DOCUMENT No. 7.

SIXTH ANNUAL REPORT

OF THE

COMMISSIONERS OF FISHERIES

OF THE

STATE OF NEW JERSEY,

FOR THE YEAR 1875.

REPORT.

To His Excellency, Joseph D. Bedle, Governor of the State of New Jersey:

SIR:—The Commissioners of Fisheries, appointed under the laws of this State, have the honor to submit this their Sixth Annual Report. For convenience, the State is divided into the Tidal, or Southern, and the Non-Tidal departments, and in reporting the condition of the interests in our charge, we adopt the same division.

SOUTHERN DEPARTMENT.

It is gratifying to learn, through the Fish Wardens of Burlington, Camden, Gloucester, Salem and Cumberland counties, bordering on the Delaware bay and river, and embracing their tributaries, and constituting this department, that the fostering care bestowed upon the fishing interest by the State, is still productive of the most important and beneficial results, the catch of shad becoming greater in numbers, and of larger size in each successive year, as will be shown in the following reports of the Fish Wardens:

Mr. James Logue, the Warden of Cumberland county, says: The number of drift-nets, or gilling seines, from this county, the past season, was fifteen. Those fishing in the bay met with extraordinary success—two hundred and fifty shad having been taken during one drift, and three thousand in the season. The average per net was about twenty-five hundred, double that of the preceding season. The quality fully corresponded with the increased number. Six pound shad had become rare. The past season they attracted no particular attention, and seven pound shad were frequently taken; and one, he was informed, weighed eight pounds. The excellent quality of the fish kept the price up. From seventeen to twenty-five cents was readily obtained for them at the wharves in Bridgeton.

On the Cohansey the fishermen were not so successful, the catch being but about six thousand, two thousand less than the year before. This result probably was owing to the water in the bay being

better suited to their tastes. Shad will often run up the tributaries to avoid the dirty water of the freshets in the main stream early in the season. About the usual number of nets were fished in the Cohansey, viz., twenty-one. Price, about twenty-five cents at retail. The abundance and nearness of the supply at Bay-side, affecting the markets in Bridgeton.

The more intelligent fishermen, constituting the majority, ascribe the increased number and superior quality of the shad to the successful operation of the new fishing laws, and express themselves well pleased with them.

James S. Hannah, Fish Warden of Salem County, reports but three shore fisheries in operation the past season, against four the previous season, viz.: At Helms' Cove, Carney's Point and Salem Cove. Fishing for rock fish, (striped bass) at Salem Cove began very early, and terminated soon after the shad season commenced. Could not learn the number of shad taken or the expense incurred.

At Helms' Cove and Carney's Point, operations continue about thirty days, herring fishing being the specialty. The numbers of shad caught at these two fisheries were, however, largely in excess of any former season, aggregating some seventeen thousand. The catch of herring was much less than usual, proving almost a failure. The whole season's work did not more than cover expenses, which, at the two fisheries, amounted to about $6,000.

The number of shad drift-nets owned and fished by residents of the county, was about one hundred and five (105). The number going from the county, but owned and fished by non-residents, was about sixty-five.

The number of shad caught by the two classes of drift-net fishermen was three hundred and twenty-eight thousand. Adding the seventeen thousand by the shore fisheries at Helms' Cove and Carney's Point, the catch foots up three hundred and forty-five thousand.

The average in the size of shad was higher the past, than for many years. More especially was this the case with those caught in the bay. This increase in size and quality of the fish, is, in his judgment, due to the wise legislation, and its better enforcement during the last few years.

It is true, a few violations of the Sunday close time, by non-residents, occurred from obscure and isolated points along the extensive water front of his county, which, in the future, he thinks, can be prevented, inasmuch as there is now a disposition shown by the more respectable class of fishermen to aid the warden by informing him of those few who do violate the law. The herring fishing, here, too, has proved a failure.

The sturgeon fishing has been poor. They appeared late and left early. Their numbers are decreasing yearly. This is evidently due to the sturgeon gill-nets.

Before these nets were introduced, the sturgeon were caught in large numbers at all the shore fisheries, the whole length of the tidal portion of the stream to the falls at Trenton.

Though considered a nuisance by those fisherman who make the catch of shad a specialty—more particularly the drift-net men, with whose fine webbed nets the sturgeon, sometimes, made sad work—it becomes a question how far their indiscriminate destruction shall be carried. They certainly constitute a valuable article of food, growing in favor, and eagerly sought after. Of the roe, caviare is made, in which a thriving business is now done.

Helmes V. Heritage, Fish Warden of Gloucester county, reports that the past season has been a good one, both for shad and herring. The shoremen, as a rule, have made money. The shad were more abundant, and larger in size, than for several seasons past, the average weight being four (4) pounds, and requiring about seventy-five fish, cleaned and salted, to fill an ordinary fish barrel.

"There are about one hundred and fifty nets, with two men to a net, used by the gill men, in my jurisdiction, and the catch averaged about three thousand fish to the net; this includes fishing in the bay and river, outside the limits of Gloucester county. There are six shore fisheries in said county, employing one hundred and ninety-three men. The number of fish taken at these, I have not been able to ascertain. All of these fisheries are operated by Philadelphians. Large numbers of herring and a few rock fish were caught."

"The fishing laws have generally been respected, although there have been some violations thereof. One person, a resident of this county, was arrested and fined $50 and costs, for having ten shad in his possession after the expiration of the season. Two others have been indicted; one, Benjamin F. Murray, for violating the Sunday close time; the other, David Patton, of Camden county, who, three years ago, rescued two violators of the law out of the custody of the Fish Warden of Camden county—is indicted for fishing after season. These will be tried at the next (December) term of our courts. There have been other cases which have recently come to my knowledge for these violations. I have been much censured for lack of vigilance; and now, when they have come to my knowledge, some of those who have been loudest in their censure, are unwilling or reluctant to furnish me with the evidence to convict the offenders. Other law-abiding citizens have, in the cases of the persons proceeded against, furnished me with the necessary proof. There have also been some violations of the Sunday law by persons living out of my jurisdiction."

Because of the great extent of water front of the said county, it is almost impossible to entirely prevent violation of the law, but all persons found violating it have been promptly dealt with. The

fishermen are, as a class, satisfied with the existing laws regulating fishing.

Frederick Shindle, Fish Warden of Camden county, reports a greater respect shown to the fishing laws, the past season, in his county, than heretofore. The early part of the season being cold, the shad were scarce in the upper reaches of the river, and drift net fishing was chiefly done farther down, till the weather, became milder, and the shad more plentiful. Larger shad were caught the past season than for many years.

The only shore fishery in his county, is that below the city of Gloucester, where they did a very fair business; but few large hauls were made, but the shad were large, and brought a good price.

Langhorn Thorn, Fish Warden of Burlington county, reports seventy drift-nets hailing from his county, viz.:

From Bordentown and Mansfield townships, twenty nets, sixty fathoms long, forty meshes deep, mesh five and three-eighths inches. Average catch of shad for the season, four hundred; price, $35 per one hundred shad.

Burlington and Beverly townships, twenty-five nets, one hundred fathoms long, fifty meshes deep, mesh five and a quarter inches. Average catch of shad for the season, one thousand two hundred; price, $30 per one hundred.

Delanco, Bridgeboro and Cinnaminson townships, twenty-five nets, one hundred to one hundred and forty fathoms long, fifty meshes deep, with eight feet buoy lines to upper margin of net, mesh five and a quarter inches. Average catch for the season, two thousand shad; price, $20 per hundred.

