

# MAINE STATE LEGISLATURE

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# Public Documents of Maine:

BEING THE

## ANNUAL REPORTS

OF THE VARIOUS

## PUBLIC OFFICERS AND INSTITUTIONS

FOR THE YEAR

1880.

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VOLUME I.

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AUGUSTA:

SPRAGUE & SON, PRINTERS TO THE STATE.

1880.

# REPORT

OF THE

## COMMISSIONER OF FISHERIES

OF THE

STATE OF MAINE,

FOR THE YEAR

1879.



AUGUSTA:

E. F. PILLSBURY AND COMPANY, STATE PRINTERS.

1879



# REPORT.

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*To His Excellency, Alonzo Garcelon, Governor of the State of Maine:*

Your Commissioners of Fisheries have the honor to report, that while the demands upon them for both fishes to stock waters, fishways to restore fish to our rivers, have been greater than ever before, their resources to comply with those requirements were crippled by the neglect of the Legislature to make any appropriation for this department. Our work is of a character and nature that cannot be perfected in one year. It cannot be suspended to await supplies from a pre-occupied or oblivious Legislature. To be stopped in the midst of our work is to lose all the results of the past. The inception of to-day can only be completed on the morrow; that of this year carried out on the next; such is the necessity, such the inexorable law of our duties. The position has been a most embarrassing one for your commissioners, who, under the express instructions of section 1st, chapter 75, laws of 1878, which we here insert, had already made purchases of the eggs of different species of fishes to be hatched and distributed to different parties in 1879.

An Act to regulate and protect Fisheries and the Propagation of Fish.

*Be it enacted, &c., as follows:*

SECT. 1. The governor, with the advice of the council, shall appoint one or two persons, as they may think best, to be commissioners of fisheries, who shall hold office for three years unless sooner removed, and have a general supervision of the fisheries, regulated by the following sections. He or they shall examine dams and all other obstructions existing in all rivers and streams in the State, and determine the necessity of fishways and the location, form and capacity thereof; shall visit those sections where fisheries regulated by this act are carried on, and examine into the working of the laws; shall introduce and disseminate valuable species of fish into the waters of this State where they do not

exist, and perform all other duties prescribed by law. He or they shall report annually on or before the thirty-first day of December, to the governor, who shall cause three thousand copies to be printed. He or they shall receive one thousand dollars and traveling and other expenses necessarily incurred in connection with his or their duties, which shall be audited by the governor and council, and it shall be his or their duty to see that all violations of the fish laws of the State are duly prosecuted.

Fishways had been ordered to be built, and process for the enforcement of the penalties for non-compliance had been already commenced. Inspection and repairs of fishways were necessary to preserve their usefulness, and the property of the State. An appeal to your Excellency, and the Honorable Council, resulted in our receiving instructions "to carry on all necessary work for the preservation of the property under our charge, to enter upon no new operations, and to exercise the closest economy consistent with the true interests of the State." These instructions we have followed out to the best of our ability, but not without incurring censure from parties deeming themselves aggrieved from our non-fulfilment of promises made in 1878. We can only plead the judicious instructions of your Excellency and the Council.

We find it difficult to convey to the people's representatives the importance of our work, or the requirements and necessities for its support. The necessary appropriations for stocking our exhausted lakes and rivers, must always be made a year in advance. There is no market to which we can go and purchase the eggs of the fishes demanded of us. We have no stock of fishes on hand to meet the impromptu demands of the public. We have no hatching-house or nursery where we keep a supply, neither do we deem it practicable even if we had funds, to employ a man to put in special charge. If we are called upon to stock a given river with salmon, we must purchase the live fish in July or August, and confine them in a pond until they are ready to spawn, which is in the months of October and November. This spawn, or ova, or eggs, is then placed on wire frames, or on gravel under running water in a darkened room, for the salmon and the trout always seek to protect their eggs from the light, where they hatch in about one hundred to one hundred and twenty days, according to the temperature of the water. This brings us to about the month of March of the following year. The little fish when first escaped from the shell is attached to the yolk of the eggs, its sole support by absorption for about thirty days; it is then capable of get-

ting its own living and protecting itself. This is the period at which we turn it into the river to be stocked. Do you perceive the helplessness of this little creature when first born and anchored fast to the yolk-sac? Here comes in again the important aid of fish culture. First we insure that every egg is impregnated, instead of 8 per cent. And then we protect the young until they are able to protect themselves. Here is extended the helping hand of man the same as to all our domestic animals. Fishes have taken their place with our poultry, our sheep, our swine, our neat stock, and by the same law of demand and supply. The chance production of nature, which was intended by the Creator to control the supply until man demanded its increase, is no longer equal to the requirements of an increased population. Not only is there a greater number of mouths to feed, but the area of our field of production has been diminished by dams shutting out the migratory fishes from their breeding grounds. The time was, and not remote in our lumbermen's memory, when a year's supply of salmon, shad and alewives could be taken at "Spad Pond" on the Penobscot West Branch, below the Grand Falls. Now you buy your fish at the city stores. Do you not perceive that when you destroy the breeding fish by shutting them out from your rivers, and then catching them at the obstruction or dam that fences them out, you exterminate them? Fishes are not like birds who when driven from one nesting-place will seek another. Fishes will still come back from year to year and attempt to reach the spawning grounds where God placed them, until the last one falls a prey to net or spear. Re-planting and fishways can then alone restore them, for you have killed all your breeding stock. The young of these fishes formerly came down in immense columns, that extended far out to the sea, as Professor Baird has informed you, and tended to attract the sea-fishes to our shores where they were caught within sight of the fishermen's homes. How is it now? Is it not evident that when you destroy the product of your rivers you increase the demand and cost of the product of the sea-fisheries? The pasture has been destroyed. The striped bass and the other sea-fishes no longer find their feed at the mouths of our dam-ridden streams and other poisonous waters. The restoration of the migratory fishes is not inconsistent with the full use of the power of our water-privileges. We only seek a portion of the wasted water. Remember that the immense property of the fish crop of our rivers belonged to the whole people.

In remonstrating with persons against the barbarous and destructive custom, so widely prevailing in Maine, of taking fish upon their spawning beds, we have been met in reply "that one fish contains eggs enough to stock a whole pond." This is a popular fallacy. We will repeat what we have before stated, making as our apology for reiteration, that every succeeding Legislature is a new audience. Our fishes, both the land-locked and the sea salmon, and the trout, usually yield about 600 eggs to the pound of fish; for instance, a one pound trout would yield 800 eggs; a five pound trout, 3,000. A ten pound salmon, 8,000 eggs. Of all these eggs deposited on the spawning bed in their natural process by the fish, under the most favorable circumstances, but 8 per cent. are fertilized by the male fish. But 8 eggs out of every 100 are capable of producing young fish. These 8 eggs are as liable to be devoured by the parent fish, or the many enemies that follow the spawning fish to devour their favorite food, as the unimpregnated eggs. Should the whole 8 per cent. escape and hatch, the young fish fast anchored to its yolk-sac, that is its only food by absorption for thirty days, is then even a more tempting bait to the chub, or eel, or duck, or sucker, or any one of its thousand enemies. Here fish culture intervenes. Every egg under her careful management is fertilized; nothing is left to chance; ninety-eight eggs out of every hundred are hatched. The helpless young fry, fast anchored to the yolk-sac, are carefully protected until ready and able to shift for themselves, the same as the farmer coops and protects his young turkeys and chickens. The same case is extended to all his young stock. Once in times past the protection of wild nature in our woods, fields and streams, was equal to man's necessities. The same causes ruling that have now overtaken our fish, demand an increased and exact production independent of the casualties of chance. Civilization demands a calculable and certain supply. We have repeated, reiterated these points, again and again, from the necessity of their being constantly borne in mind by the people, if they would aid us in our endeavor to check the threatened extermination of our fishes, both shore and inland.

