

# MAINE STATE LEGISLATURE

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**EIGHTIETH LEGISLATURE**

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**SENATE**

**NO. 125**

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In Senate, March 15, 1921.

Referred to Committee on Sea and Shore Fisheries and 1000 copies ordered printed. Sent down for concurrence.

L. ERNEST THORNTON, Secretary.

Presented by Senator Thompson of Knox.

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**STATE OF MAINE**

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**IN THE YEAR OF OUR LORD ONE THOUSAND  
NINE HUNDRED AND TWENTY-ONE**

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RESOLVE in Favor of Investigation of Methods of Canning, Curing and Propagation of Fish by the Commission of Sea and Shore Fisheries.

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Resolved: That, whereas the fisheries of Maine is one  
2 of the greatest assets and the compiling and dissemination  
3 of scientific knowledge of the industry by a college of fish-  
4 eries is of inestimable value, the commission of sea and  
5 shore fisheries is hereby authorized and instructed to in-  
6 vestigate the most modern methods of curing, canning, pre-  
7 serving, refrigeration, transportation, propagation and cul-  
8 tivation of fish. Said commission shall send one of its

9 members to other states having a college of fisheries, and  
10 to the bureau of fisheries at Washington, to obtain such  
11 information as may be necessary to a full and complete  
12 report of the subjects aforesaid. Said commission shall  
13 make its report to the next legislature, which report shall  
14 include the advisability and the probable cost of a college  
15 of fisheries for Maine. No additional salary shall be paid  
16 to any member of said commission for this work, but the  
17 actual expenses incurred shall be paid by the governor and  
18 council upon proper vouchers submitted therefor.

## A STATEMENT OF FACTS

By Edwin W. Gould, M. D., Chairman Sea and Shore Fisheries Commission.

Up to the present time the state department of sea and shore fisheries has been dealing with effect and not with the cause. The legislature in its efforts to regulate the work of the department has been seriously handicapped, by not having first-hand scientific data upon which to base their conclusions. The information at their command is gathered at committee hearings, where organized private interests are clamorous to secure special legislation, coupled with the testimony of comparatively few personal observers bearing upon the requirements of the fishing industry. As a matter of fact the basic principle upon which a law, regulating the taking of any member of the fish family, must of necessity, be founded upon, is the life history and reproducing function of the fish in question, in order to be effective and secure beneficial results.

Such essential information can only be obtained by a series of long and patient observations, and when once known, carefully checked and verified, would be of great service to any legislative committee, having the subject under consideration. In a general sense it is the view of the department, such investigations should be conducted in connection with the fisheries of Maine. The function of the department of sea and shore fisheries is to promote progress in the fishing industry. All development in the fisheries and the trades allied to the fisheries, are dependent in the long run, upon scientific investigations. The department of fisheries should be equipped for scientific research, in order to be capable of development work. It would appear to be poor business policy for the department having in charge the valuable industry of the fisheries, to act upon the report of others, it should have a scientific intelligence of its own.

There are many things that the department can do to enforce existing laws, but for constructive development there is little that it can do effectively, without a thoroughly competent, well equipped, and earnest scientific staff, actively engaged in scien-

tific research. The knowledge gained by such work, would form the basis upon which the commission of sea and shore fisheries would make suggestions for the consideration of the legislative committees. One of the first problems having an important bearing on many branches of this work, is a correct annual report of the fisheries. Such a report should have a wide scope, covering all members of the fish family that are under observation. By this means the effect of any regulation applied to any particular kind of fish could be noted, and the degree of benefit ascertained, and a knowledge based upon facts, be presented to the fisheries committee to further aid them in their legislative work. Also in conjunction with a statistical report, on the kind of fish under consideration, if a knowledge of the life history and reproductive functions of the fish, together with the natural laws that govern the movements of the fish, were known, the task of formulating intelligent regulations to be observed in the taking of these fish, to best serve the interests of the state, would be greatly simplified, and a much greater efficiency obtained.

It is of great important that there be a correct statistical report of the Maine fisheries compiled each year. Such a report would show the magnitude of the fishing industry, and place it upon a true basis in relation with other Maine industries, at the same time it would show the percentage of development that was the result of any enforced regulation, instituted for the purpose of improving any branch of the fisheries. A statistical report would be of great value as an aid to the department to keep within touch with all branches of the fisheries, and constitute an accurate guide to govern the commission in its effort to maintain and enhance the volume of the Maine fisheries.