Pennsylvania sent out a like number from the opposite shore. The same may be said in respect to the counties below. Pennsylvania and Delaware furnish their full quota of drift-nets.

SHORE, OR SWEEPING SEINES.

Ellis's Cove, fished by Lewis Consoley, of New Jersey. Seine one hundred and six fathoms long, thirty-five feet deep. Crew, thirteen; make ten hauls per diem; began April 26th; stopped June 7th. Time to make a haul, one hour; gross receipts, $1,700.

Hayes' Fishery—Rice, Norman & Co. Seine two hundred and fifty fathoms long, depth, thirty feet. Crew, thirty; number of hands per diem, nine; began April 26th; stopped June 7th. Each haul, one hour and a quarter: gross receipts, $2,500.

Hawk Island—Joseph Dilks, of Pennsylvania. Seine one hundred and sixty fathoms long; depth, thirty feet. Crew, sixteen; hauls, ten; time, one hour each; began April 27th; stopped June 6th. Gross receipts, $2,000.

Plum Point—Henry Haines, of Pennsylvania. Seine one hundred and six fathoms long; depth, twenty-eight feet. Crew, thirteen; hauls, twelve per diem; time, each three quarters of an hour; first haul, April 24th; last, June 6th. Gross receipts, $1,500.

Taylor's Point—Jacob Gosson, Pennsylvania. Seine one hundred and sixty fathoms; depth, thirty-five feet. Crew, twenty; hauls, ten; time, one hour. First haul, April 26th; last, June 6th. Gross receipts, $2,000.

Rancocas Creek—Only about one thousand shad taken in this stream.

Considers the past season a good one, and the fishermen well pleased with the results. Shad large—many weighing six pounds. Largest noticed weighed seven pounds. The laws were better observed that ever before. To the greater respect shown to the fishing laws for several years past do the fishermen ascribe the increase in numbers and size of the shad. Millions of young shad were observed, between the first of June and middle of July, descending the stream. Two hundred and fifty-five nets, belonging to Philadelphians, were ordered to be removed.

The black bass were observed in considerable numbers.

From the foregoing reports of the Wardens for the counties bordering upon the bay and tidal portion of the river, it will be seen that shad fishing commenced unusually late the past season. The shad entered the bay in immense numbers. Kept in the brackish water by the continued cold weather, they were taken in great numbers there by the drift-nets, which, for the five to six weeks—to the beginning of May—confine their operations chiefly below Fort Delaware. The shore fishermen did not commence till the 26th to the 28th of April, more than two weeks later than in ordinary seasons. The great bulk of the shad in the tidal portion of the river and the bay, are taken to Philadelphia. In point of fact, Pennsylvania is more deeply interested in the shad fisheries than is New Jersey. Beside being the recipient of most of the shad taken, a great number of her citizens are engaged in drift-net fishing, and, with one or two exceptions, all the shore fisheries below Trenton, both on her shores as well as those annexed to the New Jersey shore, are fished by Pennsylvanians, chiefly from Kensington, in Philadelphia.

Mutually interested, the legislation for the protection of the fisheries has, by long established usage, been concurrent, or coincident on the part of the two States, and the State of Delaware, within the last few years, has been in accord. The principal provisions of protective legislation are, some thirty hours weekly, or Sunday close time; prohibition of shad seines after the tenth of June, below Trenton Falls, and after the fifteenth of June above Trenton Falls; also, a fine of five dollars for each shad offered for sale or in

possession, taken from the Delaware or its tributaries after the close of the fishing season.

To enforce these salutary measures, New Jersey has a river police. Pennsylvania, also, by an act passed 1873, authorized her fishery commissioners to appoint not less than three such officers for the river Delaware, but we regret to say that up to this time, no such appointments have been made. The whole burthen of enforcing the laws, common to both States, and for their mutual benefit, has fallen upon our Wardens, who complain of the want of co-operation on the part of the authorities of Pennsylvania, and with great justice, too, when the fact is notorious that the most troublesome violators hail from that State, and particularly from Philadelphia. Nor are any steps taken to enforce either the State law or the city ordinance against the sale or possession of shad caught in the Delaware after the legal end of the fishing season, viz., the 10th of June. In former reports we have shown that the open market and ready sale of shad taken out of season, are powerful incentives to the infraction of these important provisions, and it will be found that the States will appropriate thousands of dollars for the artificial propagation of shad, in vain, if the salutary provisions above mentioned are not enforced. It is but fair that the dwellers along the whole length of the river should have their share of the shad, and it is all important that the shad reach their spawning grounds; neither of which ends can be attained if constant obstructions are interposed, or indiscriminate fishing is permitted by the gill-net fishermen. We have yet to learn of any infractions of the fishing laws at any of the regularly entered and bonded shore fisheries.

In previous reports a pretty full history of the Delaware river fisheries has been given, but, inasmuch as the public are not familiar with the subject, and that a fuller knowledge of their importance may be imparted, a brief resumé may not be amiss.

The anadromovs fishes, salmon, shad and herring, seek our fresh water streams in early spring to propagate their several species. They move in schools, sometimes of immense numbers. Salmon and shad spawn in the clear running waters above tide, which point, in the Delaware, is at Trenton, N. J. The herring here do not go above tide, but are believed to spawn upon the grassy flats below.

In taking these fishes, two kinds of seines are used—the sweeping seines, and the gilling, or drift-nets. As the fish swim in the deep water, or channels, both of these kinds of seines are therein cast. The shore seines sweep the channel opposite to a given length of shore, and are drawn to the shore by strong lines, varying in length according to the length of seine, and the distance over which it is to be drawn. The space over and through which these seines sweep is, in legal parlance, a pool, or fishery. It is also termed a shore fishery. In the compact of 1783 between Pennsyl-

vania and New Jersey, they are the fisheries alluded to as being annexed to the shores, and to be guarded and regulated by suitable legislation. They have, from a very early period in our colonial history, been recognized as vested rights, and as such, subject to be conveyed with, or apart from, the adjacent lands. They are also taxed as real estate.

The other mode of fishing is by drift, or gilling seines, introduced here a little over fifty years ago. These seines, as their names import, are stretched across the channels, drift with the current, and constructed of very fine twine, secure the fish by the gills in their efforts to push through. This mode of fishing comes within the term *Common of Fishery*. It is annexed to neither shore. Legalized, their seines are allowed to drift the length of the bay and river, save "in some pool or fishing place entered as such according to law." Both classes of fishermen are required alike to conform to the laws regulating fisheries in said rivers.

Confined to no locality, the drift-nets intercept the runs or schools of shad, in particular, so soon as they reach the upper part of the bay. Until about about the 1st of May most of their fishing is done below Fort Delaware; the season advancing, the shad make an effort to reach the upper reaches of the river and their spawning ground, the drift-nets keeping pace with them. The seines hailing from Pennsylvania, Delaware and New Jersey, number, it is believed, from eight hundred to one thousand, varying in length from one hundred to five hundred and fifty fathoms. The effect of so large a number of nets of this description, drifting for hours, and over many miles in a day, in breaking up and scattering the schools of shad, must be manifest to every one. It is to the excessive and obstructive fishing by these nets, that our migratory fishes have been so reduced in numbers; and it is to prevent utter extinction of these fishes, that restrictive legislation has been invoked. To this end, close times have been established; and to enforce their observance and other salutary measures, a river police has been organized—a Fish Warden for each of the nine counties fronting on the river and bay. The efficiency of these officers has been such that in the four years since their first appointment, very much of the illegal fishing has been checked. It cannot be expected, when the reach of each of these Warden's jurisdiction is considered—extending over many miles on a broad river—that he can be cognizant to every infraction of the law. The results, however, have been most satisfactory and encouraging, in both a steady increase of numbers, and a corresponding improvement in the average size of the shad. With these results before them, and a more thorough knowledge of the habitudes of these fishes—the more intelligent portion of these fishermen themselves are becoming reconciled to restrictions once deemed by them burthensome. In view, however, of the difficulties resulting from an extensive jurisdiction, and the character of those,

chiefly from the opposite shores, who give several of our Wardens the most trouble, we would recommend that there be an additional Warden appointed for the counties of Gloucester, Camden and Burlington.

