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FOR THE YEAR

1891.

VOLUME I.

AUGUSTA:
BURLEIGH & FLYNT, PRINTERS TO THE STATE.
1892.

REPORT

OF THE

Commissioners of Fisheries and Game

OF THE

STATE OF MAINE.

FOR THE YEARS

1889-90.

AUGUSTA:
BURLEIGH & FLYNT, PRINTERS TO THE STATE.
1891.

REPORT.

To His Excellency Governor Burleigh:

The Commissioners of Fish and Game have the honor to present their report for the years 1889 and 1890.

Notwithstanding the large increase of anglers coming into Maine, beside the many resident within her borders, the fish have held their own (with a few exceptions) and in many localities have made a decided increase in size and numbers. During the present year a larger number of trout and land-locked salmon have been taken than for several years past. The many trout brooks, lakes and ponds seem to be better stocked, both as to size and numbers, many good baskets of trout being taken in streams that heretofore have been thought to be fished out. This, in part, may be owing to the favorable stage of water we have had for the last two years. But we think it mostly due to the protection they have received in close time and in returning back of all fish of less than five inches in length. There seems to be a better feeling, except in a few localities, in favor of protecting our fish and game. More are beginning to see the large amount of money they bring into our State. It is not the value of the fish and game themselves, either for the market or consumption as food, but for the many sportsmen they bring here who spend their money freely. They come for the sport of catching our fish or shooting our game; it goes to swell the wealth of our State and is a benefit to all; it supports many a poor man in our backwoods who acts as guide; it sells the product of many a farm which lies away from a market, and at city

prices; it runs many hotels back in our forests; it patronizes our railroads; in fact, it is a product hardly second to any. Without our fish and game many farms and thriving villages would have to be abandoned, where now they have many comfortable homes. It is a product that costs but little to cultivate. Maine is now the banner State for fish and game. The number of sportsmen are increasing each year. Many are building cottages on the shores of our inland lakes and ponds. Our fish and game brought the larger number of these here. Take a look through the cars during the open season and see how many fishing rods, guns and other paraphernalia are on board which represent sportsmen. It will give some idea of the numbers who come to Maine for the purpose of catching our game fishes or capturing our game. Beside these, we have many resident sportsmen within our own borders. If rightly managed we can always have plenty of fish and game. We have the finest ponds, lakes and streams in the world, stocked with the finest fish, and our forests are full of game, but we are sorry to say in many localities the laws are not properly respected. We have the best code of laws of any state in the Union, which if lived up to would always keep up the supply of fish in our streams and game in our forests.

With our small appropriation we have not been able, in many localities to give the necessary protection, especially where the people are not inclined to assist in enforcing the laws. All are equally interested and own equally in this product. If those who feel an interest in this matter will do what they can to foster and protect it, and will inform or prosecute those who steal our fish and game in and out of season, illegal fishing and shooting will be stopped. We appeal to every lover of the rod and gun to do this. We have the fish and game in our forests and streams. Let us keep it. We think our laws are good, help us to enforce them. If they are bad, repeal them, and make them better. Those who break our laws are nearly always men who would take the last fish from the spawning bed, or kill the last head

of game, caring for nobody's interests or for those who may come after them, thinking only of their own selfish avarice. Fish caught from their spawning beds are worthless and unfit for the table. Every female trout or salmon taken from the spawning beds, represent hundreds of young fry that would replenish our depleted waters. We hear complaints from the line of the Canadian Pacific Railroad. We append an article cut from a Boston paper. We would suggest the propriety of passing some law holding railroads responsible for the acts of their employes. If they would but pattern after the Maine Central Railroad we should have no trouble from that quarter.

"BANGOR, ME., Oct. 20, 1890. This is the season of the year when the State of Maine through its fish and game laws, declares that trout and land-locked salmon shall not be taken within the borders of the commonwealth, but when she allows the sportsmen to hunt moose, caribou, deer and game birds instead.

"But this, also, is a season when the fish are taken illegally, and when in a single week the slaughter is greater than in a month at other seasons of the year. Every Sabbath about the Schoodic waters, in Ship pond, in Moosehead lake and about the head waters of the Kennebec river; in that same river between Moosehead dam and Indian pond, so well known to New York and Boston sportsmen; in and around Misery stream, and all about Long pond and other Moose river waters; in and about Beattie and Holeb town—all these places being in the wilderness and along the line of the Canadian Pacific Railway—thousands of fish are killed, and, as this is the season when the females are full of spawn, it may be said that on each of these days with hook and line, spear and dynamite, millions of fish in the egg are destroyed.

"At this season of the year female trout are seeking spawning beds, where the males have preceded them. Some go down the outlets of the lakes and ponds, some ascend inlets, while others remaining in the larger bodies of water seek spawning beds there, where they lie in winrows numbering thousands upon thousands.

"Take those at an outlet. They swim just within the range of the quick water as it flows into the stream or over the dam, and here, by an easy motion, will hold themselves for days, after crowding upon one another until the eggs shall have ripened, when they

allow themselves to be washed down the stream, regulating with their fins the pace.

"They will drop down over a ten or fifteen foot dam, always, however, going tail first, for to proceed otherwise would result in blows upon the head by contact with rocks, every fisherman knowing such blows bring speedy death to trout. The slaughter here will be during the time the fish are collecting and before they go down the stream.

"At one place in Moosehead, at the head of the Kennebec river, the writer saw a Canadian Pacific cook, in camp with a construction crew, spear fifty female trout, all full of eggs and weighing from three to five pounds each, which he afterward cut into four-inch lengths and put into a pickle in a pork barrel. When he had covered them with a flour barrel head and had put weight upon it, the whole filled the pork barrel two-thirds full.

"But next Sunday comes in this spawning season, and away roll a crew upon a hand-car for some place where the fish have congregated—the road runs along the shores of these ponds and lakes—and on arrival set at work at once. Perhaps they are near a spawning bed in the still waters of a lake or pond. Taking a sticking of dynamite, they wrapt it well, attach and light a fuse, allowing it to drop to the bottom, not among the fish, but at one side, so as not to alarm the fish, and then paddle away a short distance.

"Soon there is a report, a jet of water shoots into the air, at the base of which the water rolls like a troubled sea, and then circles wider out and disappears in the placid waters, showing no signs of the slaughter.

"But soon the waters break again, and up come, perhaps, twenty, thirty or forty fine trout, collectively weighing one hundred pounds or more, not dead, but stunned. These are taken up in dip nets, given a rap on the head and laid away. If the spawning fish be in quick water, where they would be swept away after an explosion, the spear is used, and if this is not available, then the seductive fly is thrown, which often lures one hundred pounds of fish in a day.

"When the two and three pronged spears are used, fish are taken as farmers pull potatoes from the hill. Hand-cars run out from Moose river, from Misery station, from Ship pond and intervening stations, the best point of all, however, being the Schoodic lakes, one of the finest sheets of water in New England.

"What is true of the railroad men in reference to trout and salmon, is also true of these same men as to deer, caribou and moose. Winchester rifles are almost as frequent upon hand-cars as picks and shovels, and when the haughty Canadian officials, who can see no good think in Yankeeland, gaze upon them, they say never a word, but patiently lay for some liberal slice of game which they know will soon be forthcoming."

SALMON.

We regret that it is not in our power to render a more favorable report of the salmon fisheries of Maine. They have been sustained for the last decade of years by the planting of young fry in our rivers by the Commissioners. The Penobscot salmon have been the pride and glory of our State, and by increased means of transportation have been sent to all parts of the Union. The Kennebec salmon, of world wide fame, were nearly exterminated by the Sprague dam at Augusta preventing the access of the fish to their spawning ground for some eight years. Of course within that period all the parent fish were destroyed, while the small contribution of fry to the upper waters of the river from our scanty means has been neutralized by saw dust and edgings, and the refuse of villages and factories on their shores. Let any one explore the river from Waterville to Augusta in summer. It more resembles the waste of a neglected wood-yard than a river. The St. Croix is but partly the property of Maine. The Commissioners have been ably sustained by Mr. Frank Todd of St. Stephen in planting young salmon fry as well as enforcing the police of the river. At one period salmon were poisoned by the wash from the cotton mill at St. Stephen. The provincial government promptly enforced the law, and the salmon are undisturbed by net, or spear, or poisonous waste from factories, while the young fish are found in every pool. On the Penobscot, the only large salmon river on the Atlantic coast of the United States, and the sole source of supply to the government works at Orland for Maine and the other states of the Union, unless the legislature afford

immediate relief the days of salmon production in our State are numbered.

During the fall and winter of 1887 the dam across the Penobscot river at Old Town, about ninety rods above the West Great Works pulp mill, without any notice to the Commissioners of the proposed change, was torn down and the fish-way belonging to the State of Maine destroyed. A dam was built from the East Great Works mill spanning the river to Bradley on the opposite shore. It is the habit of salmon to rest a few days below any obstruction in a river, even if it is a dam or fish-way annually passed, before resuming their way to their accustomed spawning ground. If this basin or resting place is the immediate receptacle of poisonous matter it is fatal to all fish inhaling it. All the fish were thus stopped in the poisonous waste from the pulp mill and many killed both by the lime, soda and sulphuric acid emptied into the water, as well as by the gaff and spear and net of the poacher.

It is now some three years since any but a few small fish have been enabled to reach the east and west branches of the Penobscot, where from time immemorial they have been accustomed to spawn. Contemporaneous with the innovations at East Great Works, a dam was commenced entirely across the Penobscot river at Piscataquis falls by the same company. In both of these cases the Commissioners served legal notices, as prescribed by statute, but a fish-way practicable for the fish and in accordance with the plans rendered was not obtained in the former case but a year since, and in the latter case not until too late this year for the fish to ascend, and they are now shut out from their old breeding grounds. The loss of the brood fish on the Penobscot is irreparable to the State, while the fish-ways being directly at the mills in question and accessible to poachers is a source of increased expense to the Commissioners, as wardens of our own, known and tried, have to be placed in charge to guard them.

It has been our custom for years to transport our young salmon fry far up the Mattawamkeag and Penobscot rivers that they might feed in unpoisoned water before their migration to the sea. The salmon fishery of the Penobscot has been preserved in appreciable quantity by the planting of young salmon by the Commissioners. Our apportionment of salmon eggs from our contribution of $500 to the United States Salmon Works at Orland, added to a generous contribution from Col. McDonald, the United States Commissioner was 600,000. These were all sent to other parts of the State to be hatched, as it was thought not advisable to put any more young fry into the river so long as the present poisoning of the waters at West Great Works continued. Two hundred thousand were sent to Grand Lake stream to be hatched for the St. Croix, while the remaining four hundred thousand were sent to Sebago and Rangeley to be hatched for the Presumpscot, Kennebec and Androscoggin rivers. The United States Commissioner turned in some hundreds of yearling salmon into tributaries of the Penobscot below Bangor, thus hoping to delay the destruction of their only source of supply of salmon eggs on the Atlantic coast. We append a letter from United States Commissioner Col. McDonald, whose advice we have followed in transferring our usual plant in the Penobscot river to other parts of the State.

