Sixty-Sixth Legislature.

HOUSE. No. 214.

STATE OF MAINE.

RESOLVE providing for the expenses of erecting and maintaining an establishment for the Artificial Propagation of Lobsters and other Fish.

Resolved, That the sum of ten thousand dollars, or so much thereof as may be necessary, be, and the same is hereby appropriated for the purposes of paying the expenses of the commission to be appointed by the Governor and Council for the purpose of investigating all the details, plans and estimates relating to a lobster hatchery; and also for locating, establishing and maintaining such hatching establishment for the purpose of hatching lobsters and other fish.

The Committee on Sea Shore Fisheries respectfully submit the following statement:

Owing to the limited time at our disposal it cannot be expected that a detailed statement, based on actual investigation, could be transmitted at this time as no definite information could be obtained from any source other than by correspondence.

Your committee addressed communications to the United States Fish Commissioners and to the Department of Marine and Fisheries for the Dominion of Canada, and others who might have knowledge upon this subject. The result of this correspondence is herewith submitted

And in view of the limited amount of information we have upon this very important subject we do not feel justified in recommending an appropriation except under the following conditions, viz: That the Governor with the advice of the Council shall, as soon as practicable, appoint a commi sion of three citizens of our State who have a practical knowledge of the fisheries, whose duty it shall be to investigate all the details, plans and estimates relating to a lobster hatchery, and report in writing to the Governor and Council on or before July 1, 1893, and if the report is satisfactory the Governor and Council shall immediately instruct and empower said commission to take immediate steps to locate, establish and maintain a hatching establishment for the purpose of propagating lobsters and other fish, under such rules and conditions as the Governor and Council may prescribe. And for the purpose of defraying the expense of said investigation, and erection and maintenance of the contemplated hatching establishment, the sum of ten thousand dollars shall be appropriated.

STATE OF MAINE.

IN HOUSE OF REPRESENTATIVES,
February 2, 1893.

Ordered, That the Committee of Shore Fisheries be instructed to inquire into the expediency of establishing in this State a Lobster Hatchery.

FROM THE FISHING GAZETTE.

Artificial Propagation of Lobsters.

During the past ten years there has been a great falling off in the supply of lobsters, until the price has increased fully one hundred per cent. This applies alike to the New York market, to the waters along the New England coast and in Canada and Newfoundland, where lobster fishing and canning is an important industry. The necessity of increasing the supply of lobsters is generally recognized, and two methods are proposed for accomplishing this object. One is the enactment of law which will check the depletion of lobster beds by over fishing and the other is artificial propagation.

Marshall McDonald, who is at the head of the United States Fish Commission, says: "I have always felt that the maintenance of the lobster fishery rested more essentially on proper regulation of the matter by the states than upon any efforts in the way of artificial propagation. The most usual regulation is that prohibiting the sale of lobsters below certain dimensions; the minimum limit, though varying with different states, being smallest in Massachusetts In Maine, where the law is enforced and the minimum fixed, I believe, at ten inches, the result has been a marked improvement in lobster fisheries in the recent years."

A law was enacted by the New York legislature in 1880, prohibiting the taking of lobsters smaller than ten and a half inches, but it was replaced, largely, it is said, by the reason of the efforts of the hotel keepers in New York city with political influence, who were determined to serve small lobsters on his table, regardless of the effect of rescinding the regulations.

The difficulty of securing legislation on this subject of enforcing the laws when they are enacted, and preventing their repeal through the efforts of persons who have no regard whatever for the consequences of their acts, compels those who desire to see the supply of this wholesome food

fish kept up to look to artificial propagation as the most available method for securing the object desired.

In the volume entitled "The Fishery Industries of the United States" by G. Browne Goode and associates, the following statement is made regarding the cultivation of lobsters:

"The artificial propagation of lobsters has been rarely attempted, either in this country or in Europe, and in no case are we aware of its having been productive of satisfactory practical results. There are so many difficulties to overcome in an undertaking of this character, and the breeding habits of lobsters are so imperfectly understood, that it is not surprising that greater progress has not been made in materially aiding the increase in supplies by artificial culture, as in the case of the oyster and of many of our true fishes. That further study and persistent efforts may yet afford us the means of accomplishing so desirable an object is very probable, and is sincerely to be hoped for, in view of the apparent great decrease in the abundance of lobsters on many portions of our Atlantic coast."

Since the above opinion was expressed considerable success has been achieved in the line of artificial propagation. The United States Fish Commissioner's hatchery at Wood's Holl, Mass., provides about three million young lobsters each year, and these are all placed in Vineyard sound and Buzzard's bay, owing to the impoverishment of the species in that vicinity.

For three seasons lobsters have been hatched in small numbers at the station of the New York Commission, Cold Spring harbor, L. I. Last season 27,700 were placed in the water at that point. The embryos are very delicate, and when lobsters are placed on ice, as many are which come to market, the embryo is generally ruined for hatching purposes.

