United States Centennial Commission.

INTERNATIONAL EXHIBITION, 1876.

REPORTS AND AWARDS

GROUP V.

EDITED BY

FRANCIS A. WALKER,

CHIEF OF THE BUREAU OF AWARDS.

PHILADELPHIA:

J. B. LIPPINCOTT & CO.

1877.

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SYSTEM OF AWARDS.

[*Extract from Circular of April* 8, 1876.]

Awards shall be based upon written reports attested by the signatures of their authors.

The Judges will be selected for their known qualifications and character, and will be experts in departments to which they will be respectively assigned. The foreign members of this body will be appointed by the Commission of each country and in conformity with the distribution and allotment to each, which will be hereafter announced. The Judges from the United States will be appointed by the Centennial Commission.

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Reports and awards shall be based upon inherent and comparative merit. The elements of merit shall be held to include considerations relating to originality, invention, discovery, utility, quality, skill, workmanship, fitness for the purposes intended, adaptation to public wants, economy and cost.

Each report will be delivered to the Centennial Commission as soon as completed, for final award and publication.

Awards will be finally decreed by the United States Centennial Commission, in compliance with the Act of Congress, and will consist of a diploma with a uniform Bronze Medal, and a special report of the Judges on the subject of the Award.

Each exhibitor will have the right to produce and publish the report awarded to him, but the United States Centennial Commission reserves the right to publish and dispose of all reports in the manner it thinks best for public information, and also to embody and distribute the reports as records of the Exhibition.

ORGANIZATION AND DUTIES OF THE JUDGES.

[*Extract from Circular of May* 1, 1876.]

Two hundred and fifty Judges have been appointed to make such reports, one-half of whom are foreigners and one-half citizens of the United States. They have been selected for their known qualifications and character, and are presumed to be experts in the Groups to which they have been respectively assigned. The foreign members of this body have been appointed

by the Commission of each country, in conformity with the distribution and allotment to each, adopted by the United States Centennial Commission. The Judges from the United States have been appointed by the Centennial Commission.

To facilitate the examination by the Judges of the articles exhibited, they have been classified in Groups. To each of these Groups a competent number of Judges (Foreign and American) has been assigned by the United States Centennial Commission. Besides these, certain objects in the Departments of Agriculture and Horticulture, which will form temporary exhibitions, have been arranged in special Groups, and Judges will be assigned to them hereafter.

The Judges will meet for organization on May 24, at 12 M., at the Judges' Pavilion. They will enter upon the work of examination with as little delay as practicable, and will recommend awards without regard to the nationality of the exhibitor.

The Judges assigned to each Group will choose from among themselves a Chairman and a Secretary. They must keep regular minutes of their proceedings. Reports recommending awards shall be made and signed by a Judge in each Group, stating the grounds of the proposed award, and such reports shall be accepted, and the acceptance signed, by a majority of the Judges in such Group.

The reports of the Judges recommending awards based on the standards of merit referred to in the foregoing System of Awards, must be returned to the Chief of the Bureau of Awards not later than July 31, to be transmitted by him to the Centennial Commission.

Awards will be finally decreed by the United States Centennial Commission, in compliance with the Act of Congress of June 1, 1872, and will consist of a special report of the Judges on the subject of the Award, together with a Diploma and a uniform Bronze Medal.

Upon matters not submitted for competitive trial, and upon such others as may be named by the Commission, the Judges will prepare reports showing the progress made during the past hundred years.

Vacancies in the corps of Judges will be filled by the authority which made the original appointment.

No exhibitor can be a Judge in the Group in which he exhibits.

An exhibitor, who is not the manufacturer or producer of the article exhibited, shall not be entitled to an award.

The Chief of the Bureau of Awards will be the representative of the United States Centennial Commission in its relations to the Judges. Upon request, he will decide all questions which may arise during their proceedings in regard to the interpretation and application of the rules adopted by the Commission relating to awards, subject to an appeal to the Commission.

A. T. GOSHORN,
Director-General.

[*Extract from Director-General's Address to Judges, May* 24, 1876.]

"The method of initiating awards which we have adopted differs in some respects from that pursued in previous exhibitions. In place of the anonymous verdict of a jury, we have substituted the written opinion of a Judge. On this basis awards will carry the weight and guarantees due to individual personal character, ability, and attainments, and to this extent their reliability and value will be increased. It is not expected that you will shower awards indiscriminately upon the products in this vast collection. You may possibly find a large proportion in no way raised above the dead level, nor deserving of particular notice. The standard above which particular merit worthy of distinction begins is for you to determine. In this regard I have only to express the desire of the Centennial Commission, that you should do this with absolute freedom, and when you meet with a product which you consider worthy of an award, we desire you to say, in as few words as you may deem suitable, why you think so.

"This, gentlemen, is all we ask of you in the Departments of Awards. Opinions thus expressed will indicate the inherent and comparative merits, qualities, and adaptations of the products,—information which the public most desires.

"Elaborate general reports and voluminous essays, though of great value as sources of general information, give little aid in determining the reliable or intrinsic merits of particular, individual products.

"The regulations which have been published divide the work of awards into three parts:

"1st. The individual work of the Judges.

"2d. The collective work of the groups of Judges.

"3d. The final decisions of the United States Centennial Commission in conformity with the acts of Congress.

"Each award will thus pass three ordeals, which, doubtless, will be ample and satisfactory."

GROUP V.

JUDGES.

AMERICAN.	FOREIGN.
SPENCER F. BAIRD, Smithsonian Institution, Washington, D. C.	JOAKIM ANDERSSEN, Norway.
T. B. FERGUSON, Baltimore, Md.	

GROUP V.

FISH AND FISH PRODUCTS—APPARATUS OF FISHING, ETC.

CLASS 640.—Marine mammals,—seals, cetaceans, etc., specimens living in aquaria, or stuffed, salted, or otherwise preserved.

CLASS 641.—Fishes, living or preserved.

CLASS 642.—Pickled fish, and parts of fish used for food.

CLASS 643.—Crustaceans, echinoderms, bêche-de-mer.

CLASS 644.—Mollusks, oysters, clams, etc., used for food.

CLASS 645.—Shells, corals, and pearls.

CLASS 646.—Whalebone, shagreen, fish-glue, isinglass, sounds.

CLASS 647.—Instruments and apparatus of fishing,—nets, baskets, hooks, and other apparatus used in catching fish.

CLASS 648.—Fish culture,—aquaria, hatching pools, vessels for transporting roe and spawn, and other apparatus used in fish breeding, culture, or preservation.

GENERAL REPORT

OF THE

JUDGES OF GROUP V.

INTERNATIONAL EXHIBITION,
Philadelphia, 1876.

PROF. FRANCIS A. WALKER, *Chief of Bureau of Awards:*

SIR,—I have the honor to transmit to you, on behalf of the Judges of Group V., the general report upon "Fish and Fishing Products, Apparatus of Fishing," etc.

Very respectfully,

B. PHILLIPS.

GROUP V.

FISH AND FISHING PRODUCTS APPARATUS OF FISHING, ETC.

At the International Exhibition exhibits of fish and fish-products, apparatus used in catching fish and for fish-culture, etc., occupied a prominent position.

In 1866, a special exhibition of fisheries was held at Boulogne-sur-Mer, under the auspices of the French Government, which was called l'Exposition Internationale de Pêche de Boulogne-sur-Mer. But as the exhibits were mainly derived from France, opportunities of comparing fish-products, or of studying the apparatus used in the capture of fish, coming from other countries, were limited. It may be stated, that on no other occasion have such facilities been afforded as at the International Exhibition of 1876 to contrast the fish-products of various countries, nor at any other time has there been assembled such a variety of fishing apparatus.

The following countries, represented at Philadelphia, had exhibits included in Group V.: Austria, Argentine Republic, Bahamas, Bermuda, Brazil, British Columbia, Canada, China, Chili, Cape of Good Hope, England, France, Germany, Italy, Japan, Liberia, Netherlands, New South Wales, Norway, Portugal, Russia, Sweden, Spain, Turkey, Tasmania, and the United States. The vast importance of fish as food, the amount of capital employed in the fisheries, the attention paid to the subject in other countries, and the conspicuous position occupied by fish-culture, were thoroughly demonstrated at the International Exhibition.

In treating of the great variety of objects included under the general head of Group V., for purposes of distinction, and a more thorough study of the subject, nine classes or subdivisions were made, as stated on page vii.

CLASS 640.—MARINE MAMMALS—SEALS, CETACEANS, ETC., SPECIMENS LIVING IN AQUARIA, OR STUFFED, SALTED, OR OTHERWISE PRESERVED.

In this class, the display of stuffed seals from the Atlantic and Pacific coast, exhibited by the Smithsonian Institution, was remarkable for its variety. The importance of the Phocidæ, and their rapid diminution on the Atlantic coast, have directed the attention of the Government, and of students of natural history, a more particular inquiry into the habits of the seal. The Smithsonian Institution presented for examination in the Government Building all the known American varieties of the Phocidæ, carefully stuffed, such specimens being excellent as to preparation. Of parts of Cetaceans, the jaws of right and sperm whales, with crude whalebone, were exhibited by the Smithsonian Institution, together with some plaster models of the smaller varieties of the Cetaceans. The character of the buildings which served for the exhibition precluded the placing of live seals in aquaria.

CLASS 641.—FISHES, LIVING OR PRESERVED.

To this class photographs, drawings, plaster of Paris and papier-maché casts, or models, of fish were added. This class, made more especially for the purpose of study, was very fully represented in some of its subdivisions. The preparations made by the Centennial Commissioners, however, were not of a character to insure a successful exhibition of fish in aquaria. The methods employed to maintain fish alive in their natural element were not fully carried out at the period of the Exhibition. It is, however, quite evident that peculiar and special aquaria would have had to be erected for the purpose of keeping fish alive. The expense of constructing such aquaria, and the restricted time of the Exhibition, precluded the successful carrying out of this enterprise. In Agricultural Hall were placed several large aquaria, and a number of smaller ones. The aerating engine was faulty in construction, insufficient in size, often breaking down, and depriving the water of the necessary quantity of air. Such apparatus as was employed during an unusually hot summer to reduce the temperature of the water was defective, and inadequate for refrigerating purposes. During the summer many fish died, and it was a difficult task to keep them alive at all. Such accidents as occurred to the fish were attributable to the defects before mentioned, and were beyond the control of Mr. Frederick Mather, the superintendent of the aquaria.

The following fresh-water fish were placed in the aquaria:

FRESH-WATER FISH.

Black bass, *Micropterus nigricans.*
Large-mouthed black bass, *Micropterus Floridanus.*
Brook-trout, *Salmo fontinalis.*
Buffalo-fish, *Bubalicthys bubalus.*
Catfish, *Amiurus catus, A. nigricans, Ictalurus cærulescens.*
Chubs, *Semotilus corporalis.*
Eels, *Anguilla Bostoniensis.*
Grayling, *Thymallus tricolor.*
Shad, *Alosa sapidissima.*
Lake trout, *Salmo confinis.*
Sunfish, *Pomotis aureus, Pomotis auritus.*
Bream, *Calliurus.*
Yellow perch, *Perca flavescens.*
Pickerel, *Esox reticulatus, E. fasciatus.*
Suckers, *Catostomus teres.*

With the salt-water fish placed in the aquaria the experiment was hardly more successful, the fish living but a short time, from want of sufficient aeration and from too high temperatures. Of sea-fish and crustaceans, etc., common to our own waters, the following were placed in the salt-water aquaria:

SALT-WATER FISH.

