

GREAT INTERNATIONAL FISHERIES EXHIBITION.

LONDON, 1883.

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UNITED STATES OF AMERICA.

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A.

PRELIMINARY CATALOGUE

AND

SYNOPSIS OF THE COLLECTIONS EXHIBITED BY THE UNITED  
STATES FISH COMMISSION

AND

BY SPECIAL EXHIBITORS.

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WITH A CONCORDANCE TO THE OFFICIAL CLASSIFICATION  
OF THE EXHIBITION.

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COLLECTIVE EXHIBIT

OF THE

UNITED STATES.

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# COLLECTIVE EXHIBIT OF THE UNITED STATES.

## ANALYSIS.

### SECTION A.—AQUATIC ANIMALS AND PLANTS OF NORTH AMERICA BENEFICIAL OR INJURIOUS TO MAN.

#### I.—MAMMALS.

1. Group of Fur Seals, *Callorhinus ursinus*, with screen of water-color sketches by Henry W. Elliott, illustrating the seal life of the Prybilov Islands; stuffed Ribbon Seal, *Histiophoca equestris*; cast of Harbor Seal, *Phoca vitulina*; stuffed head of walrus, *Odobænus obsesus*.
2. Cast of Manatee, *Trichechus manatus*, skull of *Rhytina gigas*, from Bering Island.
3. Casts of White Whale, *Delphinapterus*, and of foetal Black-fish, *Globicephalus*.
4. Casts of several smaller toothed cetaceans, with skulls of the same; casts of heads of cetaceans.

#### II.—BIRDS.

5. Collection of skins of Aquatic Birds of the United States, exhibited by the United States National Museum.
6. Mounted groups of Aquatic Birds.

#### III, IV.—REPTILES AND BATRACHIANS.

7. Cast of Alligator, *Alligator mississippiensis*.
8. Casts of Diamond-Back Terrapin, *Malacoclemmys palustris*, Slider Terrapin, *Pseudemys rugosa*, Alligator Terrapin, *Macrochelys lacertina*, Soft-shell Turtle, *Aspionectes ferox*, Green Turtle, *Chelonia mydas*, Loggerhead Turtle, *Thalassochelys caouana*, Leatherback Turtle, *Sphargis coriacea*.
9. Casts of Water Snakes, *Tropidonotus sipedon*, Moccasin, *Ancistrodon piscivorus*, Rattlesnake, *Crotalus adaman-teus*, &c.
10. Collection of 24 species of tailed batrachians, including *Siren*, *Necturus*, *Amphiuma*, *Menopoma*, *Amblystoma*, *Siredon*, &c.
11. Four species of edible frogs, including Giant Bullfrog, *Rana Catesbiana*.
12. Tank of living reptiles.

## SECTION A.—AQUATIC ANIMALS AND PLANTS, ETC.

## V. FISHES.

13. Casts of 121 characteristic fishes, including most of the important economic species, arranged on nine screens.
14. Cast of Giant Catfish, *Amiurus ponderosus*, and of Guasa, *Promierops guasa*.
15. A series of photographs of the important fishes of the United States.
16. A series of proofs of engravings of the food fishes of the United States, prepared to accompany the forthcoming quarto report, with specimens of the original drawings.
17. Color sketches of fishes; chromo-lithographs of twenty water color sketches of game fishes exhibited by Charles Scribner's Sons (publishers of Kilbourne & Goode's Game Fishes of the United States).
18. Series of fishes in alcohol :
  - a. Fishes of Alaska.
  - b. Fishes of the Adirondacks, collected by Fred. Mather.
  - c. The American Salmonoids.
  - d. Fishes of the Gulf of Mexico and East Florida.
  - e. The genera of fresh-water fishes.
19. Living fish eggs, fishes, &c. All under fish culture; section F.
20. Collection of market fishes in fresh condition on ice sent from time to time by E. G. Blackford, New York.

## VI.—MOLLUSKS.

21. Models of Giant Squid, *Architeuthis princeps* and of Giant Octopus, *Octopus punctatus*, prepared under direction of J. H. Emerton.
22. Series of Gastropods, useful as affording food, bait, &c., or injurious by destroying edible mollusks.
23. Series of specimens showing the life of the American Oyster from the time of attachment to full growth, under various conditions influencing development.
24. Collection of plates and diagrams illustrating the embryology of the American Oyster.
25. Series of American Oysters, illustrating geographical distribution and local variation.
26. Other useful Mollusks, *Unio*, *Haliotis*, &c.
27. Specimens illustrating injurious work of *Teredo* and other pernicious Mollusks.
28. Enemies of the Oyster.

## SECTION A.—AQUATIC ANIMALS AND PLANTS, ETC.

## VII.—MARINE AND FRESH-WATER INVERTEBRATES, EXCLUSIVE OF MOLLUSCA.

29. Collection of economic Crustaceans, mainly alcoholic, containing forty-eight species, used as food and bait, and injurious to submarine structures of wood. It includes the Lobster, *Homarus americanus*; Rock-lobster, or Salt-water Crayfish, *Panulirus interruptus*; River Crayfish, *Cambarus* and *Astacus*; Common Edible Crab, *Callinectes hastatus*; Rock Crabs, *Cancer irroratus* and *borealis*; California Market Crab, *Cancer magister*; Stone Crab, *Menippe mercenaria*; Common Shrimp, *Crangon vulgaris*; Southern Shrimp, *Penaeus setiferus*; California Shrimp, *Crangon franciscorum*; King Crab, *Limulus Polyphemus*, etc.
30. Collection of economic worms in alcohol, including the marine annelids most commonly used as bait, and the American medicinal leech, *Macrobdeella decora*, Verrill.
31. Collection of economic echinoderms, mostly in alcohol, containing five species, used as food, or available as such, injurious to oyster beds, &c., as follows: Sea Cucumber, *Pentacta frondosa*; Sea Urchins, *Strongylocentrotus dröbachiensis*, *S. franciscorum*, *Echinarachnius parma*; Starfishes, *Asterias vulgaris*, and *A. Forbesii*.
32. Collection of Florida commercial sponges, containing six species and two hundred and thirty-seven specimens, furnished by McKesson & Robbins, of New York. The species are as follows: Glove Sponge, *Spongia graminea*; Sheepswool Sponge, *S. gossipina*; Velvet Sponge, *S. meandriniformis*; Grass Sponge, *S. cerebriformis*; Yellow Sponge, *S. corlosia* and *dura*. From the same source, four specimens of Sheepswool Sponge, illustrating artificial propagation by means of cuttings. Also, one specimen of the boring sponge, *Cliona sulphurea*.
33. Complete collection of the described species of fresh-water Cray-fish, *Cambarus* and *Astacus*, occurring within the limits of the United States. Contains 40 species.

## VIII.—ALGÆ.

34. Collection of marine Algæ of the United States, prepared by W. G. Farlow.
35. Plates of Wood's Fresh-water Algæ of the United States.

## SECTION B.—FISHING GROUNDS.

## IX.—MODELS AND MAPS OF FISHING GROUNDS.

36. Cardboard model in relief of the off-shore banks of North America, from the Grand Bank to New Jersey, showing contours to a depth of 2,800 fathoms.
37. Relief model of the Gulf of Maine, prepared by C. Lindenkohl.
38. Relief models of the Eastern Continental Slope, prepared by the United States Coast Survey.
39. Model of a Chesapeake oyster-bed, showing effects of dredging and undredged portions, prepared by Lieut. Francis Winslow, U. S. N.
40. Chart showing the location and extent of the present and abandoned whaling grounds of the world, prepared by A. Howard Clark.
41. Series of charts showing the location of the Oyster beds and the present condition and progress of Oyster culture, prepared by Lieut. Francis Winslow, U. S. N.
42. Charts showing the location of the principal fishing grounds.
43. General coast charts are exhibited by the United States Coast Survey, United States Navy Hydrographic Office, and S. Thaxter & Sons.

## X.—MAPS SHOWING GEOGRAPHICAL DISTRIBUTION.

44. Charts showing distribution of the pinnipeds of the world, prepared by J. A. Allen.
45. Chart showing geographical distribution of the seals and fur-bearing animals of Alaska, prepared by W. H. Dall.
46. Series of eight charts, showing distribution of food and game fishes of North America, prepared by G. Brown Goode.

## SECTION C.—APPARATUS OF SEA AND FRESH-WATER FISHING.

## XI.—CLUBS, SPEARS, DARTS, RAKES, AND DREDGES.

47. Bows and arrows, darts, throwing-sticks, spears, harpoons, clubs, spear-rests, &c., made and used by the Indians and Eskimos of Alaska, the Northwest coast, and other parts of the United States.
48. Eel spears, porpoise and dolphin grains, swordfish lily irons and lances, and harpoons used along the Atlantic seaboard for the capture of numerous species; halibut killer and gob-stick for killing the fish and disgorging the hook; squid jigs used by Grand Bank codfisher-



## SECTION C.—APPARATUS OF SEA AND FRESH-WATER FISHING.

## XI.—CLUBS, SPEARS, DARTS, RAKES, AND DREDGES—Continued.

men in the capture of squid for bait; mackerel gaff or gambeering iron and mackerel bob formerly used by New England fishermen for the capture of mackerel without the use of bait.

49. Oulachan rake, used by the Indians of the Northwest coast; clam-rakes, hoes, and claws, sponge-hook, moss-rakes, oyster-tongs, rakes, and scrapes.

## XII.—FISH-HOOKS, JIGS AND DRAILS, ARTIFICIAL BAITS, FLIES AND FLY-HOOKS, GULLETERS, CLEARING RINGS, &amp;C.

50. Series of Indian and Eskimo hooks made of bone, wood, and iron.

51. Series of steel hooks, showing the manufacture of hooks from the plain wire to the finished hook, and all the principal varieties of fish-hooks used in sea and fresh-water fishing, including the Barbless, Limerick, Central-Draught, Kirby, Aberdeen, Kinsey, Carlisle, shark and dog-fish hooks.

52. Jigs and drails for the capture of cod, weakfish, Spanish mackerel, bass, bluefish, and dolphin; mackerel jigs formerly extensively used, with lead, ladles, molds, file, rasp, &c., used in their manufacture.

53. Spoon-baits, trolling-spoons, spinners, minnows, and insects, for salmon, trout, bass, pike, and pickerel fishing.

54. Case of lure-baits and ornamental hooks from Alaska.

55. Collection of over seven hundred varieties of salmon, bass, and trout flies, arranged on cards and labelled with their trade names.

56. Case of insects used for bait and injurious or useful to the fisheries, prepared by Prof. C. V. Riley.

57. Spring hooks for pickerel, "snap and catch'em hooks," Edgar barbless hooks, eagle-claw trap.

58. Bait boxes, creels, gulleTERS, clearing rings, pocket scales, and other miscellaneous articles used by anglers.

## XIII.—FISHING LINES AND RIGGED GEAR.

59. Indian and Eskimo lines made of kelp, whale and seal hide and cedar bark.

60. Cotton lines, shroud-laid and cable laid, white and tarred; linen, flax, grass, and silk lines, including water-proof fly lines, and other silk lines for salmon and trout fishing.

61. Spanish gut as imported for the manufacture of leaders; single, double and twisted gut leaders; minnow gangs, brails, gangings, used in various sea fisheries.

## SECTION C.—APPARATUS OF SEA AND FRESH-WATER FISHING.

## XIII.—FISHING LINES AND RIGGED GEAR—Continued.

62. Stone, lead, brass, and composition sinkers for nets, seines, and hand lines.
63. Indian and Eskimo floats carved in wood; glass, cork, and wood floats for nets and lines in sea fisheries; wood, cork and quill floats for pond fishing.
64. Hand-lines rigged for cod fishing on the off-shore and in-shore banks and ledges; pollock hand-lines; bluefish trolling lines; lines for pond fishing; gear for the capture of catfish, weakfish, and other species; Indian trawl lines made of cedar; cod, haddock, and halibut trawls in sections and fully rigged with buoys and anchors; snares and eel bobs; Indian fishing lines from Alaska and the Northwest coast.

## XIV.—FISHING RODS, AND REELS FOR LINES AND NETS.

65. Plain and split bamboo rods, for salmon, trout, bass, and general fishing; ash and hornbeam, and ash and lancewood rods; combination trolling pole, harpoon-line holder and cane; and other kinds of rods.
66. Simple reels for fly-fishing, with and without check, made of brass, German silver, rubber, ebonite, and celluloid. Multiplying reels for bass-fishing, with and without check; automatic reels, Kentucky reel, quadruple, multiplying, nickel-plated reel. Spools, winders, trawl-line rollers, line chocks for whale boats, trawl-winch or hurdy-gurdy, &c.

## XV.—NETS AND SEINES AND MATERIALS USED IN THEIR MANUFACTURE.

67. Twine used in making nets and seines, exhibited by American Net and Twine Company. Samples of netting, white, tanned and tarred, showing varieties of mesh and kinds of twine.
68. Gill nets, full-sized and in models, for the capture of shad, cod, mackerel, herring, white-fish, minnows, and other species. Gill nets made by the Indians from animal fiber, "Babiche," &c.
69. Trammel nets used for general fishing in rivers and ponds of Northern Mississippi Valley. Herring and cod seines. "Baird collecting seine." Seines and nets made of grass, pineapple fibers, and other materials.

## SECTION C.—APPARATUS OF SEA AND FRESH-WATER FISHING.

## XV.—NETS AND SEINES, ETC.—Continued.

70. Handle or dip nets and landing nets used in the capture or in handling of mackerel, menhaden, trout, and other fish. Net used in the capture of the oulachan and surf smelt by the Indians of the Northwest coast. Dip nets or baskets used by the Indians.
71. Oyster dredge and hoisting apparatus, dredge nets, dredges for clams and other shell-fish. Full-sized oyster dredge used by steam dredgers.
72. Folding or jerk nets, including full size and model mackerel purse seines and model mackerel-seine pocket, mullet and shrimp cast-nets, &c. Model of mackerel purse-seine on scale of one-twenty-fifth.

## XVI.—FISH TRAPS, WEIRS, AND POUNDS.

73. Models and drawings of fish slides and wheels used for catching shad in the rivers of North Carolina.
74. Models of bar weirs and brush weirs used for catching herring in the Bay of Fundy; salmon weirs, heart-nets, pound-nets, floating traps, basket weirs from Alaska, &c. Model of fish weir used by aborigines of Virginia in the fifteenth century.
75. Wicker fish pots used by Indians of California and by fishermen of Florida. Lobster pots in full size, and models showing the various styles used on the coast of New England.
76. Eel pots, with and without leaders, full size and model fyke nets, bass trap, &c.

## XVII.—FISHING STATIONS.

77. Model of shad battery at Havre de Grace, Maryland: model of pound fishing for white-fish at Grassy Bay, Detroit River, Michigan.

## XVIII.—KNIVES, GAFFS, AND OTHER APPARATUS.

78. Indian and Eskimo knives made of stone, bone, and iron for cutting fish and blubber.
79. Cod splitting, ripping, and throating knives; finning and flitching knives; boat chopping knives; mackerel splitting and reaming or creasing knives; scaling knives, slivering knives, &c.
80. Salmon, cod, haddock, halibut, and mackerel gaffs; halibut-cutters; hook used in decapitating fish; fish forks and "pews" used in storing and handling fish.

## SECTION C.—APPARATUS OF SEA AND FRESH-WATER FISHING.

## XVIII.—KNIVES, GAFFS, ETC.—Continued.

81. Bait mill for grinding fish for mackerel bait; clam-choppers, &c.

## XIX.—ILLUSTRATIONS OF THE FISHERIES.

82. Series of sketches in crayon illustrating the various sea fisheries.
83. Series of photographs, large and small, illustrating the methods employed in the hand-line and trawl-line, cod and halibut fisheries, the lobster and other fisheries.

## SECTION D.—FISHING VESSELS, BOATS, AND FITTINGS.

## XX.—VESSELS AND BOATS.

84. Series of rigged models of all types of vessels used in the fisheries past and present.
85. Series of builders' models showing evolution of the New England fishing schooner.
86. Series of models of all important types of boats used in the fisheries; also full-size whale boat, dories, shadow canoe, portable and folding boats, Eskimo bidarka, Indian birch canoe, &c.
87. Series of large photographs, 30 by 40 inches, showing fishing boats and vessels in different situations.
88. Series of large photographs of ship yards and boat shops illustrating the construction of fishing craft.

## XXI.—BOAT FITTINGS AND APPLIANCES.

89. Canvas used on fishing vessels, exhibited by Russell Mills Company, Old Colony Mills, and others.
90. Cordage used by fishing vessels, exhibited by Sewell, Day & Co., and others.
91. Model of steam windlass, exhibited by American Ship Windlass Company; models of capstans exhibited by Frederick S. Allen.
92. A collection of nautical instruments and books, such as are used on the New England fishing vessels.
93. A series of cabin lamps, lanterns, torches, &c., used on vessels and boats and in fishing.
94. Fog horns of various types, including Collins's patent fog-alarm.
95. Copper paint for vessels; Nelsen's canvas-preserving solution.

## SECTION D.—FISHING VESSELS, BOATS, AND FITTINGS.

## XXI.—BOAT FITTINGS AND APPLIANCES—Continued.

96. A large number of special appliances for rigging vessels and boats, exhibited by Wilcox, Crittenden & Co., and others; chafing gear, hanks, grommets, clews, thimbles, row-locks, rudder fixtures, &c.
97. Collins's adjustable marine drag, and Collins's improved adjustable marine drag.
98. A collection of oars and paddles, exhibited by E. W. Page and others.
99. Charts of United States Coast Survey, United States Hydrographic Office, S. Thaxter & Son, and others.

## SECTION E.—FISHERMEN AND ANGLERS.

## XXII.—FISHERMEN AND THEIR APPAREL.

100. Lay figures of fishermen of different classes, showing costumes, implements, &c.
101. Photographs, 30 by 40 inches, showing groups of fishermen of different nationalities, or engaged in the several branches of the fisheries.
102. A collection of fishermen's wearing apparel, in woolen, oiled cotton, rubber, boots, mittens, &c.
103. A collection of anglers' wearing apparel.

## XXIII.—FOOD, MEDICINE, SHELTER.

104. Canned, steam-dried, and other foods used by fishermen and anglers.
105. A fisherman's medicine chest, such as is carried by the Gloucester schooners.
106. Series of photographs of fishermen's houses, boarding-houses, bethels, &c.
107. Anglers' tents, and portable houses for anglers, with complete camping outfit.

## XXIV.—VESSELS' PAPERS.

108. Vessel's papers, insurance policies, log-books of fishing voyages; papers of Gloucester Seamen's and Fishermen's Widows' and Orphans' Aid Society.

## XXV.—HABITS OF FISHERMEN.

109. Collection illustrating the games, amusements, literature, art work of the fishermen, musical instruments, carvings, &c.