#### SALMON.

The Penobscot river has this year afforded us unmistakable evidence of the benefits of protection and the feasibility and entire success of artificial stockings. Perhaps we can in no better form



bring the whole matter directly to your attention than by introducing the following letters which we have the permission of the writers to publish :

BANGOR, Nov. 1, 1879.

*E. M. Stilwell, Esq.,*

*Commissioner of Fisheries:*

DEAR SIR—I was at the Hunt Place, on the east branch of the Penobscot, the last of August, with Prof. Hamlin of Harvard. We went to make a scientific exploration of Mt. Katahdin. I had just been salmon fishing on the Grand Bonaventure River, Province of Quebec, and I thought the pool from Hunt farm up to the mouth of the Wassatiquoik just the right kind of water for salmon fishing with the fly. Twenty-two years ago, I had spent ten days in the month of August on the east branch with an expert salmon fisher, Joseph Carr, Esq., of Bangor, and he could not get a rise. There were very few salmon there. The farmer at the Hunt place then used to stretch a net quite across the river and caught but one or two fish a week, and had taken it up at the time we were there, because he caught no more fish.

But now the east branch is full of salmon. The Enides, Frank Ellis of Stacyville, and others told me that one hundred salmon had been taken this year in that one pool, with drift nets ; that they generally weighed from eight to twelve pounds ; that young men came in for a day or two at a time from Stacyville and Sherman and drifted for salmon, catching a few for their families and friends—not fishing for the market, as they are too far from any market.

I decided to try that pool next year with the fly, and am confident of success.

But it was a very striking proof to me of the complete success of your process of re-stocking our rivers with salmon, as these salmon are all about the same size, and are undoubtedly the same salmon that were hatched artificially and put into the east branch four or five years ago by the Department of Fisheries.

Very truly yours,

HENRY M. PRENTISS.

*E. M. Stilwell,*

*Commissioner of Fisheries:*

DEAR SIR—Salmon on the Penobscot river in the Spring of 1879 was more plenty than they have been for a number of years. There was a great many small salmon, and had every appearance of being young, and it is the general opinion of the fishermen in this vicinity, and I think the public also, that it is the result of Mr. Atkins' labors in propagating them. The law passed last winter prohibiting fishing between the toll bridge and dam at Bangor, and Augusta, is a very essential law, and it is necessary that this law should be carried out, for it is a step in the right direction, for if fishing is allowed so near the dams and at the entrance of fishways, we might as well hang up our fiddle first as last, for the fish are driven back, and driven back, until they are about all destroyed; neither do I believe that it would be any step in advance for the preservation of fish, to allow fishing between the toll bridge and dam and have EVEN six days close time below, for I believe that the main point to be looked after is that they have free access to the fishways.

Yours Respectfully,

A. H. WHITMORE.

STOCKTON, Nov. 21, 1879.

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*To E. M. Stilwell,*

*Commissioner of Fisheries for State of Maine:*

SIR—The fishermen deem it of the utmost importance for the protection and increase of salmon on the Penobscot and Kennebec, that the present law be retained and rigidly enforced. After the fish pass above the tide waters, they have to go into a narrow space to effect a passage, and if there are any artificial obstructions it makes their capture almost a certainty. Unless we can have a law for their protection in such places, and rigidly enforced, they must eventually be about destroyed. The first three years of the last five years there was not a very marked increase of salmon on the river. In 1878, there was some increase in some places on the bay and river, but generally it did not amount to much of an increase. In 1879, a very marked increase was noticed; it was about double of that of 1878 or any of the past

four years We are of the opinion that the increase is, in part, owing to the hatching and stocking the river with young salmon, and also in part to the judicious course the Fish Commissioners have pursued the few years past in protecting the mother fish above the tide waters of the Penobscot river. We have noticed an increase of what we call racer-salmon, for a few years past, going down the river in the spring. No doubt they are mother salmon from their breeding grounds, and it shows that more salmon have passed up the river than formerly. We deem it of the highest importance that sufficient means be furnished the Fish Commissioners to enable them to take part in breeding and furnishing our rivers with young fish, and also in enforcing the laws for the protection of fish on the rivers. In regard to a three days close time on the river throughout, it could not be of any special benefit. It would subject the State to a greater cost to enforce the law, and the fishermen to a larger expense to construct their weirs. The river below Winterport is deep, wide and quick. No weirs are built above Winterport of any account. The weirs on an average do not occupy more than one-tenth (1-10) part of the width of the river, and fish do not play into them more than six hours in twenty-four.

We believe you are taking the right means to protect and increase the fish in the river, and we shall be pleased to assist you as far as we are able, provided you pursue the judicious course in the future that you have in the past. I do not know of a single instance in this vicinity where a fisherman endeavored to evade the law the past year.

Very truly yours,

EDWARD PARTRIDGE.

Of all the salmon that we have hitherto planted in the Penobscot, none have been carried higher up on the main river than Medway, where the river divides into two branches, the east and the west. It would seem that the returning young fish have made their way far up the east branch; but this is only probable, as we really believe that we are as much indebted to protection as to planting on the Penobscot river proper. The carrying away by this year's floods on the west branch of the Penobscot, of the North Tevin and Chesuncook dams, has undoubtedly allowed an unusually large number of salmon to pass up to ground not hitherto easily accessible to them. The result will be an in-

creased number of young parr and smolts from that source, the next two years. On the Mattawamkeag there can be no doubt as to the cause or source of increase, as above Gordon Falls, about five miles from the mouth of the river, where it empties into the Penobscot, there has been no salmon since the building of the two large log-driving dams at Gordon Falls and Slurgundy Rapids. Twelve miles above Slurgundy there is still another very high dam, at the village of Kingman. From the mouth of the Mattawamkeag to the foot of Gordon Falls the river was very full of salmon, continually throwing themselves out of the water. Mr. Bailey, the superintendent of the E. & N. A. R. R. repair shop, counted sixty salmon within an hour within a mile of the dam. One of the commissioners, while making a survey for the proposed fishway at Gordon Falls noted five salmon within five minutes making the attempt to pass the falls; these fish were adjudged to vary in size from 8 to 12 lbs. The salmon will occasionally make the ascent of the falls in the early spring floods, that when looked at in the lower stages of water of midsummer, would seem to be impassable, but never in numbers sufficient to continue the stock of a river where these obstructions occur near the river's mouth. The fishways we have ordered on the Mattawamkeag river must be as carefully guarded as those at Bangor and Augusta. The amount of salmon taken on the Penobscot river this year was very large. The lowest price reached was eight cts. per lb., the highest \$1. The average of the season, as reported to us by our marketmen, about 25 cts. Although some salmon were reported to us of as high a weight as 35 lbs., and we may add as great a number of large salmon were taken on the river as usual, the amount over the usual run for the last few years consisted mostly of fish from 4 to 11 lbs. weight. So marked a feature was this of the catch of the year, as to have been a matter of general observation. The presence of salmon in such numbers in the Mattawamkeag creates quite a local excitement, and the demand was made of the commissioners through the public prints, "upon whose shoulders should rest the blame of fishways not being provided at Gordon Falls and Slurgundy." We have done our duty on the Penobscot and Mattawamkeag, as well as on the Kennebec. The reply must be rendered elsewhere. In taking leave of the subject of salmon planting and protection, we offer the following excellent communication from