Sheepshead, *Archosargus probatocephalus.*
Toad-fish, *Batrachus tau.*
File-fish, *Ceratacanthus aurantiacus.*
Tautog, *Tautoga onitis.*
Sharp-nosed skates, *Raia lævis.*
Smooth dog-fish, *Mustela canis.*
Flounder, *Chænopsetta ocellaris.*
Pipe-fish, *Syngnathus Peckianus.*
Sting-ray, *Trygon centrura.*
Sea-robin, *Prionotus evolans.*
Cunner, *Tautogolabrus adspersus.*
King-crabs, *Polyphemus occidentalis.*
Hermit-crabs, *Pagurus pollicardus.*
Sand-crabs, *Platycarcinus inoratus.*
Blue-crabs, *Lupa dicantha.*
Fiddlers, *Gelsimus vocans.*
Sea-spiders, *Libinia canaliculata.*
Diamond-back terrapin, *Emys palustris.*
Loggerhead turtle.
Green turtle.
Lobsters.

Coming from the Commissioner of Bermuda, the following fish peculiar to the waters of Bermuda were put in the aquaria, but owing to the causes before mentioned, these foreign fish speedily died:

Squirrels, *Holocentrum sogo.*
Bream, *Pimelepterus boscii.*
Grunts, *Hæmulon.* (?)
Gray snapper, *Lutjanus caxis.*
Hinds, *Epinephelus guttatus.*
Groupers, *Epinephelus oxypterus.*
Sergeant-majors, *Glyphidodon saxatilus.*
Doctor, *Acanthurus chirurgus.*

In the refrigerating apparatus employed for keeping fish, the exhibit was a remarkable one. No less than seventy-four distinct species of fish were placed in refrigerators in the Government Building, and, in most cases, as of edible fish, as many as ten of the same kinds of fish, from different localities, were presented for examination. The following fish were exhibited by Mr. Eugene G. Blackford, of New York, in the refrigerators:

Tarpum.
Wolf-fish.
Sharks.
Monster blackfish, 22½ lbs.
Fresh-water sheepshead.
Wall-eyed pike.
Moss-bunker.
Yellow perch.
Butler-fish.
Herring.
Sea-robin.
Porgies.
King-fish.
Ceres.
Lump-fish.
Sturgeons.
Salmon-trout.
Red snapper.
Spotted grouper.
Grouper.
Crevalle.
Pompanos.
Moon-fish.
Fresh mackerel.
Spanish mackerel.
Mackerel, peculiar.
Flounders.
Fluke.
Halibut.
Sole.
Catfish.
Paddle-fish.
Graylings.
White perch.
Squid.
Skates.
Bass.
Sea-bass.
Mussels.
Clams.
Brook-trout.
Salmon, Kennebec.
Salmon, Restigouche.
Salmon, California.
Sheepshead.
Cod.
Haddock.
Pollock.
Cusk.
Blue-fish.
Rock cod.
Shad, North Carolina.
Shad, New York.
Shad, Pennsylvania.
Frogs.
Rabbit-fish.
Lobsters.
Weak-fish.
Silver garfish.
White-fish.
Frost-fish.
Eels.
Turbot.
Pickerel.
Black bass.
Sunfish.
Buffalo-fish.
Lafayette-fish.
Smelts.
Green turtle.
Terrapins.
Horse-shoe crabs.
Loggerhead turtle.

Such of these fish as were in ordinary use as food were remarkable for their size and beauty, and demonstrated the great abundance and variety of fish-food which the lakes, rivers, and seas of the United States possess.

In preparations of fish preserved in alcohol, the exhibits furnished by the Museum of Bergen (Norway) were distinguished for excellence and variety. One peculiar trait of this collection was an exhibit of the sea-fish in ordinary use as food in their various stages of development. Several collections made by Sweden and Canada, and one by the Maryland State Commission, were of a comprehensive character. The Maryland collection was thought worthy of special mention, as containing almost all the varieties of fish caught in Chesapeake Bay.

In stuffed fish, such collections as were on exhibition were not remarkable. It seems quite evident that while the taxidermist is enabled to retain, in some degree, the proportions of the animal or bird to be stuffed, and may keep the color of the fur or plumage, fish subjected to the same methods do not preserve either their form or peculiar coloring. In a certain time, longer or shorter, stuffed fish exude a peculiar oil, which destroys their natural color; shrinkage also takes place, and the scales gradually drop off of even the most carefully preserved specimens.

The collection of plaster casts of fish, included in Class 641, shown by the Smithsonian Institution, was by far the largest and most perfect ever exhibited. These casts, modeled from actual fish, cannot be otherwise than truthful as to form. As the hues and colors, spots and stripes, of the fish were carefully copied, the peculiar appearance of each species of fish could be unhesitatingly recognized. It occurred quite frequently during the period of the International Exhibition that this collection of plaster casts of fish had to be studied. In some special cases, when preparations of fish used as food (Class 642) could not be determined as to the kind of fish, visitors from other countries often ascertained the species by consulting these plaster casts. It became quite interesting to bring Chinese and Japanese into the Smithsonian collection of plaster casts, and to notice them recognizing certain kinds of fish as common in their country, while other fish were strange and unfamiliar to them.

The series of photographs of American fish exhibited by the Smithsonian Institution, each having a scale giving a fixed standard in feet and inches, must be considered as a great help to the study of ichthyology. This method of imparting information is so simple, first by means of plaster casts, and supplementing these casts with the photographs of the same fish, that it is believed to be the best yet devised. If for certain details fish kept in alcohol may still find a place in museums, it is thought that, for all general purposes, the casts and photographs present great advantages over dried or stuffed fish. Scientific representatives of other countries present at the International Exhibition were loud in their praises of the American manner of depicting fish, and were anxious to learn the method of making plaster casts, and to obtain duplicate specimens.

Very accurate drawings of fish, carefully colored, coming from the Cambridge Museum, of Massachusetts, and from the Smithsonian Institution, were found in Class 641.

The progress made then in this peculiar branch, to wit: the methods to be employed to facilitate the study of ichthyology, by means of casts and photographs of fish, it is thought has been very great.

Some attention had been directed towards changing the shapes of the glass vessels in which fish were placed in alcohol, with a view of preventing a certain distortion of form, due to the irregular magnifying power of spherical glass vessels. In the collection of fish exhibited by the Maryland Fish Commission, such specimens had been placed in square glasses. It is true, distortion of the fish was, in a measure, prevented. The fragility of the glass vessels, however, and

the difficulty of fitting square corks into the openings of the vessels, it was thought, were objections which more than counterbalanced the imperfections of distortions due to round glass vessels.

CLASS 642.—Pickled Fish, and Parts of Fish used for Food.

This class was very fully represented, there being some three hundred preparations of fish used for food sent to the Exhibition, coming from many parts of the world. The following fish, arranged in an endless variety of methods, were in use:

Anchovies.	Hake.	Ox-fish.	Shark.
Bream.	Haddock.	Oolachans.	Skate.
Barbel.	Halibut.	Pilchard.	Sprat.
Caviar.	Herring.	Pike.	Sole.
Carp.	Lamprey.	Pollock.	Sword-fish.
Cod.	Lanquet.	Rouget.	Sturgeon.
Cockle.	Ling.	Roach.	Turbot.
Cusk.	Lobster.	Sardines.	Tunny.
Conger eels.	Mackerel.	Salmon.	White-fish.
Eels.	Mullet.	Shad.	Whiting.
Flounders.	Menhaden.		

AUSTRIA.

From this country there was but one exhibit, of anchovies, coming from Dalmatia.

BRITISH COLUMBIA.

The exhibits from British Columbia consisted mainly of salmon, prepared in cans, which were of good quality. Salmon-trout were put up, salted, in barrels. Notwithstanding the distance from the point of curing, and the warm summer weather at the place of exhibition, all the preparations were sound and edible. One fish, the oolachan, which was of good quality, was sent from British Columbia.

BRAZIL.

There was but one exhibit, a salted preparation of ox-fish, which was apparently too coarse to be available as food, outside of the country of its production.

CANADA.

The exhibits of the Dominion of Canada, in Class 642, were numerous. In such staple products as cod, haddock, and mackerel, herring, tongues, and sounds, the exhibits were of the finest quality. In preparations of salmon (canned) the exhibits were good. In the

canned preparations of other fish, it was thought that the progress had not been so marked.

CHINA.

The preparations of fish coming from China were apparently rather curious than excellent. The Chinese have a method of curing fish, peculiar to themselves, which consists in drying and reducing to an almost impalpable powder all kinds of fish, so that it becomes quite impossible to distinguish the variety used. Among their preparations, they use the dried fins of the white and black, and white sharks. Europeans residing in China declare that such preparations, made from the fins of sharks, are excellent.

The following information given by Mr. Kwong Ki Chui, member of the Chinese Educational Mission in the United States, furnishes some interesting data as to the kinds of fish found and used in China.

Question. Are there any salmon in China?

Answer. Yes; there are in the sea, but not in large quantity.

Q. What are the principal sea-fish?

A. Mackerel, shad, garoupa, sole, herring, pike, shark, prawn, shrimp, crab, lobster.

Q. What proportion of fish enters into the daily diet of the Chinese?

A. We use fish as much as meat for every meal, and a majority of us use a little salted fish in addition.

Q. Does China import any fish?

A. Yes, we do; we import a large quantity of the following dried fish: flat-fish (Japan), abalony, or awabi (Japan and California), beche-de-mer (Japan and Sydney, Australia), shark's fins (Japan, and some islands in China Sea), scallop (Japan).

Q. What are the principal fresh-water fish?

A. They are shad (we call it fresh- and salt-water fish), mati-fish, and many kinds of which I do not know the names in English.

Q. Is there any fish-culture, or preparation of fish from their eggs?

A. Yes, there is; we raise a great deal of fish in ponds for market. In the front of our villages there are generally some fish-ponds, except those in the northern part of China. In the south there are some places where a large number of fish-ponds straggle in plains. The inhabitants of the interior are, therefore, supplied with fish especially from ponds. The way of raising fish is this: a number of male and female fish of certain kinds are kept in a small pond, and the eggs are laid in spring. After the eggs are changed into fish and it becomes as large as a small finger, it is sold to the fish-pond keeper. He then

puts it into a pond for about six or eight months, when it is caught and sent to market. The following are the fish kept in ponds: carp, pangolin, perch, tench, bream. We also raise oysters in ponds which hold salt and fresh water.

CHILI.

This South American republic presented at the Exhibition quite a series of excellent fish-preparations, in cans, due to the enterprise of a single firm of manufacturers, Messrs. Sciaccabuga & Co. This fish-food was found to be of quite superior quality.

ENGLAND.

But two exhibits were sent from England: one of salmon and one of Cornish sardines (pilchards). The latter preparation is worthy of notice, as it resembles, in many respects, French sardines. These sardines, put up at Falmouth, in England, are subjected to precisely the same processes as are adopted in France.

FRANCE.

That marked pre-eminence which France enjoys for all alimentary processes was quite as remarkable in her exhibits belonging to Class 642. Principally represented by sardines put up in oil, these goods were of the very finest quality, and were prepared with exceeding elegance and taste. To excellence of material was added that handsome appearance which so distinguishes French food-preparations. To sardines preparations of anchovies and mackerel, in oil, were added. Such exhibits as were presented for competition by French manufacturers were rightly considered as standards of excellence.

ITALY.

The exhibits of Italy, although not numerous, were all excellent, and consisted of sardines, anchovies, and eels. Eels coming from the Cammachio eeleries find a large market in South America. The exceeding cheapness of the Italian fish-preparations was very remarkable.

JAPAN.