U. S. COMMISSION OF FISH AND FISHERIES,
WASHINGTON, D. C , Jan. 25, 1890.

E. M. Stilwell, Esq., Commissioner of Fisheries and Game, Bangor, Maine,

DEAR MR. STILWELL: I delayed replying to your letter of a recent date in order that I might advise with Mr. Atkins as to the practicability of meeting your wishes in reference to rearing the Penobscot salmon fry for your State Commission. Though I felt well assured that we had already undertaken as much work in that direction as it would be possible for us to accomplish, Mr. Atkins' letter confirms me in this view. Our ponds will be taxed to their full capacity to rear the salmon fry with which we propose to stock the tributaries of the Penobscot, and possibly other salmon streams

in the State. This work, though done by the United States, is, of course, as directly in the interest of the State as if done by the State Commission; and if carried out on the scale proposed (we expect to hatch out for rearing not less than 250,000 fry), it would seem to me that the State Commission might well intermit their own work upon this river, and apply the available means that they have to stocking other streams more remote from Bucksport, and which we will not probably be able to reach by our efforts.

I regretted very much not seeing you when in Maine. I requested Mr. Atkins to notify you of my expected arrival there, and I think he did so, but you were absent from the city at the time.

You have, doubtless, heard from Mr. Atkins of the favorable results of our work with land-locked salmon on Green lake or Reed's pond. The supply already there, reinforced by the large plants of yearling fish that we propose to place in this pond and in the waters tributary to it, will, no doubt, in a few years, make the whole system of waters which drain by the town of Ellsworth afford magnificent fishing for the land-locked salmon. I propose, also, to place in the lake the Loch Leven trout, which I think will thrive in association with the land-locked species.

The printed statement you sent me in regard to the amount of lime used by a single pulp mill on the Penobscot, is a fearful reminder of the pollution of the waters of that river, which must result each year from the discharge of the waste from this and other mills into the stream, and unless State legislation can control the matter so as to improve sanitary conditions for the fish, it seems to me undesirable for either the State or the United States to attempt to establish salmon fishing in the waters above Bangor.

We can do more useful service by confining our efforts to stocking the small streams in the vicinity of Craig's brook, which drain either directly into the gulf of Maine or are tributary to the Penobscot below Bangor. By doing thorough work with these it will be possible to maintain and improve the commercial salmon fisheries of the Penobscot. But it seems to me that in view of the present condition of affairs, the attempt to establish good fishing for anglers at Bangor and above is hopeless.

Very truly yours,

M. McDONALD, *Commissioner.*

DISTRIBUTION OF SEA SALMON FOR THE YEAR 1889.

Hatched at Weld and put in tributaries of Kennebec and Androscoggin rivers	200,000
Hatched at Enfield and put in tributaries of Penobscot river	400,000
Total	600,000

DISTRIBUTION OF SEA SALMON FOR THE YEAR 1890.

Hatched at Edes Falls and put in Crooked river, tributary of the Presumpscot river	200,000
Hatched at Weld for Kennebec river	200,000
Hatched at Grand Lake for St. Croix river	200,000
Total	600,000

LAND-LOCKED SALMON.

The propagation and introduction of these fish into new waters has been a decided success. We have received a large number of applications to stock ponds and lakes with this desirable fish. We have complied as far as our stock of fry and limited means would permit. Where we have found the water suitable, we have generally met with success. We have been unable, in many cases, to examine the localities where they have been asked for, and some have not had the qualifications necessary and have proved failures, but where they have had the following requisites, they have multiplied and thrived wonderfully. To succeed we feel sure the waters where they are to be introduced must have the following advantages, viz: ponds must be of good size and of clear, pure water, with streams flowing in, of swift running currant, clean gravelly bottom, to which the fish can have free access to deposit their eggs, must also contain plenty of fresh water smelts or spring spawning minnows for food. The smelt spawns and hatches at the same time in the spring the

young salmon are beginning to feed, and is just what they need at that time to sustain them. We think many of the young salmon die for the want of proper food, and the young smelt is what they require. We have caught the young smelts at Sebago in the spring and put with the young salmon beginning to feed, in the hatching house, and they would be as eager after them as a cat after a mouse, and would pursue them until the last one was eaten. Without the above conditions we are satisfied they will prove a failure. Hereafter we shall plant no salmon in any waters unless they contain the above requisites, feeling sure that without these the labor and stock would be lost. With our small stock of these fish we are not able to try any experiments, as we can obtain only a limited number of fish eggs each year. We have good reason to think that in a few years we can increase our stock of fish and thus add to our stock of eggs. We now get our supply from Sebago lake, famous for the finest and largest land-locked salmon in the world. We have been taking eggs at Crooked river (a tributary of Sebago lake) since 1885. The first year all the eggs were hatched and put back into the lake. Since then a portion of these have been taken to stock other waters in the State, always being sure to leave enough to stock the lake, hoping and believing in the near future it will be one of the best land-locked salmon fishing resorts in Maine, worth many thousand dollars to the State. We commenced our work at Sebago by putting in a weir near the mouth of Crooked river and taking every fish that ascended, keeping them in an enclosure till the time arrived when their eggs could be taken, then turning the parent fish back to the lake. Heretofore the fish ran up Crooked river for nine miles, spawning all along in favorable places. For many years people had been in the habit of spearing and netting them on their spawning beds, not one in ten ever escaping to return to the lake. Our operation of taking them in a weir as they came into the river in the fall stopped (or nearly so) the illegal spearing and netting.

Not much result was seen of our efforts to increase the stock of fish until last fall, except that a few more large fish were taken in the spring, trolling in the lake with hook and line, those that came up in the fall being saved to return to the lake instead of being speared on their spawning beds. Last fall the results of our hatching operations and protection began to show. Hundreds of young salmon of from one-half pound to two pounds came up the river, many so small they went through the slats of our weir. Something never seen in the river before. Last spring a great many small salmon were taken in the lake trolling. In previous years it being an exception to take one of less than four pounds. Nearly all the opposition to our operations by the people living on the banks of the river and in that vicinity have ceased and the feeling is generally favorable.

Sebago lake is one of the finest in Maine, lying near Portland, easy of access *via* the Maine Central Railroad, being fifteen miles long and half as many wide, of clear pure water stocked with the finest fish, and capable of becoming one of the most popular of fishing resorts. The outlet, Presumpscot river, flowing into the ocean near Portland. The dams on this river are now supplied with fishways largely owing to the efforts of J. M. Allen, Esq., fish and game warden at Saccarappa. We see no reason why the Presumpscot cannot be made a salmon river. Since we commenced hatching on Crooked river, we have turned into Sebago waters several hundred thousand Penobscot salmon, and shall continue to do so in the future. We do not feel sure but that many of these fish will remain where planted, and grow up to large fish, thriving on the food they may find in the lake. The land-locked salmon found in this lake compare favorably with the sea salmon in many rivers, both as to size and quality. We have taken in our weir many of these fish of over twenty pounds. So near do they look like the Penobscot salmon, we are unable to discover the difference.

In several of our fishing resorts, more interest is being manifested in propagating and protecting our game fishes,

realizing that with the ever increasing number of anglers each year, the stock of fish cannot be kept up without artificial propagation, and protection during the close season.

At Rangeley village a large association has been formed, among them many wealthy sportsmen from outside the State, who have contributed liberally. A new hatching house has been built in the village which is an ornament to the place. The house will be stocked with eggs of trout and salmon and used for the benefit of those waters. Fred S. Dickson, Esq., a gentleman from Philadelphia, who owns and spends his summers with his family, on a beautiful island in Rangeley lake, and Capt. R. A. Tuttle of Boston, an owner in Lake Point cottage, have at their own expense, leased the dam of the Union Water Power Company at Rangeley outlet for the purpose of controlling the old hatching ground at that place and to so govern the water that it will be favorable for the fish to spawn as they did before the dam was built. Also to arrange a series of dams that the fish can have a free passage from, or to the lakes below. This was formerly one of the best breeding grounds for large trout in that vicinity, which was ruined when the dam was built.

At Lewiston and Auburn they also have formed an association and raised a fund of $1,000, and built one of the best hatching houses in the State, for the purpose of stocking Auburn lake. By putting in a weir at the mouth of one of the inlets, they secured several hundred large trout and salmon, from which they took several hundred thousand eggs, and saved the parent fish to turn back into the lake. Previous to this, the trout had been killed, when they came up the stream to spawn. We predict for this lake, fine fishing in the near future. There are many other places in Maine where the same thing can be done. The young fry cannot be carried in large numbers without considerable expense, and great damage of losing them in transportation. The eggs can be sent from where they are taken, as well and safely as hen's eggs and at small cost. They should be hatched as near the point of distribution as possible.

We hope in the future to see such arrangements at Aroostook and other points difficult of access. We can furnish the supply of salmon eggs, if given the means. Trout can be got at most any locality in Maine, where waters are adapted to them. We now get our supply of land-locked salmon eggs from Sebago lake and think in a few years the stock of that desirable fish will increase so we can procure all we need. At present we take all that run up Crooked river as far as our weir. This is the main salmon stream that feeds Sebago lake. The expense of taking these eggs is a trifle over one dollar per thousand. If they were put on the market they would bring four times that amount, leaving several thousand dollars to the State. They are worth much more to Maine, and should never be taken except for her own waters.

DISTRIBUTION LAND-LOCKED SALMON EGGS, 1889.

Eggs taken at Sebago lake		650,000
Hatched at Auburn Spring	75,000	
Weld	75,000	
Enfield	75,000	
Edes Falls	425,000	
Distributed from Auburn.		
To W. N. Child, Damariscotta	5,000	
G. H. Fairgraves, Skowhegan	4,000	
C. M. Jones, Solon, Rowe pond	3,000	
Geo. L. Hovey, Embden pond	3,000	
Auburn lake, Auburn	60,000	
		75,000
Enfield Hatchery.		
To E. E. Church, Eddington, for Tunk pond	10,000	
D. W. Campbell, Cherryfield, Spring River lake	15,000	
Henry Nash, Schoodic lake	10,000	
C. A. Wood, Bar Harbor, Jones pond	10,000	
E. R. Comises, E. Eddington	5,000	
Geo. W. Hathorn, Alligator lake	15,000	
L. C. Morse, Liberty	5,000	
Henry Hastings, Hartland, Moose pond	5,000	
		75,000

Weld Hatchery.

To E. Blaisdell, Temple pond	4,000	
Freeland Abbott, Garland pond	3,000	
Freeland Abbot, Four Ponds	4,000	
S. Wing, Phillips	1,000	
W. M. Shaw, Eustis, Chain Ponds	5,000	
Heber Bishop, Megantic Club	4,000	
Eugene Soule, Seven Ponds	4,000	
E. H. Viles	4,000	
Weld pond and tributaries	46,000	
		75,000

Edes Falls Hatchery.