Fred Mather, superintendent of the Cold Spring hatchery, and a man of wide experience in fish propagation, said recently that lobsters were not only decreasing in numbers, but also in size. A two-pound lobster was now considered a fair average.

New York is next to the largest receiving market for lobsters in the country, yet the lobster fisheries within the boundaries of the state are not now important, and are confined to eastern Long island. In former years lobsters were found in large numbers in New York bay and at Hell Gate. The disappearance of this food fish is due mainly to over fishing, but also to the establishment of manufactories, which have polluted the waters. Lobsters were taken at Robins Reef, New York bay, as late as 1879, but they were small and were not exposed for sale.

Lobsters are sold in New York during the entire year, but the demand is five times greater during July, August and September than during any other three months of the year. The demand is the least during February and March. The consumption of lobsters at Cony island in summer reaches 3,500 pounds a day.

The experience on the coast of Maine seems to be similar to that already stated. In 1890 twenty million of lobsters were taken, which was a falling off of five million or twenty per cent from the catch of 1888 and ten per cent from 1889. There has also been a steady decrease in the size of the fish sent to market. During 1889 and 1890 the average length of the lobsters offered for sale was ten and one-half inches and the average weight two pounds. Ten years ago the average length was thirteen inches and the weight three and one-half to four pounds. There are thirty-six factories on the coast of Maine where lobsters, sardines, herrings and mackerel are packed.

Considerable progress has been made by the Newfoundland Fisheries Commission in the way of lobster propagation. The work was taken up two years ago when the methods of the United States Fish Commission were adopted and their experience was made serviceable. A hatchery was located at Dildo island. In the summer of 1889 4,039,000 lobster eggs were hatched, and the young lobsters planted around the head of Trinity bay, the eggs having been obtained from lobster packing establishments in the vicinity.

In prosecuting this work, Adolph Nielsen, superintendent, made the discovery that lobsters had two different times for spawning. The larger run of lobsters spawn from the middle of July to the middle of August, while the smaller and middle sized ones spawn during the latter part of October and the month of November. The commissioners make the following statement in their report regarding the importance of the artificial propagation: "A means is thus provided which, if duly put into operation, will safeguard our lobster fishery from the injury or ruin which has overtaken so many of these industries in other countries, and already threatens our own. By establishing a lobster hatchery, or more than one, in each bay, the stock of lobsters may not only be maintained, but greatly increased; and at the same time, these valuable crustaceans may be planted in waters where at present they are not found, and their culture indefinitely extended." At Placentia bay, Newfoundland, alone, 1,200 men and women are employed in the lobster industry. Five million is the annual catch, which represents $180,000 in value. Superintendent Nielsen has constructed floating hatching boxes by the aid of which it is possible to hatch lobsters when the eggs have reached a due stage of ripeness. By this means the immense number of eggs which are usually destroyed at the canning factories can be hatched, and thus the supply of lobsters be kept up. The average number of fertilized eggs carried by a lobster in the spawning season is placed at 12,000 to 18,000. The export of lobsters from Newfoundland has grown from 25,814 pounds in 1874 to 3,360,672 pounds in 1888, and the value from $124,997 in 1880 to $472,524 in 1889.

For the year 1890 the Newfoundland Commission state that success in the artificial hatching of lobsters exceeded their most sanguine expectations. There were 432 floating incubators in use, which were distributed at fourteen different stations. The percentage of loss in the apparatus was twenty-eight, as against forty-nine and one-half in 1889. The result of the season's work was 406,005,300 young lob-

sters hatched and planted in good condition. "In the methods now employed," say the commissioners, "we have obtained an invaluable means of arresting the decline in our lobster fisheries, which in many places threatens entire extinction, and of sustaining the stock of this valuable crustacean."

The depletion of the lobster fisheries has been especially noticeable in Canada. The report of 1888 showed a decrease in the value of exports of $350,000, as compared with the previous year, although there had been an advance in the price of twenty-five per cent. The value of the Canadian lobster fishery in 1888 was $1,483,388; in 1886, $2,638,394; in 1885, $2,613,731.

Superintendent Nielsen of the Newfoundland fisheries, is a native of Norway, and his success in propagating lobsters has attracted a great deal of attention. In addition to artificial propagation, he believes in a closed season, when the lobsters will have a chance to propagate.

Lobsters are the more easily exterminated because they frequent shoal water within certain well-defined areas, and are therefore the more easily captured. This fact renders the artificial propagation the more important, because the exhaustion of the species is rapid and certain.

PICTOU, N. S., Feb. 16, 1893.

