DIX 1.—EXTRACTED FROM THE REPORT OF THE U. S. COMMISSIONER OF FISH AND FISHERIES FOR 1894. Pages 177 to 196. Plates 1 to 5.]

REPORT

OF THE

REPRESENTATIVE

OF THE

UNITED STATES FISH COMMISSION

AT THE

WORLD'S COLUMBIAN EXPOSITION.

BY

TARLETON H. BEAN.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1896.

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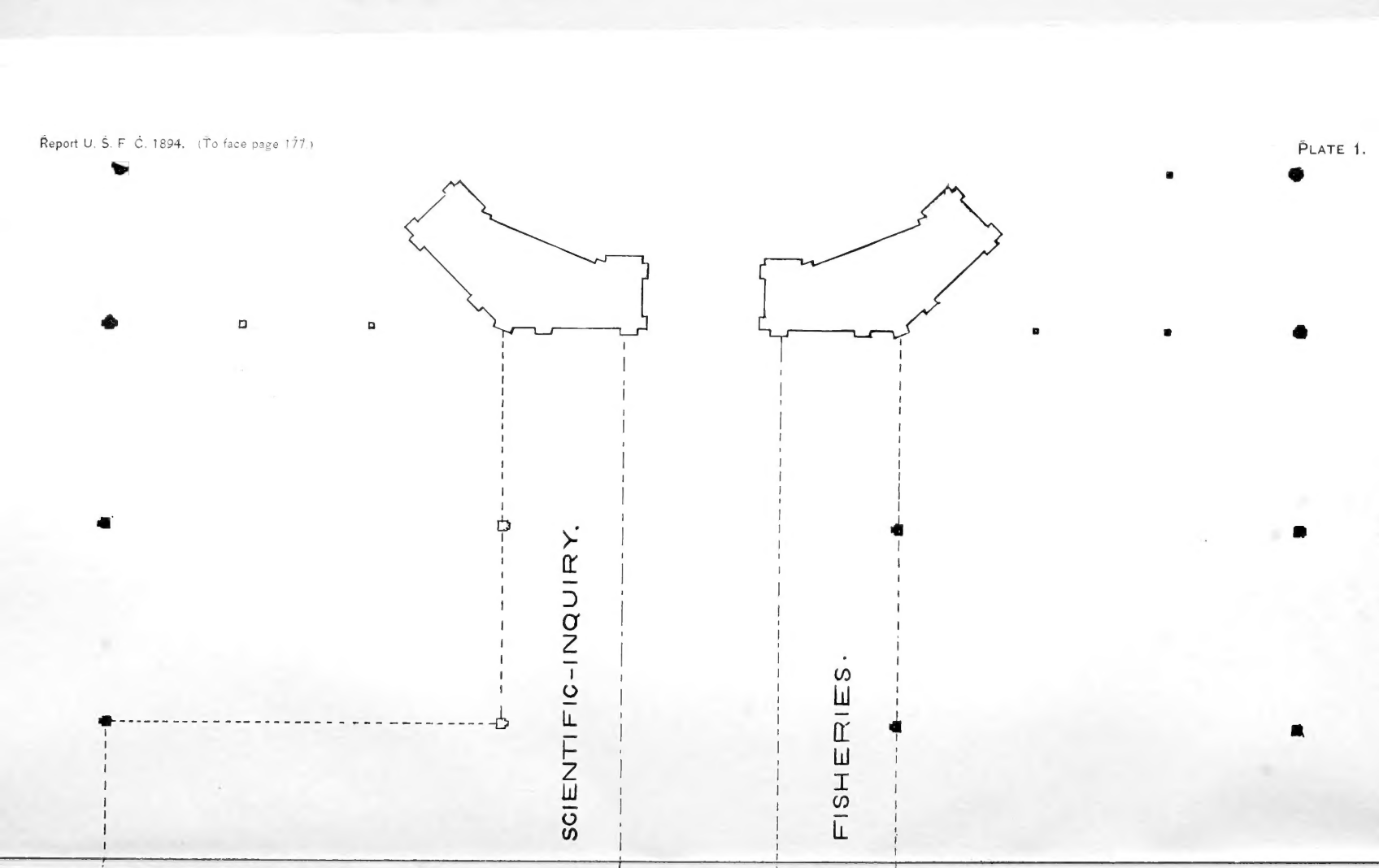
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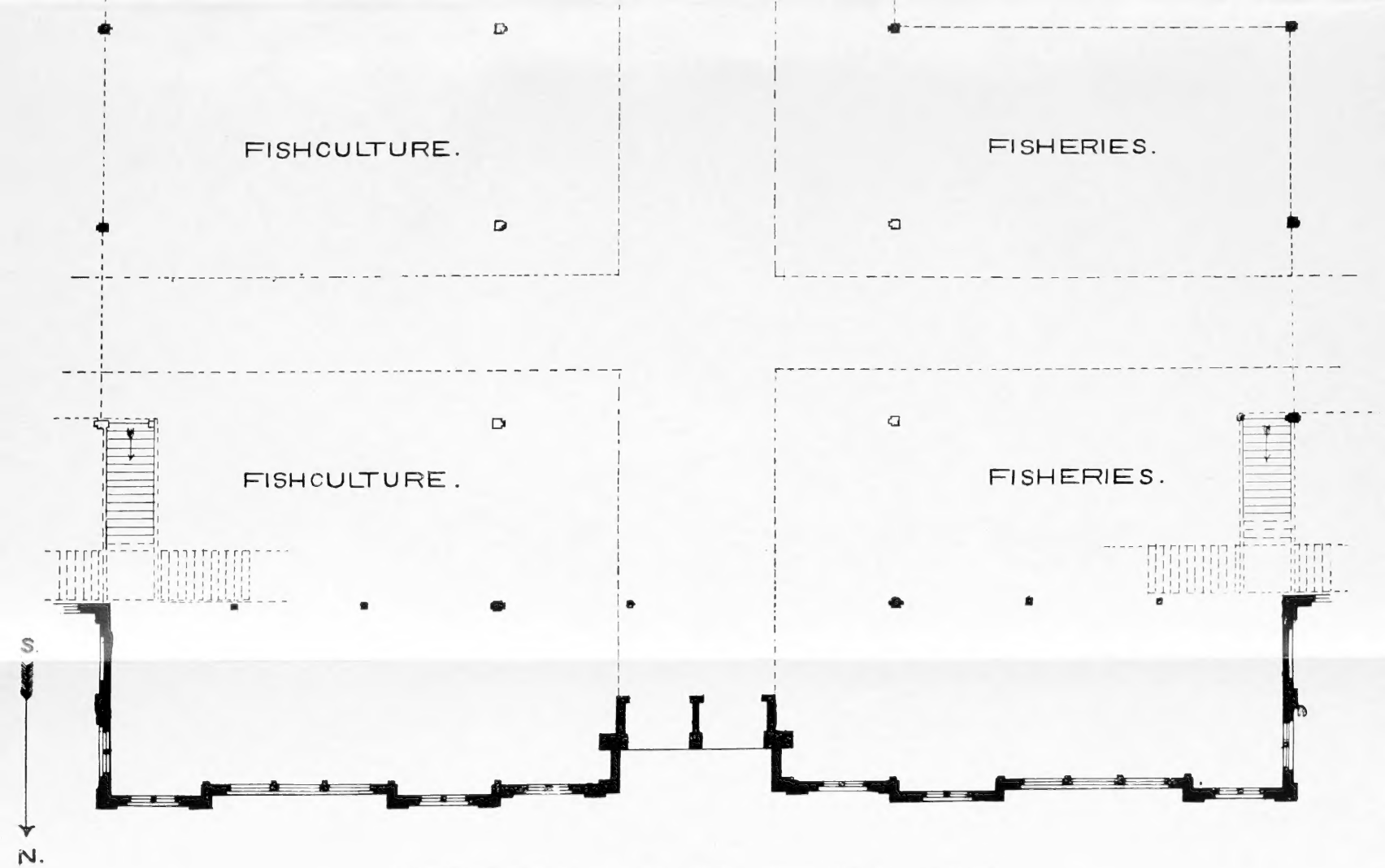
FISHERIES.



FLOOR PLAN OF THE FISH COMMISSION EXHIBIT AT THE COLUMBIAN EXPOSITION, 1893.

1.—REPORT OF THE REPRESENTATIVE OF THE UNITED STATES FISH COMMISSION AT THE WORLD'S COLUMBIAN EXPOSITION.

SKETCH OF THE EXHIBIT.

The Commissioner of Fish and Fisheries was directed by the act of Congress approved April 25, 1890, to join with the several Executive Departments in the preparation of an exhibit illustrating the functions of the Government at the World's Columbian Exposition. The representation of the Departments was intrusted to one member from each of them, and one from the Smithsonian Institution and National Museum, as well as one from the Fish Commission; these representatives to constitute a board of management and control. The representative of the Fish Commission, nominated by the Commissioner August 18, 1890, was Capt. J. W. Collins, assistant in charge of the division of fisheries. Captain Collins tendered his resignation as representative December 27, 1892, and Commissioner McDonald then designated Dr. Tarleton H. Bean, assistant in charge of the division of fish-culture, to succeed him.

No active work was undertaken until April 1, 1891, upon which date certain employees of the Commission were detailed for special duty in connection with the preparation of the exhibit, and such additional assistants as were required were employed.

The building No. 210 Tenth street NW., Washington, D. C., was leased for the use of the Fish Commission exhibit May 1, 1891. On August 13, 1891, the equipment of the building was reported complete, and W. P. Sauerhoff was detailed to work, under Mr. Ravenel's direction, upon the preparation of fish-cultural apparatus. The building was given up March 15, 1893, after the exhibit had been shipped to Chicago.

The general plan and scope of the exhibit were outlined by Captain Collins, and, with the approval of the Commissioner, active measures were soon after begun, with the assistance of E. C. Bryan, chief special agent in charge of administration and fisheries; W. deC. Ravenel, special agent in charge of fish-culture; William P. Seal, in charge of construction of aquarium, and Dr. J. A. Henshall, in charge of the angling exhibit.

Mr. Seal resigned his position as special agent in charge of the aquarium December 31, 1892, and on the following day, upon the designation by the Commissioner of Fish and Fisheries, Prof. S. A. Forbes, director of the State Laboratory of Natural History at Champaign, Ill., was appointed to take charge of the aquarial exhibit. He was assisted by

Mr. L. G. Harron, who had supervision of the salt-water section, and Mr. Alexander Jones, who superintended the fresh-water division.