## XXVI.—FISHERMEN'S TOOLS AND OUTFITS.

110. Fishermen's tools, ditty-boxes, palms, sail-needles, knives, netting-needles and mesh-boards, coopering tools, &c.

## SECTION F.—APPARATUS USED IN THE WHALING AND SEALING INDUSTRY.\*

## XXVII.—WHALING VESSELS AND BOATS.

111. Model of a four-boat whale ship, with a decapitated sperm whale alongside, illustrating the manner in which the blubber is cut off, hoisted in, and lowered into the blubber room; also showing the amount of canvas carried by a vessel while engaged in this work, and the stations of the officers and foremast hands, as well as the positions of the try-works and whale boats.
112. Model of the "camels", which were built in 1842, for floating whaling vessels over Nantucket Bar, with the hull of a vessel showing the relative positions of the one to the other when in operation.
113. Model of try-works transported by whaling vessels, for extracting the oil from the blubber, with the receptacles for scrap and for cooling the oil; also, miniature models of some of the implements commonly known as "try-works gear" for manipulating the oil and scrap.
114. A full-sized whale boat, 28 feet long, with all the apparatus of capture; the names of the various parts of the boat; the boat fittings, and each article used in the chase and capture of the whale are plainly marked.

## XXVIII.—WHALING CRAFT, HARPOONS, GUNS, AND LANCES.

115. A series of 47 hand-harpoons, arranged in groups, but not in chronological order, including the forms employed by the early and modern whalers, and several types of the walrus-harpoon.
116. A series of guns, including 8 shoulder guns of different patterns, both breech-loading and muzzle-loading; several types of the darting gun; one swivel gun, and a rocket gun; also accessories, including cartridges, wads, &c.
117. A series of 33 gun harpoons of various forms. Though these irons have no commercial value at present, with the exception perhaps of those intended for the swivel-gun, yet they have been used, and are interesting and valuable as a whole, constituting as they do the numerous links in the chain that connects the past with the present.

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\* Here are included, for convenience of arrangement, the apparatus of manufacture or preparation of whaling products, the preliminary stages of which being usually conducted on board of the whaling vessels may be regarded as a portion of the fishery proper.

## SECTION F.—APPARATUS USED IN THE WHALING AND SEALING INDUSTRY.

## XXVIII.—WHALING CRAFT, HARPOONS, ETC.—Continued.

118. Earliest types of hand-lances, formerly exclusively used for killing Whales, the past and present forms of the lances for killing Seal, Sea-elephant, and Walrus, the old-fashioned, non-explosive gun-lance, and the bomb-lance, darting-bomb, and rocket-bomb of the present. Also an example of the first bomb-lance, according to the records of the United States Patent Office, patented in this country for killing Whales. Two forms of the explosive harpoons, which may be thrust by hand, and one form intended to be used in connection with an improved pivot gun. An explosive hand-lance, several bomb-lances that have been cut from dead Whales, some of which failed to explode, others being exploded and represented by fragments.

## XXIX.—CUTTING GEAR.

119. A series of implements known comprehensively as cutting-gear and try-works gear, arranged on and about a pyramidal wooden framework, from the center of which the blubber-tackle is suspended. A cutting stage is rigged at the right; upon it is placed a lay figure, life-size, representing an officer in the act of cutting the blubber from the whale. Two long slabs of baleen cross each other near the top in the central front, and boat waifs are placed at the right and left corners. Various long-handled implements, including the cutting spades, head-spades, skimmers, and bailers, are arranged in frames at the rear. The heavy chains and toggles used for fastening the whale to the vessel, and for hoisting in the blubber, are placed about the base. The superstructure consists of a main royal pole, lookout bows, an American ensign, carried by a whaler during a cruise in Hudson's Bay, and a figure of a petty officer standing upon the cross-trees, with a marine glass at his eye, on the lookout for whales.

## XXX.—ABORIGINAL WHALING AND SEALING APPARATUS.

120. A series of whaling apparatus used by the Indians of Cape Flattery, Washington Territory, including the harpoon-staff, harpoon, and lanyards, the lance-pole and lances, the sealskin buoys, and tow-ropes made of the fibers of spruce roots.

## SECTION F.—APPARATUS USED IN THE WHALING AND SEALING INDUSTRY.

## XXX.—ABORIGINAL WHALING, ETC.—Continued.

121. Harpoons and lances employed in whaling and sealing by the Eskimo of Alaska, and the Hudson Bay region.

## SECTION G.—FISHERY PRODUCTS AND THEIR PREPARATION.

## XXXI.—APPARATUS AND MATERIALS USED IN THE PREPARATION AND CARE OF PRODUCTS.

122. Fish cars and other floating cages for aquatic animals, including model of fish-marketman's car for the preservation of living fish; model of fish-car towed by the smack for keeping the catch alive; live-car, full size, for keeping fish alive; model of lobster-car for keeping live lobsters.
123. Ice-crusher, ice-picks, and tools used in handling ice in packing fresh fish for market, or storing them in the vessel's hold; model of refrigerator for preserving fish.
124. Model of fish wharf, with all the appliances for handling and curing dry fish, including scales for weighing, butts for pickling, flakes for drying, &c.; models of tilting and brush flakes; model of smoke-house for curing herring; models of sardine factory at Camden, Maine, showing the interior arrangements of tables, elevators, &c.; model of lobster-boiling house at Boston, showing the vats for steaming the lobsters, the wharf, and the derricks used in handling the lobsters. It is accompanied by models of lobster smacks and of the principal forms of lobster nets. Model of menhaden oil and guano factory, showing the apparatus by means of which the oil and guano are prepared. Model of fishery at Waukegan, Illinois, showing the apparatus employed in cleaning and salting down lake white-fish.
125. Apparatus used in the preparation of boneless fish, including mitre boxes, knives, cutting tables, box-nailing machine, nape-hooks, &c. Brand used by inspectors for marking barrels of pickled fish; oil bags, dippers, and other implements used in the manufacture of cod-liver oil; model of guano mixer, employed in the fish-guano works for the purpose of thoroughly mixing the fish-scrap with the mineral phosphate and sulphuric acid.



## SECTION G.—FISHERY PRODUCTS AND THEIR PREPARATION.

## XXXI.—APPARATUS AND MATERIALS, ETC.—Continued.

126. Collection of cans, boxes, bags, and barrels for packing and transporting fish and oysters; box ends, sides, and covers, printed with the brands of boneless fish.
127. Samples of varieties of salt used in curing fish; exhibit showing the manufacture of cotton-seed oil, used to a considerable extent instead of olive oil for sardines, &c.
128. Several series of 30 by 40 inch photographs, showing the manner of handling and curing fish, landing from the vessels, drying, pickling, smoking, &c.; also showing the interior arrangements of canning factories, boneless-fish factories, &c.
129. Models of apparatus used in steaming oysters.

## XXXII.—PRODUCTS OF THE FISHERIES PREPARED FOR FOOD.

130. Dry salted or plain dried preparations, including whole and boneless codfish and other species. Whale sinew used for food by the Chinese of California; dried meats of Abalone; Indian food, including dried Smelts, Salmon, Prawns, Shrimp, Cuttle Fish, Clams, &c.; Irish moss, &c.
131. Smoked preparations, including Halibut, Herring, Mackerel, Bluefish, White-fish, Salmon, Sturgeon, and Haddock, also varieties of fish prepared by the Indians and Eskimo.
132. Pickle or brine salted preparations, including Mackerel, Herring, Caviare, &c.
133. Preparations in spices, vinegar, &c., including Sardines, in mustard and tomatoes, Eels in jelly, Mackerel and Ocean Trout in mustard and tomato sauce, &c.
134. Preparations in oil, including American Sardines, &c.
135. Cooked preparations in cans, including fresh Codfish, Mackerel, Herring, Bluefish, Sea Bass, Ocean Trout, Salmon, fish and clam chowders, Lobsters, Clams, Oysters, Shrimps, &c.
136. Samples of crude, half bleached and bleached Irish moss (*Chondrus crispus*), used for gelatine.

## XXXIII.—PRODUCTS OF THE FISHERIES USED FOR CLOTHING.

137. Mammal furs, including skins of fur-seal, sea-otter, &c., used for muffs, gloves, collars, cuffs, and trimmings.

## SECTION G.—FISHERY PRODUCTS AND THEIR PREPARATION.

## XXXIV.—MATERIALS EMPLOYED IN THE ARTS AND MANUFACTURES.

138. Ivory of mammals, including tusks of Walrus used for trinkets, handles, jewelry, buttons, paper-knives, counters, &c.; ivory of Narwhal (*Monodon monoceros*), used for canes; teeth of Sperm Whale (*Physeter macrocephalus*) and their application to the manufacture of balls, buttons, and trinkets.
139. Ivory of reptiles; teeth of Alligator, used for jewelry, whistles, cane-handles, buttons, &c. An extensive trade in Alligator teeth is carried on in Eastern Florida, several establishments being there engaged in their manufacture into fancy articles.
140. Bone of Mammals, including Sperm Whale, jaw-bone made into harness-rings, martingales, sail thimbles, pulley-blocks, seine-needles, chopping-knife, &c.; “Os mirabilis” of Walrus, used for charms, &c.; bone of fishes, including sword of Swordfish (*Xiphias gladius*).
141. Baleen, or whalebone, crude and prepared, for various uses. This collection includes slabs of whalebone of Bowhead Whale (*Balæna mysticetus*), Northwest coast Right Whale (*Eubalæna Sieboldii*), Humpback Whale (*Megaptera versabilis*), Sulphur-bottom Whale (*Sibbaldius sulfureus*), California Gray Whale (*Rhachianectes glaucus*), and other species; strips of bone prepared by the Eskimo; also whalebone in condition to be used in the manufacture of whips, brushes, hats, caps, canes, corsets, and numerous other articles.
142. Tortoise shell (*Eretmochelys squamata*) and commercial tortoise shell used in manufacture of combs, knife handles, and other articles.
143. Scales of fishes used in ornamental work, with specimens of flowers and other articles manufactured therefrom.
144. Pearls and nacre, embracing the pearl-yielding shells, with the pearls and the mother-o’-pearl in the rough state, with the manufactured buttons, handles, and jewelry, pearl-powder, inlaid work, and *papier-mâché*, ornamented with mother-o’-pearl; ear-shells (*Haliotidæ*) used in manufacture of buttons, handles, inlaid work, and pearl powder; Pearl Oysters (*Aviculidæ*), with pearls and nacre; River Mussels (*Unionidæ*), with pearls and nacre, crude and polished.

## SECTION G.—FISHERY PRODUCTS AND THEIR PREPARATION.

## XXXIV.—MATERIALS EMPLOYED, ETC.—Continued.

145. Cameo shell and shells of *Cypræa*, *Rotella*, *Oliva*, *Turritella*, &c., mounted as buttons and jewelry, composition shell work for box covers and frames, made by gluing shells in mosaic; cuttle-fish bone from *Sepia officinalis*, used as a pounce, as a dentifrice, as polishing powders, for taking fine impressions in counterfeiting, and as food for birds; concretions from the stomach of *Astacus*, known as "crab's-eyes" and "crab-stones," and used as antacids; shell of king-crab (*Limulus Polyphemus*), used as a boat-bailer.
146. Alligator leather (*Alligator mississippiensis*), salted and tanned, and manufactured into satchels, slippers, boots, &c. (See exhibit of Tiffany & Co. and H. J. Mahrenholz.) Skins of Eels (*Anguilla vulgaris*), Sturgeon (*Acipenser rubicundus*), Cod (*Gadus morrhua*), Hake (*Phycis chuss*), Cusk (*Brosmius brosme*), and other species, crude, and manufactured into shoes, isinglass, &c. (See exhibits of Gloucester Isinglass and Glue Co. and Russia Cement Co.)
147. Isinglass (*ichthyocolla*), made from air-bladders and skins of fishes and used in the manufacture of fine glues and sizes, adhesive and court plasters, diamond cement, imitation glass, and table-jelly and confectionery, in refining wines and liquors, in adulterating milk, in fixing the luster of artificial pearls, and in lustering silk ribbons (embracing the dried and the manufactured products) in their grades of "lyre," "heart-shaped," "leaf," and "book" isinglass. Hard and liquid fish-glue made from skins of Cod, Cusk, Hake, and other species; carriage axle, hats, oil-cloths, spools, &c., in the manufacture of which fish-glue is used. (See exhibits of Gloucester Isinglass and Glue Co. and Russia Cement Co.)
148. Specimens of American commercial sponges. (See Invertebrate exhibit.)
149. Oils and fats, including Seal oil in its various grades, used for lubricating; Sea Elephant oil, crude and bleached; oil from body of Whales, Grampuses, and Porpoises, used in the arts, for lubricating, painting, &c.; Black-fish and Porpoise jaw oil, used in lubricating fine machinery, watches, clocks, and guns; Grampus oil, used for lubricating fine machinery; crude and refined Sperm oil, used for illuminating, lubricating, as an

## SECTION G.—FISHERY PRODUCTS AND THEIR PREPARATION.

## XXXIV.—MATERIALS EMPLOYED, ETC.—Continued.

emollient in medicine, for lip-salves, and in the manufacture of spermaceti; crude and refined spermaceti, with samples of candles from it; Alligator oil, made in Florida; oil from various species of fish, as Sunfish (*Mola rotunda*), currier's cod-liver oil, medicinal cod-liver oil; stearine from liver-oil of codfish; oil from liver of Cusk (*Brosmius brosme*), Haddock (*Melanogrammus aeglefinus*), Pollock (*Pollachius virens*), &c.; Menhaden oil, used in currying leather, in rope-making, for lubricating, for adulterating linseed oil, as a paint oil, and exported to Europe for use in the manufacture of soap and for smearing sheep; Oulachan oil, used by the Indians of the North west coast for food and illumination; oil of Squid (*Ommastrephes illecebrosa*.)

150. Mammal perfumes; ambergris from sperm whale, used in the preparation of fine perfumery.
151. Chemical products and agents employed in the arts and medicine; fluid extract of seawrack (*Fucus vesiculosus*), sold under the name of "antifat."
152. Fertilizers in the preparation of which fish are used, including Menhaden guano, crude and ground, guano made from fish skins, and from fish heads and bones. Series of preparations illustrating the manufacture of soluble Pacific guano, including crude and crushed, and ground South Carolina phosphates; crude Navassa phosphate, Sicily sulphur for the manufacture of sulphuric acid; Stassfurth kainite, used in preservation of scrap, crude Menhaden scrap, and scrap dried by the Hogle patent drying machine.—(See exhibits of Quinnipiac Fertilizer Company, The George W. Miles Company, Winfield S. Dunan, W. A. Abbe, and others.)

## SECTION H.—FISH CULTURE.

## XXXV.—APPARATUS AND METHODS OF FISH CULTURE.

153. A map showing the operations of the United States Fish Commission from 1871 to the present time, the location of the hatching stations belonging to the United States Fish Commission, and to the Fish Commissions of the several States; and the dates of the establishment of the State Commissions. It also shows the locations where young fish have been planted, each species being designated by a peculiar symbol.

## SECTION H.—FISH CULTURE.

## XXXV.—APPARATUS AND METHODS, ETC.—Continued.

## LIST OF HATCHING STATIONS.

The following is a list of the hatching stations operated by the United States Fish Commission in 1883 :

1. Grand Lake Stream, Maine, station for collecting eggs of the Schoodic Salmon (*Salmo salar* var. *sebago*).
2. Bucksport, Me., station for collecting and hatch-  
ing eggs of the Atlantic Salmon (*Salmo salar*),  
and for hatching eggs of White-fish (*Core-  
gonus clupeiformis*) to be distributed in the  
waters of the State.
3. Wood's Holl, Mass. Permanent coast-station,  
which serves as a basis of operation for the  
scientific investigations of the Commission,  
and as a hatching station for eggs of the Cod  
(*Gadus morrhua*) and other sea-fishes.
4. Cold Springs Harbor, Long Island, New York.  
Station for hatching eggs of various species of  
Salmonidæ for distribution in New York and  
vicinity.
5. Havre de Grace, Maryland, Station located on  
Battery Island, in the Susquehanna River, for  
the purpose of collecting and hatching eggs of  
the Shad (*Clupea sapidissima*).
6. Washington, District of Columbia.
  - a. National Carp ponds. Ponds for the  
propagation of the three varieties of the  
Carp (*Cyprinus carpio*), and the Gold-  
fish (*Carassius auratus*), the Golden Ide  
(*Idus melanotus* var. *auratus*), and the  
Tench (*Tinca vulgaris*).
  - b. Arsenal ponds. Ponds for the propaga-  
tion of Carp (*Cyprinus carpio*).
  - c. Navy Yard. Station for collecting and  
hatching eggs of the Shad (*Clupea sapi-  
dissima*).
  - d. Central hatching station. A station fully  
equipped for scientific experiments con-  
nected with the propagation of fishes.  
The station is also provided with appa-  
ratus for hatching the eggs of all of the  
more important species, including light,

## SECTION H.—FISH CULTURE.

## XXXV.—APPARATUS AND METHODS, ETC.—Continued.

## LIST OF HATCHING STATIONS—Continued.

- heavy, and adhesive eggs. It is the principal distributing station of the Fish Commission, for both eggs and young fish to all portions of the United States.
7. Wytheville, Virginia. A station for hatching eggs of Brook-trout (*Salvelinus fontinalis*) and California Trout (*Salmo irideus*).
  8. Saint Jerome's Creek, Point Lookout, Maryland. A station for the artificial propagation of the Oyster (*Ostrea virginiana*), the Spanish Mackerel (*Scomberomorus maculatus*), and the Banded Porgy (*Chaetodipterus faber*).
  9. Avoca, North Carolina. A station on Albemarle Sound, at the junction of Roanoke and Chowan Rivers, for collecting, hatching, and distributing eggs of the Shad (*Clupea sapidissima*), Alewife (*Clupea vernalis* and *æstivalis*), and Striped Bass (*Roccus saxatilis*).
  10. Northville, Michigan. A hatching station for the development and distribution of eggs of the White-fish (*Coregonus clupeiformis*). This station is also provided with tanks and ponds for the spawning, hatching, and rearing of Brook-trout (*Salvelinus fontinalis*) and California Trout (*Salmo irideus*).
  11. Alpena, Michigan. A station for the collection and development of the eggs of the White-fish (*Coregonus clupeiformis*).
  12. Baird, California.
    - a. Salmon station. A station on the McCloud River for the development and distribution of eggs of the California Salmon (*Oncorhynchus chouicha*).
    - b. Trout ponds. A station near Baird for collecting, developing, and distributing eggs of the California Trout (*Salmo irideus*).
  13. Clackamas River, Oregon. A station on Columbia River for collecting and hatching eggs of the California Salmon (*Oncorhynchus chouicha*).