In connection with a college of fisheries a correct statistical report would be valuable in the study of the science of oceanography in its relation to the areas of distribution of pelagic spawn and fry by the ocean currents. Such a report compiled from material gathered by the method of licensing fishermen would be invaluable as a medium for educational propaganda in vogue at a college of fisheries. In a spirit of unselfishness and justice it is urged, that the importance of the fishing industry of Maine be recognized, that it no longer be treated with indiffer-

ence. This is an industry that is of direct personal interest to each citizen of the state; an industry designed from the beginning to furnish a cheap food supply; an industry that now is in its infancy; one in which development work in the different branches, is the key note to success. Yet, up to the present time, there has been no provision made by the state, to encourage and pursue such essential work, which ultimately means much to the average citizen. Primarily the health of a community should be considered, as its success depends upon the state of health and well-being of its inhabitants, and to this end, there should be established state standards for, and state inspection of fish in all branches of the fishing industry where the products are placed upon the market for consumption as food. Provision should be made for the experimentation in refrigeration and transportation of fish, in order that fish passed by the inspector, be distributed to the interior towns in a fresh, sanitary condition. This is a matter of much importance and of interest to each citizen of the state, and is the groundwork for a wholesome food supply, which could be worked out and placed upon a firm basis in a well equipped college of fisheries. another urgent study for which no provision is made, is a knowledge of the life history and reproducing functions of the different members of the fish family that are taken on the coast of Maine, and which can only be acquired through careful and patient observation. Such knowledge when once secured would constitute a basis upon which to formulate laws and regulations for efficient protection, conservation and success of the Maine fisheries.

There is no provision made to help the fisherman to cure his catch and place it upon the market in the most economical and sanitary manner, to instruct him in modern methods of canning and curing fish, for preserving his catch from the time that it is taken until delivered at the curing plant. These and many other help problems would be solved at a college of fisheries. At the present time the fisheries are feeling the aftermath of the world war to a large extent, export trade has fallen off, the result of inability of European nations to purchase, disturbed transportation, high price of labor and fishing supplies. Now is the psychological time for the state to extend a much needed help to this important industry, by establishing a col-

lege of fisheries to aid in building upon a broad basis for the present and future generations, with a market division to assist in the distribution of sea food products. Every industry as it regards the future, looks hopefully to scientific research as one of the chief means by which trade may be developed. The fishing industry is not a manufacturing one. The cotton industry is essentially manufacturing, and from the time that the seed is sown until the finished product leaves the loom is largely a child of science. While all stand to profit by pure science, some, more than others cannot thrive without applied science. The problems of the fishing industry are unique, that, in all its branches pure scientific research is of special importance, to prepare for applied science to complete the work begun. The results would be common to all.

That the fishing industry has received small recognition from the state, is shown by the assistance extended to the department of agriculture and allied interests, as compared with that accorded to the fishing industry.

The appropriations granted the department of agriculture and allied interests for the year 1917 as taken from the estimated expenditures and income for 1919-1920 were as follows:

University of Maine	\$139,202 08
Maine Agricultural Experiment Station	12,000 00
Commissioner of Agriculture:	
Salary of commissioner	2,000 00
Clerk hire	1,000 00
Travelling expenses of commissioner	500 00
Agricultural statistics	3,000 00
Printing report, blank forms, etc.	3,000 00
Improving and protection animal industry	5,000 00
Farmers' institutes and dairymen's conferences	3,000 00
Live stock sanitary commissioner	40,000 00
Aid to agricultural societies	14,847 42
Packing and shipping apples	3,000 00
Maine State Pomological Society	2,000 00
Protection of trees and shrubs	35,000 00
Improved methods of marketing farm products	3,500 00
Bureau of horticulture	5,000 00
Bureau of inspection (analysis of foods, etc.)	10,000 00
Seed improvement	3,000 00

Enforcement of dairy laws	4,000 00
Central Maine Fair Co.	2,500 00
Maine State Agricultural Society	2,500 00
Eastern Maine State Fair	1,000 00
Maine Seed Improvement Association	1,000 00
Eastern Maine State Fair to encourage pomology	750 00
Promoting and assisting poultry culture	1,000 00
New England fruit show	500 00
Damage by dogs and wild animals to domestic animals	20,000 00
Investigations in animal industry	5,000 00
(For labor, travelling expenses, equipment, etc., for conducting scientific investigations)	
Agriculture of Aroostook county	5,000 00
New dairy building	10,000 00
Public instruction in forestry	5,000 00
	\$343,299 50

Making a grand total of \$343,299.50, which amount is doubtless much less than is necessary to accomplish the desired results in that department. In contradistinction (excepting the appropriation for law enforcement) the department of sea and shore fisheries, for the year 1917 received \$5000.00 with which to purchase seed lobsters to be distributed along approximately twenty-five hundred miles of coast line. As a matter of justice this valuable industry should receive recognition commensurate with its importance as a factor in solving the food problem, and should be zealously fostered by the state. To meet this need a college of fisheries would not only be of great benefit to the fishing industry, but to the inland dwellers as well. In such a college one of the branches to be developed and taught is refrigeration and transportation, the development of which is of great moment to the residents of Maine.