Mr. Bryan severed his connection with the exhibit on January 10, 1893, and was replaced by Mr. Ravenel.

Dr. J. A. Henshall resigned his position as special agent in charge of the angling exhibit January 16, 1893, and the work to which he had been assigned was performed by the representative, Dr. Bean.

The preparation of the fisheries section included the construction of a series of boat and vessel models, together with sail and builders' plans of fishing vessels, the collection of fishes and other marine animals, and the preparation of casts of gelatin and papier mâché, the mounting of skins of seals, sea lions, and other objects of the fisheries, the collection of nets and other apparatus, fishermen's clothing, photographs and other illustrations of the fisheries and fishery industries of the United States, and the securing of a typical series of fishing and angling appliances from manufacturing firms.

The series of vessel models, built under the personal supervision of Capt. J. W. Collins, was illustrative of modern vessels engaged in the fisheries of New England, Chesapeake Bay, Gulf of Mexico, and the Pacific and Arctic oceans. It embraced also types of historical interest as showing the development of fishing craft, with suggestions for important improvements in vessel construction.

The boat models included types of those in common use in Chesapeake Bay and the North Carolina sounds, the Gulf of Mexico, the Great Lakes, and those used by natives of Alaska. These latter were accompanied by the netting and fishing appliances, clothing, and other equipment of the people.

The fish casts were made chiefly from specimens of important food and economic species which were obtained at Gloucester, Boston, and Woods Hole, Mass.; New York; Norfolk and Cape Charles City, Va.; Washington, D. C.; Tampa, Key West, and Cedar Keys, Fla.; Sandusky, Ohio; Quincy and Meredosia, Ill., and San Francisco, Cal.

Reference is made elsewhere to persons who, through their interest in the undertaking, forwarded many rare fishes. Numerous specimens were secured through dealers, and important collections were made by employees of the Commission; as, for example, Mr. V. N. Edwards, in Woods Hole, Mass.; Dr. J. A. Henshall, in Florida; Dr. S. P. Bartlett, in Illinois; Mate James A. Smith, U. S. N., in North Carolina; F. N. Clark, in Michigan; W. F. Page, in Missouri; Charles G. Atkins, in Maine; Rudolph Hessel, in Washington, D. C.; George A. Seagle, in Virginia; Capt. W. E. Dougherty, in California, and A. B. Alexander, in California and elsewhere on the Pacific Coast.

Lieut. Robert Platt, U. S. N., took an active part in the collection of marine animals with the steamer *Fish Hawk*, and sent details of men to help in the preparation and return of the exhibit.

The following superintendents of stations were present during the whole or part of the Exposition period in connection with the aquarial

FISH-CULTURAL SECTION. MODELS OF LEADVILLE STATION, COLORADO, BATTERY STATION, MARYLA
TRANSPORTATION APPARATUS, WITH 70-FOOT

ED STATES FISH COMMISSION CAR NO. 1 BESIDES VARIOUS FORMS OF HATCHING COLLECTING AND
ONTAINING VESSEL MODELS IN THE BACKGROUND

FISH-CULTURAL SECTION.—MODELS OF LEADVILLE STATION, COLORADO, BATTERY STATION, MARYLAND, UNITED STATES FISH COMMISSION CAR NO. 1. BESIDES VARIOUS FORMS OF HATCHING, COLLECTING, AND TRANSPORTATION APPARATUS, WITH 70-FOOT CASE CONTAINING VESSEL MODELS IN THE BACKGROUND

and fish-cultural exhibits: Dr. S. P. Bartlett, Frank N. Clark, H. D. Dean, J. J. Stranahan, as was also Mr. J. F. Ellis, superintendent of the car and messenger service, who gave personal direction to matters of transportation for the aquarium and fish-hatchery.

A large series of photographs, already in the possession of the Fish Commission and the National Museum, was transferred to the exhibit, and many new illustrations showing recent changes in the methods and development of the fisheries were secured by detailing employees for work in suitable regions. These details included S. G. Worth for duty in the New England States and in the South; Messrs. C. H. Townsend, A. B. Alexander, and W. A. Wilcox on the Pacific Coast; Dr. H. M. Smith, C. H. Stevenson, and Ansley Hall at various field stations. This work, in most cases, was performed in addition to regular duties. Dr. Smith also prepared the statistical charts showing the extent of the fisheries of the United States.

The exhibit of the division of inquiry respecting food-fishes was prepared under the direction of Mr. Richard Rathbun, assistant in charge of the division. In that section were to be found illustrations of the marine laboratory and fish-cultural station at Woods Hole, models and illustrations of the vessels of the Commission, specimens of the seines, trawls, nets, dredges, and other collecting apparatus, together with wire rope used in dredging operations and the other accessories for scraping the ocean bottom.

The apparatus used in sorting and preserving collections was also exhibited. There was a model of the sounding machine used in deep-sea work, with examples of the various thermometers used in physical observations. The results of scientific explorations of the Commission appear in the form of charts and models of the areas over which the vessels made their investigations.

In the cases preserved in alcohol or in a dry state were many curious inhabitants of the deep sea as well as the surface waters—the crinoids, corals, crabs, sea-pens, starfish, sea-urchins, the various invertebrate animals that form the food of fishes, foraminifera, sponges, worms, and mollusks. In the latter class extensive series of oysters were displayed to show the rate of growth on different kinds of bottoms, the method of attachment of the spat, the injuries produced by starfish, drills, and other enemies of the oyster.

The dredging apparatus included appliances for collecting in depths greater than 3 miles, and was therefore of especial interest to the public. This division was further enriched by a collection of about 150 flexible casts of fishes painted from the fresh or living specimens in faithful imitation of nature.

In the installation of the exhibit of the scientific section, as well as in its return to Washington, valuable assistance was rendered by Mr. C. H. Townsend, naturalist of the *Albatross*.

The preparation of the exhibit of the fish-cultural section was directly in charge of Mr. W. deC. Ravenel, upon plans prepared with the assist-

ance and approval of the Commissioner. In that section the apparatus of modern fish-culture was shown by means of models and full-sized specimens as far as possible in operation, and an historical series showing the development of modern appliances, as well as their geographical variation. This included apparatus for collecting and carrying eggs and for transporting spawning fish, hatching apparatus, rearing apparatus, models and pictures of hatching and rearing establishments, and collections showing the methods and results of fish-culture.

Eggs in various stages of development were shown preserved in brine or alcohol, and fish reared at the various stations were illustrated by means of painted casts and alcoholic specimens. The food and the enemies of fish were exhibited in various ways. There was also a collection of fish-cultural literature.

PRACTICAL FISH-CULTURE.

To illustrate practically the fish-cultural work of the Commission, a number of modern forms of trout and salmon troughs, shad and whitefish tables, and cod boxes were erected in the exhibit, and operations conducted during the entire Fair with real and artificial eggs. The apparatus was as follows: Two hatching tables, 8 feet long, 3 feet wide, and 3 feet high, equipped with McDonald jars for hatching eggs of shad, whitefish, and pike perch; four representative salmon and trout troughs, 8 feet long, 12 inches wide, and 8 inches deep, one for hatching trout eggs on gravel, one on trays, the Clark-Williamson combination, one of the Atkins pattern, such as is used in hatching the Atlantic and landlocked salmon in Maine, and the other with a Stone salmon basket, commonly used on the Pacific Coast. A set of McDonald cod boxes and Chester jars was also provided for illustrating work with cod and other floating eggs. As it was not possible to obtain live eggs throughout the season, it was necessary to provide a substitute, so that there should be no cessation in our work. Through the ingenuity of Mr. S. G. Worth, superintendent of Central station, artificial eggs were made of resin for illustrating the methods employed in hatching the floating and semi-buoyant varieties.

Salmon and trout eggs preserved in brine were used in the troughs. These eggs were the dead ones picked out of the hatching troughs at the different stations of the Commission during the previous winter, and answered the purpose well. Credit is due Mr. J. J. Stranahan for this idea. The artificial eggs having been found to be of greater specific gravity than fresh water, and it having been demonstrated that eggs kept in brine would soon decay in fresh water, it was necessary to equip this composite hatchery so that either fresh or salt water could be used in each form of apparatus. The fresh water was furnished by the Exposition Company and was pumped from Lake Michigan. This was found to be fairly good for hatching operations, and ranged in temperature from 42° F. in May to 74° in August, and down again to 47° in October.

The salt water was a saturated solution, and was manufactured from time to time as needed. This water was circulated by means of two pumps driven by water pressure, the pumps lifting the water from the storage tanks below the floor, into which the troughs and other forms of apparatus emptied, into the tanks overhead, from which the water was furnished by gravity to the hatching apparatus.

Eggs of various kinds were hatched during the months of May, June, parts of July and September, and all of October. At the opening of the exhibition, May 1, there were in the hatchery 800,000 shad eggs, 3,000,000 pike-perch, and 84,000 yellow-perch, and by the end of June 16,550,000 pike-perch eggs, 700,000 yellow-perch, 800,000 shad, and 154,000 eggs of the common sucker had been received and cared for and 6,900,000 fry hatched. Of these 3,700,000 pike-perch fry, 700,000 yellow-perch, and 100,000 suckers were planted in Lake Michigan near Jackson Park.

The shad eggs were all lost on account of the extremely low temperature of the water (average 42° F.), though some of them showed signs of life as late as May 13.

On June 29, 20,000 black-spotted trout eggs were received from Leadville and placed on the wire trays and in the gravel trough. The temperature of the water at that time was 64°, and the eggs commenced hatching two days after they arrived. By July 9 they were all hatched, with a loss of about 8,000. The fry commenced feeding on July 14, and were carried with fair success in our troughs, notwithstanding the high temperature of the water, until, owing to an accident to the machinery, the Exposition Company was compelled to shut off the water, which killed most of the fry on hand.

Arrangements had been made for obtaining the supply of quinnat-salmon eggs from California, and on September 23 a package containing 50,000 was received in good condition. These were placed in the Stone salmon baskets and Atkins trough, and were all hatched by October 7, with a loss of about 29,000. The fry were successfully carried in our rearing troughs until the close of the Exposition, when 19,000, the balance on hand, were shipped by one of the Fish Commission cars to Northville, Mich. A consignment of 54,000 lake-trout eggs, from Alpena, was received on October 9, and another of 40,000 quinnat-salmon eggs was received on the 19th of the same month from Clackamas. This latter package arrived in first-class condition. These eggs were placed in the hatching troughs, where they remained until the close of the Exposition, when they were shipped to Mr. Frank N. Clark at the Northville station. In addition to the hatching operations, several thousand trout furnished from the Northville station were cared for in our rearing troughs during the summer in the Government building.