To S. H. Walcott, Norway lake	5,000	
J. L. Parker, Stone pond	5,000	
A. H. Mason, Trafton and Stanley ponds	5,000	
Eugene Dudley, Anonamous pond	3,000	
G. H. Jones, Oxford, Thompson pond	5,000	
H. Hancock, Pleasant pond	4,000	
Tributaries of Sebago lake	398,000	
		425,000
Total		650,000

DISTRIBUTION OF LAND-LOCKED SALMON EGGS, 1890.

Eggs taken at Sebago	700,000
Presented to Maine by United States Commission	40,000
Total	740,000
Hatched at Rangeley	75,000
Weld	75,000
Enfield	115,000
Edes Falls	475,000

Weld Hatchery.

To Big Island pond, Franklin county	10,000
Whitney pond, Canton	10,000
Baron and Tilton ponds, Fayette	10,000
Weld pond and tributaries	45,000

Enfield Hatchery.

To H. W. Tucker, for Medomak lake	10,000
W. N. Child, Biscay pond	10,000
D. W. Campbell, Tunk and Spring River lakes	15.000
Henry Peavy, Floods pond	10,000
L. E. Kimball, Upper and Lower Hadlock ponds	10.000
T. N. Irwin, Squaw Pan lake, Aroostook county	10,000
Geo. A Sweet, Hat Case pond	10.000
Rodick & Son, Mt. Desert, Eagle lake	10,000
Henry Golder, Belgrade pond	10,000
Henry Hastings, Moose pond	10,000
G. W. Fairgraves, Haydn lake	10,000

Edes Falls Hatchery.

To Thompson pond, Oxford	10,000
Peumssewassa pond, Norway	10,000
Sebago lake, ponds leading into same	455,000

GAME.

The increase of some kinds of game within the last two years has been wonderful. Deer have spread over the whole State, appearing in many localities where they have been extinct for many years. It is now a common occurrence, almost daily, to see them in sight of many of our thriving villages. This (undoubtedly) is owing to the protection of the law they have received in a portion of the State, and of the non-dogging which has been stopped in some parts of Maine. Yet there is a portion of the State where they have put the law at defiance, and have killed them in and out of season, and with dogs. This is at the expense of the law-abiding portion, and is unjust and unmanly, taking the rights away from the law-abiding citizen. Owing to our meagre appropriation for so large an interest as our fish and game, we have been unable to give them the necessary protection they deserve.

We would here suggest the necessity and wisdom of giving a fair appropriation for the propagation and protection of our

fish and game. Look at our large forests, our many thousand square miles of water to protect and cultivate, abounding in game and fishes, the finest in the United States. A product that brings many thousands of dollars into Maine, a product that can be raised and taken care of at little expense. Does it not deserve the necessary sum we ask for its preservation? We now have the small appropriation of $7,500 for all our expenses. This has to pay 150 wardens, furnish engineers to survey and draft plans for fishways, lawyers for drafting papers and defending lawsuits, men to guard the dams on the Penobscot river, cans and apparatus for transporting fish, hatching houses and men to tend them during the winter, expenses in attending to our duties, printing fish and game laws, taking and purchasing our stock of salmon and other eggs, and numerous other items unmentioned. It seems to us that $15,000 is a small sum to ask for this important interest. Many states in the Union appropriate a larger sum who have not one-half the value of fish and game that Maine possesses in her woods and waters. It seems to us that it deserves caring for, and the means given to protect and foster it. Without good laws and the means to enforce them, our fish and game would be swept from the State in two years. Open the markets and allow fishing and shooting indiscriminately and nothing would be left. Our laws, with few exceptions are good. We would recommend the open time for deer be lengthened commencing September first. Many sportsmen would come here in September to fish and try and get a deer. They are plenty, and by legal shooting during the open months they will be able to hold their own. We think Moose and Caribou have made no increase. Caribou being migratory in their habits cannot be depended on, often being plenty one year and none the next. The proximity of our moose to the border many foreigners and Indians come over the line and slaughter them, going back into Canada and New Brunswick. In these cases we are powerless to protect them. Good men are needed to guard the border

during the crust hunting season. For this we have not had the means and it has not been done.

PROPOSED CHANGES IN FISH AND GAME LAWS.

We would respectfully propose that the open time for Moose, Caribou and Deer commence in September.

That a heavy penalty and imprisonment for using dynamite or any other explosives in destroying or taking fish be imposed.

That the law against using spoons in catching fish be repealed. It cannot be enforced as they cannot be seen when in use and are no more deadly than other bait.

That the law in regard to posting notices on streams and ponds protected by special laws, be changed, so that it shall only apply to private waters owned and protected by private individuals.

We would suggest that the same principle involved in the fish law limiting the amount of fish to be transported to his own home, by the person who has legally caught the same, and with his name legibly marked on the property, and accompanied by him in person, shall apply to every species of game. The legislature to fix the amount thus to be carried, including grouse or partridge.

We would suggest that a bounty be placed upon the killing of Seals; they are very destructive to salmon and the nets and weirs of fishermen. The animal is but of trivial value.

Thousands of young salmon are destroyed on the boarded floors of weirs that are left dry at low tide. Some law should be passed for their protection.

Fifty moose were killed, and the carcasses mostly left to rot, by a Frenchman known as Pete Fontain, last spring on the headwaters of the Penobscot river. This Frenchman is an alien living in Canada. Skin hunting, which is destined to destroy the finest game animals of Maine, can be readily put an end to, if our legislature will only give us the means. It is not the restoration of the moiety of the money penalties

for infractions of the game laws to the wardens that we ask for. But it is that they will give us the means to hire good and faithful men as wardens; to pay them fair per diem wages when ordered on duty, and a bounty for all convictions. Twenty such men sent into the forests in certain sections of our State in March and April would effectually suppress skin and crust hunting. The skins and property seized should be forfeited to the State. Let the pay be generous, and fair, and proportioned to the duty, and the bounty for convictions equally so, and deserving of the State that pays it to honest and deserving citizens. A few such men could patrol the State the whole year and cost less than an army of men who fear to offend when assigned to duty near their own homes. These men would be unknown to sight where stationed, and could not be followed or watched. No one interest has our State, that pours into her lap so large an income, and one that is shared by all as our fish and game. Not accumulated into the pockets of one to be spent in other states or climes, but dividing its portion to every home. Give us the means to enforce the laws and protect it.

E. M. STILWELL,
HENRY O. STANLEY.

REPORT

OF THE

Commissioner of Sea and Shore Fisheries

OF THE

STATE OF MAINE.

1889–90.

REPORT.

To His Excellency Gov. E. C. Burleigh:

The Commissioner of Sea and Shore Fisheries has the honor to present his report for the biennial term of 889 and 1890.

The coast of Maine being so wildly extended, it becomes quite difficult to protect its fishing interest, and it requires constant looking after to prevent its fish laws from being violated, and its fish becoming extinct.

On the whole the laws have been observed as well as could be expected with the limited means at our command. Not so much has been done, as would have been had the appropriation been more liberal. We have found it quite difficult to get good, efficient and reliable wardens to serve for the small pay.

LOBSTERS.

If we wish to prevent our lobsters from being depleted, good and wholesome laws must be enacted and enforced. Section 6th, Laws of 1889 provided "that dealers may preserve in pickle or vinegar, such surplus stock as for good reasons cannot be disposed of otherwise."

This provision has been taken advantage of by many fishermen along the coast and islands, and they have pickled their entire catch without regard to size, and some have pickled what they call weak lobsters, (and it might be said to save their lives), or in other words the lobsters were about dead when boiled.

This kind of lobster has been sold at a low price and to the detriment of honest dealers and some amendment should

be made to this section to prevent this kind of pickling being done. As nearly as can be ascertained the whole catch of lobsters on the coast of Maine for 1890 is about 20,000,000. Some twenty per cent less than in 1888 when the catch was estimated at 25,000,000.

Lobsters seem to be getting less each year and should be better protected. No lobsters less than nine (9) inches in length should be used, as lobsters of this size seldom have any eggs. The U. S. Commission of Fish and Fisheries at Wood's Holl June 3d, 1890, counted the eggs on a lobster eleven inches in length that had 34,360 attached to it and one that was fourteen inches long had 36,540. Therefore it will readily be seen that the female lobsters should be carefully protected if we wish to propagate the lobster.

It may be necessary to do as they are now doing in Newfoundland as will be seen by the following article taken from the *Halifax Herald:*

LOBSTER AND COD CULTURE.

A NEW DEPARTURE IN THE PROPAGATION OF THE SHELLFISH.

It is very probable that unless we resort to artificial culture to replenish our lobster fisheries there will be a marked decline in Nova Scotia's output during the next few years. Already Newfoundland is ahead of us in this branch of fish culture, for under the management of Adolph Neilsen, a Norwegian expert, "the ancient colony" has taken a new departure in the propagation of cod and lobsters. In a recent article Rev. Moses Harvey writes that the fish hatchery on the shore of Trinity bay is the largest in the world for the propagation of codfish and lobsters, and capable of hatching 300,000,000 of cod and 200,000,000 lobsters in a single season.

A single mother lobster can stow away no less than 20.000 eggs, and she carries these about with her until they are ripened or hatched. The lobster trapper takes these mother fish and carries them to the factory, where they are thrown into boiling water, and of course the eggs are destroyed. The quantity of lobster ova that perish in this way is beyond all calculation, and is one great cause of depleted fisheries. Mr. Harvey thus describes Mr. Neilson's in-

genious methods: He gets the female lobsters at the factories before they are boiled, and with a sort of spoon constructed for the purpose he strips the eggs from the fibrals and returns the lobster uninjured. He takes the eggs, which are not nearly so delicate as those of the cod, and places them in the incubators, where the water is kept in constant motion.

After a time, longer or shorter according to the degree of ripeness they have reached before being removed from the mother, these ova are hatched. With some of them only two days are required; in the case of others less advanced a month or even two months may be needed to hatch them. Unlike the cod the young lobster must be fed, for it has no yolk sac to feed on when it breaks from the shell. Mussels chopped fine, with occasionally a few yolks of eggs, furnish food on which they grow rapidly, and in five or six days they have gone through their first shelling and are fit to be set free in the water to pick up their own living.

Mr. Neilson has invented floating incubators to be placed in the water near the lobster factories which are scattered around the shore. In these incubators the eggs are placed and properly attended to by men properly instructed. He has 432 of these floating incubators distributed this year at thirteen different stations—thirty-six at each. They are reported to be working admirably. There would be no serious difficulty involved in making similar experiments upon our own coast, and we understand that the energetic minister of marine already has the project under consideration.—*Halifax Herald.*

For a more particular account of how the lobster is propagated, I would call attention to the valuable letters from Mr. Adolph Neilson published in the appendix.