GENTLEMEN: I send you by to-day's mail a rough sketch of the lobster hatchery. If you desire an exact plan I can get one up in a few days. The size of the building is, length 75 feet, width 35 feet, height of post 15 feet. Cost of building, wharf, pump, boiler, jars, tanks, and all appliances, about $9,000. A hatchery capable of turning out say 150,000,000 fry per annum can be erected with all equipments for about one-half the cost of this one.

I succeeded in hatching about 65,000,000 fry last year and this year I expect to turn out 125,000,000, as I have made improvements in the internal workings of the hatchery.

The cost of hatching during the past season has been about $10 per million; probably this season the cost will be about

half that amount. This includes everything except my own salary, but not the cost of plant.

I shall be pleased to send you any information you may require provided I am able to do so. My report to the Minister of last year's operations has not yet been published. I will send it to you as soon as it is out. I remain

Yours truly,

ALFRED OGDEN.

U. S. COMMISSION OF FISH AND FISHERIES,
WASHINGTON, D. C., February 7, 1893.

Mr. LUTHER MADDOCKS, Augusta, Me.

Dear Sir:—I have no information in regard to the lobster work by the Canadian and Newfoundland Commissions other than what is contained in their published reports. Mr. Neilson, the Superintendent of the Commission, makes very encouraging reports as to his success. The floating incubator used by him, we have never employed, and I doubt whether the success has been attained in their use, so far as effective hatching is concerned, as represented. Men are so apt to exaggerate results, but I have no doubt that they are in a line of work that will, with some drawbacks, eventuate in very large results and economical expenditures to attain them. We have been hatching eggs at the Wood's Holl station for some years using the same apparatus that we employ in hatching our shad eggs and from which we have gotten very fine results, so far as indicated by the percentage of eggs hatched. We have, however, during no season been able to obtain more than five or six millions eggs for this purpose, which is an entirely inadequate number to be hatched if we must depend upon artificial propagation for keeping up the supply. My own judgment in regard to the lobster fishery has always been that it is far wiser to attempt to maintain the fishery by proper regulations and reasonable, rational restraints, than to attempt to maintain them by artificial reproduction even upon an adequate scale. I have advocated repeatedly the system of reservations as in my judgment,

the most effectual and inexpensive and least harrassing means of keeping up the supply. Should you upon the Maine coast have your commissioners indicate certain reservations now frequented by the lobsters over which no fishing would be permitted, my own judgment is that natural reproduction which would occur there would be sufficient to keep all the immediate regions well stocked with the lobsters. As you know, the young are, in the early conditions of life free swimming, and though hatched in one locality, they may be picked up and carried by the tide a number of miles before settling to the bottom and becoming localized. Should reservations, even of small extent, a few miles apart be established on your coast and fishing upon them carefully restrained, my judgment is that that would be all that is necessary to maintain the supply. You would, however, still be confronted with the question of the capture of lobsters under size. This might be provided for by imposing the requirement upon the traps that sufficient interval between the slats should be allowed so as to permit the escape from the traps of all lobsters under the prescribed or authorized dimensions. I do not think that this would be a hardship upon the fishermen, nor do I think that they would make any material objection to it. Under your present law they are required under severe penalties to return such lobsters to the water. If the construction of the trap is such as to permit their escape and do away with the necessity of assorting, and the temptation to secrete and use the lobsters under size, you would have a condition of regulations in regard to this matter that seems to me would be satisfactory and would be adequate for the purpose of keeping up this fishery to its full importance and value to the State.

Very truly yours,

M. McDONALD, *Commissioner.*

Extracts from the twenty-fifth annual report of the Department of Marine and Fisheries, for the fiscal year ending 30th June, 1892. Ottawa, Dominion of Canada.

LOBSTER HATCHING.

The artificial culture of lobsters is no longer an experiment but an established success. Mr. Ogden, the officer in charge of the Bay View hatchery in Pictou county, N. S., states, that after making necessary improvements, he secured his first supply of eggs on the 19th May, and continued to do so on every favorable day following until the 6th July. About 65,000,000 of eggs were collected from one cannery, less than a hundred yards from the hatchery. The first young lobsters hatched out on the 13th June, and constant attention was given day and night to the eggs and fry till restored to the sea. The distribution of the young crustaceans covered an area of sixty miles, that is about one million to the mile, extending from Arisaig, county of Antogonish, to Pugwash, county of Cumberland. Special attention was paid to selecting proper rocky bottoms at a certain distance from the shore when distributing the young lobsters. These were poured out from the deck of a low steamer, with a dipper from a height not exceeding five feet, or let through a hose about eight feet long trailing in the water. It is hoped most of these young lobsters will attain maturity, as when they reach the bottom, the rocks afford them shelter from their enemies. Very few eggs were lost.

The officer in charge of the hatchery states that a young lobster when hatched measures about one-quarter of an inch in length, at one year old it measures two inches and grows at the rate of about two inches every year; so that a lobster of seven and a half inches in length would be four years old.