## SECTION H.—FISH CULTURE.

## XXXV.—APPARATUS AND METHODS, ETC.—Continued.

## LIST OF HATCHING STATIONS—Continued.

154. Hatching table, in three parts, showing small sized models of the various kinds of hatching apparatus used in the United States, in actual working order, the water to be supplied by means of a gas pumping engine which forces it into closed pipes with a pressure of 15 pounds to the square inch. Stop-cocks are placed at frequent intervals in these pipes and are connected with the hatching apparatus by means of rubber tubing. The apparatus is supplied with natural and artificial eggs to get a better idea of its working. The first compartment contains the closed apparatus, the next the trough and other apparatus requiring running water, while the third is arranged as a basin or artificial lake for showing the floating apparatus and other kinds used in open streams. A McDonald fish-way is placed at the end of the trough to conduct the waste water to the tank below, from which it is again carried to the pump.
155. A plaster cast representing a man in the act of taking eggs from an Atlantic salmon in a pan in which they are to be impregnated. By his side are casts of a ripe male and female salmon with the abdominal walls removed to show the ovaries and spermaries in position.
156. A model of the United States Fish Commission steamer Fish Hawk, built by Pusey & Jones, of Wilmington, Delaware.
157. Sectional model of the United States Fish Commission steamer Fish Hawk, on a scale of two inches to the foot, showing the hatching deck properly equipped with fish-hatching apparatus and the arrangement of hatching boxes on the outer side.
158. Models of several of the most important hatching houses in the United States, including the following:

Model of hatching house built at Druid Hill Park, Baltimore, Maryland, in 1875, under the direction of Maj. T. B. Ferguson, then State Commissioner of Fisheries. The interior of this model is fitted up with miniature hatching apparatus, showing the arrangements for actual work. It contains Ferguson hatching jars, flights of Coste trays, Williamson hatching troughs, Clark hatching troughs, Holton hatching box, Green hatching box, aquaria, and reservoir tank provided with filters and porcelain-lined sinks.

## SECTION H.—FISH CULTURE.

## XXXV.—APPARATUS AND METHODS, ETC.—Continued.

## LIST OF HATCHING STATIONS—Continued.

Model of hatching house at United States salmon-breeding station at Bucksport, Maine, built under the direction of Mr. Charles G. Atkins, with movable roof for showing the interior, which is provided with troughs for hatching eggs of the Salmon. The water enters the troughs through a feed trough along the side of the room and escapes by pipes through the floor.

Model of United States hatching house at Northville, Michigan, built under the direction of Mr. Frank N. Clark, for hatching eggs of Lake Trout, Brook Trout, California Trout, California Salmon, and Whitefish. The interior of this hatchery is provided with miniature hatching troughs and jars, while in the grounds adjacent are shown several of the tanks and fish-ponds.

159. Maps showing topography of the land adjacent to several of the more important hatching stations of the United States Fish Commission, including the national Carp ponds at Washington, District of Columbia, the United States reservation for fish-cultural purposes on the McCloud River, California, the salmon-breeding stations at Grand Lake Stream and Bucksport, Maine, and the hatching station at Northville, Michigan.
160. Series of 30 × 40 inch photographs, retouched with India ink, showing several of the more important hatching stations and the more interesting features of fish-cultural work, such as taking and impregnating the eggs, tagging the fish, and the process of manipulation of the eggs and young fish at the hatchery.
161. Series of fish-hatching apparatus, including all of the more important kinds used in the United States. Each specimen in this series is of actual size and in the condition ready for use.
162. Series of accessory apparatus used at fish-hatching stations such as pans, skimming-nets, pails, dippers, and lanterns.
163. Series of apparatus for the transportation of eggs and young fish, including all of the more important kinds now used by leading American fish culturists.
164. Series of fish eggs in alcohol. This series includes the eggs of about one hundred of the more important food-fishes taken within the limits of the United States.



## SECTION H.—FISH CULTURE.

## XXXVI.—EGGS AND YOUNG FISHES.

165. Series of fish-eggs showing daily development of the embryo from the unimpregnated eggs to the newly hatched fish. This series embraces all of the more important species hatched by the Fish Commission, including Brook Trout, Lake Trout, Atlantic Salmon, Schoodic Salmon, California Salmon, Rainbow Trout, Rangeley Trout, White-fish, Shad, Mackerel, Cod, Alewives, and Yellow Perch.
166. Series of young fish showing the rate of growth. This series includes the following species: Brook Trout, Rainbow Trout, California Salmon, Atlantic Salmon, White-fish, and Shad.

## XXXVI.—FISH WAYS.

167. Models of all the more important styles of fish-way used in the United States, seventeen in number. Illustrations of the Shotwell process for cleansing streams from the refuse of gas factories.

## XXXVII.—FISH CULTURISTS.

168. Photographs of State Fish Commissioners.
169. Photographs of officers and members of the American Fish Cultural Association and other representative fish culturists.

## SECTION I.—INVESTIGATION OF THE WATERS AND RESEARCH.

## XXXVIII. A.—DEEP-SEA RESEARCH.

170. A nearly complete series of the deep-sea sounding and dredging appliances, accessory apparatus, and instruments for physical observations, used by the United States Fish Commission, and United States Coast and Geodetic Survey. Models, photographs, and plans of the United States Fish Commission steamers Albatross and Fish Hawk. Series of plates illustrating the deep-sea sounding and dredging appliances of the United States Coast Survey steamer Blake.
171. Five relief models, showing the configuration of the sea bottom off the eastern coast of North America from Newfoundland to Mexico.
172. Chart, showing the dredging operations of the United States Fish Commission, 1871–1882.

## SECTION I.—INVESTIGATION OF THE WATERS AND RESEARCH.

## XXXVIII. A.—DEEP-SEA RESEARCH—Continued.

172a. Series of specimens of marine invertebrates, obtained from the deeper waters off the northeastern coast of the United States, since 1878, by the United States Fish Commission and Gloucester Fishing vessels, and representing some of the more interesting features of the fauna of that region. Specimens of rock formation from the deeper waters off the New England coast.

## B.—INVESTIGATION OF THE FRESH WATERS.

172b. Collections of crayfish and fresh water sponges from the rivers of the United States.

## SECTION K.—LITERATURE.

## XXXIX.—Books.

173. Publications of the United States Fish Commission.

Publications of the State Fish Commissions.

Publications of the United States Government relating to the fisheries.

Principal works of American writers on the marine and fresh water fauna of the United States, the geographical distribution, development, and life history of aquatic animals, and, in general, investigations upon seas, lakes, and rivers, and their inhabitants.

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COLLECTIONS DISPLAYED

BY

SPECIAL EXHIBITORS.

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## COLLECTIONS DISPLAYED BY SPECIAL EXHIBITORS.\*

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### **W. A. ABBE, New Bedford, Massachusetts :**

Samples of "Abbe's fish scrap." (29.)

1. Unground or crude menhaden scrap.
2. Fine ground menhaden scrap.
3. Very fine ground menhaden scrap.

### **MAYHEW ADAMS, Chilmark, Massachusetts :**

Patent chock for whale-boat. (6.)

### **ALEXANDER AGASSIZ, Museum of Comparative Zoology, Cambridge, Massachusetts :**

Publications relating to fishes and marine invertebrates. (60.) (See also Museum of Comparative Zoology, Cambridge.)

Plans of biological laboratory at Newport, Rhode Island. (40.)

### **STEPHEN H. AINSWORTH, New York :**

Spawning-race for *Salmonidæ*. (35.)

### **ALASKA COMMERCIAL COMPANY, San Francisco, California :**

Two Pacific walrus tusks. (32.)

One 41 inches long and weighing  $12\frac{1}{4}$  pounds.

One 41 inches long and weighing  $12\frac{1}{2}$  pounds.

Exhibit of fur-seal skins. (32.)

### **ALBANY BEEF PACKING COMPANY, 372 Greenwich street, New York City :**

Fish oils and fertilizers. (29.)

Fish oil.

Fertilizers and bone dust.

Cooked preparations in cans. (26.)

Canned Sturgeon (called Albany Beef), one-pound cans.

### **CHARLES ALDEN, Randolph, Massachusetts :**

Foods prepared by the Alden evaporating process. (26.)

### **J. A. ALLEN, Museum of Comparative Zoology, Cambridge, Massachusetts :**

Maps illustrating the geographical distribution of the seals and walruses. (55.)

Monograph of the Pinnipeds of North America. (60.)

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\*The explanations in small type are usually in the words of the exhibitor, and should not be understood to have official indorsement.

**F. S. ALLEN, New Bedford, Massachusetts:**

Bomb-lances formerly used with the whaling rifle, and other implements used in the whale fishery. (1.)

**FREDERICK S. ALLEN, Cuttyhunk, Massachusetts:**

Model of Life-Raft (patented April 26, 1881). (6.)

Made of frames attached to empty casks, provided with oars, masts, tent, &c. "The strings attached to the man-holes are to be lashed across to prevent anything from coming out."

Model of hand-capstan or windlass. (6.)

Made with one double-acting lever and adapted for weighing anchors, hauling vessels from shores when stranded, setting up rigging, &c.

Model of hand-capstan. (6.)

The brakes can always be hinged for action so that in the darkest night there need be no delay in revolving the capstan. The capstan is simple in construction and can be easily repaired.

Model of capstan or windlass. (6.)

Has two levers and is especially adapted to fishing vessels. The power can be applied to two teeth of the ratchet at the same time by the links on the push pawls of the levers.

Sword-fish iron. Improved pattern. (6.)

When the movable catch that holds the toggle strikes the skin of the fish it unlocks the iron, but, nevertheless, will remain in position as long as it continues going. When the action is reversed or the iron drawn out, it immediately toggles or comes crossways. The long shank can then be easily pulled out of the short shank by means of a small line attached.

**THE AMERICAN ANGLER, New York City:**

File of "The American Angler." (60.)

**THE AMERICAN FIELD, Western office 155 and 157 Dearborn street, Chicago, Illinois:**

Bound volume of the American Field. (60.)

**AMERICAN FISH-CULTURAL ASSOCIATION, New York City:**

Annual reports and *menus* of annual dinners. (60.)

Portraits of its members. (57.)

**AMERICAN NET AND TWINE COMPANY, Boston, Massachusetts:**

Exhibit of Nets and Seines, and Twine used in their manufacture. (1 and 8.)

One Baird Seine, all fitted.

One Minnow Seine, all fitted.

One River Seine, all fitted.

One Herring Net, 30 rows by 150 meshes, 2½-inch, 14-6, Barked, Noselled, and Roped.

One Herring Net, 30 rows by 150 meshes, 2½-inch, 10-4, Barked, Noselled, and Roped.

**AMERICAN NET AND TWINE COMPANY, Boston, Massachusetts:**

Exhibit of Nets and Seines, etc.—Continued.

One Mackerel Purse Seine.

One Herring Purse Seine.

One Barked Web, 2-inch, 20-6, Hall Twine.

One Barked Web, 2-inch, 9 thread, half patent-laid Twine.

One Barked Web, 2-inch, 18 thread, half patent-laid Twine.

One Web, 300 yards long, 2½-inch, 9 thread, half patent-laid Twine, colored red.

One Web, 300 yards long, 2½-inch, 9 thread, half patent-laid Twine, colored blue.

One Web, 1,000 yards long, 3-inch mesh, 12 thread, half patent.

One Web, 300 yards long, 3-inch mesh, 18 thread, half patent.

One River Seine, 100 feet long, 8 by 10 feet deep, 2½-inch mesh, 12½ patent Twine, Barked and fitted complete.

Pieces of Netting in Web, as follows:

One piece, 100 yards long by 150 meshes deep, 2-inch, 20-6, Hall Twine.

One piece, 100 yards long by 150 meshes deep, 2½-inch, 14-6, Hawser Twine.

One piece, 100 yards long by 150 meshes deep, 2-inch, 9, half-patent Twine.

One piece, 100 yards long by 150 meshes deep, 2-inch, 6, half-patent Twine.

One piece, 100 yards long by 100 meshes deep, 3-inch, 12, half-patent Twine.

One piece, 100 yards long by 150 meshes deep, 2½-inch, 10-4, Hawser Twine.

One piece, 100 yards long by 150 meshes deep, 2¼-inch, 20-5, Hawser Twine.

One piece, 100 yards long by 150 meshes deep, 2⅝-inch, 20-12, Cable Twine.

One piece, 100 yards long by 150 meshes deep, 3-inch, 20-9, Cable Twine.

One piece, 100 yards long by 150 meshes deep, 2½-inch, 15-9, half-patent Twine.

Samples of Twine:

One bundle each of 6, 9, 12, 15, 18, 21, 24, 27, 30, and 36 threads, half-patent (bundles not papered).

One bundle half-patent Twine. (Papered.)

Two bundles each of 20-6 and 20-12, Hall Twine, 20-6 and 20-9 Cable-laid Twine. (One bundle of each kind papered and one unpapered.)

Two sample boards of patent-laid, soft-laid, and Net Twines.

**AMERICAN SHIP WINDLASS COMPANY, Providence, Rhode Island:**

Working model of the Providence steam capstan windlass. (6.)

**MAX AMS, 372 and 374 Greenwich Street, New York City:**

Preparations in spices and vinegar, &c. (26.)

Eels in jelly, in cans.

Smoked preparations. (26.)

Smoked Eels.

Pickle or brine salted preparations. (27.)

American Caviare (Sturgeon roe).

Cooked preparations in cans. (26.)

Canned Sturgeon (called Albany Beef).

**JAMES ANNIN, Jr., Caledonia, New York:**

Box for the transportation of fish ova. (35.)

Case containing 3,000 living eggs of the Brook Trout (*Salvelinus fontinalis*). (36.)

**CHARLES G. ATKINS, Bucksport, Maine:**

Apparatus used in the artificial propagation of various species of *Salmonidæ*. (35.)

Series of eggs and young of Atlantic Salmon, showing daily growth from the newly-impregnated egg to the fry several weeks old. (36.)

Model of Pike's spiral fish-way, with modifications; also model of Atkins's Bangor fish-way. (37.)

**ATWOOD BROTHERS, Clayton, New York:**

Working model of Atwood's patent center-board for boats and canoes. (6.)

**BADOLLET & CO., and TILLAMOOK PACKING COMPANY, Astoria, Oregon:**

Cooked preparations in cans. (26.)

Canned salmon.

**BAGNALL & LOUD, Boston, Massachusetts:**

Harcourt's patent improved inside iron-strapped block. (6.)

"This improvement consists in having a solid partition in a double or triple block, and having four straps in a double and six in a triple block, each strap being let into each side of every partition."

Sheave-roller bushing. (6.)

"The rolls revolve on a sleeve or second pin, which in halyard blocks is one and one-half inches in diameter in place of three-quarter inch, thus giving a large bearing for the rolls to revolve on, the wear on the pin in the block being little, if any."

Lug-roller bushing. (6.)

"The washer being flexible, will stay in its place until the rolls are entirely worn out, which is not the case with the old style of roller bushing."



**BAGNALL AND LOUD, Boston, Massachusetts:**

Improved lug-roller with iron sheave. (6.)

Gaff-topsail cleat and downhaul attachment. (6.)

“The advantages are first in a swinging cleat which will always have a fair lead, and can be applied either to the port or starboard side as well. In connection with the cleat is the band on the gaff and downhaul attachment, consisting of a brass bull’s eye, all being easily applied in one piece to the gaff by one bolt.”

Improved snatch-block. (6.)

“The outside straps are fastened at the end of the block by a bolt, which prevents the sides of the block from pinching the sheave. To lock and unlock the fastening is very easily accomplished by turning the block or hook to right angles, thus bringing the link even with the lip, which then is slipped off, the rope inserted, and the link replaced. This does away with the bolt and chain.”

Leader for peak halyards. (6.)

Used on the cross-trees. “A new and useful attachment.”

Improved sheet-block with boom buffer combined. (6.)

“Has rubber cushions at its upper and lower ends, which are intended to ease off the strain when the boom jibes over suddenly. Intended to hang on the boom.”

Improved trawl roller. (6.)

“The improvement consists in having the spindle securely fastened to the roll, and having the outer ends revolve in a box at each end of the roll. The box is made of composition and provided with a lubricant for the spindle to run in.”

Improved seine block. (6.)

**ARTHUR H. BAILEY & CO., Boston, Massachusetts:**

Cooked preparations in cans. (26.)

Fresh Bluefish, one-pound cans.

Fresh Sea Bass, one-pound cans.

Fresh Mackerel, one-pound cans.

Fresh Deep-Sea Salmon, one-pound cans.

Ocean Trout.

Smoked preparations. (26.)

Finnan Haddies, one-pound cans.

Kippered Herring, one-pound cans.

Preparations in Spices, Vinegar, &c. (26.)

Mackerel in Mustard Sauce, two-pound cans.

Mackerel in Tomato Sauce, two-pound cans.

Ocean Trout in Mustard Sauce, two-pound cans.

Ocean Trout in Tomato Sauce, two-pound cans.

Nantucket Sturgeon in Piccalilli Dressing, two-pound cans.

Dummy cans to show various brands of canned goods.

**PASSED ASSISTANT ENGINEER WILLIAM L. BAILIE, U. S. N., Steamer Fish-Hawk:**

Improved metal case for Negretti and Zambra deep-sea thermometer. (40.)

**BENJAMIN BAKER, 2d, New Bedford, Massachusetts:**

One lobster-pot. (2.)

**J. H. BARTLETT & SONS, New Bedford, Massachusetts:**

Full size whale-boat, rigged for use. (4.)

Crude and refined whale oils. (29.)

Arctic and Humpback Whale bone. (32.)

**JOHN BARTLETT, Cambridge, Massachusetts:**

Bibliography of angling. (60.)

**JAMES BARTON, New Bedford, Massachusetts:**

Implements used in the capture of the whale. (1.)

**J. W. BEARDSLEY'S SONS, 179 West Street, New York City:**

Dry salted preparations. (26.)

Beardsley's shredded Codfish.

Boneless Codfish, Beehive brand.

Boneless Herring, Star brand.

**TARLETON H. BEAN, United States National Museum, Washington:**

Map showing geographical distribution of the *Salmonidæ* of Alaska, (55.)

Publications on ichthyology and the fisheries. (60.)

**JAMES BEETLE, New Bedford, Massachusetts:**

Live car for tautoging. (33.)

Implements used in the whale-fishery, in frost fishing, and blue fishing. (1.)

(Mr. Beetle also made the model of whale-boat.)

**RUDOLPHUS BEETLE, New Bedford, Massachusetts:**

Dried frog, taken from a whaleman's molasses cask. (52.)

**J. E. BENEDICT, United States Steamer Albatross:**

Rake-dredge for collecting Annelids and other mud-burrowing invertebrates. (40.)

**EUGENE G. BLACKFORD, New York Fish Commissioner, Fulton Market, New York City:**

Fresh food-fish on ice. (51.)

**JOHN BLISS & CO., New York City:**

Nautical instruments. (6.)

1. Taffrail log. (Complete.)

2. Parallel rules; two sizes, new style.

**A. BOOTH, Baltimore, Maryland; Chicago, Illinois; and Astoria, Oregon:**

Preparations in Spices and Vinegar, &c. (26.)

Oysters in glass.

Cooked preparations in cans. (26.)

Canned Oysters. (Oval brand.)

Canned Salmon. (Oval brand.)

Labels, cards, and empty cans, showing brands of oysters and salmon. (25.)

Refrigerator for oysters. (25.)

**JONATHAN BOURNE, New Bedford, Massachusetts:**

Series of implements used in the whale-fishery. (1.)

**E. A. BRACKETT, Winchester, Massachusetts:**

Model of fish-way, with partitions at right angles, provided with a submerged piece of cob-work, surmounted by grating, to direct the fish to the mouth of the way. (37.)

Floating box for use in open stream. (35.)

**WALTER M. BRACKETT, Boston, Massachusetts:**

Crayons and paintings of fish. (51.)