NON-TIDAL DEPARTMENT.

The reports from the Wardens of Warren, Hunterdon, and Mercer counties have been received, but Sussex sends no report, on account of the resignation of the Warden of that county in September. The Wardens heard from give flattering accounts of the success of the work of the commission in trying to advance the shad interest by enforcing the law.

The causes which made the season late in tide-water, operated with the same effect above tide, and no fish of any account were taken before May 1st.

The first fish were caught in Mercer April 15th, and in Hunterdon April 9th. The catch was very large throughout the month of May, and up to the close of the fishing season the fishermen were well paid for their labor. The proportion of large shad was greater than at any time for twenty years past, and the gross receipts from the shore fisheries exceeded any returns made since the appointment of this commission. We cannot carry the comparison of receipts back any farther, since the only data we have are in the reports to the commission in 1870, and annually since that date. The drift-nets also shared the advantages of the increase in the quantity and quality of the fish.

The improvements in this respect last year were still more marked this season, and furnish the strongest evidence of the efficiency of the system of Wardens now in force.

In Sussex county the Warden appointed last year entered on the fulfillment of his duties, and so far as the close time is concerned enforced the law. In July the Commissioner in charge of this department went to Sussex county for the purpose of conferring with the Warden, Mr. Cole, and directing him especially as to his duties. He reported only one illegal structure in the river, that being a fish-basket near Milford. Strict orders were given him to take this out, and proper notices under the ten-day law were forwarded to him with instructions to have them duly published and enforced. His report at that time was that the proprietor of the basket had promised to remove it himself. We are informed that this was done. Subsequently, in September, advices came that other baskets had been erected between Milford and the Warren county line, and the Warden was again directed to give notice and have them removed at once, at any cost, and to call on the sheriff of Sussex to assist him. The result of this was a letter from the Warden advising us that the notices would appear at once, and expressing a

fear that he might lay himself liable to prosecution in Pike county by tearing out weirs belonging to citizens of that county. To quote: "But if I should lay myself liable to their laws, they would pounce on me the first time that I touched their soil, and to law them in Milford would be to me like trying a suit in the vicinity of the infernal regions." This letter was followed next day by a notice of his resignation, which was tendered "in view of the difficulty of enforcing the law without the co-operation of the Pike county officials, and not because I think the law should not be enforced." This action left us without a Warden, and no suitable person to fill the vacancy was found in the short interval that elapsed before the close of the season for the downward passage of young shad.

These weirs are, of course, dismantled by the fall freshets, and it is expected that such measures will be taken next year that their erection and maintenance will be prevented, by whatever Warden your Excellency may appoint to fill the vacancy in Sussex. The result of the immunity of the law-breakers in Sussex has been to encourage some of the same party who operate in Warren county, but the energetic Warden of that district destroyed four weirs in the Delaware, and three in the Paulinskill, and effectually stopped the nuisance for this year. This result has not been accomplished without much labor and some danger. The owners of weirs are generally determined men, who have been long accustomed to defy law, and of course it is difficult to make them see at once the necessity for its enforcement. It is believed that little trouble will be experienced in Warren county in the future. An important question as to the right to remove a basket placed in a tributary of the river has been raised by some of the parties interested on the Paulinskill, and suit has been brought to recover damages against Warden Weller for trespass. All who assisted him are made defendants. Counsel has been employed under our direction to defend the action, with instruction to contest the suit if pressed, until a decision by the higher courts. Under the decision of the United States Supreme Court, quoted in our last report, the action of the Warden was perfectly legal, and as our statute law plainly directs the removal of these structures, the commission have not hesitated to order its enforcement. The Attorney-General was applied to informally, and said that we should enforce any plain law without questioning the right of the Legislature to make it. The importance of the law is fully impressed on us, since the structures complained of are most destructive to young fish, without giving any corresponding advantage, even to the owners of the weirs. Immense numbers of young fishes bred in the upper waters of the river, and which would find their way to their great feeding place, the sea, and bring back for our use a portion of its treasures, are wantonly destroyed for the petty advantage of less than a score of

men, mostly non-residents of New Jersey. In the tributaries the same result ensues from similar obstructions, and the abolition of these weirs is essential to the preservation of the fishing interests of the river and tributaries. The justice of the course prescribed by law and followed by the commission and the Wardens, will be obvious, when we reflect that all the people above and below any given obstruction have a right to the fair use of the river for fishing purposes, and that the proprietors of fish baskets interfere most seriously with those rights. The commissioners for Pennsylvania have not made any appointments of Wardens. They have the right to call on the several sheriffs of the river counties to enforce the fishing laws, and have called on the sheriff of Pike county, but he does not take hold of the matter.

Your commissioners will still endeavor to induce the Pennsylvania officers to be more active, and to assist our Wardens in the discharge of their arduous duties.

WARREN COUNTY.

The Warden of Warren county reports that all the nets in his county were bonded according to law. Seven fisheries were operated and the receipts were better than for some years past. The fish taken were the largest caught for twenty years, and were in good condition. The high water prevented any work until May, and in that month large numbers were caught. There were no violations of the close time known to the Warden. His principal work was done after the close of the fishing season, when the young shad were descending the river, and consisted in removing the weirs before referred to. In one case he tore out the weir and fifty yards of wing wall, thus effectually destroying the nuisance. The Warden reports that in several instances weirs torn out by him have been rebuilt by the owners. Such conduct could be, in a measure, prevented by a law declaring all such structures common nuisances, and providing penalties for their erection, and greater penalties against parties who might have the temerity to rebuild. Owing to the difficulty experienced in getting concurrent legislation laws have been changed from time to time with a view to making the regulations of the two States correspond, but there are still some differences, and it is proposed to present to the legislatures of the two States this winter a new law, so framed as to make it easier to understand the duties of the Wardens, and to enforce the prescribed penalties. New Jersey, by act approved March 27th, 1874, dispensed with the ten days' notice, the act to take effect when concurred in by Pennsylvania. That feature of the law should be done away with if possible, as it seems absurd to give ten days' notice to remove a nuisance, which is knowingly erected in violation of law and of the first dictates of common sense and justice.

HUNTERDON COUNTY.

No violations of the law are reported from this county. Great vigilance has been shown by the Warden. The principal duty has been the enforcement of the close time. Whenever reports came of any intended or suspected violation of the law, the Warden was promptly on hand to prevent the wrong. The fishermen seem to appreciate the fact that the law is beneficial rather than oppressive. Mr. Scarborough reports, "It was the most successful season they have had for seven or eight years in the number of shad caught. In size they were like those of last year, very large. The season was an unusually short one. Fishing did not commence until very late in the spring, on account of the snow and ice—the ice in the river not breaking up until the 1st of April, and was running during Monday, the 5th of April. Notwithstanding this the season was the best since my appointment as Warden. The first shad caught in my county was by Mr. Ashton, at the fishery, on the 9th day of April. But few shad were caught between the 9th and 27th of April. The season was from the 27th of April to the 1st of June —very few being caught after the latter date, on account of the river getting so extremely low. The nets fished so slowly that the shad would run away from them." "More shad were caught in the month of May this year than have been taken in the whole of any one season for the last six years." "There were fewer small shad caught here this season than there has been for a number of years, on account of there being a good height of water for fishing during the early run of shad, and some of the fishermen learning that it is not to their advantage to catch them. At the Island fishery here and at one over the river, they turned back into the stream all the small shad they caught, they having become satisfied that they are the male shad of our river. Previous to the operations of Dr. Slack, the persons I speak of did not believe that they were of the same species of shad. It was generally believed by our fishermen that they were a different species that had come into our river from some other stream."