In many interviews with citizens living in the interior of the state, upon being asked if they purchased fish as a food, the invariable reply was: "We cannot get good fish." I know of no state standard regulating the sale of fish, or any state inspection provided for fish markets or refrigeration plants. It would appear to be good business policy as well as health policy that means be provided whereby the inland dwellers be



furnished good, clean, sanitary fresh fish for their consumption. The condition in which fresh fish would arrive at a given point would depend largely upon the manner in which they were transported, the degree of temperature to which they were subject during transit, and under which they were kept after arrival at their destination. This can only be accomplished through laboratory research and careful experimentation. In England and France they are using with good results, refrigerator motor trucks and trailers for transportation. If transportation be successfully accomplished under certain conditions, it is equally important that the fish be in good condition until purchased by the consumer, hence the care and sale of fish should be regulated by the department of fisheries.

Another important study that should be given prominence in the curriculum of a college of fisheries, a study that would be far reaching in its effect upon the fisheries and one that would become more valuable each year, is that of marine biology. It is a well known fact that all members of the fish family are governed by natural laws and instinct. Under natural laws may be mentioned, temperature of the water, its salinity, the currents, etc., under instinct the fish are guided to the proper locality where the climatic conditions are conducive to promote the function of reproduction. Of many of the fish that come to Maine waters comparatively little is known.

The fundamental principle upon which all laws regulating the taking of fish should be founded to secure the desired result, is upon the life history and reproducing function of the fish in question. Such knowledge can only be obtained through long and careful observation and research. As we are more conversant with their habits than of some others, suppose we take the salmon and alewife as an illustration, suppose that according to correct statistics these fish have been steadily diminishing in numbers, and that the marine biologist of the college of fisheries has been making observations as to the cause of the diminution, and that according to his observations the diminution in numbers of these fish, is owing to the faulty construction of the fishways through which these fish attempted to pass on their way to their spawning grounds, that he ascertained that salmon could readily pass through a fishway when the water was going through at a velocity, say, of ten feet per

second, but that at a greater velocity the passage was more difficult and that only the most sturdy fish could succeed in passing. That the alewife could not pass with the current at a velocity of ten feet per second, but could do so with ease with the current moving at a rate of five feet per second, and that salmon would pass with the current at the latter velocity. Here we have a condition to be corrected, and we also have the scientific facts upon which to base the remedy.

Closely affiliated with marine biology is the study of oceanography, by which is meant the study of ocean currents, their velocity, and direction, depth, etc., the study of the ocean bottom and allied subjects. Nearly all of the salt water fish that come to Maine tidal waters are pelagic spawners, the herring being the exception. Pelagic spawners are those fish whose spawn or eggs float as soon as extruded by the female fish, some of the eggs arising to the surface, others remaining below, but all are subject to the currents. If the eggs of a certain fish require four days to hatch and during that time were in a current flowing at a rate of two miles per hour, when the fry emerged from the egg it would be leagues from the place of spawning, and exert its influence upon the fish within that area. In taking up the study of grayfish, the scourge of the Maine fisheries, about which there is very little known, no literature as to their habits, yet they exert a great influence upon the Maine fisheries.

A thorough study of this fish, its habits, and in a well equipped laboratory work out a method whereby all of the many by-products be utilized, would be a great help to the fishing industry. To pursue this class of work it is essential that there be established in connection with a college of fisheries a marine biological laboratory. I have discussed briefly only a few of the individual researches to be conducted in a college of fisheries, that have a broad bearing upon some of the questions to which the department seeks an answer. Among which are

(1) How best can the present stock of fish be maintained at its level so that the prosperity of the fishermen be preserved and the food supply of the people not be diminished?

(2) Can the fisheries be increased by human endeavor while they continue to yield their present toll?

(3) In what measure is the application of the findings of science practicable in formulating laws for the preservation of the fisheries?

(4) What method of refrigeration and transportation be employed to supply fish food in a fresh sanitary condition to the interior cities and towns of Maine.

