
PROCEEDINGS AND PAPERS
OF THE
NATIONAL FISHERY CONGRESS,

HELD AT
TAMPA, FLORIDA, JANUARY 19-24, 1898.

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PREFATORY NOTE.

U. S. COMMISSION OF FISH AND FISHERIES,
Washington, D. C., February 23, 1898.

The National Fishery Congress, which convened at Tampa, Florida, in January, 1898, pursuant to the call of the governor of Florida, was attended by a large number of persons prominently connected with the fisheries, fish-cultural work, scientific research, and general economic pursuits from all parts of the United States. Papers covering a wide range of subjects were presented, and some of them evoked considerable discussion. A number of special topics of timely importance were brought up, some of which formed the basis for formal resolutions. Of scarcely less consequence than the regular proceedings of the Congress was the opportunity afforded the delegates for the personal interchange of opinions and experiences.

In order that a permanent record may be made of the work of the Congress, the Commission has undertaken the publication of the papers and an abstract of the proceedings, but in so doing assumes no responsibility for any opinions expressed.

For the purpose of expediting the issuance of this report, it has been deemed advisable to utilize the Bulletin for 1897, although the proceedings more properly belong in the Bulletin for 1898, the printing of which will not begin for some months.

GEORGE M. BOWERS,
Commissioner.

8.—PROCEEDINGS OF THE NATIONAL FISHERY CONGRESS, HELD AT
TAMPA, FLORIDA, JANUARY 19-24, 1898.

WEDNESDAY, *January 19.*

The convention met at noon in the casino of the Tampa Bay Hotel and was called to order by Hon. M. E. Gillett, mayor of Tampa.

On motion of Hon. S. G. McLendon, of Georgia, Mr. Gillett was made temporary chairman, and on motion of Maj. A. A. Wiley, of Alabama, Mr. H. Cunningham, secretary of the Tampa Board of Trade, was elected temporary secretary.

On motion of Mr. William E. Meehan, of Pennsylvania, the chair appointed the following committee on credentials and permanent organization, the chairman being subsequently added to the committee: Mr. W. E. Meehan, of Pennsylvania, chairman; Hon. S. G. McLendon, of Georgia; Maj. A. A. Wiley, of Alabama; Dr. H. M. Smith, of Washington; Mr. F. Q. Brown, of Massachusetts, and Gen. Patrick Houston, of Florida.

On motion of Major Wiley the following resolution was adopted:

Resolved, That no resolution will be considered by this Congress that is not germane to the call of Governor Bloxham, and that all resolutions shall be referred, without debate, to the committee on resolutions, when duly raised by this Congress.

The chairman announced that it was expected that at this morning's session Governor Bloxham would deliver an address of welcome and that the work of the convention would begin, but owing to the fact that a great many delegates, who expected to be here, were en route and would arrive on incoming trains, it was thought best to defer further action until to-morrow.

The Congress then adjourned until 11 o'clock a. m., January 20.

THURSDAY, *January 20.*

The Congress was called to order by Temporary Chairman Gillett. The secretary then read the following call of Governor Bloxham for the Congress:

EXECUTIVE MANSION, *Tallahassee, Fla., April 14, 1897.*

Impressed with the importance of propagating and protecting the fish in the waters of the United States, and the necessity of devising means and formulating methods to save from total extinction many varieties of valuable food-fish, we have deemed it proper to issue a call for a National Fishery Congress to assemble at Tampa, Fla., on the 19th day of January, 1898.

The National Fishery Commission of the United States will take a prominent part in the proceedings of this assembly.

We respectfully request the governors of the various States of the Union, and the fishery commissioners of the same, to appoint delegates to this Congress, which should command the earnest

attention of all good citizens of the United States. In this interest we commend the words of Hon. T. T. Wright, who says:

"The water farms of the United States, oceans, lakes, and rivers, are neglected and but half developed. Let us turn on them the search-light of science to reveal their treasures and possibilities, and thereby increase openings for new fields of labor and a larger supply of food for mankind."

Trusting that this Congress will receive the consideration it deserves, and that its deliberations may prove beneficial to the citizens of the United States and the world at large,

W. D. BLOXHAM,
Governor of Florida.

Mr. Gillett then addressed the meeting, welcoming the delegates in behalf of the city of Tampa, after which he introduced Governor Bloxham, who spoke as follows:

The assembling of this Fishery Congress is the result of the suggestion of Col. T. T. Wright, one of the most progressive intellects of the South. His presentation of the possibilities of such a meeting was the prompting cause of my issuing the call, and he organized the movement so well executed by Tampa's board of trade and Dr. H. M. Smith of the United States Commission of Fish and Fisheries. Tampa's representative will bid you welcome to this city; and I have been requested to welcome you not only to this progressive and prosperous city, but to Florida. I take pleasure in performing the task, feeling that in doing so I but voice the sentiments of our entire people.

I welcome you to a State whose history is the most romantic in the annals of America. When familiar with the raiment with which nature has clothed her—the richest that a tropical luxuriance could furnish so captivating a figure—with her limpid streams glistening like sheens of silver under a semitropical sun; with deep-bedded rocks reflecting with a dazzling brilliancy God's great orb of light, and penciled fringes of the richest foliage adding a halo to their unsurpassed beauty, can we wonder that fable's persuasive tongue invested her with treasures surpassing the famed El Dorado? Are we surprised that imagination's "weird sisters" pictured her waters as holding by divine right the most precious of Hygeia's elixir to restore honorable but tottering infirmities to the freshness and vigor of robust manhood, and that the hope of this famed fabled physical regeneration should have served as an irresistible stimulant to Spain's lion-hearted cavalier, Ponce de Leon?

You meet here upon historic ground, where the footprints of some of Spain's greatest cavaliers and America's noblest captains can be traced. While it is not my intention to recur to their heroic deeds, or to offer you a cup filled with the ambrosia of ancient story, yet there is one romance, based upon historic fact, associated with this very spot, that I feel you will kindly indulge should a brief reference thereto be made.

Wherever the history of America is read, there the story of Pocahontas is known. The romance is most captivating, and some of Virginia's most honored sons trace back a lineage to this daughter of the forest. But the historic fact that a similar scene was enacted on this very spot, three-quarters of a century before the name of Pocahontas was ever lisped by English lips, is unknown even to many Floridians.

It was here, in 1528, twelve years before De Soto landed upon Tampa's Bay, that Juan Ortez, a Spanish youth of eighteen, having been captured at Clearwater, was brought before Hirrihugua, the stern Indian chief, in whose breast was rankling a vengeance born of ill treatment of his mother by the followers of the ill-fated Narvaez. Ortez was young and fair, but the cruel chief had given orders, and here was erected a gridiron of poles, faggots were prepared, and young Ortez was bound and stretched to meet the demands for a human sacrifice. The torch was being applied, the crackling flames began to gather strength for a human holocaust, when the stern chief's daughter threw herself at her father's feet and interposed in Ortez's behalf. Her beauty rivaled that of the historic dame "whose heavenly charms kept Troy and Greece ten years in arms." The soft language of her soul flowed from her never-silent eyes as she looked up through her tears of sympathy, imploring the life of the young Spaniard. Those tears, the ever-ready weapon of a woman's weakness, touched the heart of even the savage chief, and Ortez was for a time spared.

But the demon of evil in a few months again took possession of Hirrihugua, and his daughter saw that even her entreaties would be unavailing. She was betrothed to Mucoso, the young chief of a neighboring tribe. Their love had been plighted—that God-given love that rules the savage breast as—

"It rules the court, the camp, the grove,
And men below, and saints above."

Her loving heart told her that Ortez would be safe in Mucoso's keeping. At the dead hour of night she accompanied him beyond danger, and placed in his hands such tokens as Mucoso would recognize. She acted none too soon. As the sun rose over this spot its rays fell upon the maddened chief, calling in vain for the intended victim of his revenge. His rage was such that it dried up the wellsprings of parental affection, and he refused the marriage of his daughter unless Ortez was surrendered. But that Indian girl, although it broke the heartstrings of hope, sacrificed her love to humanity; and Mucoso sacrificed his bride upon the altar of honor. Ortez lived to welcome De Soto.

Tell me, aye, tell the world, where a brighter example of noble virtue was ever recorded. Where in history do you find more genuine and more touching illustrations of "love, charity, and forgiveness"—the very trinity of earthly virtues and the brightest jewels of the Christian heaven? What a captivating theme this Florida Pocahontas should present to the pen of imagination picturing this spot, then and to-day associated with romance rich in historic lore!

