of the of meshes, preventing the pollution of the waters, and by artificial pr gation."

II—THE REGULATION AND INSPECTION OF FISHERIES BY LAW AND SI AUTHORITY.

For a number of years there have been in existence statutes providing n or less definitely for the regulation of fisheries; such for instance as rest tions upon the size of meshes in gill, seine and other nets, the open and cl seasons for fish of various kinds, places where certain appliances may not used, and the sizes of fish of certain kinds that may not be taken or sold. the main these provisions have been right, or as nearly right as suggesti coming from inexperienced or interested persons could be expected to be, would have been reasonably serviceable if they had been accepted and ac upon in good faith. But unfortunately they have not, in many instan been regarded. Frequent complaints have been made to the Commissio of the violations of the law in the particulars named, and most commo such complaints have come from fishermen. The great difficulty with laws has been that responsibility, for their enforcement was not clearly lod anywhere, and no provisions had been made for it either by suitable legis tion, or by appropriations to secure the necessary agents and to defray th expenses in enforcing the laws. We have known of many infractions of laws which we were powerless to prevent; for example, many cases wh white fish and lake trout are taken in gill nets of from one to three and sev eights inch mesh, pound or trap nets of one inch mesh, brook trout a grayling under six inches in length taken in great quantities, sometimes men pretending to be sportsmen; and sometimes the same fish have be speared on their spawning beds; this has been more frequently done in t case of brook-trout than grayling, because of their spawning at a time wh the streams are more conveniently reached. White fish have been taken the ton, weighing from one-half pound to one pound, and shipped to mark fresh or salted. Great numbers of young white fish, too small for mark value, have been destroyed by being taken with larger fish in nets of t small mesh, and left to rot upon the shores, or used by farmers for manu Complaint was made within a year that young white fish, unsuitable f market, had been taken in Lake Superior for the purpose of manufacturi into oil. Small black bass are sold in Detroit every winter, in great quantiti that have been taken in nets, fish that have never spawned, and were un for market even if captured in legitimate ways. This has been the case other markets than Detroit. We know that in many localities the comm mode of killing black bass is with the spear.

Many complaints come from the inland counties of the use of explosives i the smaller lakes, by means of which fish of all ages and sizes are killed i great numbers. We know that this has been carried on to the extent th "fish cartridges," as they are called are sometimes ordered from deale in sporting goods as if they were a recognized article of trade by suc houses. The notable decline in the numbers of black bass along the Detro and St. Clair rivers, and Lake St. Clair, is due principally to their being take in nets, which is prohibited by law, and partly because they are not protecte by a close season, from March 1st to July 4th, which would cover the spaw

ing season, with a brief period for recuperation. The prohibition of the capture of fish at particular seasons, or under a given size, will not accomplish their protection unless accompanied by a prohibition of their being exposed for sale, or had in possession during the time their capture is prohibited. It is generally conceded that no laws prohibiting acts, which but for the prohibition would be lawful, can be enforced in a large community with entire success, very much in advance of a public opinion favorable to their enforcement, and clearly recognizing their existence upon grounds of public necessity. A "public opinion" respecting the general and urgent necessity of proper restriction upon indiscriminate and wasteful fishing amongst the classes most directly interested, is gradually growing in Michigan, and we believe can be readily developed by methods which we recommend in this report, for the regulation and inspection of fisheries. Something has been done to stimulate it by the visits of our agent to many fishing points in the fall and winter of 1883, referred to more fully above. Much, also, has been done by the demonstration, only partly made as yet, that the annual plants of white fish in the Great Lakes, by the Commissioners, have begun to produce results. We are strongly of the opinion that when the State is equipped, as it ought to be, with the stations and facilities for hatching and planting from two to three hundred millions of white fish annually with other kinds of fish in due proportion, and the results of our present work are more fully realized and understood, which necessarily requires time for demonstration, all reasonable State regulation and inspection will be readily acquiesced in, or easily and effectively enforced. When the fisherman understands the true intent and objects of regulation, as well as the benefits to be derived from it by him, his principal objection to that part of it which bears directly upon his interests will be removed; because he will see that any temporary inconvenience he may suffer in the loss of tackle and present profits, is more than made good to him by the permanent improvement in the number and size of fish available. We have heard from many fishermen the confession that their unlawful fishing was ruining the fisheries, accompanied by the statement that their next neighbor was engaged in unlawful ways of fishing, and if they ceased it others would step into their places to continue it, and they might as well continue and secure their share while the fish lasted, as to leave it all to the others. Such a statement, and we have heard it in substance from many fair minded and intelligent men in different parts of the State, is a confirmation of all that the Commissioners have been trying to enforce upon the attention of the public since the first report was made, in brief, that the fisheries of the State were gradually being exhausted, and would within a time capable of being fixed with some degree of certainty, be rendered comparatively useless by illegal fishing if unrestrained by fair statutory regulation. In this regard we owe something to the coming generation and the future of the State. Ours is a right to the thrifty use of the natural resources of the waters, but not the right to exhaust and destroy their productiveness. The fishing grounds are one after the other fished out, and then new places sought where the same process is repeated. If each ground, as it becomes unprofitable for large operations was actually abandoned and allowed to rest, it would undoubtedly be slowly restored to productiveness by natural processes, because the fishing would become unprofitable before the last fish was taken, but this seldom happens, for when the great establishment is moved to a new ground, instead of being

allowed the required rest, which were it the subject of private control be given it (as a farmer does his fields by rotation of crops and "s down"), others come upon the ground, and by diminishing the s meshes in the nets used, catch the smaller fish that have been left, an carry to a further point the destruction of the fishery. It is to prevei that the present legislation upon these subjects exists at all, and it is to ively enforce this legislation, amended in the few particulars that need ion, that we now seek to secure from the Legislature the measure propos the regulation and inspection of the fisheries.

The scheme proposed is briefly this:

The appointment of an Inspector of Fisheries, who, with a limited nu of wardens as his assistants, under the general direction of the Commissi should be charged with the duty of enforcing the fishery laws. These of should be clothed with authority to arrest offenders, seize unlawful appar and prosecute in earnest all infractions of the laws coming to their noti discovered by them; to inspect apparatus, methods of fishing, and mar as well as packing-houses. A very important branch of their duty wou the gathering of a perfect census and reports of all fishing statistics, g amongst the fishermen and dealers and acquainting them with the laws, also giving them reliable information respecting the ability of the Stat maintain and increase the fish supply.

This would constitute a distinct department of the work carried on by State through its Fishery Commissioners. The preservation of the sup of fish now being put into the waters of the State from waste by illegal useless destruction seems to us to be too plain a duty to require argum If it is right to use a dollar of the public money to replenish the pu domain—and our public waters are about all the public domain now rem ing in the State—it is equally right to take reasonable precaution at pu expense to secure the best results of those plants of fish, to secure the lar returns from the public waters for the increase of the public wealth and food supply of the citizens of the State, and not suffer the general benefit arise from them to be sacrificed to the temporary advantage of a comp tively limited class of citizens.

There is another consideration to which the foregoing remarks naturally l —one that should be kept steadily in view: That the cost of replenishing public waters for industrial fisheries should be borne by the persons immediat and directly benefited by it. That the business of fishing should be licensed the State, and the fees paid for the license should be devoted to the hatch and distribution of the best varieties of fish and to pay the cost of State re lation and inspection. By a statute passed in 1865, §2170, General Statut non-resident fishermen are required to pay a license of $50 for each pou net used in our waters. But this is a matter of so great importance that should not be trifled with, and we submit at this time no scheme for licensi the fisheries, because we have not sufficient data at hand upon which to b a fair and comprehensive recommendation. The proposed law for regulati and inspection, it will be seen, will furnish the necessary materials for wor ing out an intelligent scheme of license. In Canada the public waters a fished under license with good results. In some of the older States this done, even to the leasing of small lakes and ponds, and in still other Stat it is being proposed, the recognition of the principle being quite general almost all the States which are replenishing the supplies of fish in publ waters for industrial fisheries.

Many fishermen in our own State have discussed this matter with the Commissioners and their officers, and in almost every instance have expressed their willingness to pay license fees if only proper regulations can be effectively enforced to preserve the fisheries, and sufficient young fish provided to ensure the continuance of the supply of fish. The lack of sufficient definite information, referred to above, renders it almost impossible to advocate with entire confidence in their justice and equality the various schemes for licensing which have suggested themselves or been suggested by others to the Commissioners, and it is for this reason that we say the subject should lie open until the next session of the Legislature. The present and most urgent need is for proper regulation and inspection of the fisheries, with increased facilities for artificial propagation. We give in the appendix the draft of a bill for regulation and inspection, with the amendments* which we recommend for the existing fishery laws.

III.—ARTIFICIAL PROPAGATION AND DISTRIBUTION OF FOOD FISH.—PRESENT AND PROPOSED EQUIPMENT, WITH GENERAL CONSIDERATIONS PERTINENT TO THIS TOPIC.

A—Whitefish.

The whitefish planting of April and May, 1883, was as follows:

Lake Michigan	10,500,000
Lake Superior	2,000,000
Lake St. Clair	3,000,000
Detroit river	6,720,000
Loon lake, Oakland county	1,500,000
For United States Commissioner in Indiana	15,000
Total	23,735,000

The details of the points of deposit, with the respective amounts and dates, will be found in table "A," given in the schedule.

The planting was done this year with the usual cans of tin, holding ten gallons, which experience has proved a good and safe way for the distances we have to travel with the young fish, and just as safely done as if far more expensive apparatus was used. The number carried in a can for a journey that requires all day, and not over three days, is about 20,000. If the journey is to be a short one of but a few hours as many as 30,000 or 35,000 may be safely carried. The essential thing in carrying young fish safely is to preserve an even and low temperature. It may be lower than the water from which they are taken, but must not become any higher than that. The even temperature is maintained by use of ice, and unremitting vigilance is always required. The car used this year was a box freight car, chartered from the Detroit, Lansing & Northern, fitted with air-brake attachments. The car was in use about six weeks, but no charge was made for the time it was kept beyond the month for which it was engaged. The car was hauled for us free of charge by the different railroad companies over whose lines it passed, and they also furnished free transportation for the attendants. The Detroit, Grand Haven & Milwaukee furnished us with a baggage car for the trip made over their road.

* NOTE.—The draft of amendments was not prepared in time to go to press with this report. They will be completed in time to lay before the proper committees of the Senate and House of Representatives. The general character of them will be understood from the text of the report.

The whitefish planting of 1884 was as follows:

Lake Michigan	15,800,000
Lake Huron	4,500,000
Lake St. Clair	4,000,000
Lake Erie	4,000,000
Detroit river	9,300,000
Loon lake, Oakland county	150,000
Total	37,750,000

The first plant this year was made April 4 and the last May 10, which was considerably earlier than 1883, when the first plant was made April 19 and the last May 25. The difference was caused by the rapid rise in the temperature of the water from about April 1. For the planting this year we chartered a baggage car from the Grand Rapids & Indiana Railroad Company, which answered the purpose admirably. The terms were very favorable to us, as no charge was made for the time the car was running over their own road.

The details of this plant will be found in table "B."

Total whitefish hatched and deposited in Michigan waters by this Commission, according to the reports, are as follows:

For 1874	1,532,000	For 1880	10,695,000
1875	2,211,500	1881	3,000,000
1876	9,310,000	1882	18,170,000
1877	8,001,000	1883	23,735,000
1878	12,520,000	1884	37,750,000
1879	14,545,000		
Total			141,469,500

Brook Trout.

The number of brook trout planted in 1883 was 269,000. These were deposited in fifteen different streams in Charlevoix, Genesee, Grand Traverse, Isabella, Kent, Kalkaska, Mecosta, Muskegon, and Wexford counties. Eight of these plants were of over 10,000 trout fry. Experience has shown that it is better to make the plants much larger than was done in the early years of the commission. Less than 10,000 in a stream of any extent seems to make but little impression until after the fish have spawned naturally in the stream. The details of the plant will be found in table "C." The first plant was made on February 24 and the last April 24.

The brook trout hatch and plant of 1884 was the first made after Mr. Walter D. Marks took charge of the Paris station. The stock of breeding trout which he found there in March, 1883, was so small that it was found necessary to purchase eggs, as had been done each year since the removal to Paris. About 107,000 were purchased from Mr. C. Holt, of Kent county. The total number of eggs laid down, including those bought of Mr. Holt, was 450,000. The first plant was made February 25 and the last April 24. The number planted was 353,000, and 30,000 were kept at the ponds to rear for breeders. The hatch this year was a remarkably good one, the fry proving strong and good feeders, and being in unusually good condition when planted.

The counties in which plants were made were Berrien, Barry, Emmet, Grand Traverse, Clare, Cheboygan, Isabella, Kent, Kalamazoo, Lake, Livingston, Muskegon, Mecosta, Mason, Newaygo, Otsego, Oakland, Ottawa, Osceola, Van Buren, Washtenaw, and Wexford. The details of the plant will be found in table "D."

The success that has been attained in the brook trout work has been very great and gratifying. There is excellent trout fishing in many counties of the State where trout were never known until planted by the State, and in many streams where grayling formerly lived but have become extinct. There are many more suitable streams still to be planted. No part of the work of the Commissioners has been attended by so many proofs of entire success, and no work that it can do can give more pleasure to so many people of the State as the propagation and planting of this beautiful fish. This year we shall lay down about 450,000 eggs of the brook trout from our own stock fish, and with the rapidly increasing number of breeders, in another year probably as many as 700,000, and after that, unless crippled by unforseen disaster, as many as we can find facilities for hatching. In another place we have spoken of the needs and possibilities of the Paris station—but it is proper to say here that we ought to have more hatching-house room, sufficient for at least 1,000,000 brook trout.

We have selected from a large correspondence a number of letters from different parts of the State, showing the success of this brook-trout work, and inviting a careful examination of them. The letters are given in the appendix.

Schoodic Salmon.

By the courtesy of Prof. Baird, of the United States Fish Commission, we received in February, 1883, 25,000 eggs of the Schoodic salmon, from the Station on Grand Lake Stream, Maine. These were hatched by Mr. William Elliott, of Cheboygan, at his trout farm, near Duncan City, Cheboygan county. The eggs were not in perfect condition when received, which resulted in a loss of about 7,000. Eighteen thousand were hatched and lived to be planted in Teal lake, at the village of Negaunee, in Marquette county. In February, 1884, we received from the same source 10,000 Schoodic salmon eggs, which arrived at Paris in excellent condition. These eggs were placed in the troughs, not upon trays as usual, but directly upon the clean gravel, and a very thin stream of water flowed over them. The success of this hatch was most remarkable. The total loss from bad eggs and every other casualty up to the time of planting the fry was only 126—less than one and one-third per cent. The fry were planted in fine condition in the Rapid river, and will drop down into Torch lake, a body of water, so far as we can tell without having tried it, exceedingly well adapted to the wants of this fish. It will be remembered that in 1876 a small plant of these fish was made in Log lake, Kalkaska county, where they attained a weight of eight pounds in three years. The lake is small and clear, and all have been speared out.

We know of no reason why this fish may not become habituated to some of our inland lakes like Torch lake, and in the Straits of Mackinaw, the St. Mary's river, and Lake Superior. The experiment, with the success attained in Log lake, is certainly worth an effort to give it a fair trial. This fish, besides his excellent qualities as food, is one of the best game fish. If we could have had the fish which were placed in Log lake protected and preserved we should now have an abundant stock from which to draw for making an experiment with the great lakes, as well as to properly stock suitable other inland waters. The proposed scheme for protection may yet save us Torch lake, and one or two others where we have reason to believe they have lived, and we have every reason to believe will increase. While we are under obligation to Prof. Baird, United States Fish Commissioner, we are also deeply

indebted to his able assistant, Mr. Charles G. Atkins, of Bucksport, who has personal charge of the Schoodic salmon work at Grand Lake S not only for the care with which he has prepared the eggs to be sent for the intelligent interest he has shown in our success with them, be as he does that ours are the waters where the propagation of this valual will eventually make the most important addition to our food supply. paper read by Mr. Atkins before the American Fish Culture Associatio at Washington in May, 1884, he closed with these words:

"The growth attained in some of the instances cited above lead hope that introduced to conditions more favorable than those of their haunts, they will become permanently increased in size and in importan is not too much to hope that in suitable tributaries of some of the great especially those of Lakes Superior, Michigan, and Huron, they may become what they have never yet been in their original homes in Main object of pursuit of an industrial fishery."

B.—PRESENT EQUIPMENT.

1.—The Detroit Station.