the pen of Dr. Wm. M. Hudson, one of the Fishery Commission of Connecticut :

HARTFORD, CONN., Sept. 30th, 1879.

*Mr. E. M. Stilwell :*

DEAR SIR—While you are at work constantly increasing the salmon in the depleted rivers of your State, it may be of some interest to you to know what we are doing here for the Connecticut river, which formerly abounded in salmon, but in which they were exterminated by dams preventing access to their spawning grounds nearly three-quarters of a century since. About ten years ago, we commenced investigations as to the feasibility of restocking this river with salmon, and after many trials, in connection with Prof. Baird, U. S. Commissioner on Fisheries, and the Commissioners of Massachusetts and New Hampshire, we employed Mr. Chas. G. Atkins to procure salmon from the Penobscot river in June and July, confine them in a pond until the spawning season in October and November, and then take the eggs from the females and impregnate them with the milt taken from the male at the same time. In pursuance of this plan in 1873, Mr. Atkins bought six hundred and fifty-two adult salmon, and placed them in a pond near Bucksport, Me. In the autumn he manipulated more than four hundred of them, from which he obtained a large number of eggs. These eggs were put into hatching boxes and retained until sufficiently advanced for transportation, when they were forwarded to the Commissioners of Massachusetts, New Hampshire and Connecticut. In a short time the young fish were hatched from the eggs, and after forty-five days more, in which the yolk-sac was absorbed, the young fish were put into tributaries of the Connecticut river to take care of themselves and demonstrate whether they could find proper food and suitable water to enable them to thrive and grow to maturity. From the well-known habits of the salmon, four years were allowed for their return as adult fish, and we did not hesitate to predict that they would return in appreciable numbers in 1878. It was impossible to procure any law to protect them for that year, for the members of the Legislature were incredulous and ridiculed the idea that we should have any mature salmon in the Connecticut, pronouncing us to be visionaries. As was predicted, in 1878 the fishermen were delighted at capturing salmon weighing from ten to fifteen pounds each, for which they were enabled to obtain

from seventy-five cents to one dollar per pound. About five hundred were taken during the season, and they were pronounced by connoisseurs to be superior to any salmon in the market, and moreover this was shown by the price paid for them. I lay special stress upon the quality of these fish, every one of which was produced by "artificial propagation." Because, while on a recent visit to your State, I learned that an impression prevailed that fish hatched artificially are not strong, healthy, vigorous fish. Facts are stubborn things, and it seems to me that five hundred healthy, full grown salmon, all hatched artificially, ought to be sufficient to remove any such false impression as that alluded to above.

Yours very truly,

WM. M. HUDSON.

#### STATE INLAND FISHERIES.

Although the Legislature made no appropriation for our Department last year, we found ourselves in possession of 160,000 landlocked salmon ova, and 18,000 Rangely trout, and 10,000 blueback trout, contracted for in the previous year. Under instructions from your Excellency and Council, we proceeded to distribute these as previously assigned. Sixty-three thousand were sent to be hatched at Rangely hatching house, and the young fish were divided between Rangely, Moosetocmaguntic and Richardson lakes. The remainder, about one hundred thousand, as also the trout ova, were sent to the hatching house at Bucksport, and the young fish when developed were divided as follows: 20,000 were sent to Moosehead lake; 5,000 to J. S. Bangs at Waterville; 10,000 to Dr. Byron Porter of Newport; 5,000 to Dr. Harris Pushor of Hartland; 5,000 to W. D. Hayden of Skowhegan; 5,000 to J. A. Carr, East Winthrop; 5,000 to Dr. Atwood Crosby, Waterville; 5,000 to Dr. Ward Safford, Belgrade; 5,000 to Damariscotta; 10,000 to Dr. L. B. Crosby, Brownville; 10,000 to A. J. Darling, Enfield; 10,000 to Loomis Taylor, Glenburn; 5,000 to J. Libby, Unity; 5,000 to Wm. S. Young, Auburn; 5,000 to J. Hamilton, Dexter. The blueback trout we divided between Newport pond, and Dexter pond, and Moose pond in Hartland. Rangely trout were sent 10,000 to Ferguson Haynes for "Biddeford and Saco Fish and Game Association," and to Waterville and Dedham the remainder. All the above fish were delivered at the designated places to the

gentlemen whom we have mentioned, who kindly volunteered to place them safely in the waters to which we had assigned them, thus relieving the Commissioner of much care, and enabling him to recognize his overtaxed time.

The better enforcement of the law protecting the fish at Lake Sebago the last three years, has been evidenced in great improvement in the fishing. Much interest is now felt in Portland and vicinity in the fine fishing afforded in that magnificent lake. The following notice which we clipped from the "Portland Press," will explain itself:

#### PRESERVATION OF FISH.

All interested in the preservation of fish in Sebago Lake and its tributaries will meet at the Common Council room next Friday at 4 p. m.

The Legislature of this state, at its last session, having made no appropriation for the protection of fisheries in internal waters, and the Commissioners of Fisheries being without funds to employ fish wardens to detect and prosecute offenders against the fish laws, it becomes important that measures should be taken to prevent the destruction in close time of land-locked salmon and trout in the waters of this county, which are annually destroyed in large numbers on their spawning beds by lawless persons, and whatever is done to this end must be accomplished by private citizens acting in concert.

And the following from the Argus, is a specimen of the result of energy and determination, which we hope to see followed out, and copied at Rangely and Moosehead lakes, indeed throughout the State:

#### SUPERIOR COURT.

BEFORE JUDGE BONNEY.

THURSDAY.

Melvin Munroe, James G. Fogg, Horace Proctor and George Wilber, all of Harrison, indicted for taking fish in close time, were sentenced each to pay a fine of \$10.00, and \$2.75 each for each trout taken, and \$31.31 each for costs of prosecution, making a total fine for each respondent of \$44.06.

We think a half million of salmon and trout eggs should be annually hatched and turned into Sebago Lake for several years, to bring it up to its former high standard. Its capability of development is almost unlimited. Its waters contain excellent stock for food for salmon and trout. Chub, sea-fish and smelts are abundant; and when the alewife is added, which we intend to accom-

plish this coming spring, we believe Lake Sebago may be made the finest and most popular angling resort in the United States.