This country had a single exhibit, consisting of salmon salted, smoked, and dried, secured in cotton bags. This fish was not highly salted, but was thoroughly smoked in the curing. Whether that method of preparing salmon was original with the Japanese, or derived from the Dutch, was not ascertained. The Japanese Commissioner stated that the catch of salmon on the west coast of Yezo

was exceedingly large, the yield being greater than the consumption. The salmon differed in the preparation from our own or Dutch salmon, in being split through the back, and not through the belly. At Jeddo, the capital of Japan, it was stated that such dried fish were worth twenty-five cents each. Information was obtained that mackerel, bass, and cod were salted and dried, and that many other kinds of fresh- and salt-water fish were arranged for food according to the Chinese method, that is, by drying and pounding. The quantity of salmon caught in the rivers of Japan was stated by the Commissioner to be fully 48,000,000 pounds. As one of the advantages derived from the interchange of thought at the International Exhibition, it is believed that the native Japanese will acquire the American methods of preparing salmon, as in use on our Pacific coast, and will thus be enabled to supply China with this excellent fish-food.

NETHERLANDS.

The Netherlands were but poorly represented in Class 642. Such exhibits as were made consisted of salmon, soles, and herrings. These only showed the highest grades of canned goods, the staple fish-products not being presented. Such exhibits as were examined were of good quality.

NORWAY.

Prominent among all the exhibits in Group V. were those of Class 642, due to Norway. Almost every edible fish caught on the coast of Norway was found. Codfish, haddock, ling, cusk, were shown in their dried form. Such dried preparations were apparently used to some degree for home consumption, or in the North of Europe, though a certain quantity is sent to more distant markets. Dried cod, without salt, has various appellations, derived sometimes from the seasons in which the fish is caught, or from the cut of the fish, as prepared for various markets. Such fish as were dried (without salt) kept perfectly sweet during the American summer. Salted codfish was remarkably well prepared, and in the higher grades of fish showed the care taken in trimming and cutting them. Preparations of dried and salted ling were also found to be excellent. Cusk, dried (without salt), was also found to be a good preparation. In herrings, there were numerous exhibits, smoked, salted, and pickled, and prepared with oil. Of anchovies (pilchards) prepared with bay-leaves, there were numerous examples, all good of their kind, neatly put up, and remarkable for their cheapness. In mackerel, the method of preparing the fish by salting did not seem to be employed. This fish, caught in fair quantity on the coast of Norway, finds a market

in England, where it is sold fresh, being transported in ice. There was but a single preparation of mackerel, and that was put up in oil. In salmon, there were several preparations, some put up in the manner common to America, and some in oil. The color of the Norwegian salmon, when canned, seemed somewhat lighter than our American fish (*Salmo salar*). Certain carefully arranged preparations of fish, designated as fish-cakes, seasoned with wine and other sauces, were excellent. Other exhibits of fish-cakes, consisting of dried fish, ground into meal, and then made into biscuits, were suggestive of an excellent method of utilizing fish when found in great abundance, and of obtaining good food in a comparatively small bulk. Exhibits of fish-meal, the material from which the fish-biscuits were made, were found to be excellent. Caviar, made of cod-roe, was a good preparation. Cod-roes, which are put up in large quantities in Norway, for exportation to France, where they are used by French fishermen in baiting for sardines, were among the exhibits. Such products derived from the cod as tongues and sounds were of the finest preparation, being put up specially for the West Indian and Australian markets. With very rare exceptions, all the preparations of fish from Norway kept in a perfectly sound condition through the months of June, July, and August, and at the conclusion of the Exhibition were excellent.

PORTUGAL.

The exhibits made by Portugal were of the most varied character, in fact, exceeded in quantity those of any other country at the International Exhibition. The general excellence of the Portuguese fish-productions was quite remarkable. Owing to the cheapness of oil in the country, the canned goods made in Portugal were very low-priced. A large export trade to Brazil seems to have fostered the canning business. It was not alone in the finer preparations of fish that the care taken by the Portuguese was manifest, but in the cruder preparations the same skill was evident. The variety of fish was very large, including almost every edible fresh- and salt-water fish found in the country and on the coast. Certain methods of preparing sardines by salting, and pressing them in bulk, were thought worthy of particular notice. In regard, then, both to excellence and variety of fish-products, Portugal occupied a position second to none in the Exhibition.

RUSSIA.

In Class 642, more especially in canned fish, Russia had but little on exhibition. Its fish-products were, however, excellent of their kind. In caviar the exhibits were more numerous, and were of fine

quality. A peculiar preparation called veziga, made from the spinal cord of the sturgeon, used as a delicacy in Russia, was among the exhibits.

SPAIN.

In Class 642, the exhibits of Spain were very numerous. Great attention seems to have been paid, not only to the preparations of fish which could be used by the wealthier classes, but also to such staple fish as would serve for the food of the poorer classes. Pilchards in bulk, smoked, salted, and pressed, were of a very superior quality. In the higher grades of canned goods, Spain, having a considerable export trade, puts up such preparations as are especially adapted for colonial use. The range of fish used in Spain is exceedingly large. The excellence of Spanish oil, and its cheapness, allow her to produce high grades of canned food at exceedingly low prices. As in Portugal, manufacturers of canned goods do not restrict themselves to a single preparation of the same fish, but have various methods of arranging it.

TURKEY.

This country had but a single exhibit, botargo, a preparation of mullet's roe, closely resembling the same substance as is put up in Florida. This preparation was excellent, and kept sweet and sound during the summer.

UNITED STATES.

The following States sent exhibits belonging to Class 642; California, Maine, Massachusetts, New York, New Jersey, and Oregon. The prominence salmon-fishing and the preparation of salmon have taken on the Pacific coast was strikingly represented. Exhibits of canned salmon coming from the State of Oregon, and principally from the Columbia River, were of very good quality. Extensive factories on the Columbia River, during from three to four months of the year, are constantly at work preparing canned salmon, and find for their products a market in all parts of the world. The certainty of the catch, and the cheapness of the product, together with its excellence, have led to these results. In 1875, it was estimated that the total make of canned salmon on the Columbia River was about 16,000,000 pounds. For preserving processes, rather than for table use as fresh fish, the fat condition and handsome color of the flesh of the *Salmo quinnat* of the Pacific market is a better fish for canning than the *Salmo salar* of the Atlantic coast. Without an exception, all preparations of salmon put up on the Pacific coast were excellent, and

were thought to be superior to those coming from other countries. In fact, the cheapness of these Pacific preparations of salmon has, in a certain degree, driven out all other canned salmon. It was quite evident to the Judges that great progress had been made in this special branch of canning. Salmon salted in barrels, coming from the Pacific coast, was excellent, and was remarkable for its cheapness. In canned preparations of staple fish, such as mackerel, put up in the New England States, the progress was not so marked as in California canned goods. The Eastern goods were often somewhat wanting in care as to preparation, and though the fish kept sweet and good, in flavor, and especially in appearance, they did not equal similar fish put up in other countries. In certain kinds of fish, especially menhaden, prepared like sardines, notable progress was, however, visible. It is worthy of mention, that a class of goods closely resembling the finer grades of fish put up in Norway and Sweden, called there *delicatessen*, are now being put up in the United States, more especially to supply the wants of our foreign citizens. Such preparations were found to be remarkably good. In caviar, an excellent effort has been made to bring into use the roes of sturgeons, and very good preparations of caviar, manufactured in San Francisco and in Milwaukee, were among the exhibits, and were deemed worthy of an award. It is to be regretted that there were no exhibits of salted cod, nor of any of the staple preparations of fish. An extract of fish made from the menhaden, due to a manufacturer in Maine, was thought worthy of special commendation. This product was excellent, without any fishy taste or odor, and closely resembled the extract of beef. For use as a substitute for the extract of meat, this preparation, it was thought, might present certain advantages. As it could be made in quantity where any kind of fish is caught in abundance, it seemed to resolve the problem of utilizing all portions of the fish, as the manufacture did not preclude the extraction of the oil, nor the subsequent conversion of what was left of the fish into manure.

CANS.

No marked progress was visible in the manufacture of the cans. In Sweden, tin cans were used, with a large hole in the top of them, which hole was closed with a cork, which was sealed up. This method, which was not a good one, it was understood, was only used in order to evade certain duties. Certain inventions, due to France, in the method of securing the covers to cans, were presented, but these were mainly directed towards facilitating the opening of the can. Paper boxes, of thick material, covered with a varnish, were

also on exhibition from Sweden, but were believed to present no particular advantages. The excellence of the French cans was particularly conspicuous. As nothing but metal is used in France, even for the labels, it was thought that any imperfections in the cans might be more immediately visible by the manufacturers. Very generally, American cans were not remarkable for neatness of form, and did not equal those made in other countries. It is thought that, by greater attention to details in the manufacture of cans in the United States, some advantage might be derived. Spanish and Portuguese cans, closely resembling the French in form, were excellent.

GENERAL REMARKS.

In examining the fish consumed fresh as food, or put up for exportation, it is found that, whereas in the United States we restrict ourselves to a few fish, such as cod, mackerel, herrings, and salmon, in other countries the kinds of fish salted, dried, pickled, or canned by far exceed those we prepare. Again, in the preparation of fish in the United States, we restrict ourselves to one or two methods of curing or canning. In other countries, preparations of the same kind of fish are varied. Sometimes the same fish is put up in half a dozen different ways. It is quite evident, then, that in the United States we refuse to eat certain kinds of fish, or to prepare them for future use. This wastefulness of fish, excellent as food, is quite apparent. Whether this fact arises from prejudice or ignorance it is difficult to determine. When comparing the fish-preparations of Portugal, with its limited sea-coast, with our own, the great variety of fish used as food in Portugal is quite remarkable. Deductions of this character are, of course, more directed to quality than quantity. Though in salmon we quite equal, if we do not surpass, similar canned preparations of salmon produced in other countries, in other canned fish the United States is inferior to those derived from this source. It was in the more careful preparation of fish-food, and in the variety furnished, that the exhibits in Class 642, coming from other countries, were pre-eminent. Very noticeable among the fish-preparations were those furnished by Norway. In Norway, in addition to cod, the ling, hake, and pollock are used. If Norwegian dried fish resolve the problem of giving the greatest quantity of food in the smallest bulk, it has not been determined whether the climate of America would permit of the natural desiccation of fish. It is not certain either that desiccated food, when used in large quantity, is really as nutritious as salted food. In Norway, and in the northern countries of Europe, dried fish is mostly eaten with the addition of some alkaline substance

in solution. It seems as if the absolute desiccation of fish in some way changed the character of fish-food, and made it less assimilable to the human organism, unless subjected to some soaking in an alkaline water. Particular attention seems to have been paid by foreign Commissioners to our own methods of curing and salting staple fish. The American way of storing fish in ice, either on board of the fishing-vessel or in warehouses with refrigerators, has occupied the particular attention of foreign experts.

In the finest preparations of fish, such as sardines, the high position taken by France has been before mentioned. What is wanted, then, in the United States, is a greater variety of preparations of fish, and the utilization of certain kinds of fish now neglected. These fish would not only be found excellent for immediate consumption in a fresh state, but, properly put up either for future use or exportation, would undoubtedly add to our national food, and might considerably increase our commerce abroad, with the greatest advantage to our general fishing interests.

CLASS 643.—Crustaceans, Echinoderms, Beche-de-Mer.

Class 643 presented no special features. Most of the exhibits in lobsters came from Nova Scotia, with some from Maine and from Massachusetts, and two from Norway. These products were generally excellent, and showed care in preparation.

CLASS 644.—Mollusks (Oysters, Clams, etc.) used for Food.

This important class was represented by exhibits from the United States, Spain, Portugal, and Chili. Oysters, pickled and preserved in various ways, and clams, came from the United States, the finer varieties especially from Baltimore. The excellence of the methods employed, and the fine flavor and appearance of the canned preparations of oysters presented by the United States, were quite noticeable. The Spanish and Portuguese preparations were varied as to flavors and seasonings. Chili also had an excellent exhibit of oysters and mussels peculiar to her sea-coast. It is believed that if the oyster-canners in Baltimore were to prepare oysters especially put up for use on the Continent, more particularly to meet the French demand, an important branch of business might be opened. The preparation of oysters being carried on more largely in the United States than in any other country, special facilities seem to have been acquired in the methods of preservation. Some methods of keeping oysters in oil were peculiar to Spain and Portugal.