These questions are only a few of the many to be solved at a college of fisheries, and present with fair accuracy the trend of proposed investigations. Such investigations have a negative aspect, and reinforce the department to resist any proposed legislation advanced by interested persons, who use alleged facts of natural laws as a means to secure their purpose. To illustrate what is meant by alleged facts: When beam trawlers were first placed in commission in England, there were strenuous protests against their use, the petitioners relying in their contention, upon the alleged fact that the beam trawl drawn over the ocean bottom damaged the eggs of fishes on the so-called spawning grounds, and which was ultimately disposed of by the discovery of science that the eggs of all the principal food fish were pelagic, i.e., free floating, and could not therefore be damaged by the trawl. That instance is sufficient evidence to prove the importance to the department, that may be called upon to introduce or criticize legislative proposals for the regulation of the fisheries, of having an adequate scientific intelligence.

Another broad field of usefulness for a college of fisheries is in connection with the state department of inland fish and game. In that department fish culture has reached a certain stage of development, but much remains to be attained. The matter of fishways opens up a large and very important field for investigation, which should be instituted in the near future. In connection with a college of fisheries there should be a biological station where primarily the work should be to investigate the best methods of increasing the natural supply of fish in the different branches of the Maine fisheries with the following objects in view:

(a) To determine if possible the most successful method of rearing lobster fry to the lobsterling or sinking stage before liberating.

(b) To ascertain the rate of growth under various natural conditions and the length of time necessary to raise marketable clams.

(c) To discover methods of culture and determine suitable regulations, that would increase the supply.

(d) To demonstrate through the state reservations for shell fish culture the value of unproductive clam bottoms.

(e) To determine the physical condition of the natural mussel beds and methods of culture.

In order to satisfactorily determine these and other questions that may arise, it will be necessary to follow and carry on to completion a series of experiments and observations among which, essential to success are:

(1) To ascertain the distribution and range of the clam, mussel, scallop and oyster in Maine waters.

(2) The anatomy of these fish.

(3) The relation of the anatomy, to the habits of these fish.

(4) The spawning, early life history, reproduction and propagation of the giant scallop.

(5) The habits of both young and adult together with the rate of growth.

(6) To make bacteriological examinations of shell fish taken from polluted areas.

(7) To demonstrate the extent and possibilities of the shell fish fisheries.

In the selection of a site for a biological station many requirements must be considered, among which are:

(1) Unpolluted salt water.

(2) A protected basin where floats, rafts and other appliances may remain moored undisturbed by the elements.

(3) A sufficient area of clam bottom of suitable soil and current to demonstrate the cultivation of clams for experimental purposes.

Such a station should be conducted along scientific and practical lines, the study of cause and effect, close observation of the different changes during the life cycle of the members of the fish family, and how advantage may be taken of observed facts to benefit the fishing industry. To facilitate this work it is necessary that such a station should be furnished with scientific instruments of precision essential for the kind of

work contemplated. For example: a micro-photograph of a frozen or fresh section under examination is absolutely perfect in detail, while a wash drawing of same must of necessity be more or less inaccurate, take a longer time in execution, and require a special artist. While the initial cost of a microscope with micro-photographic camera attached would be considerable, the relative cost of plates would be very small in comparison and more satisfactory.

Scientific research coupled with practical application necessarily is slow, especially if the initial work is started along broad lines, looking toward comprehensive results for the future. The establishment of such a station in connection with a college of fisheries is one of the first steps to be accomplished, the details of which can only be worked out after mature deliberation. The building should be of strong construction and so designed and located that as the work increased in scope to demand more commodious quarters, that additional wings could be erected without disturbing the harmony of the whole. In conjunction with the foregoing statement of facts the one dominant idea that should be kept in mind is the fact that the fisheries consist of the gathering of a harvest where man has not sown, where the harvest is free for the taking, where the only means to conserve the future supply are measures enforced to regulate the taking. Measures based upon a scientific knowledge of the life history and reproducing functions of the fish.

It is deplorable that the State of Maine should remain so long indifferent to this important industry, the harvest of the seas. One of the big problems to be solved as has been stated, is the organized distribution of the fish food supply, that it may reach the inland consumer in good condition. But after the distribution what? The average fish market is illy kept. With its unsanitary condition, foul odors, slimy goods, floating in unclean water, flies and dirt, it is not to be wondered at that fish are so little used as an article of food. Under these conditions educational propaganda can accomplish little. Were the fish markets of Maine subject to special state inspection and conducted in a sanitary manner, with the fish products attractively displayed, the first step in fresh sea food propaganda would be accomplished.

It is certain that were a college of fisheries established in Maine, it would have the hearty support and active co-operation of the bureau of fisheries at Washington.

As a preliminary to such an undertaking as herein outlined, a full investigation of such fishery schools and colleges and biological stations as are in operation in other states and by the bureau of fisheries at Washington should be made by the sea and shore fisheries commission, in order to embody all of the requirements for modern research in the general plan.