LOBSTER HATCHING.

A successful beginning has been made in procuring the eggs of this valuable crustacean, and we now think in future we will be able to save many hundreds of thousands of eggs which would otherwise be boiled with the lobster and thrown away with the shells. We only turned out 27,500 young, but it was late in the season before we struck the source of supply, and it has been proved that we can handle the eggs

successfully, if we get good ones. Heretofore, we have tried to get them from Fulton market, but one of three things had occurred to weaken the embryo to an extent that was fatal, even though it lived to burst the shell. These were: retention in bad water in the slips; icing the parent to retard its circulation and prolong its life, and the drying out and consequent identation of the eggs by exposure to the air. It has taken several years' study of the condition under which the eggs had been kept, and comparison of their condition as embryos, to get at the reason why we were not successful in hatching, for other questions came in, such as the temperature of our water, its density, and its being pumped into a reservoir on the hill, any of which might be the cause of failure. All was in doubt, and though clear now, it has taken several years to find out what was the trouble with our lobster eggs.

The State Fishery Commission has been successful in hatching lobsters from eggs obtained from Martha's Vineyard, although many were spoiled in transit. Ten thousand were planted in Cold Spring harbor lately, and, as we write, there are 50,000 eggs in the hatching jars. Superintendent Mather has sent the naptha launch "Rutifer" to New Rochelle for more eggs. and it is expected that a large percentage will be turned out from these, which are obtained nearer home and have not been roughly handled by expressmen.

The "Rutifer" went to New Rochelle on 26th June, in charge of Mr. C. H. Watters, and got of Messrs. Baker Bros., dealers in sea-food, the eggs from four lobsters, without other expense than his time and a few gallons of naptha. He brought back 42,630 eggs, by measure, one-fourth being bad by reason of being too ripe and hatching and drying on the way. From these, we planted 17,700 young ere season closed.

At Wood's Holl, I picked up the following information concerning lobster culture at that station from Mr. John Maxwell, the superintendent. The first eggs were taken this year on April 12th, but were not hatching on May 14th, the

day of my visit. When the temperature of the water gets up to 58° Fahrenheit, they will hatch in a few days, therefore, their period of hatching differs in different localities.

The eggs measure 6,090 to the ounce, and twelve ounces only are placed in a MacDonald hatching jar, because the pressure at Wood's Holl is only sufficient to overcome the specific gravity of that number. On this basis all our estimates were formed, and my limited experience confirms what Mr. Maxwell told me.

He also gave me from his books the following extracts, which show the average results in lobster hatching at Wood's Holl:

1889.	Number of Lobsters.	Number of Eggs.	Average per Lobster.
April 16	18	171,240	9,513
June 23	23	364,610	15,852
Total	41	435,850	10,630

In 1890, from 723 lobsters were taken 8,317,640 eggs, or 11,500 per lobster, which gives us leave to roughly average the yield at 10,000 each. From the eggs of 1890, there were hatched 4,511,000,—over fifty per cent.

One day, about the middle of August of this year, Mr. William Gardiner, an oyster man of this place, brought me a young lobster about an inch and a half long, which he took near the place where our first plant was made in June.

It will be remembered that I made a plant of lobsters in Cold Spring harbor in 1886, and "Shooting and Fishing" of June 25, 1891, in speaking of our work this year, says: "Ten thousand young lobsters were hatched at the Cold Spring harbor station of the New York Fish Commission and turned into the Sound, June 15th. It is reported that this is the best lobster year from Lloyd's Neck to Northfort, on the north shore of Long island, that has been known in thirty years, and it is assumed that this is owing to a plant of young lobsters made from Cold Spring harbor in 1886. That year, Mr. Mather

obtained from the Wood's Holl station of the United States Fish Commission 50,000 lobster eggs and 5,000 young lobsters, which he took to his station. The eggs died in transit, and the young lobsters at shedding time devoured each other until but 4,000 were left, and these were planted on the north shore of Long island, where the lobster was practically extinct. So, the north coast of Long island is indebted to the United States Fish Commission for its lobsters, as is the western shore of the United States. By the way, one of the best papers in the last Bulletin of the United States Fish Commission (vol. viii, 1888) is that of Dr. Richard Rathbun entitled, "Transplanting of Lobsters to the Pacific Coast of the United States." It relates in detail to the five trials made to transport lobsters across the continent, which resulted in planting 590 adult lobsters and 104,000 embryos in the waters off the coast of California and Washington.

STATE OF MAINE.

HOUSE OF REPRESENTATIVES,
February 27, 1893.

Reported byMr. MADDOCKS of Boothbay Harbor, from Committee on Shore Fisheries, and ordered printed under joint rules.

W. S. COTTON, *Clerk.*