CLASS 645.—Shells, Corals, and Pearls.

This class presented no exhibits of special interest or merit, save a fine collection of corals from Bermuda.

CLASS 646.—Whalebone, Shagreen, Fish-Glue, Isinglass, Sounds.

In whalebone, the United States had two exhibits, both of whalebone for general purposes, in its rough and finished condition. In shagreen, the only exhibits were from Japan. Beautifully prepared skins of the shark (shagreen) were found in the Japanese collection. A peculiar kind of shagreen, derived from the sturgeon, was also among the Japanese exhibits. In fish-glue, isinglass, and sounds, the exhibits were numerous. Prominent among the samples of isinglass were those of Russian make derived from the sturgeon. Russian isinglass, besides being used for fining and clearing wines and fermented liquors, such as beer and ale, is employed to a considerable extent as a glaze or dressing for silk, velvet, and satin fabrics. The exhibits from Russia were excellent in quality. The demand for a "fining" substance, capable of removing the albuminous or other impurities in malt liquors manufactured in the United States, has been fully met by a preparation made from the sounds of the hake. The isinglass furnished by a number of manufacturers in the United States, made principally from the sounds of the hake, fully answered the purposes for which it was intended. American isinglass has almost entirely supplanted in the United States all imported substances. The demand for this American isinglass has increased very much of late years, it being used largely by the German brewers. The care shown in the manufacture of this particular isinglass, evidenced by its clear color and perfect solubility, was thought to show marked progress. It would be worth while for manufacturers of this American isinglass (made from the hake) to find out whether, in case of a surplus, this substance might not be used in England, France, or Italy, as a glaze or dressing for silk-goods. Some isinglass from the United States, resembling the Russian and made from the sounds of the sturgeon, was of good quality. A valuable product prepared from the skins of the cod, partaking more of the character of a glue than of isinglass, was thought worthy of special mention, as utilizing a substance hitherto thought to be of little value. Isinglass from Brazil, made by simply stripping the bladder of a fish called the pascada, was of fine quality. Norway exhibited a good quality of isinglass. In the Chinese collection there were found good specimens

of isinglass, which, it was understood, was used as food. In point of cost the American product compared quite favorably with the Russian.

CLASS 647.—INSTRUMENTS AND APPARATUS OF FISHING—NETS, BASKETS, HOOKS, AND OTHER APPARATUS USED IN CATCHING FISH.

This important class was very fully represented, specimens of nets, lines, hooks, traps, etc., being on exhibition from Norway, Sweden, the Netherlands, China, Japan, Spain, Germany, and the United States. The general collection was not only complete as to the apparatus used in catching fish as a business, but abounded with the finer implements used by sportsmen. The general construction of nets coming from foreign countries differed but little from those of American manufacture, except in the exhibits from the Netherlands. The drag-nets from Holland were made of exceedingly strong material, were mounted on a boom, and were used to catch flat fish, such as turbot, etc., found at the bottom of the German Ocean. Great strength and careful knotting were the distinguishing characteristics of the Netherlands apparatus. In Norway, both cotton and flax nets were shown. The use of gilling-nets for small fish, such as herrings, seemed to be more employed in the northern fishing regions of Europe than in the United States. In some instances, the floats employed were made of glass. In deep fishing, it is doubtful whether glass floats would present any great advantages, as from experiments tried in the deep-lake fishing in the United States, water has been known to force itself through the pores of the glass. The devices used by fishermen in Northern Europe to sink their nets are in some of the poorer portions of that country quite primitive. Stones, either with a hole bored through them or tied without perforation to the nets, or the split shank-bones of sheep, are used. In some cases sinkers are made of baked clay. For floats, instead of cork, the light bark of the northern pine, or portions of fir-cones imbued with a varnish, are used. In lines, such as are used for catching cod, no great variation of form from those employed by our New England fishermen was discoverable. A close inspection sometimes showed that the method of arranging the hook, or the form of the leaden sinker, were somewhat different from our own; but on careful inquiry into the manner of arranging hooks or sinkers as used by foreign fishermen, it was ascertained that such methods were known in the United States, and were either in use or had been abandoned for some more approved plans. In the shaping of hooks, the

variations were so slight as, in many cases, to be hardly noticeable. In Spanish machine-made nets, the two exhibits were excellent. The American exhibit of nets was wonderfully complete, and showed apparatus intended for the capture of every kind of fish found on our coast. The general tendency to use cotton for nets seems to imply its superiority over all other material. The great ingenuity displayed in nets and seines of American planning, apart from the excellence of the material, was quite conspicuous. In fact, nets of American manufacture, made especially for European use, are now in demand abroad. In the apparatus used by sportsmen, the American exhibit was excellent. It is to be regretted that no opportunity was allowed to compare them with those of English make. The variety of reels of American make, of simple and compound construction, devised for trout-, salmon-, or for sea-fishing, was a feature of the Exhibition. In the Japanese exhibits of fishing-implements, the excellence and neatness displayed in their various apparatus were quite remarkable. For preserving their nets and lines the dried juice of the persimmon is used by the Japanese. In the Chinese exhibits of Class 647, peculiarly constructed fish-traps, which worked automatically with the falling and rising of the tides, were conspicuous. In apparatus serving for dredging oysters, and for lifting such dredges, the American exhibits were of the most serviceable character. The general conclusion to be derived from a close comparison between the fishing-apparatus used by fishermen in other countries and by American fishermen, is quite favorable to the latter. Nets made of ramie fibre, coming from Liberia, were apparently of great strength and flexibility.

CLASS 648.—Fish-Culture—Aquaria, Hatching-Pools, Vessels for Transporting Roe and Spawn, and other Apparatus used in Fish-Breeding, Culture, or Preservation.

The entire list of exhibits belonging to Class 648 came from the United States, and represented all the varieties of apparatus used in fish-culture, either for the hatching of the eggs or for the transportation of the young fish. American fish-culturists having first resolved the problem of subjecting the spawn of fish to long land transits, the apparatus used in transporting the ova of the California salmon from the Pacific to the Atlantic coast was on exhibition. Such receptacles for the transportation of fish were simple in character, the principles of aerating being carried out either by hand or by readily understood mechanical arrangements. In hatching-apparatus, as for salmon, no very great improvements have been made over those in use in 1875. In shad-hatching, the method employed by the Fish Commissioners

of the State of New York—one which had led to excellent practical results—was deemed worthy of especial mention. A shad hatching-trough of a new pattern, a modification of the New York hatching-trough, was believed to possess some excellent features. It is a necessity in fish-culture that all apparatus shall be of the most simple character and obtainable at a small outlay, and the exhibits were remarkable in both these respects. In models of a fish-hatching establishment, the fac-simile of the one at Druid Hill, Baltimore, in use by the Maryland Fish Commission, was remarkable for thoroughness of detail. During the period of the Exhibition, at the Maryland Building, the process of hatching the eggs of the California salmon was successfully carried on. It is quite apparent that, from the different character of fish-ova, the constructions of fish-hatching apparatus must be considerably varied. Such major improvements as fish-culturists are now looking to are mainly directed towards the saving of labor in manipulating the eggs of the young fish. The problem of the development of the eggs seems to have been, in a very great measure, already solved. The success attending the taking of the eggs of fish, and their fecundation, may be fully understood when, with such apparatus as was at the Exhibition, as many as fifty millions of shad have been hatched out in a season at a single American station. The erection of dams on rivers being one of the great causes of the absence of fish in streams, the attention of fish-culturists has been directed towards the proper construction of fish-ways. The Exhibition presented a series of models of fish-ways, all having certain features of excellence.

The Centennial Exhibition was in its broadest sense founded on the grand principle of an exchange of thought, and that portion represented in Group V. may prove of great advantage to other countries, by affording them opportunities of studying our methods of fish-capture, while in exchange we may take from them many approved ways of preparing fish as food. As to fish-culture, both the United States and Canada have performed greater feats, and have arrived at more useful results, than Europe. If it is to the Old World that we owe fish-culture, it is in the New that it has taken its most practical development.

AMERICAN METHOD OF PREPARING CANNED SALMON.

The American method of canning salmon differs in some important respects from the modes of putting up fish practiced in Europe. As time and labor are of importance in the United States, the effort in preparing food has been mainly directed to arrive at immediate results. The salmon is cooked in the cans in which it is put up. In all fish put up in oil or canned in Europe, the fish is first partially or entirely cooked in distinct vessels, and then transferred to the cans, where another cooking or heating takes place before the closing of the tins is effected. The process of canning the salmon of the Columbia River, at Astoria, may be briefly described as follows: As soon as the fish caught during the night are landed at daybreak at the factory, gangs of Chinamen take the fish, scale and clean them, cut off heads, tails, and fins, and place the fish in tanks filled with salt and water. Here the salmon remain for a certain length of time, and the cleansing process is known as "sliming." Now the fish are brought into the factory. A Chinaman with a peculiar machine, at a single stroke of a lever, cuts the fish into exactly the proper-sized slices which will fit the cans. Another set of hands take these bits of fish, place them deftly in the cans, whence they go to other workmen, whose duty it is, by means of an apparatus, to put in each can a small amount of brine; nothing else is added, the salmon being cooked *au jus*. Now the cans filled with the raw fish pass to workmen, who apply the lid and solder it on. Next, the cans are placed, hundreds together, in iron rings, each form holding 800 cans, and, by means of cranes, all lowered into steam-boilers, where they are cooked for an hour. Now quite a nice operation takes place, similar to that employed by the champagne-wine manufacturers, which is called venting. A hole is pricked in the top of the can, and the air and the gases generated are allowed to escape, when the little vent-hole is instantly re-soldered again. A second cooking now takes place, when the culinary portion of canning is ended. The cans are again taken from the boilers, and are showered with cold water. If the vacuum is perfect, and the package sound, the top of the can hollows in and assumes a concave form. If, however, there is the least

convexity, this condition of "swell heads," as it is called, causes the rejection of the package, for the salmon would not keep a week, and manufacturers know that a single spoiled can would injure the reputation of a thousand packages. It will not even do to tinker with these "swell heads," as they would cost too much to put in order. If they are worked over, however, they are never shipped as first-class goods. It is a necessity, in order to insure the excellence of the canned product, that each day's catch of fish should be prepared within twenty-four hours. Should there be any hitch in the factory and all the day's salmon cannot be canned, what remains over is salted and barreled. So far, the barreling of salmon has by no means been profitable, a barrel of salted salmon being worth only seven dollars the two hundred pounds; and three and one-half cents a pound is very cheap food indeed. These salted fish are, however, finding a market in the United States, where they are freshened and smoked. It is, perhaps, not out of the way to say that the can of salmon, before it is completed, with a handsome label put on it, and boxed, goes through as many as a hundred different operations, from the catching of the fish until it is sold as a finished product. Through April, May, June, and July the factory has no idle moment. The fishermen ply their nets all night, and the Chinamen work all day and up to ten o'clock at night, when the canning is carried on by gas-light.

Oregon salmon, as a canned product, has nearly driven out all other similar preparations of the fish, and the Eastern establishments are fast passing out of existence. In 1875 England took 165,600 cases of Oregon salmon; New England, 2400; South America, 1500; Australia, 14,190; and New York and the Atlantic coast, some 57,571. The European demand for the canned salmon product of Oregon is steadily increasing, and the cry is a constant one for more. The value of salmon as put up on the Columbia River alone is estimated at $2,500,000.

METHOD OF PREPARING SARDINES IN FRANCE.