Our suggestion of establishing hatcheries at the sources of rivers and waters to be stocked, has been carried out at Rangely on the Androscoggin, and Moosehead on the Kennebec. At the former a large number of trout eggs are yearly taken and hatched and turned into its waters. At Moosehead a very fine commodious hatching house has this year been built by the proprietors of the "Kineo House," and most liberal arrangements made for taking and hatching yearly a half million of trout eggs, to keep up the stock of the lake to its fullest capability. We hope the Legislature will afford us the means to fully stock this lake with land-locked salmon, and as well as to accept the generous offer "to hatch and take charge of as many salmon eggs as we will send them for re-stocking the Kennebec river," extended to us by the owners of this fine property. Our inland fisheries now constitute a great source of wealth to the State. It is questioned whether any one interest actually produces and distributes so equally among all our people so large a sum. Even our railroads alone could we demonstrate to them by eliminating from their passengers all who come to our State, solely attracted by our angling resources, would find an item withdrawn from their receipts that would seriously affect their prosperity. If all the fish of Rangely and Moosehead could be taken and sold by the pot hunters and poachers who now seek to destroy them by their short-sighted avarice, they would barely net them, after paying freight and commission, but a few cents per pound. The trout that are taken by our visitors cost them many dollars per lb. This includes, of course, their expenses and travel from the time they enter the State until their departure. The very guides who attend them realize more for their services than if left entirely in lone possession of the fisheries of the lakes. All that we, the commissioners, seek, is even justice to all. A strict and rigid enforcement of the law. The wish to exercise the same care in the preservation of our fish that is exercised by the farmer in the breeding and preservation of his poultry and his other stock.

#### SMELTS.

We wish to call attention to the value of these fish in our inland waters, as contributing not only delicate food for man, but furnishing a most important supply of favorite food to salmon and



trout. In lake Sebago trout of large size abound, and the land-locked salmon attain a size not known elsewhere, reaching a known weight of upwards of 17 lbs. (A number of these fish, exceeding 10 lbs. weight each, have been taken by sportsmen this year.) Among the chief causes conducive to this unparalleled development, may be attributed the fact that smelts abound in the lake, and they form the chief and favorite food of the Sebago salmon at all seasons of the year. Therefore in protecting our larger fish there should be protection afforded to the smaller fishes that contribute the food that is necessary for their existence. Here land-locked smelts attain a size of more than twelve inches in length in some localities within this State, and their importance in the economy of nature should be realized by our citizens, that they may not be unnaturally destroyed, but may be afforded such protection as will enable them to multiply.

It is well-known that the quality, and hence the value of flesh and fowl depends upon the food partaken of by the beast or bird. This is instanced by the superior qualities of American beef and the famous canvass-back duck. In like manner the delicacy of flavor and proportionate value of our fishes, depends to a considerable extent upon the nature, as well as the abundance of their food.

The trout artificially raised at various places on Long Island, New York, command a much higher market price than others. And wild trout, from certain localities, are more valuable than others of the same species taken in localities less favorable to them. The superior flavor of a trout to that of a sucker, taken from the same waters, is mainly owing to its food.

Smelts are found in many of our lakes, and their appearance in the small tributary streams in the spring, at the time these fish ascend for the purpose of spawning, has heretofore been the occasion for a general jollification among men and boys resident in the vicinity. Bonfires were built at night upon the banks of the stream, and the fish taken in such numbers as to be wantonly wasted by being thrown upon the land as manure, or as food to the hogs. This practice has nearly depleted some waters, but with the increasing growth of public appreciation of the real value of our fishes, the practice will probably be abandoned. Should it not, there will be a necessity for an absolute prohibition of the capture of smelts in inland waters for a term of years. Not only may our lakes become more fully stocked with trout and salmon

by increasing the abundance of food, but their quality may, in some instances, be enhanced by affording them a supply of such favorable food as smelts and young alewives.

#### ALEWIVES.

The existence of fishes may be compared to a chain, each link of which is dependent upon others for its hold upon life. When a single link is broken or destroyed it affects the whole chain. The alewives are not second in commercial importance to any link in our chain of fishes, and we do not hesitate to assert that the diminution of their numbers has seriously affected other fisheries of the State, both shore and inland. Prof. Baird, the U. S. Commissioner of Fisheries, regards the alewives of Maine waters as superior to herrings as an article of food, and more valuable for export.

These fish may be restored to the waters of the State, in all the abundance known previous to the construction across the streams of impassable barriers to their passage from the sea to the lakes. And this restoration can be accomplished without any detriment whatever to the manufacturing interests of the State. Many of our mill-owners erroneously suppose that such a volume of water is requisite for the purposes of a fishway as to be of material importance, upon a small stream where the supply of water is limited. The old-time method of cutting down the dam a portion of each week during a "run" of fish was long since abandoned. And a sluiceway, giving a free delivery of water, is no longer adopted as a means of affording the fish a passage. The modern fishways are so constructed as to retard the flow of water, so that the rate of delivery is comparatively slight.

One of the many favorable localities for alewives in this State is at Damariscotta Mills, in Lincoln County. And, as a practical example of the valuable results to be obtained if proper steps are taken for the protection and increase of our fishes, a brief recital of the history of the alewife fishery at Damariscotta Mills is here given :

The fishing privilege at this place has been owned jointly by the towns of Nobleboro' and Newcastle. The left bank of the stream being in Nobleboro', and the right bank in Newcastle. Until within a few years the method here in vogue was somewhat similar to that adopted by the town of Warren, on the Georges river, whereby the fish were legally allowed to be taken only by

officers appointed for the purpose by the town. Every inhabitant of the town was then allowed to have a certain number of fish, either free or at a nominal price, and the surplus, if any, was sold for the benefit of the town.

Under this system little profit accrued to the owners of the fishery. Everyone claimed his share of the fish, whether desired for consumption or not, and many of the fish taken furnished food for hogs and manure for the land; while others were improperly cured and of little or no market value. The protective laws were but partially enforced, illegal netting was constantly carried on, the value of the fishery gradually decreased, and became an exemplification of the saying: "what's everybody's business is nobody's business."

But at Damariscotta Mills the policy of leasing the fishing privilege to private individuals was adopted, and a better protection was afforded each succeeding year, and as there was an efficient fishway for the passage of the fish over the dam, their numbers have greatly increased. This fishery, in the control of private enterprise, creates a local industry of no little importance. Labor must be employed to harvest and cure the crop, and transport it to a market, and the business has now become an established one, yielding profitable returns.

The following newspaper cutting is quoted as apropos: "At Damariscotta Mills on Wednesday, they netted 100,000 fish—one of the largest runs on record. The little village just makes up in the fish season. Messrs. Houghton Bros. have already sent there four cars of extra Liverpool salt."

A prominent gentleman of Damariscotta, in a letter of Nov. 24, 1879, writes: "The alewife season here is from about May 10th to June 20th, and the yearly catch from 400,000 to 600,000 fish. The fish are well protected in their chance to spawn."