It was not until the middle of June, 1883, that we knew the appropr bill had passed the Senate and been approved by the Governor. Work then commenced in earnest to prepare for a new hatching-house fo whitefish work at Detroit. The Commissioners at Detroit and the S intendent had already examined new locations and decided upon that occupied at the corner of Lafayette street and Jos. Campau avenue. advantages over the old site on Atwater street are obvious to any one fam with the two localities, or who has visited the new hatchery. It was dec advisable to rent because the appropriation did not admit of the purcha sufficient ground at any of the points best suited for our purpose. The chosen has a frontage on two well paved streets, 100 feet on each st with an alley on the east side, and consists of four lots as platted. ground is owned by Captain John Pridgeon, of Detroit, and is leased fo years, with privilege of removal of buildings. The rental is two hun dollars ($200) per year, payable in quarterly installments, and the t Being now in use for State purposes, it is not assessed for taxation. The re is a very reasonable one to the Commission, and is cheaper for the State t to buy the property, at we think all the money that is appropriated to Commission can with advantage to the State be more actively employed investment in equipment and practical operations.

Before commencing on the building a competent architect, Mr. Arthu Cram, of Detroit, was employed to prepare suitable plans and specificat for a building of the size determined upon. The main building is 40x80 f with a shop and barn 30x46 feet, the hatchery fronting on Campau ave extending along Lafayette street, with the shop and barn extending along alley at the rear of the lot, leaving sufficient space for a dwelling house the overseer of the station or the superintendent. As the plans were develo and the requirements of the house were discussed and more fully underst by the Commissioners, it became evident that the plant would cost more t had been estimated; but the necessity for making the house and its equ ment as nearly perfect as our experience permitted became more and m evident. The increased cost over the estimate is due mainly to the fact t

it is a better house for its purpose than was at first contemplated. It is of the utmost importance to maintain as even and low a temperature in the house as possible. This was attained by sheathing the sides with inch boards on the studding, covering the sheathing with thick builder's paper, and clapboards outside of that, while the inside of the studding was lathed and plastered above the wainscotting, and the ceiling ceiled with matched flooring, which was well painted. The space above the ceiling is connected with the main room by the hatches, that can be left open (which has always been done) if desired. The ends of this upper space are left open, protected from weather by louvre-boards, for the circulation of air. The floor is of cement, well laid on a substantial foundation of concrete spread over broken brick and slag. A suitable office and comfortable bed-room with two closets is fitted up in the southwest corner, close to the front door. The shop opens off the northeast side, with the barn beyond, the rooms over the barn and shop being used for storage. When the plans and specifications were in readiness they were placed in the hands of the most competent builders, and bids for the work were received and examined. The bids being found to range above the estimate, it was decided to be our best course to employ builders of capacity and established reputation to furnish the materials and labor at cost and proceed under the superintendence of the architect to do such of the work as was deemed necessary, paying the carpenters a commission of 15 per cent, and for the mason work a definite sum, considerably less than usual profits. We accordingly employed Mr. Alexander Chapoton to do the mason work and the Messrs. Candler to do the carpenters' work. The result abundantly justified this course.

The interior fittings of frames and tanks were constructed in the same way, under the immediate supervision of Mr. Chase, the Superintendent. The apparatus used is the Chase Automatic glass jars. The jars are carried in double rows, three tiers high, on two sets of frame work, as in the old house, with supply troughs and waste troughs between the jars, there being cross-troughs at the different levels, with one large receiving tank across the end, and another connected with the former running lengthwise of the house between the two frames that carry the jars. These frames have been made high enough to put in another tier of jars. The present number of jars is 312, with a capacity of about 42,000,000 whitefish eggs. The jars are placed 16 inches from center to center, and the remaining space would admit of increasing the number somewhat, if the water supply and tank room would admit of it. By putting in the fourth tier the number of jars could be increased one-third with the present water supply.

Last winter's experience has shown that more tank room for storing and carrying young fish is needed. The relative size of tank room to the number of jars is a matter that can be settled only by experience. Extensive operations have not been conducted a sufficient length of time yet to furnish the data for a correct estimate. In the former house it was known that our tank space was insufficient, and in laying out the new house, where the number of jars was increased only one-half, the tank space was increased five fold, still there is not enough storing space. With the increased capacity of the new house it became necessary to arrange for additional water supply, and a consequent additional expense. The water supply is from two connections of one and one-half inch pipe to the mains, and is just sufficient for the number of jars, and in doubling the water supply the Detroit Water Commissioners increased our water rates from $200 to $350, which was deemed v reasonable, if any charge should be made to the State for it. The cost construction of the Detroit house is as follows:

Carpenter work including interior fittings		$3,783
Mason work, floor and sewerage		1,304
Painting and glazing		236
Architect		129
Plumbing		192
Trees and sodding		37
Total construction		$5,683
Furnishing bedroom and office	$70 93	
100 new carrying cans, 10 gal.	375 00	
100 new jars	235 00	680
Total construction and furnishing		$6,364

2.—The Paris Station.

The most important inland work of the Commission is that conducted a Paris, Mecosta county. During the past two years very much has been don to increase the efficiency and improve the general appearance of this station The hatchery has been ceiled and painted inside, which has added to its ligh and cheerfulness. The shop has been removed to the rear of the building The ice-house and food-chopping room has been removed across the creek t the south side, a distance of about 60 feet from the hatchery door. The work of preparing the food for the fish is all done there and the place is kept sweet and clean. An upright plank has been set about a foot from the sills of the hatchery, all around, to give a circulation of air and prevent rot. The waste from the large pond is now carried around the west end of the hatchery in a conveniently shaped and firm plank sluice-way, from which it discharges into the creek bed.

On the south side of the hatchery, between it and the creek, have been placed four rearing or nursery races, four feet wide and thirty-five feet long, for the proper care of the fry that are kept and reared for stock fish or breeders. These races are fed from a cross trough across their upper or west end, and supplied either from the waste of the lower pond, or directly from the overflow ditch which carries the surplus water from the upper dam around the ponds. In this way the races are kept pure, and the young fish have a supply of water from which the small animalcula and other swimming or floating food has not been taken, as is the case, more or less, with the water flowing through the series of ponds. The races are supplied with screened gravel, screens and covers, and have proved a great advantage during the past year in carrying a large stock of young trout which could not have been so conveniently and safely cared for in ordinary ponds.

Last year plank ponds, with covered spawning races connected to them, were placed in the two lower large ponds, and this year two other plank ponds have been constructed, one in the large "elbow" pond and the other entirely new, each having covered spawning races. The California trout pond has been rebuilt, its entire walls having been constructed of cobble-stones laid up like a sea wall, and a spawning race put into the upper end. The new upper pond is connected to the creek above the upper dam. In the creek above the

upper dam a covered spawning race has been placed, and above it a small plank pond, with an inflow so constructed that adult trout dropping down the stream can come into it, but cannot go up stream again unless they are permitted. This virtually gives us an additional large wild pond, which has been of great service during the spawning season just passed.

A large amount of grading has been done around the ponds and on the road just opposite the hatchery, and a row of maple trees has been planted on each side of the road across the premises. A large wild pond has been constructed between the highway and the G. R. & I. R. R. track, through which the entire creek flows. This pond will catch the leakage of small trout from the house and ponds above, as well as the fish coming up from the creek below, and so add to the stock of fish available for supplying eggs to the hatchery. This pond is held by a high, strong dam, and will add very much to the appearance of the place. On the side extending along the road it has a well laid stone "sea wall." It is intended to place over the wall a substantial railing to render the travel on the highway perfectly safe at this point. The roadway between the pond and the hatchery has been graded up about two and one-half feet. Considerable grading has also been done about the ponds this year, but much more remains to be done to make the place attractive and to complete the ponds.

The dwelling house has been made more comfortable by the addition of an inclosed woodshed on the rear. It needs, however, to complete it, a covered piazza across the west front, and around to the hall door on the north, and to have the chimneys extended down to the ground and rested upon proper foundations. Some of the plastering should come off where it has been loosened by the settling of the house, caused by the weight of the chimneys, which were not properly built. The barn should be removed to a point just north of the house, on the east side of the road, and the sink-hole at that point drained. When the barn is removed from its present site the grading can be completed down to the ponds. The property should also be substantially fenced along the highway.

Our stock of fish carried at this station consists of brook trout, land-locked or Schoodic salmon, California trout, a few salmon trout, hybrids of the brook and salmon trout (one-half and three-fourths), and a few grayling. The experiments thus far with hybridization have been very successful. The half-breeds (one-half brook trout and one-half salmon trout) have re-produced, and their eggs have been fertilized again from the male brook trout, making three-fourths breeds, and these have again spawned and been crossed with the brook trout. The one-half and three-fourths breeds have proved a strong, rapidly growing, hardy fish, with, so far as can now be seen, the best qualities of their progenitors—the beauty and game qualities of the brook trout, with the strength and large growth of the salmon trout. To carry these experiments to further and practical tests, more pond room is needed. This season is the first one that we have been able to lay down a stock of eggs without buying from other establishments. This we were able to do from the number of mature fish caught in the creek above the ponds. The number so taken the past summer and fall was 671. Probably as many more three years old and upwards can be procured from the same source next year. The number of eggs laid in this past fall is 467,000, including 17,500 eggs of the hybrids. In 1885 the stock should furnish about 700,000, and in 1886 as many as 1,000,000 and upwards. To carry this stock successfully and keep up the efficiency of the establishment we need, the coming season, at least three ponds on Cheeney creek. The hatching house room needs to be do before the fall of 1885. The present hatchery building is 20x60, abou feet of which is taken off for shop room. By doubling the building, m it 40x60, and using the entire space of that size, there will be sufficient ac modation for hatching and caring for one million brook trout and upw the shop should be added on the north side. The entire building shoul raised about one foot to protect the sills properly, and the attic be prep for a sleeping apartment and large store-room, reached by a stairway.

But to do all that the inland work requires, the Commission needs further facilities of land and water. Such can be most conveniently fo on the property purchased last summer by Mr. Archer C. Babbitt, the as ant at the Paris station, north of and adjoining the State property, w gives the confluence of the creeks known as the Big and Little Buckh enough of the Big Buckhorn for an ample pond room for the grayling hybrids, or California trout, and the most favorable opportunity for Scho salmon if it is possible to rear them to the breeding stage in confinement, also gives entire control of another small spring brook of cold water wh will be valuable as a wild breeding pond. This property has a very g house upon it which is occupied by Mr. Babbitt, and can be purchase rented for the State on reasonable terms. It is further of importance as co manding the lower part of the united creeks in their course upon the pres State property.

In addition to the other work done at this station, we have this year ad a stock of salmon trout eggs, about 700,000, the fry from which will planted in some of the larger and deeper inland lakes. This, it is hop can be made a prominent part of the work at Paris, as it can be done connection with the regular work of the station, and it will prove very adv tagious to introduce this valuable fish to such inland waters as are suital for its growth.

The importance of the inland work is duly appreciated by the Commissio ers, and the results so far attained are becoming more and more appreciat by the citizens of the interior. And yet we have not done one-half that ca and ought to be done if the means and facilities are supplied by the Stat The Paris station has been maintained at an expense of less than $2,500 p year for the past two years. By increasing the current expenses about $1,5 and adding to the plant as suggested above, at a cost of say $5,000, the wo can be doubled in 1885, and increased still further in succeeding years. I counting the cost of such extension it must be remembered that if the Stat should hereafter determine to stop this work or remove it to some other point the property would readily bring in the market all that it had cost the State so that there could be no loss.

3.—The Petoskey Station.

On the 6th of August, 1883, Commissioners Kellogg and Bissell, with Mr. O. M. Chase, Superintendent, visited Petoskey to decide whether a whitefish hatching station should be located there. The visit was made after an inspection of Sault Ste. Marie, and when it was known that nothing could be done there until Congress should pass a resolution authorizing a lease of the grounds which we should need if an establishment were made at that point. The village council of Petoskey had voted the Commission free use of water if

they should locate there, and the geographical position of Petoskey, its railroad communication, and the importance of the fisheries in the vicinity combined to make it a desirable point for an extensive whitefish work. The citizens of the place took a decided interest in having the work located there, and some of the most prominent and influential of their men met the Commissioners on their arrival and escorted them on their inspection of the various sites proposed. It was speedily determined to locate at Petoskey, and we were not long in selecting the place. That chosen is just northeasterly of the Arlington Hotel, fronting the Grand Rapids and Indiana Railroad track. A ten years' lease of the ground was given us by the proprietors of the Arlington Hotel without rent. There was no improvement on the ground except a small cottage, which was purchased at its cost price—$140. The dimensions of the building were determined upon, 30x60 feet; it was laid out, the lot staked off, the specifications were drawn, and a contract let to a builder, Mr. John Creller, at once. The work was promptly and efficiently performed, and in October we had a complete hatchery. The cottage on the grounds was rebuilt, and furnished a neat and comfortable dwelling for the Overseer and his family. A small spring brook flows across the grounds, and at a small expense has been made to adorn the premises and to furnish sufficient pond room to make some display of living fish.

The cost of the station has been as follows:

For the hatchery, interior woodwork, and rebuilding cottage	$2,077 01
For pipes, water connections, materials, fountain, and labor	832 03
Cost of 208 automatic glass jars	488 80
Total construction and equipment	$3,397 84

Mr. George W. Armstrong of Meridian, Ingham county, who has been employed several times at taking whitefish eggs, and had proved to be a very valuable man, was appointed overseer, at a salary of eight hundred dollars ($800). He moved there with his family and took charge in October. Mr. Chas. H. Brownell, who had been favorably known to the Commission some years before as an assistant at Pokagon, and who had been recently Superintendent of Fisheries in Nebraska (the latter place he had resigned on account of sickness), was engaged as assistant, at six hundred dollars ($600) per year, moved with his family to Petoskey, and went to work the first week of September. The labor and experience of these men made a very large saving in construction of the interior apparatus of the hatchery, and in completing the house ready for operation in November.

The question of a water supply was of course the first one settled, and that had been decided before any decision was reached in favor of the Arlington location. The Arlington hotel was supplied by an inch and one-half iron pipe connected to an eight-inch main in Lake street, and brought from thence along the G. R. and I. R. R. track to the hotel. The pressure on the main from the height of the reservoir is over seventy pounds to the square inch, and we were advised that by connecting to that service pipe at the hotel a pipe of the same size an abundance of water would be had in the house. This accorded with our experience at Detroit, and we were of the opinion that the greater pressure at Petoskey would make up for the difference in length of the pipe there and at Detroit, the pressure at Detroit being about twenty pounds and the connection with the main not being over

twenty-five feet. The great head shown at the faucets in the hotel ap
confirmed this belief; but when the connections were made at the
and the full flow turned on it was found the supply was scant.
covery was not made until about ten days before time to commenc
tions—too late to make any other arrangements, except connecting
railroad water tank at the corner of our grounds. The mistake wa
ous one, although, perhaps, it was a natural one, and was simply
inexperience with the conditions to be dealt with there.

It was hoped the village authorities would be able to extend a ma
or six inch, down Division street, in the direction of the hatchery fr
street during the summer of 1884, but their water fund has not warra
as we were assured by the committee of the council, and we shall be
to wait another year. That extension must shortly be made to fur
protection needed in that quarter of the village from fire risk. When
accomplished we shall have an abundant supply by connecting w
larger service pipe than the one now in use.

The difficulty with the water supply at Petoskey led to a most di
accident. The water was turned on in the house the third week in
and as soon as it was found that the supply was not sufficient to run
then in place, Mr. Armstrong, the overseer, telegraphed Mr. Chase,
once went to Petoskey to learn the extent of the difficulty, and, if p
to overcome it. Everything was done that could be to remedy it—ne
valves were put in, all connections carefully examined from the hate
the junction with the supply pipe at the hotel. But to no purpose.
operations took up two weeks of most precious time, for it was just
beginning of the fishing, and they delayed the final arrangements for
eggs. Mr. Chase had prepared crates for holding the live whitefish just
the mouth of Bear creek, which flows into the bay through the vill
Petoskey, and a live-boat, or box, was made for hauling the fish fr
pound nets of Mr. Connable, on the south side of the bay, to the crates
river for handling. Fearing that this source of supply might, in case
dent, be insufficient for the capacity of the house, Mr. Chase determi
go to Harbor Springs and there arrange with other fishermen for atte
upon the nets on that side of the bay. Accordingly he went on
morning, November 11, across the bay to see the fishermen, with Mr.
strong, Mr. Brownell, and Mr. Detweiller, his two sons, and grandso
Mackinaw boat. This boat and crew had been engaged to bring in t
from the nets. The work of examining the water pipes had only
finished late the night before. The great storm began that mornin
was at its height in the afternoon when the party were ready to ret
Petoskey. From the shelter of that perfect harbor at Harbor Spring
were unable to judge of the violence of the storm out in the bay beyo
harbor point. When they were ready to go the elder Detweiller and
others were doubtful if it was safe for them to attempt the crossin
Mr. Chase, being anxious to get the train for Detroit that night in or
give personal attention to the operations on Detroit river, which were b
time under way, appealed to the sailing master to say if it was safe to
The captain, assuring him that there was no danger and he could take
safely, the party embarked. The weather was cold, and the squalls
accompanied with thick flurries of snow. The boat was seen by s
people who watched it out into the middle bay, as well as they were able

account of the high seas running and the snow squalls that from time to time hid her entirely from view. The boat was seen by a woman in Petoskey to capsize; an alarm was given, and the boat was not seen again until she was discovered driving before the storm into the breakers which lined the banks. The entire crew was drowned, and none of the bodies have ever been discovered or seen except the elder Mr. Detweiller, whose body was found some days after far up on the shore, covered with snow and the sand and drift wood thrown out by the waves. How the accident occurred no one knows, beyond the conjecture that the foresail, being old, was blown out, and the boat becoming unmanageable fell off before the wind, and the gale striking the mainsail broadside bore her over. This is suggested by the fact that when driven ashore the foremast stood upright in its place with small shreds of the sail still clinging to the spar. The impression made on that community by this dire calamity will not be forgotten while one of this generation lives. And while we recall with gratitude the generous sympathy that went out from the whole people of Petoskey to the women widowed and the children orphaned by that cruel storm, we must not forget to mention the brave though fruitless attempt at a rescue undertaken by Captain Atkins in the partially open boat Cora, accompanied by a volunteer crew.