THE AQUARIUM.

The east wing of the Fisheries building was fitted up by the Columbian Exposition Company for the aquarial exhibit of the Fish Commission.

The engineering duties in the preparation of this exhibit at first devolved upon W. B. Bayley, U. S. N., and afterwards upon I. S. K. Reeves, U. S. N. The Commissioner personally assisted in the installation of the live-fish exhibit, having previously determined by experiment the principles of successful management.

In the course of these experiments sea-anemones were kept alive in an aquarium fitted up with air circulation and with water half artificial, the aeration having been effected by means of a succession of fine jets lowered to the bottom of the tank.

A full report upon this part of the exhibit was published in the Bulletin of the Commission for 1893, pages 143 to 190. It will be necessary only to give here a brief sketch of its main features.

The aquarium was a circular structure of 125 feet in diameter, forming the east annex of the Fisheries building. Upon the completion of the annex it was turned over to the Fish Commission for the purpose of making its aquarial display. Tanks of various sizes, made of cement, slate, glass, and iron, filled all the available exhibition space of the building. Some of them were large enough to accommodate the largest fish that could be transported alive. For example, one tank in the fresh-water series was about 50 feet in length. Nearly one-third of the tank capacity was devoted to the exhibition of salt-water animals and plants. The water was brought from the ocean at Morehead City, N. C., and was stored in a reservoir under the Fisheries building. This reservoir was $46\frac{3}{4}$ feet long, $18\frac{2}{3}$ feet wide, and $8\frac{1}{2}$ feet deep. From this reservoir water was pumped into a pressure tank 30 feet in diameter and 5 feet deep, located at the top of the Fisheries building. From this height it was conveyed into the aquarium tanks, after leaving which it passed through a sand and gravel filter back again into the reservoir.

Rubber pumps for the circulation of the salt water were located under the Fisheries building and were operated by electricity. All the pipes and connections with which the salt water came in contact were made of hard rubber or were lined with that material. About 60,000 gallons were required for the supply of the tanks.

The fresh water was obtained from the city waterworks, and was filtered before entering the aquaria. On some occasions during the Exposition as much as 750,000 gallons of fresh water passed through the tanks in twenty-four hours.

The salt water was constantly aerated by means of two hydraulic pumps which delivered the air into a galvanized air cylinder at a pressure of about 7 pounds per square inch. From this cylinder the air was conducted to the backs of the salt-water aquaria by iron pipes, and each aquarium received its supply of air by rubber tubing, into which were inserted plugs of basswood, through which the air was forced.

FISH-CULTURAL SECTION.--SHAD AND WHITEFISH HATCHING TABLES AND TROUT AND SALMON TRO
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KING FROM SOUTH ENTRANCE TO BUILDING, WITH OTHER FORMS OF FISH-CULTURAL APPARATUS
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FISH-CULTURAL SECTION.--SHAD AND WHITEFISH HATCHING TABLES AND TROUT AND SALMON TROUGHS LOOKING FROM SOUTH ENTRANCE TO BUILDING, WITH OTHER FORMS OF FISH-CULTURAL APPARATUS IN THE BACKGROUND.

Marine fishes and plants were obtained at various localities along the east and west coasts and the Gulf of Mexico. The fresh-water supplies were drawn chiefly from the Potomac, Mississippi, and Great Lake basins, as also from the hatching establishments of the Commission. A principal object of the exhibit was to show the important food and game fishes of typical localities, as well as numerous species which were notable on account of their colors, their forms, and their singular habits. The kinds of fishes and other forms of animal life shown were as follows:

Species.	Number.	Species.	Number.	Species.	Number.
Paddle-fish	23	Viviparous perch	8	Pike perch	300
Bullhead catfish	83	Ling	1	Yellow perch	282
Spotted catfish	2,724	Dogfish	24	White perch	196
Carp	211	Toadfish	10	Sea bass	17
Tench	36	Alewives	9	Black bass	1,944
Golden tench	20	Angel-fish	3	Warmouth bass	384
Golden ide	150	Stingray	2	Rock bass	47
Goldfish	350	Remora	6	Calico bass	33
Redhorse	50	Sea-raven	53	White bass	83
Fresh-water drum	23	Burrfish	64	Striped bass	35
Gizzard shad	24	Shark	1	Crappie	500
Brook sucker	201	Sand shark	4	Sunfish	695
Shiner	20	Sea-urchin	1	Red snapper	7
Stickleback	25	Starfish	185	Scup	112
Garfish	11	Alligator	1	Cod	3
Minnows	3,965	Sea eel	7	Tautog	70
Quinnat salmon	9	Lamper eel	3	Flounder	25
Grayling	204	Crayfish	500	Pompano	46
Loch Leven trout	2,049	Blue crab	53	Tomcod	32
Rainbow trout	26	Spider crab	21	Cunner	25
Von Behr trout	2,068	Hermit crab	52	Kingfish	83
Black-spotted trout	50	King crab	5	Mussels	250
Brook trout	2,607	Lady crab	6	Turtles	3
Lake trout	54	Whitefish	48	Clams (barrels)	2
Saibling	10	Lake herring	99	Lizard	3
Hogchoker	46	Muskellunge	3	Sea anemone	37
Scallop	8	Pike	103	Sea moss (tanks)	2
Skate	36	Pickerel	73	Red sponge (tank)	1

Water for the aquarium.—It was at first proposed to use the constituents of salt water and make from them the amount necessary for supplying the marine aquarium at the World's Fair by the addition of fresh water. Bitter water, salt, and lime were purchased in New Bedford, Mass., and shipped to the Fisheries building. The lime residuum from salt-water evaporation, upon analysis by the chemist of the Agricultural Department, was pronounced almost pure calcium sulphate. One hundred and fifty sacks of natural sea salt, 3 bushels of lime residuum, and 40 barrels of bitter water were obtained for the purpose. Before this was finally used the Commissioner instituted a series of experiments in his office at Washington and found that bitter water offers no advantage, and it was feared that some deleterious effect would result from its use. The original plan was abandoned, and it was determined to transport natural sea water from a point on the Atlantic coast.

Transportation of marine animals.—It was found very difficult to ship large skates in water tanks; therefore the superintendent of the Woods Hole station was instructed to experiment in keeping such animals in clean sea weed, cotton fabric, or burlaps, providing for a free

circulation of air. They were inclosed in crates and were sprinkled once an hour by hand with salt water. In order to keep down the temperature of the salt water the Commissioner advised that direct connection be made to permit circulation of the water to the aquaria and back from the reservoir without pumping it up into the tank on the top of the Fisheries building.

Food for aquarium animals.—The principal articles of food used in the aquarium were beef liver and beefsteak. It was sometimes difficult to obtain these, and parties were sent to the lagoons to seine for small minnows, which were fed to the fish as a substitute for other meats. Clams and mussels were forwarded from various parts of the east coast, and small fresh-water crustaceans were obtained by tow nets and other apparatus in the fresh waters in the vicinity of Chicago to feed the paddle-fish.

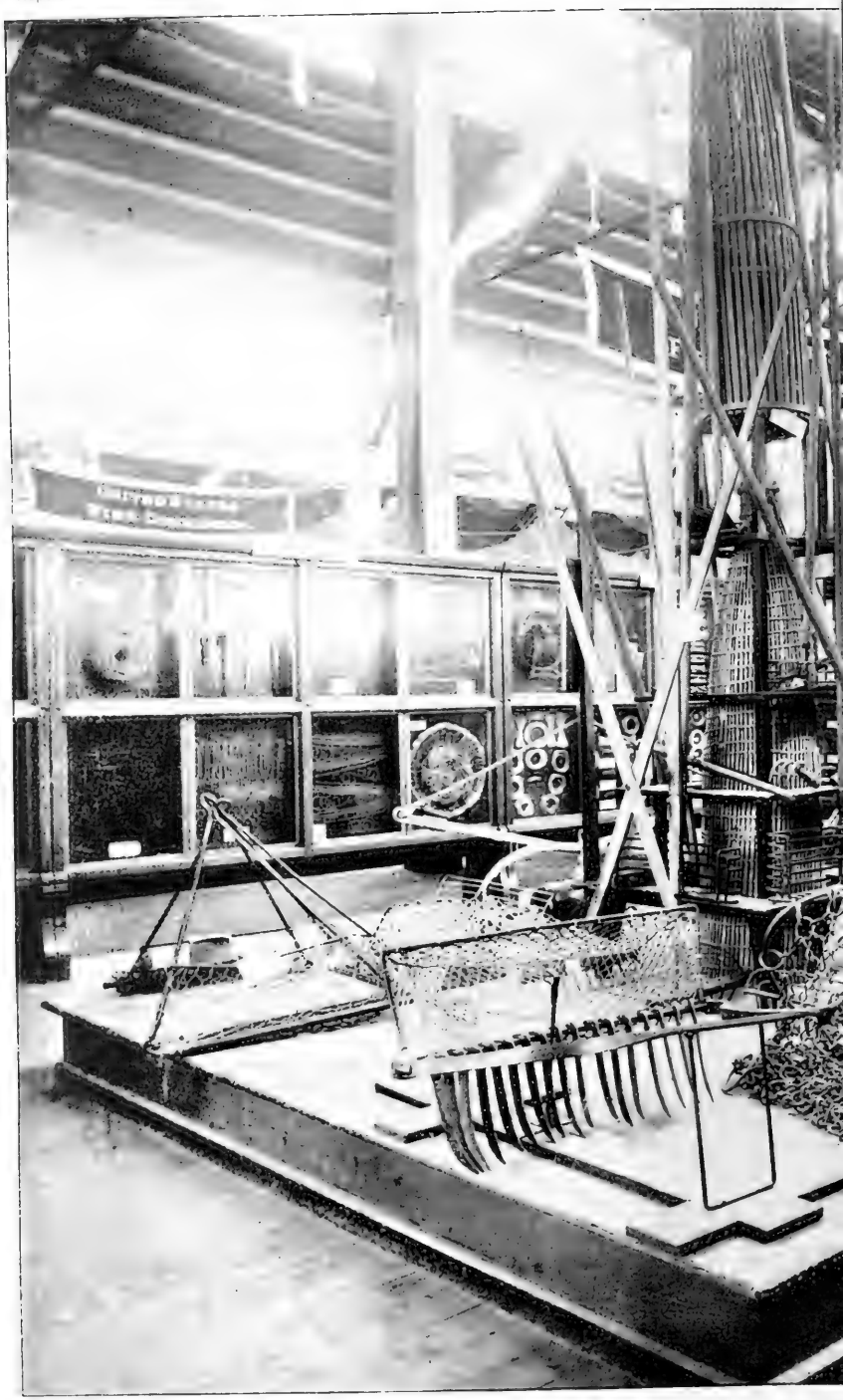
WORLD'S FISHERIES CONGRESS.