The alewife fishery at Damariscotta Mills is cited as practical example, showing that the propagation and protection of fish "pays;" and when the people of the State realize this fact, they will bestir themselves to see to it that their Commissioners of Fisheries are provided with means to carry on and extend their labors.

The following letter gives information of interest, and is self-explanatory :

DAMARISCOTTA MILLS, Nov. 24, 1879.

*Everett Smith, Esq.,*

DEAR SIR—in regard to the alewife fishery at this place, I would say that we used to choose a fish committee of three from each town, and allow them to take charge of the stream, sell the fish and turn in the proceeds to the towns owning the privilege after paying expenses. But we found that it did not pay much, and about twelve years ago the towns concluded to sell the right to take the fish. The selectmen were appointed a committee to see that the fish were protected and allowed a good opportunity to pass up into the lake to spawn, and they looked after it better than when it was in the hands of a fish committee. We have a passage or fishway for the fish to go up, and no fish are allowed to be taken at that point. A large quantity go up each year, and there is no reason why the value should not be doubled. There is no protection for the young fish when they go down the stream, and thousands upon thousands are killed by the water-wheels in the stream through which they have to pass. This fishing privilege can be made a very valuable one. Shad ought to be introduced here. The large lake above is twelve miles long and from one to three miles wide, and the water is deep and pure. The secret of our success is in letting enough fish go into the lake to breed.

Respectfully yours,

A. J. TRASK.

#### FISHWAYS.

In 1864 the State of New Hampshire passed the following resolve: "Whereas the rivers and lakes of this State were wont formerly to furnish an inexhaustible supply of salmon, shad, and other migratory fish, which have now disappeared from our waters; and whereas there is nothing to prevent the return of such fish but the want of suitable fishways over the dams across the Connecticut, Merrimac and Saco, and other rivers, and in such numbers as to contribute very largely to the supply of wholesome and agreeable food for the inhabitants of this State. Therefore, resolved, that the attention of the State of Massachusetts, Connecticut and Maine be invited to this subject, and that they be

earnestly requested to take early measures to cause such fishways to be constructed \* \* \* as due alike to the relations of comity between those States and our own, to the obligations of national law, and to the interest of those States themselves."

Since that time many fishways have been constructed within the New England States, but there is yet need for more in Maine, and notably upon the Kennebec river.

The Kennebec was formerly one of the best salmon rivers on the Atlantic coast; and but a few years will be needed to make it again rank as such, and yield a great abundance of salmon and other fish, if fishways are provided for their access to favorable breeding grounds, and thorough protection afforded them.

The Messrs. Lockwood, owners and occupants of the dam at Waterville, have expressed their willingness to construct a fishway over their dam, as soon as there shall be one built at the Augusta dam.

The Augusta dam, situated at the head of the tidal flow, is an absolutely impassable barrier to the passage of any fish up the Kennebec river beyond that point.

The people of Maine, alive to the importance of restoring the fish to the Kennebec, one of our principal rivers, have demanded that fishways shall be built, and their Commissioners of Fisheries have made strenuous efforts during the past year toward the attainment of the desired result.

A meeting was held at Augusta, July 23d, 1878, for the purpose of considering the matter of constructing a fishway over the dam at that place. There were present at this meeting, the Commissioners of Fisheries, E. M. Stilwell and H. O. Stanley; Messrs. Wm. Sprague, Supt. N. W. Cole, and J. P. Nourse of the "A. & W. Sprague Manufacturing Co.," and Messrs. C. G. Atkins and Everett Smith, Civil Engineer.

The matter under consideration was fully discussed, and no objections were offered on the part of the dam owners to the immediate construction of a fishway so soon as the necessary plans and specifications therefor could be furnished them. And on August 19, 1878, the Commissioners, in writing by notice served by the Sheriff of Kennebec Co., Sept. 3d, 1878, notified the dam owners to construct a fishway of the form, capacity, and location set forth by plans and specifications attached to said notice, and to complete the same on or before Nov. 1st, 1878.

Twenty days right of appeal to the County Commissioners was by law allowed ; but no appeal was made. Although thus required to construct the fishway within seventy-three days from date of notice, there were no penalties to be incurred for its non-completion until after May 1st of the following year, so that the dam-owners were practically allowed eight months after said notification, within which to construct the fishway. More than a year elapsed, and the notice from the Commissioners of Fisheries continued to be persistently ignored. And as none of the owners of the dam reside within this State, legal proceedings for the enforcement of the order have been commenced by the issue of a libel upon the property, whereby the owners are cited to appear before the Supreme Judicial Court on the first Tuesday of March, 1880.

We are informed that the parties have engaged eminent counsel at Augusta, and intend to seek relief through our legislature.

If it is the will of the people of the Kennebec valley, and of the citizens of our State, that this fishway, which will be the key to open the river for the restoration of the fish, shall be built, it behooves them to see to it, through their representatives, that no changes shall be made in our present law.

At Brunswick and Topsham, the head of tidal water in the Androscoggin river, there are two dams, and as yet but one has been provided with an efficient fishway. At the upper dam, the old stone fishway has been enlarged and improved within the present season ; but, at the other dam, a few hundred yards below, a fishway is yet to be constructed, and the Commissioners will require that it shall be completed in season for the passage of fish next spring.

There have been many salmon seen below this dam during the summer of 1879, and at least one of them succeeded in passing over it, and was seen between the two dams by many persons.

It will be remembered that the Androscoggin river has been artificially stocked with salmon within a few years, and their return may now be yearly looked for. The operatives in the paper mill report having seen salmon almost daily in the river below the lower dam, for a period of many weeks during the last summer.

Mr. R. W. Ricker reports having seen as many as six at one time, besides others at various times, immediately below the dam. An efficient warden will be needed on this river in the future.

On the Presumpscot river, within the present year the chain of

fishways has at last been completed. The old fishway at Mallison Falls, that was not built according to the original design and was utterly inadequate to its purpose, has been torn down and replaced by a new and efficient fishway. Other fishways on the river have been repaired and improved, and a fishway has been constructed over the new dam at Wescott's Falls, at the head of the river.

The Presumpscot river, in its length of about sixteen miles, has a total fall of 267 feet, with many dams across it, necessitating a proportionate number of fishways. It is the outlet of Sebago Lake, one of the finest lakes in the State, its waters being of great purity and having a superficial area of over one hundred square miles. This lake abounds with smelts, trout, land-locked salmon of the largest known size, and many other fishes; and owing to the generally better observance and enforcement of the protection laws, their numbers are yearly increasing.

A large number of young sea-salmon were placed in the headwaters of the Presumpscot river in 1876, but, from our own observations and experience, there has been no expectance of the appearance of the matured fish in the river until the spring of 1880 or 1881, at which time they will find fishways provided for them over all the dams between Lake Sebago and the ocean.

On the Georges river there are two fishways, but some improvement is called for there. The value of the fisheries on this river may be materially increased by better protection, whereby illegal netting, extension of weirs, etc., may be stopped. This river formerly abounded with salmon and shad, as well as alewives.