The loss of Mr. Chase, Mr. Armstrong, and Mr. Brownell was as great a blow as the Commission and its work could sustain. The minute which was spread upon our records on the occasion of this accident we have embodied in this report (see appendix) as a just, though incomplete tribute to the memory of capable, zealous, and trustworthy officers.

The news of the disaster at Petoskey was not known in Detroit until just after noon the following day, as the telegraph lines were blown down at several points along the line. Mr. Walter D. Marks, overseer at Paris, was telegraphed to go to Petoskey by first train, and Mr. Wm. Elliott of Cheboygan was asked if he could spare Mr. A. W. Marks, a skilled fish culturist who was then in Mr. Elliott's employment, laying out his trout farm near Duncan City. By the first train after the intelligence was received, Mr. Bissell, with E. O. Chase, left Detroit, and the President, Dr. Parker, left Grand Rapids and reached Petoskey Tuesday evening. It was found everything had been done that could then be done to recover the bodies by the citizens of Petoskey. The intense interest taken by the people was gratefully appreciated by the bereaved families as well as by the Commissioners.

We take this occasion to say that wherever we have gone on our business throughout the State the people of all classes have shown an intelligent interest in the work of the Commissioners and a readiness to give it such support and assistance as was required. This has been noticeably so at Petoskey, and has been duly appreciated.

As the season was rapidly passing for procuring a supply of eggs about Little Traverse Bay, it was necessary to do promptly what could be done to repair the losses. On Nov. 13th A. W. Marks arrived from Cheboygan and was employed as overseer of Petoskey station at a salary of eight hundred dollars ($800). He at once began to secure such ova as could be had, but success was small, as a second storm destroyed the nets. From that time he tried every available place in that region, finally securing about eight million eggs, the larger part of which were procured very late in December near Escanaba. Upon the return of Ed. O. Chase to Detroit Eli Tinlan, the assistant at that hatchery, was detailed as assistant at Petoskey. In January it was

found there was not sufficient water to carry the eggs then in the house in view also of the large expense incurred in efforts to fill that house it deemed advisable to remove the eggs to Detroit and close the Petoskey for the remainder of the season. This was accordingly done about the m of February, 1884. Room was found for the Petoskey eggs in the jars a Detroit house by filling up the places of the bad eggs, which had by that worked off. The removal was successfully accomplished by packing the in the usual carrying boxes. A. W. Marks went to Paris to assist in ing the brook trout plant from there, and Eli Tinlan returned to his fo place in Detroit.

As the supply of water is no better there this year than last, it has thought best to make no attempt to fill the house and run it at a full exp when less than one-half of its capacity is unavailble. Mr. Marks' family m there in May, and will remain there during the winter to care for property, while he will be employed at Paris and Detroit, where plenty work is ready for him. During the summer considerable work has been d at Petoskey, grading and sodding, relaying the circular fish pool and fo tain, putting in along the brook two plank ponds for the exhibition of and finishing two rooms in the high basement of the overseer's cottage.

4.—Glenwood Station—For Carp.

In November, 1880, the Commission received from the United States F Commissioner, Prof. Baird, eighty young carp. These were placed in State ponds, then at Pokagon, and cared for through the winter, but w indifferent success, quite a number dying. Those remaining made a ra growth during the ensuing summer, but on the removal of the hatchery fr Pokagon to Paris, Mecosta county, it was thought best to remove the carp some locality in the immediate neighborhood rather than risk the transfer Paris. Fortunately a selection was made of some ponds on the farm of M W. Wells, at Glenwood, a station on the M. C. R. R. near Niles, and arrangement made with Mr. Wells that in consideration of caring for th in the matter of protection and feeding he should be entitled to one-half the increase, the old fish to remain the property of the State.

Owing to complications consequent upon the removal to Paris, and t labor involved in the erection of buildings at Detroit and Petoskey, ve little attention was paid to the carp, only to ascertain that they had winter nicely, and that quite a large number of young had been hatched the follo ing spring.

In the early spring of 1884 the Superintendent visited the ponds at Gle wood and found that the ponds were exceptionally favorable to their su cessful wintering—undoubtedly the most important factor in the successf rearing of carp in our comparatively cold northern climate—there being spring in a deep portion of the pond in and near which the carp took up the winter quarters, and from which they came forth this spring in fine cond tion, as evinced by the fact that some of the original stock had attained to weight of thirteen pounds.

An attempt was made to spawn them artificially, which was not success ful. They were then given the freedom of the ponds and allowed to arrang their domestic affairs in their own way with the result that there are nov several thousand young fry in the ponds in good condition.

The Commission have endeavored, and in a measure feel that they hav

succeeded, in obtaining reliable and practical information in regard to the successful propagation and rearing of what may properly be designated as the "farmers' fish," and hope to be able through the coming winter to lay before the people of the State as thoroughly a practical treatise on this subject as their experience and observation will permit.

Enough information has been gathered to warrant them in saying that only by intelligent care and cultivation in properly constructed ponds can any considerable success be hoped for by those constantly applying for this fish. In order that the Commission may meet the rapidly increasing demand for carp it will be necessary to select one or more convenient localities, where properly constructed ponds and accessories can be made to carry forward the important work.

The geographical position and the degree of success obtained at Glenwood make it desirable to select that as a point from which that portion of the State can be easily and economically supplied, and they would ask you to recommend to the Legislature a sufficient appropriation to forward this important work.

C.—PROPOSED EXTENSION OF THE EQUIPMENT.

1.—The State Agricultural College at Lansing.

In the spring of 1884 it occurred to this Board to inquire why it might not join with the State Agricultural College at Lansing in establishing as an adjunct to the college, and upon its grounds a station for the propagation and distribution of German carp, and possibly black bass. Correspondence with President Abbot, of the college, disclosed the fact that the Faculty and State Board of Control of the college were in favor of making an effort in that direction, and furnishing us such facilities as they had at their command. Accordingly, in the latter part of June, Mr. Bissell went with the Superintendent, Mr. Marks, and spent part of a day at the Agricultural College examining the availability of the grounds and their water supply, and also discussing with the President and other officers of the college the practicability of carrying out this scheme. There are two notable advantages in making the location at the college, which are: First, that a successful establishment for the artificial propagation of carp and bass will furnish the means of instructing the students in the college in useful ways of improving the waste and other waters that are so abundant upon the farms in Michigan. Another is, that while it would furnish this Board with an advantageously situated station for carrying on an important part of its work, the necessary grounds and part of the necessary expense would be supplied at the lowest possible cost to the State, as we should be able to utilize at slight expense the waters of Cedar creek, which are admirably adapted for this purpose, and also to utilize the grounds adjoining the creek, between that and the bluff upon which the building is situated, which is of no special use to the college. It will also furnish us with a station at the Capital, where members of the Legislature and other officers of the State government may learn something of the methods, extent, and value of this work while they are in attendance upon their duties at the State Capital. A further examination of this location was made by Dr. Parker and the Superintendent, and the former good opinion of it confirmed. While there are no springs at hand to keep up the temperature in winter, artesian wells are easily and cheaply constructed here to furnish water of proper temperature to take the place of natural springs.

Already, at the suggestion of the Commissioners, the authorities of the college have authorized a small expenditure of money to strengthen and raise the dam across Cedar creek, by which their pump works are supplied, and also to prepare a part of the grounds where ponds shall be laid out. Not having sufficient funds in the fall of 1884 to improve the ponds, a small pond in use by the Botanical Department of the Agricultural College was prepared and stocked with small carp from the station at Glenwood. In another part of this report the importance, as well as the methods of carp culture, are fully discussed, and to which we respectfully refer in connection with the proposed establishment at the Agricultural College. So far it has met with great favor, not only by State officers but by prominent citizens of the State whose attention has been called to it. The calls by people of the State for supplies of carp have been very numerous, and ought to be supplied. There are on our books at present, without any advertising on the part of the Board that they were prepared to distribute carp, not less than 79 applications.

2.—Sault Ste. Marie.

Early in 1883 the desirableness of having a station for whitefish as well as trout hatching upon Lake Superior was suggested and pretty thoroughly discussed by the Board. Attention was at once called to the site at the Rapids of the St. Marie river, lying just between the rapids and the ship canal, as a place affording many advantages. The water flowing right past this location, and it could be made to flow across it either in artificial streams, or artificial ponds, or from piping through the house for hatching operations, is extremely cold, is perfectly pure, and is the native water of the speckled trout and the whitefish. The whitefish, as is generally known, are caught on the rapids directly opposite this location in great quantities by the Indians from their canoes, and while at the present time trout fishing along the rapids is not as good as in former years, because it has been so assiduously fished, particularly from the American side, still not infrequently speckled trout of quite large size are caught there. It is thought that the advantages of this water will enable us to solve some experiments which have never yet been successfully accomplished. If anywhere in the world the delicate whitefish can be reared to maturity in captivity, and made to produce, it would be under the favorable conditions found in these waters. This matter of the location at Sault Ste. Marie was referred in February, 1883, to Commissioner Bissell. Investigation showed that the title to the property was vested in the United States government—that it had been withdrawn from entry or location and reserved for military purposes. It was supposed by the engineer officers that this ground would ultimately be needed some way in connection with the improvement or enlargement of the canal. It has been occupied for a number of years past by some Indians and half-breeds for their summer quarters while fishing upon the rapids. All Indian title in the land has been long ago extinguished by treaties between the United States and the Indians. Application was made to the Secretary of War in March, 1883, requesting that he would give a lease of this location to this Board for the purpose of making an establishment there for the artificial propagation of food fishes, to be used entirely for State purposes. The Secretary of War replied when we had submitted to him the plans of the building which we desired to erect, he would then consider and decide whether or no he had authority to give us the license to use the grounds. He suggested, however, that it would probably

require Congressional action before he could act. To that the Board of Commissioners replied that they thought that the Secretary of War had better first decide the question whether he had authority to make any lease for our use and occupation of the premises. Whereupon he promptly responded that he had no authority, and that it would require a joint resolution of Congress to authorize him to make the lease. Application in the mean time had been made to some of our Representatives in Congress to further our interests in securing that location, and we had also applied to Prof. Spencer F. Baird, United States Fishery Commissioner, asking his influence and assistance in the matter. These agencies failed, and it was then too late to seek favorable action in Congress, particularly as the dilatory action of one of our Representatives in whom we had placed some reliance, gave us no encouragement that action could be had. The matter, however, was not abandoned, but the government officers in charge of the work at the canal were seen at different times, and their interest in the matter was secured. In August Mr. Kellogg, Mr. Bissell, and the Superintendent, Mr. Chase, went to the Sault to examine the property, and ascertain whether the improvement of it for our purpose was practicable. A very careful inspection of the property, its location, fall and character of the water was noted, and the opinion was general that it was a very desirable place, although the construction of extensive works here would probably be a very considerable expense. This, however would be more than counterbalanced by the superior advantages of the abundance and quality of the water. Before our Representatives in Congress went to Washington for the last session they had all been approached to secure their interest in the passage of a joint resolution authorizing the Secretary of War to give us a lease of the grounds. The matter was presented to the House by Hon. W. C. Maybury, of the First District. It was referred to the Public Lands Committee. A full hearing on the merits was had before that committee, which reported unanimously to the House in favor of the passage of the resolution, and it was passed. In the meantime Senators Conger and Palmer had promised their assistance in the Senate, and ultimately procured its passage late in June, 1884. The resolution was approved by the President. In the middle of July it was thought best to visit the Sault again and reëxamine the property in the light of the experience which we had gained in the past year. Accordingly Mr. Bissell and Mr. Whitaker went to the Sault, and were there joined by the Superintendent, Mr. Marks, and A. W. Marks, the overseer of the Petoskey house, who have had very wide experience in locating and opening new hatching places. Again a careful examination of the premises was made, partly with a view to trying some experiments this coming winter if found practicable to do so. Upon this visit, and a very careful consideration of the subject with the engineer officers, as well as the executive officers of the canal, and also with intelligent fishermen and citizens of the Sault, we were led to the conclusion that one of the most serious obstacles to be overcome in utilizing that water power for our purposes, was the long-continued cold and penetrating frosts of this latitude. Another matter of considerable importance will be the manner of taking water into the house, provided the grounds are utilized at once, for the hatching of white-fish. After a very full discussion and consideration of all the conditions under which we should have to commence our operations there, we are led to the conclusion that it would be unwise to do more for the first year than to commence the improvement of the grounds and

erect part of a trout-hatching house for speckled and lake trout, leaving the manner of improvement, for the purpose of white-fish culture, and the extent to which white-fish operations should be established there, until we should have one year's experience at least in the operations of trout work. It is difficult to make a close estimate of the amount of money that would be required to properly improve these grounds; because there are many large boulders upon the ground which would need to be handled and moved; and the whole depth that we should need to disturb, either in laying foundations or in digging the deepest ponds, would not require us to go to the bed rock, as we are informed that the surface here for ten or twelve feet consists of this boulder-drift. All of the stone which we should require for making a sea-wall or for making ponds would be found ready to our hands. The only expense in connection with them would be the lifting and handling and perhaps splitting them for our purpose.

After the passage of the joint resolution a lease between the Secretary of War in behalf of the United States Government, and by the Commissioners in behalf of the State, was executed in duplicate on the 16th day of Sept., 1884. Steps were at once taken under the direction of General Poe to deliver to us possession of the premises.

We recommend that a sufficient appropriation should be made for the improvement of this location in the way indicated above, that is, for the purpose of commencing, and completing part of, a future trout hatchery; for building such ponds as may be found necessary, and for securing a proper supply of water for the house as well as for making a small crib dock about 75 feet in length to project from the upper part of the premises, across the nearest channel of the rapids in order to divert a large stream of water across the grounds, through the ponds and into the house, and to provide quarters for the overseer who is placed in charge. We think the appropriation should not be less than $5,000.00. We look upon the location of our work at this point as one of immense future importance. The time is already at hand when preparation should be made for meeting the demand to be made upon the State for an abundant supply of young white-fish and trout to supply the needs of the Lake Superior coast. The disastrous effects of over-fishing have begun to show themselves on several of the older fishing grounds along the Lake Superior coast. This is notably the case at the shore fisheries at White-fish Point, and for thirty miles either side of Marquette, and in the head of Keweenaw Bay. And the amount of fishing done on Lake Superior has been and will hereafter be increased many times each year.

3.—Belle Isle Park, Detroit.

The Commissioners of the Belle Isle Park have considered that in making improvements upon certain portions of the park property an opportunity may be offered for improving some large fish ponds. There are some places in the park which will be laid out in artificial ponds or miniature lakes, with a current of fresh water flowing through them from the head of the island, partly to aid the drainage and partly to furnish material for roads, which they will be glad to have properly stocked with useful and ornamental fish, to furnish an additional attraction to this beautiful place. It is quite probable that we may see a way to accept their generous proposal and utilize the ponds for extensive breeding operations.

Their plans for improvement are not sufficiently advanced now, to enable

us to say in what way we can aid them and benefit our work by accepting the offer; but when they are ready to lay out the work we shall not lose the opportunity to forward the State's interest, if it shall prove to be practicable to utilize the park ponds for the State's work.

D.—OTHER MATTERS RELATING TO ARTIFICIAL PROPAGATION, ETC.

1. Examination of waters.
2. Inter-State conference.
3. Re-stocking the Au Sable river.
4. Applications for fish.
5. White-fish ova and Fort Wayne fishery.
6. Outline reviews—1882–1884.

1.—Examination of Waters.

The building of the Detroit and Petoskey houses in the summer of 1883, and the necessary pond work at Paris and carp work at Glenwood in the summer of 1884 prevented as full and systematic work in examining lakes and streams as was intended and desired. The superintendent has examined Torch lake so far as to demonstrate the fact that white-fish and salmon trout exist there. Some streams in Emmet, Charlevoix, Wexford, and Newaygo counties have been examined for brook trout, in all of which the streams were found of the first quality as to water, abundance of food and other conditions favorable to supporting a large number of well-fed fish—much larger than were found, or reported in either locality. It is the intention of the commissioners to make a complete and systematic investigation by the use of nets of all lakes that have been stocked, or where that has been attempted, by the State, in order to determine whether they were suitable for the fish planted in them, and if not to learn the conditions existing that are favorable for the development of other kinds of fish.