Mr. Scarborough reports the number of fisheries operated in Hunterdon the same as last year—twenty-three—and that all were successful and paying. More black bass have been caught than in any previous year. They have increased at the expense of some of the smaller fishes. The number of other fishes taken has been about as usual. A few salmon have been caught at the different fisheries in small mesh nets. He has not heard of any being taken with the hook and line. All were caught in the spring, in the month of April, on their way to the sea. The difficulty complained of at Scudder's Falls and Bull's Island, still exists, and will continue

until lgislation shall be had authorizing us to place guards at the head of the water-power and canal feeder. The Warden recommends such legislation, and the commissioners heartily concur.

MERCER COUNTY.

Mr. Joseph Ashmore gives returns from the fisheries in Mercer, showing a large increase in the number and value of the fishes taken over last year. The total number of shore fisheries in use was seventeen. Duck Island, Long Bar, Buttonwood, and Hole in the Wall fisheries have been abandoned, owing to changes in the current, which have caused injury to the pools. These changes result from encroachments on the river, by shore owners near the head of tide.

The largest catch was at Taylor's Point, near Bordentown, fished by Hamilton Hill, and employing eleven men. In the whole county the gross proceeds foot up twelve thousand two hundred and thirty-three dollars from the shore fisheries, an advance of four thousand nine hundred and fifty-eight dollars over last year, and the net profits this year have been nearly one-half greater than those of the year before. The eleven drift-nets in this county brought in one thousand four hundred and seventy dollars receipts, and as their expenses are very light this is a good showing. The number of men employed at all the fisheries, (exclusive of drift-net men) is one hundred and eight. The fishing season was marked by the same characteristics as in other counties. Several reports of violations of the law as to close time, were made to the Warden, but some of the stories were found to be false, and as to others, no witnesses could be found to make a case. One of your commissioners traced up some of the alleged violations, and upon examining the parties implicated found nothing worthy of prosecution.

There are several "set nets" in Mercer, between Trenton and Bordentown, and in Burlington county near Bordentown. These nets are heavily leaded and arranged so that the cork line sinks below the surface of the water. They can be paid out in a few minutes, by experienced men, and unless the Wardens see them placed, it is impossible for them to discover their whereabouts. On this account we directed the Wardens of Mercer and Burlington, on their application, to procure a tug and run up the river with a drag, to tear out and seize all nets of this character. The request for this aid came so late, however, that the season closed before the plan was put in operation. The resident owners of this class of nets were all called on by our officers, and ordered to hang up their nets, with which order they complied. Those who continued to violate the law, resided and stored their nets in Pennsylvania, and the only way to reach that class is by the tug and drag. The great extent of water surface below Trenton, and the large number of

non-resident owners of set nets, makes it impossible to enforce the law against these devices, and to compel observance of the close time, without the constant use of a tug. The purchase of such a vessel by the State, for the use of the Commission, is again earnestly recommended. It would do more to enable us to advance the fishing interest, than any other measure that can be proposed. If the full extent of the injury done by blockading the river with set nets, and fishing during the close time, was appreciated, there can be no doubt any means calculated to destroy the nuisance and prevent the violation of law, would be provided by the legislature. We claim that the great and constantly increasing improvement of our fisheries is due to the partial enforcement of the law by our Wardens, with the appliances at their command, and we fell assured that strict compliance can be compelled in the way indicated, and that a corresponding benefit would follow.

The catch of smelt from the Raritan was less than the average the past season. The cold weather continuing later than usual, and several northeast storms occurring about the time of their arrival at the mouth of the river, seemed to have the effect of driving them back to deep water.

At the request of Prof. Baird, we sent some of the Raritan smelt to the Smithsonian Institute, and received the following letter in relation thereto:

UNITED STATES COMMISSION, FISH AND FISHERIES,
WASHINGTON, April 8th, 1875.

MY DEAR SIR—I have much pleasure in acknowledging the receipt of the package of smelts, which arrived in good condition and have already been fully attended to. I was very much surprised to see them in spawn at this time, and presumed the delay was in consequence of the cold weather. I am sorry that the needs of science were paramount to those of the table, as the entire set was put in alcohol for preservation.

In regard to a supply of black bass, I think you can get them without any difficulty from the Potomac. If you will address T. B. Ferguson, Esq., Fish Commissioner, 192 North Charles street, Baltimore, he can advise you as to parties at Point of Rocks on the Potomac. There is also a man at Duncan's Island, near Harrisburg, who has done a good deal in supplying these fish, but I have forgotten his name.

Yours truly,
SPENCER F. BAIRD,
Commissioner.

J. R. SHOTWELL, ESQ., Rahway, New Jersey.

In a subsequent letter, received November 12th, Prof. Baird says that the accomplished naturalist, Prof. Gill, will this winter take

up the *salmonidæ* generally, and prepare a monograph for the forthcoming report of the United States Fish Commission.

Your Commissioners have arranged with Mr. Ferguson to exchange impregnated ova of the smelt, if they can be procured, for black bass, during the ensuing season. He is anxious to procure the Raritan smelt for the Maryland waters, and has great facilities for securing bass from the Potomac to send in return.

ARTIFICIAL PROPAGATION OF SHAD.

The legislature, at its last session, appropriated one thousand dollars to be used by your Commission in the artificial propagation of shad in the Delaware river. Pennsylvania appropriated three thousand dollars for the same purpose. Your Commissioners at once entered into correspondence with Col. H. J. Reeder, of Easton, one of the Pennsylvania Commission, who requested us in May to take entire charge of the work. Prof. Baird, the U. S. Fish Commissioner, having offered us some assistance and the use of the hatching boxes belonging to the United States, we agreed to undertake the whole work for the two States at joint expense. Diligent inquiry was made of owners of shore fisheries at various points, to ascertain the facts necessary to enable us to choose the best locations, and from the information thus obtained we determined to work at Moon's Island and at Black's Eddy, or Point Pleasant. Through the favor of Quartermaster-General Perrine, we procured the necessary tents, and on the 31st of May the work was commenced and was continued until July 10th. The first ripe fish were taken at Moon's Island on June 3d, and at Point Pleasant on June 7th. The fish taken at Moon's Island being generally unripe, the station was abandoned June 20th, and the boxes removed to Blackguard Island. From this point the operator in charge moved to Lower Black's Eddy late in June, and continued the work in connection with Mr. Swartz, who was employed at that station. At Point Pleasant greater success attended our efforts, and we continued to operate there until the close of the season. The total number of fishes hatched at all the stations amounted to one million four hundred thousand. If the Lower Black's Eddy fishery had been properly cleared out before the season commenced, we could have used it to advantage.

The cost of the work amounted to $937.20, one-half of which sum we expect to receive from Pennsylvania. All the fishes hatched were turned into the Delaware, except one hundred thousand, which, at the request of Prof. S. F. Baird, and in return for his advice and assistance, were given to him, and forwarded by the U. S. Commission, to Jackson, Mississippi.