**JUNIUS A. BRAND, Norwich, Connecticut:**

Bomb-lances and darting-bomb for killing whales. (1.)

**JAMES D. BREWER, Muncy, Pennsylvania:**

Model of fish-way, with transverse sloping floors; also model of oblique groove fish-way. (37.)

**JAMES TEMPLE. BROWN, United States National Museum, Washington:**

Collection of whaling harpoons, lances, guns, bombs, &c., gathered for the Fish Commission at New Bedford in 1882. (The entire whaling collection has been arranged by Mr. Brown.) (1.)

**BRUSH SWAN ELECTRIC LIGHT COMPANY, New York City:**

Apparatus for enlarging photographs. (51.)

(Used by Mr. T. W. Smillie in preparing the series of photographs illustrative of the fisheries, but not exhibited.)

**OLIVER N. BRYAN, Occokeek, Maryland:**

Floating hatching-box for use in open stream. (35.)

**BURNHAM & MORRILL, Portland, Maine:**

Smoked Preparations. (26.)

Finnan Haddies, in 1-pound cans.

Cooked preparations in cans. (26.)

Canned Lobsters, 1-pound flat cans.

Canned Lobsters, 1-pound tall cans.

Canned Mackerel, 1-pound cans.

Canned Clams, 1-pound cans.

**J. T. BUTTRICK**, New Bedford, Massachusetts :

Ship bread carried by whalemén. (22.)

**CHARLES CARPENTER**, Kelley's Island, Ohio :

Camel's-back buoy. (6.)

**CASTINE PACKING COMPANY**, Castine, Maine :

Cooked preparations in cans. (26.)

Canned Lobsters in 1-pound and 2-pound cans, one dozen each.

Canned Mackerel, one dozen 1-pound cans.

Canned Soused Mackerel, No. 4, one dozen cans.

Canned Halibut, No. 5, one dozen cans.

Canned Clams in 1-pound and 2-pound cans, one dozen each.

Canned Clam Chowder, one dozen 3-pound cans.

Pickle or Brine-Salted Preparations. (26.)

No. 5 Mess Mackerel, one dozen cans.

**THE CENTURY COMPANY**, New York City, Art Department, A. W. Drake,  
Superintendent.

Original sketches from which were engraved the illustrations of  
the *Century* article upon the United States Life-Saving  
Service. (9.)

1. Off to a wreck.
2. Life-saving station.
3. Drill, &c., in surf-boat.
4. Launching surf-boat.
5. Night patrol.
6. Burning a signal.
7. Hauling mortar-car.
8. Surfman with life-belt.
9. Firing the mortar.
10. Breeches-buoy in operation.
11. Breeches-buoy.
12. Self-righting life-boat.
13. Self-righting life-boat under sail.
14. Life-saving dress.
15. Tally-board and whip-block.
16. Resuscitation, ejecting water.
17. Resuscitation, restoring respiration.
18. Medicine chest.
19. Mess-room.

Other sketches for illustration of marine subjects.

1. A glimpse of the sun.
2. Hove to for a pilot.
3. Launching the boat.
4. Taking a Porpoise aboard.
5. Sebatis in a perilous condition.
6. Beaching the canoe.
7. Reefing the mainsail.

**A. J. CHASE, Boston, Massachusetts:****Chase's Cold Blast Refrigerator. (33.)**

"This scientific system of refrigerating with ice, or ice and salt, or other freezing mixture, is the invention of Andrew J. Chase, of Boston, Massachusetts. It has been in use now five years. The strong points of this system are claimed to lie in the fact that it is adapted to all purposes, as it gives any temperature from 24° below freezing to 42° above zero. The internal circulation of the air is very brisk and dry, a necessary condition for preserving perishable goods. Thus far this refrigerator has been used principally for heavy work, or upon a large scale. At this time there are about 2,000 cold-blast cars in use, transporting dressed beef from the West to all the principal cities and towns from Maine to New Orleans and Florida. Thirty-two large English steamships have been fitted for transporting fresh meats to Europe. These have a capacity ranging from 800 to 1,800 quarters of beef each. The leading hotels and markets of the States are also fitted with these important structures. Cold-blast preserving houses are getting very popular in all parts of the country. Boston has the largest one in the world, just finished. Fish dealers are beginning to see that the old slop and slime method of packing in ice must very soon give place to the dry handling. Mr. Chase makes contracts for putting up buildings with all the improved appliances, guaranteeing any temperature desired. He also makes a specialty of cooling and ventilating buildings or passenger cars."—  
(*From letter of A. J. Chase.*)

**Chase's Monitor Display Refrigerator. (33.)**

"This refrigerator is used by those who wish to display small goods, such as print butter, chops, steaks, and fish. It is very economical in the use of ice, costing but a few cents to run it during the day. It is made in three sizes at present prices, \$15, \$20, and \$25. These may be used with ice and ice water, or with salt and ice, according to the temperature required."—(*From letter of A. J. Chase.*)

**OREN M. CHASE, Detroit, Michigan:**

A glass hatching jar, provided with a glass tube, by means of which the water is delivered at the bottom and allowed to pass upward through the eggs. (35.)

**CAPTAIN H. C. CHESTER, Noank, Connecticut:**

Walrus tusks scrimshawed, and frame made of walrus ivory. (32.)

Bucket and box used in hatching floating eggs. (35.)

Rake Dredge, and other apparatus used in deep-sea research. (40.)

**A. HOWARD CLARK, United States National Museum, Washington:**

Map illustrating the past and present locations of the whaling-grounds of the world; publications on fishery statistics. (55-60.)

**FRANK N. CLARK, Northville, Michigan:**

Series of eggs and young fish, showing development and growth, as follows: Brook Trout, Rainbow Trout, Schoodic Salmon, and White-fish. (36.)

**FRANK N. CLARK, Northville, Michigan:**

Various kinds of apparatus used in hatching White-fish and other species of *Salmonidæ*; also box for the transportation of fish ova. (35.)

**JAMES B. CLARK, Chester, Connecticut:**

Working model of W. N. Clark's patent rudder hanger. (6.)

**HENRY CLAY, New Bedford, Massachusetts:**

A "Nantucket Bell" for calling the watch on a whaling vessel. (6.)

**J. W. COFFIN, Edgartown, Massachusetts:**

Log-book. (6.)

**CHARLES A. COLE, Scituate, Massachusetts:**

Specimens of commercial carrageen, or Irish moss (*Chondrus crispus*). (32.)

a. Moss as it comes from the rocks.

b. Moss partly bleached.

c. Moss bleached for market.

**LUTHER COLE, New Bedford, Massachusetts:**

Nickel-plated whaling instruments. (1.)

**A. S. COLLINS, Caledonia, New York:**

Spawning race for *Salmonidæ*. (35.)

**CAPTAIN J. W. COLLINS, Gloucester, Massachusetts:**

Collins's improved adjustable marine drag. (6.)

Full size for fishing vessels. It consists of a strong iron hoop, jointed and braced, so that it can be folded and stowed away in small compass when not in use. To this is attached by interlocking hoops a heavy canvas bag, which will fill with water when thrown overboard and hold the vessel steady, nearly head to the sea and wind, and with only a moderate leeway. The drag, when in use, is secured to a hawser by a chain bridle, and can be suspended at any required depth by means of a buoy. A line is attached to the bottom of the drag, so that it can be tripped and easily hauled in when its use is no longer necessary. The advantages of this drag are that it is always ready for use, being easily adjusted in a few moments when needed; that it can be unrigged and stowed away when not in use; that it can be constructed at a moderate cost, and that it promises to secure the desired end much better than the drags ordinarily employed for the same purpose. Dimensions: Circumference of hoop, 18 feet; length of cross-bars (each), 5 feet 10½ inches; size of iron (hoop and bars), 1½ inches; length of bridle chains (each), 5 feet; circumference of bag, 19 feet; depth, 4 feet; canvas No. 0, white cotton duck; buoy, 7-gallon keg; buoy line, 1½-inch manila rope, 10 fathoms long; tripping line, 2-inch manila rope, 25 fathoms long. This drag is used to insure the greater safety of vessels in heavy gales, and also to prevent them from drifting so rapidly to leeward, as they do when it is not employed. It is secured to a hawser or chain and paid out from a schooner's bow, the distance varying from 25 to 75 fathoms.—(Collins.)

**CAPTAIN J. W. COLLINS, Gloucester, Massachusetts :****Collins's patent fog alarm. (6.)**

This invention consists of an upright cylindrical bellows of stout grain leather, supported by and working upon three brass rods, which are fastened at the lower ends to a strong wooden pedestal, and the upper ends of which are secured by means of screw caps to a wooden top, to which also is attached the upper part of the bellows. This wooden top or cap-piece is surmounted by a brass cone, having a hole in its apex, into which is screwed a reed horn. The bellows is collapsed or distended by means of an iron lever working on a hinge attached to the wooden base. By moving this lever the air in the bellows is driven with great force through the horn at the top. A very heavy sound is obtained when a large horn is used, while a small horn can be blown to its fullest capacity with any slight exertion on the part of the operator. Dimensions: Diameter of base, 2 feet; thickness, 4 inches; diameter of wooden top, 19 inches; thickness,  $1\frac{1}{2}$  inches; diameter of bellows (No. 56955), 15 inches; height, 20 inches; height of brass cone,  $6\frac{1}{2}$  inches; diameter of cone (at base), 9 inches; thickness of brass rods,  $\frac{5}{8}$  of an inch; length of lever, 4 feet. This implement was originally designed for use on fishing vessels, especially such as are employed in the line-trawl fishery. In the latter fishery the men go out in dories long distances (one to three miles) from the schooners that are lying at anchor, and the prevalence of dense fogs in summer, and snow in winter, causes the loss of many fishermen, who go astray because they are unable to hear the horns which are ordinarily employed. The advantages of this fog alarm are that it can be heard farther than any horn now in use on sailing vessels (this having been proved by actual test at sea); that the material of which it is made, and the simplicity of its construction, render it less liable to get out of repair than other patent horns; that it may be at all times operated with comparatively slight physical exertion, and without any of the exhaustion that results from blowing a horn with the mouth; and finally, that it is adapted for use on all kinds and classes of vessels. (*Collins.*)

**Nickle-plated fog horn. (6.)**

Tin, nickle-plated, bell-mouth, fitted with large brass reed. Length (excusive of reed), 4 feet; diameter of mouth, 8 inches.

This horn is used on the bellows, and constitutes a portion of Collins's fog alarm.

**Brass fog horn. (6.)**

Bell-mouth, large brass reed at lower or small end. Length,  $3\frac{1}{2}$  feet; diameter of mouth, 6 inches.

Used on the bellows, and is part of Collins's fog alarm.

**Tin fog horns. (6.)**

Three horns, tin, ordinary mouth horns, adapted for use in the bellows of Collins's fog alarm; length of each, 3 feet 2 inches; diameter of mouth,  $5\frac{1}{2}$  inches.

**Fog-horn reeds, &c. (6.)**

One large brass reed  $3\frac{1}{2}$  inches long,  $1\frac{1}{2}$  inches wide; two small reeds and mouth-pieces for tin fog horns.

To be used to replace other reeds which may be lost or injured.

**CAPTAIN J. W. COLLINS, Gloucester, Massachusetts:**

- Model of ideal fishing schooner. (4.) (See Collective Exhibit.)  
Publications relating to the fisheries. (60.)

**PAUL E. COLLINS, Boston, Massachusetts:**

- Oil painting, "Hand-line Mackerel-fishing off the New England coast." (1.)

**CAPTAIN B. F. CONKLIN, Jamesport, New York:**

Sketches illustrating the Menhaden fishery, including (57.)—

1. Setting the seine.
2. Hauling the seine.
3. Scooping out the fish.
4. Floating factory Algonquin.
5. Boats going out to fishing grounds.
6. Working to windward of shoal.
7. Encircling the school.
8. Pursing, and fish striking the seine.
9. A loaded carry-away boat in good breeze.
10. A big strike, &c.

**D. CONNELL, Provincetown, Massachusetts:**

- Harpoon-bomb. (1.)

**CONROY & BISSETT, 65 Fulton street, New York City:**

- 1 Hexagonal split bamboo Salmon rod, german-silver mountings, 18 feet long. (14.)  
1 Hexagonal split bamboo Grilse rod, german-silver mountings, 15 feet long. (14.)  
1 Hexagonal split bamboo Trout and Black Bass fly rod, german-silver mountings, 12 feet long. (15.)  
1 Hexagonal split bamboo Trout and Black Bass fly rod, german-silver mountings, 11 feet long. (15.)  
1 Hexagonal split bamboo Saint Lawrence rod, german-silver mountings, 10 feet long. (15.)  
1 Hexagonal split bamboo McGuinness' Black Bass rod, german-silver mountings, 11½ feet long. (15.)  
1 Hexagonal split bamboo California general rod, making 3 distinct rods, german-silver mountings, 8½ to 12½ feet long. (15.)  
1 Hexagonal split bamboo "Newport," or heavy Bass rod, ash butt, agate tube top. (15.)  
1 Hexagonal split bamboo "Holberton" fly rod, 2 pieces, and short ash butt. The joints of this rod are contained in the landing-net handle; the butt and folding landing net can be carried in the angler's pocket. (15.)  
1 Hexagonal split bamboo "Henshall" Black Bass minnow rod, 8½ to 9 feet long. (15.)



**CONROY & BISSETT, 65 Fulton street, New York City:**

1 Hexagonal split bamboo southern Bass or Weak-fish rod, 9 to 9½ feet long. (15.)

**CAPTAIN CALEB COOK, Provincetown, Massachusetts:**

Exhibit of crude and refined oils from Beluga, Porpoise, and Black-fish. Watch and clock oils prepared from jaw oil of Porpoise. (29.)

**N. N. COOK, Provincetown, Massachusetts:**

Pair of duck trousers worn by N. N. Cook when bitten by a shark. (21.)

**STEPHEN COOK, Provincetown, Massachusetts:**

Implements used in the capture of the whale. (1.)

**H. & S. COOK & COMPANY, Provincetown, Massachusetts:**

Builder's model of Grand Bank fishing schooner Lizzie W. Matheson. (4.)

**PATRICK CUNNINGHAM, New Bedford, Massachusetts:**

Wooden model of darting-gun, and explosive lances cut from dead whales. (1.)

**CUTTING PACKING COMPANY, San Francisco, California:**

Cooked preparations in cans. (26.)

Fresh Salmon from California, Oregon, and Alaska streams.

This exhibit contains Alaska Salmon, probably the first ever shipped abroad. One can contains one fish, live weight eighty-six pounds; dressed, sixty-five pounds; the largest on record on this coast; caught at the company's cannery, at the mouth of the Knsiloff River, Alaska, July 22, 1882. We began prospecting for runs for canning purposes in 1881, and being located as above found three varieties, called by us, for commercial purposes, King Fish, Silver Side Salmon, and Small Red Fish, all of which are fully equal to the varieties caught by us at our canneries in Oregon and California.—A. D. Cutler, of Cutting Packing Company.

**CAPTAIN W. H. DALL, United States Coast Survey, Washington:**

Map showing geographical distribution of fur-bearing animals of Alaska, charts and publications upon the hydrography, meteorology of the North Pacific, and upon its marine fauna. (55.)

**FRANK E. DAVIS, Gloucester, Massachusetts:**

Davis' Standard Rowlocks, in galvanized iron, plain brass and polished brass; twenty specimens. (6.)

**DE BUTTS and DAGGETTS, Boston, Massachusetts:**

Cooked preparations in cans. (26.)

Canned fish.

**W. G. DELAWDER, Easton, Maryland :**

Spawning-box for *Salmonidæ* and other fresh-water species. (35.)

**A. W. DODD & COMPANY, Gloucester, Massachusetts :**

Exhibit of fish oils, stearine, and guano. (27 and 29.)

Pure cod-liver oil for medicinal use.

This oil is steam-rendered by the best process known, from fresh and healthy Cod livers, and warranted perfectly pure.

Blackfish oil, refined for morocco.

Cod oil, "Newfoundland," for tanners' and curriers' use.

Cod oil, "Labrador," for tanners' and curriers' use.

Cod oil, "Grand Bank," for tanners' and curriers' use.

Cod oil, "Shore," for tanners' and curriers' use.

Menhaden oil, "cold pressed," for tanners' and curriers' use.

"Cod oil stearine," for tanners' or soap-makers' use.

"Menhaden oil stearine," for tanners' or soap-makers' use.

Fish guano.

**J. T. DONNELL, Bath, Maine :**

Cable used by fishing vessels. (5.)

**J. W. DRESSER, Castine, Maine :**

Cotton lines used for Cod and Mackerel ; hand-lines and Cod and Halibut trawl-lines. (1.)

**BENJAMIN F. DREW, Fairhaven, Massachusetts :**

Armor said to be worn by natives of Marshall and Caroline groups of islands, South Pacific. (21.)

**JAMES D. DRIGGS, New Bedford, Massachusetts :**

Harpoon. (1.)

**WINFIELD S. DUNAN, Baltimore, Maryland :**

Exhibit of Menhaden oil and scrap. (29.)

1. Unground or crude Menhaden scrap ; made of fish two years old and over, called large fish.
2. Ground Menhaden scrap ; made from the same stock as No. 1.
3. Unground or crude Menhaden scrap ; made of fish not over one year old, called small fish.
4. Ground Menhaden scrap ; made of same stock as No. 3.
5. Samples of Menhaden oil ; two qualities.

**R. EDWARD EARLL, Washington, District of Columbia :**

Series of eggs of Codfish, showing daily development from the unimpregnated egg to the time of hatching. (36.)

Publications relating to the fisheries, fishery statistics, and fish culture. (60.)

**SELMAR EGGERS, Sr., New Bedford, Massachusetts:**

An improved breech-loading whaling gun (deposited in part by S. Eggers and the U. S. Fish Commission). (1.)

**SELMAR EGGERS, Jr., New Bedford, Massachusetts:**

Improved frost-fish spear. (1.)

**HENRY W. ELLIOTT, Washington, District of Columbia:**

Series of water-color sketches, illustrating the fur-seal fisheries of Alaska. (1.)

Report upon the natural history of the fur seal and the seal fisheries of Alaska. (60.)

Sketches in India ink illustrating fisheries of various parts of the United States. (1.)

**HENRY W. ELLIOTT and J. W. COLLINS:**

Pictures of various scenes in the New England fisheries. (1.)

**J. H. EMERTON, Peabody Museum, Yale College, New Haven, Connecticut:**

Models of Giant Squid and Giant Octopus shown in the collective exhibit. (46.)

**F. M. EVERLETH, Waldoboro, Maine:**

Model of fish-way, with automatic float for regulating the supply of water. (37.)

**JAMES L. EVERSON, Williamsburg, New York:**

"Shadow canoe," with sails, for cruising, fishing, or hunting. (20.)

**FAIRBANKS & COMPANY, New York City:**

Scales used in weighing fish and in scientific investigation. (34.)

**PROF. W. G. FARLOW, Harvard College, Cambridge, Massachusetts:**

Collective exhibit of North American Algæ. (42.)

Investigations of the red algæ infesting dried fish, with specimens of red fish and red salt. (42.)