2.—Inter-State Conference.

In October, 1883, a meeting of Fishery Commissioners from States bordering the great lakes was held at Detroit upon invitation of the Michigan Commission. The purpose of the conference was to interchange views upon and discuss the best methods of regulating the fisheries of these States with a view to general uniformity, so far as that was attainable, in the laws of the several States affecting different parts of the same waters and the pursuit in them of the same kinds of fish. Commissioners attended from Minnesota, Wisconsin, Ohio, and Michigan, and the United States Fish Commissioner was represented by one of his assistants. A very general agreement was found to exist among the representatives as to need of better enforcement of existing laws, as well as for uniformity of legislation by the several States concerned.

A question has sometimes been raised as to the jurisdiction of the States bordering the great lakes to make and enforce such laws as they deemed necessary respecting the fishing carried on in those lakes, and it was thought probable that the same question would be suggested at this conference. To be prepared to answer it if asked, we requested Mr. Kirchner, late Attorney General of Michigan, to examine the authorities and present at the conference the results of his investigation on this subject. At one of the sessions Mr. Kirchner was present and explained the law as to the power of the State over its bordering waters in substance as follows:

The first question is whether these waters are within the civil and criminal jurisdiction of the States. This matter has been gone over very fully, and has been expressly decided by our own Supreme Court in the case of The People vs. Tyler, 7 Mich. Tyler had committed a deadly assault on the St. Clair river, and the question arose whether it was a matter of State cognizance, or a matter within the jurisdiction of the Feveral Government. It was decided by a full bench, each judge giving an opinion, that it was within the cognizance of the State, and that Tyler had committed an offense for which he could be held liable under the State laws. The Chief Justice said that "whenever a State bounds a public water, its civil jurisdiction extends to the boundary line." So, if these waters are within the jurisdiction of the State for civil and criminal purposes, then it follows that the State has power to legislate upon the subject; it is within the police powers of the State.

The right of the State to govern fisheries first came up before a Federal tribunal in 1823, in the case of Garfield vs. Carroll, 4 Wash., 377. The State of New Jersey had passed an act prohibiting the fishing for oyster by drags, and the question came up directly before Justice Washington, sitting as circuit judge, whether it was within the powers of the State of New Jersey to pass such a law, and in quite an elaborate opinion he decided it was.

Angell on Tide Waters, a a book of standard authority, has collected all the authorities upon the subject. It appears that nearly all the Atlantic States have legislated upon the subject, and in nearly all the States the right to so legislate has been affirmed,

But in 1855 a case was brought to the attention of the Supreme Court of the United States (18 How. 71). The State of Maryland had provided by law that no one should fish for oysters except by hooks and nets, as then in use, and expressly prohibited fishing for oysters by drags. A Mr. Smith was the owner of a schooner, which was registered and enrolled under the laws of the United States. He was sailing down Chesapeake Bay, dragging for oysters. The laws of Maryland provided that a vessel violating the provisions of the act, might be seized and condemned, and the State Constable seized this vessel and a justice of the peace condemned her for the State of Maryland. Thereupon her owner, Smith, took the case to the Supreme Court of the United States.

The question was very fully argued, and Benjamin R. Curtis, then a Justice of the Supreme Court, delivered the opinion. It was a very exhaustive argument. It examined first into the right of the State to legislate upon this subject at all. He based his opinion upon the well-settled rule that whatever rights individuals possess, they must exercise with a due regard to the rights of others. He held that it was within the police powers of the State so to legislate as to require obedience to this rule. It was claimed that the vessel was engaged in commerce and navigation; that she was registered and enrolled in accordance with the laws of the country, and therefore it was not within the powers of the State to interfere; much more so as the power to regulate commerce had been committed to Congress. Mr. Justice Curtis said that all rights are subject to the police power of the State, which is axiomatic, and he applied it to this case, and he said this right to regulate fisheries was not a matter which had been delegated to Congress, and the Supreme Court rendered a decision affirming the decree of the court below. Since then the question has not been before the Supreme Court.

The principal points that were agreed upon at the conference were, briefly, the following:

a. When seines or other nets are used during the spawning season of any fish, upon the spawning grounds, or where the fish are running, the use of all such nets should be prohibited from 12 o'clock Saturday night until 1 o'clock of the next Monday morning.

b. Trap and pound nets of all kinds should not be over 80 rods in length of lead, nor contain more than four cribs in string.

c. Pound nets should not extend beyond a line one mile out from headland to headland, all nets set in the bays between should be limited to the same line.

d. No nets should be set upon reefs or other grounds known to be used as spawning grounds.

e. It is desirable and just for the successful propagation of fish on the Great Lakes that a license be laid upon nets used in fishing thereon, the proceeds of which should be devoted to the purposes of fish culture to replenish the lakes with young fish. The standards for license being: 1. Seine and gill nets by the fathom. 2. Trap or pound nets by the heart, or crib, and by the fathom of lead beyond 25 rods.

f. Each State should appoint fishery officers to enforce the inspection of nets, etc., and the laws for the protection of fish.

g. Stringent laws should be passed and enforced by each State prohibiting the use of explosives for the destruction of fish.

h. As proper statistics of the fisheries in each state are a necessary adjunct to the work of the several commissions, that the States be urged to adopt measures for gathering the same in respect to the fishing interests within their several jurisdictions.

i. Throwing offal, or other deleterious matter, upon spawning grounds should be prohibited.

j. That in view of the present condition of the fisheries of the Great Lakes, and from the known results of artificial propagation of whitefish and trout, the work of propagation should be vigorously prosecuted.

k. It is deemed advisable to consult with the fishermen in respect to the various matters above indicated, and to obtain from them as definite opinions as possible upon these subjects for mutual understanding and cöoperation.

l. It is recommended to the Fish Commissions of the States bordering the Great Lakes, to urge upon the senators and representatives in congress the necessity of securing action on the part of the United States Government, through its efficient Fish Commission, to send one of its steamers with a sufficient force of skilled and scientific men to the Great Lakes for the purpose of investigating the development and habits of fish, the methods of fishing employed, and all other matters connected with the fishing industry, as none of the States have the means for such an enterprise.

m. The several States should pass and enforce uniform laws regulating the size of all fish taken in the Great Lakes, that shall be marketable.

It will be seen that the principal points among these suggestions have been adopted by this Commission, and are urged in this report, if not in the exact form here presented, still they are substantially comprehended in the recommendations which we have made.

A second meeting of the conference was held at Milwaukee, in October, 1884, at which the President of the Commission, Dr. Parker, was present.

Very much the same ground was gone over, but not having received a of the proceedings we are unable to give as full a notice of it as we wish. We believe some good can be accomplished by uniformity of tion among the States in the matter of fishery regulation, and will do o to encourage it.

3.—Brook Trout for the Au Sable River.

For two years past the Commissioners have been urged by several gent whose knowledge of that river is full and accurate, to plant the f grayling river, the Au Sable, with brook trout. They tell us the gray almost exterminated there, and that the log-running, which has been th potent factor in his extermination, will prevent his ever being estab there again. We have very reluctantly come to the same conclusion. summer of 1883 you could float down the Au Sable for fifteen miles belo village of Grayling without seeing or raising a single fish. From that down there were a few fish, and it is possible that for many years some ling will live in that lower part of the river where the main stream is enough to furnish some protection to the fish and some suitable spav beds from the ravages of the running logs and the deadly spear. The cipal cause of the decline in the number of fish has been the log-run The grayling is a spring spawner. As a rule the spawning ground is n very deep water, and while the eggs are in process of hatching, or whil fish are working on the spawning beds, the logs come down, filling the st from bank to bank, ploughing up the beds, and raking them clean of eg driving off the working fish. The grayling is peculiarly obnoxious to danger, as he spawns almost entirely in the main body of the stream. T would not be so liable to be interfered with in this way; as they spaw October and November the eggs would be hatched before the log run would begin.

The quality of the water and abundance of food is all that could be des for growing trout, and by planting them high up in the sources of the r they will gradually drop down as they grow and fill the places now vacate the grayling. This conclusion is reached after due deliberation and a attempt to do something to restore the grayling. During the spawning sea of 1884 Mr. Babbitt, assistant at Paris, made a trip down the Au Sabl secure, if possible, a stock of grayling eggs, having with him all necess appliances for preserving and transporting them. He went down the r twenty miles from the village of Grayling, but could not secure a sin spawning fish. The proposal to stock the Au Sable with trout is urged by s gentlemen as Mr. D. H. Fitzhugh, of Bay City, as well as by the m experienced guides who are familiar with the river and the entire history grayling fishing there.

A determined effort will be made by the Commission as soon as the additio water facilities can be procured at Paris, to secure a good stock of graylir give them the most favorable environment, and do whatever can be done raise sufficient young fish to preserve for the Manistee and some smaller gr ling streams this famous and valuable game fish. Special mention has be made of the Au Sable river because it is the largest and most importa stream of the lower peninsula capable of rearing and supporting a large supp of valuable food and game fish.

4.—Applications for Fish.

On the 5th of November there were on our books applications for various fish as follows:

Carp	79
Brook trout	67
Eels	32
Wall-eyed pike and pickerel	63
Whitefish	4
Schoodic salmon	2
Total	247

5.—Whitefish Ova and the Fort Wayne Fishery.

The earlier reports are replete with experiments of how and where to procure ova for our whitefish work, and that, too, has been and is one of the most serious questions in deciding upon any proposed new stations. Mr. O. M. Chase practically solved the question for the Detroit hatchery by his demonstration that whitefish could be "crated" and handled in that way with very little injury, and also by getting permission, on quite reasonable terms, to handle the fish at the Fort Wayne fishery. It is barely possible that the supply from Detroit river may become sufficient for other stations. The Commission have hopes of finding a safe and convenient source of supply in some of our inland lakes. This fishery is on the government front at Fort Wayne, in Springwells; easily accessible by the street cars, which run from there to and nearly through the city of Detroit, passing within one block of the Detroit hatchery. Under Mr. Chase's arrangement the ova for the fall of 1882 and the fall of 1883 were taken there. In the summer of 1884 Mr. Collins, who owned the plant there and held the fishing permit from the post commander, sold to the Commission his plant and fishing right, with the approval of the commanding officer at the fort, and we took possession. The terms of the fishing permit are $150 per year and 500 fish. The Commission made a fishing contract with Messrs. Chappee & Reaume, who had fished the ground many years, on the usual terms, we to furnish the grounds and repair the plant for the exclusive control of the fish and one-quarter of the total product. The fishery adjoining on the west, owned by Mr. George Weber, was rented for the purpose of preventing fishing operations there, as very nearly the same ground would be swept by each seine.

The advantages afforded to our work by this fishery are:

1. Its accessibility from the hatchery and the city.

2. The safety with which the operations for egg-taking can be conducted; and,

3. The convenient disposition of the fish by holding them in crates and pound, so that the maximum number of eggs can be obtained at the exact time when the fish are ripe for handling, which enables the work to be done to the very best advantage for the condition of the eggs, and at far less expense than could be possible at pound or gill-net fisheries.

The experience of this year most amply justifies our expectations in this regard. The fishing was very light in the number of fish caught, being a little less than 3,000. From the history of the fishery we had reasonable grounds to anticipate a catch of 6,000 and upwards. The fish averaged very

large and were in fine condition, and have yielded about 51,000,000 With a catch of 5,000 or over, even if the average size should be a little that of this year, the yield of eggs will come up to a very large numbe about 70,000,000.

The quantity of eggs taken this year is the largest we have had, whil total extra expense of it (that is outside the salaries of regular empl is considerably less than at any time in the past four years. The extra ex is less than $500—that is a trifle less than 1 cent per 1,000 eggs pro impregnated and deposited in good order in the hatching apparatus. cost of the plant purchased, consisting of dock, pound, and shanty, was

6.—Outline Review and Comparison of the Work at Dec. 1st, 1882, Dec. 1st, 1884.

When the last report was submitted (two years ago) the condition and e of the operations of the Commission as then conducted were:

1. At Detroit, where the superintendent, being a resident, had per direction, was a whitefish hatchery, 20x50 feet, over-crowded with appar and defficient in every particular essential to extended and convenient w In this house about 20,000,000 whitefish eggs were running in 207 jars. house was dependent for its supply of eggs upon such yearly bargains a energetic superintendent could make with fishermen on the river. The favorable arrangement he had made up to this time was with Mr. Collins, of Fort Wayne fishery. At Detroit was an overseer and an assis besides the superintendent.

2. At Paris a meagre supply of stock fish from four ponds without a si proper spawning race had furnished about 350,000 brook trout eggs. condition of the property in other respects will be understood from improvements noted under the general account of Paris station. An o seer and assistant were in charge.

3. At Glenwood were the few carp remaining, in as good private hand could be found, but up to that time nothing but expectation had been reali from them.

4. In June of each year there was either a substantial work in gathe silver eels from the Hudson at Troy, N. Y., for planting in central and sou ern counties of the State; or a hatch and planting of pickerel, or wall-e pike, this work being done principally by the men from Detroit hatchery.

The present condition of operations is as follows:

1. At Detroit, a complete hatchery, 40x80 feet, with 41,500,000 whitef eggs running (Dec. 1st, 1884) in 312 jars, with about 10,000,000 eggs reserve to fill up the jars as they work off, or else available to exchange w others for ova of other kinds we may need. The number of jars can increased to 416, with capacity for 55,300,000 whitefish eggs. A valua fishery (Fort Wayne) under our control, the plant being owned by the Sta where this year with a catch of less than 3,000 fish we have laid down o 51,000,000 whitefish eggs, and with an average good catch our share of t proceeds will pay the entire expense of getting the ova. An overseer and o regular assistant, two extra hands while gathering ova and planting.

2. At Paris, the same property increased in effectiveness 100 per cent., wi 7 ponds, 2 large wild ponds, 6 covered spawning races, 4 nursery ponds races, and one large wild nursery. At this time (Dec. 1st, 1884) there are the hatching trays 450,000 brook trout eggs taken from own fish, and 700,0

salmon trout eggs ready to place in the troughs, taken at the Alpena fisheries. An overseer and one regular assistant.

3. At Petoskey, a completely appointed whitefish hatchery, 30x60 feet, with 208 jars ready to be put in commission as soon as the water supply can be furnished, having a capacity of 28,000,000 whitefish eggs. An overseer detailed for work at Paris, or Detroit, or Glenwood, while this hatchery is out of commission.

4. At the State Agricultural College arrangements completed for an extensive carp and bass work, with all the ground and water that can be used to advantage. Awaiting appropriation for improvement.

5. At Sault Ste. Marie, a lease procured from United States government of ground, with abundance of the finest water for brook trout, salmon trout, schoodic salmon, and whitefish. Awaiting appropriation for improvement.

6. At Glenwood, two new spawning ponds and a good stock of carp for a branch carp station.

7. At Detroit, an organized office with a Secretary, rendered necessary by the extent of the work to be systemized and the increasing correspondence of the Commission.

This comparison is made for the purpose of showing whether or not a reasonably good use has been made with the increased appropriation for these two years, and not in the slightest to disparage the work of two years ago, for that was the foundation upon which this is built.

I.—ORGANIZATION.

Since the submission of the last biennial report the following changes have been made in the organization of the Commission and the working force under its direction.

At a meeting held February 19, 1883, Dr. Parker was elected President of the Board for the ensuing year.

The necessity and advisibility of appointing a Secretary of the Board, to be regularly employed and paid for his services, and to perform the duties under the direction of the Commissioners, was discussed at length, and it was the unanimous opinion that for the proper attention to these duties some one should be employed to act in such capacity, and thereupon Mr. Herschel Whitaker was appointed Secretary, his compensation to be thereafter fixed.

At a meeting of the Board held in March, 1883, regulations were adopted reorganizing the Board and to systematize its work, which regulations are set forth in appendix.

During this month Mr. W. D. Marks was put in charge of the Paris station. Mr. Marks had formerly been employed by the New York Commission, and his thorough acquaintance with trout culture has been of great advantage to the Commission, as has been manifested by his suggestions and intelligent direction of the improvements carried forward at Paris.

In July Mr. Wm. A. Butler, Jr., was appointed treasurer of the board. Mr. Butler kindly consented to attend to the details of disbursement of the funds, and serves without compensation.

In September, 1883, the Petoskey station having been completed, Mr. Geo. W. Armstrong, who had formerly been employed by the board, in connection with its work in the matter of plants, etc., was permanently employed as overseer of that station, and Mr. Chas. H. Brownell was employed as his assistant. Mr. Eli Tinlan was also employed as assistant at the Detroit station.