But I am here to welcome you to this National Fisheries Congress; and what location more fitting for such a congress than the shores of this western Mediterranean, the Gulf of Mexico.

Mathew Maury, that great intellect and writer on the currents of the oceans, that great map-maker of the air that circles above Old Ocean's waves, states it as a physico-commercial fact that "the area of all the valleys which are drained by the rivers of Europe that empty into the Atlantic, of all the valleys that are drained by the rivers of Asia that empty into the Indian Ocean, of all the valleys that are drained by the rivers of Africa and Europe that empty into the Mediterranean, does not cover an extent of territory as great or as fertile as that included in the valleys drained by the American rivers alone, which discharge themselves into this our central sea."

Those vast valleys furnish waste organic matter that is brought into this inland sea, furnishing abundant food for animal life. The temperature of the waters of the Gulf of Mexico and the Caribbean Sea is most favorable to the development of the lower orders of animal life; and the animalcula and small fish feed upon this abundant supply of food, and in turn become food for larger fish. The Gulf Stream, originating in the Caribbean Sea, sweeping through the Gulf of Mexico and around the entire coast of Florida, helps to bring to our very doors this vast food supply, and gives us the best of feeding-grounds, many times the area of our State.

What State, then, more suitable in which to organize a national fishery congress than Florida? Stimulated by the erroneous sentiment that America's fishery resources, on account of the great area and capabilities of her waters, are practically inexhaustible, improvidence has led, in many States, to useless and wasteful destruction that tends strongly to the depletion of their waters.

The valleys drained into the Gulf of Mexico and the Caribbean Sea range through all the producing latitudes of the world and embrace every agricultural climate under the sun. Upon their green bosom rests the throne of the vegetable kingdom; and in the near future, when the waters of the Atlantic and Pacific shall be allowed to commingle through a canal across Central America, the commerce of the world will here hold its court.

Public sentiment is becoming largely directed and educated up to a full comprehension of the importance of the industry, and the General Government is lending its powerful aid to the dissemination of information and the propagation of valuable species of food-fish. With such earnest and intelligent workers as are now in the Government employ and at the head of this great work, with the various States cooperating, we may confidently look to a cessation of useless improvidence and an increase in the supply of desirable food-producing fish. And what efforts more commanding and deserving greater consideration than the suggesting of new fields of labor looking to increasing the food supply of mankind? And where can we look more confidently for such increase than in the water farms of America?

This Congress is really in the interest of the highest civilization, for no questions are of more moment than the increase or diminution of a wholesome food supply for mankind.

But, Mr. Chairman, I am not here to discuss any of the phases of the many questions that may be brought to the attention of this Congress. That will be the work of specialists and experts. I am here simply to give you a cordial welcome, and in the name and on behalf of the good people of Florida,

"I will welcome thee and wish thee long."

Hon. A. Nelson Cheney, of New York, was then presented and made the following response to the governor's address of welcome:

Your Excellency, Ladies, and Gentlemen: On behalf of the delegates of the National Fishery Congress I desire to thank you, and also the people of Florida, for your most gracious welcome. As you have said, the food problem is a most important one to this country and all countries, and the fish food is not the least important.

Called upon unexpectedly, as I have been, I thought that I could do no better than to state to you the beginning of fish propagation, leading back some centuries. It is said in the encyclopedias that China and Egypt practiced fish-culture. If they did it is not probable that they practiced the fish-culture that we know to-day. The history of our fish-culture has never been written, and I regret that I must trust to my memory as to dates. It is recorded that a French marquis hatched fish in 1420. By those best informed it is believed that he did not do more than to transport the fertilized eggs of fish from one water to another. The real father of fish-culture was Stephen L. Jacobi, a German fish-breeder, who announced the discovery in 1761. He practiced it for some twenty years before that date. His observations were conducted in a little wooden trough, and he himself or his sons continued the work for thirty or forty years. He is undoubtedly the father of fish-culture, as we understand fish-culture to-day. His methods were translated into French, Italian, and English, and George III granted him a life pension.

Down to 1848 there is little or no record of fish-cultural work. Two French fishermen, Remy and Gehin, discovered, as they claimed, the process of hatching fish artificially, and were brought to Paris and there conducted a number of experiments, which happened to be witnessed by Dr. E. S. Sterling, from Cleveland, Ohio, who had as a classmate in Cleveland a Dr. Garlick. Dr. Sterling went abroad to complete his studies, and there witnessed the experiments. In 1853 Dr. Garlick brought trout from Lake Superior to a stream or pond near Cleveland, took the eggs of trout, artificially fertilized them, and hatched them in 1854. Those were the first fish to be hatched artificially in the United States. Dr. Sterling was then in Cleveland and knew nothing about this experiment until he was called on by Dr. Garlick to look at the trout. Dr. Sterling is credited as being the author of the experiments as practiced by Dr. Garlick. Soon after these experiments were made known, as they were in a paper before the Cleveland Academy of Science, it was claimed that the fish had been hatched artificially in 1804 in this country, but this was found to be a mistake.

The first act of any State legislature looking to the propagation of fishes was a resolution passed by the legislature of Massachusetts in 1856. The States formed fish commissions from that date, and in 1872 the United States Fish Commission was organized—largely at the instigation of the American Fisheries Society, as it is now called; it was formerly the American Fish-Cultural Association. One of the first acts of the society was to appoint delegates to go to Washington and recommend the creation of a United States Fish Commission. We all know the workings of the United States Fish Commission and the State fish commissions, because almost every State in the Union has a commission now.

The following telegrams were read:

WASHINGTON, D. C., *January 20.*

The Secretary of State of the United States has the pleasure to extend cordial greetings to the National Fishery Congress now assembled at Tampa, in the hope that its deliberations and results will further the important objects proposed to be attained.

JOHN SHERMAN.

LONDON, ENGLAND, *January 20.*

The world will be benefited by your Fishery Congress. Success to it.

R. MILLER ARNOLD.

DUSSELDORF, GERMANY, *January 19.*

Accept my hearty congratulations for the great movement you have inaugurated. May success attend your deliberations. The International Fishery Congress which you propose to organize is destined to benefit the whole world.

PETER LIEBER.

WASHINGTON, D. C., *January 19, 1898.*

Accept my best wishes for success of National Fishery Congress.

THEODORE ROOSEVELT.

INDIANAPOLIS, IND., *January 19, 1898.*

May the National Fishery Congress be a success is the wish of your Indiana friends.

ALBERT LIEBER.

CHICAGO, ILL., *January 18, 1898.*

Regret exceedingly can not attend Fishery Congress. Sincerely hope meeting will result in greater protection to one of our greatest industries.

H. H. KOHLSAAT.

CHICAGO, ILL., *January 19, 1898.*

Regret extremely inability to attend. Noble industrial enterprise.

THOMAS B. BRYAN.

CHICAGO, ILL., *January 19, 1898.*

Please express to Governor Bloxham and to the Fisheries Congress my regret at being unable to accept his and their very kind invitation, and be good enough to tender my best wishes for the success of the Congress; also present my regards to my old and valued friend, H. B. Plant, whose hospitality I am sure you are all enjoying.

STUYVESANT FISH.

Letters were read from President McKinley, expressing the sincere hope that the Congress would accomplish all that it was assembled for, and from United States Fish Commissioner Brice, conveying his best wishes for the success of the meeting.

In response to calls from the audience Mr. H. B. Plant spoke in part as follows:

I am not a public speaker, and am rarely called upon to make any address, and especially to such an intelligent set of people as I see before me now. It is a pleasure, however, to be here, in the presence of gentlemen who are devoting their time for the benefit of mankind in an effort to promote the propagation and preservation of that excellent food for man—fish. And I thank you, sir, Governor Bloxham, for calling the attention of the American people—not only the American people, but the people of the world generally—to the fact that fish must be protected. It is not an easy matter to protect the fishes of this country, whether it be the fish that swims in the water or the fish that is hidden away in the sands.

You have done well, sir, to call this convention. You have done better, perhaps, than you thought to bring it to the attention of the whole country, as well as to the countries represented here, and to whom invitations have been sent by the Secretary of State of the United States. It is to be regretted that so few foreign delegates have been able to attend. I know, sir, that it was the intention of the Emperor of Japan, through his cabinet, to have sent a delegate here, and I am informed that the occasion for not sending is, as you have announced, a change in the official cabinet of the Emperor. I had the assurance of the prime minister that there was no subject that could be brought to the attention of the Emperor and the cabinet that they felt a greater interest in than that of preserving the fish industry. The Japanese are a great fish-eating people. Fish is their principal article of diet, together with rice, and I am sure that country will regret that it was not able to be represented here.

