U.S. Congress. House. Committee on the [illegible] marine and fisheries.

...To establish a biological station in the upper Mississippi River Valley, in the state of Iowa... 1908.

60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { REPORT No. 1055.

TO ESTABLISH A BIOLOGICAL STATION IN THE UPPER MISSISSIPPI RIVER VALLEY IN THE STATE OF IOWA.

FEBRUARY 22, 1908.—Committed to the Committee of the Whole House on the state of the Union and ordered to be printed.

Mr. WILSON, of Illinois, from the Committee on the Merchant Marine and Fisheries, submitted the following

REPORT.

[To accompany H. R. 13659.]

The Committee on the Merchant Marine and Fisheries, to whom was referred the bill (H. R. 13659) to establish a biological and fish-cultural station in the Second Congressional district of the State of Iowa, having considered the same, respectfully report with the recommendation that it do pass with the following amendments, to wit:

Amend the title of the bill so as to read: "A bill to establish a biological station in the Upper Mississippi River Valley in the State of Iowa."

Strike out all after the enacting clause and in lieu thereof insert the following:

That the Secretary of Commerce and Labor is hereby authorized and directed to establish and equip a biological station for the propagation of fresh-water mussels in the Upper Mississippi River Valley in the State of Iowa, at some suitable point in said State to be selected by the Secretary of Commerce and Labor; the cost of establishing the same, including purchase of site, construction of buildings and ponds, and equipment, not to exceed the sum of twenty-five thousand dollars.

The purpose of this bill is to make possible the perpetuation of the supply of raw material for the growing American industry of manufacturing pearl buttons from the shells of fresh-water mussels and the industries collateral to it. By reason of the growth and development of this industry the supply of mussel shells is threatened with exhaustion. By establishing the station proposed in this bill it is believed that the question of artificial propagation will be completely solved, and that the supply of these shells will be perpetuated by propagation which can henceforth be carried on without material additional expense to the Government.

In the last session of Congress an additional appropriation of money for scientific investigation under the United States Fish Commission

was granted for the purpose of making an investigation of the fresh-water mussels of the United States in their relation to the pearl-button industry. This investigation was ordered by the Secretary of Commerce and Labor on a showing made to him that this American industry of manufacturing pearl buttons from the shells of fresh-water mussels had grown to considerable proportions during the past few years, and that the rapidity with which these shells were being taken from the streams of the United States threatened the extinction of these mussels, thereby cutting off the source of the raw material for this industry and the consequent doom of the industry. It was found that comparatively little knowledge had been obtained by scientists and investigators regarding the life history of our fresh-water mussels, and so a commission was created under the supervision of Prof. Paul Bartsch, an eminent biological authority. This commission made an examination of many of the principal streams of the country where the fresh-water mussels abound, and secured much valuable information on the subject. The work of this commission has been carried forward by Professors Lefevre and Curtis, of the University of Missouri, who, by the way, have been conducting these investigations without compensation. They have determined the mode of development of fresh-water mussels, and it has been found to differ from what occurs in any of their marine relatives. This difference lies in the fact that the embryo lives for a time as a parasite upon fresh-water fishes and can only develop in this parasitic condition.

With this fact established, careful experiments have been made in inoculating fishes with these embryo clams. These experiments have been conducted by Professors Lefevre and Curtis, and the results thereof indicate that the infection of fishes on a large scale is entirely possible, and that there is ample reason to believe in the success of such work in building up the supply of mussels.

It is clearly pointed out that the steady decline of the beds demands some such remedial measures if the supply is to be maintained for more than a very few years. There are still many fundamental scientific facts relating to the subject which are yet to be determined. For example, we do not know the exact breeding seasons of any one of the button mussels. We do not know what fish are best adapted to carrying the glochidia of each species, nor what are the best methods for work on a large scale. These facts can be ascertained if proper facilities for work are provided, and they must be ascertained before the process of artificial propagation can be established on a sound basis; but since many of them can only be learned by the actual experience of attempting artificial propagation on a large scale the investigation and the propagation must go hand in hand. To carry on such work properly, there is necessary a station, properly equipped, for the wholesale collecting and transporting of fish and mussels to the tanks and ponds of the station, where the infections are to be performed. In this way there could be liberated hundreds of thousands of fishes loaded with these embryo clams, and thus sow these clams broadcast in our rivers. It may be added that this process of propagation is in no way harmful to the fish.

The establishment of such a station as is provided for in this bill is recommended by the United States Commissioner of Fisheries.