One of the strongest evidences of decrease of lobsters in this State is the average size of those now sent to market. The average length of lobsters in the market in 1889 and 1890 was about 10½ inches and would weigh about two pounds on an average against the average length of about 13 inches and would weigh three and one-half pounds to four pounds ten years ago. At that time there was an abundance of large lobsters and the small ones were regarded as of little account. Smacks that then carried 1,500 to 2,500 lobsters now carry 4,000 to 7,000.

I regret to have to refer to a most mischievous practice resorted to by some of the lobster fishermen on this coast, for if not efficiently checked, it will result in the decimation of this industry, in spite of the wise provisions already made for the perpetuation of the lobsters. The practices which I refer to are that being aware it is illegal to retain female lobsters with spawn, many fishermen knock the spawn off and thus defy detection. Another practice is to destroy all lobsters found in their traps less than the legal length, which by law should be cast back into the water. The killing and throwing away of small lobsters is perpetuated on the plea that if allowed to live they return again to the traps and thus keep on devouring the bait.

Anything more vicious than these practices or more certain to result in the total extinction of the lobsters would be difficult to imagine, and they certainly require that severe measures be used to stop this practice. At my request the United States Commissioner of Fish and Fisheries, Col. McDonald, has kindly furnished me with a statement and tables of the fisheries of Maine for 1887, 1888 and 1889 in advance of publication which will be found as an appendix to this report.

As the United States Fish Commissioner did not have the amount of lobsters and herring canned in 1890, I requested the canners to send a statement of the amount canned this season. Up to this time I have received returns from thirty-six, showing the amount they have canned. There are about forty lobster and sardine factories, and there are about four that have made no returns.

No. of factories.	Lobsters. No. of cans.	Sardines. No. of cases.	Herring. Barreled and smoked.	Mackerel. No. of cans.
2	588,000 1 lb. cans.			
1	125,000 1 lb. cans	35,000 cases...	7,000 bushels.	
2	119,482 ten oz. cans.			
1	62,122 1 lb. cans		20,924 large herring 1 lb. cans	10,832 1 lb. cans.
1	28,800 1 lb. cans.			
1	4,800 1 lb. cans	600		4,800 1 lb. cans.
9 factories in Lubec		155,000 cases.		
15 factories in Eastport	33,600 1 lb. cans	299,000 cases.		
1	30,000 1 lb. cans.			
1	24,000 1 lb. cans		52,800 1 lb. cans	2,880 1 lb. cans.
2	110,240 1 lb. cans; 27,240 2 lb. cans; 3,744 ½ lb. cans	2,000 cases.		
36				

Portland Packing Company did not run any lobster factory in Maine this season, but run twenty-seven (27) in the Provinces, and canned 32,000 cases, 4 dozen in each case.

Burnham & Morrill only run two lobster factories in this State and twenty in the Provinces.

It would seem from this that the canners find it more profitable to can in the Provinces than in this State, as lobsters are more plenty and are bought at a lower price. They were bought this season in the Provinces for about $1.25 per hundred pounds, while the price in Maine was from $1.30 to $1.85 per hundred.

I would call attention to an article on "American Sardines," copied in the Appendix, which I think will be read with interest.

Various reasons are given why more lobsters were not caught and canned this season.

One canner writes: "On account of the stormy weather, we did very little business," and that he had been in the business for twenty-seven years, and he thought that this spring for the months of May and June the roughest he ever knew. Average price paid for lobsters, $1.55 per cut. Another writes: "On account of the high price paid for lobsters this season, I did not can as many as I have in former years." Another says: "I think the pack of lobsters this season was much smaller than last. The lobsters were larger this year than for several years."

A lobster fisherman writes, November 17, 1890, that "the whole catch of lobsters for 1890 is about two-thirds of the catch of 1889, but prices have been better. The fishermen in this section sold lobsters in 1889 for three and one-half to four cents each, and from July to the present time they bring seven to eight cents. The fishermen find them scarce at the present time, and the average catch is about fifteen smack lobsters (10½ inches long) out of forty-five lobster traps."

There are now three lobster pounds in the State, and about 200,000 lobsters are now stored in them for winter use.

MACKEREL.

This fish seems to be growing less and less each year as will be seen by the report of the Boston Fish Bureau up to November 21, 1890.

The total catch up to November 21, 1890 was 15,071 barrels; in 1889, 17,239 barrels; in 1888, 40,769 barrels; in 1887, 78,478 barrels; in 1886, 80,315 barrels; in 1885, 330,033 barrels, and in 1884, 422,187 barrels.

Most of the mackerel caught this year were quite small and will number about 3's. What large ones have been caught in the vicinity of Monhegan and Matinicus were quite large and some of them weighed two and one-half pounds. They do not seem disposed to school, but occasionally show up just to prove that they have not entirely deserted us then suddenly disappear again.

PORGIES AND MENHADEN.

The sudden appearances of this fish last year and the present season after an absence of twelve years from our coast cannot be accounted for or, at least, it has not been.

Large numbers have been caught and made into oil this season. It is said that one steamer caught at one haul 2,200 barrels and that another had caught 25,000 barrels this season, and it is estimated that about 10,000,000 have been caught.

Four oil factories have operated this season and have used about 262,000 barrels porgies and made about 17,500 barrels of oil (fifty gallons to the barrel) worth twenty-one cents per gallon, also made about 8,000 tons scrap, worth $20 per ton. About 400 men were employed at average wages of $30 per month and board. About sixty of the men were foreigners and were employed at less wages.

Quite a number of steamers have been employed in the business, and some of them have been indited for violating the laws, and their cases are now pending. It has been quite difficult to catch these steamers, as most of them are from other states. They steam into our small bays and rivers and cast their seines, then steam out before a warden can board them or learn ther names. The small fishermen along the coast want these fish for bait and complain that they are being used up in so large numbers that they fear they will be exhausted.

A fisherman stated that he can sail through a school of these fish and that they will take no notice of him, but just as soon as he casts his seine down they sink.

This fish is now canned for food under the name of "Sea Trout," "Ocean Mackerel" and "Blueback Mackerel" and are said to quite good eating.

Chapter 306, section 1, Laws of 1889, should be made more definite as it does not seem to be well understood.

ALEWIVES.

The catch of this fish at Newcastle and Damariscotta this season is said to be about three-fourths of the number caught last year.

	1,155,675 were caught at Damariscotta Mills worth	$3,850
About	418,000 were caught in nineteen weirs and smoked, worth	3,145
"	15,000 were caught in nets and hedges, worth	225
"	20,000 were caught and given deserving widows, worth	100
	1,608,675	$7,320

In 1889, the catch of these fish at Waldoboro was about 160,000 and were sold for thirty-three and one-third cents per hundred. The largest catch in one day was 37,000. Four men were employed nine days each.

It was not thought best to catch any of them in 1890, as the fishways were not in suitable order for the fish to run up.

Six weirs on the Georges river, at South Warren, caught 60,000 1889, and 145,000 in 1890, and sold for about one dollar per hundred.

I have not been able to get the number of alewives caught at Warren village in 1889, but learn that the net proceeds for that year was $893.87, and for 1890 about the same as 1889.

SMELTS.

In concluding I would call attention to the recommendation made by me two years since relating to smelts.

This little fish is caught in weirs and in large quantities in this State and shipped to Boston, New York and Philadelphia, at a profit in the fall and winter.

"Section 5th, Laws 1887, provides that no smelts caught in such weirs after the first day of April shall be sold or offered for sale in this State, nor shall smelts caught in any

manner between the first day of April and the first day of October following."

It will be seen by the above that no smelts can be sold in this State after April 1st, caught in any manner except by hook and line.

Many complaints have been made to me by people that could not get smelts to eat unless they were made liable to a fine, as the ice seldom leaves our bays and brooks in season for smelts to come up before April 25th, and it would seem that the time should be extended for taking smelts in the spring by dip-net to May 1st. It was formerly May 20th, but was changed to suit the weir men, and certainly it would look hard that the spring fishermen should be entirely shut off that the fall fishermen should gain.

Large quantities of smelts were caught in dip nets last spring and left to lay on the ground to rot, when they might have been sold for $2.00 or more per bushel if allowed to be sold. Therefore I would recommend that dip-nets may be used up to May 1st, and that smelts caught in this State may be sold up to that time.

Respectfully submitted,

B. W. COUNCE.

COMMISSIONERS OF FISHERIES.

The following list of the Commissioners of Fisheries of the United States, the several states and territories, and of the Canadian provinces, has been compiled from information recently obtained by the secretary from first hands, and is believed to be full and accurate:

Dominion of Canada—John Tilton, deputy minister of fisheries, Ottawa, Ont.

Province of New Brunswick—W. H. Venning, inspector of fisheries, St. John.

Province of Nova Scotia—W. H. Rogers, inspector, Amherst; A. C. Bertram, assistant inspector, Amherst.

Province of Prince Edward Island—J. H. Duvar, inspector, Alberton.

Province of Quebec—W. Wakeham, inspector, Lower St. Lawrence and Gulf division, Gaspe basin.

Province of British Columbia—Thomas Mowat, inspector, New Westminster.

Province of Manitoba and Northwest Territories—Alex. McQueen, inspector, Winnipeg, Man.

The United States—Professor G. Brown Goode, Washington, D. C.; assistant commissioner, J. H. Kidder. Assistants in charge: fish culture, Marshall McDonald; scientific inquiry, Richard Rathbun; statistical inquiry, R. Edward Earle.

Alabama—Col. D. R. Huntley, Madison; Hon. Charles S. G. Doster, Prattville.

Arkansas—H. H. Rottaken, president; J. W. Calloway and W. B. Worthen, all of Little Rock.

Arizona—J. J. Gosper, Prescott; Richard Rule, Tombstone; J. H. Taggart, business manager, Yuma.

California—T. J. Sherwood, Marysville; Joseph D. Redding, San Francisco; J. D. Harvey, Los Angeles.

Colorado—G. F. Whitehead, Denver; E. V. Bogart, superintendent.

Connecticut—Dr. William M. Hudson, Hartford; Robert G. Pike, Middletown; James A. Bill, Lyme.

Dakota—No commission.

Delaware—Elwood R. Norny, Odessa; Dr. E. G. Shortlidge, assistant and superintendent of hatcheries, Wilmington.

Florida—No commission.

Georgia—Hon. J. T. Henderson, commissioner of agriculture, Atlanta; Dr. H. H. Cary, superintendent of fisheries, Lagrange.

Illinois—N. K. Fairbanks, president, Chicago; S. P. Bartlett, secretary, Quincy; Major George Brenning, Centralia.

Indiana—Enos B. Reed, Indianapolis.

Iowa—E. D. Carlton, Spirit Lake; Ole Bjorensen, superintendent of hatchery, Spirit Lake.