The drowning of Mr. Chase, Mr. Armstrong and Mr. Brownell on the of Nov., 1883, necessitated various changes and additions to the force, and i diately thereafter Mr. W. D. Marks was promoted to be acting superinte until a regular superintendent should be appointed. Mr. E. O. Chas appointed overseer of the Detroit station and Mr. A. W. Marks was en to take the place of Mr. Armstrong at Petoskey. Mr. Orr Mark appointed overseer at Paris.

In March, 1884, the board having duly considered the applications sented to it by various parties to be appointed superintendent, determi appoint Mr. Walter D. Marks, taking into consideration his active and i gent conduct of the work of the commission for the period succeedi death of Mr. Chase, and he was so appointed.

Upon the closing of the Petoskey hatchery in the winter of 1884 a r tion of the force was necessary and Phillip Tinlan and Archer C. B and Mr. Golloway, assistants at Detroit and Paris, were discharged a W. Marks was detailed for special service to the Paris station.

In May, 1884, A. W. Marks returned to Petoskey, taking charge of station.

In June, 1884, Mr. A. J. Kellogg resigned his office as fish commissi and Mr. Herschel Whitaker was, upon the application of the board t Governor, appointed in his stead. Mr. Kellogg was elected on the 9th of to succeed Mr. Whitaker as secretary.

On the 1st of July, 1884, Eli Tinlan was appointed overseer of the D station, E. O. Chase retiring.

The board is at present constituted as follows:

Dr. J. C. Parker, president.
Mr. John H. Bissell, } Commissioners.
Mr. Herschel Whitaker, }
Mr. W. D. Marks, superintendent.
Mr. A. J. Kellogg, secretary.
Mr. Wm. A. Butler, jr., treasurer.
Mr. Eli Tinlin, overseer at Detroit whitefish station.
Mr. Floyd C. Marks, assistant.
Mr. A. W. Marks, overseer of the Petoskey station.
Mr. Orr. D. Marks, overseer of the Paris Station.
Mr. Archie C. Babbitt, assistant.

Regular meetings of the board have been held when all the commissi were present as follows:

February 19th, March 29th, July 7th, Sept. 11th, Nov. 3d, 1883; Jan 10th, March 26th, May 10th, June 10th, September 16th, 1884.

Special meetings have been held as follows:

February 27th, 1883, at Lansing.
Present: Mr. Kellogg and Mr. Bissell.
June 9th, 1884, a meeting held at Detroit.
Present: Mr. Bissell and Mr. Whitaker.
June 16th, a meeting at Detroit.
Present: Mr. Bissell and Mr. Whitaker.

FISH CAR FOR PLANTING AND ACKNOWLEDGMENT TO RAILROADS.

The distribution of the fry of the whitefish and trout in the inland wa and great lakes of the State necessarily involves large shipments by ra

points remote from the hatching stations, and also involves the transportation of men and material over many different lines of road. This work necessitates the use of one or two cars for a period of nearly two months in the spring of the year, and the cars needed for such distribution have up to this date been procured from the different railroads. Many times it has been a matter of extreme difficulty to procure a suitable car for this purpose, for the reason that at this period of the year nearly all the railroad companies require all their rolling stock for use in their own business. The necessity for quick transportation of fry from the hatchery to points at which they are deposited in the waters requires that all shipments should be made upon express trains, and the different roads, so far as requested, have afforded the Commission the opportunity of having its car attached to express trains, thereby expediting shipments. The Grand Rapids & Indiana and the Detroit, Lansing & Northern roads have within the past two years furnished cars for this purpose to the Commission at quite reasonable rentals for their use, and have afforded every facility within their power to forward the work of the Commission in this respect. These roads, as well as other roads hereafter mentioned, have furnished free transportation for employés and material. The Commission desires to make a fitting acknowledgment to the following roads for permission to attach their car to express trains, and for their courtesy in passing men and material over their roads free of charge: The Grand Rapids & Indiana, Detroit, Lansing & Northern, Flint & Pere Marquette, Michigan Central, Lake Shore & Michigan Southern, Canada Southern, Detroit, Grand Haven & Milwaukee, Chicago & West Michigan, Detroit & Bay City, Jackson, Lansing & Saginaw, Grand Trunk, and Marquette & Mackinaw.

In the report of two years ago we recommended that an appropriation be made for a car specially constructed for the purposes of the distribution of fry, which should be owned by the Commission and be at its disposal when required. While the Board remains of the opinion that in the near future such means of transportation will be required, and a car for that purpose should be constructed, still we think at present, if we can be reasonably sure that the facilities we have enjoyed from the roads above mentioned will be extended to us at the same reasonable cost, that the need of such a car at present is not so urgent as it otherwise would be, and the Board will not at present ask for an appropriation for that purpose.

CONCLUSION.

Fish Culture in 1884.

The present aspect of this subject is far different in many respects from what its advocates and promoters of ten or more years ago believed it would be at this time. The general enthusiasm of the early movement, as it seized upon the naturalist and sportsman of ten or fifteen years ago in the blush of its first successful experiments, has not entirely faded away, but has ripened into a deep conviction on the part of an ever increasing number of intelligent men that fish culture has solved one-half of the question, "can the fisheries be preserved?" and has now settled down upon business-like principles and methods to do its part. The other half of that question must depend for its answer upon wise measures for protection. This is true of almost every State and Territory in the Union. In the central and southern portions of the Union the artificial cultivation of the useful varieties of carp is increasing

with great rapidity and success. On the Pacific coast the salmon, valuable for smoking and canning, are being propagated not only by States, but on some rivers by the great canning establishments, where they are secure of the benefits of their labor in that direction. On the Atlantic coast the re-establishment of the shad by the United States and the State Commissions, the demonstration that has been made in Maine and some other New England States, of the practicability of restoring the Atlantic salmon to several rivers where once this fish was found in great abundance, the successful establishment of our eastern brook trout in the streams of the Pacific States, and the natural complement of that fact in successfully establishing the California or Rainbow Trout in States eastward of the Mississippi river, with what we have said elsewhere of the work in this State (and the same kind of work is being done in Ohio, Minnesota, and Wisconsin), all point incontestably to the truth of the fact above asserted. In almost all the States the work is being more thoroughly prosecuted than ever. Minnesota has just added the Chase automatic jar to its other equipment, and is joining the whitefish work. The Pennsylvania Commission with new life and energy infused into it, is proposing to engage in whitefish work at Erie in another year. The reports of all the States show that a more comprehensive and business-like view of the subject is gaining ground, and that fish culture means now a real and substantial aid in the maintenance of great industrial fisheries, and not mainly gratification to the fancies of a small sporting class in the extension of game fishes, or experimental operations by specialists in natural history. Fish culture, it is true, owes very largely its eminent position to-day to the successful experiments of the one, and the enthusiasm of the other; but it has now got beyond its leading strings and is beginning to be appreciated in its proper sphere as a useful adjunct to the public business of the State.

In bringing about this prosperous state of fishery affairs, the work of the United States Fish Commission has been, as it ought to be, pre-eminent. Its report for the year 1882, an octavo volume of 1,100 pages, which has just appeared, is a notable publication in the history of fish culture. Our space and time forbid as extended a review of it as we should like to make, for there is much valuable information in it referring to matters in which this State is immediately interested, which we should like to present for the benefit of many persons who may not see the original. We very heartily commend an examination of the publications by the United States Fish Commission to every one who seeks to acquire a comprehensive view of what has been done and what can be done in this department of public work, and to further an industry of national importance. We feel constrained to quote the following from Prof. Baird's introductory remarks, which is pertinent to our Michigan work:

"The work of increasing the supply of valuable fishes in the waters of the United States, whether by artificial propagation or by transplantation, although very successful, may be considered as yet in its infancy.

"It must be remembered that the agencies which have tended to diminish the abundance of fish have been at work for many years, and are increasing at an enormous ratio. This, taken in connection with the rapid multiplication of the population of the United States, makes the work an extremely difficult one.

"If the general conditions remained the same as they were fifty years ago it would be a very simple thing to restore the former equilibrium.

"At that time, it must be remembered, the methods of preservation and wholesale transfer, by means of ice, were not known, while the means of quick transportation were very limited. Hence a small number of fish supplied fully the demand, with the exception, of course, of species that were salted down, like the cod, the mackerel, and the herrings (including the shad). At that time a comparatively small quantity supplied the demand for fresh fish, and it was easy to more than meet the demand. Now, however, the conditions are entirely changed. The whole country participates in the benefits of a large capture of fish, and there is no danger of glutting the market, since any surplus can be immediately frozen and shipped to a distance or held until the occurrence of a renewed demand.

"Another impediment to the rapid accomplishment of the desired result is the absence of protective legislation of a sufficiently stringent character to prevent unnecessary waste of the fish during the critical period of spawning, and the erection or maintenance of impediments to their movements in reaching the spawning grounds. This is especially the case with the shad and the salmon, where the simple construction of an impassable dam, or the erection of a factory discharging its poisonous waste into the water, may, in a few years, entirely exterminate a successful and valuable fishery.

"It is to be hoped that public opinion will be gradually led up to the necessity of action of the kind referred to, and that year by year a continued increase in the fisheries will be manifested. Even if this does not occur as rapidly as some may hope, the experiments so far furnish the strongest arguments in favor of continuing the work for a reasonable time. A diminution that has been going on for fifty or more years is not to be overcome in ten, in view of the increasing obstacles already referred to."

Following a very complete statement of the methods employed by the U. S. commission, in connection with the tenth census, to procure a fishing census of the United States, is given this brief summary of results:

"The general results of the investigations from the statisticians' standpoint may be briefly summarized as follows:

"In 1880 the number of persons employed in the fishery industries of the United States was 131,426, of whom 101,684 were fishermen and the remainder shoremen. The fishing fleet consisted of 6,605 vessels (with a tonnage of 208,297.82) and 44,804 boats, and the total amount invested was $37,955,349, distributed as follows: Vessels, $9,357,282; boats, $2,465,393; minor apparatus and outfits, $8,145,261; other capital, including shore property, $17,987,413.

"The value of the fisheries of the sea, the great rivers, and the great lakes was placed at $43,046,053 and that of those in minor inland waters at $1,500,000; in all, $44,546,053. These values were estimated upon the basis of the prices of the products received by the producers, and if average wholesale prices had been considered the value would have been much greater. In 1882 the yield of the fisheries was much greater than in 1880, and prices, both 'at first hand' and at wholesale, were higher, so that a fair estimate at wholesale market rates would place their value at the present time rather above than below the sum of $100,000,000."

Many suggestions have been made for a prudent investment of the surplus revenues now lying in the treasury of the United States, all of which have been open to some criticism, and it may be rash to add another, but, if any statesman should by accident read this report, we take the liberty of suggesting to him that no better use could be found for a portion of the surplus th investment by the United States fish commission in completing and equippi its stations for research, increasing and perfecting its stations for artific propagation of fish and oysters, and in further facilities for extending work by steamers on the Atlantic coast, and additional stations for work in a of inland (as distinguished from seacoast) fisheries.

We wish, also, to make due acknowledgment for assistance rendered by t U. S. fish commission to the work in this State. A fair share of whitefi plants made in Lake Michigan, and all made in Lake Huron, are a gain to o waters. We are also indebted to the U. S. commission for grants of school salmon eggs. For these we make acknowledgment on behalf of Michigan.

All of which is respectfully submitted.

JOEL C. PARKER,
JOHN H. BISSELL,
HERSCHEL WHITAKER,
Commissioner

December 1st, 1884.

I.—TABLES OF PLANTS.

TABLE A.—WHITEFISH PLANT FOR 1883.

Lake Michigan—	
St. Joseph, April 19	2,000,0
South Haven, April 16	2,000,0
Ludington, April 11	2,000,0
Grand Haven, April 28	2,000,0
Harbor Springs, April 24	2,000,0
Straits of Mackinaw, May 9	500,0
Lake Superior, Marquette, May 10	2,000,0
Lake St. Clair, Grosse Pointe, May 20–21	3,000,0
Detroit river, Hurley's dock, Detroit, May 18–20	1,700,0
Fort Wayne fishery, May 20	1,000,0
Grosse Isle, May 23–26	1,020,0
Belle Isle, May 25	3,000,0
Loon lake, Dayton Plain, Oakland, May 21	1,500,0
Sent United States Commissioner, Indiana	15,0
Total	23,735,0

NOTE.—The numbers in the above plants are not as they appear on our books, but are undoubtedly nearer accurate for the reason that the estimates of the plants that year over-ran the number of fish actually hatched. The total given above is what we know the jars could hold (and they were well filled that year), less the allowance of 15 per cent for all accidents and the percentage that always run off. The plants at Hurley's dock were often made at night, being forced because there was no room for the fish in the cramped and limited tank. The other tanks were probably a little less than reported, and that at Hurley's dock more than reported.

TABLE B.—WHITEFISH PLANT, 1884.

WHERE PLANTED.	NUMBER.	DATE.	NAME OF PLANTER.	WHERE PLANTED.
Lake Michigan.	2,000,000	April 4,'84	E. O. Chase	Off South Haven.
Lake Michigan.	2,000,000	" 8,'84	A. Marks and E. O. Chase	Ludington.
Lake St. Clair..	4,000,000	" 9,'84	W. D. Marks	Grosse Point.
Detroit river..	4,000,000	" 10,'84	W. D. Marks.	Fort Wayne.
Lake Erie.....	4,000,000	" 12,'84	A. Marks and E. O. Chase	Monroe Harbo
Lake Michigan.	3,000,000	" 14,'84	Chase & Marks	Muskegon.
Detroit river..	4,000,000	" 14,'84	W. D. Marks	Belle Isle.
Lake Michigan	2,800,000	" 15,'84	A. Marks and E. O. Chase	Grand Haven.
Lake Michigan.	2,000,000	" 20,'84	Chase & Marks	Traverse Bay.
Lake Huron....	2,000,000	" 24,'84	Chase & Marks	Cheboygan.
Lake Michigan.	2,000,000	" 28,'84	Chase & Marks	St. Joseph.
Detroit river..	300,000	May 1,'84	J. P. Clark	Sugar Island.
Lake Michigan.	2,500,000	" 1,'84	Marks & Chase	Mackinac.
Lake Michigan.	2,000,000	" 5,'84	Marks & Chase	Harbor Springs
Detroit river..	1,000,000	" 5,'84	Eli Tinlin	Hurley's Dock.
.....	150,000	" 10,'84	E. O. Chase	Drayton Plains
Total.....	37,750,000	.....	.....	.....

TABLE C.—Deposits of Brook Trout, 1883.

County and Name of Stream.	Township where Located.	Date of Deposit.	Name of Depositor.	No. of Fish.
Charlevoix:				
Boyne river	Boyne Falls	March 20, '83	Wm. Miers	22,000
Genessee:				
Begole creek	Geneseeville	April 4, '83	Chase & Marks	10,000
Grand Traverse:				
Stream not given	Fife lake	March 20, '83	D. W. Hight	6,000
Private pond and creek	Williamsburg	March 20, '83	F. H. Vinton	12,000
Isabella:				
Stream not given	Sherman City	Feb. 24, '83	Albert Hoiles	9,000
Kent:				
Stream not given	Grand Rapids	March 5, '83	J. M Metheany	40,000
Mill and Rattleford creeks	Grand Rapids	March 9, '83	Chas. Ogden	30,000
Kalkaska:				
Boardman river	Kalkaska	March 20, '83	H. W. Hill	9,000
Mecosta:				
Cedar creek	Paris	March 6, '83	Chas. Ogden	14,000
Tributary to Pine river	Blanchard	March 22, '83	H. T. Blanchard	9,000
Cheney creek	Paris	April 24, '83	O. D. Marks	5,000
Buckhorn Creek	Paris	April 24, '83	O. D. Marks	2,000
Muskegon:				
Landford	Montague	April 10, '83	O. D. Marks	30,000
Wexford;				
Sligo creek	Not given	March 22, '83	Frank Ogden	21,000

TABLE D.—Deposits of Brook Trout, 1884.