The following statement of the principal facts in the life history of our fresh-water mussels and the means proposed for increasing the

supply was written by Professors Lefevre and Curtis, who have been and are now conducting experiments under the direction of the United States Fish Commission. This statement is made a part of the report and will be found most interesting.

The fresh-water clams or mussels of the United States and similar forms from other parts of the world exhibit a mode of development which differs from what occurs in any of their marine relatives. This difference lies in the fact that the embryo lives for a time as a parasite upon the gills or fins of fresh-water fishes, and can only develop in this parasitic condition, the life history being, briefly, as follows: The eggs of the female clam are fertilized by the sperm of the male, which enters the body of the female in the water current that brings the clam its food. These eggs begin development within the female, where they are contained in sacks formed by the animal's gill. Development proceeds as far as a stage known as the glochidium (Pl. ia), which has the two halves of a miniature shell and looks much like a gaping clam shell, but which has none of the internal organs necessary for the life which the adult clam leads in the mud of the bottom.

The glochidia are shed out of the parent as they become ripe and they fall to the bottom, where, having no power of locomotion, they remain motionless unless washed about by the currents. Experiments prove that they will die before many days when left in this condition. If, however, the glochidium chances to come in contact with the fins or gills of a fish, which brushes against the silt of the bottom, it fastens itself, and within twenty-four hours has caused the skin of the fish to grow over it, so that the young mussel is completely imbedded within the living tissue of the fish. In this condition it rests securely, receiving its food from the blood of its host, and leading a truly parasitic existence for some months. During this period the glochidium changes until all the organs of the adult are developed, though it has not increased in size. At the end of its parasitic existence, when the organs are fully formed, the young clam effects the tissue of the fish in such a way that the skin opens and the young clam drops to the bottom, where it begins the life which it will lead throughout the remainder of its existence.

The attachment to a fish is entirely a matter of chance, but where mussels and fish are abundant it must often occur under natural conditions, as is seen from the examination of fish taken in nature. Still the fishes thus infected will almost never be found carrying as many of the parasites as they can without serious injury. If the fish are taken and placed in a tub or bucket of water containing large numbers of glochidia, which have been obtained from removing them from the ripe mussel, it is possible to cause the attachment of hundreds of the parasites for every one that would be found there by the chance of nature. A fish under 6 inches in length may thus be made to carry several hundred glochidia, and thus a thousand fish artificially infected may do the work of several hundred thousand in a state of nature.

Experiments with small numbers of fish under observation in the laboratory indicate that their infection on a large scale is entirely possible, and the experiment now in progress at La Crosse, in which over 25,000 young fish have thus been infected, gives every indication that such work may be begun even with the scanty knowledge we now possess.

While there is ample reason to believe in the eventual success of such work in keeping up the supply of mussels, and while the steady decline of the beds demands some such remedial measures, if the supply is to be maintained for more than a very few years, we are not yet in a position to proceed safely with this work, because we are still ignorant of many fundamental scientific facts. For example, we do not know the exact breeding seasons of any one of the button mussels. We do not know what fish are best adapted to carrying the glochidia of each species, nor what are the best methods for work on a large scale. These facts can be ascertained if proper facilities for work are provided, and they must be ascertained before the process of artificial propagation can be established on a sound basis. But since many of them can only be learned by the actual experience of attempting artificial propagation on a large scale, the investigation and propagation must go hand in hand. To carry on such work properly, there is necessary a station properly equipped with boats and a steamer for the wholesale collecting and transporting of fish and mussels alive to the tanks and ponds of the station where the infection could be performed.

Nature is prodigal with the supply of glochidia, but so great is the chance against any ever fastening themselves upon the fish and against any ever dropping from the fish to a place on the bottom where they can succeed in the struggle for life that, with the added destruction of hundreds of millions of shells each year for commercial purposes, we may easily exterminate before many years the forms upon which the button industry depends. If we can discover the places in the life history where the

waste is greatest and aid the species at those critical stages, there is every reason to hope that the supply of mussels can be made to equal if not surpass the numbers existing when the first button was cut.

Legislation against fishing must also be made use of as soon as we know enough of the habits and breeding seasons to propose measures that are likely to be a real protection. Until then all such laws should be discouraged, however strong may be the wishes of the manufacturers or others to preserve any local supply. We are as likely to do harm as good in the making of such laws without adequate knowledge, and the revision of bad laws would probably be more difficult than the passage of new ones.