If it is thought advisable to continue this work for another year, arrangements will be made in advance of the fishing season, so as

to secure a good pool, free from obstructions, at Lower Black's Eddy, and another below the dam at Bull's Island.

The canal company find it necessary, late in the season, to raise the height of the dam, thereby interfering with the passage of the fish up stream. Of course, this makes further work at Point Pleasant impossible, but the effect of the obstruction, if a suitable fishery should be cleared out below the dam, would be to facilitate the work of artificial propagation, by collecting the spawning fish near the foot of the dam, where they could be easily netted.

The following abstract from a letter of Prof. Spencer F. Baird, United States Commissioner of Fish and Fisheries, addressed to Congress last year, is of interest in this connection. "The so-called anadromous fishes, (those coming into fresh waters from the ocean or lakes to spawn), ascend the rivers as full grown mature fish, for breeding purposes, and very seldom, if ever, touch anything as food during their stay. The young fish when hatched out, remain—shad for a few months, the salmon for a year or more—in the rivers, but develop very slowly, and consume but little food until they return to the ocean, when they grow very rapidly and attain their full size in about three or four years; the shad, when they return after that interval, weighing three to five pounds, and the salmon nine to fifteen. It is only necessary, therefore, to provide a swimming-way for the fish, and not in any degree for their food, and consequently, by the process of artificial propagation, we are able to increase the number to an enormous degree, and, as shown by actual experience, even beyond that which had ever been manifested previously.

It may seem rather paradoxical to state that the artificial method of multiplying fish is much more efficient and perfect than the natural, but such is the case. In the more usual process of reproduction in fish spawning, in a state of nature, the sexes swim side by side, and the eggs are discharged by the female and the milt by the male, in close proximity. A very large per centage of the eggs, however, fail to be impregnated, and consequently produce no result. During this operation there are myriads of minnows and other predaceous fish at hand, busily catching up and devouring the eggs, whether impregnated or not, and a comparatively small number is ultimately hatched out. But even after this result is accomplished, the young remain helpless from a period varying from several days to a month, (or until the yolk bag is absorbed), subject to constant attacks of the same class of enemies that devoured the eggs. It may be safely assumed, that of the entire number of eggs spawned naturally, scarcely more than three to five per cent. survive to a period of development when they can begin to feed for themselves, liable, of course, to be still further decreased in number by the continued depredations of their associates in the water.

With artificial impregnation the case is entirely reversed, a very small per centage of the eggs—in some cases scarcely more than one or two in the hundred—failing to be properly fertilized. These are then hatched, and usually retained in the hatching-boxes or troughs until the yolk-bag is absorbed, and they are able to swim, and the instinct of self-preservation leads them to the use of the readiest means for their safety by hiding from their enemies. Instead of there being only a few per cent. saved, in this case the loss of over five or ten per cent. would be considered as indicative of poor management on the part of the fish breeder.

The eggs and the young of fishes constitute to a very large degree the sustenance of the animals in the waters of whatever kind, and the vast number of eggs laid by some kinds has a direct relation to this law of preserving a due proportion of the species. The persistence of the species, however, is based more upon the degree to which the eggs or the young can be preserved from attack than upon their numbers. Thus certain kinds of catfish lay from five to twenty eggs only, but these are carried in the mouth of the male until they are hatched out, and then the young are protected by him until they have attained a considerable growth. Codfish, on the other hand, are said to spawn from two to six millions of eggs at a time, and give no care to them afterward; yet the catfish and the cod equally maintain their abundance against surrounding agencies."

While the work was going on at Point Pleasant, Mr. Fred Mather and an assistant, Mr. Bell, were sent by Professor Baird to assist in our work and also to endeavor to ascertain the best method for keeping the young fish alive in tanks while being transported for the purpose of stocking other waters. To this end they conducted a series of experiments with fish taken from our hatching boxes, carefully noting the temperature of the air and water, and found that under favorable conditions the young fish would live at least ten days. Mr. Mather used a tank of his own design, with arrangements to allow a current of water to pass over the fishes without crowding them against the outlet, and thus destroying them. The apparatus worked satisfactorily in that respect. The great difficulty in the way of keeping the young alive so long a time as is desired, is the fact that they begin to feed after three or four days, when in their natural condition, and no one has yet been able to find food suitable for such young fishes.

The United States Commissioner continued this year the effort begun in 1874 to supply the German Government with shad. The attempt was unsuccessful. As some hours can be gained by taking fish from the Delaware, it is probable that our river will furnish the stock used in the next trial. In 1874 the fish were carried safely as far as Southhampton and could have been delivered there. Only a few hours more would have insured success.

The Raritan river, formerly a valuable shad stream, is now so obstructed by dams that but few are taken there, and those only below the dam of the Delaware and Raritan Canal Company at Bound Brook.

In the spring of 1871, Mr. John Miller, of the latter place, commenced the operation of taking shad from the fishing ground below the dam, and removing them in a flannel-lined vessel, filled with water, to the stream above the dam. He has continued this practice every year since.

As a proof of the success of this performance, he states that at one time during the summer of 1872 he placed thirty-five shad above the dam in the way above described, and that nearly the whole number were caught at one haul of the seine three days after they were put in, at South Branch, about twelve miles further up the river. At another time sixty-five shad were taken from the stream some miles above the dam. Observant persons in the neighborhood state that every year young shad are seen going down the stream on their way to the ocean.

Your Commissioners saw in a small pond, shad that Mr. Miller had caught and placed there twenty-four hours previously. They showed no signs of having been injured by the handling they had received, but, on the contrary, were very active; and when, in our presence, some of them were placed in the river, they darted off with great agility.

Mr. Miller, under our direction, removed ninety-five shad the past summer from the fishing-ground below the dam to the river above.

At the date of our last report two hundred and twenty-five thousand salmon ova had been received from the Sacramento river, and all except thirty-four thousand, lost in transportation, were in the hatching-troughs at Troutdale. Of these one hundred and sixty-five thousand were successfully hatched and distributed. The eggs were given by the U. S. Commission, and in return we gave to Prof. Baird twenty thousand young fishes for Southern waters. These were taken from Troutdale by Mr. Sheriff, of Baltimore, and distributed by Mr. T. B. Ferguson, the efficient Commissioner of Maryland. Of the balance some thousands were retained in the house in a large tank, where they were kept for the purpose of learning something more about their habits, and all the rest were distributed in the waters of the State.

Two thousand were placed in tributaries of the Passaic above Paterson; three thousand in the Raritan, and the remainder in various tributaries of the Delaware. In March, through the favor of Prof. Baird, Mr. Charles G. Atkins, of Maine, sent us eighty thousand Penobscot salmon ova from his works at Bucksport. The loss in transportation and in unpacking this lot of eggs was probably less than in any like number ever shipped. Only nine spoiled

ova were found in the whole consignment, a result which shows the skill of Mr. Atkins, and the perfection already attained in the art of impregnating and developing the ova. Very few were lost during the hatching process, and more than seventy-nine thousand were left for distribution. They were nearly all placed in the Musconetcong, Pohatcong and Paulinskill rivers, and those not deposited there were placed in the south branch of the Raritan, and the Hackensack.

Dr. Charles C. Abbott, naturalist, of Trenton, caught a young salmon at the mouth of Crosswick's creek this summer. He preserved it as a specimen. From its size it must have been one placed in the river near Easton, in 1874, and had thus traveled fifty miles on its way to the sea. Many others have been caught at points along the river, and Mr. Broadhead, at Water Gap, assured us that the young salmon were frequently caught there. This shows that they will flourish in our river. At Bristol, as we are informed by Mr. H. Morris, a fish supposed to be a salmon *grilse* was caught at a shad fishery in May. This must have been one of the lot introduced by Dr. Slack or by the Pennsylvania Commissioners three years ago. In the Musconetcong one of your commissioners has caught numbers of salmon, growing finely and in perfect condition. They are found in many of the spring runs leading into the river. All these facts lead us to believe that only persistent effort is required to ensure the stocking of the Delaware with salmon. The water is pure and is cold enough to suit the fishes, while the supply of suitable food is inexhaustible.