The sardine being a very delicate fish, the utmost attention is directed towards having the fish as fresh as possible, and as near as can be to the *usine* or factory where it is to be canned. Factories are therefore situated rarely more than two or three hours' distance from the place where the fish are caught. The fish are placed on stone tables; women pluck off the heads, which operation removes the en-

trails. The fish are then placed on wooden slats and allowed to drip; are slightly salted, and remain over-night. Next day they are again slightly salted, and allowed to dry. The old and most approved method of cooking sardines is to place them in vessels filled with hot oil, where they are cooked. When the fish are done, they are put into a wire basket to drip. At exactly the right point of cooking, the scales remain on the fish, which is desirable. If the cooking has been carried on too much, or if the fish are too fat, the scales drop off, which impairs the value of the canned fish. A period of from five to six minutes is about the right time for this *cuisson* (cooking) in the hot oil. The fish are allowed to drip carefully, with the head-part downward. When the fish are cold, they are placed on tables, and arranged by women in the tin boxes, the oil being dipped from barrels into the boxes. The oil being intrinsically dearer than the fish, efforts are made, without too much crowding, to put as many sardines as possible in a box. Soldering of the lids of the boxes then takes place, and the boxes are then heated in receptacles by means of steam. The sooner this heating of the boxes, with their contents, takes place the better. The temperature of the water in which the boxes of sardines is placed is at first cold, and the steam is gradually introduced. This second heating is sometimes carried on for an hour and a quarter. When sufficient time has been taken to heat the boxes, they are sometimes allowed to cool in the water, particular pains being taken at all times not to move the boxes too much. Another method, and a cheaper one, of preparing sardines, is to cook them without oil, in a circular oven. The after-processes are the same as before described. Sardines are most prized when not too large in size. Whereas those which are of approved size may be worth six francs a thousand, as delivered by the fishermen; if too large, these fish are worth only four francs. As the sardines are migratory, a shoal of fish sometimes remaining at a fishing-station for but a week and then going somewhere else, extensive French canners have sometimes two factories, situated at different localities on the coast. About from three to four months—from the middle of May to the 15th of August—is the time of the sardine catch, and of the canning. Factories engaged in the preparation of sardines do not devote their attention solely to the putting up of these fish, but prepare other alimentary substances during their idle time.

AMERICAN ISINGLASS.

The best quality of American isinglass is made from the sounds of the hake. The crude material is collected during the summer and autumn, coming from Maine, New Brunswick, Nova Scotia, and Prince Edward's Island. The conversion of the crude material into the mercantile article takes place in winter. A low temperature is necessary, in order to turn out by machinery the fine ribbons of isinglass, and ice-water passes through the rolls. The total product is about 250,000 pounds. Besides the use of isinglass for fining beer, etc., it is employed as a dressing or glaze for straw goods in the United States.

PROCESS OF MAKING PLASTER CASTS OF FISH.

Fish are taken as fresh and perfect as possible, wiped with a cloth, not only to dry the moisture, but to remove the mucous secretions. The fish is then laid on a flat, smooth board, and placed in a natural position by means of little lumps or wedges of potter's clay, raising the parts liable to drop below the axis of the fish. The fins are spread out upon flat cushions made of potter's clay, and are kept in their spread position by means of pins. When the fish has been firmly set in a natural position, a rather thin mixture of plaster of Paris and water is poured over the fish, and repeated coatings of this material are applied until a sufficient thickness is attained, when it is allowed to set moderately hard. The mould is now turned over and the fish removed. When the cast is made, a slight coating of shellac varnish is applied throughout the inside of the mould. The plaster of Paris mixture is then poured in, and when sufficiently "set," the mould is chiseled away, the shellac coat guiding the workman as to the depth it is safe to cut. The cast is now trimmed of its rough edges and projections, and a square stiff frame having been made, with the inner edges studded with nails, the cast is placed within it, lying on a flat table, and plaster of Paris is then poured within the frame until it rises to the level of the edges. Embracing the base of the cast, it also adheres firmly to the inside of the frame, and when "set," is lifted from the table. The plaster matrix which now becomes the background of the fish is smoothed. The plaster cast is now ready for coloring.

REPORTS ON AWARDS.

GROUP V.

1. Prof. Alexander Agassiz, Museum of Cambridge, Mass., U. S.

WATER-COLOR SKETCHES OF FISHES OF CALIFORNIA COASTS.

Report.—Commended for great accuracy and faithful coloring.

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2. Eugene G. Blackford, New York, N. Y., U. S.

LIVE FISH IN AQUARIA, WITH FISH IN REFRIGERATORS.

Report.—Commended for a collection of live fish in aquaria, and for a very general exhibit of almost all the edible fish found on the Atlantic coast, with specimens from the Pacific, and from the rivers and lakes of the United States; for keen interest taken by Mr. Eugene G. Blackford in American fishes, and assistance rendered by him in the study of ichthyology.

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3. Museum of Bergen, Bergen, Norway.

COLLECTION OF MAMMALS, FISHES, CRUSTACEANS, MOLLUSKS, AND OYSTERS; MODELS OF BOATS.

Report.—The models of boats are well made, and the large collection of fishes, mollusks, etc., are well preserved; the whole being a very complete collection.

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4. Government of Bermuda.

COLLECTION OF BERMUDA FISH ALIVE, INCLUDING PARROT-FISH, GRUNTS, SQUIRREL-FISH, AND GROOPERS.

Report.—Commended for general character of exhibit, as illustrating the fish of Bermuda in their live state.

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5. Charles Dury, Cincinnati, Ohio, U. S.

SPECIMENS OF LAKE FISH.

Report.—A very good and well prepared collection of fish.

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6. Educational Department, Toronto, Ontario, Canada.

PREPARED FISH.

Report.—Commended as well prepared.

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7. John H. Klippart, Columbus, Ohio, U. S.

LIVE FISH.

Report.—An interesting exhibit of live fish in good condition.

8. **Paulis Roeter, Museum of Cambridge, Mass., U. S.**

WATER-COLOR SKETCHES OF NORTH AMERICAN FISHES.

Report.—Commended for exceeding accuracy of drawing and color.

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9. **F. St. John, Melbourne, Victoria, Australia.**

SPECIMENS OF PREPARED FISH.

Report.—Commended as well prepared and in good state of preservation.

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10. **Alden Sea Food Co., New York, N. Y., U. S.**

DRIED TURTLE, DRIED COD, AND DRIED CLAMS.

Report.—Commended for good preparation, and for presenting products in a desiccated form.

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11. **Antonio Avellino fu Giuseppe, Leghorn, Italy.**

SARDINES IN OIL.

Report.—Commended for good preparation, choice fish, and fine oil.

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12. **Adolph Asmann, San Francisco, Cal., U. S.**

CAVIAR, PREPARED FROM STURGEON ROES.

Report.—Commended for excellence in preparation and having withstood the very warm weather, remaining perfectly sound and good.

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13. **Commissioners of Tasmania.**

BROWN TROUT.

Report.—Commended as being a fine specimen, showing the result of the introduction of a new species into Tasmania.

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14. **American Boneless Sardine Co., New York, N. Y., U. S.**

AMERICAN BONELESS SARDINES.

Report.—Commended for very careful preparation, excellent in taste, well put up, and as made from the menhaden, a fish usually condemned as refuse.

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15. **Gustaf Anderson, Fjellbacka, Sweden.**

ANCHOVIES.

Report.—Commended for exceedingly good preparation.

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16. **Arzadum & Co., Pontevedra, Spain.**

SQUID IN OIL, CLAMS, RODAVALLO, MERLUSA SARDINES, SARDINES WITH OIL AND TOMATOES.

Report.—Commended for general excellence, fine preparation, and good oil, with fine flavor.

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17. **Ascencio José dos Santos, Vianna do Castello, Valença, Portugal.**

SHAD IN OIL, PICKLED SALMON AND LAMPREY.

Report.—Commended for very good preparation.

18. **Max Ams, New York, N. Y., U. S.**

PRESERVED FISH.

Report.—Commended for general variety of products, with great excellence; pickled eels, caviar, pickled salmon, anchovies, and sardines.

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19. **H. C. Bergstrom, Lysekil, Sweden.**

ANCHOVIES.

Report.—Commended for exceeding excellence of preparation.

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20. **Bordewich & Co., Lyngvær, Norway.**

COD ROE CAVIAR, FISH MEAL, ISINGLASS, AND PLUCK FISH.

Keport.—Commended for great excellence in preparation.

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21. **James Barber, Halifax, Nova Scotia.**

CANNED LOBSTER AND CANNED MACKEREL.

Report.—Commended for good preparation.

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22. **J. D. Bain, Restigouche, New Brunswick.**

CANNED MACKEREL, CANNED LOBSTER, AND CANNED SALMON.

Report.—Commended for excellence of preparation.

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23. **Bergens-Rogeri, Bergen, Norway.**

SMOKED RED HERRING.

Report.—Commended for perfect preservation, the flavor being excellent.

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24. **A. Booth & Co., Oregon, U. S.**

PRESERVED SALMON.

Report.—Commended for very great excellence, the preparation being wonderfully sound and of choice flavor.

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25. **Burnham & Morrill, Portland, Me., U. S.**

CANNED MACKEREL, CANNED LOBSTER, AND CLAMS.

Report.—Commended for very great excellence in preparation and good flavor.

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26. **Board of Commerce, Bergen, Norway.**

SALTED HERRING AND COD, DRIED COD, COD ROES, COD OIL, DRIED LING AND CUSK.

Report.—Commended for fine preparation of the various kinds of fish.

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27. **A. S. Crowe, Halifax, Nova Scotia.**

SALTED AND DRIED HADDOCK, SALTED HAKE, SALTED POLLOCK, AND SMOKED HERRING.

Report.—Commended for great excellence in all the preparations in the exhibit.

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28. **Crosse & Blackwell, London, England.**

SALMON.

Report.—Commended for excellent preparation.

29. **J. W. & V. Cook, Oregon Packing Co., Clifton, Oregon, U. S.**

SALMON IN PICKLE AND IN CANS.

Report.—Commended for very excellent preparation, the salted salmon in barrels having withstood for some time the heat.

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30. **President Vianna Commission, Vianna do Castello, Portugal.**

LAMPREY IN OIL.

Report.—Commended for very good preparation.

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31. **Povoense Factory, Povoa de Varzim, Portugal.**

CONGER EEL IN OIL, BREAM IN OIL, SHAD IN OIL, SARDINES IN OIL, AND OYSTERS.

Report.—Commended for very general exhibit of fish and oysters, all of them excellent as to flavor.

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32. **Henrick Dons, Christiania, Norway.**

FISH CAKES AND SMOKED HERRING IN OIL.

Report.—Commended for exceedingly fine preparation and good taste.

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33. **Feliciano Antonia da Rocha, Setubal, Portugal.**

CONGER EELS IN OIL, SARDINES, THREE VARIETIES, SWORD-FISH IN OIL, SHAD IN OIL, LINGUADO IN OIL, BREAM IN OIL, BESUGO IN OIL, CACHUCHO IN OIL, GOBAS IN OIL, RED MULLET, EELS IN OIL.

Report.—Commended for great variety of products and general excellence.

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34. **A. Dufour & Co., Bordeaux, France.**

SARDINES IN OIL (VICTORIA).

Report.—Commended for general excellence, this product being of the finest quality.

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35. **Dandicolle, Son, & Gaudin, Bordeaux, France.**

SARDINES AND RAYONS IN OIL, SARDINES IN OIL WITH TRUFFLES, ANCHOVIES, SARDINES IN OIL.

Report.—Commended for very remarkable excellence in preparation, fine fish and good oil.

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36. **Edv. Nilsson, Grebbestad, Sweden.**

MACKEREL IN OIL.