In response to calls Col. A. A. Wiley, of Montgomery, Ala., made a stirring address.

Mr. W. E. Meehan, of Pennsylvania, from the committee on credentials and permanent organization, announced the list of delegates and made the following report, which was adopted:

We recommend that Mr. A. N. Cheney, of New York, be selected as president of this Congress, and that Dr. H. M. Smith, of Washington, D. C., be selected as secretary of this Congress.

We further recommend that five vice-presidents be hereafter appointed by the president, to preside over the deliberations of this Congress at his invitation.

We further recommend that a committee on resolutions, consisting of one from each State, shall be appointed by the president of this Congress on the nomination of such delegates as may be selected respectively by the representatives from said States.

Mr. Cheney, on taking the chair, made the following address:

Gentlemen of the Congress: I thank you for the honor you have paid me by my selection to preside over your deliberations. I am often asked the question, How many fish arrive at the age that we call adult fish? That is a difficult question to answer; but there is this known: That during a drought in the rivers of Canada, salmon rivers especially, the hatchery men of the State of New York went to the head of one river and secured some salmon eggs. They found that only 2 per cent of the eggs were impregnated. If that, or anything near it, holds true of the salmon family, probably less than 1 per cent is hatched. In all artificial propagation of the salmon family about 95 per cent of all good eggs are hatched. That is a long step forward in fish propagation. We also rear a large percentage of other fish.

But there is still another step, and, as I believe, a most important one, that now deserves attention. Fish-breeders have very little to do with the enacting of laws to protect fish; but it is incumbent upon them to discover some means to feed the fish that are planted in the waters in such large numbers. The State of New York alone last year hatched and planted of various kinds of fish 216,000,000, and the United States Fish Commission, for the year ending June 30, 1897, hatched and planted 586,000,000 fish of various kinds and ages.

Of the value of artificial fish propagation I will only refer you to one item. About 1880 the shad resorts of the Atlantic coast were in a deplorable condition. The shad had fallen off, and something had to be done to restock them, and they were restocked by artificial processes. At that time the catch was 5,162,000 shad. In 1896 the catch was 13,000,000 shad, an increase of 7,900,000 fish, or an increase in the value of the shad product of \$1,580,000, on the basis of 20 cents each to the consumer. That will show the benefit derived from artificial fish propagation.

Pursuant to the recommendations of the committee, the chair announced the following as vice-presidents: Hon. Thomas H. Watts, of Alabama; Hon. Eugene G. Blackford, of New York; Hon. George F. Peabody, of Wisconsin; Hon. P. J. Berckmans, of Georgia; Hon. D. P. Corwin, of Pennsylvania.

The Congress then took a recess until 3 p. m.

The Congress reassembled at 3.30 p. m.

The committee on resolutions, as selected by the respective States, was announced as follows: Alabama, W. K. Pelzer; Florida, John G. Ruge; Georgia, T. B. Felder; Illinois, S. E. Meek; Iowa, A. Holland; Kansas, Albert Finger; Kentucky, Jule Plummer; Louisiana, W. Edgar Taylor; Maine, Henry O. Stanley; Massachusetts, F. Q. Brown; Michigan, Col. Hiram F. Hale; Minnesota, Frank Bruen; Missouri, J. A. Sherman; New Jersey, George L. Smith; New York, Edward Thompson; North Carolina, W. R. Capehart; Pennsylvania, W. E. Meehan; Rhode Island, C. W. Willard; Tennessee, A. J. McIntosh; Vermont, J. W. Titcomb; Wisconsin, Calvert Spensley.

The reading of papers was then taken up, and Mr. W. E. Meehan was called on to present his paper on "The relations between the State fish commissions and the commercial fishermen." The paper was discussed by Messrs. Blackford, of New York; Corwin, of Pennsylvania; Peabody, of Wisconsin; Spensley, of Wisconsin; Cheney, of New York, and Meehan.

The paper of Prof. Jacob Reighard on "Methods of estimating plankton and their value for practical purposes," was read by the secretary.

Prof. W. Edgar Taylor then read his paper on "The establishment of a marine biological station on the Gulf of Mexico."

The paper of Mr. R. M. Munroe, on "The green turtle and the possibilities of its protection and consequent increase on the Florida coast," was read by the secretary.

The Congress then adjourned to meet at 9.30 a. m. January 21.

FRIDAY, January 21.

On the assembling of the Congress the chair asked Hon. L. T. Carleton, of Maine, to speak in connection with the discussion of Mr. Meehan's paper of the previous day, especially the matter of the money expended in Maine each season by anglers. Mr. Carleton said:

I did not expect to take any active part in these proceedings. The printed program as distributed does not call for any paper or speech from any of the Maine delegates, and, sir, I am taken very much by surprise to be called upon this morning to make an address upon any subject connected with the deliberations of this Congress. I have been more than content to be a silent listener to the exceedingly interesting papers that have been read and the timely and lively discussions thereon. I count myself indeed fortunate that I was privileged yesterday to listen to the stirring address of welcome of his honor the mayor of this metropolitan city of south Florida, and that I was permitted to sit here as a delegate and hear the wonderfully eloquent speech of his excellency Governor Bloxham, the chief magistrate of this great and powerful and prosperous Commonwealth. To a person coming as I do from the frozen North to this sunny Southland, the voices of these eloquent and distinguished citizens were sweet music to my ears, more charming, I assure you, than "the voices of many waters." And, sir, I feel that I express the sentiments, the feelings, of delegates from the North, from the West, and, in fact, of all the representatives here assembled, when I declare that we are charmed with the cordiality of the people of this State, greatly pleased with your city and State, and are enjoying ourselves to the fullest extent.

Coming as I do to Florida for the second time only—my first visit was in 1861-62—the patriotic words of Governor Bloxham, when, pointing to the Star-Spangled Banner, the emblem of our national unity and liberty, he declared "that for all time we are one and indivisible, and that we have one flag and one country and one destiny," thrilled me through and through. We are indeed, sir, gathered here from every State in the American Union with unity of purpose, unity of interest to do as best we may to advance the great and important fish and game interests of the nation, as citizens of the best country on God's green earth, under the best government ever yet devised by mortal man. Maine sends greeting to the earnest, patriotic, and brave people of the South, and rejoices in your marvelous prosperity, the evidences of which are seen on every hand.

But I am reminded, Mr. President, that I am expected to say something about the fish and game of the old Pine Tree State—the State of Maine. You will pardon me, sir, when I declare to you that Maine in this respect, as in many others, leads the world. In her limitless forests roam countless numbers of the monarch of the forest, the gigantic moose, the bounding caribou, and the graceful, beautiful Virginia deer. In her more than 2,000 inland seas and lakes are found in greater abundance than elsewhere the square-tailed trout and the landlocked salmon. The great dailies and sporting papers of the American continent are in the habit of referring to Maine as the "Paradise of the sportsman," and this is a very appropriate title, as nowhere else is there such sport to be had for either rod or rifle. We have an area of about 30,000 square miles in extent, and from the nature of the soil and the climate, affording food and cover for numberless herds of deer, caribou, and moose, not to speak of the countless flocks of birds, both resident and migratory, including the ruffed grouse, woodcock, snipe, wild geese, black duck and wood duck, and an endless variety of sea birds—and the whole world is fast learning of our advantages in this respect. In her majestic rivers, those great highways from the mountains to the sea, is found in increasing numbers the best fish that swims the ocean blue, the Atlantic salmon. Wise, well-considered laws we have and an enlightened public sentiment.

Ten thousand citizens of other States during the open season last year, now just closed, came to Maine to fish and hunt, employed our 1,300 registered guides, skilled guides, and spent \$4,000,000 among our people and killed 10,000 deer, 250 moose, 230 caribou, and 160 bears, while \$6,000,000 more were spent there by non-residents last year, by visitors to our seashore and inland summer resorts, making \$10,000,000 expended in Maine last year by non-residents for pleasure.

Do you wonder that the people of Maine are marvelously interested in fish and fisheries? We follow the example of the great Apostle Peter, we go a fishing, and invite everybody to come and do likewise. We have a health-giving, invigorating climate, wondrously charming and enchanting scenery. There is not a poisonous reptile, nor ravenous beast, nor poisonous insect in all her borders; and in her mountain streams, numerous as the sands of the seashore, are the protected nurseries of our lakes, wherein are millions of speckled beauties, the brook trout, and these feeders are so numerous,

so well protected and restocked by artificial propagation as to give assurance that fishing in Maine will be better and still better as the years go and come.