At the date of our last report we had at Troutdale ten thousand land-locked salmon. These were afterwards, November 28th, placed in Lake Hopatcong, White Pond, Green Pond, and Mackopin Lake. They were of sufficient size to take care of themselves, and we expect to hear from them in due course. Whether the peculiar characteristics required to develop these northern fishes exist in these waters, can only be determined by experiment.

We purchased this year six thousand salmon trout ova, which were hatched at Troutdale, and placed in northern New Jersey by Mr. M. R. Dennis, of Newark, A. C. Canfield, of Morristown, and others. These fishes grow rapidly, and are of fine quality. They are abundant in northern New York and are very attractive to anglers. If they flourish where placed we will endeavor to secure a larger supply for another year to stock lakes and streams in the upper part of the State.

The demand for black bass has exceeded the supply, although we have been very successful in procuring them. More than thirty different streams and lakes have been stocked, and upwards of three thousand fishes have been distributed. This work was done principally in the months of September and October. The fishes were all yearlings or older, and will spawn next spring. Our ex-

perience with this species leads us to expect sure and speedy returns. We have been aided in the work by all of our Wardens. One lot of four hundred was sent to Gloucester county for distribution in South Jersey under the direction of Dr. Howell, and the fishes were placed in the various streams under the immediate supervision of the wardens of the lower river counties.

The West Jersey Game Protective Association assisted materially in selecting the locations chosen, and defrayed the expense of transportation and depositing this lot of fish. This association is entitled to great credit for the energetic measures adopted by them for the purpose of enforcing salutary game laws and introducing and protecting game birds. In some of the counties of the State similar organizations have been adopted, having as their object the protection and increase of fishes in the inland lakes and streams. The first of these bodies was organized in Morris county and under the direction of the efficient President, Hon. A. W. Cutler, has been doing a good work. It has a large membership, and they fully appreciate the advantages which will accrue if our fine fishing grounds can be restocked and made attractive to the citizens of our neighboring States. All parts of New Jersey can be easily reached by rail from either large city, and many anglers who now make long journeys in the fishing season to ensure success in this enticing sport, would gladly spend their time in our State if the lakes and rivers furnished bass, and the trout streams were brought back to their old condition. Your commissioners have to do only with the economic food fishes and have given no attention directly to trout breeding, but we cannot fail to give credit to the farsighted gentlemen who have organized these protective fishing clubs.

The bass in the Delaware already furnish a large supply of valuable food, and in addition to this, many visitors from the cities have used the Belvidere Delaware Railroad to bring them to this, the most attractive fishing ground to be found anywhere near their homes. The amount of travel by this class alone was so great during the past summer as to attract the attention of the railroad officials. The same result will ensue in other parts of the State when it is known that our efforts to stock other streams and lakes have been successful. New Jersey is already known as one of the most progressive States in this regard. The establishment at Troutdale, used by your commission for breeding purposes, is recognized as one of the best in the country, and enjoys more than a national reputation among fish culturists. It may be of interest to know that orders have been received there this year, from England and Scotland, for nearly one million brook trout ova.

The people of Morris, Essex and Passaic counties procured last year the passage of a law providing for a fish Warden in each of those counties. The law gives each Warden full authority over the waters of his county, and also a right to prosecute for violations of

the law discovered in either of the three counties. Under this act, your Excellency appointed John C. Roe, of Paterson, Warden for Passaic county; Lambert Speer, of Caldwell, Warden for Essex county; and Charles Arrowsmith, of Morristown, Warden of Morris county. Each of these gentlemen accepted the position, and qualified for the office. They have all been zealous in the discharge of the duties imposed. In Essex, four persons have been prosecuted and fined for violations of the law. The Wardens have all sent in reports, as follows:

Mr. Lambert Speer, Warden of Essex county reports: "In accordance with your request, I hereby submit my first annual report as required by the "Act for the preservation of fish in certain waters within the State of New Jersey, approved April 8th, 1875."

Having been appointed Warden for Essex county, by his Excellency, Governor Bedle, with full power to act also in Morris and Passaic counties, (the Wardens of those counties having the same power in Essex) I at once had printed in poster form the above act, from a certified copy received from the Secretary of State, and the sixteenth and twentieth sections of the "Act to amend and consolidate the several acts relative to game and game-fish," approved March 27, 1874, together with your official notice calling attention thereto, and had the same extensively circulated. I send you copy herewith. Soon after my appointment I received information that certain persons, all of Morris county, had violated the first named act, by fishing in the Passaic river (which forms the boundary between Essex and Morris counties) near the "forks" of the same with the Rockaway river, with set-nets and fikes. The names of witnesses and dates being ascertained as required by the act, and also by your special instructions, I caused their arrest and prosecution with as little delay as possible. They were tried on the 12th day of June, before Justice Israel B. Condit, of Hanover, Morris county. Their only defence was that they were uncertain as to the passage of the law, which had been, however, as was shown, a matter of common report, and the offences with which they were charged, were committed before the above mentioned notices were posted. Justice Condit informed them that the law did not require the notice which had been given, that "ignorance was always poor stock," and that he should be obliged to impose a penalty, which, under the circumstances, he would make the lowest allowed by the law, viz., a fine of ten dollars each. These being the first cases of prosecution under this act, in consequence of the above representations, the fact that the parties convicted were poor men, and that they promised compliance with the law in future, the Justice, the witnesses and myself, remitted our fees, and the officer who had assisted in the arrests, a portion of his; the balance due the State was made up and paid by friends of the law, who were present, and

the offenders released. Much interest was manifested in these trials by the citizens of both Morris and Essex counties, who are remarkably united (as well as the press of this section of the State) in favor of enforcing the law, what little opposition there was, being almost exclusively confined to those owning or interested in nets or fikes.

The foregoing are all the prosecutions to this date.

The one hundred and fifty black bass forwarded to me through Mr. A. A. Anderson, were carefully placed in the Passaic river at Pine Brook, in fine condition, on September 27th.

I would recommend that you call the attention of the legislature to the necessity of erecting fishways at the Falls of the Passaic at Paterson and Little Falls, and at the mill-dam at the latter place, which would admit of the introduction into our waters of salmon, shad, and other fish requiring salt water at certain seasons of the year.

The new dam at Little Falls has proved an effective barrier to the passage even of eels, which were formerly abundant above the same, but are of late rarely found. This is owing to the fact that, being now built of cut stone, which presents a smooth and perpendicular surface, the eels are unable to crawl up the dam, as before over the rough stones, and as they still do on the edges of the rocks at the Falls.

The enforcement of these laws, together with the aid which your honorable Board may be able to give us from time to time in stocking our waters and in other ways, will undoubtedly soon afford the citizens of a large section of our State, a supply of food fishes such as would, a few years ago, have been thought impossible, and which can but prove of great value. Those who have had an opportunity of seeing the benefit derived from the State appropriations to your department, are of the opinion that the amount should be considerably increased, and it is to be hoped that our next legislature will see the propriety of such action.