Report.—Commended for most excellent preparation, fine flavor, and generally handsome appearance.

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37. **N. O. Ericsson, Lysekil, Sweden.**

SARDINES IN OIL AND ANCHOVY.

Report.—Commended for excellent preparation.

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38. **Petter Egidius, Bergen, Norway.**

ANCHOVIES WITH BAY LEAVES.

Report.—Commended for very excellent preparation.

39. **João da Silva Ferrão de Castello Branco, Lisbon, Portugal.**

SARDINES IN OIL (TWO KINDS).

Report.—Commended for great excellence of preparation and purity of oil.

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40. **Charles A. Tryer, Whitehall, England.**

PILCHARDS IN OIL.

Report.—Commended for excellence of preparation.

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41. **Garcia & Pinon, Coruña, Spain.**

LANGOSTA EN SALPICON, EELS IN OIL, FRIED FISH IN OIL, BESUGO FRITO.

Report.—Commended for general excellence in preparation.

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42. **S. L. Goodale, Saco, Me., U. S.**

EXTRACT OF FISH.

Report.—Commended for originality of preparation, the extract of fish being made from fish which had hitherto been only used for their oil or for manure. Worthy of mention as the production of a new substance, likely to be found of great service.

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43. **J. J. Hallgren, Oroust, Gullholman, Sweden.**

ANCHOVIES AND DÉLICATESSE HERRING.

Report.—Commended for very excellent preparation.

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44. **William Hume, Eagle Cliff, Washington Territory, U. S.**

CANNED SALMON.

Report.—Commended for very good preparation.

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45. **H. A. Helgesen, Aalesund, Norway.**

BOILED SALMON, PLUCK FISH, AND FISH CAKES.

Report.—Commended for general excellence of preparation, the products being good-flavored.

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46. **Holbrook & Cunningham, Victoria, British Columbia.**

CANNED SALMON.

Report.—Commended for great excellence in preparation, the salmon retaining its form, taste, and color.

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47. **Hapgood & Co., San Francisco, Cal., U. S.**

CANNED SALMON.

Report.—Commended for remarkably fine preparation, the fish retaining its color and flavor.

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48. **Joaquin Martinez, Pontevedra, Spain.**

SQUID IN OIL, AND EELS AND MUSSELS IN OIL.

Report.—Commended for great excellence in preparation.

49. Manuel Jose Netto, Setubal, Portugal.

SARDINES IN OIL AND SAUCE, LULLAS IN OIL, MACKEREL IN OIL, SALMONETTE, CORVINA IN OIL, HAKE IN OIL.

Report.—Commended for very good preparation, and general excellence of material employed.

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50. Chr. Johnsen, Christiansand, Norway.

SALTED AND DRIED COD.

Report.—Commended for good preparation and soundness.

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51. John Winslow Jones, Portland, Me., U. S.

FRESH MACKEREL AND CANNED LOBSTER.

Report.—Commended for particular excellence of preparation. Both the mackerel and lobster were firm and sound and of very good flavor.

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52. Joseph Colin, Nantes, France.

MACKEREL IN OIL, AND SARDINES IN OIL.

Report.—Commended for general excellence of preparation.

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53. C. C. Just, Christiania, Norway.

ANCHOVIES.

Report.—Commended for excellent preparation.

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54. Kemp, Day, & Co., New York, N. Y., U. S.

CANNED LOBSTERS, MACKEREL, SALMON, OYSTERS, AND LITTLE NECK CLAMS.

Report.—Commended for fine preparation and excellence of flavor.

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55. Braulio Larravide, Laredo, Santander, Spain.

CODFISH IN OIL, SARDINES IN OIL, MULLET IN OIL, BESUGO IN OIL, MACKEREL IN OIL, BREGUILLAS IN OIL.

Report.—Commended for variety and great excellence in preparation.

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56. Francisco Ramon Lopez, Vivero, Lugo, Spain.

PILCHARDS, SALTED AND PRESSED.

Report.—Commended for excellent preparation, the fish having withstood the excessive heat, remaining sound and good.

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57. Campelo Leon Caziano, Vianna do Castello, Portugal.

PRESSED AND DRIED SARDINES.

Report.—Commended for exceeding excellence of preparation, this exhibit having remained sound and good during the hottest weather.

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58. Francisco Leite & Co., Alcantarilha, Faro, Portugal.

TUNNY IN BRINE (TWO QUALITIES).

Report.—Commended for very good and sound preparation.

59. **W. K. Lewis & Brothers, Boston, Mass., U. S.**

CANNED MACKEREL, LOBSTER, SALMON, AND CLAMS.

Report.—Commended for very good preparation.

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60. **A. Loggie & Co., New Westminster, British Columbia.**

SALTED SALMON, TROUT, AND OOLACHAN, IN BARRELS AND KITS.

Report.—Commended for excellent preparation, having withstood the heat; sound and well flavored.

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61. **Lonit Brothers & Co., Bordeaux, France.**

SARDINES IN OIL, AND ANCHOVIES IN OIL.

Report.—Commended for excellence of preparation, and neat construction of cans.

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62. **Aug. Lysell, Lysekil, Sweden.**

ANCHOVIES IN OIL, AND PICKLED ANCHOVIES.

Report.—Commended for great excellence in preparation.

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63. **Leal, Costa, & Co., Lisbon, Portugal.**

SARDINES IN OIL, SARDINES IN SAUCE, CHERNE ASSADA, FISH IN SAUCE, AND CHERNE EM ESCABECHE.

Report.—Commended for great variety of fish, and for general excellence.

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64. **Georg Lund, Christiania, Norway.**

ANCHOVIES.

Report.—Commended for good preparation.

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65. **Larentz Madson, Aalesund, Norway.**

LING, SALTED AND DRIED.

Report.—Commended for very great excellence in preparation, being remarkably sweet and sound.

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66. **Peter Mohn, Bergen, Norway.**

EXTRA FINE SALT HERRING IN PICKLE.

Report.—Commended for excellence of preparation.

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67. **J. G. Megler & Co., Brookfield, Wyoming Territory, U. S.**

CANNED SALMON.

Report.—Commended for good preparation.

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68. **C. Mangold, St. Petersburg, Russia.**

WHITE FISH, CARP EN MATELOTE, POISSON BLANC AUX TRUFFES.

Report.—Commended for good preparation.

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69. **Nicolo Marsardo, Sampierdarena, Genoa, Italy.**

ANCHOVIES IN OIL, AND SARDINES IN OIL.

Report.—Commended for good preparation and excellence of flavor.

70. C. Maré, Nantes, France.

SARDINES IN OIL.

Report.—Commended for excellent and novel method of cans; very good flavor of product, with excellent oil.

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71. Caillebotte & Damagnou, Paris, France.

SARDINES IN OIL, AND PICKLED FISH, AND CRAYFISH.

Report.—Commended for excellent preparation, with exceeding cheapness.

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72. Maille & Tandeau, Paris, France.

ANCHOVIES IN OIL ON GLASS.

Report.—Commended for excellent preparation; fish of the choicest quality.

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73. Terrier Sr., Belle-Isle-sur-Mer, France.

ROUGETS IN OIL, AND TUNNY IN OIL.

Report.—Commended for great excellence in preparation, and neatness in form and construction of tin cases.

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74. Chr. Aug. Thorne, Moss, Norway.

SALMON IN OIL, PRESERVED LOBSTER, AND ANCHOVIES.

Report.—Commended for good preparation.

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75. Nicolas Mandado & Sons, Aldan, Pontevedra, Spain.

PILCHARDS, SALTED AND PRESSED.

Report.—Commended for very good preparation, the product exposed to the warm weather having remained perfectly sound.

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76. Wm. Nordrock, Christiania, Norway.

ANCHOVIES.

Report.—Commended for very good preparation.

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77. Nicholas of Prevesa, Epirus, Turkey.

BOTARGO (MADE OF MULLET ROE).

Report.—Commended for excellence of taste and good method employed in its preservation.

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78. Nieuwenhuiss, Jr., & Co., Amsterdam, Netherlands.

SMOKED SALMON AND BOILED SALMON.

Report.—Commended for very good preparation and fine flavor.

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79. Jose Antonio de Oliveira & Co., Lisbon, Portugal.

SARDINES RAVIGOTE, WITH OIL AND SAUCE, AND IN OIL.

Report.—Commended for very good preparation.

80. **Francisco Otero, Pontevedra, Spain.**

PILCHARDS SALTED AND PRESSED IN TUBS.

Report.—Commended for very excellent preparation.

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81. **Oregon Packing Co., Portland, Oregon, U. S.**

PRESERVED FISH (SALMON).

Report.—Commended for good flavor and soundness.

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82. **Portland Packing Co., Portland, Me., U. S.**

CANNED MACKEREL AND CANNED LOBSTER.

Report.—Commended for very excellent preparation.

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83. **Carl E. Ronneberg & Sons, Aalesund, Norway.**

COD SOUNDS, SALTED AND DRIED COD, AND COD TONGUES.

Report.—Commended for the great excellence of preparation. The Judges would call special attention to the fine quality of the sounds and tongues.

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84. **Romero & Ferrin, Coruña, Spain.**

BOGAS IN OIL AND TOMATOES.

Report.—Commended for good preparation and fine flavor.

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85. **Nicholas Phaptopovlo, St. Petersburg, Russia.**

CAVIAR.

Report.—Commended for good preparation.

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86. **A. Rosing's Widow, Christiania, Norway.**

BISCUITS OF FISH MEAL.

Report.—Commended as of good preparation and very useful.

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87. **Royal Swedish Commission, Stockholm, Sweden.**

BLEKINGE, SALTED GOTTLAND HERRING, EELS, AND COD, DRIED COD AND LING, PICKLED SPRATS; NETS, AND MODELS OF BOATS.

Report.—Commended for general excellence as a collective exhibit.

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88. **Fernando Rodrigues & Nephew, Lisbon, Portugal.**

CONGER EEL IN OIL, HAKE IN OIL, LAMPREY IN OIL, SOLES IN OIL, AND OYSTERS IN SAUCE.

Report.—Commended for remarkable excellence of preparation.

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89. **João Setubal, Lisbon, Portugal.**

SOLES IN SAUCE AND OIL, WHITING IN SAUCE, AND CACHUCHO IN OIL.

Report.—Commended for general excellence and particularly good preparation.

90. **Kaitaku-Shi, Tokio, Japan.**

SALMON SMOKED IN BAGS.

Report.—Commended for good preparation.

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91. **Filippo Stiassi, Bologna, Italy.**

EELS IN PICKLE.

Report.—Commended for excellent preparation and fine flavor.

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92. **Widow of J. W. Suiri & Son, Rotterdam, Netherlands.**

HERRINGS MARINÉE, AND SOLES FRIED IN OIL

Report.—Commended for good preparation.

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93. **H. Chr. Strommer, Svovlvor, Norway.**

WHITE CAVIAR.

Report.—Commended for very good preparation and excellence.

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94. **Sciaccaluga & Co., Calbuco, Chili.**

PREPARED FISH AS FOOD.

Report.—A large and general exhibit of fish, oysters, crabs, sea-weed, in oil, vinegar, and sauce, all of them excellent. The preparations were neatly put up, and all sound and of good flavor.

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95. **Alexander Schultz, Astrakhan, Russia.**

ISINGLASS, CAVIAR, AND VIAZIGA.

Report.—Commended for good preparation and general excellence.

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96. **Mrs. Gina Smith, Christiania, Norway.**

ANCHOVIES.

Report.—Commended for great excellence in preparation.

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97. **Stavanger Preserving Co., Stavanger, Norway.**

FISH CAKES AND LOBSTERS.

Report.—Commended for general excellence, good flavor, and neat construction of cans.

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98. **Antonio Topich, Lissa, Dalmatia, Austria.**

SARDINES IN OIL.