County and Name of Stream.	Township where Located.	Date of Deposit.	Name of Depositor.	No of Fish.
Berrien:				
Spring creek	Three Oaks	March 17, '84	A. W. Marks	9,000
Barry:				
Cold river	Parmelee	March 31, '84	A. W. Marks	10,000
Emmet:				
Minnehaha creek	Petoskey	March 20, '84	A. W. Marks	20,000
Stream not given	Alison	April 24, '84	O. D. Marks	5,000
Grand Traverse:				
Betner's creek	Betner's Station	April 11, '84	A. C. Babbitt	10,000
Clare:				
Chippewa and Tobacco rivers	Farwell	March 27, '84	A. C. Babbitt	10,000
Cheboygan:				
Elliott pond	Cheboygan	April 9, '84	Wm. Elliott	15,000
Isabella:				
Spring creek	Sherman City	March 7, '84	O. D. Marks	10,000
Kent:				
South branch of creek	Casnovia	Feb. 25, '84	A. W. Marks	12,000
Rogue river	Rockford	March 24, '84	A. W. Marks	9,000
Stream not given	Edgerton	April 15, '84	A. Durgie	5,000
Kalamazoo:				
Portage	Kalamazoo	March 14, '84	A. W. Marks	15,000
Pine creek	Kalamazoo	March 18, '84	O. D. Marks	9,000
Allerton brook	Galesburg	March 18, '84	O. D. Marks	9,000
Portage and Bear creeks	Cooper	March 18, '84	O. D. Marks	9,000
Stream not given	Richland	March 18, '84	O. D. Marks	9,000
Lake:				
Sanford	Baldwin	March 23, '84	O. D. Marks	12,000

TABLE D.—Deposits of Brook Trout, 1884.—*Continued.*

County and Name of Stream.	Township where Located.	Date of Deposit.	Name of Depositor.	No. Fis
Livingston:				
Spring brook	Green Oak	March 23, '84	W. D. Marks	9
Muskegon:				
Clear lake and Morngood lake	Trent	March 6, '84	A. W. Marks	10
West branch Crocker cre'k		Feb. 25, '84	A. W. Marks	12
Stream not given	Montague	March 26, '84	A. W. Marks	9
Mecosta:				
Horner creek	Sylvester	March 21, '84	A. W. Marks	10
Ranney creek	Crapo	March 13, '84	S. C. Ranney	1
Stream not given	Big Rapids	April 2, '84	O. D. Marks	10
Printer and Bridges creeks	Mecosta	March 31, '84	O. D. Marks	10
North and south branch Big creek	Morley	March 13, '84	A. W. Marks	9
Cheney creek	Paris	April 18, '84	O. D. Marks	7
Mason:				
Clear and Keby creeks	Ludington	March 3, '84	A. W. Marks	12
Newaygo:				
Stream not given	Newaygo	April 1, '84	A. W. Marks	10
Bigelow creek	White Cloud	April 1, '84	W. D. Marks	10
Otsego:				
Spring creek	Elmira	March 8, '84	L. S. Carver	1
Oakland:				
Mill creek	Davisburg	April 3, '84	A. W. Marks	10
Ottawa:				
Private pond	Holland	April 14, '84	A. C. Babbitt	9
Osceola:				
Brick-House creek	Crapo	April 18, '84	W. Sebastian	10,00
Bisbee creek	Hersey	April 18, '84	J. Bisbee	5,0
Van Buren:				
Private pond	Lawton	April 1, '84	John Elyea	1,0
Washtenaw:				
Stream not given	Saline	April 21, '84	O. D. Marks	10,00
Spring brook	Ann Arbor	April 4, '84	W. D. Marks	10,00
Wexford:				
Cedar creek	Manton	April 4, '84	A. C. Babbitt	10,00
Total				353,0

TABLE E.—PLANT OF EELS IN 1883.

DATE.	County.	Town.	Depositor.	Where Planted.	No. of Fish.
June 13.	Allegan	Fennville	P. C. Whitbeck	No place given	9,000
June 13.	Berrien	Sawyers	W. A. Keith	No place given	9,000
June 13.	Berrien	Three Oaks.	Jas. Fields	No place given	9,000
June 19.	Barry	Irving	Fred Black	No name given	3,000
June 19.	Clare	Farwell	H. Woodruff	Mill pond and Tobacco river	9,000
June 19.	Eaton	Kalamo	O. W. Gridley	Lacey lake	9,000
June 26.	Eaton	Dimondale.	G. W. Armstrong.	Grand river	8,000
June 19.	Ingham	Okemos	Thos. McMannon.	Mud lake	9,000
July 11.	Ingham	Bankers	R. D. Lane	Mill lake	8,000
July 12.	Ingham	Leslie	Jas. Blackman	Island and Huntoon lakes	6,000
.....	Ionia	Ionia	J. W. Weeks	No place given	9,000
June 13.	Jackson	Leoni	A. A. Sullivan	Gillett and Mud lakes	9,000
June 13.	Kalamazoo	Schoolcraft.	J. Hartman	Black river	4,000
July 12.	Kent	Oakfield	J. H. Sayler	Scum lake	6,000
July 19.	Livingston	Pinckney	S. G. People	No place given	9,000
July 12.	Livingston	Brighton	P. O. Clark	Mount lake	3,000
July 12.	Livingston	Brighton	F. T. Hyne	Bidwell lake	3,000
July 5.	Lapeer	Attica	A. Williams	No place given	6,000
July 5.	Lapeer	Imlay City.	H. D. Goodrich	Goodrich lake	4,000
June 19.	Muskegon	Muskegon	M. G. Averill	Bear and Muskegon lakes	9,000
July 11.	Monroe	Dundee	Wm. A. French	River Rasin	9,000
July 25.	Monroe	Otter Lake.	W. C. Cummings.	Otter lake	4,000
June 13.	Ottawa	Holland	Jno. Roost	Black lake	9,000
.....	Oakland	Rochester	J. Van Husen	Mill-pond and Small lake.	4,000
July 12.	Ottawa	Spring Lake	C. A. Pearson	Spring lake	6,000
June 19.	Shiawassee	Fremont	John Cole	No place given	12,000
June 19	Shiawassee	Fremont	H. Jacobs	No place given	6,000
June 13.	Van Buren	Lawton	John Elyea	Henry lake	9,000
June 13.	Wash'naw	Dexter	C. A. Hardman	Forty-acre lake	9,000
July 3.	Wash'naw	Chelsea	R. S. Armstrong.	No place given	8,000
July 3.	Wash'naw	Dexter	P. Flemming	Cranberry lake	4,000
July 11.	Wayne	Wyandotte.	G. S. Paine	Monguagon lake	3,000
July 11.	Wayne	Rockwood	John Strong	Huron river	6,000
July 25.	Wayne	Detroit	E. O. Chase	Detroit river	6,000

TABLE F.—PLANT OF WALL-EYED PIKE, 1884.

DATE.	County.	Town.	Depositor.	Where Planted.	No. of Fish.
June 10.	Livingston.	Fowlerville	W. B. Gale	Cass lake	100,000
May 26.	Oakland	Daviesburg.	E. A. Botsford	Long lake	100,000
June 9.	Oakland	Pontiac	C. O. Buddington.	Cass lake	240,000
June 11.	Oakland	Commerce.	John Corbitt	Long lake, Straight lake and Snyder lake	100,000
.....	St. Clair	Algonac	W. D. Marks	St. Clair river	400,000
.....	St. Clair	Algonac	W. D. Marks	St. Clair river	560,000
.....	St. Clair	Algonac	E. O. Chase	St. Clair river	140,000
.....	Washtenaw	Ypsilanti	J. E. Bassett	Huron river	200,000
.....	Washtenaw	Ypsilanti	E. Batwell	Huron river	200,000
Total.	.....	.....	.....	.....	2,040,000

II.—PROPOSED BILL FOR REGULATION.

A BILL TO SECURE ENFORCEMENT OF THE LAWS REGULATING THE FISHERIES OF THIS STATE AND THE GATHERING OF FISHERY STATISTICS, FOR THE APPOINTMENT OF AN INSPECTOR AND WARDENS FOR THAT PURPOSE, AND DEFINING THE DUTIES OF SUCH OFFICERS AND ALL PERSONS IN RELATION TO THE SAME.

SECTION 1. *The People of the State of Michigan enact,* The State Board of Commissioners are authorized and directed, with the approval and consent of the Governor, to appoint and employ a suitable person as Inspector of Fisheries, with the powers and duties prescribed in this act; the Inspector to hold his office for the term of two years, unless sooner removed by the Board of Commissioners, and receive a salary of not more than fifteen hundred dollars ($1,500) per annum and such expenses in the performance of his duties as the Board of Commissioners may approve and from time to time direct from moneys appropriated to their use for the purpose contemplated by this act.

SEC. 2. The Board of Commissioners shall appoint and employ not less than three nor more than five Wardens for the State, upon the nomination and recommendation of the Inspector, to hold office for one year, unless sooner removed by the Inspector, with the approval of the Commissioners. They shall receive such compensation and allowance for expenses in gathering statistics and in market inspection, as the Commissioners may direct, to be paid from moneys appropriated to carry out the purposes of this act, and for all other services in prosecution, making arrests and seizures, they shall receive from the county where the service is performed the same fees and mileage allowed by law to sheriffs. In cases not otherwise provided for the compensation shall be two dollars ($2) per day for each day's actual service. The Inspector may, in case of necessity, employ Deputy Wardens, who, for the time of their employment, shall have all the powers of Wardens and be subject to the like control and direction.

SEC. 3. The Board of Commissioners shall, within ten days of the appointment or removal of the Inspectors of Fisheries and the Wardens, notify the Secretary of State of the fact, who shall forthwith inform the clerk and sheriff of each county of this State, and also keep a record of such appointments and removals in his office.

SEC. 4. The Inspector's certificate of appointment shall be made under the seal of the Commission and the hand of at least two members of the Board; that for each Warden and Deputy Warden shall state the counties for which he is appointed under the hand of the Inspector, countersigned by one Commissioner. Such certificates shall be received in all courts and by all officers of this State as evidence of the official character of such officers, and warrant the exercise of all lawful powers conferred upon them by law.

SEC. 5. The Inspector of Fisheries, under the general direction of the Board of Commissioners, and the Wardens, under the direction of the Inspector, shall strictly enforce all laws of this State now in force, or hereafter enacted for the government and regulation of the fisheries in all the waters of this State. They shall prevent the capture or killing in the ways or times or waters or of sizes prohibited by law, and prosecute all offenders and offenses against the fisheries laws as the same or any general law may provide, and to that end they are authorized and directed—

1. To seize and keep all implements used or intended for use in the capture, killing, or destruction of fish contrary to law.

2. To arrest all persons found in the act of capturing or killing fish in the ways or times or waters or of sizes prohibited by law; and,

3. To prosecute according to law all persons against whom the Inspector or Wardens shall have evidence of the commission of like offenses.

In prosecutions under this (3) subdivision, the complaint shall be held sufficient if made under oath by such officers upon their information and belief.

SEC. 6. All fines and other penalties imposed and collected under the fisheries laws, shall be paid forthwith by the officers by whom collected, to the county treasurer of the county in which collected, and by him transmitted to the State treasurer, to be by him credited to the State Board of Fish Commissioners, and subject to use by them, either in carrying this act into effect, or, if not needed in addition to the appropriation made for that Board for artificial propagation and distribution of food fishes.

SEC. 7. The Wardens shall gather statistics of all matters relating to the fisheries within the counties or districts for which they are appointed, including the number, sizes, and kinds of nets used, the number, kinds, and sizes of boats used, the number of men engaged or employed in capturing and marketing fish, the places and manner of using nets, the number, weights, and kind of fish taken, and the condition in which they are marketed; the wages of the fishermen, the number of days they are employed in each season, the rates at which the various kinds of fish are sold, and the amount of capital employed in the fisheries, and such other facts as they may be directed by the Inspector. Such reports to cover each year from January 1 to the end of the season of the same year. These reports to be made upon blanks provided by the Commissioners, and returned to the Inspector on or before December 15 each year. The Warden's reports shall be compiled by the Inspector, and included in his reports to the Board of Commissioners. The Wardens shall further, under the direction of the Inspector, perform such duties in market inspection of fish and inspection of nets and other implements as may be required of them. They shall also take and include in their reports all complaints made by the fishermen and fish dealers respecting the regulation of fisheries, with their own comments upon the same.

SEC. 8. The Inspector shall annually, and as often as required by the Board

of Commissioners, report to them the general condition of the fish[eries] the State, including in the annual report statistics gathered by the W[ardens] covering all his official operations and acts, as well as the operations Wardens and deputies under this law.

He shall from time to time inspect nets and other apparatus u[sed] intended for use, in fishing, the methods of fishing, and see that no [appa]ratus for or methods of fishing are employed contrary to law.

He shall from time inspect fishing stations and grounds, and the houses, freezing and packing-houses of fishermen and dealers, as well a[s pub]lic markets and stores, to prevent the handling or sale of fish within th[e] or weights prohibited by law; and whenever such fish, under weight o[r] are found, to seize the same and prosecute the persons in whose poss[ession] the same are found. All fish so seized, as well as the entire contents of package in which they are found, shall be forfeited to the State and del[ivered] to the nearest poor-house or State asylum for the insane.

SEC. 9. All persons fishing in any of the waters of this State are requi[red] display and exhibit to the Inspector, Wardens, or Deputy Wardens all th[eir] and other apparatus employed by them, or intended for use, upon dema[nd] any such officer, as well as the methods of using such implements. And persons are also required to furnish to any of the same officers as con[cise] and full reports upon, or answer to questions relating to the subjects officers are required to report upon, as the circumstances or the ability o[f the] person interrogated will permit. The provisions of this section shall [apply] to all dealers, wholesale or retail, in fish. Every person who fails or re[fuses] to comply with the requirements of this section shall, upon conviction b[efore] a justice of the peace or in any municipal court having criminal jurisdic[tion] be punished by a fine of not less than ten dollars ($10) nor more fifty dollars ($50), besides costs, for each offense, and in addition theret[o] imprisonment in the county jail for thirty days, in the discretion of the [court] in which conviction is had. Every person convicted of such offense shal[l be] committed until the fine is paid.

SEC. 10. It is hereby made the duty of the sheriff and prosecuting a[tor]ney, their deputies and assistants, in every county of this State to aid officers aboved named in the execution of their duties under this law w[hen] ever called upon, and in particular the sheriff shall assist the Inspector, W[ar]dens, or Deputy Wardens in making seizure of nets or other unlawful ing implements, or in making arrests whenever called upon; to exe[cute] all process promptly, and make arrests where complaints are made by fishery officers. For all such services the sheriff shall receive from the co[unty] in which the service is rendered the usual lawful fees and allowances. prosecuting attorney shall advise the fishery officer, draw complaints or o[ther] criminal pleadings, attend preliminary examinations and trials persons and by all means in their power aid in the successful execution of this act

SEC. 11. The waters to which this act shall apply are defined and decla[red] to be all lakes and streams inland not wholly within the boundaries of a sin[gle] owner, and upon Lakes Erie, St. Clair, Huron, Michigan, Superior and straits or rivers, with the interior lakes connecting the great lakes, from shore or bank to the State or national boundary lines. The Wardens Deputy Wardens may perform their duties and exercise all the powers l[awf]ully possessed by them in every county in the State.

SEC. 12. The Board of Commissioners shall include in their biennial repo[rt]

to the Governor summaries of the Inspector's reports, and all action under this law, with such recommendations respecting the same as they may approve tending to the general welfare and improvement of the fisheries and their better regulation.

The following has been suggested as section five in place of that given above, and probably in the main should be adopted. It is thought best, however, to give the bill as originally drawn, and this section five by itself.

SEC. 5. The Inspector of Fisheries, under the general direction of the Board of Commissioners, and the Wardens, under the direction of the Inspector, shall enforce all the laws of this State now in force or hereafter enacted for the government and regulation of the fisheries in all the waters of this State. Said Inspector and Wardens shall have authority to arrest without process, and to detain in custody until they can be conveniently taken before a magistrate, any person or persons found violating any of the laws of this State designed for the protection and preservation of fish in the waters subject to the jurisdiction of this State. Such persons so arrested shall be taken before a justice of the peace of the proper county and proper complaints made against him. No security for costs or order in writing from the prosecuting attorney allowing such complaints shall be required in such cases. When any person found violating any of the laws of this State designed for the protection and preservation of fish in the waters subject to the jurisdiction of this State shall be arrested without process, the officer making the arrest shall seize and take into his possession all implements and material used or intended to be used by the persons so arrested in violating such laws. Such office shall hold such implements and material, irrepleviable, until the final determination of such complaints as shall be made with regard to them. And in making complaints against such persons so arrested the person making the complaint shall embody in the complaint a charge that the implements and materials so seized (describing them) were used, or intended to be used, in violation of law, specifying the manner of such use or intended use. And if, upon the hearing of such complaint, such charge is found to be true, such implements and materials so seized shall be forfeited to the people of this State, and shall be delivered to the agents of the State Board of Fish Commissioners for such disposition as shall be determined upon by said Board. If the accused persons are acquitted the articles seized shall be restored to the possession of the person or persons from whom they were taken. Such Inspector and Wardens shall have authority to seize without process and take into their custody all implements and materials which they shall find being used, or designed to be used, in violating any of the laws of this State designed for the protection or the preservation of the fish in any of the waters subject to the jurisdiction of this State. Such officer shall hold such implements and material, irrepleviable, until the final determination of such complaints as shall be made with regard to them. If no person is found in possession thereof complaint shall be made before a justice of the peace of the proper county, charging that such implements and materials (describing them) were used, or intended to be used, in violation of law, specifying the manner of such use or intended use. Thereupon the justice shall adjourn the hearing of such complaint for a period of not less than thirty nor more than sixty days, and shall give public notice of the hearing of said complaint by filing with the clerk of the county a copy of such complaint, with a notice endorsed thereon of the day to which the hearing of such complaint is adjourned. Upon such

adjourned day the justice shall proceed to the hearing of such c
Any person claiming the ownership or a right the possession of th
seized may appear and contest the allegations of the complaint. I
gations of the complaint shall be found to be true the implem
materials seized shall be forfeited to the use of the people of this S
shall be delivered to the agents of the State Board of Fish Comm
for such disposition as shall be determined upon by said Board. If
gation of the complaint shall not be established the articles seized
delivered to the person or persons who shall establish a right
possession.