In conclusion, we may say that the parasitism on the fish makes the propagation of mussels go hand in hand with the propagation of our fresh-water fishes, since the fish is in no wise injured by the presence of the parasites. When we liberate a hundred fish each loaded with its hundreds of glochidia we not only sow the clams broadcast on the bottom, but we are also distributing fish which, when their work for the clams is done, are just as useful as though they had never known such an experience. Wholesale infection gives every promise of success, but the means must be provided at once for work on a large scale, and unless something radical is soon accomplished the making of buttons from our fresh-water shells is doomed.

As indicating the size of the pearl button industry in the United States and the large number of wage-earners engaged in such manufacture, the following table, taken from the report of the Census of Manufacturers for 1905, gives a comparative summary of the industry by States for the years 1905 and 1900:

Comparative summary—Fresh-water pearl buttons and button blanks, by States: 1905 and 1900.

State.	Census.	Number of establishments.	Capital.	Salaried officials, clerks, etc.		Wage-earners and wages.		Miscellaneous expenses.	Cost of materials used.	Value of products.
				Number.	Salaries.	Average number.	Wages.			
United States	1905	150	$3,234,379	385	$276,491	5,085	$1,621,669	$319,593	$1,911,187	[1]$4,926,458
	1900	122	1,109,572	117	85,646	3,574	1,147,252	89,414	940,838	2,766,053
Illinois	1905	13	148,313	16	8,530	259	95,486	14,280	54,353	209,500
	1900	10	37,643	11	6,172	237	85,071	2,616	42,332	181,704
Indiana[2]	1905	3	67,901	4	3,460	139	39,459	4,035	14,042	69,068
Iowa	1905	51	1,173,866	116	74,685	1,936	653,520	92,530	533,917	1,500,945
	1900	50	314,685	38	24,756	1,335	438,168	36,853	185,257	822,478
Massachusetts[3]	1900	3	270,597	10	19,200	388	141,200	12,783	72,188	304,400
Missouri	1905	8	126,968	16	5,671	180	55,314	7,588	34,135	136,994
	1900	8	26,995	1	300	64	17,821	962	12,525	34,529
New Jersey	1905	11	273,215	22	29,584	330	140,311	36,491	199,114	480,765
	1900	11	77,550	9	9,500	193	75,679	4,323	129,569	310,954
New York	1905	27	904,447	163	122,300	1,461	406,837	96,952	818,679	1,844,432
	1900	15	155,834	28	16,613	906	254,027	19,355	366,040	771,482
Ohio	1905	3	59,008	5	2,539	66	16,224	4,002	23,796	50,216
	1900	3	48,120	6	4,086	66	17,138	5,487	19,962	56,008
Pennsylvania	1905	8	303,830	25	19,826	397	117,568	47,020	135,019	333,732
	1900	6	110,299	4	2,424	223	73,247	3,875	87,697	193,823
Wisconsin	1905	17	113,340	11	5,420	187	58,700	10,510	58,064	164,229
	1900	9	34,499	4	1,425	96	32,108	1,830	18,751	63,125
All other States	[4]1905	9	63,491	7	4,476	130	38,250	6,185	40,068	136,577
	[5]1900	7	33,350	6	1,170	66	12,793	1,330	6,517	27,550

[1] Includes $556,217 worth of ocean pearl buttons.
[2] No establishments reported in 1900.
[3] Included in "all other States" in 1905.
[4] Includes establishments distributed as follows: Arkansas, 3; Massachusetts, 2; Minnesota, 1; Mississippi, 1; Nebraska, 1; Tennessee, 1.
[5] Includes establishments distributed as follows: Arkansas, 1; California, 2; Minnesota, 2; Nebraska, 2.

An unofficial statement of the fresh-water pearl button industry for the year 1906 is also submitted herewith. This report furnishes additional information regarding the industry and is as follows:

Fresh-water pearl button industry report, 1906.

BUSINESS AND INVESTMENT.

Amount of money invested in plant, machinery, etc	$1,488,200
Amount of business done during year 1906	5,650,000
Number of gross manufactured during year 1906	25,200,000
Average price of button, 21¾ cents per gross	5,481,000
Amount of crushed shell waste material used for chicken feed, 30,726 tons, at $5.50 per ton	169,000
Expended for paper boxes, cards, silver foil, etc	335,000
Amount of money paid in wages	3,450,000
Amount of money paid for shells	737,280

HELP AND WAGES.