Something has been said here about the constitutional right of a State to enact restrictive or protective laws regulating the times in which and the circumstances under which inland fish and game may be taken. That question has fortunately been settled for all time in the United States. The United States Supreme Court in a late decision has declared that the people of a State, in their sovereign capacity, own the fish and the game within its borders, and may say through its legislature how, when, and where the game and the fish may be taken and disposed of; in other words, the legislature may give a qualified property right or ownership to fish and game lawfully taken. We have found by experience that protective laws are necessary, and that these laws must be enforced. Why, do you know that down in Maine if a person is shot by another while hunting it is called an accident, but if a person shoots a moose or a caribou unlawfully we imprison him four months "without the benefit of clergy."

As true disciples of Isaak Walton we propagate artificially the trout and the salmon, and, aided greatly by the United States Fish Commission, we are constantly making the fishing better, and the multitude is constantly growing larger who come among us, and let me say, though I am no prophet, or the son of a prophet, but only a down-east Yankee, that in these times of wages growing less and still less, and the army of the unemployed constantly being augmented, the Congress of the United States can display wise statesmanship by giving earnest attention to the improvement of fishing, better fishing to those who go down to the sea in ships, better opportunity to secure this good, wholesome food, greater opportunity to willing hands to engage in this great industry. Dollar wheat may be a blessing to the farmers of the West, but it means dearer bread to the toiling millions, but better than dollar wheat would be a greater abundance of fish and game and enlarged opportunities to our laboring people to engage in this great, important, and growing industry.

The committee on resolutions reported organization by the election of Hon. H. O. Stanley, of Maine, as chairman, Hon. Edward Thompson, of New York, as vice-chairman, and Mr. W. E. Meehan, of Pennsylvania, as secretary. The committee also presented a resolution calling for a statement at each session of the program for the next session, which was adopted.

The secretary gave notice of a complimentary excursion to the Manatee River provided for the delegates by the Tampa Board of Trade on Saturday, January 22, on the steamer *Margaret*; also a trip on the U. S. Fish Commission steamer *Fish Hawk* on Tampa Bay, for exhibiting the methods of deep-sea dredging, etc.

The following telegram was read:

OMAHA, NEBR., January 20, 1898.

Unable to be present at meeting of Congress, but send greeting and invite all members to visit Trans-Mississippi and International Exposition at Omaha during meeting of American Fisheries Society third Wednesday in July, current year.

W. L. MAY,
President American Fisheries Society.

The following letter from Mr. A. Milton Musser, of Salt Lake City, Utah, was read by the secretary and discussed by Mr. Edward Thompson, of New York:

It would give me great pleasure to attend the Fishery Congress, were it possible for me to do so.

For the information of the managers I will give brief data respecting the Utah fish industry. The native fishes consist of mountain trout, Williamson's whitefish (both very choice), suckers, chubs, and mullets; more suckers than all others put together.

During my labors for the Territory and the State as fish and game commissioner, I introduced from the East and West and planted in our public waters some 11,000,000 of choice fishes. Most of these were gifts from the general government, and consisted of whitefish, shad, black bass, rock bass, perch, crappie, sunfish, speckled, rainbow, and lake trout, catfish, eels, carp, etc. We hope soon to have an abundant supply of the best of these fishes for home consumption and sale to our neighbors. We have not yet attempted to increase our supplies by artificial means. Our legislators thus far have refused to appropriate funds for a public hatchery. Long ago I came to the conclusion that the only way to

keep our mountain streams stocked with trout would be by turning into them a few million fry every year from a local hatchery. The basses, etc., need no artificial manipulation. They multiply very rapidly, and, as a rule, find suitable places to spawn in the waters in which they are planted.

The salinity of Great Salt Lake is too great for the propagation of fishes. Nothing larger than the brine shrimp is found in its waters. At different periods since the year 1850 the following densities have been observed by different persons: 22.28, 14.99, 16.716, 19.557, and 22.

As has been suggested, I hope your Congress will find some process for drying fish when taken from the water, so that they can be shipped as hay, cotton, etc., are shipped to the marts. This would indeed be a grand consummation, especially if it is comparatively inexpensive.

I have all along contended that an acre of water can be made more remunerative than an acre of land, and when the comparative labor and expense bestowed upon their respective cultivation is considered, the force of the conclusion is irresistible. Our large lakes have never been thoroughly prospected. Only a very limited area has been seined, and we do not know what might be found in the great areas not yet seined.

Under the pressure brought to bear on our legislators by selfish men, an abnormal and no doubt unconstitutional provision was put in the fish and game law of the State, which obliges seiners to hire and pay the warden for his presence during the seining. The provision reads:

"Provided, that before any person shall use a seine * * * such person shall secure the presence of either the county warden or his deputy, who shall be paid not to exceed \$2 per day by the party drawing the seine."

I would be surprised to find any such provision in the fish law of any other State in the Union. To discriminate against fishermen alone is class legislation, and to oblige them to pay a second party to keep them from breaking the law is, indeed, to say the very least, remarkable legislation. The result is that nearly all the seiners are forced out of the business. Another source of evil, which nearly amounts to a crime, is that carp, suckers, etc., are permitted to multiply prodigiously and prey upon the spawn and fry of the good fish and to occupy the waters largely to their exclusion. Further, the poor people who can not afford to pay from 15 to 30 cents per pound for bass, trout, etc., are barred from purchasing the commoner kinds, which by this lawless law virtually prevents their being caught.

The president, having called Vice-president Corwin to the chair, presented his paper, "The Hudson as a salmon stream." In the discussion which followed Messrs. Meehan, Corwin, Titcomb, Thompson, Spensley, Peabody, and Cheney participated.

Dr. H. C. Bumpus, of the Rhode Island Fish Commission, then read his paper on "The importance of extended scientific investigation." In discussing the paper Hon. E. G. Blackford, of New York, said:

The point emphasized by Professor Bumpus as to the proper handling of fish is a very important one, especially to the fishermen of Florida. Some ten years ago, when the first shipment of fresh fish was made to New York from the State of Florida, they were thrown into large casks, indiscriminately, and chunks of ice weighing 15 pounds each were put upon top of the fish, then another layer of fish was thrown upon the ice, and again another layer of broken ice, and the whole put under a canvas cover on the steamer. These were Spanish mackerel. On the arrival of the steamer at New York the entire shipment had to be thrown away, as a large portion of the fish were spoiled by decomposition, and the remainder were so badly bruised as to be unfit for market purposes. This was a costly experiment for the shipper; yet year by year experience has demonstrated to the shippers of fish the importance of careful handling and packing, so that now mackerel, pompano, sheepshead, and other fish are sent from the most remote parts of Florida to the New York market in perfect condition, and bring a fair and remunerative price to the producer.

As an example of the increased returns to the shippers from careful handling, I call the attention of the convention to the fact that certain shipments of shad, going to the New York market from North Carolina, bring from 25 per cent to 40 per cent more than other shad from the same locality. For instance, a certain shipper from Albemarle Sound, North Carolina, pursues the following method: His shad are carefully taken from the nets and placed in a cold room until thoroughly chilled, then packed in boxes; first a layer of fine ice, broken into lumps no larger than chestnuts, is placed in the bottom of the box; then the shad are placed in rows, lying on their backs, making a complete layer on the ice; then a layer of fine ice is spread over the bellies of the shad, and on this layer is another

row of shad; all the shad are packed in a similar way; then the top of the box is filled with fine ice and the cover nailed securely on. These shad reach the New York market in a perfect condition, and so well known has this shipper's mark or brand become that the buyers are always on the lookout for this particular brand, and these shad are the first that are sold and bring the highest prices. On arriving in New York the fish have not moved from their position in the box, the ice is still intact, and on opening the box we find all the fish to be in a perfect condition, each scale undisturbed, and the whole presenting the appearance of a glistening jewel just taken from a casket.

As I said before, these fish bring a very much greater price than other fish shipped from the same locality; the latter have been packed in a careless and slovenly way, and the packages when opened in the New York market do not look inviting, and, as a result, are not sought for and can only be sold by marking down the price.

What I wish to impress upon the shippers and fishermen is that for every dollar invested in labor and ice in packing the fish they will receive \$10 in return.

Mr. J. M. Willson, jr., of Kissimmee, Fla., read a paper on "Florida fur-farming," relating to the breeding of otters in captivity, which was briefly discussed by Mr. Blackford.