Kansas—S. Fee, Wamego.

Kentucky—William Griffith, president, Louisville; P. H. Darby, Princeton; John B. Walker, Madisonville; Hon. J. C. Walton, Munfordville; Hon. John A. Steele, Versailles; W. C. Prince, Dansville; Dr. W. Van Antwerp, Mt. Sterling; Hon. J. M. Chambers, Independence; A. H. Goble, Catlettsburg; J. H. Mallory, Bowling Green.

The commission has been without funds for about four years and consequently no work has been done.

Maine—E. M. Stilwell, Bangor; Henry O. Stanley, Dixfield, commissioners of fish and game. B. W. Counce, Thomaston, commissioner of sea and shore fisheries.

Maryland—G. W. Delawder, Oakland; Dr. E. W. Humphreys, Salisbury.

Massachusetts—Frederick W. Putnam, Cambridge; Edward A. Brackett, Winchester; Edward H. Lathrop, Springfield.

Michigan—John A. Bissell, Detroit, president; Dr. J. C. Parker, Grand Rapids, Herschel Whitaker, Detroit; W. D. Marks, superintendent, Paris; A. J. Kellogg, secretary, Detroit; William A. Butler, Jr., treasurer, Detroit.

Minnesota—Robert Ormsby Sweeny, St. Paul, president; Niles Carpenter, Rushford; William Bird, Fairmount; S. S. Watkins, superintendent.

Mississippi—No commission.

Missouri—H. M. Garlichs, chairman, St. Joseph; J. L. Smith, Jefferson City; H. C. West, St. Louis; A. P. Campbell, secretary, St. Joseph; superintendents: Philip Kopplin, Jr., St. Louis; Elias Cottrill, St. Joseph.

Montana—No commission.

Nebraska—W. L. May, Fremont; R. R. Livingston, Plattsmouth, B. E. B. Kennedy, Omaha; M. E. O'Brien, South Bend, superintendent.

Nevada—W. M. Cary, Carson City.

New Mexico—Has no commission, but Governor Ross intends to have one established. Hon. E. S. Stover, Albuquerque, has given the subject much attention, and will impart information.

New Hampshire—George W. Riddle, Manchester, chairman; E. B. Hodge, Plymouth; John H. Kimball, Marlboro'; E. B. Hodge, superintendent.

New Jersey—Richard S. Jenkins, Camden; William Wright, Newark; F. M. Ward, Newton.

New York—Hon. R. B. Roosevelt, president, 120 Broadway, New York; General R. U. Sherman, New Hartford, Oneida county; E. G. Blackford, treasurer, Bedford bank, Brooklyn; William H. Bowman, Rochester, Monroe county; A. S. Joline, Tottenville, Richmond county; E. G. Blackford, shell-fish commissioner, Fulton market, New York; clerk of the board, Edward P. Doyle, Potter building, New York room 110; superintendents: Seth Green, Rochester; Fred Mather, Cold Spring Harbor; Monroe A. Green, Mumford; James A. Marks, Bloomingdale.

North Carolina—W. J. Griffin, Elizabeth City, chairman; R. B. Watson, Englehard; W. T. Caho, Bayborough.

Ohio—C. V. Osborn, Dayton, president; J. H. Laws, Cincinnati; John Hofer, Bellaire; A. C. Williams, Chagrin Falls, secretary; E. D. Poller, Toledo.

Oregon—F. C. Reed, Clackamas, president; R. C. Campbell, Ranier; E. P. Thompson, Astoria.

Pennsylvania—Henry C. Ford, president, 524 Walnut street, Philadelphia; James V. Long, 205 Ridge avenue, Allegheny City; H. C. Demuth, secretary, Lancaster; S. B. Stilwell, Scranton; A. S. Dickson, Meadville; W. L. Powell, Harrisburg.

Rhode Island—John H. Barden, president, Rockland; Henry T. Root, treasurer, Providence; Wm. P. Morton, secretary, Johnston —commissioners inland fisheries. James C. Collins, North Provi-

dence; N. P. S. Thomas, North Kingstown; James M. Wright, Foster—shell-fish commissioners.

South Carolina—Hon. A. P. Butler, Columbia, commissioner of agriculture, *ex-officio*, fish commissioner.

Tennessee—W. W. McDowell, Memphis; H. H. Sneed, Chattanooga; Edward D. Hicks, Nashville.

Texas—Commission abolished.

Utah—No commission. A. Milton Musser, acting fish commissioner, Salt Lake City.

Vermont—Frank Atherton, Waterbury; Herbert Brainerd, St. Albans.

Virginia—Col. Marshall McDonald, Washington, D. C.

West Virginia—C. S. White, president, Romney; F. J. Baxter, treasurer, Sutton; J. H. Miller, secretary, Hinton.

Wisconsin—The Governor (*ex-officio*); Philo Dunning, president, Madison; C. L. Valentine, secretary and treasurer, Janesville; Mark Douglass, Melrose; A. V. H. Carpenter, Milwaukee; Calvert Spensley, Mineral Point; E. S. Miner, Sturgeon Bay; James Nevin, superintendent, Madison.

Wyoming Territory—Otto Gramm, Laramie. (Dr. W. N. Hunt, Cheyenne, is commissioner for Laramie county and B. F. Northington, Rawlins, is commissioner for Carbon county.

APPENDIX.

U. S. Commission of Fish and Fisheries.

WASHINGTON, D. C., November 4, 1889.

Hon. B. W. Counce, Commissioner of Sea and Shore Fisheries, Thomaston, Maine:

DEAR SIR: I send you, herewith, several tables relating to the fisheries of Maine, which, with one exception, I think, will furnish you with all the information you ask for. The compilation of the statistics of the fisheries for 1889 is not completed; the figures can be sent you, if you require them, at a later date, but probably not during the present calendar year.

I will say that the tables are intended to include only the sea fisheries; the inquiries have been extended up the rivers generally only so far as tide water. They include the fisheries of the St. Croix river to Calais; the Penobscot to Bangor; the Sheepscot to Wiscasset, and the Kennebec to Woolwich, five miles above Bath. All the other streams, which are of minor importance to those above mentioned, have been investigated and all the fisheries are included. The tables, as you will see, contain statistics for 1887 and 1888; the tables relating to the lobster fishery, including the canning of lobsters, however, are complete for the three years, 1887, 1888 and 1889.

I enclose explanations of the tables which you will probably find it expedient to publish in connection with them.

Yours, very respectfully,

J. W. COLLINS,

Assistant in Charge of Division of Fisheries.

Explanations of Tables Relating to the Statistics of the Fisheries of the State of Maine.

Table I shows the number of persons employed in various capacities, as vessel fishermen, shore fishermen, factory hands, curers, packers, etc., in the fisheries of Maine in 1887 and 1888. The special feature of this table is the division of the men employed on boats and vessels, whereby those engaged in fishing proper and those employed on freighters or "running boats" are shown separately.

A comparison of the fishery statistics of Maine for 1880 and 1888 shows an increase in the number of persons employed of 4,100. This increase is found wholly in the shore fishermen, factory hands, curers, packers, etc., since there has been a decrease in the number of vessel fishermen amounting to 649 persons.

Table II presents an exhibit of the apparatus and capital employed in the fisheries of Maine in 1887 and 1888. It shows the number, tonnage and value of vessels; the number and value of boats, and the number and value of the various forms of apparatus of capture in the vessel and shore fisheries; also the value of shore property and amount of cash capital. The total for 1887 amounted to $3,170,243, and for 1888 to $3,022,957. There appears to have been a considerable decrease in the valuation of property employed since 1880, at which time it amounted to $3,375,994. This difference is due almost entirely to the marked decrease in the fleet of vessels employed in the fisheries; the amount and value of apparatus employed in the shore fisheries showing a considerable increase over the returns for 1880. The fleet of vessels has decreased from 606, in 1880, to 410 in 1888, and is one of the most striking features connected with the fisheries of the State.

Table III presents in detail by species, and the condition in which the products were marketed, the quantities and values of fish and other fishery products taken by fishermen of Maine in 1887 and 1888. In the quantity and value of products there has been a decrease amounting to upwards of a million dollars from 1880 to 1888, which is entirely due to the decrease in the vessel fisheries,

since the shore fisheries, and particularly the lobster fishery, show an increase in recent years. The catch in 1880 amounted to 202,048,449 pounds, valued at $3,614,178; in 1888 the catch was 132,929,594 pounds with a value, at prices paid the fishermen of $2,292,043.

Table IV shows by towns the shore lobster fishery of Maine for 1887, 1888, and 1889. The products as compared with 1880 show a large increase in the three years mentioned which is partially attributable to the greater number of persons employed in the fishery as noticed in Table 1.

In addition to the lobsters taken in the shore fishery, mention should be made and additional credit given for the amounts taken by vessels. In 1887 the vessel lobster catch amounted to 508,828 pounds worth $16,401, and in 1888 to 424,912 pounds, valued at $12,360.

The importance of the lobster fishery on the coast of Maine and the marked attention which has been given to it by the Fish Commissioners and legislature of the State have been considered sufficient to warrant the presentation of the facts relating to this industry in the fullest detail.

Table V shows by counties the extent of the lobster canning industry in Maine during 1887, 1888 and 1889. The table shows the quantities and values of fresh lobsters utilized, the number of cans of lobsters packed and the value of the canned products, together with the number of canneries in operation during each year, the number of employes in same, and the amount of investment.

It should be borne in mind that but in few cases are canneries devoted entirely to the lobster industry. In many instances the canning of lobsters is only incidental to the preparation of sardines, etc. In the preparation of this table an estimate has been made of the value of the property and number of persons devoted exclusively to the canning of lobsters. This estimate is believed to be as accurate as it is possible to make it, since the information from which it has been compiled is very complete and detailed.

Table I—*Table showing the number of persons employed in various capacities in the fisheries of Maine during the years 1887 and 1888.*

Prepared by the United States Fish Commission.

How Engaged.	1887.	1888.
On fishing vessels	3,293	2,878
On vessels transporting	76	103
On boats transporting	143	149
In shore fisheries	6,089	6,140
On shore—in canneries, factories, etc	5,722	5,901
Total	15,323	15,171

Table II—*Showing the apparatus and capital invested in the fisheries of Maine in the years 1887 and 1888.*

Prepared by the United States Fish Commission.