Report.—Commended for good preparation.

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99. **Mrs. Rina Tellefsen, Christiania, Norway.**

ANCHOVIES.

Report.—Commended for excellence of preparation and good flavor.

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100. **T. Doyle, Halifax, Nova Scotia.**

TONGUES, SOUNDS, HERRINGS, AND MACKEREL.

Report.—Commended for excellence of preparation, the product, in barrels, having kept sweet and in a sound condition during an exceptionally hot summer.

101. William Underwood, Boston, Mass., U. S.

CANNED LOBSTER, CANNED MACKEREL, CLAMS, AND FRESH COD.

Report.—Commended for exceeding excellence of preparation, the products being of fine flavor and in good shape.

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102. Vicente Riego, Vivero, Lugo, Spain.

PILCHARDS IN SALT, AND SARDINES.

Report.—Commended for good preparation, and remarkable for their cheapness.

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103. Varzea & Coelho, Oporto, Portugal.

SALMON IN OIL, ROACH IN OIL, SHAD IN OIL, HAKE IN OIL, RODOVALHO IN OIL, LAMPREY IN OIL, STURGEON, AND CODFISH.

Report.—A general exhibit of various kinds of fish in oil. Commended for excellent preparation. Contents of tin boxes sweet and sound, with fine character of oil.

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104. Joanna Balbina Romao, Aveiro, Portugal.

PICKLED TAEBAS, PICKLED COCKLES, PICKLED SOLES, PICKLED EELS, AND PICKLED MUSSELS.

Report.—Commended for very great excellence. The exhibit is particularly to be recommended for the method of canning, the boxes being on tin and inclosed in wood, giving greater security for transportation.

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105. Andrews & Co., Halifax, Nova Scotia.

CANNED LOBSTER AND MACKEREL.

Report.—Commended for good preparation.

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106. Brazilian Commission, Rio de Janeiro, Brazil.

TURTLE OIL WITH TURTLE BUTTER.

Report.—Commended for very sound and sweet preparation.

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107. Chibucto Packing Co., Halifax, Nova Scotia.

CANNED LOBSTER.

Report.—Commended for excellence in preparation.

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108. John Merriman, Cape Town, Cape of Good Hope.

PRESERVED CRAYFISH.

Report.—Commended for good preparation.

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109. R. B. Noble, Richibucto, New Brunswick.

CANNED LOBSTER.

Report.—Commended for good preparation.

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110. Benj. J. M. Carley, New York, N. Y., U. S.

PRESERVED OYSTERS, SPECIMENS OF OYSTERS AND CLAMS.

Report.—An exhibit of live oysters and clams, and of the shells of the various kinds found on the east coast of the United States.

111. **Miguel Cotrofe, Coruña, Spain.**

MUSSELS IN OIL.

Report.—Commended for very excellent preparation.

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112. **Louis McMurray & Co., Baltimore, Md., U. S.**

LUNCH OYSTERS AND CANNED OYSTERS.

Report.—Commended for general excellence, sound condition of oysters, and flavor.

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113. **John L. Shriver & Bros., Baltimore, Md., U. S.**

PICKLED OYSTERS IN RESERVOIR FRUIT JARS.

Report.—Commended for very excellent preparation.

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114. **A. B. De Frece, New York, N. Y., U. S.**

MOTHER OF PEARL.

Report.—Commended for good work and taste in design.

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115. **Mrs. M. E. Gardner, Nassau, Bahamas.**

SHELL WORK.

Report.—Commended for excellence of design.

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116. **F. C. Kiergaard, Philadelphia, Pa., U. S.**

FISH SCALE JEWELRY.

Report.—Commended for excellence of design.

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117. **Dr. C. A. Miller, Cincinnati, Ohio, U. S.**

MOTHER OF PEARL (UNIOS).

Report.—A good exhibit of ornamental shells.

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118. **Mrs. C. E. Mott, Jacksonville, Fla., U. S.**

SHELL WORK.

Report.—Commended for good work and artistic design.

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119. **Mrs. S. E. Robertson, Nassau, Bahamas.**

SHELL WORK.

Report.—Commended for good design and excellence of work.

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120. **David H. Schaffer, Mount Lookout, Cincinnati, Ohio, U. S.**

ORNAMENTAL JEWELRY FROM THE NATIVE PEARL OF THE SHELLS (OR UNIO) OF THE MIAMI RIVER.

Report.—Commended for good work and tasteful designs.

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121. **Government of Bermudas.**

SHELLS, CORALS, SPONGES, SEA FANS, AND ECHINODERMS.

Report.—Commended for variety and excellence of specimens exhibited.

122. **Banaiot & Bros., Bethlehem, Turkey.**

MOTHER OF PEARL WORK.

Report.—Commended for careful work and good design.

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123. **N. E. Atwood, Provincetown, Mass., U. S.**

FISH OILS.

Report.—Commended for general character of exhibit, representing all varieties of oil from fish, viz., oils of cow-fish, pollock, squid, menhaden, thrasher shark, cod, harbor seal, blackfish, jaw porpoise, head of blackfish, liver of dogfish, cusk, cramp-fish, mackerel, shark, haddock, and horse-mackerel.

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124. **American Whip Co., Westfield, Mass., U. S.**

WHALEBONE.

Report.—Commended for good workmanship.

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125. **Cape Ann Isinglass Co., Rockport, Mass., U. S.**

ISINGLASS.

Report.—Commended for good preparation.

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126. **Captain Caleb Cook, Provincetown, Mass., U. S.**

FISH OILS AND VARIOUS OILS OF GRAMPUS AND BLACKFISH, MELLON BLUBBER OF BLACKFISH AND GRAMPUS.

Report.—Commended for variety of products from various fish, with excellent preparation, and especially adapted for lubricating fine machinery.

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127. **Domingos José d'Almeira, Pará, Brazil.**

ISINGLASS (TWO PREPARATIONS, THE BLADDER AND IN FINE CUTTINGS).

Report.—Commended for good preparation.

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128. **Ewing & Wise, Victoria, British Columbia.**

ISINGLASS.

Report.—Commended for good preparation.

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129. **Haven, Williams, & Co., New London, Conn., U. S.**

FISH OIL.

Report.—Commended for good preparation and variety of products, viz., oils from humpback whale, sea-elephant, right whale, and sulphur-bottom whale.

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130. **Gloucester Isinglass Co., Gloucester, Mass., U. S.**

ISINGLASS AND FISH GLUE.

Report.—Commended for great excellence; specially worthy of notice as bringing into use the skins of the codfish, making a valuable product.

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131. **Howe & French, Boston, Mass., U. S.**

RIPLEY AMERICAN ISINGLASS.

Report.—Commended for good preparation.

132. **Imperial Board of Agriculture, Industry, and Commerce, Tokio, Japan.**

FISH SKINS.

Report.—Commended for beautiful preparation of sturgeon and shark skins

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133. **Gustav Mueller, Chicago, Ill., U. S.**

ISINGLASS (TWO KINDS, COMMON AND PREPARED).

Report.—Commended for great excellence and purity. This product is quite equal to the foreign product.

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134. **C. Norwood & Son, Ipswich, Mass., U. S.**

ISINGLASS.

Report.—Commended for very great excellence and purity.

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135. **Svend Foyn, Tonsberg, Norway.**

WHALE OIL (DIFFERENT KINDS).

Report.—Commended for good preparation.

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136. **E. E. Small, Provincetown, Mass., U. S.**

FISH OILS.

Report.—Commended for good preparation and variety of oils exhibited, viz., oils from head of grampus, blackfish, head of blackfish, liver of cramp-fish, porpoise, liver of porpoise, liver of pollock, haddock liver, hake liver, saw-fish, Russian grampus, snuffer, crude oil from menhaden, and sperm oil.

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137. **Nicholas Sokolof, St. Petersburg, Russia.**

ISINGLASS FROM CARP, STURGEON, AND VIAZIGA, AND EDIBLE SUBSTANCE FROM THE SPINAL CORD OF THE STURGEON.

Report.—Commended for good preparation and general excellence.

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138. **Joseph F. Tobin, New York, N. Y., U. S.**

WHALEBONE.

Report.—Commended for excellence of collective display and variety of exhibit; also for accuracy in the shape and form of the manufactured whalebone.

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139. **Walter G. I. Wheeler, New York, N. Y., U. S.**

ISINGLASS.

Report.—Commended for excellence of product and neatness of preparation.

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140. **E. F. Gilbert, Jacksonville, Fla., U. S.**

ALLIGATOR IVORY.

Report.—Commended for bringing into use a valuable substance, and for good workmanship.

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141. **Marvin Brothers & Bartlett, Portsmouth, N. H., U. S.**

COD LIVER OIL.

Report.—Commended for good preparation.

142. **Conroy, Bissett, & Malleson, New York, N. Y., U. S.**

ARTIFICIAL FLIES, BASS LINES, FINE RODS, REELS, AND ARTIFICIAL BAIT.

Report.—Commended for excellence of manufacture and great variety of fishing implements.

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143. **Christiania Sail-Cloth Manufactory, Christiania, Norway.**

FISHING THREAD (YARN AND TWINE) AND SEINE NETS.

Report.—Commended for excellence of manufacture.

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144. **J. F. Carter, Gloucester, Mass., U. S.**

FISHERMEN'S OIL CLOTHING.

Report.—Commended for great excellence of make and cut, being light and serviceable.

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145. **J. W. Dresser, Castine, Me., U. S.**

FISHING LINES.

Report.—Commended for strength and good material.

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146. **S. Ellwell, Jr., Gloucester, Mass., U. S.**

FISHING KNIVES.

Report.—Commended for good shape, make, and temper.

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147. **Ths. Erichsen, Bergen, Norway.**

FISH HOOKS.

Report.—Well-made hooks for general fishing.

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148. **George Fox, Jr., Philadelphia, Pa., U. S.**

TROUT FLY RODS.

Report.—An excellent rod, showing care in construction, with neat workmanship.

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149. **J. L. Graves, Springfield, Mass., U. S**

FISHING RODS (HOLLOW).

Report.—Commended for lightness and strength.

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150. **Bradford & Anthony, Boston, Mass., U. S.**

ANGLERS' IMPLEMENTS AND FISHING TACKLE.

Report.—An exhibit, in exhaustive variety, of anglers' apparatus, especially of hooks, lines, rods, and artificial flies, all of American make and of the best quality. Most of the flies artificially made were accompanied by a drawing of the original insect from which they were modeled.

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151. **Arntzenius, Jannink, & Co., Goor, Overyssel, Netherlands.**

NETS.

Report.—A fine collection of well-made nets.

152. **J. & S. Allen, Walpole, Mass., U. S.**

FISHING LINES.

Report.—Commended for strength, and care taken in manufacture.

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153. **American Net and Twine Co., Boston, Mass., and New York, N. Y., U. S.**

NETS (SEINES, TRAMMEL-NETS, GILL-NETS, AND PURSE-NETS) AND LINES.

Report.—As a collection, it is of the most complete character, and is excellent as to material and as to knotting. They are among the best of machine-made nets exhibited.

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154. **C. G. Atkins, Bucksport, Me., U. S.**

FISH-WAYS.

Report.—Commended as exhibiting, in a collective form, the general construction of fish-ways, with several of his own invention, adapted to peculiar circumstances.

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155. **Charles Belbin, Md., U. S.**

MODELS OF OYSTER PUNGY, WITH MODEL OF OYSTER DREDGE.

Report.—Commended as fully illustrating the construction of the peculiar boat used in Maryland, and the apparatus used in dredging.

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156. **Jonathan Buck, Harwich, Mass., U. S.**

FISHERMEN'S BOOTS.

Report.—Commended for good make and sound material.

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157. **James Buchanan, Glasgow, Scotland.**

FISH HOOKS.