A pair of live otters raised in captivity were exhibited.

Col. F. C. Zacharie, of Louisiana, brought up the subject of crayfishes in the Mississippi levees, showing the damage done by a certain species, which appeared only during high water. Dr. H. C. Bumpus, Dr. H. F. Moore, and Mr. C. H. Townsend made remarks on the subject.

A recess was then taken until 3 p. m.

On the reassembling of the Congress, the president called Vice-president Peabody to the chair.

The afternoon session was occupied in the reading of papers and discussions thereon.

Prof. H. A. Smeltz, of Tarpon Springs, Fla., delivered a paper on the "Florida oyster-bars, their depletion and restoration," and exhibited specimens of live oysters attached to various objects, from the vicinity of Tarpon Springs. Mr. Blackford, Dr. Moore, and Colonel Zacharie spoke on the subject.

In the discussion of the paper Mr. Blackford said:

One point as to the oyster question brought forward so very interestingly by Professor Smeltz, in speaking of the efforts that should be made to obtain legislation: He seems to lay a great deal of force upon the fact that a revenue might be obtained from the leasing or selling of these grounds for oyster-culture. I think that is the wrong end of it. I think that the terms should be such as to invite oyster-culture, to protect the industry by giving the man the right, by lease or selling the ground outright, on such terms as would encourage him to go into the business. There is no reason why a revenue should be sought from the oyster-cultivator for the purpose of lowering the tax upon the farmer who occupies the upland. I think this the wrong way to go at it. I think we should make legislation so as to encourage and promote oyster-farming, to obtain such an immense product that it would bring a large business to the State, and consequently wealth, but not particularly for the purpose of raising a revenue for the State and thereby reducing the taxes of other people.

Dr. Moore said:

I have given the subject of oyster-culture some attention during the last year or more. I have been interested in it more or less for a number of years, and I have given particular attention to the facts which Mr. Blackford has just brought up. I am inclined to agree with what he has said. I think the main unfortunate feature of our oyster legislation heretofore has been the effort to get a

large income. The prospects of acquiring a large revenue to the State have been held out. The income to be derived from oyster-culture has been very much magnified by those who have given the subject attention, and legislatures have become imbued with an entirely erroneous idea concerning the matter. Their aim has, therefore, been to secure as large an amount of the revenue as possible, and in many cases this has resulted in the enactment of laws which were practically prohibitory, so far as oyster-culture is concerned. This is the case in the State of Virginia. They have there an enactment allowing the leasing of the land. The annual rental was at first 25 cents per acre. The legislators from the interior of the State of Virginia believed that vast revenues were being derived from these oyster-bars, and it immediately became their aim to secure a larger share of this revenue for the State. The consequence has been that the annual rental has been raised, to the detriment of oyster-culture.

Col. F. C. Zacharie, in discussing the subject, spoke as follows:

As a member of the bar, as a lawyer, I desire to say something in regard to the laws which we have in the State of Louisiana, supplementary to the comments of Mr. Blackford and Dr. Moore. I am not familiar enough with the oyster laws of the other States to say what their provisions are, or what is the principle upon which the oyster tax is based. One of the chief difficulties which we have had in Louisiana has been that oyster-culture is looked upon by a large portion of our legislators as an experiment, and people from the interior are very ill-disposed toward making any experiments which increase taxation upon them. The theory of taxation is that it is a correlative and corresponding duty between the citizens and the government; that the government shall give him protection in life, liberty, and property, and that the tax which is levied on him is simply a correlative duty from the taxpayer to pay his proportionate share toward that protection.

Now, in view of this, we have sought in Louisiana not to derive any revenue for the State beyond the needs of the regulation and protection of the oyster fishery, and so we have held out for very small taxation or fishing licenses, and have a tax upon planted oysters—a very small tax, for the purpose of meeting the expenses of the particular production and regulation of that particular industry—so that we have not sought to make the oyster industries of the State a source of general revenue. This is a tentative process or principle, because we look forward to the day, or at least some of us do, when these industries will become very much developed and very valuable, and of course as they become more valuable and remunerative and the protective system is more detailed and complicated, then will be the time for the State to tax that property, as it does all other property, in proportion to its value.

I believe I make myself clear in announcing that the policy of my State has been not to derive a revenue from the oyster industry as a matter of general revenue, but merely to attempt to raise a revenue sufficient to regulate and protect the industry, and when we placed it on that basis we found that the people from north Louisiana and the interior middle district of Louisiana were perfectly willing to pass any legislation which they thought productive of good in regard to the oyster industry, providing it did not cost them anything.

Mr. Meehan read the paper by Dr. Bushrod W. James, of Philadelphia, on "International protection for the denizens of the seas and waterways."

Mr. J. F. Welborne, of Sanford, Fla., read a paper by Mr. George W. Scobie, of Titusville, Fla., entitled "The fishing industry on the east coast."

Dr. H. F. Moore read an article by Dr. J. P. Moore, of Philadelphia, on "The utility and methods of mackerel propagation."

Adjournment was then taken until Monday morning, January 24.

SATURDAY, January 22.

In the evening, in the music hall of the Tampa Bay Hotel, Mr. Charles H. Townsend, of the United States Fish Commission, gave a lecture on "The world's seal fisheries, with special reference to the American fur-seal." The lecture was illustrated by lantern slides.

MONDAY, *January 24.*

The meeting was called to order by President Cheney. He presented a letter he had received from Mr. Stevison, of New York, relative to a close season for tarpon in Florida, and asked any persons who were informed on the subject of the spawning time of the tarpon to report at the afternoon session.

The president introduced Mr. Chow Tsz-chi, who made the following response in behalf of the Chinese Government:

Mr. President and Gentlemen of the National Fishery Congress: I thank you for your kind reference to my Government and also for honoring the Government of China with an invitation to be represented at this important gathering of learned and distinguished gentlemen who have assembled here in the interest of a work which is destined to benefit mankind and all the nations of the earth. How I long for words in your language to express the feelings of my heart for the many kind attentions extended to me! I came to you a stranger; I leave you as a brother. Governor Bloxham in eloquent words referred to the early pioneers of Florida; I would write in words of gold the deeds of Henry B. Plant, the modern Christopher Columbus, who rediscovered Florida and built the palace which now shelters us. I will ever remember you, kind friends; my heart goes out to you in thanks unspeakable.

May peace, prosperity, and happiness be with you and the people of the United States forever!

The president presented Capt. E. N. del Arbol, of the Spanish navy, who said:

I wish to congratulate you on the interest you are taking in such an important matter to you and to the world at large as that which pertains to fish and fisheries; to congratulate you, too, on the numerous and valuable papers that are being read here; to thank you in behalf of my country for the courtesy in inviting it to participate in this Congress, and for the kindness you have shown to its delegate; and allow me to express my desire that in some time to come all the navies of the world, to one of which I belong, may be a large police force whose principal duty may be to protect fish and fisheries for the benefit of mankind and to enforce the wise laws enacted for this purpose.

The committee on resolutions reported the following, which were adopted:

Whereas it is the opinion of this Congress that every State should have a well-organized and active board of fish commissioners, whose duty it should be to foster the fishery interests of their respective States; to advise the legislatures in all matters pertaining to fishery legislation; and to secure by protective, fish-cultural, and educational methods the preservation and increase of useful water products: Therefore, be it

Resolved, That this Congress recommends to those States having no fish commission the appointment of such at the earliest practical date.

Resolved, That at least one member of each commission should be a man of scientific attainments, competent to intelligently deal with the biological phases of fish commission work.

Resolved, That a copy of these resolutions be sent to the governor of each State having no fish commission, requesting him to bring the matter to the attention of the legislature; and that a copy also be sent to the governors of those States which now have such commissions.

The following resolutions were also reported and adopted:

Whereas, recognizing the great extent of the Gulf coast line and the fact that this section possesses excellent food fishes in greater abundance than elsewhere; that her superior oyster facilities are being rapidly depleted by lack of proper protection and investigation; that this section possesses shrimp and other resources of great interest, with the possibility of development of still other industries as yet untried; that climatic conditions being different from other sections of our country renders it necessary that the fauna of this region be given individual study; and, furthermore, wishing in every reasonable way to stimulate and encourage each and all of the States of the Gulf region to a more active interest in our fisheries: Therefore, be it

Resolved, That this Congress express itself as favoring the location and equipment of a national fish-hatchery and laboratory at some central and suitable location on the Gulf coast, to be under the control and direction of the United States Commission of Fish and Fisheries.