III.—CORRESPONDENCE ABOUT PLANTS.

In June, 1884, a circular was sent to those who had made plants of fish, who were not in any manner connected with the commission, asking them as to the success or failure of the plants made by them in years past. The following are the replies received:

ROCKFORD, *Kent Co., July 12, 1884.*

The trout planted in the streams in Kent county have done better than any one expected. * * * Some have been caught that weighed one and one-half pounds (three years old). Some have been caught in Rogue river in fine condition. In fact, I have never seen finer ones.

D. E. HILLS.

GRAND RAPIDS, *Kent Co., July 12, 1884.*

We would say that the trout fry planted by us in March, 1882, in a branch of Buck creek, have thriven there. They spawned last fall, the little brook three-fourths of a mile long being fairly alive with them. This spring many have been caught weighing one to one and one-half pounds. At least one-third of the creeks in this county are as well adapted to the growth of trout as could be wished.

TAGGART & WOLCOTT.

WEST BRANCH, *Ogemaw Co., July 14, 1884.*

The trout I planted here in my creek were mostly carried off by breaking of a dam in West Branch river, and overflowing my creek. They were carried into the West Branch river, where they are doing well. You would please us farmers here if you would send us about three thousand trout next spring, for our several streams.

Yours etc., OTTO KREBS.

ALLEGAN, *Allegan Co., July 14, 1884.*

In regard to the trout I planted in 1881, I gave one-half of them to R. M. Moore, and the balance I planted in the stream that connects Wetmore and Dumont lakes, and in a brook which heads in Monteray and empties into Rabbit river. I have not heard from those planted in the Wetmore brook, but those Moore and I planted in Monteray and Heath townships are doing well. Mr. Huskinson has caught a great many fine ones. There is no question about the success of the plant. I know of several streams here they would thrive well in. If you will send them I will see they are well planted.

Yours, etc., H. B. PECK.

ALLEGAN, *Allegan Co., July 14, 1884*

The eels planted in Dumont lake, in 1878, have multiplied, and the wat are getting well stocked. They are a success in every lake in this county, far as tried.

Yours, etc., S. S. DRYDEN

RICHLAND, *Kalamazoo Co., July 14, 1884.*

The only carp found in waters planted by me was one speared by a boy i pond adjoining my farm, which weighed four pounds. * * * T trout have shown up in every instance, and I trust a great enlargement will made by the board in that line. Put me down for 50,000 fry.

Yours, etc., ELI R. MILLER.

ALLEGAN, *Allegan Co., July 19, 1884.*

Eels that were planted have, I think, done well, as quite a good many h been caught from Miner lake, two and one-half and three feet long. regards white fish and salmon-trout, can not report favorably, as we h never been able to see any of them since planting them.

Yours, etc., W. C. WEEKS.

VICKSBURG, *Kalamazoo Co., July 21, 1884.*

The trout planted in Frank's brook are doing well, thirteen having be caught, one weighing $1\frac{1}{16}$ lbs, and the smallest one lb. If you can send some trout, catfish, and carp I can plant them in Austin lake and Porta creek, as I think they will do well there. There have been some eels caug there—one $28\frac{1}{2}$ inches long, the smallest $17\frac{1}{2}$ inches long.

Yours, etc., G. W. CHAMBERLIN.

KALKASKA, *Kalkaska Co., July 24, 1884.*

The Blue Lake plant has never been heard from, but the landlocked s mon, planted in Log lake, near here, have done well. There are quite number of persons who have seen them. Quite a few of them have be caught. Yours, etc., A. A. BLEASBY.

DOWAGIAC, *Cass Co., July 15, 1884.*

On my farm is a pond of pure spring water, from two to fifty feet dee fed by springs, into which the young trout were planted. Only one has be caught, to my knowledge, last summer. That one weighed three-fourths of pound. The pond empties into the north branch of the Dowagiac cree which runs through thick timber. My trout have run down into the cree and some have been caught there. Several fine ones have been taken in t outlet of Pine and Crooked lakes, near this city. The fry I received from M Portman were in bad condition—many of them dead. Send some more a my son will see that they are planted as you direct. We have fine waters this section for trout, just such streams as I formerly caught them in, in t State of New York. Yours, etc., H. H. TAYLOR.

YPSILANTI, *Washtenaw Co., July 16, 1884.*

Your circular asking about brook trout, planted by me in 1878, I wou say that I have caught three. The largest weighed two pounds. I al let some parties from Saline have some last year. They do nicely. I g only a few of the fry at that time. There are other streams here they wou do well in. Yours, etc., PETER D. MARTIN.

MUSKEGON, *Muskegon Co., July 17, 1884.*

In your circular referring to trout planted by me in this county, I can say the results are entirely satisfactory, and I find they are doing well in all the brooks planted. There are three other brooks in our vicinity that we would like to stock; also would like to place more in one of the brooks before planted. Yours, etc., J. J. FAY, JR.

MICHIGAN CITY, *July 17, 1884,*

The brook trout planted by me in Newaygo that were furnished by the State, and 10,000 I bought in Wisconsin, have done splendidly. No county in the State is better suited for trout than Newaygo. * * * I have caught them weighing 2½ pounds, some have been caught weighing 3½ pounds. The head waters of the White river ought to be stocked. Although I am writing you from this place, my home is in Newaygo. * * * The planting is a grand success. There are other streams that should be stocked. * * * What I would like to see is the saw-mills stopped from putting saw-dust in the streams. There are several on the Muskegon and White rivers that let all their dust go into the rivers. Trout cannot live where there is saw-dust. * * *

Yours, etc., DANIEL PATTERSON.

CEDAR SPRINGS, *Kent Co., July 12, 1884.*

Will say the few carp I planted are doing well. One was caught last month by some strangers who were ignorant of the plant, it weighed three pounds. * * * The eels I planted have done well. The trout I planted three years ago have done splendidly. I saw six that weighed nine pounds. We have quite a number of good streams for trout I would like to see stocked next spring. * * *

Yours, etc., C. S. FORD, M. D.

MARSHALL, *Calhoun Co., June 14, 1884.*

Two years ago this month I received from the Board of Fish Commissioners 50,000 young eel, which I planted in the following waters in this vicinity: The mill pond at Marshall, Cedar lake, four miles north of this place, Mattawa lake, seven miles south, Squaw lake, Maguire's lake, and Fish lake. The most of these waters are south of Marshall. I could not get the farmers north interested enough to see them planted in the lakes north. But now they keep asking me for eels for the lakes north of this place. I will say that the eels have grown nicely, *and already they have taken out of Northern lake young ones that have been bred there this spring and are putting them in other lakes.* Boys catch the adult eels that weigh three to four pounds.

Yours, etc., A. J. ROWLEY.

PAW PAW, *Van Buren Co., June 16, 1884.*

I see by the newspapers you wish information in regard to waters stocked and waters that should be stocked. * * * There are three or four streams here that have been stocked from three to four years, and it is wonderful the amount of trout that have been caught out of these streams. There have been a great many caught that weighed from two to three pounds. They appear to thrive in our waters. I suppose it is the abundance of food they

get. Can you send me four or five thousand to stock the east branch of Paw Paw river? I will attend to it myself. * * *

Yours truly, GERARD HAWKINS

HART, *Oceana Co., June 17, 1884*

I wish to state that in this county (Oceana) the result of planting bro trout is of the most satisfactory character. * * * In the spring of 18 we planted 3,000, and since, we have had them several times from the Sta Last year was the first year we were allowed to take them, owing to a spec act protecting them. *We now have good trout fishing in every stream th they were planted in. Some trout are taken out that weigh four pound several over three pounds.* It is nothing unusual to get one from twenty thirty ounces.

In the Pentwater river, that runs through this town, we catch grayling an trout close together. We organized a sportsman's club, mainly to protect th streams planted, and we justly feel proud of our efforts, now that success assured, as we are able to go out at any time and get some of the "speckle beauties" during the open season. Our secretary has maps of the count showing the streams and date of planting, as well as the number planted.

Yours, etc., J. K. FLOOD.

KALAMAZOO, *Kalamazoo Co., June 9, 1884.*

We desire to say to the members of the Commission that the trout plante in this vicinity have exceeded the most sanguine expectations. We have seer trout taken from Spring Brook that weighed 1¾ lbs. and have heard of others that exceeded 2 lbs. Two trout were speared by boys in the Portage creek one measured 12 inches and the other 17 inches in length. From 2,000 to 4,000 trout (it is estimated) have been taken from Spring Brook alone this year. A few have been caught in the Kalamazoo river, and we are confident that if an effort is make in other places to stock the streams tributary to the Kalamazoo, as we have done here, in a few years the Kalamazoo will be one of the *noted* trout streams of Michigan. * * *

Respectfully yours,
DR. J. A. PARTRIDGE,
THOS. S. COBB,
Ex-Com. of Kalamazoo Gen. Club.

DOWAGIAC, *Cass Co., May 27, 1884.*

DEAR SIR—In reply to your notice in the Evening Journal, I have to say that there are a few streams near this place that are suitable for brook trout. I went out to one of the streams a few days ago and caught two as fine specimens of trout as any that are caught in northern Michigan. There have never been many trout put in the streams here as it was thought they would not do well, but I think it has been demonstrated they will grow as fast and do as well as in any part of the State, and we ask you to furnish us some more young trout to plant at your earliest convenience.

Yours etc., F. J. MOSHER.

GRAND RAPIDS, *Kent Co., July 6, 1884.*

DEAR SIR—In March, 1881, there was received here by O. & W. Davis a quantity of trout fry. We deposited them in Bear and several smaller streams in this county. We have this summer visited all places where they were

planted. From one small creek (no name) Mr. Davis and myself took with rod and line in about three hours, 42 fine trout from nine to sixteen inches long. A party took from Bear creek last week a large number, two of them weighed respectively 1¼, 1⅛ lbs. Every place visited has furnished trout of goodly size and quantity. I visited a feeder of Bear creek and found plenty of small trout from 3 to 4 inches long. Our planting in this county is a complete success. Yours etc., GEO. A. LOVE.

FENTON, *Genesee Co., May 27, 1884.*

DEAR SIRS—I noticed a paragaph in Detroit Tribune asking for information as to the fish of the interior lakes. Being much interested in the work of the Commission, will say for this section that we have never known so abundant a supply of fish of all kinds as this spring. They are taken in large numbers and are affording an abundant supply at low prices. The writer has seen eels taken this spring from a lake where they were planted three years ago that were over three feet long. Yours, etc., A. B. LATOUNETTE.

Office of the Supt. Northern Division G. R. & Q. R. R.

GRAND RAPIDS, *Kent Co., July 12, 1884.*

DEAR SIR:—In reply to your circular letter, I cannot speak of my own personal knowledge as to the result of fish planting in Northern Michigan, but from what I believe to be the fact, most of the small streams which cross our road, and those near our track, have produced trout where, until lately, we never found signs of them. I am firm in the belief that the planting is bringing about good results. It has been generally understood that in the small streams planted two years ago, fishing was prohibited until after two years. Whatever fishing has been done there, has been on the "sly," but from the great number of small trout brought into Petoskey for sale, by Indians and boys, it is evident to me that the seed planted by the commission is now bearing fruit. All the small streams putting into the Muskegon river, in the vicinity of Big Rapids and Paris (of which there are quite a number), are well stocked with trout. Of this I have good evidence, and there is no doubt but this is the result of a hatching started a few years ago south of Big Rapids, and the dam giving way, the trout were carried into the Muskegon river, and they flowed into every little stream that furnished water enough to flood them. Ten days ago I fished in a small stream near Traverse City, where fish had been artificially hatched and the enterprise abandoned on account of the owner having more profitable business in another locality. Three hours' fishing brought me eighty two trout, and there were hundreds in sight, only waiting for a fly. I am a firm believer in the artificial process, and hope to see the good work continued.

Yours very truly, J. M. METHEANY, *Superintendent.*

COLDWATER, *Branch Co., July 1, 1884.*

DEAR SIR—In compliance with a request printed in the newspapers for information in regard to food fishes, I would say: 1. The plant of Eels in the lakes and streams of Branch county has proved a wonderful success. *A number have been caught that would weigh from 3 to 5 pounds, this spring, and they are so plentiful that some portions of the year they have clogged up the water wheels of two of the grist mills within one-half and one miles of this city, the proprietors having to stop running and clean out the wheels.* 2. Carp

are multiplying at a fair rate, and a good many are caught, *but only wit spear and net so far.* 3. White-fish (or "chemose," a species of white are caught also quite frequently, and in size weighing 2½ to 3 pounds. * I was not living here at the time of the plant of fish in the waters i vicinity, but feel an interest in the success of the undertaking, and feel fident that in a short time all the different kinds of fish will be abun Aside from my own personal knowledge, I have taken pains to ascertai within facts from one of the most experienced fishermen in this section. information I may be able to furnish the Board in the future, I shall be to do so. Yours, etc., GEO. A. RANDAI

BATTLE CREEK, *Calhoun Co., July 12, 188*

DEAR SIR—I planted 3,000 brook trout in the year 1881, in a small s brook, about one mile long, called Austin brook, just outside the city li In the spring of 1882, the brook was alive with them. A few were caugh parties not knowing they were planted there. They were very large for year old, 9 to 10 inches in length. The law was out this year; over 200 I have a record of had been caught. All under six inches were placed i in the brook. The largest were about 18 inches long. *Hardly a boa spearing in April or May, on the Kalamazoo river, but what speared tu three each night.* Trout have been caught this year at many places below above here—at Galesburg one that weighed over 19 ounces. I planted a 2,000 in 1881, six miles north, in a spring brook two miles long. This empties into the Kalamazoo river. This has never been examined. * Yours, etc., N. A. OSGOO

HART, *Oceana Co., July 19, 188*

DEAR SIR—Yours in regard to my planting brook trout in the wate Oceana county were duly received. The plants were a success in every ticular. The waters planted are full of trout, and it is no trouble for a son to get a nice string of the beauties from 6 to 18 inches long. A num *have been caught that weighed two pounds.* * * * We have other wa that should be planted. Yours, truly, E. D. RICHMON

ESCANABA, *Delta Co., August 3, 188*

DEAR SIRS—I will drop you a line in regard to the fishing here. For the two years fishing has been a failure. There are about fifty pound-nets in north end of Green Bay, and each net catches about 1,000 fish per day. Al four-fifths of them weigh about one-half pound and under. I have tal with all the gill-net fishermen, and they all agree with me that the only to protect young fish is to regulate the size of the mesh in pound nets, wh is now two and one-half inches, and it should be at least four inches. Pou net fishermen are in favor of it, or at least those I have talked with about matter. I have been fishing for the last twenty years, and the two last are poorest I have ever seen. I have been compelled to lay the nets by, so have the rest of the gill-net fishermen. This is whitefish I am speaking Hoping you will give this matter immediate attention, I am,

Yours, etc., JOHN COFFE

KALAMAZOO, *Kalamazoo Co., June 6, 1884.*

GENTLEMEN—We, the undersigned, interested in the success of the work under your supervision, being well satisfied that the success of the plants of trout in the brooks of this State is assured, do respectfully request that this branch of your work for the coming year be greatly enlarged, and a plant of several millions be secured for the coming spring.

(Signed) GEO. TORREY, *Of Daily Telegraph.*
E. R. MILLER,
P. RANNEY.
J. PARSONS,
HENRY WOOD,
CHAS. A. SMITH,
ALLEN POTTER,
J. P. WOODBURY,
S. S. COBB,
THOS. S. COBB,
ROBT. BURNS,
A. J. SHAKESPEARE,

And twenty-five others.

ST. JOSEPH, *Berrien Co., May 24, 1884.*

GENTS—We, the undersigned fishermen of St. Joseph, wish to state to your board that the catch of whitefish is increasing at this point, and the catch now is the effects of plants made by your board, and we wish you to make a plant here this year if possible, and will furnish boats to make the plant.

(Signed) A. S. PETERSEN,
JAS. WERNER & Co.,
JOSEPH BENNING & Co.,
HABEL BROS & Co.,
H. GRIMM & Co.,
GEO. KISSINGER,
W. LEESING & Co.,
MARTIN SCHULTZ,
I. SAWYER & Co.,
SHEAR & ARMSTRONG.
C. L. PAXTON,

SHERWOOD, *Branch Co., June 20, 1884.*

DEAR SIR—In response to your request on fish matters in this part of the country, I would say that the lakes about here where whitefish were planted are doing well. Kenyon lake in Sherwood was stocked with whitefish. The fish are in fine condition as to growth. I have some of them and they were fine specimens of fish. Eels that were put in Colon lake are running up the St. Joseph and coming to the lakes and streams adjacent to the river. In Mattison lake in Mattison adjoining this town *the fish are being destroyed by dynamite cartridges, also all the lakes here.* Now sir, is there no law to protect the fish? If there is none what is the use of stocking the lakes with fish? It will not be two years before there will not be a fish to be caught in Michigan inland waters.