The fishing privilege at Warren is owned by the town; and we would call the attention of the citizens of Warren to the results, (given under the caption "alewives" in this report), that have been obtained at Damariscotta Mills since adopting the practice of leasing the fishing privilege to private individuals, and a better enforcement of the laws.

On the Medomak river there are several fishways at Waldoboro', and there have been young sea-salmon placed in this river. The Commissioners are indebted to Dr. F. M. Eveleth for very material assistance in all that has thus far been done toward increasing the value of the fishery on this river.

Complaints have been heretofore made that the salmon were in danger of extermination, by being taken in purse nets at the

mouth of the river, by fishermen in quest of other fish, but who take all that comes within their nets.

Patten's brook, in the town of Sarry, is the outlet of a chain of lakes, and in these waters there were placed 100,000 young sea-salmon in the spring of 1876. There are fishways on this stream, and these fish, as may be expected, appear within five years from that date as mature salmon, ascending the stream to spawn.

On Pleasant river, improvements were made last year in the fishway at Columbia Falls, and, although rather late in the season, salmon were seen to pass through it within a few days after completion. These were the first salmon seen to pass this dam, which had heretofore proved an effective barrier to their passage up the river.

Instead of collecting in the pools below the dam, the salmon now pass freely through the fishway, and many have been seen in the river above during the summer of 1879.

The lower dam on the river, although readily passed by salmon, is an effectual barrier to the passage of alewives, and there could be a fishway provided for them at that point.

The Dennys river is especially suited to the requirements of salmon, shad, and alewives, with which fish it fairly teemed in former years, before they were shut out by the dams. Since the establishment of fishways on this river there has been a perceptible increase of salmon. A better feeling and an increasing interest now exists among the people of the region adjacent to this river, and here, as elsewhere, many skeptical persons, hitherto making opposition to the building of fishways, are already convinced of their practical utility, and have become firm advocates of a continuance of the system.

The Penmaguan river is especially suited to the propagation of alewives in large numbers, and petitions have been sent to the Commissioners from the citizens of the contiguous towns, asking that means may be provided for the restoration of these fish.

The young of both land-locked and sea-salmon have been placed in the headwaters of this river. Efficient fishways will be needed at the dams on the river, and can be constructed at comparatively moderate expense.

The St. Croix river, which forms the boundary between Maine and New Brunswick, has been stocked with artificially hatched salmon by the Commissioners of Maine, and there has been a marked increase of these fish observed, the weirs on the river



having taken more this year than previously. The improvement in the fishery on this river may be attributed to the joint effect of protection and artificial stocking. The St. Croix is capable of being greatly developed as a salmon river. Some improvements are needed in regard to fishways, and will be attended to during the coming year. We have a very efficient coadjutor in our efforts for the improvement of the fisheries of this river, in Mr. Frank Todd, Esq., fishery officer at St. Stephen, New Brunswick.

The Penobscot river affords the best example that we have as yet of the practical results of protection and artificial propagation within this State. Since the introduction of artificially hatched fish, and their return from the ocean when mature has been made possible, the salmon have so increased as to be observed in large numbers where almost unknown for many years previously; and a large revenue is derived from the catch of nets and weirs in the lower portion of the river. We have no means for obtaining returns of the exact number of fish taken from the Penobscot this year, but the amount of salmon may be estimated by *tons*.

The Penobscot has now attained the rank of being the first river on the Atlantic coast of the United States to which the salmon have been restored in such numbers as to afford a valuable fishery, and it is now in every sense a "salmon river."

The fishway at Bangor, over the first or lower dam across the river, is effective for all of our migratory fishes. This fishway has withstood the pressure of several very high freshets, and on one occasion was subjected to the danger of destruction by an immense accumulation of ice above it. Twice since its completion a portion of the dam has been carried away, but the fishway has remained uninjured.

Shad are known to have passed through this fishway the present year, and alewives, in considerable numbers, have ascended the river as far as the mouth of Nichols stream, below Great Works, having passed the dams at Bangor, Veazie, and Orono. An easier and better passage for fish has been made within the present year at Ayer's Falls, Orono, but the next dam above, at Great Works, forms an effectual barrier to the ascent of shad and alewives, and only at certain stages of the water can salmon pass this dam. An increased run of alewives is expected next spring, and only the lack of a suitable fishway over the Great Works dam will prevent their access to the upper portion of the river. Proper steps have been taken that fishways may be built, so that the shad and ale-

wives, as well as salmon, may be able to gain access to the whole river and its tributaries.

The fishway ordered for the Great Works dam is of a new design, plans and specifications for which, as well as the design, having been furnished by one of your Commissioners.

In designing this fishway close study has been given to the requirements of the fish, and a selection of the most favorable location for their passage, in conjunction with due attention to economy of construction, and the permanency of the structure. A perfect fishway should be one that the fish not only *can* pass through, but such that the fish will *naturally seek* to pass through it. And it should be equally effective at all times, whether at ordinary stage of the river, during a drought, or when at a high stage of the water in the river. There are many minor details to be studied, but one serious defect in fishways has existed in their not being efficient except when the water in the stream is at a certain stage. The designer of the Great Works fishway has sought to overcome this defect, without resorting to the use of a series of gates. Such an improvement will prove of great practical value, and render the fishway dependant neither upon the stage of water, nor a proper attendance of gates. As this fishway is located near the center of a great river that is subject to frequent changes in its volume of water, the design is especially applicable to the location.

At Enfield, on Cold Stream, after a delay of two years, fishways have now been constructed. This stream is the outlet of Cold Lake, and empties into the Passadumkeag river near its mouth where tributary to the Penobscot.

At the request of the citizens of the vicinity, alewives, and a large number of land-locked and sea salmon, have been placed in these waters. Several large schools of the young alewives were seen to pass down from the lake, and the appearance of mature alewives in Cold Stream, may be looked for next spring, if the fishway is built at Great Works in season for their ascent of the river.

On the Mattawamkeag river the appearance of salmon in large numbers within the present year (1879) has called forth demands from the people for fishways on that stream, and steps have been taken toward providing a suitable passage for the fish over the dams on this river, which is an important one for salmon.

When the young salmon that had been artificially hatched were

placed in the Mattawamkeag river a few years ago, many of the inhabitants of that region regarded it as an experiment of visionary scientists, that would never prove of practical value; and even ridiculed the prediction of just what has now occurred, the return of the fish in great numbers when mature, to the identical stream wherein they had been placed at six weeks age. Although this is no more wonderful than the yearly departure and return of birds, so familiar to everyone, even though he be no naturalist, yet in regard to fishes, practical demonstration only has convinced many of our citizens, that the labors of the Commissioners of Fisheries are not in any sense experiments, but a judicious prosecution of the development of one of the greatest resources of the State to a constantly increasing value. And we earnestly hope that with the increase of general knowledge of the subject, there will be accorded increased support in carrying forward this important work.

#### IMPORTANCE OF OUR FISHERIES.

No State in our republic is better endowed by nature, in regard to propagating in great variety and quantity the most valuable fish, than Maine, and her waters can be cultivated so as to yield a much greater profit, in proportion to the necessary outlay, than can be derived from any other resource.