Resolved, That this Congress appoint a committee of five, one from each of the States bordering the Gulf, whose duty it shall be to urge upon the United States Congress the necessity for making an appropriation for carrying on this hatchery and laboratory.

The committee appointed in pursuance of this resolution was later announced, as follows: Florida, Mr. John G. Ruge; Alabama, Maj. A. A. Wiley; Mississippi, Mr. Frank Howard; Louisiana, Prof. H. A. Morgan; Texas, Prof. W. W. Norman.

In acknowledgment of the telegram from Mr. W. L. May, president of the American Fisheries Society, the following resolution was adopted:

Resolved, That the National Fishery Congress now assembled in Tampa, Fla., accepts the greeting and invitation of the American Fisheries Society, and hereby expresses the hope that the purpose and result of this Congress may, with their aid and approval, become an international one in full effect.

Resolved, further, That the secretary of this Congress transmit a copy of this resolution to the President of the American Fisheries Society.

A resolution was also adopted providing that in the presentation of papers preference be given to those accompanied by their authors, and another recommending that the proceedings of the Congress be terminated on this date.

Dr. H. F. Moore, in referring to the resolution relative to the establishment of a biological station on the Gulf coast, called attention to the large prawns found in the waters of Tampa Bay by the *Fish Hawk* while engaged in experimental trawling, and their prospective importance to the State.

Col. F. C. Zacharie discussed the resolution relative to fish commission boards, and asked for information relative to the organization of such boards. He gave notice of the calling of a proposed meeting of the people of Louisiana interested in fishery matters, and announced that later there would be a convention of the Gulf States for the purpose of securing uniform legislation and interstate cooperation.

Mr. Meehan referred to the valuable aid rendered the Pennsylvania Fish Commission by fish-protective associations, and the financial assistance given the commission after the failure of the legislature to make any appropriation for the current year.

The president then yielded the chair to Hon. E. G. Blackford, vice-president, who spoke briefly on the oyster question, and presented Dr. H. F. Moore, who delivered a paper on "Some factors in the oyster problem."

Mr. Edward Thompson, shellfish commissioner of New York, spoke on the extent of the oyster-planting business. His remarks, in substance, were as follows:

The sensible oysterman leaves natural grounds alone. After Mr. Blackford had secured a law to permit the use of barren bottoms in New York, the business increased rapidly. The great importance of liberal laws, the prohibition of poaching, and the taking up of barren grounds should be emphasized. The business is almost certain to be successful. The fifteen-year lease is a failure, as five years may be required to get a set. There should be a perpetual lease. I am a successful grower, and give the credit of it to Mr. Blackford, the gentleman in the chair. The present law ought to give place to the old Blackford law, which is good enough for all. All the members should go home and secure the enactment of liberal planting laws, where none exist. I once got a lease of 200 acres of bottom in Long Island Sound, spending \$9,000 in cleaning the grounds, and planted 45,000 bushels of shells and 1,500 bushels of large oysters thereon. In a year I sold out my half interest for \$30,000 and bought it back in two years for \$50,500 at public auction.

Mr. John G. Ruge, of Apalachicola, Fla., then read a paper on "The oysters and oyster-grounds of Florida."

In response to an inquiry of Mr. Blackford as to whether any delegate could present information on the subject of raising seed oysters in claires or ponds according to the French system, Colonel Zacharie spoke as follows:

I know of no such experiment having been tried in the Gulf States or indeed anywhere in this country. I may add, however, that members of the Bayou Cook Fish and Oyster Company have discussed the feasibility of an experiment in that direction on a small scale on their property, as it

could be tried at trifling expense. The current in Bayou Cook, like that in nearly all the salt or brackish bayous, while bringing down the finest food for the fattening of planted oysters, prevents to a great degree the satisfactory "fixing of spat," as the spawn is carried out, in large part, into Bastian Bay or the Gulf, into which Bayou Cook empties, where it is nearly entirely lost. The reckless and wasteful fishing of the natural reefs in that neighborhood has denuded and destroyed them, so that planters in the bayou now have to go over 60 miles to the westward, mainly to Timbalier Bay, to get seed or young oysters for planting. The Timbalier natural reefs are being rapidly exhausted from the same causes as the eastward, and fishing in a few years will be entirely exhausted unless the matter is regulated by stringent legislation and execution of the laws. The planters, and indeed the fishers for market, will be forced to go farther west still when the Timbalier fisheries are destroyed.

It is therefore contemplated for the company to raise its own seed in the following manner: The soil on the banks of the bayou being soft and marshy, an area of a quarter or half an acre can be readily excavated by spading to the depth of from 4 to 6 feet. An inlet, say 10 feet wide, can be cut in from the bayou so as to admit the waters thereof, and a similar outlet can be made into the bay, through which the water can be partially discharged into the sea at low tide, the reverse flow taking place at high tide. These openings may be closed by close-meshed nettings of galvanized wire or other suitable material, so as to protect the breeding oysters and spawn in the pond to a great extent at least from drumfish, starfish, boxers, conchs, crabs, and other enemies of the oyster. Benches of poles can then be erected in the "claire" or pond, and on them will be placed earthenware tiles, or half tiles, previously limed. These tiles or half tiles can be procured from a tile factory a few miles above on the Mississippi River at a nominal price for the broken or damaged unsalable half tiles which would answer the purpose.

The pond or "claire" can then be stocked with breeding oysters, carefully selected from prime stock. Indeed, by importation from northern and eastern quarters, crosses could be experimented with by interbreeding with the native bivalve. In the spawning season the ova of the female and the milt of the male would, in this comparatively still water, more readily coalesce with their "affinities" of the opposite sex, and a larger product of the embryo oyster be furnished. This embryo or "spat" would readily "fix" on the tiles. When this spat is sufficiently developed in size to plant, the wire-netting screens can be removed and small flatboats or shallops introduced into the "claires," the tiles covered with spat removed from the benches and loaded on the flatboats. These being carried out into the bayou, the young plants can be scaled off the tiles with trowels or similar instruments, and dropped into and on the plant or growing beds, there to fatten, grow, and mature until ready for market. The tiles being then relimed may be placed back in the "claires" ready for the "fixing" of the next season's spat. In other words, the "claires" would be used as nurseries for the raising and growing of spat, which might be perhaps further improved and developed by artificial feeding.

The system is called the "French," but is in fact the old Roman method, as frequent mention is made in the old Latin writers of "oyster ponds." The French, it is said by French writers, have also made use of these "claires" as "écoles des huitres," by which they profess to be able to teach the oysters, by gradually increasing the length of time, during which the oyster is without water, to take in an extra supply of water like a camel about to cross a desert, so as to last through transportation on long voyages and keep the mollusks in good condition. It is not definitely known that this last method has ever been tried in America, although it is believed that it has been—and that successfully. American biologists (humorously styled here "oyster sharps") are, however, skeptical on the subject. The French governmental reports seem to substantiate the practicability of the method.

In case the idea is adopted, when the Bayou Cook Company gets into operation it will report progress and results to the United States Fish Commission. If successful, each oyster-culturist will be independent of the natural reefs, can obtain all the necessary seed or spat in his own inclosure, and vastly improve the poorer species of the native oyster by interbreeding with other and choicer varieties, besides improving much the preservation of oysters in shipment in their full excellence when delivered to the consumer at far distant points. If successful, it could be conducted on a very large scale, and it would be profitable for some planters to embark in the business of raising and selling the young plants exclusively as a special branch of the trade. It would produce a revolution in oyster-culture.

In reference to the opposition of oystermen to the enactment of oyster-planting laws, Mr. Blackford referred to meetings at which the oyster fishermen had had their

opposition allayed by being shown that they would have more regular and remunerative employment on planted grounds than if they worked on the natural grounds.

Mr. John Y. Detwiler, of New Smyrna, Fla., read a paper on "Experimental oyster-culture."

A recess was then taken until 3 p. m.

At the opening of the afternoon session a paper entitled "The Florida commercial sponges: their nature, protection, and cultivation," was read by Dr. Hugh M. Smith and discussed by Professor Smeltz and the author.