Yours etc.,
S. J. BOOTH.

IV.—CIRCULAR OF SEPTEMBER, 1884.

CIRCULAR LETTER.

DETROIT, *September 1, 1884.*

MY DEAR SIR—In the interests of the fisheries of this State we desire our biennial report to present to the Governor and Legislature the mo reliable information respecting the importance and value of the fisheries th can be obtained; and, with that end in view, consult with the men who ha practical knowledge and experience in these matters, and who have had f greater opportunities to know accurately these things than we have, or ca have. Will you favor the State Board of Fish Commissioners with the resul of your experience and best judgment in answer to the following questions?

This information will be used mainly in our reports and before the fishe committees of the Legislature, not necessarily by publishing the names of th writers, and your communication will be treated as confidential to an extent you may wish.

In making answers to the following questions please be as definite as yo can. Answers as brief or as full as you may please will be very gratfull received. A blank form is enclosed with a post-paid envelope for the answe

Yours very truly,

JOEL C. PARKER,
JOHN H. BISSELL,
HERSCHEL WHITAKER,
Commissioners.

1. The total value of the entire fishing product of Michigan each year?
2. The number of men engaged as fishermen or dealers.
3. The total amount of capital invested in plants, as warehouses and grounds and freezing and packing-houses, and cars, boats, and nets of all kinds?
4. The same (1), (2), and (3) for your locality, specifying it (as Saginaw Bay, Lake St. Clair, Beaver Islands, Detroit river, etc.)?
5. Is the average size of the fish taken increasing or decreasing?
6. Is the general product in pounds each year increasing or decreasing?
7. The same as to the extent of ground fished?
8. Are more or fewer men, boats, and nets employed than formerly in fishing?
9. Can you give an estimate of the comparative values of different kinds of fish caught by you, or in your locality, as whitefish, lake trout, pike-perch, or pickerel, bass, perch, suckers, sturgeon?
10. Remarks on any of the points suggested above.

V.—MEMORIAL OF MESSRS. CHASE, ARMSTRONG, AND BROWNELL.

IN MEMORIAM.

The Michigan State Roard of Fish Commissioners direct this minute to be spread upon their records in respectful and affectionate remembrance of their friend, as well as in sincere sorrow for the loss of their most efficient and helpful officer, OREN M. CHASE, Superintendent of Fisheries for the State of Michigan, and in memory of two of his most trusted and respected assistants, GEORGE W. ARMSTRONG and CHARLES H. BROWNELL, the overseer and assistant of the Petoskey station.

In the fateful storm which swept over the great lakes on the 11th day of November, 1883, which will long be remembered throughout this State by reason of the loss of life occasioned, Oren M. Chase, George W. Armstrong, and Charles H. Brownell, while engaged upon the work of this commission, were drowned in Little Traverse bay, opposite the village of Petoskey.

No man who knew either of them doubts that they each met death as bravely and quietly as they met the duties and responsibilities of life, nor do we doubt that they made as brave a struggle for life as ever men made when overwhelmed by cruel seas and bitter cold which no mortal strength or skill could overcome or long resist. For each possessed the best things that made life dear and worth a manful struggle to retain, as sterling characters, health and a hopeful future of honorable usefulness in their chosen work—and, more potent still, homes where their loss can never be repaired.

Oren M. Chase was born at Rochester, in the State of New York, in the year 1840, where he spent his childhood, and at the age of about twenty years moved to Michigan, beginning life as a farmer near Dimondale. By his own efforts he cleared a farm of about forty acres, upon which he remained for a number of years, and then returned to Rochester to reside. After his return he was employed by the N. Y. C. R. R. as baggagemaster at Rochester.

While connected with the railroad, Mr. Chase became acquainted with the pioneer fish culturist, Mr. Seth Green, who recognizing his many sterling qualities, induced him to enter the employment of the New York Fish Commission. Mr. Chase took up the duties with that energy and singleness of purpose which were characteristic of the man, and made rapid advancement in the principles and practical detail of the work.

In the summer of 1875 Mr. George H. Jerome, then Superintendent of Fisheries, applied to Mr. Seth Green for assistance in securing a competent person to undertake the whitefish work at Detroit, expressing at the same time a preference for Mr. Chase. Mr. Green consented and Mr. Chase came here for

the season to inaugurate that work. But little time was required to satisfy the Commissioners of Mr. Chase's entire competency, and he was given full charge of the operations, which were so successfully conducted by him that he was permanently employed.

Mr Chase remained in charge of the Detroit hatchery until September, 1882, when he was appointed State Superintendent of Fisheries. He entered upon the work at Detroit with the crude apparatus then used, in the face of many discouragements and achieved most notable and honorable success. To his unfailing energy, consummate skill and thoughtful, intelligent application to his duties we owe all that is permanently useful in this department. He has perfected and simplified the apparatus for hatching by his invention of the automatic jar; and by his thoughtful experiments and keen observation rendered safe and comparatively easy the methods of gathering the ova, and thus make it possible for the Commission to meet the urgent necessity for operations that can be increased almost without limit.

In addition to the skill and industry that made him a competent overseer of a single work, he had also the business capacity, good judgment, address, and promptness of decision that made him an invaluable superintendent. He was just and considerate to those under him, loyal and most helpful to those under whom he worked. He never spared himself, or was afraid of work that promised to avert disaster, or give results of value. He was progressive, ready to learn, and never content to rest upon moderate results, or partial successes.

But admirable and valuable as Mr. Chase's official and technical work has been, he was more than a good officer in the force, or at the head; he was an honest, courteous, manly man.

At this board we shall sorely miss his practical counsel and his ready sympathy with every suggestion that looked to extend usefulness of the work in which his heart was so earnestly enlisted.

Mr. Brownell had been employed for a number of years at the Pokagon hatchery, where he won the confidence and respect of all by his intelligent devotion to his work, and his manly bearing. Upon the recommendation of the Michigan commission he was appointed superintendent of the Nebraska commission. That post he relinquished on account of a prolonged sickness in the winter of 1883, and upon his recovery this commission was very glad to welcome him back, and secure his valuable services.

Mr. Armstrong, while not a regular employé until September, 1883, had yet served for several seasons in gathering white fish ova. He had gained the reputation of being one of the most skillful and capable among experts. He was also well known for his industrious habits, honorable dealing, and good judgment. When the increased appropriation granted by the legislature, made it possible to extend operations by this commission, Mr. Armstrong was the first man engaged.

They were three manly fellows, that any commission might well have been proud of,—as we were. They were three fast friends who were always loyal to each other and themselves, their families, and their friends.

And this minute is the saddest that shall ever be made upon these records.

VI.—INVENTORIES CONDENSED.

1—INVENTORY OF PROPERTY BELONGING TO THE DETROIT STATION.

Buildings		$6,134 58	
Chase glass jars		790 15	
Tools and apparatus		275 00	
Furniture		122 30	
Fish cans		746 25	
Fishery at Fort Wayne		131 00	
Boats		112 00	$8,311 28
Docks and pound, Fort Wayne fishery			150 00
Insurance on house	$3,000 00		
Equipment	725 00		$8,461 28
	$3,725 00		

2—INVENTORY OF PROPERTY BELONGING TO THE PARIS STATION.

Thirty-eight and seven-tenths acres of land		$700 00	
Residence		1,150 00	
Out-houses		58 00	
Hatchery, apparatus, and ponds		4,025 00	
Furniture		56 50	
Wagons, sleighs, etc		114 00	
Carpenters' tools, etc		50 90	$6,154 40
Insurance on residence	$800 00		
House, etc	500 00		
	$1,300 00		

3—PROPERTY BELONGING TO THE PETOSKEY STATION.

Hatchery, water-pipes, and fixtures		$3,000 00	
Residence		700 00	
Chase glass jars		502 90	
Furniture		79 45	
Carpenter tools		58 90	
Tools and apparatus		120 00	
Ponds		75 00	$4,536 25
Insurance on residence	$300 00		
House, etc	1,200 00		
Equipment	700 00		
	$2,200 00		
Total insurance	$7,225 00		

INVENTORY OF PROPERTY IN SECRETARY'S OFFICE.

One letter press	$5 25	
One seal	5 00	
One ink-stand	75	
One book-case	30 00	
One postal card file	2 50	
Two letter files	2 00	
One letter clip board	50	
Books and stationery	20 00	
Library	20 00	$80 50
		$19,232 43

VII.—FINANCIAL STATEMENT.

There was appropriated by the Legislature, at its last session, to aid the c
mission in the prosecution of its work, and available for use July 1, 1
the following sums:

For special purposes, building and equipment of new stations, etc		$10,00
On this account there has been expended for construction and equipment of the Detroit Station	$6,134 58	
Construction of Petoskey Station, with equipment	3,470 03	
Other special expenditures	395 39	
		$10,00
Appropriated for current expenses for the years 1883-4	$10,000 00	
Appropriated for current expenses for the years 1884-5	10,000 00	
		$20,000

On this account the following sums have been expended up to Decem
1, 1884:

At Detroit Stations, salaries and incidental expenses	$6,847 51	
Water rates to October 1, 1885	350 00	
Royalty on jars	200 00	
Insurance	54 68	
Salaries and incidental expenses of Petoskey Station	1,507 77	
Salaries and incidental expenses at Paris Station	2,617 28	
Expenses of Commissioners	685 71	
Salary and expenses of Superintendent	1,576 70	
Salary and incidental expenses of Secretary	724 08	
Expense of gathering reports in pursuance of act	482 25	
Expense connected with carp work	224 12	
Expense connected with eel plants	216 11	
Expense connected with grayling work	86 10	
Total amount from July 1, 1883, to December 1, 1884		$15,572
Amount on hand December 1, 1884		$4,427

VIII—REGULATIONS.

1. At the first meeting in each year the Board shall elect one member president, appoint a secretary, a superintendent, and an overseer of the Paris hatching station, and any other employés needed.

2. The president to be the executive officer of the Board, and with assent of the Board to apportion the details of work to single members as committees.

3. The secretary to keep full records of meetings and transactions of the Board; to conduct, keep, and file correspondence and reports, to sign all vouchers for drawing appropriation and keep accounts of all receipts and disbursements, and under direction of the Board to compile the annual or biennial reports to the Governor or Legislature. All letters received to be kept in suitable files to be provided; copies of letters written and accounts to be copied in proper books to be provided.

All records, files, account-books, and reports to the Board, deeds, contracts, and vouchers coming to the secretary's hands to be the property of the Board, open to inspection by the Board and superintendent, and to be surrendered to the Board or its agent upon demand, and on a proper receipt being given.

The secretary to receive a monthly salary to be fixed by the Board.

4. The superintendent to have general supervision of the practical and experimental work of the Commission under the general direction of the Board; or in the absence of direction by the Board under any members of the Board having charge of any particular branch of the business, as a committee of the Board, with headquarters in Detroit, to have special charge of the white-fish work and all other work undertaken at Detroit.

The superintendent to receive a monthly salary to be fixed by the Board.

5. The overseer of the Paris hatching station, under the general direction of the superintendent, to reside and conduct the operations at the Paris station, that being designated as the headquarters of the brook trout, California trout, salmon-trout, and grayling work of the Commission. To receive a monthly salary to be fixed by the Board.

6. The superintendent and overseer of the Paris hatching station, each to have one regular assistant to see that regular notes or memoranda of all operations conducted at the special stations, or of special work done by them or under their direction, and reports are made monthly or quarterly to the secretary. To make and keep accurate minutes of all property, apparatus, and tools, and furnish copies of the same to the secretary once a year, or when called for.

7. All appointees of the Board to give and receive one month's notice to quit, except that for insubordination, intemperance, or gross neglect of duty they may be discharged at any time, by the superintendent, or the person who employed them.

Extra help to be governed by the terms of their employment, as to its du tion. This regulation shall be deemed an essential part of each contrac employment.

8. There shall be two members of the Board appointed as a committee audit. They, or one of them, shall countersign all vouchers before money is drawn on appropriations. The superintendent, or any member the Board having bills to be audited, shall present them to the secretary, order that an accurate copy of the same may be made by him, and obtain endorsement that the bill has been examined and entered. When the vou er has been endorsed by the secretary the same shall be countersigned either of the committee of audit, and when so countersigned shall be deem a sufficient voucher under the law upon which to obtain the warrant of auditor general, and as the voucher of the State Board of Fish Commissione

A copy of this regulation shall be furnished the auditor general.

IX.—OTHER COMMISSIONS.

NAMES AND ADDRESSES OF COMMISSIONERS OF FISHERIES.

UNITED STATES.

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

DOMINION OF CANADA.

A. W. McLelan, minister of marine and fisheries, Ottawa.
Samuel Wilmot, superintendent fish breeding establishment, Newcastle, Ont.

ALABAMA.

C. S. G. Doster, Prattville.
Col. D. R. Hundley, Madison.

ARIZONA.

J. H. Taggart, Yuma.
J. J. Gasper, Prescott.
Richard Rule, Tombstone.

CONNECTICUT.

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

KANSAS.

W. S. Gile, Venango.

KENTUCKY.

Wm. Griffith, Louisville.
P. H. Darby, Princeton.
John B. Walker, Madisonville.
John H. Steele, Versailles.
Dr. W. Van Antwerp, Mt. Sterling.
J. M. Chambers, Independence.
A. H. Gable, Catletsburg.
J. H. Mallory, Bowling Green.
W. C. Price, Danville.

MAINE.

E. M. Stillwell, Bangor.
H. O. Stanley, Dixfield.

MARYLAND.

G. W. Delawder, Oakland.
Dr. E. W. Humphreys, Salisburg.

MASSACHUSETTS.

E. A. Brackett, Winchester.
A. W. Putnam, Cambridge.
E. H. Lathrop, Springfield.

MICHIGAN.

J. C. Parker, President, Grand Rapids.
John H. Bissell, Detroit.
Herschel Whitaker, Detroit.
W. D. Marks, Superintendent, Paris.
A. J. Kellogg, Secretary, Detroit.

MINNESOTA.

Robert Ormsby Sweeney, St. Paul.
D. Cameron, La Crescent.
W. W. Sweeney, M. D., Red Wing.

MISSOURI.

Dr. J. G. W. Steedman, St. Louis.
Col. John Reid, Lexington.
Dr. John A. Logan, St. Joseph.

NEVADA.

H. G. Parker, Carson City.

NEW HAMPSHIRE.

G. W. Riddle, Manchester.
Luther Hayes, Milton.
E. B. Hodge, Superintendent, Plymouth.

NEW YORK.

Robert B. Rosevelt, 17 Nassau street, New York.
Richard U. Sherman, Secretary, New Hartford.
Edwin N. Smith, Rochester.
E. G. Blackford, 809 Bedford avenue, Brooklyn.

NEW JERSEY.

Richard S. Jenkins, Camden.
Wm. Wright, Neward.
Francis M. Ward, Newton.

NORTH CAROLINA.

S. G. Worth, Raleigh.

OHIO.

Col. L. A. Harris, Cincinnati.
Jas. Dority, Toledo.
Geo. Daniels, Sandusky.

PENNSYLVANIA.

John Gay, Greensburg.
James Duffy, Marietta.
H. H. Derr, Wilkesbarre.

A. M. Spangler, Philadelphia.
Arthur Maginnis, Swift Water.
Aug. Duncan, Chambersburg.

RHODE ISLAND.

John H. Barden, Rockland.
Henry T. Root, Providence.
Col. Amos Sherman, Woodsocket.

SOUTH CAROLINA.

A. P. Butler, Columbia.
C. J. Huske, Superintendent, no address given.

TENNESSEE.

George F. Akers, Nashville.
W. W. McDowell, Memphis.
H. H. Sneed, Chattanooga.
Edward D. Hicks, Superintendent, no address given.

UTAH.

Hon. John T. Caine, Salt Lake City.

VERMONT.

Herbert Brainerd, St. Albans.
Dr. H. H. Cutting, Lunenburg.

VIRGINIA.

M. McDonald, Washington, D. C.

WEST VIRGINIA.

H. B. Miller, Wheeling.
C. S. White, Romney.
M. M. Lowrey, Hinton.

WISCONSIN.

The Governor, ex-officio, Madison.
Phila Dunning, president, Madison.
C. L. Valentine, secretary and treasurer, Janesville.
J. V. Jones, Oshkosh.
A. V. H. Carpenter, Milwaukee.
Mark Douglass, Melrose.
C. Hutchinson, Beetown.

WYOMING TER.

Otto Gramm, Laramie.