One of the natural outgrowths of the Fish Commission exhibit in Chicago was the relation in which the Commission stood to the World's Congress Auxiliary, organized under the direction of a committee of the Columbian Exposition, of which C. C. Bonney was general chairman.

The Commissioner of Fisheries called a preliminary meeting in Chicago April 25, 1893, associating with himself Dr. G. Brown Goode, Prof. S. A. Forbes, and Dr. T. H. Bean, for the purpose of organizing a Fisheries Congress. With these gentlemen were united Mr. E. G. Blackford, of New York; N. K. Fairbank and A. Booth, of Chicago; and R. E. Earll, of Washington. After the preliminary meeting Chairman Bonney officially appointed the committee just named, and the work of organization was immediately entered upon. Men of prominence in the fisheries, fish-culture, and scientific investigation in various parts of the world were designated to form an advisory council, and invitations were sent out requesting attendance at the sessions of the congress and asking for contributions. The responses to this call were numerous, and the communications brought together were of a very important character, embracing papers upon fishery laws and regulations, science in relation to the fisheries and fish-culture, methods employed in the capture and utilization of fishery products in all parts of the world, together with statistics of fisheries and essays upon fish-cultural topics.

Associated with the general committee was a committee of State commissioners of fisheries, through whom it was arranged to hold meetings of those commissioners during the time occupied by the meetings of the Fisheries Congress. Mr. E. A. Brackett, of Winchester, Mass., was the chairman of the committee of organization.

The formal sessions of the Fisheries Congress opened in a hall in the Memorial Art Palace, Chicago, on October 16, at which time Hon. Marshall McDonald delivered the opening address as chairman of the



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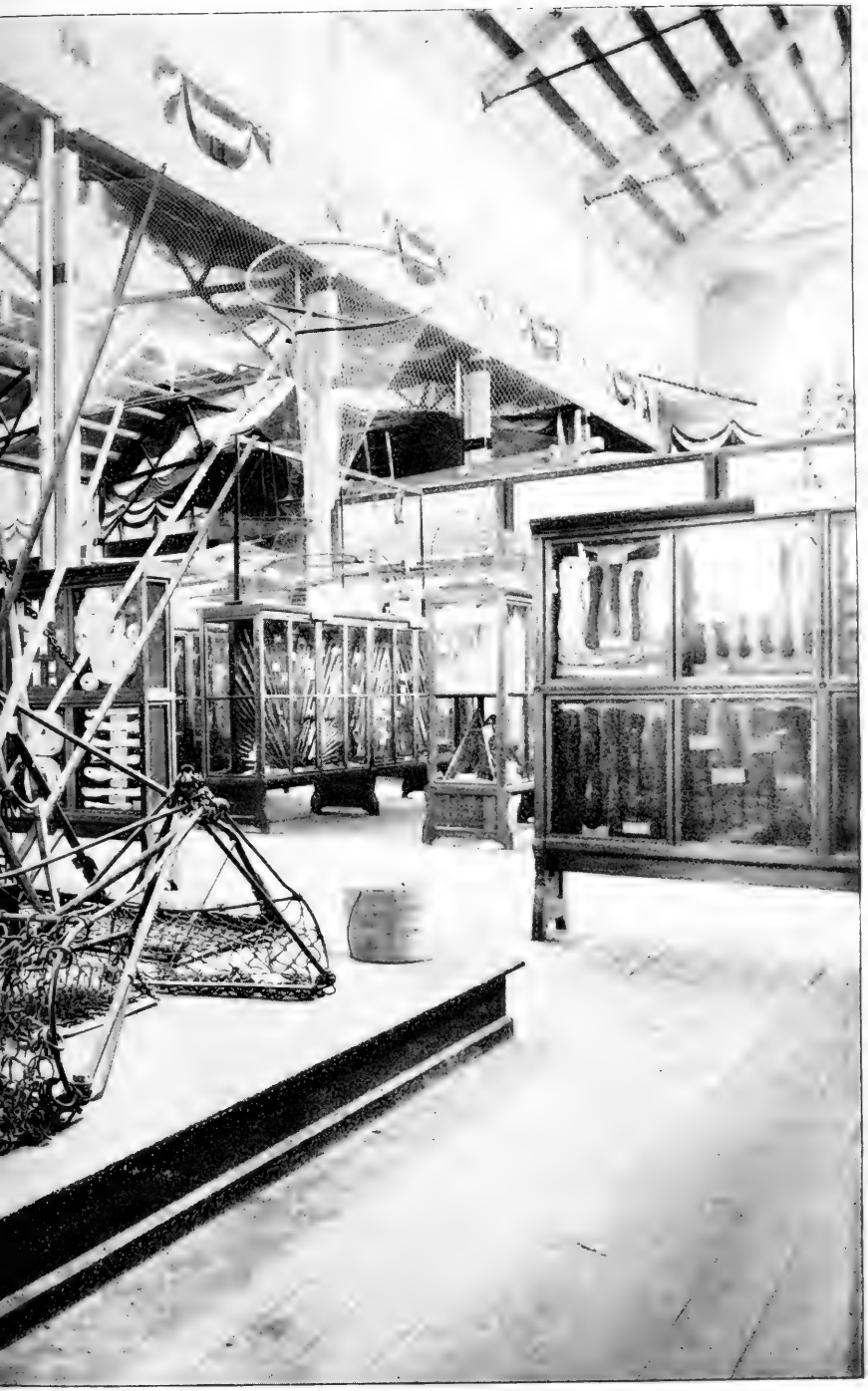

SHERIES SECTION

fisheries. In the central tier are wicker and slat traps fished for eel, catfish, etc. The cases contain
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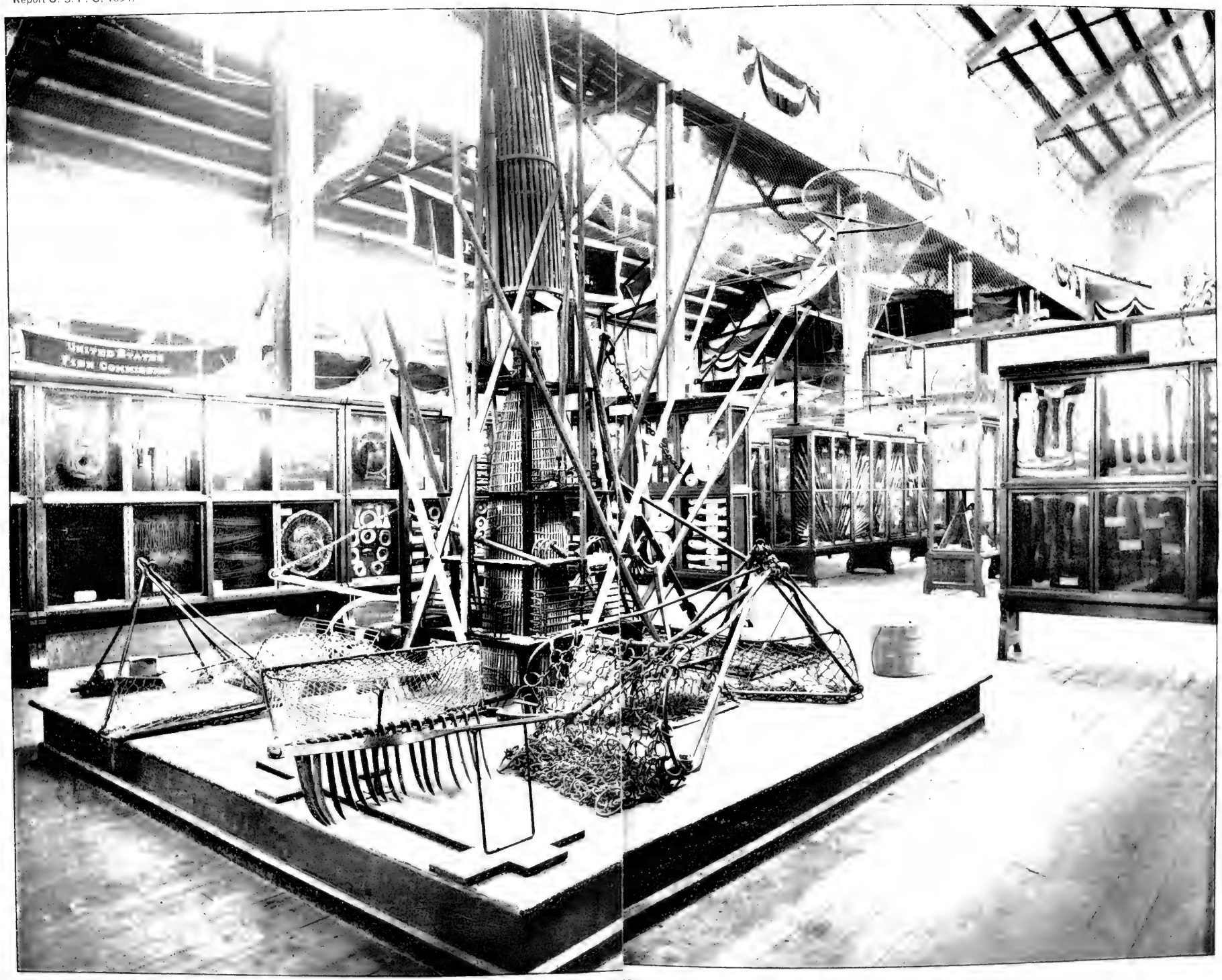

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On the platform are various types of dredges and rakes used in the oyster, clam, and other mo'luscan fisheries. In the central tier are wicker and slat traps fished for eel, catfish, etc. The cases contain twines, nets, lines, and various forms of t ackle employed in the economic fisheries

congress. Dr. G. Brown Goode, Hon. E. G. Blackford, and Dr. Hugh M. Smith acted as chairmen of the principal sections of the congress. The meetings were brought to a close on October 19 by a fish banquet in the hall of the New York State building, in Jackson Park, in which the members of the Fisheries Congress, the conference of State commissioners of fish and game, and their invited guests participated. Hon. T. W. Palmer presided and delivered the opening address. Other speakers of the evening were Hon. Carter H. Harrison, mayor of Chicago; Messrs. Andrews, Bowman, and Breslin, of New York; Commissioner McDonald, J. J. Quelch, commissioner of British Guiana, and John Foord, secretary of the New York World's Fair Commission.