Designation.	1887.		1888.	
	No.	Value.	No.	Value.
Vessels fishing (14,834.41 tons '87 13,851.99 tons '88)	386	793,715	371	629,915
Outfit	–	218,525	–	192,569
Vessels transporting (5747.76 tons '87 6053.65 tons '88)	32	39,350	39	59,500
Outfit	–	6,480	–	7,885
Boats*	5,537	201,112	5,810	209,117
Boats transporting only	87	23,170	97	25,920
Vessel fisheries:				
Seines	139	69,500	80	40,000
Gill-nets	897	9,025	1,057	10,636
Trawls	1,076	78,132	1,090	77,420
Lines	4,203	13,824	4,118	14,102
Pots	4,750	4,750	5,150	5,150
Dredges	14	168	7	84
Harpoons	27	810	28	840
Rakes	34	21	28	17
Shore fisheries:				
Weirs	238	43,280	287	55,772
Trap-nets	344	34,045	343	33,720
Pound-nets	27	13,125	32	14,855
Gill-nets	2,926	27,796	3,271	29,929
Seines	70	5,795	93	7,025
Eel-pots	136	153	135	148
Eel and flounder spears	313	327	283	294
Lobster-pots	108,549	98,061	107,482	96,294
Fyke-nets	135	580	135	580
Bag-nets	257	10,720	280	11,760
Hand-lines and trawl-lines	–	13,590	–	13,698
Clamming apparatus	–	1,693	–	1,671
Miscellaneous nets	123	408	106	357
Dredges	87	1,131	102	1,297
Shore property	–	779,852	–	766,716
Cash capital	–	690,100	–	716,600
Total	–	3,179,233	–	3,023,921

* Not including those on vessels.

Table III—*Showing by species and condition in which sold the quantities and values of fish and other fishery products credited to the State of Maine in 1887 and 1888.*

Prepared by the United States Fish Commission.

Species.	Pounds.		Value	
	1887.	1888.	1887	1888.
Mackerel, fresh	1,486,934	573,509	$ 79,100	$40,703
Mackerel, salted	3,023,000	1,121,000	159,784	73,900
Cod, fresh	7,790,221	7,473,431	151,630	146,141
Cod, salted	18,614,702	16,359,434	475,863	450,950
Halibut, fresh	626,807	549,347	39,243	34,025
Halibut, salted		1,000	-	50
Haddock, fresh	5,567,168	5,693,979	84,192	94,422
Haddock, salted	1,666,748	1,482,498	22,644	21,556
Hake, fresh	3,104,258	2,993,637	28,480	26,251
Hake, salted	5,478,972	5,977,041	62,515	74,904
Pollock, fresh	692,843	922,303	7,043	9,474
Pollock, salted	995,395	1,226,570	10,413	12,943
Cusk, fresh	456,047	442,582	5,288	5,372
Cusk, salted	110,041	136,059	1,099	1,412
Red Snappers, fresh	129,500	188,809	4,069	5,238
Groupers, fresh	8,400	16,500	231	462
Herring, fresh	23,946,855	28,994,454	96,239	112,008
Herring, salted	3,731,800	4,928,000	37,346	54,626
Herring, smoked	2,012,800	2,207,745	47,030	73,315
Alewives, fresh	897,042	974,399	7,435	8,343
Alewives, salted	779,960	715,450	13,581	14,319
Alewives, smoked	229,279	244,140	7,140	7,441
Menhaden, fresh	702,000	3,121,200	1,765	14,001
Menhaden, salted		2,000	-	18
Shad, fresh	1,087,720	807,256	27,010	22,868
Shad, salted	8,000	32,000	320	1,500
Cunners, fresh	52,200	71,647	1,665	2,058
Flounders, fresh	658,525	828,995	11,778	15,590
Eels, fresh	107,285	127,140	9,105	10,090
Swordfish, fresh	234,721	440,523	10,679	18,691
Salmon, fresh	185,637	205,149	36,398	41,209
Smelt, fresh	1,205,150	1,279,550	87,977	94,927
Tom-cod, or frost fish, fresh	477,300	474,560	3,309	3,772
Butterfish, fresh	5,000	22,000	75	360
Bream (*Sebastes Marimes*), fresh	25,000	26,000	255	270
Catfish (*Anarrhicas*), fresh	6,000	6,200	120	124
Wastefish, fresh	484,000	446,200	1,782	1,785
Clams (soft), fresh	1,886 540	1,863,950	75,536	76,665
Clams (soft), salted	4,201,260	4,142,800	152,954	151,000
Quohaugs, fresh	800	800	100	100
Scallops, fresh	221,132	180,006	13,994	11,278
Mussels, fresh	6,450	6,540	189	193
Lobsters, fresh	22,916,642	21,694,731	512,044	515,880
Sea-weed	14,500,000	12,700,000	7,115	6,215
Cod tongues	267,630	232,812	6,022	4,646
Cod and hake sounds, green	113,618	118,941	22,733	9 516
Oil (fish, whale, porpoise and seal)	679,110	676,707	21,586	21,432
Total	131,379,591	132,929,594	2,344,906	2,292,043

Note —This table does not include the quantity and value of canned goods and other products of canneries and factories, as oil, fish scrap, etc.

Table IV—*Showing by Townships the Extent and Value of the Lobster Fishery of Maine in 1887, 1888 and 1889. Prepared by the United States Fish Commissioner.*

Locality.	Number of Fishermen			Number of Boats.			Value of Boats			Number of Traps			Value of Traps.		
	1887.	1888	1889	1887	1888.	1889.	1887.	1888	1889.	1887.	1888	1889	1887.	1888	1889.
Robbinston	6	6	5	4	4	4	$110	$105	$100	170	170	200	$170	$170	$200
Perry	3	3	3	3	3	3	60	60	60	160	120	150	160	120	150
Eastport	6	8	9	7	8	9	170	185	200	240	325	375	144	195	225
Pembroke	5	3	5	5	3	5	60	36	60	200	120	205	150	90	154
Lubec	16	17	17	14	15	15	480	510	510	988	1,028	1,045	973	1,013	1,030
Trescott	12	12	12	12	12	12	300	300	300	570	540	570	579	540	570
Cutler	22	16	18	15	9	18	293	176	353	1,096	505	1 054	1,090	500	1,014
Machiasport	20	15	23	15	11	16	310	220	320	900	600	980	1,050	750	1,150
Jonesboro'	12	18	19	14	18	22	650	400	945	710	840	1,135	710	840	1,135
Jonesport	75	73	95	78	73	98	5,170	4,335	6,280	5,200	3,886	6,990	5,200	3,886	6,990
Addison	32	31	43	29	28	42	1.125	1,090	1,580	2,240	1,240	2,270	1,790	990	1,916
Harrington	17	15	15	17	15	15	595	525	525	1,090	680	960	98	612	864
Millbridge	25	26	42	28	29	45	1,950	2,000	2,800	2,000	2,080	3,360	1,400	1,456	2,352
Steuben	26	25	32	27	26	33	700	675	850	1,955	1,870	2,400	1,212	1,159	1,488
Gouldsboro'	104	99	106	92	87	93	2,900	2,730	2,335	8,345	7,527	8,415	6,754	6,016	6,759
Sullivan	5	5	8	5	5	8	125	125	200	450	475	613	450	475	613
Hancock	2	3	2	2	3	2	70	95	70	150	190	200	150	190	200
Lamoine	3	2	7	4	3	7	75	65	115	230	110	290	230	110	290
Eden	8	12	12	8	12	12	160	240	240	525	735	825	525	735	825
Mt Desert	10	9	11	7	6	8	111	96	121	590	480	610	529	434	534
Tremont	23	26	29	22	23	30	1,280	1,385	1,880	1,595	1,735	1,890	1,557	1,697	1,810
Cranberry Isles	11	12	9	10	12	9	350	400	310	1,540	1,680	1,270	1,500	1,650	1,250
Blue Hill	4	3	10	4	3	10	160	120	386	300	250	660	300	250	660
Brooklin	21	26	36	19	24	33	805	1,015	1,250	1,455	1,785	2,354	1,455	1,785	2,354

Table IV—*Continued.*

Locality.	Number of Fishermen.			Number of Boats			Value of Boats.			Number of Traps.			Value of Traps		
	1887.	1888.	1889.	1887	1888	1889.	1887.	1888.	1889	1887.	1888.	1889.	1887.	1888.	1889.
Deer Isle	174	181	191	189	192	204	$16,284	$16,380	$18,190	12,840	13,390	14,105	$12,815	$13,315	$14,080
Isle au Haut	50	51	56	55	58	59	4,650	4,860	5,130	3,050	3,075	3,350	3,050	3,075	3,350
Swan's Island	70	70	86	68	68	82	7,855	8,150	9,750	6,790	6,820	8,220	6,790	6,820	8,220
Sedgwick	1	1	2	1	1	2	100	100	120	65	65	90	65	65	90
Brooksville	7	9	8	7	9	8	195	382	392	365	415	365	365	415	365
Castine	3	6	7	3	6	7	75	150	175	65	110	133	65	110	133
Penobscot	1	2	3	1	2	3	25	40	50	50	65	87	50	65	87
Verona	-	-	1	-	-	1	-	-	10	-	-	20	-	-	20
Stockton	5	5	5	5	5	5	100	100	100	100	100	100	50	50	50
Searsport	5	5	5	5	5	5	100	100	100	200	200	300	100	100	150
Belfast	12	6	14	6	3	7	150	75	175	300	150	345	150	75	173
Islesboro'	23	23	23	24	24	24	360	360	360	805	805	805	805	805	805
Northport	10	10	13	7	7	10	105	105	150	200	200	256	200	200	256
Lincolnville	1	1	1	1	1	1	15	15	15	50	50	50	50	50	50
Camden	4	5	4	4	5	4	105	135	105	300	300	275	175	175	160
Rockland	20	20	20	20	20	20	600	600	600	1,000	1,000	1,000	1,000	1,000	1,000
Matinicus	40	44	43	31	33	32	2,130	2,150	2,130	2,560	2,800	2,700	2,560	2,800	2,700
Vinalhaven	75	75	80	121	121	127	4,583	4,583	4,753	5,300	5,300	5,775	3,975	3,975	4,331
North Haven	35	35	35	36	36	36	1,000	1,000	1,000	2,000	2,000	2,000	1,000	1,000	1,000
South Thomaston	25	35	35	50	70	70	1,250	1,750	1,750	1,000	1,500	1,500	1,000	1,500	1,500
St. George	70	70	70	41	42	42	2,755	2,770	2,770	2,445	2,590	2,630	2,423	2,495	2,540
Cushing	9	9	9	9	9	9	160	160	160	450	485	485	450	485	485
Friendship	50	50	46	47	47	43	3,500	3,500	3,150	2,400	2,500	2,850	2,400	2,500	2,850
Waldoboro'	19	19	19	19	19	19	190	190	190	950	950	950	950	950	950
Bremen	28	28	28	40	40	35	1,715	1,715	945	1,650	1,650	1,650	1,650	1,650	1,650
Bristol	126	126	126	126	126	125	5,825	5,825	4,875	4,560	4,560	4,325	4,560	4,560	4,325