Publications upon algæ. (60.)

**WALTER FAXON, Museum of Comparative Zoology, Cambridge, Massachusetts:**

Publications upon marine invertebrates. (60.)

**ALBERT FERGUSON, 65 Fulton street, New York City:**

Anglers' Lanterns. (19.)

No. 1. Excelsior jack, dash, fishing lamp, and hand lantern, for night fishing and hunting and other purposes, with cap or cover for obscuring the light when necessary; burns kerosene oil.

**ALBERT FERGUSON, 65 Fulton street, New York City :**

## Angler's Lanterns—Continued.

- No. 1 A. Socket attachment for adjusting the lamp to a stick or pole in the bow of a boat or canoe.
- No. 1 B. Fishing reflector for night fishing, and for reading and writing at night when in camp; is adjusted to the face of the lamp by the hinge pin, the cap or cover being first removed.
- No. 1 C. Adjustable dash attachment by which the lamp can be applied to any shaped leather wagon dash, and to any part thereof.
- No. 1 D. Adjustable bracket attachment used in place of the dash clamp, by which the lamp can be applied to a wooden wagon, dash, pillar, or bow of a top vehicle, side of a house, &c.
- No. 2. Universal reflecting lamp, for night fishing and hunting and general illuminating purposes; combines head jack, boat jack, fishing lamp, camp lamp, dash lamp, belt lamp, and hand lantern, with cap or cover for obscuring the light when necessary; burns signal oil.
- No. 2 A. Socket attachment for adjusting the lamp to a stick or pole in the bow of a boat or canoe.
- No. 2 B. Fishing reflector for night fishing, and for reading and writing at night when in camp; is adjusted to the face of the lamp by the hinge pin, the cap or cover being first removed.
- No. 2 C. Head attachment for adjusting the lamp to the front of the head—worn over the hat.
- No. 2 D. Head attachment, for adjusting the lamp to the top of the head—worn over the hat.
- No. 2 E. Adjustable dash attachment by which the lamp can be applied to any shaped leather wagon dash, and to any part thereof.
- No. 2 F. Adjustable bracket attachment, used in place of the dash clamp, by which the lamp can be applied to a wooden wagon dash, pillar, or bow of a top vehicle, side of a house, &c. By means of the folding handles at the back, this lamp can be used as a hand lantern, and by means of the loop as catch, above the handles, the lamp can be hung in any desired position.

Prices: Excelsior jack lamp, including reflector and attachments, \$7.75; universal lamp, with reflector and attachments, \$10.25.

**MAJOR T. B. FERGUSON, Assistant United States Fish Commissioner, Washington, District of Columbia:**

Various kinds of apparatus used in hatching heavy eggs; also transportation case for young fish. (35.)

**J. WALKER FEWKES**, Museum of Comparative Zoology, Cambridge, Massachusetts:

Publications on marine invertebrates. (60.)

**FOREST AND STREAM PUBLISHING COMPANY**, 39 and 41 Park Row, New York City:

A series of nineteen bound volumes of the weekly paper Forest and Stream and Rod and Gun. (60.)

**AL. FOSTER**, New York City:

Placards advertising fishing excursions in the vicinity of New York. (3.)

**MRS. CAPT. J. H. FREEMAN**, Wellfleet, Massachusetts:

Crayon sketch of Mackerel. (51.)

Oil painting of Salmon Trout. (51.)

**FULTON MARKET FISH-MONGERS' ASSOCIATION**, New York City:

Portraits of its members. (57.)

**MRS. E. A. GANNETT**, Edgartown, Massachusetts:

Log-book. (6.)

**JOHN D. S. GILES**, Brig "George and Mary":

Dried potato carried in pocket during a sixteen months' voyage in Hudson Bay. (21.)

**GLOUCESTER ISINGLASS & GLUE COMPANY**, Gloucester, Massachusetts:

Exhibit of Liquid Isinglass for adhesive paper, labels, and envelopes; Isinglass for court plasters; Pure Fish Glues (hard and liquid, free from salt), for leather belting, roll cots, and card felting, &c. (29.)

*Extracts from the Catalogue prepared by the Company.*

- No. 1. Sample of the stock that is selected for making glue just as it comes from the salt fish. The Cod and Cusk skins are preferred to any others as they contain a larger percentage of glue or isinglass. Last year there were about 1,500 tons of this kind of stock used in Gloucester for glue and isinglass, at a value of \$15 per ton.
- No. 2. Sample of Cod skins, after being cleaned and the salt removed, ready to be made into isinglass or liquid glue.
- No. 3. Sample of Cusk skins, after being cleaned and the salt removed, ready to be made into glue.
- No. 4. Sample of Hake skins, after the salt has been removed and cleaned. The percentage of glue is small in these skins. See samples of liquid and dry.
- No. 5. Sample of Haddock skins prepared for glue. The percentage is small. See sample of liquid and dry.
- No. 6. Sample of Pollock skins, after being cleaned and salt removed. The percentage is small. See sample.

**GLOUCESTER ISINGLASS & GLUE COMPANY, Gloucester, Massachusetts:****Exhibit of Liquid Isinglass, etc.—Continued.**

- No. 7. Show case or frame, with rolls of colored isinglass made from the skins of Cod and Cusk.
- Nos. 8 and 9. Samples of Cod and Cusk isinglass made from the skins. It is used in very large quantities in the United States for the manufacture of court-plaster. We are supplying all the manufacturers, and they produce no less than \$50,000 worth of goods a year.
- No. 10. Samples of dry fish glue made from Haddock, Hake, and Pollock skins.
- No. 11. Samples of liquid isinglass or glue used for gummed paper labels and envelopes, from Cod skins.
- No. 12. Sample of liquid isinglass, for the same use, made from Cusk skins.
- No. 13. Sample of liquid isinglass made from Hake skins.
- No. 14. Sample of liquid isinglass made from Haddock skins.
- No. 15. Sample of liquid isinglass made from Pollock skins.
- No. 16. Sample of our mucilage made from fish skins, for office and express uses.
- No. 17. Sample book of gummed paper from the Dennison Manufacturing Company of Boston, Massachusetts, U. S. A. This was gummed with liquid isinglass. 10,000 reams of paper were used in the United States last year. The isinglass and labor on same would amount to \$25,000, and the paper would cost as much more. After this it goes to the printer and is worked up into all kinds of labels, &c. E. W. Dennison, president Dennison Manufacturing Company, No. 19 Milk street, Boston, says: "We have used the liquid glue manufactured by the Gloucester Isinglass and Glue Company for the past six or seven years, and have found it constantly improving. We do not know of any substitute equal to it."
- No. 18. Sample of scrap book wherein our liquid isinglass is used, from D. Slote & Co., of New York. They say: "Gentlemen: We take pleasure in bearing testimony to the excellent quality of the liquid isinglass manufactured by you under John S. Rogers' Patent Process. We have used it extensively and find it a very superior article.—Daniel Slote & Co., Blank Book Manufacturers, William street, New York."
- No. 19. Sample of leather belting wherein our dry isinglass or glue is used. Messrs. I. B. Williams & Son, of Dover, New Hampshire, say: "We have used your isinglass in cement for our leather belting for the last five or six years, and find it superior to anything we ever used."
- No. 20. Sample of sheet glue dried in pans, used in the manufacture of leather belting.
- No. 21. Samples of card belting from parties that use our liquid isinglass.
- No. 22. Sample of court-plaster from some of our customers. Dr. C. B. Robbins, of Worcester, Massachusetts, U. S. A., says: "We have used your isinglass, dry and liquid, for nearly seven years, and it is the best manufactured isinglass with which we are acquainted. It is satisfactory in every respect." A. S. Knights & Co., Boston, Massachusetts, U. S. A., say: "Having used your isinglass in the manufacture of our goods for the past six years, we consider it

**GLOUCESTER ISINGLASS & GLUE COMPANY, Gloucester, Massachusetts :****Exhibit of Liquid Isinglass, etc.—Continued.**

superior to anything in the market." M. S. Carpenter, M. D., of Mansfield, Massachusetts, says: "I think the isinglass manufactured by your company is the best made in this country. I shall continue to use it as long as it is kept up to its present high standard of excellence."

No. 23. Sample of Spurr's paper veneer put on wood with our liquid glue; also samples of same from Chas. W. Spurr, of Boston, Massachusetts.

No. 24. Sample of box work where our glue is used for putting on velvet and plush, from Geo. W. Brooks, Boston, Massachusetts.

No. 25. Cod and Cusk skins made into leather.

No. 26. Pair of shoes (Newport ties) made from Cusk skins.

No. 27. Samples of George's Hake sounds from which fibrous isinglass is made. They will make liquid isinglass, but it would come very expensive. This quality of sounds are worth 75 cents per pound dry.

No. 28. Sample of Cod sounds that are used for fibrous isinglass. Liquid isinglass can be made from them. This quality of sounds are worth 17 cents per pound, dry.

No. 29. Sample of fish glue made from fresh fish heads; is not as strong as glue made from the skins.

No. 30. Sample of our liquid glue in bottles, from fish skins, for household use.

No. 31. Sample of our goods put up in boxes for the trade.

No. 32. Sample of our mechanics' liquid glue for all kinds of wood work, boots and shoes, paper boxes, &c., in cans.

No. 33. Guano manufactured by this company from salt fish and bones, waste that has been removed from the fish, in preparing boneless fish for the market. Last year there were 3,000 tons of this waste; it had a market value of \$12 per ton. According to an analysis by S. P. Sharples, United States assayer, this guano contains:

|                              | Per cent. |
|------------------------------|-----------|
| Phosphoric acid.....         | 9.67      |
| Equal to bone phosphate..... | 21.10     |
| Nitrogen.....                | 8.45      |
| Equal to ammonia.....        | 10.26     |
| Moisture.....                | 5.30      |

No. 34. Guano from the fish skins, Cod and Cusk, after the glue has been removed. According to an analysis by S. P. Sharples, United States assayer, this guano contains:

|                              | Per cent. |
|------------------------------|-----------|
| Phosphoric acid.....         | 9.38      |
| Equal to bone phosphate..... | 20.47     |
| Nitrogen.....                | 8.12      |
| Equal to ammonia.....        | 9.86      |
| Moisture.....                | 5.23      |

No. 35. Guano from Pollock skins and scales, after the glue has been removed. According to an analysis by S. P. Sharples, United States assayer, this guano contains:

|                              | Per cent. |
|------------------------------|-----------|
| Phosphoric acid.....         | 15.82     |
| Equal to bone phosphate..... | 34.53     |
| Nitrogen.....                | 8.65      |
| Equal to ammonia.....        | 10.50     |
| Moisture.....                | 6.29      |

**GLOUCESTER ISINGLASS & GLUE COMPANY, Gloucester, Massachusetts:**

## Exhibit of Liquid Isinglass, etc.—Continued.

No. 36. Guano from Halibut heads, after the oil has been removed. According to an analysis by S. P. Sharples, United States assayer, this guano contains:

|                              | Per cent. |
|------------------------------|-----------|
| Phosphoric acid.....         | 12.89     |
| Equal to bone phosphate..... | 27.14     |
| Nitrogen.....                | 5.29      |
| Equal to ammonia.....        | 6.42      |
| Moisture.....                | 5.11      |

No. 37. Guano from fresh fish heads after the glue has been removed. According to an analysis by S. P. Sharples, United States assayer, this guano contains:

|                              | Per cent. |
|------------------------------|-----------|
| Phosphoric acid.....         | 20.22     |
| Equal to bone phosphate..... | 44.14     |
| Nitrogen.....                | 6.52      |
| Equal to ammonia.....        | 7.91      |
| Moisture.....                | 3.48      |

No. 38. Fishes eye-balls after the heads have been boiled.

No. 39. Sample of frozen fish glue.

“The utilizing of fish waste or skins was first discovered by the patentee, John S. Rogers, of Gloucester, Massachusetts, U. S. A., in the fall of 1873. Having tried a number of loads for fertilizing purposes, he found that it was very hard material to make into a fertilizer, as it was very highly salted, and the skins would not work up nor the bones dissolve. The Gloucester Isinglass and Glue Company have a process for making all the bone and skin into guano, that has a market value of \$30 per ton. Having noticed a gummy or sticky substance in handling what skins he tried for fertilizing purposes, Mr. Rogers was led to think that isinglass or glue could be made from them, and offered some of the fish merchants five cents per barrel to keep the skins by themselves. From these skins he experimented and finally made samples of glue from fish skins, such as are shown at this exhibition, only on a very small scale. At this time parties in the boneless fish business did not know what to do with their fish waste and skins taken from the fish in preparing their goods for market, and would pay from 25 to 50 cents per ton to have them removed from their buildings. Now they very often see what they can get for their skins before they make a price for the fish in filling orders. The preceding descriptive account of the different articles exhibited by the Gloucester Isinglass and Glue Company shows the results obtained by the process, starting from the raw material.”—*(John S. Rogers.)*

**MONROE A. GREEN, Mumford, Monroe County, New York:**

Samples of barbless hooks, made by Mr. Green for Trout and Bass fishing. (18.)

Box for the transportation of fish ova. (35.)

**SETH GREEN, Rochester, New York:**

Hybrid between California Salmon and Brook Trout; hybrid between Salmon Trout and Brook Trout. (36.)

Floating box for use in open stream. (35.)



**OSCAR HARGER**, Peabody Museum, Yale College, New Haven, Connecticut:  
Publications upon Isopod Crustaceans. (60.)

**HAVEN, WILLIAMS & CO.**, New London, Connecticut:  
Whale oils. (29.)

**WILLIAM P. HAYWOOD**, West Creek, Ocean County, New Jersey:  
Model of Oyster Tongs. (2.)

**J. E. HENDLEY**, United States National Museum, Washington, District of Columbia:

Plaster cast of negro fisherman. (21.) (The lay figures in the collective exhibit of the United States, with the exception of the whalemens, were made by Mr. Hendley.)

**HIGGINS & GIFFORD**, Gloucester, Massachusetts:

Higgins & Gifford's life-saving surf-boat (full size and model). (9.)  
Model of fish wharf. (7.)

**J. E. HILGARD**, Superintendent United States Coast and Geodetic Survey:  
Ocean salinometer and optical densimeter. (40.)

**L. S. HILL & CO.**, Grand Rapids, Michigan:

Frame containing samples of Hill's Spoon Baits. (14-16.)  
Frame containing an illustrated card of Hill's Baits with commendations, &c. (14-16.)

**HINE & CO.**, 13 and 15 Doyers street, New York City:

Cooked preparations in cans. (26.)  
Terrapin Soup, in cans.  
Green Turtle Soup, in cans.  
Terrapin stew, in cans.

**WAKEMAN HOLBERTON**, 65 Fulton street, New York City:

Full-length Holberton Fly Books.

No.  $\frac{2}{3}$ . Finest Alligator-skin cover, capacity 6 dozen Trout Flies. (15.)

No.  $\frac{0}{7}$ . Russia cover, capacity 3 dozen Salmon or Bass Flies. (14.)

No. 1. Russia cover, capacity 1 gross Trout Flies. (15.)

No. 2. Russia cover, capacity 8 dozen Trout Flies. (15.)

No. 3. Leather cover, capacity 6 dozen Trout Flies. (15.)

No. 4. Leather cover, capacity 3 dozen Trout Flies. (15.)

No. 5. Muslin cover, capacity 3 dozen Trout Flies. (15.)

"ADVANTAGES CLAIMED FOR THESE BOOKS.—Flies are kept separate, straight, and at full length, so that the angler, when fishing, can attach them at once to the leader. No woolen leaves to attract moths. The finer qualities have a heavy blotting-paper leaf for drying the flies, and all have pockets between each leaf. These

**WAKEMAN HOLBERTON, 65 Fulton street, New York City :****Full-length Holberton Fly Books—Continued..**

books have a greater capacity and are much less bulky than the old ones. The clips are of spring brass and silver plated, and will not tear out or come loose with ordinary use. These books were invented by W. Holberton, and are now universally used, and have been copied by all dealers.”—(*Holberton.*)

**FRANK HOLMES, Chagrin Falls, Ohio :****Stranahan folding canvas boat, length 10 feet. (20.)**

“These boats are a combination of lightness, strength, and durability, such woods being selected as give these qualities in the highest degree, and all made upon honor from first to last. The water-proof gum which we use renders the duck water-tight and water-proof, and at the same time preserves the strength of the fiber and protects the cloth from mildew and mold, being of uniform pliability in both intense hot and cold weather. The canvas is heavier and stronger than that used by other firms, the best quality always being used. Each boat has an adjustable stretcher attached to the stern, which provides for stretching the cloth as taut as a drum-head. The real capacity of the boats is greater than given in the table, but they will carry the weights given with perfect ease. We keep a stock of each size constantly on hand, and will make special sizes at reasonable rates. The ten-foot boat has eleven ribs; the twelve-foot, fifteen; the fifteen foot, nineteen. This brings the ribs so close together that (combined with the bilge or stiffening slats which are placed at equal distances between the gunwales and bottom) all bagging of the cover is obviated. The bow and stern pieces, gunwales, bilge slats, and ribs are made of second-growth red elm, the bottom strips, stools, oars, and paddles are of second-growth linden (basswood). The gunwales are  $1\frac{7}{8}$  inches wide by  $\frac{1}{4}$  inch thick, the ribs and side slats  $1\frac{1}{2} \times \frac{1}{4}$  inches; bottom slats  $1 \times \frac{5}{8}$  inch. The frame has three strips the size of the ribs, running lengthwise of the bottom, outside of the ribs, being fastened together with wrought nails firmly clinched. The frame is cut in the center at the two ribs nearest together, as shown in the cut, the pieces cut alternating on each rib, and fastening at each gunwale and at two points on the bottom, with wrought-iron latches fastened with thumb-screws. We also make them in three sections, at an additional cost of \$3. The canvas is secured to the frame by leather straps buttoned to the inside of the gunwales over round-headed screws. The frames are neatly painted and trimmed, each strip primed before they are put together, making every part impervious to the water. The oars and paddles are copper-tipped and finished with varnish. In shipping, the canvas is entirely removed, folded compactly, and secured to the inside of the frame with the stools and oars, making one complete package, so that nothing can be misplaced or lost, and no danger or damage to canvas. We claim the following advantages for our boat: It is the lightest complete boat made of its size, length and breadth considered. The duck is made in one piece, and, therefore, the only seams below water-line are those at the ends, which are as strong as any other part of the cloth. It will stand as heavy a sea as any wooden boat of the same size. They are pointed at

**FRANK HOLMES, Chagrin Falls, Ohio :****Stranham folding canvas boat—Continued.**

both ends, and straight and flat on the bottom. There are two sets of row-locks in each boat, one to use when one or three persons are using it, the other when there are two, thus maintaining a "trim" position in the water. The construction of the boat is such that the cloth is kept out to its place and a good shape maintained, which cannot be done with the majority of canvas boats. They being flat on the bottom makes them very steady for shooting or casting while standing, a very desirable point, as every practical sportsman knows. They also make a desirable family pleasure boat, and a sail can be attached if desired. The boat can be folded and made ready for transportation in a few minutes, and unfolded and put together, ready for use, in the same length of time, no tools being required. Any of the modern rowing gears can be applied and used. Prices given in the table are for boats with oars and stools. We can give no discount on these prices, as we are selling very low and do not sell through agents, preferring to give the purchaser the benefit of the agent's usual commission. We will make a reduction of \$2 for a paddle in place of a pair of oars. Paddles furnished with boats if desired at 75 cents apiece extra. We also furnish shoulder straps for carrying the boat when desired. By means of these straps one man can carry the boat, when folded, almost any distance with perfect ease, both hands being free. Price of straps and fixtures \$1 extra. These boats when folded occupy one-half their size in length, being in two sections, the full width being maintained. The three sections when folded occupy one-third their size in length, the full width being maintained. We manufacture three sizes, of the following dimensions and weights, with oars and stools:

10-foot boat, price \$20; width at bottom, 18 inches; capacity, 400 pounds; width at top, 32 inches; oars, one pair; depth at center, 11 inches; number stools, two; depth at ends, 15 inches; 6-foot oars; weight, 35 pounds.