The papers prepared for the World's Fisheries Congress have been published, and form volume XIII of the Bulletin of the U. S. Fish Commission.

A complete descriptive catalogue of the Fish Commission exhibit was prepared, but the plan and scope of the several sections will be sufficiently shown by means of the following synopsis:

CATALOGUE OF THE EXHIBIT.

Scientific Inquiry Section.

1. **Laboratories for Marine Exploration.**

Illustrations of Zoological Stations: (1) Laboratory at Woods Hole, Mass., 1875. (2) Laboratory at Woods Hole, Mass.

2. **Exploring Vessels.**

Models: (1) Steamer Albatross. (2) Steamer Fish Hawk. (3) Schooner Grampus.
Illustrations: (1) Steamer Albatross. (2) Steamer Fish Hawk. (3) Schooner Grampus.

3. **Collecting Apparatus.**

Nets: (1) Seines. (2) Beam trawls. (3) Towing nets.
Dredges: (1) Naturalist's deep-sea dredge. (2) Naturalist's boat dredge. (3) Benedict rake dredge. (4) Oyster dredge.
Tangles.

4. **Accessories for Dredging and Trawling.**

Dredge rope (steel-wire dredge rope; splices in dredge rope). Iron dredge block. Sigsbee accumulator. Weights for beam trawl.

5. **Apparatus for Assorting Collections.**

Rocker sieves. Table sieves. Hand sieves.

6. **Apparatus for Preserving Collections:** *Tanks.*

7. **Apparatus for Deep-Sea Sounding:**

Sigsbee sounding machine (model).

8. **Apparatus for Physical Observations.**

Thermometers: Deck thermometer. Professor Baird's protected thermometer. Miller-Casella deep-sea thermometer. Negretti & Zambra thermometer.
Thermometer cases and accessories: Wooden cases. Brass cases. Reading lens.
Salinometers: Hilgard salinometer.

9. Results of Explorations.

Charts and models.

Collections:

1. Marine animals in alcohol:
   (*a*) Deep-sea animals: Crinoids, corals, crabs, sea-pens, starfish, sea-urchins, etc.
   (*b*) Surface animals: Entomostraca, etc., forming food of fish.
   (*c*) Shallow-water animals: Mollusks, crustaceans, etc.
2. Marine animals: Foraminifera. Sponges. Corals. Mollusks, etc.
3. Microscopic slides: Of fish eggs, fish embryos, fish food, and Foraminifera.

FISH-CULTURAL SECTION.

10. Transportation Apparatus.

Apparatus for collecting and carrying eggs:

Models and specimens: Wroten bucket. Wroten bucket improved. Collins's can. McDonald's egg reel. McDonald's crate. McDonald's crate for egg reel. Atkins's egg box. Green's egg box. Clark's egg case. Clark's whitefish crate. Clark's foreign-egg case. Mather transportation box. Taylor's egg-transportation can. Trout boxes used in 1872.

11. Apparatus for Transporting Fry.

Models and full-sized apparatus:

(*a*) Models: Car No. 1. Clark's transportation can.

(*b*) Specimens: Stone's transportation can. Automatic transportation can. Mulertt's transportation can. McDonald's trout can. Zolinsky's carboy. Mortimer's sole aquarium. Carp transportation pail. Carp transportation kettle. Wood-bound can, full size. Messenger's complete outfit. Bucksport transportation can. Ferguson's transportation can. Fish Commission transportation can. Stranahan transportation keg. Box for native food-fishes.

(*c*) Accessories: Siphon strainer. Monroe Green's aerator and cooler. Siphon tube, bag, and cage. Dip nets of various sizes. Water bucket.

12. Apparatus for Carrying Spawning Fish.

Models and specimens:

(*a*) Models: Group of salmon dory cars.

(*b*) Specimens: Maitland's salmon car. Seal's transportation tub.

13. Hatching Apparatus.

Models and specimens:

(*a*) For floating eggs: Chester wave box. Chester semi-rotating hatcher. Chester cod box. Cone with automatic siphon. Stand of cones with automatic siphon. McDonald's cod hatcher. Cod box. McDonald's cod box. McDonald's improved cod box. McDonald's mackerel tubs. McDonald's hatching bucket. Ferguson's submerged bucket.

(*b*) For semi-buoyant eggs: Wroten's bucket. Green's shad box. Brackett's shad box. Wright's submerged box. Ferguson's submerged bucket. Mather's shad can. Bell-Mather shad cone. Ferguson's improved cone. Models of cones and buckets. McDonald's Y-shaped box. Bower's V-shaped box. Chase's whitefish jar. McDonald's jar, old style. McDonald's universal hatching jar. Clark's jar. Apparatus used on cars. De Lawder-Wroten shad hatcher.

(*c*) For heavy eggs: Garlick's hatching box. Stone's charred trough. Coste's hatching grills. Williamson's hatching trough. Stone's salmon basket. Bucksport hatching trough. Brackett's hatching trough. Holton's hatching box. Clark's hatching trough. Hatching trough with glass strip trays. Mather's hatching trays. Atkins's hatching crate.

14. Rearing Apparatus.

Clark's trout-rearing troughs: Whitefish tanks. Shad tanks.

(*a*) Accessories: Ainsworth's spawning race. Mather's spawning cone. Spawning pans. Spawning buckets. Page's egg scale. Egg funnels for whitefish and shad. Series of nets from Central station, Washington, D. C. Series of nets from Northville station, Mich. Series of nets from Battery station, Md. Nippers, brass and wood. Dippers. Strainer dippers. Hume's spawning box. Rubber boots. Oil clothing. Pan for washing eggs. Salmon dip net. Tray for washing eggs. Siphon bags. Siphon cages. Siphon tubes. Aquaria.

(*b*) Accessories to pond culture: Seines. Dip nets. Farm profit boiler. Meat chopper. Gun. Garden rake.

15. Hatching and Rearing Establishments.

Charts:

(*a*) Chart giving names and location of stations and output of each station for fiscal year 1891–92.

(*b*) Chart showing work of the Commission from 1872 to 1892.

Models of hatching establishments:

(*a*) Hatching houses: Put-in-Bay hatchery. Leadville hatchery. Havre de Grace hatchery. Gloucester, Mass., hatchery.

(*b*) Floating hatchery. Hatching barge.

Illustrations of hatching stations (showing buildings, exterior and interior, methods employed in collecting, hatching, rearing, and distributing fish fry and eggs):

(*a*) Green Lake. Grand Lake stream. Bucksport and Craig Brook, Me. Gloucester cod station and Woods Hole, Mass. Central station and Fish Commission fish ponds, Washington, D. C. Battery station, Havre de Grace, Md. Bryan Point shad station, Md. Wytheville station, Va. Duluth station, Minn. Alpena and Northville stations, Mich. Put-in-Bay station, Ohio. The Quincy (Ill.) station. Neosho station, Mo. Leadville station, Colo. Fort Gaston, McCloud, and Baird stations, Cal. Clackamas, Oreg.

(*b*) Floating stations: Hatching barge. Steamer Fish Hawk.

16. Methods and Results of Fish Culture.

Lay figures: Group illustrating shad fishing and spawning. Group illustrating cod fishing and spawning.

Chart showing the effect of fish-culture on the shad fishery.

Painted casts of fishes reared by the Fish Commission:

(*a*) Brook trout, 1, 2, 3, and 4 years old. Von Behr trout, 1, 2, 3, and 5 years old. Loch Leven trout, 1, 2, 3, and 6 years old. Lake trout, 1 and 2 years old. Landlocked salmon, 1 year old. Rainbow trout, 1 and 2 years old. Whitefish, 5 years old. Carp, tench, goldfish, black bass, etc.

(*b*) Alcoholic and brine specimens: Eggs in different stages. Fry, yearlings and adults.

Protection of Fish (assistance in ascending streams):

Duncannon fishway. Shaw's spiral fishway. Swazey's oblique fishway, old style. Swazey's oblique fishway, new style. Worrall's expanding sluice fishway. Worrall's chute fishway. Brewer's single-groove fishway. Brewer's double-groove fishway. Steck's fishway. Smith's inclined-plane return fishway. Lawrence fishway. Holyoke fishway. Everleth's self-adjusting fishway. Pike's spiral fishway. Atkins's spiral fishway. Bangor fishway. McDonald fishway, old style. McDonald fishway, section 6, Great Falls, Potomac River.

Illustrations: Photographs: McDonald's fishway, Fredericksburg, Va.

FISHERIES SECTION.

17. Objects of the Fisheries.

Mammals:

1. Sirenians: Manatee (cast).
2. Cetaceans:
   (*a*) Dolphins: Common dolphin (cast). Bottle-nose dolphin (cast). Blackfish (cast). Grampus (cast). Harbor porpoise (casts).
   (*b*) Sperm whales: Pygmy sperm whale (cast).
3. Carnivores:
   (*a*) Earless seals: Harbor seal (mounted group).
   (*b*) Eared seals: Northern fur seal (mounted group). Steller's sea lion (mounted group).

Birds: Fish-eating birds, 80 skins.

Reptiles and Batrachians:

1. Alligators: Florida alligator (mounted skin).
2. Turtles and tortoises: Loggerhead turtle (cast). Hawk's-bill turtle (mounted shell). Green turtle (cast). Soft-shell turtle (cast). Snapping turtle (cast). Spotted turtle (cast).
3. Snakes: Water snake (cast).
4. Frogs: Bullfrog (cast). Green frog (cast). Pickerel frog (cast).

Fish: Casts of 150 species of marine and fresh-water food-fishes. Color drawings of fishes. Maps showing the distribution of halibut, cod, mackerel, and other kinds. Living marine and fresh-water fish in aquarium.

Invertebrates: Living sea-anemones, starfish, crabs, lobsters, mollusks, algæ, etc., in aquarium.

18. Fishery Apparatus.

Vessels: (1) Models of sloops, ketches, schooners, steamers. (2) Pictures of vessels. (3) Vessel fittings. (4) Instruments of navigation (logs, compasses, clocks, etc.). Fishermen's clothing, etc.