Monhegan	30	30	30	50	50	50	3,585	3,585	3,585	1,200	1,200	1,200	1,200	1,200	1,200
Wiscasset	1	2	3	1	2	3	20	40	50	35	50	50	30	40	40
Newcastle and Edgecomb	10	10	10	10	10	10	200	200	200	150	150	150	120	120	120
Boothbay	49	60	61	50	60	62	2,500	3,000	3,200	2,500	3,000	3,310	2,000	2,400	2,640
Southport	26	25	24	30	30	31	1,400	1,400	1,425	1,200	1,200	1,240	960	960	1,012
Georgetown	32	32	37	32	32	37	960	960	1,110	1,280	1,280	1,485	1,024	1,024	1,187
Phippsburg	27	27	27	24	24	24	720	720	720	1,080	1,080	1,080	864	864	864
Harpswell	113	114	114	105	107	106	2,340	2,420	2,405	4,380	4,420	4,406	3,464	3,516	3,498
Islands in Casco Bay†	121	114	114	104	101	102	2,575	2,425	2,445	4,600	4,320	4,440	3,680	3,458	3,516
Brunswick	10	10	10	10	10	10	250	250	250	380	380	380	304	304	304
Freeport	16	14	12	14	12	10	420	360	300	600	560	450	480	448	360
Portland	6	6	6	6	6	6	90	90	90	240	231	246	192	186	197
Cape Elizabeth	16	16	16	16	16	16	240	240	248	460	460	472	216	216	224
Biddeford	34	33	33	34	33	33	1,360	1,320	1,320	3,800	3,700	3,680	3,040	2,960	2,942
Kennebunkport	44	43	43	29	28	28	520	500	500	3,480	3,460	3,384	2,784	2,720	2,716
Wells	9	9	11	9	9	11	180	180	220	510	510	560	408	408	448
York	19	19	19	16	16	16	320	320	320	810	840	770	648	672	617
Kittery	12	12	12	12	12	12	240	240	240	650	650	650	900	900	900
Totals	1,906	1,967	2,080	1,909	1,939	2,096	$89,756	$90,333	$97,563	109,549	107,482	121,140	98,061	96,294	108,668

Table IV—*Continued.*

Locality.	Value of Accessories and Shore Property.			Pounds of Lobsters.*			Value of Lobsters.		
	1887.	1888.	1889.	1887.	1888.	1889.	1887.	1888.	1889.
Robbinston	$42	$42	$24	6,000	6,050	7,500	$200	$202	$250
Perry	18	18	15	25,250	17,200	22,500	465	330	450
Eastport	-	-	-	28,800	18,000	29,025	430	300	585
Pembroke	60	40	60	33,450	18,600	27,495	540	300	550
Lubec	95	105	105	221,300	208,908	215,800	2,692	2,615	2,675
Trescott	130	130	130	156,000	148,000	150,000	5,460	5,180	5,250
Cutler	243	212	265	155,575	121,890	230,000	2,031	2,083	3,312
Machiasport	215	90	225	120,000	67,500	115,000	2,487	1,350	2,300
Jonesboro'	180	245	260	174,880	239,904	279,033	2,334	3,051	3,748
Jonesport	415	536	518	2,951,364	3,144,330	3,736,660	33,513	41,463	56,016
Addison	350	350	460	656,640	444,166	563,300	7,223	5,330	7,323
Harrington	200	180	180	313,083	136,700	248,077	3,757	2,734	3,225
Millbridge	312	322	724	648,000	303,846	1,012,000	8,700	3,950	15,400
Steuben	166	160	204	686,400	602,100	615,400	8,580	7,500	8,000
Gouldsboro'	587	562	593	1,150,481	984,879	1,203,440	29,929	29,290	33,188
Sullivan	40	40	90	41,100	45,960	85,270	1,032	1,150	1,960
Hancock	25	38	25	10,500	13,200	20,665	300	330	500
Lamoine	38	15	38	25,200	13,480	35,467	540	288	830
Eden	235	285	305	48,825	70,250	78,583	2,010	2,690	3,600
Mount Desert	36	32	42	33,150	33,950	43,840	1,186	1,200	1,590
Tremont	770	805	1,435	178,430	219,487	338,885	4,685	5,635	8,960
Cranberry Isles	90	100	75	66,000	73,500	58,500	2,200	2,450	1,950
Blue Hill	28	20	65	51,800	41,625	153,750	1,036	832	3,075
Brooklin	227	274	348	299,375	178,273	333,375	4,790	2,995	5,369

Deer Isle	$1,610	$1,680	$1,780	3,838,957	4,494,312	4,068,816	67,765	71,170	77,665
Isle au Haut	1,050	1,075	1,170	785,714	947,142	1,213,320	26,900	32,550	35,800
Swan's Island	1,600	1,595	1,824	618,325	570,150	658,060	16,950	16,050	20,036
Sedgwick	10	10	15	16,250	19,500	22,750	325	390	485
Brooksville	156	172	164	31,675	39,715	30,250	1,267	1,390	1,210
Castine	18	36	42	5,050	10,500	10,800	170	350	360
Penobscot	5	5	10	11,140	13,600	16,600	279	340	415
Verona	-	-	2	-	-	2,400	-	-	96
Stockton	25	25	25	9,000	10,000	9 000	450	500	450
Searsport	25	25	25	20,000	20,000	24,000	1,000	1,000	1,200
Belfast	110	80	120	40,000	23,500	47,000	2,000	1,175	2,350
Islesboro'	125	125	70	297,000	200,000	205,000	11,212	10,000	6,875
Northport	50	50	63	22,000	15,000	24 000	500	750	465
Lincolnville	10	10	10	6,100	2,500	8,000	117	125	212
Camden	30	30	30	88,000	64,000	46,800	1,925	1,800	946
Rockland	220	220	220	500,000	400 000	375,000	13,250	12,000	11,250
Matinicus	120	120	115	268,000	188,000	344,000	11,400	8,600	11,025
Vinalhaven	250	250	250	845,000	600,000	950,000	25,000	24,000	28,375
North Haven	700	700	700	800,000	350,000	550,000	18,250	14,000	13,750
South Thomaston	250	250	250	410,000	500,000	450,000	9,675	15,000	11,925
St George	1,260	1,260	1,260	508,000	616,000	727,000	17,740	18,560	18,338
Cushing	50	50	50	40,000	60,000	72,000	1,200	1,800	1,912
Friendship	250	250	250	195,000	300,000	265,000	5,812	10,500	7,587
Waldoboro'	1,000	1,000	1,000	190,000	150,000	190,000	5,300	5,250	5,300
Bremen	80	80	80	250,000	180,000	264,000	6,725	6,300	7,080
Bristol	1,800	1,800	1,800	865,000	768,000	785,000	25,797	26,880	22,187
Monhegan	240	240	240	140,000	140,000	120,000	5,600	7,000	6,000
Wiscasset	10	10	10	12.000	11,000	11,000	320	320	340
Newcastle and Edgecomb	60	60	60	18,000	18,500	18,850	720	740	754
Boothbay	450	480	480	240.000	239,400	236,300	7,985	7,980	7,877
Southport	250	250	250	55,000	68,000	68,000	2,000	2,500	2,600
Georgetown	300	300	300	125,000	125,000	153,000	3,600	3,600	4,910
Phippsburg	250	250	250	122.000	120,000	117,500	3,200	3,200	3,500
Harpswell	1,750	1,750	1,750	988,000	955,000	930,000	21,900	21,700	21,785
Islands in Casco Bay†	1,830	1,960	1,940	1,003,000	932,000	889,100	23,880	22,740	21.572
Brunswick	100	100	100	70,000	67,000	62,000	2,000	1,917	1,860
Freeport	150	150	125	75,000	70,000	57,000	2,300	2,200	1,900
Portland	50	50	50	35.000	34,000	32,500	1,200	1,200	1,200
Cape Elizabeth	200	200	200	185,000	180,000	173,000	5,550	5,400	5,190

Table IV—*Concluded.*

Locality.	Value of Accessories and Shore Property.			Pounds of Lobsters.*			Value of Lobsters		
	1887.	1888.	1889.	1887.	1888	1889.	1887.	1888.	1889.
Biddeford	$1,000	$1,000	$1,000	230,000	245,000	258,000	$7,800	$8,400	9,060
Kennebunkport	800	660	660	178,000	175,000	176,000	4,925	5,005	5,015
Wells	125	125	125	39,000	38,200	41,000	1,090	1,190	1,240
York	145	135	135	96,000	103,000	88,000	2,600	2,900	2,580
Kittery	200	200	200	55,000	55,000	58,000	1,800	1,800	1,900
Totals	23,216	23,419	25,386	22,407,814	21,269,819	24,452,111	495,643	503,520	556,733

* The quantities given represent the weight of the lobsters as taken from the water.

† Including Great Chebeag, Long, Peak's and Cousin's Islands.

NOTE—In addition to the above figures, which represent exclusively the shore fishery, a number of vessels engaged in the industry to a greater or less extent. These in 1887 carried 4,690 traps, valued at $4,675, and caught 508,828 pounds of lobsters, valued at $16,401; and in 1888 employed 4,970 traps, worth $4,925, and took 424 912 pounds of lobsters, valued at $12,360.

Table V—*Showing, by counties, the extent of the lobster canning industry in the State of Maine in the years 1887, 1888 and 1889. Prepared by the United States Fish Commission.*

County.	No of canneries in operation.			No. of factory hands.			Investment.					
							Value of buildings, machinery, etc.			Cash capital.		
	1887.	1888.	1889.	1887.	1888.	1889.	1887.	1888.	1889.	1887.	1888	1889.
Washington	7	2	7	190	65	177	$20,450	$7,500	$18,100	$31,200	$ 9,500	$24,400
Hancock	5	3	5	159	119	157	6,450	2,950	9,200	21,050	13,250	25,500
Knox	2	–	4	109	–	149	8,250	–	12,750	8,000	-	16,750
Lincoln	2	1	3	64	28	94	6,750	5,000	9,150	7,800	4,800	9,300
Total	16	6	19	522	212	577	41,900	15,450	49,200	68,050	27,550	75,950

County.	Pounds of lobsters bought from fishermen.			Value to fishermen.			No. of one and two pound cans of lobsters prepared.			Value of canned goods to canners.		
	1887.	1888	1889.	1887.	1888.	1889	1887.	1888.	1889.	1887.	1888.	1889.
Washington	*3,155,562	*341,053	*2,451,303	$35,496	$5,116	$30,988	†584,456	†64,800	†467,000	$55,648	$ 8,775	$60,654
Hancock	1,676,802	327,825	1,073,323	20,035	5,006	13,258	351,077	80,335	227,009	43,884	10,862	29,320
Knox	931,320		1,772,620	11,176	–	22,158	152,060	–	275,571	21,566	–	40,087
Lincoln	394,524	195,000	455,408	4,932	2,430	5,688	77,713	33,360	76,951	9,453	4,150	10,424
Total	6,158,208	863,878	5,752,654	71,639	12,552	72,092	1,165,306	178,495	1,046,531	130,551	23,787	140,485

*Of these quantities, 1,100,211 pounds, 151,578 pounds and 386,526 pounds, respectively, were purchased from fishermen of New Brunswick.