The committee on resolutions reported the following, which were adopted by a rising vote:

Resolved, That the National Fishery Congress acknowledges the call of his excellency W. D. Bloxham for the existence of this Congress, as well as the inception of the idea to Col. T. T. Wright, and hereby gives an expression of appreciation and grateful thanks to Mr. H. B. Plant, not only for his general interest in the purpose of this Congress, but for his liberal hospitality in furnishing the use of the hall for the Congress, the excursion by train and steamer; and in thus manifesting our appreciation we also gratefully acknowledge the courtesy of his honor M. E. Gillett, mayor of Tampa, as also of Mr. H. Cunningham, the efficient secretary of the Board of Trade of Tampa, for their cordial greeting; be it further

Resolved, That we extend our thanks to Lieut. Franklin Swift for the pleasant trip on the United States Fish Commission steamer *Fish Hawk*; be it still further

Resolved, That the secretary of the Congress furnish a copy of these resolutions to those above mentioned.

The question of publishing the proceedings of the Congress being under consideration, the following resolution was passed, and pursuant thereto Dr. H. M. Smith and Mr. W. E. Meehan were selected by the chair to constitute, with himself, the committee on publication:

Resolved, That the president of this Congress appoint two persons, who, with himself, shall constitute a committee on publication, with powers to arrange for the editing, printing, and distribution of the papers here presented.

Col. F. C. Zacharie, of New Orleans, presented his paper on "The oyster industry of Louisiana," which was discussed by Mr. Blackford and Colonel Zacharie.

Dr. S. E. Meek, of Chicago, read a paper entitled "The utility of a biological station on the Florida coast in its relation to the commercial fisheries."

Dr. H. C. Bumpus brought up a topic which had been referred to in the paper of Professor Smeltz read on January 21, namely, the alternating sexuality of the oyster. He asked the author to state the basis for his remark that the sex of the common Eastern oyster changes from season to season, and requested an outline of the experiments on which the statement was founded. Professor Smeltz said he had had about 400 oysters under observation, and about 2 per cent of them apparently exhibited the condition stated. Dr. Bumpus, Dr. Moore, and Mr. Blackford referred to the great liability of error in the experiments and observations, and thought Professor Smeltz should not make a positive statement until crucial tests had been applied.

Owing to the fixing of an earlier date for final adjournment than had been anticipated, a number of papers could not be read. These were read by title by the secretary, who outlined their scope.

The following are the titles of the papers:

- Possibilities of an increased development of Florida's fishery resources. By John N. Cobb.
 The fish fauna of Florida. By Prof. B. W. Evermann.
 A plea for the development and protection of Florida fish and fisheries. By Dr. James A. Henshall.
 The protection of the lobster fishery. By Prof. Francis H. Herrick.
 Oysters and oyster-culture in Texas. By I. P. Kibbe.
 Parasitism among fishes considered from an economic standpoint. By Prof. Edwin Linton.
 The black bass in Utah. By John Sharp.
 Some notes on American shipworms. By Dr. Charles P. Sigerfoos.
 The restricted inland range of the shad due to artificial obstructions, and its effect on natural reproduction. By Charles H. Stevenson.
 Some brief reminiscences of the early days of fish-culture in the United States. By Livingston Stone.
 The methods, limitations, and results of whitefish culture in Lake Erie. By J. J. Stranahan.
 The lampreys of central New York. By H. A. Surface.
 The oyster-grounds of the west coast of Florida: Their extent, condition, and peculiarities. By Lieut. Franklin Swift.
 The past, present, and future of the red-snapper fishery in the Gulf of Mexico. By A. F. Warren.
 The feasibility of propagating sponges from the egg. By Prof. H. V. Wilson.

A motion of thanks to the officers of the Congress was adopted by a rising vote. The Congress then, at 5.30 p. m., adjourned sine die.

In the evening, in the music hall of the Tampa Bay Hotel, Mr. George F. Kunz, of New York, delivered an address on the fresh-water pearl fisheries of the United States, and exhibited some choice specimens of pearls and pearl-bearing mussel shells.

HUGH M. SMITH,
Secretary of National Fishery Congress.

LIST OF DELEGATES IN ATTENDANCE AT THE NATIONAL FISHERY CONGRESS.

ALABAMA:

Joel C. Barnett, Montgomery.
 R. F. Ligon, jr., Montgomery.
 W. K. Pelzer, Montgomery.
 W. F. Spurlin, Camden.
 Alexander Troy, Montgomery.
 T. H. Watts, Montgomery.
 A. A. Wiley, colonel, chief of ordnance, governor's staff, Montgomery.

FLORIDA:

W. H. Bigelow, Tarpon Springs.
 F. G. Bunker, Cedar Keys.
 J. S. Custaing, mayor, Tarpon Springs.
 W. W. K. Decker, Tarpon Springs.
 John Y. Detwiler, New Smyrna.
 J. A. Enslow, jr., Board of Trade, St. Augustine.
 John Fiernally, Orlando.
 Frank Hyers, Palmetto.
 John W. Jackson, Palmetto.
 Raymond D. Knight, mayor, Jacksonville.
 W. T. McCreary, Cedar Keys.
 William Macleod, St. Petersburg.
 C. E. McNeil, Palmetto.

FLORIDA—Continued.

H. E. Mills, Tampa.
 W. A. Rawls, State chemist, Tallahassee.
 John G. Ruge, Apalachicola.
 George W. Scobie, Titusville.
 Henry A. Smeltz, Tarpon Springs.
 H. D. Stratton, Board of Trade, Jacksonville.
 S. Stringer, mayor, Brooksville.
 Dr. C. B. Sweeting, Key West.
 W. S. Ware, Board of Trade, Jacksonville.
 J. F. Welborne, Sanford.
 J. M. Willson, jr., Kissimmee.

GEORGIA:

A. H. Adams, Macon.
 J. H. Alexander, Augusta.
 P. J. Berckmans, Augusta.
 E. P. Black, Atlanta.
 H. H. Cabaniss, Atlanta.
 H. F. Emery, Atlanta.
 T. B. Felder, jr., Atlanta.
 V. L. McLendon, Atlanta.
 S. G. McLendon, Thomasville.
 H. L. Mershon, Brunswick.

GEORGIA—Continued.

C. W. Parrott, Atlanta.
J. J. Spaulding, Atlanta.
R. D. Spaulding, Atlanta.

ILLINOIS:

August Hirth, Chicago.
Dr. S. E. Meek, assistant curator of zoology, Field Columbian Museum, Chicago.

IOWA:

A. Holland, Des Moines.

KANSAS:

Judge Albert Finger, Girard.

KENTUCKY:

Dr. H. Garman, professor of zoology, State University, Lexington.
R. P. Jacobs, Danville.
Jule Plummer, Newport.

LOUISIANA:

H. A. Morgan, representative Louisiana Society of Naturalists; professor of zoology, State University, Baton Rouge.
W. Edgar Taylor, professor of biology, Louisiana Industrial Institute, Ruston.
C. J. Wenck, New Orleans.
F. C. Zacharie, New Orleans.

MAINE:

L. T. Carleton, chairman Maine Fish and Game Commission, Augusta.
Charles E. Oak, member Maine Fish and Game Commission, Caribou.
H. O. Stanley, member Maine Fish and Game Commission, Dixfield.

MASSACHUSETTS:

F. Q. Brown, Boston.

MICHIGAN:

C. E. Brewster, Grand Rapids.
Hiram F. Hale, Battle Creek.

MINNESOTA:

A. J. Boardman, Minneapolis.
Frank Bruen, Minneapolis.

MISSOURI:

John A. Sherman, St. Louis.

NEW HAMPSHIRE:

O. L. Frisbee, Portsmouth.

NEW JERSEY:

George L. Smith, member New Jersey Fish and Game Commission, Newark.

NEW YORK:

Eugene G. Blackford, New York.
A. Nelson Cheney, State fish-culturist, New York Fish Commission, Glens Falls.
Warren N. Goddard, New York.
G. E. Jennings, publisher The Fishing Gazette, New York.
George F. Kunz, New York.
C. L. MacArthur, editor The Troy Budget, Troy.
Edward Thompson, New York shellfish commissioner, Northport.

NORTH CAROLINA:

Dr. W. R. Capehart, Avoca.
Frank Wood, Edenton.

OHIO:

Albert Brewer, member Ohio Fish Commission, Tiffin.

PENNSYLVANIA:

D. P. Corwin, secretary Pennsylvania Fish Commission, Pittsburg.
Jacob Dowler, member Pennsylvania Fish Protective Association, Philadelphia.
W. E. Meehan, member Pennsylvania Fish Protective Association, Philadelphia.
Mrs. W. E. Meehan, Philadelphia.

RHODE ISLAND:

Dr. H. C. Bumpus, member Rhode Island Fish Commission; professor of comparative anatomy, Brown University, Providence.
Charles W. Willard, member Rhode Island Fish Commission, Westerly.