Boats: (1) Models. (2) Full-sized boats. (3) Pictures.

Canoes: (1) Bark. (2) Skin. (3) Wood.

Nets: Pounds. Weirs. Pots. Seines. Cast nets. Dip nets. Trawls. Dredges.

Lines: Trawl lines. Hand lines. Accessories (rods, reels, floats and sinkers, gaff hooks, creels, bait boxes, fly books, etc.).

Appliances for seizing: Rakes. Tongs. Hooks for sponge. Accessories (water glass).

Appliances for striking: Spears. Lances. Bows (and arrows). Guns.

Lures: Artificial flies; artificial minnows, frogs, etc.

Charts of fishing grounds.

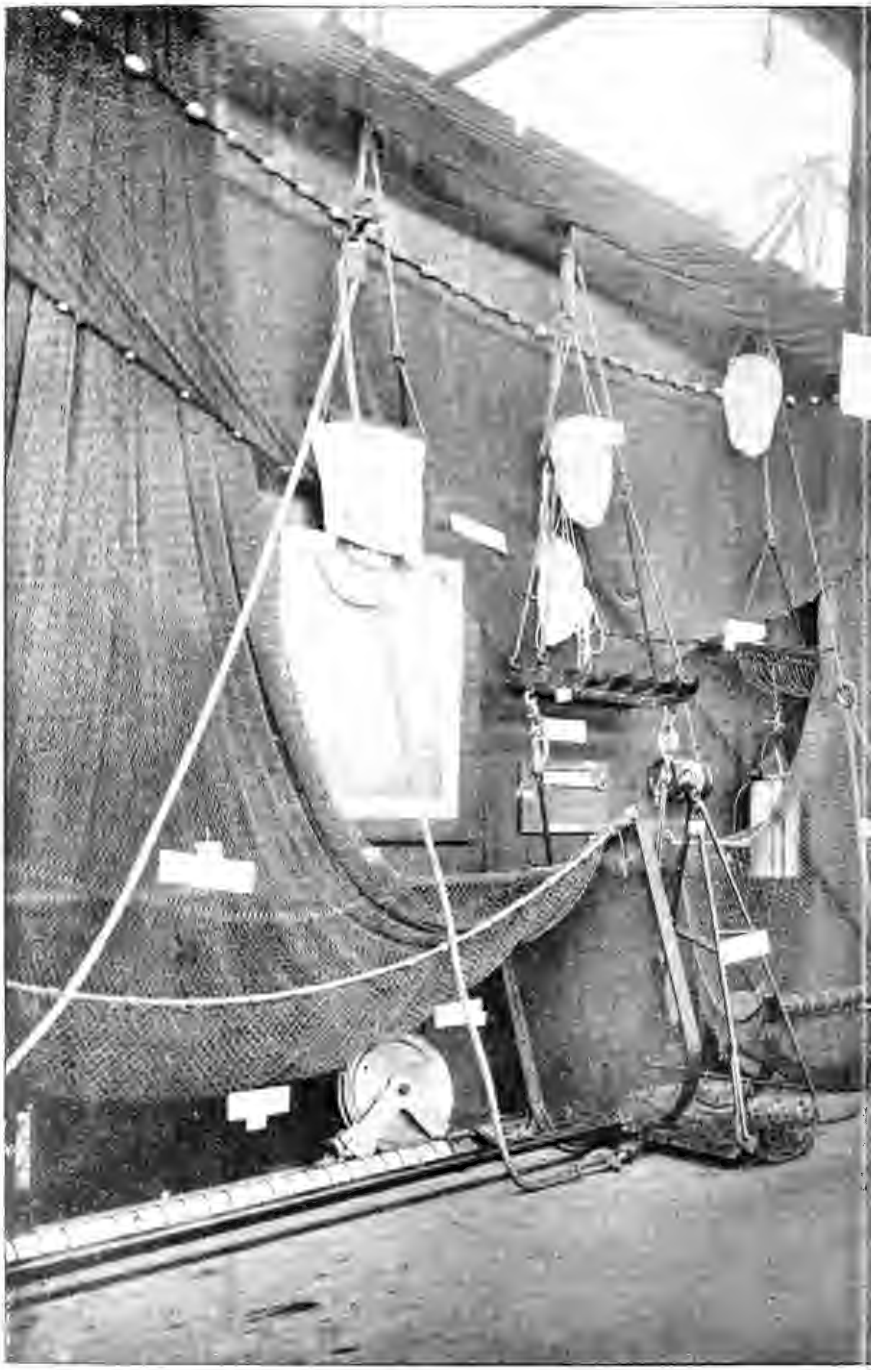
19. Illustrations of Fisheries.

Fishermen: Professional; anglers; lay figures.

Fishermen's dwellings. Fishing towns.

Special fisheries: Mammals; reptiles; fishes; mollusks; crustaceans; sponges.

20. Statistics of Fisheries.



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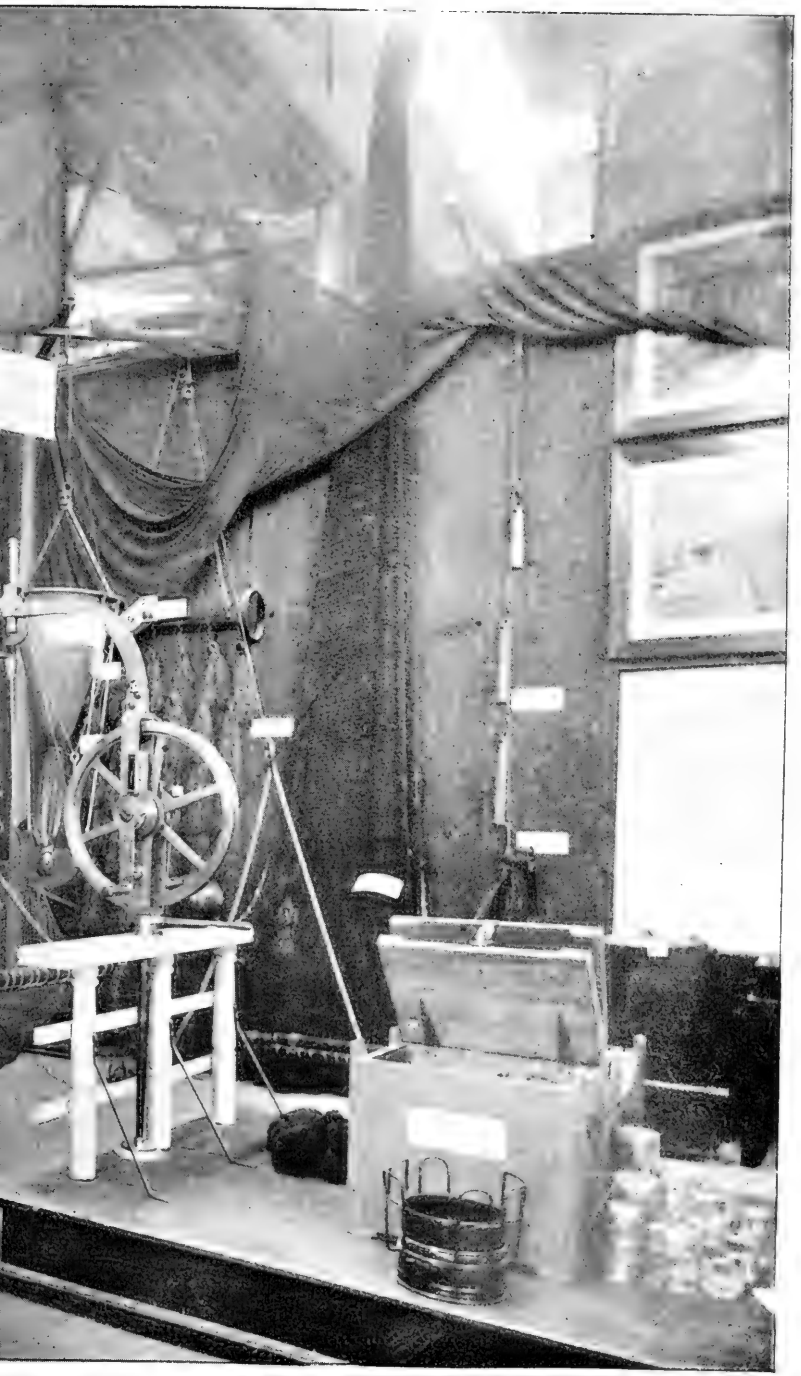