In closing, I wish to acknowledge the assistance and support of your Board, of Warden Arrowsmith, of Morris county, and of the Morris County Fishing Club (an organization with a large membership, including many of the most influential men of that county); also valuable legal advice kindly given by Hon. A. W. Cutler, counsel of the above named club, and Hon. John W. Taylor, of Newark.

Respectfully yours,

LAMBERT SPEER,
Warden Essex County.

Caldwell, N. J., November 1st, 1875.

PATERSON, November 1st, 1875.

To J. R. Shotwell, Esq.:

DEAR SIR—Since my appointment, I beg leave to report as follows:

Pompton Lake—I destroyed one gill-net, about sixty-five feet.

Pompton Lake—I destroyed two set-lines, about nine hundred feet.

Dundee Lake (Passaic river)—I destroyed one large fyke.

Ramapo River—I destroyed one medium-sized fyke.

Franklin Lake—I destroyed one set-seine, about twelve hundred feet.

Greenwood Lake—I destroyed three gill-nets, averaging eighty-five feet each.

Greenwood Lake—I destroyed one gill-net, small, fifty feet.

Greenwood Lake—I destroyed three set-lines, averaging six hundred feet.

Greenwood Lake—I destroyed one set-line, at least three thousand feet.

Yours, most respectfully,

JOHN C. ROE,

Fish Warden Passaic County.

MORRISTOWN, November 5th, 1875.

Mr. J. R. Shotwell, Commissioner:

DEAR SIR—I have only to report two arrests for violation of the fishing laws. Warden Speer, living as he does near the Passaic river, has had several complaints from Morris county, which he has promptly attended to. The arrests I made were for using "Giant Powder" in Lake Hopatcong.

The parties were indicted at the October term of Court, but for some reason the trial was laid over until next term, which will be in January. The arrests, however, have had a good effect, and, I think, will stop the use of powder on the Morris county side of the lake. The use of "Giant Powder" is certainly the most villainous mode ever invented for catching fish. Thousands, both large and small, are destroyed at every discharge, and only a very small per cent. (even of the large ones), are secured, as they do not rise immediately to the surface when killed. It is greatly to be hoped that Sussex county will be included this coming winter, under the law of April 8th, 1875, for the "preservation of fish." Then, with a Warden on the Sussex side to co-operate with me, we could prevent, to a great extent, the wholesale destruction of fish in Lake Hopatcong, and the waters on and near the county line.

The people in this county are now taking great interest in the fish question. To give you an idea of the change, there has existed for a long time a club in Morristown for the express purpose of catching fish. They had all kinds of nets and traps to accomplish that object; but as soon as the law for the preservation of fish was passed, they immediately discarded their nets and traps and re-organized themselves into the Morris County Fishing Club, for the preservation of fish, and have already bought and distributed in the streams in the neighborhood between five and six thousand trout (all they could procure last spring.) They now have seventy-five members and are rapidly increasing, including many of the most wealthy and influential citizens of the county, and will in the spring procure a goodly number of the small fry for our streams.

We acknowledge the receipt of one hundred and fifty black bass, which arrived safe and sound under the care of Mr. A. A. Anderson, for which we are greatly obliged.

Yours truly,

CHARLES ARROWSMITH,

Warden for Morris County.

The effect of these appointments is not shown altogether by the number of cases prosecuted. The result has been a greater respect for the law and a very general observance of it. We hope that the suggestion of Mr. Arrowsmith will be adopted and an additional Warden appointed this year for Sussex County. This will enable us to enforce the law as to Lake Hopatcong, the most important body of water in that section; besides this, various other waters in Sussex have been supplied with new varieties of fish and are entitled to protection.

The Warden who may be appointed for the Delaware will have all his time occupied in guarding the extensive river front in his jurisdiction.

The subject of fishways has received much attention from your commissioners during the last year. The act of March 27th, 1874, empowered the commissioners to build fishways in all dams across the Raritan, which may be so constructed at present as to interfere with the free passage of fish. The dam at Bound Brook maintained by the Delaware and Raritan Canal Company, is a complete barrier to the passage of anadromous fishes. It has entirely destroyed the shad fisheries formerly existing above the dam.

The shute placed in it some years ago, to facilitate the passage of fish, is worse than useless, and any unlucky member of the finny tribe, who should waste his energies upon it would probably be turned out of community by his fellows. It consists of a smooth shute, over which the water flows in an unbroken current, and with great velocity. In May last, at the request of Mr. Tunis Van Camp, Hon. R. H. Veghte, and others, your commissioners visited

the dam. We were met by a large delegation of men interested in water rights above the dam, and armed with petitions signed by a hundred property owners whose lands are bounded on the river or its tributaries. These petitions asked us to carry out the law, and place fishways in the several dams embraced in the scope of the act. We were also attended at the same time by Mr. Brewer, of Pennsylvania, who brought with him a model of the fishway erected by him in the Mohawk, and endorsed by the New York Commission in their last report. After full examination we decided that fishways ought to be built in the several dams at Bound Brook, Raritan and Branchville. In accordance with this view, notices were given to the parties in interest as required by law. The dam owners did not comply with these, and your commissioners did not see their way clear to go on during the summer, owing partly to the fact that the act of 1874 does not satisfactorily provide for defraying the expense in the first instance, and partly owing to the difficulty experienced in obtaining satisfactory information as to the best mode of constructing, at a moderate expense, a way for fish so timid as the shad. Mr. Brewer offered to let us use his fishway without charge for the patent; he also, in response to our request, sent us estimates of the cost of erecting his fishway at Bound Brook. Before acting on his proposition, we determined to visit the one already erected in the Mohawk, and accordingly, in August, visited Schenectady for that purpose. We inspected the structure, and examined the builder, and several persons who were interested in it, and had watched it closely, and came to the decided conclusion that it would not answer for the Raritan.

The way open in the dam at Scudder's Falls is a complete success, but that dam is less than four feet in height, while the dam at Bound Brook is seven feet high. It is believed that a rough stone structure, representing as nearly as possible the natural rocky rapids of a swiftly descending stream, is the only practical way yet discovered. We are about to institute an experiment with a model recently received in which provision is intended to be made for rests, after each foot of rise. If this will give sufficient depth of water in the lower part of the way, or ladder, there seems to be no reason why it should not answer the purpose, if proper leaders are built out below. We recommend such a supplement to the law of 1874, referred to, as will enable us to do the work required, at the cost of the State, in the first instance, the money to be paid back by the dam owners, when the work is completed.

In the early part of September last we were notified that Mr. Stone had procured another lot of salmon ova on the McLoud river, and addressed Prof. Baird, asking for three hundred thousand.

These came safely, and were received in October, we paying the expense of packing and the express charges. The eggs were placed

in the hatching-boxes at Troutdale, and we now have a fine lot of fish to be distributed in a few weeks.

The work of the Commission is now so considerable that it is necessary for us to have authority and means to employ a superintendent to give his whole attention to the various details connected with the propagation, distribution, and protection of fishes throughout the State, under our direction and control. This would leave us free to devote more time to general oversight of the work; to examine more thoroughly the workings of the various laws and suggest amendments, and to learn, by personal inspection, the needs of different sections of the State. It is probable that the construction of fishways will require much of our attention during the ensuing year. In order to continue our efforts to stock the inland waters on a scale to produce the best results and secure the benefit of the work already done, an appropriation of ten thousand dollars will be needed. An appropriation of five hundred dollars will enable us to continue with Pennsylvania in the work of artificial propagation of shad. Her Commissioners have a balance of twenty-five hundred dollars in hand for this work, contingent upon the action of New Jersey.