By protecting and increasing our inland fishes, the shore fisheries will be proportionately increased in value; and while the recent labors of the U. S. Fish Commission demonstrate the feasibility of stocking even the ocean by means of artificial propagation, yet there must be food to attract fishes in any great numbers to frequent given localities. Many of our own citizens will remember that when the streams of Maine teemed with salmon, shad, alewives, smelts, etc., our whole coast abounded with the sea fishes that were attracted in shore by the supply of food that was furnished by the river fishes. The practicability of restocking our streams has been fully demonstrated, and it is only necessary to continue and extend the work of propagation and protection, to increase the value of our fisheries, both shore and inland, to an almost illimitable degree.

As the cost of nearly all of the necessities of life depends upon the price of labor, so does the price of labor chiefly depend upon the price of food.

It is practically demonstrated in various countries that the cheapest food is fish, and it is owing to the abundant supply of fish that the cost of living is so little. Not that the people subsist solely upon fish, but because the abundance and cheapness of one principal article of food tends to cheapen other food, and thus every ordinary necessity of life may be obtained at a proportionately less cost.

Owing to the comparatively unrestricted destruction of fish, the waters of Maine have been so depleted, that for many years past the yield has not been sufficient for the wants of the people of the State. With all her natural facilities for the propagation and increase of fish, Maine can not only furnish an abundance of the best of fish food to her own citizens, but derive a large revenue by supplying other markets, if these endowments of nature are properly guarded and cultivated.

A brief statement of the imports of some of our best known and most valuable fish may convey to many who have not given attention to the subject, some information of the immense quantity yearly brought to us from a foreign country.

The list includes only such as were regularly entered at the custom house.

From 1854 to 1872, there were entered at the single port of Portland, Maine, 2,700 barrels of salmon, 400 barrels of shad, 39 barrels of trout, beside alewives, etc.

During the same period, according to statistics prepared by Mr. W. R. Clark of Boston, there were imported from the Canadian Provinces into Massachusetts, 83,000 barrels of salmon, 50,000 barrels of shad, 18,000 barrels of trout. 270,000 barrels of alewives.

From 1874 to 1878 inclusive (five years) there were imported from British North America into the United States, 26,462 barrels of pickled salmon, 145,687 lbs. of dried or smoked salmon.

It is impossible to give the quantities of alewives imported, but some estimate may be made from the fact that in addition to the smoked and pickled salmon, and "1,560,962 boxes of dried and smoked herrings," there were imported within the same five years upwards of 36,000,000 lbs. of other fish "smoked and dried."

Had the Commissioners of Maine specific returns of the amount of fish caught in the waters of this state, they would be enabled to show not only the present value of our fisheries, but from year

to year show the increase that is inevitable if the work of propagation and protection is vigorously carried out.

The most immediate benefit from such public returns would result from our citizens learning the immense actual value of our fisheries, and thus becoming stimulated to provide ample means to foster them. As there is no prohibition for such a stimulant in Maine, we trust that steps may be taken toward obtaining these returns in the immediate future.

The annual value of the fisheries of Canada is estimated at \$1,000,000, of Norway, \$16,000,000, France and Russia each \$18,000,000.

By looking at the map and comparing the area of inland waters, magnitude of rivers, and extent of coast line, one may form a conception of the value to which the fisheries of the State of Maine can be developed.

In addition to her extensive coast line, the lakes and streams, with a surface area of more than 2,000,000 square acres, are all well suited to the production of fish.

The water, as well as the land, may be cultivated and made to yield more bountifully, and fish farming is now profitably carried on to a considerable extent in the United States. In this connection the following quotation from an article recently published in the "Boston Sunday Budget," by a writer who has evidently given much study to the subject, will be read with interest. "The most frequented fishing grounds are much more prolific of food than the same extent of the richest land. Once a year only will an acre of the best land, most carefully tilled, produce two tons of hay, or one ton of indian corn, or afford the food for producing 200 or 300 lbs. of meat or cheese. The same area at the bottom of the sea on the best fishing grounds yields a greater weight of food to persevering fishermen every week in the year."

The same writer adds, that "according to calculations made, the flesh of fish contains as large an amount of proteine as pork; 100 lbs. of fish contain as much nourishing matter as 200 lbs. of wheat bread, or 700 lbs. of potatoes." Although so nutritious, it is not expected that any one will use fish as a sole article of diet, and with the modern facilities for transportation, all not needed for home consumption, can find a ready market, and remunerative prices elsewhere.

Maine is not only capable of producing all the fish needed for home consumption, but can in the future supply markets now dependent upon the Canadian Provinces.

#### PROPOSED LEGISLATION.

The great trouble is not in the laws themselves so much as the continued changes made in them from year to year, rendering it difficult for the people to understand or remember, or even know what they are. The laws are nearly correct now, they require but few slight changes, and they can then be codified and printed in pamphlet form and generally distributed. The chief fault is not in the laws but in the power of enforcement. The Wardens, both for fish and game should not be appointed for districts or counties, but for the State at large. They could then be sent where their services are most urgently required by the Commissioners. The Wardens when appointed for a locality, are liable to be intimidated, or influenced by interest. The salary is not sufficient to warrant their being appointed for a locality, remote from their own home and property. At Bangor the position is a peculiar one, and requires that the Commissioners should be vested with power to increase the force when required. It is a common boast, and used to imply a threat by the class of persons who infest the rivers during the salmon season, that they have men in the crew who would "as soon shoot a man as look at him." The Wardens on this section of the river have been repeatedly assaulted, and in a manner and with dogged persistence that renders it miraculous that they have escaped with their lives. One was struck in the dark with a stone and left lying for sometime senseless upon the ground. It should be borne in mind that all this has occurred in the same district, and nearly in the same locality or neighborhood, where three murders and one case of manslaughter have been committed within a few months.

The river is broad below the water works dam, where the fish collect in large numbers before the first great obstruction on the river. In the vicinity of a city like Bangor, there is always a large class of idle, dissipated men, ready for any wild enterprise. The taking of a salmon affords a tempting means of obtaining rum and tobacco. We should have a boat on this station all the time day and night. The river at Orono at Basin Mills and at Great Works, is often tempting ground for poachers. All this

ground has at present to be guarded by only two Wardens. The poachers from Bangor go on to the forbidden ground between the dam and toll bridge, with a boat's crew of four good oarsmen ; if they are detected and pursued, they trust to escape by means of a stronger crew ; and if out-rowed, they run their boat ashore and escape. We seize the boat and it is next day claimed as having been stolen. The law should be so amended that boats and nets when taken on forbidden ground, should be treated as summarily as in cases of smuggled goods, when the teams and all are condemned and sold. We require more force on this section of the river. We have hitherto relied upon the aid extended to us by the Mayor and City Government of Bangor, as our citizens are all deeply interested in the preservation and protection of our salmon on the Penobscot, and have extended to us volunteer aid. The Commissioners require that means be provided them for summarily suppressing netting of fish on our inland waters. Many lakes and ponds have been stocked at considerable expense to the State, while the worthless poacher is continually depleting them by means of set nets. These nets are put down and taken up at night ; their locality defies the search of the Warden, as they are sunk so that the floats are beneath the surface of the water. Most of our hotels and fish dealers in our towns are supplied from this source. The perpetrators are a worthless class, who obtain their food and shelter at the expense of hard working abused wives, while their nefarious occupation merely furnishes them with rum and tobacco.