3,000 cutters (male), $14 average wages per week	$42,000
1,800 operators (female), $8 average wages per week	14,200
600 employed as foreman, $18 average wages per week. Manager, salesman, buyers, office force.	10,800
1,000 employed at home sewing buttons (female)	3,000
6,400 Total wages per week	69,000
50 weeks wages per year	3,450,000

SHELLS.

Amount of shells, district, etc.

	Amount.	Average price.	Total cost.
	Tons.		
Wabash River	14,400	$15.00	$216,000
Ohio River	13,440	15.00	201,600
Arkansas River	9,120	15.00	136,800
Mississippi River	8,640	17.00	146,880
Other rivers	2,400	15.00	36,000
	48,000	.....	737,280
48,000 tons shell, average price $15.35	.....	.....	737,280

Estimated 3,000 clammers working five months in the year, average amount received by each man for year's work, besides amount received for pearls, etc., for year	$204.50
Freight paid for shells for year	120,000.00

These tables do not indicate the full size of this comparatively new and growing industry. There are collateral industries which have grown up as a result of the manufacture of pearl buttons in the United States from fresh water mussels. The sale of pearls and baroques which are found in these fresh water mussels has grown to large proportions, and a conservative estimate would place the value of these pearls at $1,000,000 per annum. Another industry which has grown up as a result of the manufacture of buttons from these shells is the manufacture of buckles and other articles of adornment, including stick pins, brooches, and other articles of jewelry. No data is at hand as to the magnitude of this particular industry, but it has already attained considerable proportions.

In addition the manufacture of button-making machinery has grown to considerable proportions, and the progress in the manufacture of buttons is marked by a corresponding progress in the manufacture of labor-saving machines, some of which rival the modern type-setting machines in their intricacy and perfection of action.

In the light of these facts the committee recommends the passage of the bill.

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60TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { REPT. 1176, Part 2.

TO ESTABLISH A BIOLOGICAL AND FISH-CULTURAL STATION IN THE UPPER MISSISSIPPI RIVER VALLEY.

MARCH 13, 1908.—Committed to the Committee of the Whole House on the state of the Union and ordered to be printed.

Mr. SPIGHT, from the Committee on the Merchant Marine and Fisheries, submitted the following as the

VIEWS OF THE MINORITY.

[To accompany H. R. 13659.]

The bill as reported by the committee ought not to pass.

This bill is in the interest of the manufacturers of pearl buttons, already, under general law, amply protected by a tariff duty.

This proposition goes far beyond the doctrine of protection. It seeks to have the Government appropriate money from the Treasury to advance the interests of a private enterprise operated for profit. It is altogether different from the fish hatcheries established by the Government for the breeding of young fishes of approved varieties and their distribution to the water courses, lakes, and ponds all over the country for increasing the food supply of all the people. The mussel is not edible, and its only value is its shell, which is of use solely to the button factories. The effect of this bill, if passed, will be to furnish raw material to these factories. As evidence that such is the purpose, an effort was made to amend the bill so as to limit its operation to a scientific investigation as to the best method for the propagation of the fresh-water mussel. This was promptly voted down by the friends of the measure.

If we inaugurate the policy of appropriating public money for private enterprises, where shall the line be drawn? It is said that the manufacture of pearl buttons, ornaments, etc., is a young and growing industry in the United States, and that it gives employment to many wage-earners. Grant that this is so. It is equally true that it is a profitable business to those engaged in it or they would seek other avenues of investment. They are not in the business from any motives of patriotism or for the public good, but solely for private gain. The laborers are given work to do not because of sympathy for the unemployed, but because their services are profitable to their employers.

Then why should the public Treasury be made to contribute to their already profitable business?

While the bill as originally presented has been so amended by its friends as to read, "A biological and fish-cultural station," the expression is, perhaps unconsciously, misleading, because there is no disguising the fact that it is intended to apply alone to mussels.

In the interest of the popularity of the measure it has been so amended as to apparently eliminate the restriction that the proposed plant shall be established in the Second Congressional district of Iowa, by substituting the words "In the Upper Mississippi River Valley." It may be, however, that there is no one so disingenuous as to suppose that the passage of the bill would mean anything else than that the station will be located in the Second district of Iowa, which is the only locality asking for it.

We think the proposed legislation is unnecessary, unwise, and vicious in principle, and therefore oppose it.

THO. SPIGHT.
J. A. GOULDEN.
J. W. ALEXANDER.
G. W. FAIRCHILD.
J. T. WATKINS.
WILLIAM E. COX.