Your Commissioners attended the Convention of Fishery Officers of the various States, held at New York in February last. The United States Commissioners, and delegates from nearly every State and from Canada, were present. An opportunity was given for a free exchange of opinion, and a comparison of results attained by different lines of action adopted in the several States, all having in view the same great object—the increase of the food supply. It is believed that much good will result from these meetings.

We append hereto a list of the Commissioners of Fisheries now in office, including officers of the United States, Canada, and eighteen different States.

All of which is respectfully submitted.

B. P. HOWELL,
J. R. SHOTWELL, } *Commissioners.*
G. A. ANDERSON,

FINANCIAL STATEMENT.

Balance on hand November 14th, 1874,		$900 00
Appropriation—Session of 1875,		2,500 00
Paid for Salmon trout,	$90 00	
" " Cans and net,	32 25	
" " Hatching and rearing salmon,	900 00	
" " Transportation of salmon,	67 00	
" " Placing shad in the Raritan,	35 62	
" " Black bass and transportation,	1,552 51	
" " Packing and transportation of California salmon ova,	211 42	
		2,888 80
Balance on hand November 14th, 1875,		$411 20

APPENDIX.

APPENDIX.

Commissioners of Fisheries thus far Appointed.

UNITED STATES.

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

MAINE.

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

NEW HAMPSHIRE.

O. H. Noyes,	Henniken.
J. S. Wadleigh,	Laconia.
A. C. Fifield,	Endfield.

VERMONT.

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

MASSACHUSETTS.

Theodore Lyman,	Brookline.
E. A. Brackett,	Winchester.
Thomas Talbot,	North Billerica.

RHODE ISLAND.

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

CONNECTICUT.

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

NEW YORK.

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

NEW JERSEY.

B. P. Howell,	Woodbury.
J. R. Shotwell,	Rahway.
G. A. Anderson,	Trenton.

PENNSYLVANIA.

B. L. Hewitt,	Holidaysburg.
Howard J. Reeder,	Easton,
James Duffy,	Marietta.

MARYLAND.

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

VIRGINIA.

Asa Wall,	Winchester.

ALABAMA.

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

IOWA.

Samuel B. Evans,	Ottumwa.
B. F. Shaw,	Anamosa.
Chas. A. Haynes,	Waterloo.

MINNESOTA.

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

MICHIGAN.

Gov. J. J. Bagley,	Detroit.
Andrew J. Kellogg,	Allegan.
George Clark,	Ecorse.

OHIO.

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

CALIFORNIA.

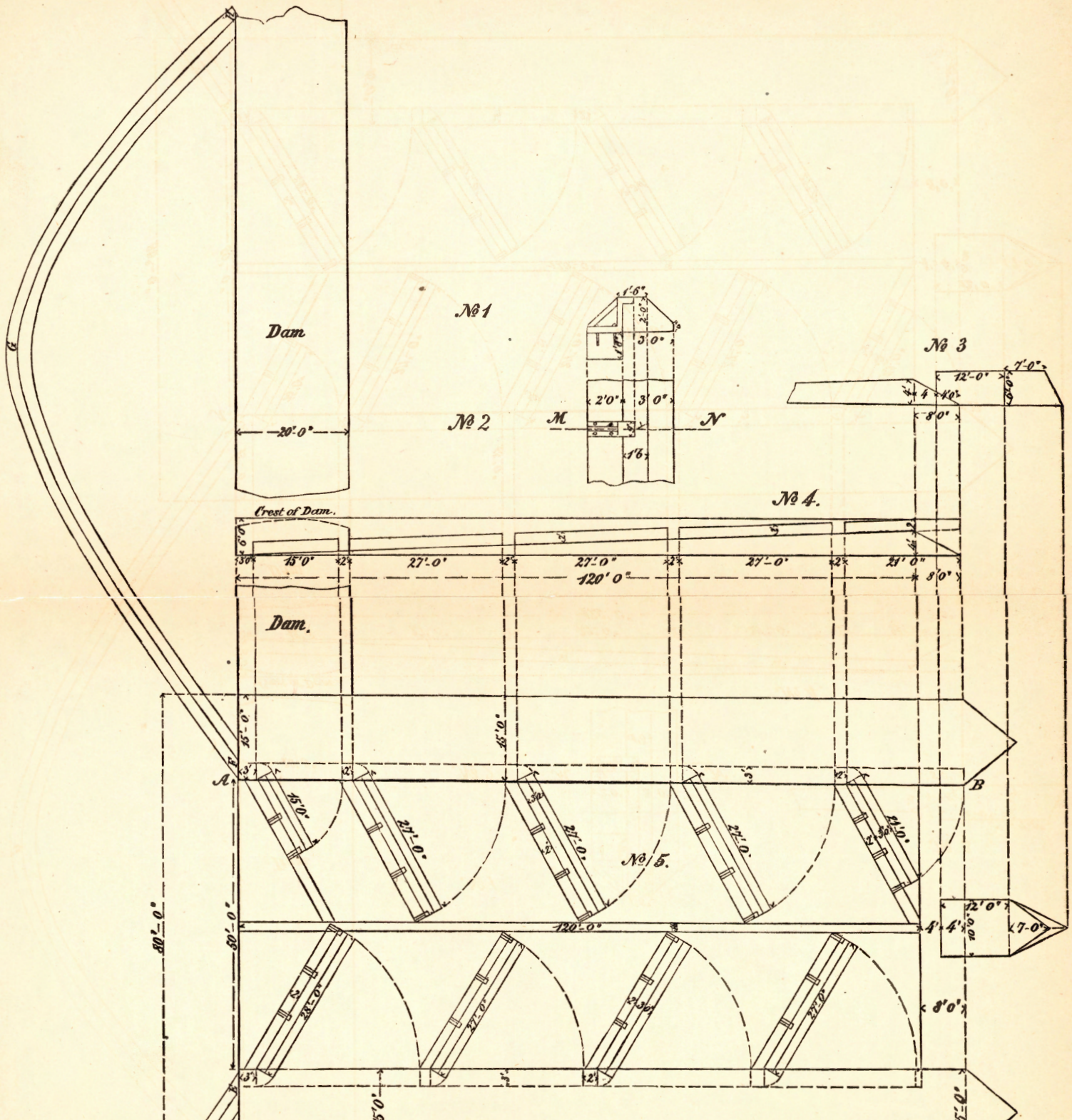
R. B. Redding,	Sacramento.
S. R. Throckmorton,	San Francisco.
J. D. Farwell,	San Francisco.

WISCONSIN.

A. Palmer,	Boscobel.
William Welsh,	Madison.
P. R. Hoy,	Racine.

DOMINION OF CANADA.

W. F. Whitchen,	Ottawa.



PROPOSED PLAN FOR FISH-WAYS.

No. 1. Elevation and Cross-Section of Iron Cleat, and Bulkhead and Diagonal Sill on the line M. N. of Fig. 2.

No. 2. Plan of Iron Cleat, and Bulkhead and Diagonal Sill.

No. 3. Elevation of Crest of Fish-Way and Pier, along center-line of Fish-Way.

No. 4. Elevation of side A. B. of Guard Crib, showing Slope of Paved Floor of Fish-Way and Recesses for Bulkheads in Winter.

No. 5. Plan of Fish-Way, showing Guard Cribs, Pier, Shifting Bulkheads, Recesses, Longitudinal and Diagonal Sills.

C. D. E. and F. G. H. are Guides of broken stone, giving direction to ascending fishes.

Scale of Nos. 1 and 2—$\frac{1}{8}$ inch=1 foot.
" " 3, 4, and 5—$\frac{1}{24}$ inch=1 foot.

Drawn and arranged by
BENJ. P. HOWELL, J.