12-foot boat, price \$25; width at bottom, 26 inches; capacity, 600 pounds; width at top, 38 inches; oars, one pair; depth at center, 13 inches; number stools, three; depth at ends, 17 inches; 6½-foot oars; weight, 50 pounds.

15-foot boat, price \$35; width at bottom, 28 inches; capacity, 800 pounds; width at top, 40 inches; oars, two pairs; depth at center, 14 inches; number stools, four; depth at ends, 18 inches; 6½-foot oars; weight, 65 pounds.

For boat in three sections add \$3 to price.—(Holmes.)

**MARSHALL H. HOLMES, 226 N. Fourth street, Philadelphia, Pennsylvania :****Holmes's Life-Preserving Mattress and Berth. (9.)**

"A Life Preserving Mattress inclosed in a berth, which is movable, and answers the four functions of a bed, boat, life-preserver, and, when a number of them are lashed together, they make a very formidable raft. Each berth is supplied with an extra cord or line, to be thrown to any one in distress, or to lash the berths together when forming a raft, and each berth has a pair of oars for the purpose of propelling the same. In case of an accident the

**MARSHALL H. HOLMES, 226 N. Fourth street, Philadelphia, Pennsylvania :****Holmes' Life-Preserving Mattress and Berth—Continued.**

berth is drawn out with its contents and dropped or lowered overboard. The buoyancy is very great. The mattress, containing solid cork and cork shavings, will support the largest person in the water. There is also a central hole in the center of the mattress, through which the occupant can go and seat himself or herself on a saddle underneath, which throws all the upper part of the body out of the water and gives the person the free use of the oars, which are chained fast to the berth. The whole device weighs from 32 to 35 pounds; is the full size of a berth, and it slides on cleats in the stateroom the same as a drawer. This invention has been adopted as a life-preserver by the United States Board of Supervising Inspectors of Steamboats, and resolutions been adopted by the Boards of Trade and Chambers of Commerce and Maritime Exchanges of the principal cities of the United States, among which are New York, Boston, Philadelphia, Chicago, Saint Paul, Cincinnati, Saint Louis, and Detroit, and has the hearty endorsement of practical vessel-owners in all of these cities. The present address of the inventor, M. H. Holmes, is 226 N. Fourth street, Philadelphia, Pennsylvania, United States.—(*Holmes.*)

**WILLIAM J. HOOPER SONS (Baltimore Twine and Net Company), Baltimore, Maryland :**

Exhibit of netting. (8.)

**W. T. HORNADAY, United States National Museum, Washington, District of Columbia :**

Specimens of Taxidermy. (53.)

Walrus Head.

Quinnat Salmon (in collective exhibit).

**WILLIAM HUME, Astoria, Oregon :**

Cooked preparation in cans. (26.)

Canned Salmon.

**ICHTHYOPHAGOUS CLUB, New York City :**

Collection of *menus* of annual dinners of the club. (57.)

**THOMAS A. IRVING, Provincetown, Massachusetts :**

Full-rigged model of three-masted cod-fishing schooner "Lizzie W. Matheson," of Provincetown, Massachusetts. (4.)

**PROF. DAVID S. JORDAN, Indiana University, Bloomington, Indiana :**

Works on Ichthyology. (60.)

**DANIEL KELLEHER, New Bedford, Massachusetts :**

An explosive hand-lance for killing whales. (1.)

**GEORGE KNOWLES, Provincetown, Massachusetts :**

Ear-bone of finback whale. (54.)

Banjo made by a negro whaler. (21.)

**JOHN P. KNOWLES, 2d, New Bedford, Massachusetts:**

Lower cutting-block showing the improved method of strapping with iron bands. (6.)

**THOMAS KNOWLES & CO., New Bedford, Massachusetts:**

Series of articles used in the whale-fishery. (1.)

**LAWRENCE & CO., New London, Connecticut:**

Implements used by whalers and sealers. (1.)

**WILLIAM LEWIS, New Bedford, Massachusetts:**

One whaling-gun and apparatus used in the whale-fishery. (1.)

**W. K. LEWIS & BROTHERS, Boston, Massachusetts:**

Cooked preparations in cans. (26.)

Canned fresh Lobsters, 1-pound and 2-pound cans.

Canned fresh Clams, 1-pound and 2-pound cans.

Canned fresh Mackerel, 1-pound and 2-pound cans.

Canned fish Chowder, 3-pound cans.

Canned clam Chowder, 3-pound cans.

Fishermen's food. (22.)

Canned roast Mutton, 2-pound cans.

Canned roast Beef, 2-pound cans.

Canned roast Turkey, 2-pound cans.

Canned roast Chicken, 2-pound cans.

**W. N. LOCKINGTON, Philadelphia, Pennsylvania:**

Publications on marine fishes and invertebrates. (60.)

**LOOMIS, PLUMB & CO., Syracuse, New York:**

Bronze Plate Automatic Reel, for 90 feet of line, No. 1. (14-16.)

Nickel Plate Automatic Reel, for 150 feet of line, No. 2. (14-16.)

**H. & G. W. LORD, Boston, Massachusetts:**

Exhibit of cotton netting used in the manufacture of seines, traps, dip-nets, &c. (8.)

**DAVID W. LOW, Gloucester, Massachusetts:**

Low's Improved Ice-Crusher. (34.)

**F. A. LUCAS, United States National Museum, Washington, District of Columbia:**

Exhibit of stuffed Turtles, &c. (52.)

Exhibit of stuffed Crabs and Lobsters.\* (51.)

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\* The stuffed Lobsters shown in the National Museum Exhibit were prepared by Mr. Lucas.

**JOHN McCULLOUGH, New Bedford, Massachusetts :**

Articles used in the whale-fishery. (1.)

**MARSHALL McDONALD, Washington, District of Columbia :**

Various kinds of apparatus used in hatching adhesive, floating, and heavy eggs ; also apparatus for the transportation of eggs and young fish. (35.)

Series of eggs and fry showing development and growth as follows :  
Brook Trout, Lake Trout, and White-fish. (36.)

Model of counter-current fish-way, the partitions being so arranged that the velocity of the current is retarded by the water being turned against itself. (37.)

Publications upon fish culture.

**H. D. McGOVERN, Brooklyn, New York :**

Stuffed trout, and *Belostoma* which killed it. (49.)

**McKESSON & ROBBINS, 91 Fulton Street, New York City :**

Collection of Florida Sponges. (43.)

Collection of cultivated Spouges. (36.)

**MACKEY & P. NDAR, New Bedford, Massachusetts :**

Apparatus used in the whale-fishery. (1.)

**McMENAMIN & CO., Hampton, Virginia :**

Cooked preparations in cans. (26.)

Fresh Deviled Crabs, No. 2. Cans.

Fresh Deviled Crabs, No. 1. Cans.

This is the meat of the crab carefully picked, seasoned, and packed in cans, as above. The carapace or top shell of the crab accompanies each case of cans—a case of shells to each case of cans. These are filled from the cans, baked in a quick oven until nicely browned, and eaten from the shell ; or the shells may be dispensed with, and the meat may be eaten from the can, or prepared into a variety of dishes.

Fresh Crab Meat, No. 2. Cans.

Fresh Crab Meat, No. 1. Cans.

Extra selected Oysters, Lion brand, No. 2. Cans.

Extra selected Oysters, Lion brand, No. 1. Cans.

Extra cove Oysters, Hampton Roads brand.

Cove Oysters, Hampton Roads brand, No. 2. Cans.

Cove Oysters, Hampton Roads brand, No. 1. Cans.

Lunch Oysters, in flat cans.

“We are the pioneers in the packing of canned crabs. So far as we are able to learn, the idea was first conceived and put into execution by ourselves. Other similar establishments started afterwards, but to-day we are the only packers of canned crabs in America.”  
(*McMenamin & Co.*)

**JOSEPH B. MACY, Nantucket, Massachusetts:**

- Sundry articles used in the whale-fishery, including harpoons used to kill the whale with prussic acid. (1.)

**H. J. MAHRENHOLZ, New York City:**

- Boots and shoes made of alligator leather. (32.)

**JOHN MANN & CO., Syracuse, New York:**

- Artificial trolling spoons. (14-16.)

**MANN BROS., Chicago, Illinois:**

- Packages for transporting oysters. (33.)

**C. B. MARCHANT, Edgartown, Massachusetts:**

- Series of lances cut from dead whales. (1.)

**HENRY MARSHALL, United States National Museum, Washington, District of Columbia.**

- Mounted group of aquatic birds. (53.)

**H. W. MASON, New Bedford, Massachusetts:**

- Explosive and non-explosive projectiles for killing whales. (1.)

**MASSACHUSETTS HUMANE SOCIETY:**

- Reports of the Massachusetts Humane Society. (9.)
- Medals for Life-Saving Service granted by the Massachusetts Humane Society. (9.)

**FRED. MATHER, New York City:**

- Conical apparatus used in hatching eggs of the shad; also boxes and cans for the transportation of fish and fish ova. (35.)
- Collection of fishes from the Adirondack region, with map showing distribution of species, and report. (51, 55.)

**HENRY MAYO & CO., Boston, Massachusetts:**

- Pickle or brine salted preparations. (26.)
  - Paragon Mess Mackerel, 5-pound cans.
  - Perfection Mess Mackerel, 5-pound cans.
  - Standard Mess Mackerel, 5-pound cans.
  - Breakfast Mess Mackerel, 5-pound cans.
  - Family Mess Mackerel, 5-pound cans.
- Preparations in spices, vinegar, &c. (26.)
  - Soused Mackerel, 1-pound, 2 pound, 3-pound, and 4-pound cans.
- Cooked preparations in cans. (26.)
  - Fresh Mackerel, 1-pound and 2-pound cans.
  - Fresh Mackerel in tomato sauce, 3-pound cans.
  - Fresh Mackerel in tomato sauce, 2-pound square cans.
  - Fresh Mackerel in mustard, 3-pound cans.

**HENRY MAYO & CO., Boston, Massachusetts :**

Pickle or brine salted preparations—Continued.

Fresh Mackerel in mustard, 2-pound square cans.

Fresh Salmon, 1-pound cans.

Fresh Lobsters, 1-pound cans.

Clam Chowder, 3-pound cans.

Fish Chowder, 3-pound cans.

Green Turtle soup.

Fresh Clams, 1-pound and 2-pound cans.

Codfish balls, 2-pound cans.

Fishermen's food in cans. (22.)

Baked Beans, Bean-pot brand.

Picnic Beans, Bean-pot brand.

Green Lima Beans, Bean-pot brand.

Green Lawnsdale Beans, Bean-pot brand.

Green Corn.

Green Peas.

Fresh Pumpkin.

Fresh Squash.

Fresh Tomato.

Fresh Succotash.

Roast Beef.

Roast Lamb.

Roast Turkey.

Roast Chicken.

Beef Soup.

Chicken Soup.

Macaroni Soup.

Mock turtle Soup.

Mutton Soup.

Ox-tail Soup.

Pea Soup.

Tomato Soup.

**GEORGE MERCHANT, Jr., Gloucester, Massachusetts :**

Model of Mackerel pocket. (1.)

Fishermen's games and puzzles. (21.)

**B. C. MILAM, Frankfort, Kentucky :**

Milam or Frankfort Fishing Reel. (14-16.)

“A combined multiplying and click reel used for either bait or fly fishing, and multiplies four times. The friction of the parts is so slight that a smart stroke of the handle causes it to make about fifty revolutions. For bait fishing the reel is used clear, with alarm and rubber both off, and, with a little practice, one can drop his bait at any desired spot within 50 or 60 yards with ease. For fly fishing the rubber or drag is put on, and if you desire a click also



**B. C. MILAM, Frankfort, Kentucky :****Milam or Frankfort Fishing Reel—Continued.**

the alarm or click is used. These improvements can be used separate or together as desired. We wish to call special attention to these important adjuncts, and have their use fully understood, for with their aid you can make a multiplying or click reel at pleasure, thus rendering the "Frankfort" doubly valuable. They are operated by sliding disks on side of reel, and do not in the least complicate its working. Made in brass and German silver in six sizes, costing from \$13 to \$26 each."—(*Milam.*)

**THE GEORGE W. MILES COMPANY, Milford, Connecticut :****Samples of Menhaden; Menhaden oil and guano. (29.)**

One Jar.—Containing 3 Menhaden.

Two Jars.—Containing Pure Menhaden Oil.

Jar No. 1.—George W. Miles' I. X. L. Ammoniated Bone Superphosphate, containing ammonia 3 to 5 per cent.; available phos. acid, 10 to 12 per cent.; potash, 2 to 4 per cent. ammonia, produced from fish.

Jar No. 2.—Miles' Patented Ammoniated Superphosphate, containing ammonia,  $2\frac{1}{2}$  to  $3\frac{1}{2}$  per cent.; available phos. acid, 8 to 10 per cent.; potash, 1 to 3 per cent. ammonia, produced from fish.

Jar No. 3.—George W. Miles' Patented Acid Fish No. 1, containing ammonia, 10 to 12 per cent.; available phos. acid, 4 to 6 per cent. This is fish fresh from the presses treated with acid.

Jar No. 4.—Miles' Patented Acid Fish No. 2, containing ammonia, 9 to 11 per cent.; available phos. acid, 4 to 6 per cent. This is fish after passing through a sweating process treated with acid.

Jar No. 5.—George W. Miles' Patented C. Island Guano, No. 1, containing ammonia, 10 to 12 per cent.; bone phosphate of lime, 14 to 17 per cent. This is fish fresh from the presses dried in steam dryers.

Jar No. 6.—Miles' C. Island Guano, No. 2, ammonia, 8 to 10 per cent.; bone phosphate of lime, 10 to 12 per cent. This is fish dried in steam dryers after passing through a sweating process.

Jar No. 7.—Pure Dried Fish, No. 1, containing ammonia, 10 to 12 per cent.; bone phosphate of lime, 9 per cent. This is fish fresh from the presses dried on platforms and ground.

Jar No. 8.—Pure Dried Fish, No. 2, containing ammonia, 10 to 12 per cent.; bone phosphate of lime, 9 per cent. This is fish fresh from the presses dried on platforms, unground.

Jar No. 9.—Miles' Ammoniated Dissolved Bone; ammonia, 2 to 3 per cent.; 7 to 9 per cent. phos. acid; ammonia, from fish.

Jar No. 10.—Miles' Dissolved Black, containing 36 per cent. bone phos. of lime; burnt bone dissolved in acid.

Jar No. 11.—Miles' Acid Phosphate, containing 25 per cent. bone phos. of lime.

Jar No. 12.—George W. Miles' Ammoniated Acid Phosphate, containing 3 per cent. of ammonia; 22 per cent. bone phos. of lime; ammonia produced from fish.

Jar No. 13.—Pure Rock Phosphate, 60 per cent. bone phos. of lime.

Jar No. 16.—Miles' Fish and Potash, No. 1; ammonia, 4 to 6 per cent.; available phos. acid, 5 to 8 per cent.; potash, 4 to 6 per cent.

Jar No. 17.—Miles' Fish and Potash, No. 2; ammonia, 3 to 5 per cent.; available phos. acid, 5 to 8 per cent.; potash, 4 to 6 per cent.

**THE MILLER BERTH AND LIFE-SAVING MATTRESS COMPANY,**

Boston, Massachusetts. Capt. Benj. F. Flinn, Agent:

Life-Saving Mattress. (9.) (Patented December, 1880.)

“A life-preserving arrangement, which consists of an ordinary mattress, surrounded upon all its sides with a flexible rubber tube, divided into compartments, filled with compressed air and cork. Although the weight of the mattress is only fifteen to twenty pounds, it has a buoyancy upon the water capable of sustaining six or seven hundred pounds, and in case of shipwreck or disaster the passenger can, instead of being obliged to hunt around for a life-preserver, take up his bed and walk, with the confidence that he has a better means of saving his life than from any device hitherto invented for enabling shipwrecked persons to reach the land in safety. In case of the shipwreck of a large vessel, a number of these mattresses can be combined into rafts of any desirable size, by using the “lashings” with which they are provided, so as to make them capable of landing one hundred or more passengers at a time through breakers and over the roughest seas in the most tempestuous weather.”—*Captain Flinn.*

**WILLIAM MILLS & SON, 7 Warren street, New York City:**

- Salmon rod : Leonard's Split Bamboo, 16 feet, 32 ounces. (14.)  
 Salmon rod : Leonard's Split Bamboo, 15½ feet, 26 ounces. (14.)  
 Bass bait rod : Leonard's Split Bamboo, 10¾ feet, 15¾ ounces. (16.)  
 Bass bait rod : Leonard's Split Bamboo, 8¼ feet, 9¾ ounces. (16.)  
 Trout fly rod : Leonard's Split Bamboo, 11½ feet, 8¾ ounces. (15.)  
 Trout fly rod : Leonard's Split Bamboo, 10½ feet, 8½ ounces. (15.)  
 Catskill rod : Leonard's Split Bamboo, 10 feet, 4¾ ounces. (14-16.)  
 Trunk fly rod : Leonard's Split Bamboo, 11 feet, 10¼ ounces. (14-16.)  
 Combination rod : Leonard's Split Bamboo. (14-16.)  
 Salmon reels : Leonard's patent. (14.)  
 Trout reels : Leonard's patent. (15.)  
 Salmon reels. (William Mills & Son's new patent.) (14.)  
 Trout reels. (William Mills & Son's new patent.) (15.)  
 Multiplying reels : (B. H.) adjustable click, three sizes, 2, 3, and 4,  
 in rubber and German silver. (14-16.)  
 Braided linen lines. (B, C, D, E, F, G.)  
 Salmon lines: standard tapered silk (B and C), 120 yards each. (14.)  
 Fly lines: standard level silk (E, F, and G), 100 yards each. (14-16.)  
 Braid-silk lines : standard (C, D, E, F, G, and H), 50 yards each.  
 (14-16.)  
 Fly lines : standard tapered silk (F), each 30 and 50 yards. (14-16.)  
 Fly lines : standard tapered (E), each 25 and 40 yards. (14-16.)  
 Leaders : single, double, and twisted, Nos. 1 to 8 ; lengths, 3 feet,  
 6 feet, and 9 feet. (14-16.)  
 Flexible Minnows : Nos. 2, 3, 4, 5, 6, 7, 8. (14-16.)  
 Caledonian Minnows : Nos. 3, 4, 5, 6, 7, 8, 9, 10. (14-16.)  
 Phantom Minnows : Nos. 5, 6, 7, 8. (14-16.)