TENNESSEE:

Dr. W. H. Jarman, Knoxville.
J. O. Kirkpatrick, jr., Nashville.
A. J. McIntosh, Nashville.

VERMONT:

Dr. James B. Tanner, Burlington.
John W. Titcomb, superintendent U. S. Fish Commission station; member of the Vermont Fish and Game League, St. Johnsbury.
Henry Wells, Burlington.

WASHINGTON, D. C.:

Dr. H. F. Moore, naturalist, steamer *Albatross*, U. S. Fish Commission.
T. C. Pearce, car and messenger service, U. S. Fish Commission.
W. de C. Ravenel, in charge Division of Fish Culture, U. S. Fish Commission.
Dr. H. M. Smith, in charge Division of Scientific Inquiry, U. S. Fish Commission.
Lieut. Franklin Swift, U. S. N., commanding U. S. Fish Commission steamer *Fish Hawk*.
Dr. J. S. Thompson, U. S. Fish Commission steamer *Fish Hawk*.
C. H. Townsend, in charge Division of Statistics and Methods of the Fisheries, U. S. Fish Commission.

WISCONSIN:

George F. Peabody, vice-president American Fisheries Society, Appleton.
Hon. Calvert Spensley, member Wisconsin Fish Commission, Mineral Point.

CHINA:

Chow Tsz-chi, Chinese legation, Washington, D. C.

SPAIN:

José Buigas, Spanish vice-consul.
Capt. E. R. del Arbol, Spanish navy.
Pedro Solis, Spanish consul.

INTERNATIONAL FISHERY ASSOCIATION.

On January 25, 1898, at the close of a session of the National Fishery Congress, convened at Tampa, Fla., persons interested in the formation of an international fishery association met. Prof. Herman C. Bumpus, of Brown University, Providence, R. I., a member of the Rhode Island Fish Commission, was made temporary chairman, and Dr. Hugh M. Smith, of the United States Commission of Fish and Fisheries, was made temporary secretary. The following letters were read:

[Society for Professional and Technical Instruction in the Marine Fisheries.]

Dr. H. M. SMITH,

United States Fish Commission:

We will hold at Dieppe, in the latter part of August, 1898, an International Congress of Marine Fisheries under the presidency of M. Perrier, member of the Institute. We will organize in 1900 a third International Congress. If you organize at the Congress of Tampa an International Fish Society, this society would have charge of the organization of the Congress of Dieppe and of that of Paris in 1900.

I hope that you have requested the minister of marine to be represented at the Congress of Tampa. If not, it would be necessary to do so immediately, in order that we may avail ourselves of the opportunity.

Please accept, dear doctor, the assurance of my highest consideration.

25 QUAI SAINT-MICHEL,
Paris, November 19, 1897.

E. CACHEUX,
*President of the Society for Professional and Technical
Instruction in the Marine Fisheries.*

PARIS, January 14, 1898.

MR. PRESIDENT: Not being able, to my regret, to be present with you at this time, I desire to announce to the members of the Congress at Tampa, that the Second International Congress of Fisheries and Agriculture will assemble at Dieppe on September 5, 1898. At the general meeting the following questions will be considered:

1. The economical transportation of fish by railroads.
2. Modifications of the rules relating to lights on fishing vessels, to avoid collisions.
3. Actual conditions of oyster-culture in France, and of the culture of mollusks.
4. Mutual agreements among sea fishermen to provide remedies in case of loss of apparatus, etc.
5. Effects of trawling near the coast.

At the meetings of the sections various questions of interest will be discussed, among which I will cite:

Diseases caused by the consumption of fish and shellfish taken from polluted waters.

Practical means of improving the lodgings of marine fishermen.

Charts of fishing banks.

I have addressed to you by the same mail a report of the proceedings of the first congress.

It will be desirable that the United States unite with us in organizing the International Society of Marine Fisheries or, rather, a permanent committee which will interest itself in such international congresses, and especially that which will be held in Paris in 1900.

Please accept the assurances of my highest esteem.

E. CACHEUX,
*President of the Society for Professional and Technical
Instruction in the Marine Fisheries.*

A telegram was read from Hon. John Sherman, Secretary of State of the United States, expressing his interest in the formation of an international association and stating that he would take pleasure in bringing the matter appropriately to the attention of foreign Governments.

After informal discussion of the importance and functions of such an association, the following resolutions were adopted:

Resolved, That pursuant to published announcements, there be organized at this congress an *International Fishery Association* for the promotion of friendly relations, the exchange of information and experience in fishery and fish-culture matters, and cooperation in preserving and protecting the fishery resources among the nations of the earth.

Resolved, That there be chosen at this time by this meeting a president, two vice-presidents, and a secretary and treasurer, and a committee, not to exceed forty persons, who, with the officers named, shall constitute an executive board. This board is authorized to appoint an advisory board, consisting of persons of all nations who are prominently identified with the fisheries, fish-culture, fish protection, and the study of water animals. The executive board is also empowered to select a suitable number of vice-presidents at large for the United States and foreign countries and any other officers who may appear desirable. This board is further authorized to formulate rules for the government of the association, to fill vacancies, and to call meetings, five members constituting a quorum.

The following officers were then elected:

President: Prof. Alexander Agassiz, Museum of Comparative Zoology, Cambridge, Mass.

Vice-Presidents at Large:

Prof. Edmond Perrier, Paris, France, member of the Institute and president of International Congress of Fisheries and Agriculture to meet at Dieppe, France, in September, 1898.

Hon. A. Nelson Cheney, chief fish-culturist of the State of New York, Glens Falls, N. Y.

Secretary-Treasurer: Dr. Hugh M. Smith, U. S. Commission of Fish and Fisheries, Washington, D. C.

The following members of the executive board were also elected:

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| Hon. George M. Bowers, United States Commissioner of Fish and Fisheries (ex officio), Washington, D. C. | Prof. David S. Jordan, president Leland Stanford Junior University, California. |
| Hon. A. A. Adee, Assistant Secretary of State, Washington, D. C. | Mr. Marshall J. Kinney, Astoria, Oreg. |
| Hon. L. T. Carleton, chairman Maine Fish and Game Commission, Augusta, Me. | Prof. C. C. Prince, Superintendent of Fisheries of Canada, Ottawa, Canada. |
| Mr. Clarence B. Mitchell, Boston, Mass. | Mr. Adolphe Neilsen, Superintendent of Fisheries, St. Johns, Newfoundland. |
| Prof. Herman C. Bumpus, member of Rhode Island Fish Commission, and professor of comparative anatomy in Brown University, Providence, R. I. | Mr. R. B. Marston, The Field, London, England. |
| Hon. Eugene G. Blackford, New York, N. Y. | Mons. Raveret-Wattel, Paris, France. |
| Mr. William E. Meehan, Pennsylvania Fish Protective Association, Philadelphia, Pa. | Mr. S. Jaffé, Osnabrück, Germany. |
| Prof. Theodore Gill, Smithsonian Institution, Washington, D. C. | Mr. C. J. Bottemanne, Berg-op-Zoom, Netherlands. |
| Dr. W. R. Copehart, Avoca, N. C. | Dr. C. G. Joh. Petersen, Copenhagen, Denmark. |
| Hon. W. D. Bloxham, governor of Florida, Tallahassee, Fla. | Dr. Rudolph Lundberg, Stockholm, Sweden. |
| Col. F. C. Zacharie, New Orleans, La. | Prof. A. Landmark, Inspector of Fresh-water Fisheries, Christiana, Norway. |
| Prof. Jacob Reighard, professor of zoology, University of Michigan, Ann Arbor, Mich. | Mr. Alexander Hintze, Helsingfors, Finland. |
| Prof. S. A. Forbes, professor of zoology, University of Illinois, and director of the Illinois Laboratory of Natural History, Urbana, Ill. | Dr. Nicolas Borodine, Russian Association of Fisheries and Fish-Culture, Uralsk, Russia. |
| | Dr. Anton Dohrn, director of the Naples Laboratory, Naples, Italy. |
| | Capt. Guilio Ricotti, Leghorn, Italy. |
| | Capt. E. R. del Arbol, Spanish Navy. |
| | Mr. Chow Tsz-chi, Chinese Legation, Washington, D. C. |
| | Mr. K. Ito, Hakodate, Japan. |

The letters of Mr. Cacheux and the telegram of Secretary Sherman were referred to the executive board, after which the meeting then adjourned, subject to the call of the board.

HUGH M. SMITH, *Secretary*.