Report.—Commended for excellence of make, good shape, and temper.

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158. **J. T. Buell, Whitehall, N. Y., U. S.**

TROLLING SPOONS.

Report.—Commended for general excellence and good workmanship.

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159. **C. C. Brand, Norwich, Conn., U. S.**

WHALING GUN, WITH BOMB PROJECTILE.

Report.—Commended for efficiency in capturing whales with the minimum of labor, and in taking species, as the finback, which are scarcely to be mastered by the ordinary harpoon.

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160. **Board of Commerce, Aalesund, Norway.**

FISHING TACKLE, LINES AND NETS.

Report.—A very good and complete collection of fishing tackle for cod and other fish; also nets and fine models of fishing boats.

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161. **W. D. Chapman, Theresa, N. Y., U. S.**

TROLLING BAIT.

Report.—Commended for good workmanship.

162. Gloucester Fishing Exhibit, Gloucester, Mass., U. S.

GENERAL COLLECTION OF FISHING IMPLEMENTS, WITH MODELS OF BOATS.

Report.—Commended for very great excellence as to character of exhibit and its comprehensiveness, the whole history of the Gloucester fisheries finding in this collection a thorough illustration.

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163. Falck Ytter, Christiania, Norway.

FISHING SLED, WITH IMPLEMENTS.

Report.—Commended for excellence of make.

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164. S. P. Hedges, Greenport, Long Island, N. Y., U. S.

FISH SPEAR.

Report.—Commended for good work and serviceable shape.

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165. Hurdal Biri, Hadeland, and Hävicks Glass-Works, Christiania, Norway.

GLASS FLOATS.

Report.—Well-made articles, and a useful application of glass to the uses of the fisheries.

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166. Fagerheim Mechanical Net Co., Bergen, Norway.

NETS AND SEINES.

Report.—Commended as very well constructed, double knotted, and of good material.

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167. W. E. Hooper & Sons, Baltimore, Md., U. S.

NETS OF VARIOUS KINDS.

Report.—Exceedingly well made nets.

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168. John Krider, Philadelphia, Pa., U. S.

SPLIT BAMBOO RODS.

Report.—Commended for excellent workmanship; constructed of split bamboo; enamel inside.

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169. First Japanese Manufacturing and Trading Company, Tokio, Japan.

FISHING TACKLE.

Report.—A general exhibit of various kinds of tackle and nets used in Japan. These articles show great skill in making, and seem well adapted to the purposes for which they are intended.

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170. Jens O. Dahl, Havoen, Norway.

COD AND HERRING NETS, COD LINES AND GEAR.

Report.—A good collection of nets for cod and herring, with lines.

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171. Kelsey & Hosmer, Sandusky, Ohio, U. S.

FISH-DRESSING MACHINE.

Report.—Commended for facilitating the operation of cleaning and dressing fish; worthy of mention as an ingenious mechanical device.

172. H. L. Leonard, Bangor, Me., U. S.

FISHING RODS.

Report.—Commended for excellence of workmanship.

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173. Alexander McCurdy, Gloucester, Mass., U. S.

FISHERMEN'S KNIVES.

Report.—Commended for good workmanship and material.

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174. A. E. Maas, Scheveningen, Netherlands.

NETS AND TRAWL LINES, MODELS OF BOATS.

Report.—Very well made trawl net.

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175. Sara J. McBride, Mumford, N. Y., U. S.

ASSORTMENT OF FLIES.

Report.—Commended for exceedingly neat work, with solidity of construction.

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176. G. H. Mansfield & Co., Canton, Mass., U. S.

ASSORTMENT OF BRAIDED FISHING LINES.

Report.—An exhibit of braided fishing lines, excellent as to material and workmanship, exhibiting strength and suppleness, and covered with a protecting composition.

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177. Massachusetts Marine Exhibition, U. S.

BOATS FOR FISHERMEN AND FISHING VESSELS (MODELS).

Report.—A fine collection.

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178. Maryland Centennial Commission, U. S.

MODEL OF FISH-HATCHING HOUSE, MODELS OF VARIOUS BOATS USED IN THE MARYLAND FISHERIES, OYSTER DREDGES, FISHING BATTERY, SPECIMENS OF FISH, AND MODEL OF THE FERGUSON HATCHING JAR IN EXISTENCE AT DRUID HILL.

Report.—A collective exhibit of Maryland fisheries and fish-culture, including the most recent applications for the purpose.

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179. E. B. & F. Macy, New Bedford, Mass., U. S.

WHALING GEAR.

Report.—Commended as illustrating the general character of implements used in whale fishing.

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180. Thaddeus Norris, Philadelphia, Pa., U. S.

FISHING RODS.

Report.—Commended for very great excellence in manufacture, these rods combining strength with elasticity and lightness.

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181. Norwegian Patented Twine Manufactory, Kraasby Brothers, Aalesund, Norway.

FISHING LINES AND SNOODS.

Report.—Commended as very well made, of great strength, and reasonable price.

182. **C. F. Orvis & Co., Manchester, Vt., U. S.**

THE ORVIS REEL, WITH OR WITHOUT CLICK.

Report.—This reel is simple in construction and neat in workmanship. Two points of advantage are its lightness, and, being perforated, the line dries on it rapidly.

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183. **Pedro Alier, Gracia, Barcelona, Spain.**

NETS MADE BY MACHINERY.

Report.—Remarkably good machine-made nets.

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184. **William Henry Ryder, Birmingham, England.**

FISHING REELS AND GENERAL FISHING TACKLE, WITH RODS, ETC.

Report.—Commended for general excellence with cheapness.

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185. **A. B. Shipley & Son, Philadelphia, Pa., U. S.**

ARTIFICIAL FLIES, RODS, REELS, AND GENERAL ASSORTMENT OF FISHING TACKLE.

Report.—A very full and well made assortment of fishing tackle. The exhibitors also show a fine collection of hooks, as agents of John James & Sons, of London.

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186. **D. Scribner, St. John, New Brunswick.**

RODS FOR CATCHING SALMON.

Report.—Commended as well made and serviceable.

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187. **W. W. Smith, Provincetown, Mass., U. S.**

FISHING BOAT FITTINGS.

Report.—Commended for strength and lightness and excellence of make.

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188. **W. H. Young, Philadelphia, Pa., U. S.**

TROLLING SPOONS.

Report.—Commended for variety of exhibit and general excellence.

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189. **William T. Wroten, Baltimore, Md., U. S.**

MODELS OF OYSTER BOATS.

Report.—Commended for neat workmanship and faithful representations of boats used in Chesapeake Bay for taking and transporting oysters, with models of apparatus used in the capture of oysters.

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190. **A. Voss, Gloucester, Mass., U. S.**

BAIT MILL.

Report.—A convenient method of preparing bait.

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191. **Charles E. Wheeler, Farmington, Me., U. S.**

SPLIT BAMBOO RODS.

Report.—Salmon trout rods, split bamboo, enamel outside, good workmanship.

192. **White Manufacturing Co., Bridgeport, Conn., U. S.**

FISHING LAMPS.

Report.—Commended for serviceable form and general excellence.

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193. **Wilcox, Crittenden, & Co., Middletown, Conn., U. S.**

MARINE HARDWARE.

Report.—A complete exhibit of fishing boat fittings and fishermen's outfit and knives.

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194. **James D. Brewer, Muncy, Pa., U. S.**

FISH-WAYS.

Report.—An exhibit illustrating the construction of fish-ways of different forms, on the Brewer pattern.

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195. **Johnson & Young, Boston, Mass., U. S.**

LOBSTER FACTORY.

Report.—Commended as illustrating the method of steaming and preparing the lobster.

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196. **Mrs. J. H. Slack, Bloomsbury, N. J., U. S.**

COMBINATION HATCHING BOXES.

Report.—An excellent arrangement for hatching large quantities of eggs in a small space.

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197. **W. H. Cook & Co., New Bedford, Mass., U. S.**

WHALING GEAR.

Report.—Commended as a collective display showing the implements used in the capture of whales.

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198. **Mechanical Net Manufacturing and Weaving Stock Co., Itzehoe, Germany.**

NETS (LINEN AND COTTON).

Report.—Commended as being well made and of good material.

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199. **Smithsonian Institution (T. W. Smillie), Washington, D. C., U. S.**

COLLECTIVE EXHIBIT OF PHOTOGRAPHS OF AMERICAN FOOD FISHES.

Report.—Commended for great comprehensiveness of exhibit, and excellence, illustrating the fish of America.

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200. **Smithsonian Institution (Joseph Palmer), Washington, D. C., U. S.**

CASTS OF AMERICAN FISHES IN PLASTER OF PARIS AND PAPIER-MACHÉ.

Report.—Commended for the most faithful representation of the fish on the American coast. These casts, which number four hundred and eight, constitute the largest and most perfect collection heretofore made as a perfect illustration of the shape, form, and appearance of American fish.

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201. **Smithsonian Institution (J. H. Richards), Washington, D. C., U. S.**

COLLECTION OF WATER-COLOR SKETCHES AND OIL PAINTINGS (ON PLASTER CASTS) OF FISH OF NORTH AMERICA.

Report.—Commended for exceeding truthfulness in the coloring of the plaster casts of fish, and for the painstaking labor and artistic effect.

SIGNING JUDGES OF GROUP V.

The figures annexed to the names of the Judges indicate the reports written by them respectively.

JOAKIM ANDERSSEN, 1, 2, 3, 4, 8, 10, 11, 12, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 161, 162, 163, 164, 165, 166, 167, 169, 171, 172, 173, 174, 177, 178, 179, 180, 181, 184, 187, 188, 189, 190, 192, 193, 194, 195, 197, 198, 199, 200, 201.

T. B. FERGUSON, 5, 6, 7, 9, 13, 147, 148, 160, 168, 170, 175, 176, 182, 183, 185, 186, 191, 196.

SUPPLEMENT TO GROUP V.

REPORTS

OF

JUDGES ON APPEALS.

JUDGES.

JOHN FRITZ, Bethlehem, Pa.
EDWARD CONLEY, Cincinnati, Ohio.
CHARLES STAPLES, JR., Portland, Me.
BENJ. F. BRITTON, New York City.
H. H. SMITH, Philadelphia, Pa.
COLEMAN SELLERS, Philadelphia, Pa.
JAMES L. CLAGHORN, Philadelphia, Pa.
HENRY K. OLIVER, Salem, Mass.
M. WILKINS, Harrisburg, Oregon.
S. F. BAIRD, Washington, D. C.

1. John Shields, Boston, Mass., U. S.

ARTIFICIAL FLIES.

Report.—Commended as an extremely complete collection of artificial flies for taking salmon, bass, trout, shad, etc., embracing about four hundred varieties, made in the most artistic manner from undyed feathers, and copied from natural flies with great accuracy, as shown by accompanying colored drawings of the originals.

2. Frank N. Clark, Northville, Mich., U. S.

APPARATUS FOR HATCHING EGGS OF THE SALMON FAMILY.

Report.—Commended for capacity for hatching a great number of fish eggs in a very small space.

3. E. A. Brackett, Winchester, Mass., U. S.

FLOATING SHAD HATCHING BOX.

Report.—Commended for novelty and adaptation to the purpose intended.

4. Seth Green, Rochester, N. Y., U. S.

SHAD HATCHING BOX.

Report.—Commended for adaptation to the purpose of hatching shad economically and on a very large scale.

5. **Camilo Fabra, Barcelona, Spain.**

FISHING NETS.

Report.—Commended for excellence, variety, and adaptation to the purpose intended.

SIGNING JUDGE OF SUPPLEMENT TO GROUP V.

The figures annexed to the name of the Judge indicate the reports written by him.

SPENCER F. BAIRD, 1, 2, 3, 4, 5.