In closing we would respectfully call your attention to the importance of having provision made for obtaining correct returns of our shore and river fisheries, that a record may be had of the quantities and varieties taken, as well as modes of capture. These statistics would be of great utility, and exhibit to our people the great commercial value of fisheries, which may be greatly developed, as a source of revenue to the State. The late action of the United States government has already called your attention to the subject.

Respectfully submitted,

E. M. STILWELL,  
EVERETT SMITH.





## LIST OF FISH COMMISSIONERS.

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### *United States.*

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

### *Alabama.*

Charles S. G. Doster, Prattsville, Autauga Co.

Robert Tyler, Montgomery.

D. R. Huntley, Courtland.

### *Arkansas.*

N. H. Fish, Pine Bluff.

J. R. Steelman, Little Rock.

N. B. Pearce, Fayetteville.

### *California.*

B. B. Redding, Sacramento.

S. R. Throckmorton, San Francisco.

J. D. Farwell, San Francisco.

### *Colorado.*

Wilson E. Sisty, Brookvale.

### *Connecticut.*

William M. Hudson, Hartford.

Robert G. Pike, Middletown.

James A. Bill, Lyme.

### *Georgia.*

Thomas P. James, Atlanta.

Duties embracing the work of the fish interest assigned to  
Commissioner of Agriculture.

### *Illinois.*

N. K. Fairbank, Chicago.

S. P. Bartlett, Quincy.

J. Smith Briggs, Kankakee.

*Iowa.*

Samuel B. Evans, Ottuwa.  
 B. F. Shaw, Anamora.  
 Charles A. Haynes, Waterloo.

*Kansas.*

D. B. Long, Ellsworth.

*Kentucky.*

Wm. Griffith, Pres. 166 W. Main st., Louisville.  
 John B. Walker, Madisonville.  
 Hon. C. J. Walton, Munfordville.  
 Hon. John A. Steele, Versailles.  
 Hon. J. H. Bruce, Lancaster.  
 P. H. Darby, Princeton.  
 Dr. S. W. Coombs, Bowling Green.  
 Hon. James B. Casey, Covington.  
 General T. T. Garrard, Manchester.  
 Hon. W. C. Allen, Owingsville.

*Maine.*

E. M. Stillwell, Bangor.  
 Everett Smith, Portland.

*Maryland.*

T. B. Ferguson, Baltimore, (Address 1327 M St., Wash-  
 ington, D. C.)  
 Thomas Hughlett, Easton.

*Massachusetts.*

Theodore Lyman, Brookline.  
 E. A. Brackett, Winchester.  
 Asa French, Boston.

*Michigan.*

Eli R. Miller, Richland.  
 A. J. Kellogg, Detroit.  
 Dr. J. C. Parker, Grand Rapids.

*Minnesota.*

1st district—Daniel Cameron, La Crescent.  
 2d district—Wm. W. Sweeney, M. D., Red Wing.  
 3d district—R. Ormsby, Sweeny, Chairman, St. Paul.

*Missouri.*

I. G. W. Steedman, Chairman, 2803 Pine st., St. Louis.  
 John Reid, Lexington.  
 Silas Woodson, St. Joseph.

*Nevada.*

H. G. Parker, Carson City.

*New Hampshire.*

Samuel Webber, Manchester.  
 Luther Hayes, South Milton.  
 Albina H. Powers, Plymouth.

*New Jersey.*

Dr. B. P. Howell, Woodbury.  
 Col. E. J. Anderson, Trenton.  
 Theodore Morford, Newton.

*New York.*

R. Barnwell Roosevelt, 76 Chambers st., New York.  
 Edward M. Smith, Rochester.  
 Richard U. Sherman, New Hartford, Oneida Co.  
 Eugene G. Blackford, 809 Bedford ave., Brooklyn.  
 Seth Green, Superintendent, Rochester.  
 Horatio Seymour, Utica.

*North Carolina.*

Governor Z. B. Vance, Raleigh.  
 Professor W. C. Kew, Raleigh.  
 President R. P. Battle, Chapel Hill.  
 Colonel S. M. Holt, Haw River.  
 Captain S. B. Alexander, Charlotte.  
 Major Jonathan Evans, Fayetteville.  
 Captain J. R. Trispan, Earboro.

*Nebraska.*

R. R. Livingston, Plattsmouth.  
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 James Duffy, Marietta.  
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*Rhode Island.*

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

*South Carolina.*

A. P. Butler, Hamburg.

*Tennessee.*

W. W. McDowell, Memphis.  
 George F. Akers, Nashville.  
 W. T. Turley, Knoxville.

*Utah.*

A. P. Rockwood, Salt Lake City.

*Vermont.*

M. Goldsmith, Rutland.  
 Charles Barrett, Grafton.

*Virginia.*

Colonel Marshall McDonald, Lexington.

*West Virginia.*

Henry B. Miller, Wheeling.  
 Christian M. White, Romney.  
 N. M. Lowry, Hinton.

*Wisconsin.*

Governor William E. Smith, ex-officio, Madison.  
 Philo Dunning, President, Madison.  
 J. V. Jones, Oshkosh.  
 C. L. Valentine, Secretary and Treasurer, Janesville.  
 Mark Douglass, Melrose, Jackson Co.  
 John F. Antisdell, Milwaukee.  
 Christopher Hutchinson, Beetown, Grant Co.  
 H. M. Welsher, Superintendent, Madison.

*Dominion of Canada.*

- W. F. Whittier, Ottawa, Commissioner of Fisheries for Dominion of Canada.
- W. H. Venning, St. John, N. B., Inspector of Fisheries for New Brunswick.
- W. H. Wylde, Inspector of Fisheries for Nova Scotia.
- Alexander C. Anderson, Inspector of Fisheries, British Columbia.
- Samuel Wilmont, Ottawa, Superintendent Fish Breeding Establishments, Dominion of Canada.



## ERATTA.

On page 5, read "Shad Pond" for "Spad Pond." Same page, read "their poisoned waters" for "other poisonous waters."

On page 6, read "600 eggs" for "800," and "6,000" for "8,000." Also "production" for "protection."

On page 7, for "Enides" read "guides."

On page 9, for "Tevin" read "Twin."

On page 10, eleventh line from bottom, "4 to 11 lbs. weight" read "8 to 11 lbs. weight."

On page 13, for "recognize" read "economize." Also for "sea-fish" read "red-fins."

On page 14, for "sense," in nineteenth line, read "sum."

On page 15, tenth line, for "Here" read "These."

On page 17, twenty-fifth line, for "makes" read "wakes." In thirty-second line insert the word "a" before practical.

On page 22, eighteenth line, "could" should read "should."

On page 35, for "Whittier" read "Whitcher." For "Wilmont" read "Wilmot."