**WILLIAM MILLS & SON, 7 Warren street, New York City :**

Protean Minnows : Nos. 4, 5, 6. (14-16.)  
 Artificial Dobson : large and small. (14-16.)  
 Artificial Frogs : large and small. (14-16.)  
 Artificial Crawfish, Grasshopper, Cricket, and May-fly. (14-16.)  
 Lone Star Baits. (14-16.)  
 Eclipse Baits. (14-16.)  
 Bates' Patent Spinner. (14-16.)  
 Minnow Gangs : five styles. (14-16.)  
 Leonard Click Reel. (14-16.)  
 Billingham Reel. (14-16.)  
 Bass and Trout Hooks.  
 Virginia Hooks.  
 Blackfish Hooks.  
 Tapered-point Blackfish Hooks.  
 Aberdeen Hooks.  
 Sneek Hooks.  
 Sproat Hooks.  
 Chestertown Hooks.  
 Central Draught Hooks.  
 Bright Treble Hooks.  
 Spring Shank Treble Hooks.

**WILLIAM MITCHELL, 26 Vandam street, New York City :**

Salmon rods ; five varieties. (14.)  
 Trout rods ; twelve varieties. (15.)  
 Bass rods ; five varieties. (16.)  
 Salmon reel ; one sample. (14.)  
 Trout reel ; one sample. (15.)  
 Bass reels ; two samples. (16.)

## TROUT FLY RODS.

|             | Length.          | Weight.         | Reel and line.  | Leverage.      |
|-------------|------------------|-----------------|-----------------|----------------|
|             | <i>Feet.</i>     | <i>Ounces.</i>  | <i>Ounces.</i>  | <i>Ounces.</i> |
| No. 1 ..... | 12               | 9 $\frac{1}{2}$ | 6 $\frac{1}{2}$ | 30             |
| No. 2 ..... | 11 $\frac{1}{2}$ | 7 $\frac{1}{2}$ | 5               | 26             |
| No. 3 ..... | 11               | 6 $\frac{1}{2}$ | 4 $\frac{3}{4}$ | 22             |
| No. 4 ..... | 10               | 4 $\frac{1}{2}$ | 3 $\frac{1}{2}$ | 16             |
| No. 5 ..... | 9 $\frac{1}{2}$  | 4               | 3 $\frac{1}{2}$ | 13             |

## SALMON RODS.

| Length.                    | Weight.        | Reel and line.   | Leverage.      |
|----------------------------|----------------|------------------|----------------|
|                            | <i>Ounces.</i> | <i>Ounces.</i>   | <i>Ounces.</i> |
| 14 feet.....               | 17             | 19 $\frac{1}{2}$ | 20             |
| 16 feet.....               | 26             | 22               | 47             |
| 16 $\frac{1}{2}$ feet..... | 28             | 22               | 50             |
| 17 feet.....               | 30             | 22               | 64             |
| 18 feet.....               | 35             | 22               | 74             |

**WILLIAM MITCHELL, 26 Vandam street, New York City :**

*Split bamboo rods of the same class average from 1 to 3 ounces heavier.* [See "Henshall's Book of the Black Bass," or "Forest and Stream," January 2, 1879.]

"The average leverage, holding the rods at an angle of 30° from the horizontal, is fairly two-thirds of the foregoing. Rod No. 1 is a standard black bass rod. Upon a No. 2 was caught and killed, without gaff or net, a salmon which weighed 33 pounds. No. 3 is the "standard" trout rod at present in this part of the country. A "standard" rod of 1843, made for Daniel Webster (sent in for repair), has also been tested: Length, 12 feet; weight, 17½ ounces; weight of reel and line, 7 ounces; leverage, 5 pounds. As the reel is above the hand, this rod of 1843 is not so strong, nor will it stand work, nor can it cast as far as the 11-foot standard of to-day. A 10 ounce rod is now almost as obsolete as that one of 1843.

A fly rod of 11 feet in length, weighing 6½ ounces, having on it a No. 4 reel and line weighing 4¾ ounces (grip above reel, of course), the leverage is 22 ounces, that is, if the rod be held level; upright, of course, there is no leverage; if the rod were held most of the time at an angle of 45°, the average power exerted would be 11 ounces; but the rod is held lower, nearer 30°, and it is safe to say that, on such a light rod, a power of over more than one pound and a half is constantly straining on the muscles.

The principles of a good fly rod have been reduced to axioms by William Mitchell, of New York, who is the father of the American fly-rod manufacture. His axioms are:

1. The less number of pieces in which a rod is made, the more perfect will be its action, and the less its liability to get out of order.
2. The more homogeneous the materials of which the rod is made, if it have sufficient elasticity and strength, the longer will it stand the necessary strain without injury.
3. The more impervious to the action of water, dampness, or change of atmosphere, the longer will the rod retain its elasticity and perfect action.
4. All weight in wood or metal in a rod, above the grip, which does not strengthen the rod, weakens it, and, with all weight added below the grip, to balance the rod, is so much useless weight.
5. When, in any given rod, under the necessary strain, any part does not bend, that part does not bear its proportion of the strain, and the latter is transferred to the next adjacent weaker part (which is the spot where the rod will break, if at all); so that an absolutely perfect rod should be springy from tip to heel-plate of butt.
6. The rod possessing sufficient elasticity and strength, with lightness, and which is the least liable to get out of order from any cause, and which, when broken, is the easiest to repair (right on the stream), is the nearest to perfection that a rod can be made.

The "MITCHELL FLY ROD," with *patent* handpiece, is the only fly rod having perfect spring from tip to heel-plate, and is the lightest and strongest fly rod made.

The original and only maker of the celebrated McGinnis black bass rod."

**MUSEUM OF COMPARATIVE ZOOLOGY, Cambridge, Massachusetts :**

Publications upon ichthyology and marine invertebrates. (60.)

**CHRESTEN NELSEN, Gloucester, Massachusetts :**

Patent preservative for canvas, manila rope, and netting. (5.)

Specimens of canvas, rope, and netting, preserved with the fluid. (5.)

**NEW BEDFORD CORDAGE COMPANY, J. W. Macomber, agent, New Bedford, Massachusetts:**

Samples of whale-line and lance-warp used in the capture of the whale (1); and of guy-rope and cutting falls used in cutting in the whale. (1.)

**NICKERSON & BAXTER, Boston, Massachusetts. Agents for J. W. Court & Co.:**

Samples of fish-hooks used in sea fisheries, manufactured by J. W. Court & Co., Brooklyn, New York. (1.)

These hooks are mostly used in the Cod, Haddock, Hake, Halibut, and Mackerel fisheries, though the latter fishing is now conducted almost entirely with the purse seine. The central draught hooks are the latest pattern, and are usually given the preference over the straight shank hook. No. 10 central draught and No. 6281 straight shank are used for large Codfish in hand-line fishing, and Nos. 11, 12, and 13, and 6282-3-4 for smaller fish. No. 14 is a Grand Bank trawl hook, and 15, 16, and 17 are for Haddock trawls.

**B. F. NICHOLS, Boston, Massachusetts:**

Hexagonal split bamboo fishing rods. (14-16.)

FLY RODS.

- No. 1. 10 feet long, 3 pieces, weight 7 ounces, 2 tips, Bamboo tip case, sack and wood shipping case.
- No. 2. 11 feet long, 3 pieces, weight 8 ounces, 2 tips, Bamboo tip case, sack and wood shipping case.
- No. 3. 11½ feet long, 3 pieces, weight 9 ounces, 2 tips, Bamboo tip case, sack and wood shipping case.
- No. 4. 11½ feet long, 3 pieces, weight 10 ounces, 2 tips, Bamboo tip case, sack and wood shipping case.
- No. 5. 12 feet long, 3 pieces, weight 10½ ounces, 2 tips, Bamboo tip case, sack and wood shipping case.
- No. 6. 12 feet long, 3 pieces, weight 12½ ounces, 2 tips, Bamboo tip case, sack and wood shipping case.
- No. 7. GENERAL ROD. 11½ feet long, with Fly Tip, weight 10½ ounces; and 9½ feet long, weight 9½ ounces, with short tip (2 feet long), for Bait Fishing or Trolling.

This is a very handy rod, is suitable for Bass or Trout, with the fly tips (of which there are two), and Bait Fishing or Trolling, with the short tip; making the rod in 3 pieces, Bamboo tip case, sack and wood shipping case.

BLACK BASS RODS.

- No. 8. 10 feet long, 3 pieces, weight 9½ ounces, ring guides, reel-seat below grasp, 2 tips, Bamboo tip case, sack and wood shipping case.
- No. 9. 10 feet long, 3 pieces, weight 10 ounces, standing guides, reel-seat above grasp, 2 tips, Bamboo tip case, sack and wood shipping case.
- No. 10. 8½ feet long, 2 pieces, weight 9½ ounces, standing guides, reel-seat above grasp, 2 tips, grooved wood case, sack and wood shipping case.

**B. F. NICHOLS, Boston, Massachusetts :****Hexagonal split bamboo fishing rods—Continued.****STRIPED BASS RODS.**

- 1 rod, 8 feet long, 2 pieces, weight 19 ounces.
- 1 rod, 8½ feet long, 2 pieces, weight 20 ounces.
- 1 rod, 9 feet long, 2 pieces, weight 25 ounces.
- 1 rod, 8 feet long, 3 pieces, weight 20 ounces.
- 1 rod, 8½ feet long, 3 pieces, weight 22 ounces.
- 1 rod, 9 feet long, 3 pieces, weight 25 ounces.

**SALMON RODS.**

- 1 rod 16 feet long, 3 pieces, weight 26 ounces.
- 1 rod 16½ feet long, 3 pieces, weight 27 ounces.
- 1 rod 17 feet long, 3 pieces, weight 28 ounces.
- 1 rod 17½ feet long, 3 pieces, weight 30 ounces.
- 1 rod 18 feet long, 3 pieces, weight 32 ounces.

**GRILSE RODS.**

- 1 rod 14 feet long, weight 22 ounces.
- 1 rod 14½ feet long, weight 23 ounces.
- 1 rod 15 feet long, weight 24 ounces.

All rods have full German silver reel-plate and mountings, and grooved cases covered with cloth and cloth sacks. All above rods have two duplicate tips.

**CALEDONIA FLY RODS.**

- No. 1. 9 feet 4 inches long, weight 5½ ounces, 3 pieces, 2 tips.
  - No. 2. 9 feet 8 inches long, weight 6 ounces, 3 pieces, 2 tips.
- Full German silver mountings, grooved cases, etc.

**THE TOURIST COMBINATION ROD.**

12 feet long, in 4 pieces, weight 13 ounces, with extra butt-joint, and extra reversible grasp and reel-seat (to be used with reel above or below the hand), and extra short tip for trolling or bait fishing, and extra long butt-joint, to be used instead of first and second joint, making a 9 feet 7 ounce fly-rod, making in all 8 pieces, and four regular and perfect rods, all in a cloth-covered grooved case 3 feet 3 inches long, all weighing about 4 pounds when packed. It has full German silver mountings.

**JOHN W. NORTON, Edgartown, Massachusetts :**

Log-book. (6.)

**OLD COLONY MILLS, Plymouth, Massachusetts :**

Samples of Canvas used on fishing-vessels. (5.)

**OREGON PACKING COMPANY, J. W. and V. Cook, Proprietors, Portland, Oregon :**

Cooked Preparations in cans. (26.)

Canned Salmon. (One-half dozen cans.)

**JAMES C. OSBORNE, Edgartown, Massachusetts :**

Whaling harpoon. (1.)

**SAMUEL OSBORNE, Jr., & SONS, Edgartown, Massachusetts**

Implements used in the whale-fishery.

**N. A. OSGOOD, Battle Creek, Michigan :**

Portable Folding Canvas Boat. (20.)

Length, 12 feet; width, 3 feet; height, 1 foot.

Folding Minnow Crate. (33.)

**H. D. OSTERMOOR & SON, 36 Broadway, New York City :**

Life-saving Mattress. (9.)

**A. S. PACKARD, Jr., Providence, Rhode Island :**

Publications on aquatic invertebrates. (60.)

**THOMAS B. PADDOCK, Nantucket, Massachusetts :**

An implement used on Nantucket whaling vessels in 1775. (1.)

**E. W. PAGE, & CO., 69 West street, New York City :**

Exhibit of oars used on fishing and whaling vessels. (6.)

**JOSEPH PALMER, United States National Museum, Washington, District of Columbia :**

Casts of seal and fish (51-54) (the entire collection of casts of cetaceans, reptiles, and fishes in the collective exhibit of the United States was made by Mr. Palmer).

**JOEL C. PARKER, Grand Rapids, Michigan :**

Hatching box with clock-work attachment for supplying motion. (35.)

**WILLIAM B. PARSONS, Rockport, Massachusetts :**

Ancient fishing apparatus used at Rockport. (1.)

1. Old Stone Killick.

2. Old Bait Chopper.

3. Old Lantern.

**THOMAS M. PEAKES, Edgartown, Massachusetts :**

Log-book. (6.)

**PERKINS AND SHURTLEFF, Portland, Maine :**

1 box of compressed cod, 10 packages in case, 5 pounds each, with all large bones removed, compressed in rolls of a round shape, and ready for cooking. (26.)

**BARNET PHILLIPS, New York City :**

Essay on Prehistoric Fish-hooks. (57.)

**WILLIAM PHILLIPS & SON, New Bedford, Massachusetts:**

Brass and steel whaling-gun. (1.)

**L. PICKERT & CO., Boston, Massachusetts:**

Dry salted preparations. (26.)

Compressed Codfish, 5-pound paper packages.

Smoked preparations. (26.)

Blackwood's English Boned Herring, in tin.

Blackwood's Mount Desert Boneless Herring, in wood.

Finnan Haddies, 1-pound cans.

Pickle or brine salted preparations. (26.)

Corned Codfish, 5-pound oval cans.

Nonpareil Mess Mackerel, 5-pound cans.

Climax Mess Mackerel, 4-pound cans.

Isles of Shoals Mess Mackerel, 5-pound cans.

Diadem Mess Mackerel, 4-pound cans.

Preparations in spices, vinegar, &c. (26.)

Soused Mackerel, 1-pound, 2-pound, 3-pound and 4-pound cans.

Soused Brook Trout, 3-pound cans. (26.)

Broiled Mackerel, Mustard Sauce, 3-pound cans.

Broiled Mackerel, Tomato Sauce, 3-pound cans.

Labrador Herring, Tartar Sauce, 3-pound cans.

Hudson Bay Herring, Tomato Sauce, 3-pound cans.

Soused Brook Trout, 3-pound cans.

Fresh Codfish, 2-pound cans.

Fresh Mackerel, 2-pound cans.

Fresh Lobster, 1-pound and 2-pound cans.

Fresh Clams, 1-pound and 2-pound cans.

Clam Chowder, 3-pound cans.

Fried Smelts, 2-pound cans.

Fishermen's food in Cans. (22.)

Baked Beans, 3-pound cans.

New England Boiled Dinner, 3-pound cans.

Samples of brands of boneless fish and canned fish. (26.)

**HENRY T. PICKING, Commander, U. S. N., Naval Secretary, Washington,  
District of Columbia:**

Nickel-plated working model of the Courtenay Automatic Whistling Buoy. (6.)

**CAPTAIN EBEN PIERCE, New Bedford, Massachusetts:**

Bomb-lance for killing whales. (1.)

**R. G. PIKE, Middletown, Connecticut:**

Model of Spiral Fish-way, showing the economy of space and material, by spiral arrangement. (37.)



**PORTLAND PACKING COMPANY, Portland, Maine:**

Cooked preparations in cans. (26.)

Canned Lobsters.

Canned Clams.

**POTTER & WRIGHTINGTON, Boston, Massachusetts:**

Dry salted preparations. (26.)

Boneless Fish, Lion and Unicorn brand, in paper packages.

Minced Codfish, 1-pound cans.

Smoked preparations. (26.)

Boneless Herring, Lion and Unicorn brand, in cans.

Smoked Salmon, Lion and Unicorn brand, in cans.

Smoked Halibut, Lion and Unicorn brand, in cans.

Pickle or brine salted preparations. (26.)

Canned Salt Mackerel, Lion and Unicorn Brand, 5-pound oval cans.

Prize Mess Mackerel, 5-pound oval cans.

Minot's Light Mess Mackerel, 4-pound oval cans.

Preparations in spices, vinegar, &c. (26.)

Fresh Soused Mackerel in mustard, 2-pound and 3-pound cans.

Spiced Ocean Trout, 2-pound and 3-pound cans.

Soused Herring, 2-pound and 3-pound cans.

Herring in Tomato Sauce, 2-pound and 3-pound cans.

Eels in Jelly.

Mackerel in Tomato Sauce, 2-pound and 3-pound cans.

Ocean Trout in Tomato Sauce, 2-pound and 3-pound cans.

Cooked preparations in cans. (26.)

Fresh Mackerel, 1-pound and 2-pound cans.

Fresh Herring, 1-pound and 2-pound cans.

Fresh Ocean Trout, 1-pound and 2-pound cans.

Fresh Clams, 1-pound and 2-pound cans.

Fresh Codfish, 1-pound and 2-pound cans.

Fresh Lobsters, 1-pound and 2-pound cans.

Clam Chowder, 2-pound and 3 pound cans.

Codfish Chowder, 2-pound and 3-pound cans.

Fresh Cod, 1-pound cans.

Fishermen's food in cans. (22.)

Baked Beans, 1½-pound and 3-pound cans.

Roast Beef, 1-pound, 2-pound, and 3-pound cans.

Roast Mutton, 1-pound, 2-pound, and 3-pound cans.

Roast Turkey, 2-pound cans.

Roast Chicken, 2-pound cans.

Roast Veal, 2-pound cans.

Boiled Dinner, 2-pound and 3-pound cans.

**EDWARD POTTS, Philadelphia, Pennsylvania:**

Collection of dried and microscopic preparations of Freshwater

Sponges. (43.)

**PROCTER BROTHERS, Gloucester, Massachusetts :**

File of "Cape Ann Advertiser." (60.)  
Publications relating to the Fisheries. (60.)

**G. W. PROCTOR, San Miguel, California :**

Gun harpoon, used on the California coast. (1.)

**JASPER PRYER, 143 Front street, New York City :**

Samples of Fish Oils and their products. (29.)

**F. W. PUTNAM, Cambridge, Massachusetts :**

Publications on ichthyology. (60.)

**JAMES QUINN, Quinnis, Oregon :**

Cooked preparations in cans. (26.)  
Canned Salmon.

**QUINNIPIAC FERTILIZER COMPANY, New London, Connecticut :**

Samples of Menhaden Guano. (29.)

## 1. Dry Fish Scrap.

Percentages: Ammonia, 10½ per cent.; bone phosphate of lime, 15 per cent.

## 2. Dry Ground Fish Guano.

Percentages: Ammonia, 10½ per cent.; bone phosphate of lime, 15 per cent.