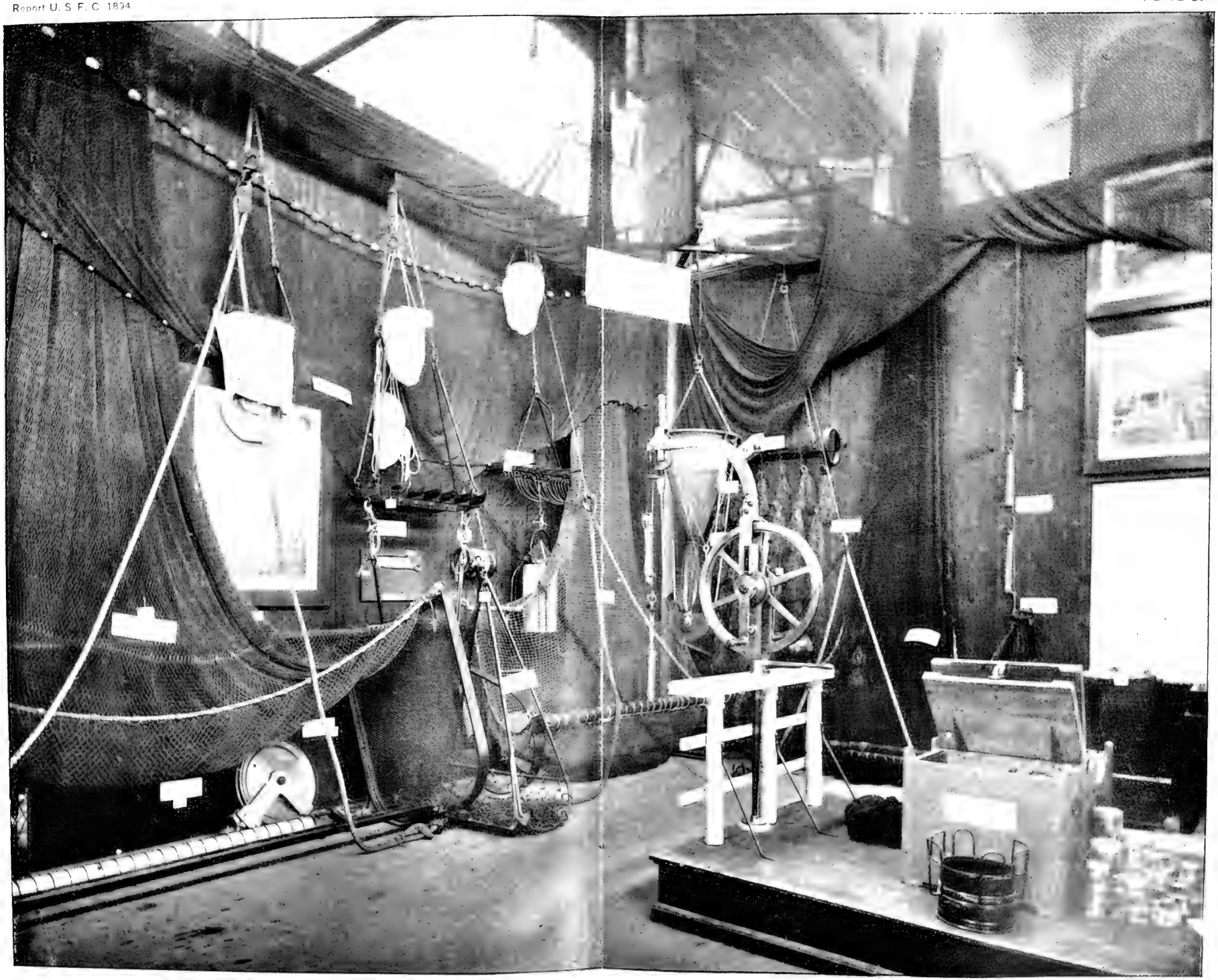

APPLIANCES USED IN THE STUDY OF THE SEA FISHERIES

INSTALLATION OF THE EXHIBIT.

The delivery of boxes in the Government building began early in December, 1892, the freight having been consigned to Capt. J. F. Aytoun, local agent of the board of management and control at Chicago. All of the materials were on the space by April 15. A temporary office was constructed on the ground floor in January, 1893, for use during installation, and permanent offices were completed on the gallery in April. Late in February, 1893, Mr. W. P. Sauerhoff was sent to Chicago to commence unpacking and setting up cases, and about the end of March the active work of installation was begun, under the supervision of Dr. Bean and Mr. Ravenel.

The installation was seriously hindered by unfavorable weather, but was finished by the end of April, both in the Government building and in the aquarium in the Fisheries building. The hatching apparatus and pumps in the fish-cultural section were working satisfactorily, and supplies of eggs had been obtained, so that the entire exhibit was ready for the inspection of visitors upon the opening day.

The exhibit was located in the northern portion of the Government building, between the Agricultural Department on the east and the Interior Department on the west. Its space was 150 feet from east to west, by 95 feet in depth along the western border, and 120 feet in depth along the eastern line.

This space was continued backward along the west side of the main north and south aisle by a strip 15 feet wide and 75 feet long, and on the east side of the same aisle by a strip of the same width 50 feet in length, the narrow strips extending to the rotunda.

The western portion of this space was devoted entirely to the fisheries exhibit; the eastern portion to the divisions of fish-culture and scientific inquiry.

The general arrangement is shown by the accompanying floor plan, and the details of the exhibits may be seen from the illustrations which form part of this report.

The superficial area, including the aisles, amounted to 16,000 square feet, while the aquarial exhibit in the east annex of the Fisheries building had an area of nearly 10,000 square feet.

FOREIGN VISITORS TO THE EXHIBIT.

The exhibit attracted the attention of a great many visitors from foreign countries who were interested in the apparatus and methods employed by the National Fish Commission. The following are among those who called during the Exposition and to whom the operations of the Commission were explained in greater or less detail. Many of the

persons named made reports to their Governments upon the subject, embracing in them an account of the exhibit of the Commission:

Dr. Henri de Varigny, in behalf of the minister of public instruction and fine arts, and delegate of the minister of commerce, Paris, France.
Mr. A. Caméré, chief engineer of bridges and roads, Paris.
Mr. Pung Kwang Yu, first secretary of the Chinese legation and commissioner to the World's Columbian Exposition.
Dr. Nicolas Borodine, St. Petersburg and Uralsk, Russia.
Dr. Einar Lönnberg, delegate of the royal Swedish board of agriculture, Stockholm.
Mr. Paul Hillman, agricultural student, Rustorf, Germany.
Dr. Gaston Bodart, assistant I. R. Austrian commissioner.
Mr. E. A. C. Landmark, government inspector of fresh-water fisheries for Norway, Christiania.
Mr. Ivan Janschul, professor of political economy in the University of Moscow, Russia.
Hon. L. O. Smith, ex-member of the Swedish Senate, Stockholm.
Mr. Frederico Atristain, Mexican commissioner to the Columbian Exposition.
Mr. Carlos Young, Montevideo, Uruguay.
Mr. A. Hinkelmann, director of fisheries, Kiel, Germany.
Mr. Nobuakira Yamataka, imperial Japanese commissioner.
Mr. Tamotsu Murata, member of the House of Peers, chief counsel of the Society of Fisheries, Japan.
Mr. K. Tawara, secretary Imperial Japanese Commission.
Mr. Y. Yambe, secretary Imperial Japanese Commission.
Mr. Sakaye Sawatari, commissioner of Japanese Fisheries Society.
Mr. N. Yanagimoto, Okinawa, Japan.
Mr. T. Kondo, Osaka, Japan.
Mr. L. Z. Joncas, M. P., Quebec, Canada.
Dr. Ernst Ehrenbaum, Royal Biological Station, Helgoland.
Mr. Fernando Ferrari Perez, general secretary Mexican World's Fair Commission.
Dr. Emile Poussié, delegate of the Agricultural Society of Melun, France.
Comte de Balincourt, lieutenant, French Navy.
Mr. Albert Gomez Ruano, special commissioner of education from Uruguay.
Mr. Henri Giudicelli, commissioner of fine arts for France.
Constantine de Rakouza Soustcheffsky, commissioner-general for Russia to the Columbian Exposition.
Dr. Oscar Nordqvist, inspector of fisheries of Finland, Helsingfors.
Mr. J. J. Armistead, proprietor of Solway fisheries, Dumfries, Scotland.

COURTESIES RENDERED TO THE U. S. FISH COMMISSION.

From the U. S. National Museum were obtained numerous objects illustrating fish, fisheries, and fish-culture, some of which were on exhibition in the fisheries section of the Museum, and others stored among the duplicate collections. The officers of the Museum cooperated most heartily with the Commission in bringing together a valuable and comprehensive exhibit.

To Dr. Goode personally the Commission is indebted for the loan of a series of chromolithographs which form part of the illustrations of Game Fishes of the United States, for which he wrote the text, which was published by Charles Scribner & Sons in 1880. He lent, also, a number of fish-cultural books to make the series exhibited more nearly complete.

Through the courtesy of Hon. W. M. Meredith, Chief of the Bureau of Engraving and Printing, Washington, a supply of macerated greenback pulp was obtained for the purpose of making casts of fishes.

The Department of Agriculture assisted the Commission in its investigation of a fish disease, which proved very destructive during the progress of the Exposition, by the detail of Dr. Charles W. Stiles, who made a study of the parasite and prepared a report upon its life-history and the methods of its destruction.

Through the intervention of the late Hon. F. B. Stockbridge the Commissioner obtained permission from Mr. Howard Page, 26 Broadway, New York City, to use a sufficient number of tank cars belonging to the Standard Oil Company to convey salt water from the North Carolina coast to Jackson Park, Chicago, to be used in maintaining marine animals and plants in the aquarium. Free transportation for the salt water was obtained from Richmond, Va., to Chicago through the liberality of Mr. M. E. Ingalls, president of the Chesapeake and Ohio and the Cleveland, Cincinnati, Chicago and St. Louis railroads.

One of the cars of the Commission was sent from Chicago to Wisconsin for living specimens of muskellunge, black bass, and other fishes, in which undertaking Mr. C. L. Ryder, agent of the Milwaukee, Lake Shore and Western Railroad at Milwaukee, furnished free transportation for the car and its attendants. He also provided the service of Mr. J. B. Carlin, one of the conductors on the road, who was thoroughly familiar with the region to be visited, as a guide and helper for the trip, and he proved of great assistance on that occasion and subsequently.

In the selection of available localities for collecting marine materials along the southern coast, the advice of Dr. W. K. Brooks, of Johns Hopkins University, Baltimore, was profitably followed by the Commission.

In the collection of live fish and other objects in North Carolina, the agent of the Commission was assisted by Mr. George N. Ives and Mr. William Arendell, of Morehead City, and Mr. W. S. Chadwick, of Newbern.

Mr. T. J. Griggs, fish commissioner of Iowa, cooperated with Dr. Bartlett in securing specimens of black bass and other fish at Muscatine Slough during the entire course of the Exposition, as well as in their transportation to the aquarium.

To Mr. R. Ulrich, superintendent of the landscape gardening department of the Columbian Exposition, the Commission is indebted for flowering plants by means of which its space in the Government building was beautified.

A very useful device for recording the pressure of the water in the main supplying the Government building was furnished by Bristol's Manufacturing Company, of Waterbury, Conn. A pressure gauge was set up in proximity to the water motors, enabling us to show upon dials a constant record of the pressure. Thus, when it fell below a point to which the pumps were adjusted, it was easy to ascertain where the fault lay and to give the proper notice to the Exposition authorities.

On July 25, 1893, the water was turned off at one of the pumping stations at Jackson Park to make repairs, but fortunately no loss occurred in the aquarium. Men were up all night for the purpose of making water connections with hose borrowed from the fire department

Thanks are due to Marshal Murphy, chief of the fire department, for permission to connect hose with the plug outside of the aquarium building, in the event of its becoming necessary to shut off the water again for repairs or any other purpose.

During the progress of the Exposition the Imperial Japanese Commission, through Commissioner C. Matsudaira, signified its intention to present the fisheries exhibit of Japan to the U. S. Fish Commission at the close of the Exposition. After consultation with the Commissioner of Fish and Fisheries the gift was accepted, and a few articles desired by the Japanese Commission were promised them in exchange for their valuable collection, which filled 46 cases. These articles were deposited in the Fisheries section of the United States National Museum upon their arrival in Washington.