†Of these quantities, 209,040 cans, 28,800 cans and 73,440 cans, respectively, were prepared from lobsters obtained in New Brunswick.

OFFICE OF THE SUPERINTENDENT OF FISHERIES,
St. John's, N'f'l'd, November 17, 1890.

Sir:—Yours of 27th to hand. In reply I have the pleasure of informing you that the apparatus I use for propagation of codfish is the automatic siphon system on the one side of the hatching room, and an improved system of Clark's apparatus on the other side. I have also a few of McDonald's boxes, but these I don't approve of on account of the surface water cannot be diverted. The glass jars 9x15 inches which I use for incubators on one side of the hatching room is better. These are the same as is used in Wood's Holl which I suppose you are acquainted with. The Clark system which consist of a long box 13x2½x1 feet, I have divided into 24 compartments, and two inlet and two outlet rooms for the water. It has a slope of one-fourth inch to a foot. In each compartment is placed a box 12x12x9 inch, with a bottom covered with brass wire cloth. These boxes or incubators are fastened to the partitions in the one end with hinges. When the water is turned on, the free end of the incubators floats up about four inches above the level of the box. In order to get these incubators to work up and down for the purpose of getting a vertical as well as a horizontal motion in the water and for in this way to get rid of the dead corner, I have invented a mechanism which consist of a long wooden bar or lever, in which I have iron bolts fastened across that catches the end of the incubators and presses them down regularly every two minutes. This lever I work automatically with the overflow water from the same apparatus. I consider these to be the best for codfish propagation. The stripping of the fish, fertilization of the ova etc., I anticipate you know all about. In fertilizing the ova I always use to mix the milt with a very little water first and immediately afterwards put the ova in along with the milt. The lobsters I hatch from the ova stripped from the lobsters brought to the canning establishments before they are thrown into the boiler. I generally have to collect them from factories a long way from the hatchery and carry them from five to eight miles over land and from eight to twenty miles by water afterwards, as the few factories in the vicinity of the hatchery cannot supply me with all I can work. The ova is scraped off the swimmerets of the lobsters with a spoon made for that purpose, or the handle of a teaspoon will also do. The ova I

convey on crates (fifteen inch square and one inch high on which the bottom is covered with cotton cloth) to the hatchery. They are hatched in the same glass incubators as the codfish, and wants to be cleaned every day. This season we have up to this time hatched 17,100,000 codfish and 15,070,800 lobsters at the Dildo hatchery. In connection with the hatchery I have invented floating incubators for hatching lobsters in which this season has been hatched and planted 390,934,500 lobsters, making the grand hatch including the hatchery 406,005,300. These incubators are placed in the vicinity of the lobster canning establishment and thirty-six of those are worked by two men in two months. In each incubator I put one and one-half million of ova, and the loss of eggs when properly worked do not exceed twenty per cent, whereas in the apparatus used in the hatchery, we lose about thirty per cent and more, according to the distance I have to convey the ova. The floating incubators I have patented.

Any further information in regard to the propagation of cod or lobsters in the hatching at Dildo I shall only be glad to furnish you with, in case you should desire some information on certain points.

Yours respectfully,

AD. NIELSEN.

B. W. COUNCE, ESQ., THOMASTON.

AMERICAN SARDINES.

Maine's Great Industry of Packing Young Herring in Oil.—Processes of Preparing Fish for the Table.—The Various Oils Used.

The canning of small fish, that are sold as sardines has only been carried on in America about twelve years, but it has attained proper magnitude. The idea seems to have originated in France, where for a long time the people have been in the habit of packing small fish that would be virtually worthless for any other use, in oil. It is only, however, in quite recent time that the business in that country has amounted to much. In 1850 France produced 3,000,000 cans or boxes of sardines, while there are now seventy-two establishments there, the least of which turn out several millions of boxes annually. Other European countries also do considerable at it now, but France leads.

In 1865 a start was made in this country, a Maine man conceiving the belief that the almost countless number of small herring caught every year off that coast would make an admirable substitute for the real sardines. In 1867 an attempt to this end was made, but was eventually abandoned, it being impossible to get the herring flavor out of the would-be sardines. New York parties took it up later, and 1879 organized a company and began operations. Success attended the venture, and to-day the "sardine" canning industry is not the least important of "down East" enterprises.

The different processes gone through in fitting young herring for the table are can or box making, catching the fish, transporting to factory, cutting and dressing, salting, flaking, drying, frying, sorting and packing, can soldering, venting, cleaning and boxing. The bulk of the herring is caught by brush weirs although some fishermen adhere to the old way of torching, or "driving," as it is often called. The brush weir is built on a principal similar to all the weir traps, and pounds along the shore, the plan being to direct the fish toward the "bowl" by the use of long "leaders" and funnel-shaped

openings, and to prevent them from escaping by means of projecting curves or hooks, which carry them beyond the opening, or by stretching the net across the mouth of the weir after the fish have entered. Several kinds of weirs are employed in the fisheries at Eastport. These have names depending largely on their shape and the character of the shore and adjoining bottom on which they are built.

A "bar" weir is one that is located near a rock, ledge or bar that is usually exposed at half tide. It is so arranged that the fish shall pass over the bar and into the pocket at high water, and be effectually prevented from escaping by its exposure as the tide falls. The "shore" weir is usually built very near the land which answers as one side. It has a long leader running obliquely out from the shore, which directs the fish to the entrance of the bowl or pocket. A "channel" weir is built between two ledges or islands in such a way that all the herring passing between them are obliged to enter it. A patent weir has found much favor with the herring fishermen, for by its peculiar construction the fish may enter regardless of the direction in which they are moving. The brush weir, as its name implies, is built exclusively of brush and poles, carefully, ingeniously interwoven, and is very efficient. The cost of building weirs run from $40 to $900, according to kind, size and location.

The Maine law allows packers of sardines to resume operations April 15, from which time weir fishing is prosecuted to the following January. The fish are taken from the weirs by means of boat-seining; and is most successfully done in the night. Compacted in the seine, they are dipped out into boats with nets, while another way is to roll them into the boat at low water. They are taken to the canneries in sailboats or steamers. These canneries are located on some convenient wharf; are wooden structures, with large open platform, and cost from $2500 to $15,000, the average cost being about $4,000. Cutting and dressing is done chiefly by boys and girls from eight to fifteen years of age, who dexterously sever the head and tail, remove the intestines, and wash the body. A child cuts three to four barrels of ordinary-sized fish in a day. The price paid for cutting is about five cents a box. As it is desirable to have the fish cut as soon as possible, a large force is employed and the work is completed in a few hours when the children return home. The next process is salting. As soon as the fish are dressed they are taken in a small car into the salting room, where they

are thoroughly washed and placed in the strongest brine. The time for salting varies greatly, according to the size of the fish, their freshness and the weather. Large and fresh herring should be salted fully an hour, while smaller ones and those that have been kept for some time will be sufficiently "struck" in thirty or forty minutes. In cold weather, owing to their firmer flesh, they must be salted longer than in summer. When a larger quantity is received than can be used for canning, the balance are at once salted in large hogsheads and allowed to remain until such time as they can be cut into Russian sardines. These have no value for canning, as they become so salt as to injure their flavor.

As soon as they have been sufficiently "struck," the herring are taken from the salting troughs and thoroughly washed in spring water. They then go to the "flaking" rooms, where boys and girls, and occasionally grown people, arrange them on frames of wood or galvanized wire. These frames, technically known as "flakes," are thirty inches square, with small triangular strips of wood, or small galvanized iron wires stretched across it, one or two inches apart, and holding about 175 fish each. The drying of the fish is one of the most careful and important of the processes, for if not performed with absolute exactness as to time and conditions the fish will turn rancid and destroy the flavor of the oil in which they are packed. In dry weather the most desirable method is to place them in the sunlight in the open air, where the moisture evaporates in a few hours.

The fish are next fried in sheet-iron pans, about six feet long, two feet wide and six inches deep, two of which are placed on a large brick furnace, and protected from the direct action of the fire by sheet iron plates. The fish, arranged on small wire trays, are submerged in two inches depth of oil which has been heated to a little over 200 degrees, and the frying is done in one or two minutes. The oil generally used for frying is of a superior grade of cotton-seed oil, though in some cases the oil of different species of nuts is used. An improved method over the old way of drying the fish and frying them in oil is now chiefly pursued, requiring only a few minutes, which consists in steaming and boiling in large patent fruit dryers or ovens.

When sufficiently cooled the herring are sorted into different sizes and packed in various sized cans. Nearly all the smaller fish are packed in oil in small sized cans, known to the trade as "quarter

cans." These are four and one-half inches long, three inches wide and one inch deep, and hold from nine to twelve herring according to their size. The fish most suited for this purpose measure about six inches when whole, and when cut from three and one-half to four inches. Those eight to nine and one-half in length are most part put up in mustard, spices and vinegar, tomato sauce, or other condiments, in "half-cans," twice the thickness of the "quarter cans." The oil used for canning varies greatly in quality in the different establishments. Occasionally the best olive oil, from Italy and costing about $3 per gallon is used. A common practice is to mix a small quantity of olive oil with a large amount of cotton-seed oil, the latter costing about one-sixth as much as the former. Some canneries are using other oils made from various seeds and nuts of foreign countries. The oil in which the fish are packed is usually flavored to the taste by using lemon, sugar and various spices. At the present time fully 400,000 gallons of cotton-seed oil are used annually in sardine packing in Maine. After the packing the cans are soldered; are boiled from one and a half to two hours; cleaned and packed in sawdust in common wooden boxes, holding 100 of the smaller and fifty of the larger cans, when they are ready for shipment.

There are sixteen sardine factories in Eastport, and from one to four factories each at Robbinston, Lubec, Jonesport, East Lamoine, Camden and Milbridge, in all about forty. In 1875 there were packed in oil in the United States 50,000 "quarter-cans," valued at $5000; in spices and mustard, 10,000 "half-cans," valued at $1600, and 3000 barrels of Russian sardines, valued at $9000. In 1880, 6,141,400 of quarter-cans, valued at $552,726; 142,900 of half-cans, valued at $18,577; in spices, mustards and tomato sauce, 1,141,200 half-cans, valued at $172,315; of Russian sardines, 8165 barrels, valued at $28,578. In that the increase in the value in the five years was from $15,600 to $772,196, or about the proportion of one to fifty. Since 1880 there has been a tremendous increase, and Maine "sardines" now find their way to almost every part of the continent. Besides all this there continues to be a comparatively small business done at canning large herring as "brook trout," "sea trout" and mackerel. The total sardine pack for 1888 was 450,000 cases; in 1889 not far from 500,000 cases. As each case contains 100 boxes or cans the present annual pack reaches 50,000,000 cans. —*C. O. Stickney in St. Louis Globe Democrat.*