Mr. Kokichi Mikimoto, of Miyeken, Japan, on behalf of the Japanese Central Association, also presented numerous specimens showing the growth of the pearl oyster for seven years.

Acknowledgments are due to the following persons for gifts of model of vessels and boats used in the fisheries: Gillman Hodgkins, Lamoine, Me.; Louis King, Lamoine, Me.; Newell B. Coolidge, Lamoine, Me.: Coolidge & Bros., Lamoine, Me.; Robert Dority, Sargentville, Me.; D. D. Hodgkins, Lamoine, Me.; J. Brown, Lubec, Me.; Board of Trade, New Bedford, Mass.; L. D. Ashby, Noank, Conn.; E. J. Tull, Pocomoke City, Md.; H. Brusstar & Bro., Newport News, Va.; W. W. Sweat, Tampa, Fla.

From Mr. A. R. Crittenden, Middletown, Conn., was obtained an old-time quadrant used by a fishing captain until about 1840.

A model of a fish car or live box, used by fishermen of Cape Fear, N. C., and made in the shape of a boat, was presented by Lieut. Robert Platt, U. S. N.

Mr. J. M. K. Southwick, Newport, R. I., presented to the Commission a model of fish marketman's car, used by fishermen of southern New England for keeping live fish and lobsters.

Mr. Charles L. Marsh, Solomons, Calvert County, Md., presented for exhibition a pair of his patented deep-water oyster tongs, with photographs illustrating their use.

Capt. E. P. Herendeen, while at Point Barrow, Alaska, obtained specimens of the whalebone gill nets used by the Eskimo in fishing, and an ancient fishing spear from the Mackenzie River basin, through a native of Herschel Island.

Mr. F. E. Brown and Capt. E. Pierce, of New Bedford, Mass., lent a unique collection of whaling apparatus, including many articles of historic value as well as the principal implements now used by whalers.

Mr. John A. Sawyer sent from the same place a darting gun harpoon which had been strangely bent in the body of a whale.

The American Needle and Fish Hook Company, New Haven, Conn., furnished a large series of hooks manufactured on automatic machinery.

The T. J. Buell Company, Whitehall, N. Y., lent spoons, minnow gangs, leaders, and lures for fishing.

Charles Kerrison, jr., Charleston, S. C., sent a case of hooks with barbs shaped like the point of an arrow.

Edward Pitcher, Brooklyn, N. Y., furnished a large series of hooks, squids, swivels, sinkers, and other angling appliances.

Mr. G. M. Skinner, of Clayton, N. Y., furnished a series of his fluted spoon baits.

Messrs. Welch & Graves, Natural Bridge, N. Y., forwarded a specimen of trolling apparatus consisting of a glass tube in which a live minnow can be used as a lure without injury.

J. & S. Allen, Walpole, Mass., lent a series of silk and linen fishing lines.

G. H. Mansfield & Co., Canton, Mass., provided a series of enameled waterproof braided fishing lines.

A very large collection of rods, made at their several factories, were furnished by the Montague Rod Company, of Montague City, Mass. This series included split bamboo, lancewood, and various other styles.

Messrs. Abbey & Imbrie, New York City, lent for exhibition many of the finest types of rods used by anglers, including the celebrated Queen's Jubilee gold-mounted and jeweled fly rod, which was valued at $2,000, and was accompanied by an engraved gold reel. This handsome collection also contained lines of high grade and a variety of high class reels for salmon, tarpon, bass, and trout fishing; also fly books and boxes and a steel tarpon gaff.

The Andrew B. Hendryx Company, of New Haven, Conn., lent 211 reels, representing all grades of their workmanship, and mounted and labeled them in handsome cases at their own expense. This exhibit was so arranged as to show all parts of the reel from the outside, as well as the separate pieces used in reel construction.

Mr. Charles F. Orvis, of Manchester, Vt., provided the exhibit with four of his patent perforated reels, designed for drying the rod without removing it from the reel. The collection of flies manufactured by Mr. Orvis and arranged with angling scenes by Mrs. Mary Orvis Marbury, contained 428 flies for trout, salmon, black bass, etc., and 157 photographs representing angling in nearly all parts of the United States and Canada.

D. W. C. Farrington, Lowell, Mass., exhibited a beautiful series of flies and bugs made by himself for his own use, together with a mounted half skin of a brook trout around which the flies were arranged.

T. W. Rudolph, Chicago, Ill., furnished his ventilated tackle box, his minnow trap, floating minnow bucket, and floating live net, and these were afterwards presented to the Commission for its permanent exhibit in Washington.

G. L. Bailey, Portland, Me., furnished his patent landing-net frame with patent ring.

A figure representing a modern angler was clothed and fitted out by A. G. Spalding & Bros., of Chicago, with a Kosmic rod, reel, line, net, and the angler's suit.

R. D. Hume, of Gold Beach, Oreg., presented for exhibition a spawning box for holding salmon when taking eggs or milt, such as he uses on Rogue River, Oregon.

The Colorado Fish Commission, through Mr. O. G. French, secretary of the Colorado World's Fair Commission, lent a trout transportation can, a spawning can, a zinc hatching tray, and a pair of nippers.

Mr. Henry W. Elliott, 317 Detroit street, Cleveland, Ohio, lent his valuable series of water-colored paintings, illustrating the fur-seal and other related fisheries of Bering Sea.

Permission was obtained from Harper & Bros., Scribner & Co., the Outing Magazine Company, the Cosmopolitan Magazine Company, the Century Magazine Company, and Frank Leslie's Publishing Monthly Magazine Company to borrow illustrations from their respective magazines for the use of the Fish Commission exhibit.

In the preparation of the illustrations of Alaskan fisheries, Mr. Ivan Petroff's sketches were utilized, and he also superintended the construction of certain models showing native fishing methods.

Mr. Alexander Agassiz, Cambridge, Mass., furnished plans and photographs of the Zoological Laboratory at Newport, R. I., besides memoirs by himself, Garman, Hillman, De Pourtales, and Whitman.

Hon. J. J. Grinlinton, commissioner for Ceylon, presented copies of the Handbook and Catalogue of the Ceylon Courts.

Hon. Arthur Renwick, executive commissioner for New South Wales, furnished numerous copies of a catalogue of Australian mammals and of a work on edible crustaceans and fishes, which were intended partly for the library of the Commission and partly for distribution from its office.

Acknowledgments are due to Capt. William T. Lee, of Gloucester, Mass., and Capt. William M. Ellis, for specimens of rare and curious fishes obtained by them on La Have Bank.

Also to F. F. Dimick, Boston, Mass., for a curious flounder, and to Capt. Alfred Bradford, of Gloucester, for a collection of flounders taken with the beam trawl.

Miss E. E. Davidson, Jamaica Plains, Mass., lent two cases of stuffed European fishes prepared in accordance with the process of her father, Dr. Davidson.

E. A. Holmes, Eastport, Me., sent a living albino lobster.

COURTESIES RENDERED BY THE FISH COMMISSION.

On October 31, 1893, after the close of the Exposition, all of the aquarium fishes and other animals and plants not otherwise assigned by the Commissioner, such as brood fishes to be returned to the stations from which they were shipped and a small part of the marine species for the aquarium at the office in Washington, were transferred to Prof. S. A. Forbes for the State Laboratory of Natural History at Champaign, Ill. It was the intention to give this material to the South Park commissioners, of Chicago, but after operating the establishment for a few days these commissioners found themselves unable to maintain it and it was turned over to Professor Forbes for the State of Illinois.

On February 21, 1894, permission was given to James R. Barrie, of New York City, to have two photographic prints made from each negative belonging to the U. S. Fish Commission exhibit, Mr. Barrie desiring to use these prints in the illustration of a sumptuous work on the World's Fair.

Mr. J. H. Crockwell, agent of Halligan's Illustrated World's Magazine, was given permission to make photographs of the Fish Commission exhibit for reproduction in his magazine.

FINANCIAL STATEMENT.

The total allotment to the United States Fish Commission of the funds appropriated by Congress for the preparation, maintenance, and return of the Government exhibit, after deducting 5 per cent for common expenses of the board of management, was $89,205. This sum was increased by resolution of the board in May, 1893, by granting permission to use a further sum of $4,000, or so much thereof as might be necessary, for carrying out the plan of the Fish Commission exhibit as formulated by the Commission and approved by the board of management. Of that sum, however, only $584.60 was required. The total expenses of the exhibit to September 30, 1894, amounted to $89,789.60.

The various items for which the above expenditure was incurred are as follows:

1.	Salaries	$41,215.35
2.	Travel	3,327.80
3.	Subsistence	6,631.16
4.	Office equipment	5,081.62
5.	Transportation and freight	3,998.37
6.	Scientific inquiry	376.40
7.	Fish-culture	1,612.04
8.	Fishery exhibit	9,956.46
9.	Installation and maintenance	2,537.62
10.	Exhibition furniture	8,042.10
11.	General equipment	331.23
12.	Labels	654.10
13.	Packing and repacking	1,838.13
14.	Aquarium, equipment	1,877.55
15.	Aquarium, temporary labor	595.88
16.	Aquarium, collection and food for fishes	1,713.79
	Total	89,789.60

Salaries, $41,215.35, may be subdivided as follows:

1. Administration and office force	$15,951.79
2. Installation, maintenance, and return	7,054.06
3. Fish-cultural section	5,130.25
4. Fisheries section	5,890.41
5. Aquarium	7,188.84
Total	41,215.35

The amount expended for subsistence may be classified as follows:

1. Preparatory work	$358.45
2. Installation and maintenance	3,400.97
3. Aquarium	2,871.74
Total	6,631.16

RETURN AND DISPOSITION OF THE EXHIBITS.

The extensive collection of fishery objects presented to the U. S. Fish Commission by the Imperial Japanese Commission at the close of the Exposition was deposited in the U. S. National Museum.

The large case made for the boat and vessel models of the exhibit was also turned over to the Museum and adapted for use in the section of naval architecture.

All the vessel and boat models, canoes, fishing apparatus, clothing, marine animals, fishery products, fishery illustrations, etc., not needed by the Commission were deposited upon their return to Washington in the fisheries section of the National Museum. Articles and materials belonging to the exhibit such as could be utilized in the work of the Commission were transferred to its central office after their return to Washington, in accordance with the instructions of the Treasury Department.

Respectfully submitted.

TARLETON H. BEAN,
Representative.