## 3. Fish and Potash (ammoniated with fish).

Percentages: Ammonia, 5 per cent.; bone phosphate of lime, 12 per cent.; available phosphoric acid, 5 per cent.; potash, 5 per cent.

## 4. Superphosphate (ammoniated with fish).

Percentages: Ammonia, 3 per cent.; bone phosphate of lime, 25 per cent.; available phosphoric acid, 10 per cent.; potash, 2½ per cent.

**RICHARD RATHBUN, United States National Museum, Washington :**

Publications upon Aquatic Invertebrates. (60.)  
Photographs of Brazilian corals in National Museum. (44.)

**DR. CHARLES RAU, United States National Museum, Washington :**

Publications on prehistoric fishing. (57.)

**C. RECHT, 183 Bowery, New York City :**

Foster's transparent Gimp Gut. (14-16.)

**GEORGE RICARDO, Hackensack, New Jersey :**

Box for hatching eggs of the smelt. (35.)

**NATHAN RICHARDSON, Gloucester, Massachusetts :**

Richardson Challenge Steerer. (6.) Steering-wheel, patented May 30, 1882.

**RIDGWAY REFRIGERATOR COMPANY (LIMITED), Philadelphia, Pennsylvania:**

Model of Refrigerator. (33.)

**ROBERT RIDGWAY, United States National Museum, Washington:**

Publications upon aquatic and fishing birds. (60.)

**Prof. C. V. RILEY, Department of Agriculture, Washington:**

Types of insects useful and injurious to fish and fishermen. (49.)

**WILLIAM ROBERTS, Provincetown, Massachusetts:**

Whaling harpoon. (1.)

**G. S. ROBINSON, Fairhaven, Massachusetts:**

Ear-bone of calf sperm-whale. (54.)

**WM. S. ROBINSON & CO., New Haven, Connecticut:**

Exhibit of tubs and kegs for packing oysters and fish. (33.)

2-gallon oak Oyster tub.

3-gallon oak Oyster tub.

4-gallon oak Oyster tub.

6-gallon oak Oyster tub.

10-gallon oak Oyster tub.

15-gallon oak Oyster tub.

$\frac{1}{4}$ -gallon Oyster keg.

$\frac{1}{2}$ -gallon Oyster keg.

1-gallon Oyster keg.

2-gallon Oyster keg.

3-gallon Oyster keg.

4-gallon Oyster keg.

5-gallon Oyster keg.

$\frac{1}{4}$  Anchovy keg.

$\frac{1}{2}$  Anchovy keg.

1 Anchovy keg.

$\frac{1}{4}$  Russian Sardine keg.

$\frac{1}{2}$  Russian Sardine keg.

1 Russian Sardine keg.

1 Russian Sardine keg (white hoops).

$\frac{1}{8}$  Sardelle keg.

Herring keg.

**ROSENSTEIN BROTHERS, 323 Greenwich street, New York City:**

Preparations in spices, vinegar, &c. (26.)

Spiced Sardines, Royal brand, 1-pound cans.

Mustard Sardines,  $\frac{1}{4}$ -pound cans.

Mustard Sardines, 1-pound cans.

**ROSENSTEIN BROTHERS, 323 Greenwich street, New York City:**

Preparations in oil. (26.)

Oil Sardines, Debois brand,  $\frac{1}{4}$ -pound cans.

Oil Sardines, Louis Phillipe brand,  $\frac{1}{4}$ -pound cans.

Oil Sardines, Alfred Elienne brand,  $\frac{1}{2}$ -pound cans.

Cooked preparations in cans. (26.)

Canned Lobsters, Royal brand, Eastport Packing Company.

**RUSSELL MILLS COMPANY, Plymouth, Massachusetts, N. Boynton & Co.,**

**Agents, Boston, Massachusetts:**

Samples of sail canvass. (5.)

**RUSSIA CEMENT COMPANY, Gloucester, Massachusetts:**

Exhibit of glue made from fish skins and materials used in its manufacture; also articles in the preparation of which fish is used. (29.)

1. Skins of Cusk and Codfish, from which fish-glue is obtained by cooking.
2. Residuum remaining in the bags after the glue has been pressed from the cooked skins.
3. Lee Page's Mucilage.
4. Russia Belting Cement; for belting, card clothing, and top roll manufacturers.
5. Lee Page's Carriage Glue; for fine wood work.
6. Lee Page's Liquid Glue; for family use.
7. Lee Page's Fish Glue, No. 12; for ordinary wood work, &c.
8. Lee Page's Fish Glue, No. 16; for boot and shoe manufacturers.
9. Lee Page's Fish Glue, No. 20 F; for gum labels, &c.
10. Lee Page's Fish Glue, No. 20 X; for woolen and carpet sizing.
11. Lee Page's Fish Glue, No. O. C., for table and stair oil cloths.
12. Lee Page's Bleaching Glue, No. S. S., as sold to straw-goods manufacturers.
13. Lee Page's Bleaching Glue, No. S. S., reduced to sizing as used by straw-goods manufacturers.
14. Ground fertilizer, the residuum from cooked fish skins after the glue has been removed.
15. Fish Sign, made by cementing pieces of wood with fish glue.
16. Part of carriage axle, wood and iron glued together.
17. Organ and Piano work, Spool and Bobbin work; wood and cloth glued together.
18. Leather work; samples of leather belting, shoe and shoe heel, in which glue is used.

**RUSSIA CEMENT COMPANY, Gloucester, Massachusetts :**

Exhibit of glue made from fish skins, etc.—Continued.

19. Paper work ; samples of scrap-books and calendars prepared with fish glue.
20. Table Oil Cloths ; sample book of various patterns of oil cloths.
21. Sample of Parquet flooring, made of pieces of wood glued together.
22. Samples of Straw Hats bleached and colored.
23. Samples of Gummed Paper.

**JOHN A. RYDER, United States Fish Commission, Washington :**

Publications upon the embryology of fishes and microscopic sections and photographs illustrative of the same. (60.)

**JOHN A. SAWYER, New Bedford, Massachusetts :**

- Improved apparatus for the capture of the whale. (1.)
- An old-fashioned scallop dredge. (2.)

**CHARLES M. SCAMMON, Captain United States Revenue Marine :**

One volume on Marine Mammals, together with account of the American whale-fishery. (60.)

**S. SCHMIDT & BRO., New York City :**

- Smoked preparations. (26.)
- Smoked Eels, in cans.
  - Smoked Salmon, in cans.
  - Smoked Sturgeon, in cans.
  - Smoked Smelts, in cans.
  - Smoked Herring, in cans.
  - Brat Herring, in cans.
- Pickle or brine-salted preparations. (27.)
- Caviare (Sturgeon roe).
- Isinglass from Sturgeon. (27.)

**CHARLES SCRIBNER'S SONS, New York City :**

Game Fishes of the United States: (55.)

A series of twenty magnificent paintings of fishes and scenery, by S. A. KILBOURNE, with text by G. BROWN GOODE, assistant director United States National Museum, and assistant in the United States Fishery Commission; 10 parts in wrappers, not stitched, large folio, 1879-1881.

The plates are exact reproductions of the water-color paintings of S. A. Kilbourne, the studies for which were made from life, by the brook and on the shore. The details of form and structure are preserved with scientific accuracy, while color and life-action are shown with excellent effect. The work has been completed in ten parts, each part containing two plates, size 20½ inches by 14, mounted on heavy board, 28 inches by 22 inches; and the letter-press printed on rich-toned calendered paper. Wood-engravings are added.

**CHARLES SCRIBNER'S SONS, New York City :****Game Fishes of the United States—Continued.**

Mr. Kilbourne's paintings will open up a new world of delight to many who have never dreamed of the loveliness of the denizens of our own streams and bays. \* \* \* Game fishes are those which, by reason of their cunning, courage, strength, beauty, and the sapidity of their flesh, are sought for by those who angle for sport with delicate fishing tackle. \* \* \* In preparing the following essays, my endeavor has been to give a concise account of habits and geographical distribution. Descriptions would be superfluous; for Mr. Kilbourne has combined in his paintings artistic truth of coloring and scientific accuracy in the delineation of form. Fish-culture is frequently referred to, since its results are of great interest to the zoologist, the angler, and the public at large.—*From the preface of Mr. Goode.*

*List of the Colored Plates.*

- |   |   |
|---|---|
| Part I.—The Atlantic Salmon.<br>The Eastern Red-speckled Trout. | Part VI.—The Pompano and its allies,<br>The Sea Bass or Southern Black Fish.  |
| Part II.—The Spanish Mackerel.<br>The Black Basses.             | Part VII.—The King Fish and the Whiting.<br>The Sheeps-head and the Scuppaug. |
| Part III.—The Striped Bass.<br>The Red Snapper.                 | Part VIII.—The Namaycush or Lake Trout.<br>The Bonito and the Tunnies.        |
| Part IV.—The Blue Fish.<br>The Yellow Perch.                    | Part IX.—The Red Fish.<br>The Grayling.                                       |
| Part V.—The Mackerel.<br>The Weak-fish or Southern Sea Trout.   | Part X.—The California Salmon.<br>The Muskellunge, Pike, and Pickerel.        |

Also a map, showing by means of colored lines the geographical distribution of the game fishes of Eastern North America, compiled from sketches by G. BROWN GOODE; and many engravings.

**SEA WORLD PUBLISHING COMPANY, W.B. Hopson, manager and editor,  
Baltimore, Maryland:**

File of "The Sea World and Packer's Journal." (60.)

**HENRY SELLMAN, Camden, Maine. (Union Fish Company.):**

Model of Sardine Factory. (25.)

**SEWELL, DAY & CO., Boston, Massachusetts:**

Samples of Cordage used on fishing vessels. (5.)

**B. F. SHAW, Anamosa, Iowa:**

Model of step and pool Fishway in spiral arrangement. (37.)

**A. ZENO SHINDLER, United States National Museum :**

Paintings of tortoise, snake, and fish from plaster casts. Three specimens. (51 and 52.) (The entire collection of reptiles and fishes in the collective exhibit of the United States was painted by Mr. Shindler.)

**A. B. SHIPLEY & SONS, Philadelphia, Pennsylvania :**

Fishing-rods. (14-16.)

Six-strip split Bamboo rod, \$20.

Six-strip split Bamboo rod, \$30.

Split Bamboo rod and reel in case.

Bethabara wood, 10-foot pole, \$16.50.

Bethabara wood, pole 5½ ounces, \$10.50.

Bethabara wood, 12-foot pole, \$16.50.

Fishing-reels. (14-16.)

70-yard Balance sliding click reel.

250-yard Fairmount click reel.

300-yard Balance handle, steel pivots, &c.

Waterproof fly line. (14-16.)

Brails, snoods, cat-fish nippers, and other articles used by anglers. (14-17.)

**F. H. SIEWERD & BROTHER, Baltimore, Maryland :**

Cooked preparations in cans. (26.)

Canned Oysters, Cove brand.

**COMMANDER CHARLES D. SIGSBEE, United States Navy, Washington :**

Apparatus employed in deep-sea research in the work of the United States Coast Survey. (40.)

**JAMES M. SIMMS, Gloucester, Massachusetts :**

Gang of standing rigging for fishing schooners. (5.)

**I. A. SMALL, Provincetown, Massachusetts :**

Implements used in the capture of the whale. (1.)

**C. W. SMILEY, United States Fish Commission, Washington :**

Publications relating to fish and fisheries. (60.)

**T. W. SMILLIE, Photographer, United States National Museum, Washington, D. C. :**

One screen of photographs of fishes and illustrative of the fisheries. (The entire collection of photographs in the collective exhibit of the United States was made by Mr. Smillie.) (51.)

**EVERETT SMITH, Portland, Maine :**

Model of inclined plane return fish-way. (37.)

**SETH SMITH, Provincetown, Massachusetts:**

Apparatus used in the whale-fishery, dog-fish capture, and mack-reeling. (1.)

**SMITHSONIAN INSTITUTION, Washington, Spencer F. Baird, Secretary:**

Publications relating to the Natural History of the waters. (60.)

**LOUM SNOW & SON, New Bedford, Massachusetts:**

Apparatus employed by whalers, sealers, and sea-elephant hunters. (1.)

**SOLUBLE PACIFIC GUANO COMPANY, Wood's Holl, Massachusetts:**

Series of preparations illustrating the manufacture of Soluble Pacific Guano. (29.)

1. Crude Menhaden Scrap.
2. Dried and Ground Menhaden Scrap.
3. Muriate of Potash.
4. Nitrate of Soda.
5. Crude South Carolina Phosphate.
6. Crushed South Carolina Phosphate.
7. Ground South Carolina Phosphate.
8. Sicily Sulphur.
9. Stassfurth Kainite.
10. Soluble Pacific Guano, unscreened.
11. Soluble Pacific Guano, screened.

**HENRY O. STANLEY, Dixfield, Maine:**

Pencil sketch on birch-bark of a Rangeley Trout caught by Mr. Stanley October 10, 1877; weight  $9\frac{1}{2}$  pounds. (57.)

**SILAS STEARNS, Pensacola, Florida:**

Papers on Ichthyology. (60.)

**E. M. STILLWELL, Bangor, Maine:**

Can for transportation of young fish, and pump for aerating the water. (35.)

Painting on birch-bark of Grand Lake Stream Trout. (51.)

**LIVINGSTON STONE, Charlestown, New Hampshire:**

Series of eggs and young of the California Salmon, showing the daily growth from the newly-impregnated egg to the young fish several weeks old. (36.)

Apparatus used in hatching eggs of the various species of *Salmonidae*; also box for rearing young Salmon. (35.)

**JAMES G. SWAN, Port Townsend, Washington Territory:**

Publications relating to the Indian fisheries of the Northwest coast. (Most of the fishery collection of the Northwest coast in the fisheries exhibit was made by Mr. Swan.) (60.)



**JIREH SWIFT, New Bedford, Massachusetts :**

Eskimo lance-head taken from a bowhead whale, North Pacific. (1.)

**LIEUT. Z. L. TANNER, U. S. N., U. S. Steamer Albatross :**

Deep-sea Sounding Machine. (40.)

**JAMES H. TARR, Gloucester, Massachusetts :**

Cape Ann Copper Paint; used on bottoms of fishing vessels. (6.)

**TARR & WONSON, Gloucester, Massachusetts :**

Patent Copper Paint, used on bottoms of fishing vessels. (6.)

**JAMES TAYLOR and JAMES V. COX, New Bedford, Massachusetts :**

Box and ship's papers carried by bark "Gosnold," outward bound.  
(6.)

**THOMAS TAYLOR, New Berne, North Carolina :**

Can for the transportation of fish ova. (35.)

**WILLIAM TAYLOR, Portland, Maine :**

An improved sword-fish lily-iron. (1.)

**S. THAXTER & SON, Boston, Massachusetts :**

Exhibit of Eldridge's Charts and Coast Pilot. (6.)

No. 1.—THE VINEYARD SOUND AND NANTUCKET SHOALS, on a very large scale, with a Book of Sailing Directions. Persons using this chart will save the expense of employing a pilot. Price \$5.

No. 2.—THE COAST OF NORTH AMERICA, from Cape Henry to Cape Sable, including the Chesapeake and Delaware Bays, and George's Shoals, on a large scale. Price \$4.

No. 3.—CAPE COD TO BELLE ISLE, including the Bay of Fundy, Gulf of Saint Lawrence, and Banks of Newfoundland, with plans on a large scale of the Coast of Nova Scotia from Cape Canso to Pictou; the Coast of Cape Breton from Scatarie to Sydney, and the Harbor of Saint John, New Brunswick, Halifax, and Miramichi. This is a new chart, prepared from the latest surveys, expressly for the Coal and Fishing trades. Price \$5.

No. 4.—BOSTON HARBOR, on a large scale, with Sailing Directions. This chart affords a more practical guide to the various channels, passages, fishing-grounds, &c., of Boston Harbor, than any that has ever been issued. The bearings and distances of dangerous rocks and shoals, and the principal ranges of objects, are all given on the chart. Price, cloth, \$1.

No. 5.—This is a new chart of LONG ISLAND SOUND from Newport to New York; with a Book of Sailing Directions, containing a full description of the dangers to be avoided in entering the various harbors of the Sound. Price \$5.

No. 6.—LYNN TO HALIBUT POINT, with the harbors of Salem, Beverly, Marblehead, Manchester, Gloucester, Rockport, and Annisquam; also the stone quarries at Folly Cove, Lanesville, Bay View, &c., on a large scale. Price, cloth, \$1.

No. 7.—CHESAPEAKE BAY, with the James, York, Rappahannock, and Potomac Rivers. This is a new chart, and the only one published which gives the rivers on a large scale on one sheet. Price \$3.50.

**S. THAXTER & SON, Boston, Massachusetts :****Exhibit of Eldridge's Charts and Coast Pilot—Continued.**

No. 8.—MONTAUK POINT TO SAINT AUGUSTINE, with a plan of New York Bay and Harbor, on a large scale. Price \$3.50.

No. 9.—SAINT AUGUSTINE TO NEW ORLEANS, with Florida Reefs, Bahama Banks, and entrance to Pensacola and Mobile Bays, on a large scale. Price \$3.50.

No. 10.—BUZZARD'S BAY, on a very large scale, with a Book of Sailing Directions. Price \$3.

No. 11.—NEW CHART OF DELAWARE BAY AND RIVER, on a large scale, in one sheet.

ELDRIDGE'S COAST PILOT. No. 1. Chatham to Saint John. Price \$3.

Printed on the best quality of linen paper, and mounted on cloth to make them durable.

**JOHN H. THOMPSON, New Bedford, Massachusetts :**

Idol worshipped by natives of an island on the southwest coast of New Guinea. (21.)

**TIFFANY & CO., New York City and Paris :**

Exhibit of articles made of Alligator Skin. (32.)

Traveling-bags in great variety, and filled with articles for ladies and gentlemen.

Steamer bags.

Tourists' bags.

Railroad bags.

Pic-nic bags.

Dress-suit bags.

Hand bags.

Shopping bags.

Brief bags.

Belt bags for ladies.

Card cases.

Letter cases.

Porte-monnaies.

Pocket-books.

Bill books.

Visiting books and cases.

Blotters.

Railroad ticket cases.

Prescription books.

Memorandum books.

Nail-set cases.

Dressing-cases.

Scissor cases.

Hair-brush cases.

Cigarette cases.

## TIFFANY &amp; CO., New York City and Paris :

## Exhibit of articles made of Alligator Skin—Continued.

Cigar cases.  
 Photograph cases, pocket.  
 Razor cases.  
 Note cases.  
 Jewelry cases.  
 Comb cases.  
 Work cases.  
 Writing cases.  
 Postage-stamp cases.  
 Cigar boxes.  
 Jewel boxes.  
 Handkerchief boxes.  
 Glove boxes.  
 Match boxes.  
 Photograph frames.  
 Photograph screens.  
 Coin pouches.  
 Eye-glass pouches.  
 Papeteries.  
 Music rolls.  
 Shawl straps.  
 Inkstands.  
 Belts for ladies.  
 Dog collars.  
 Portable mirrors.  
 Paper racks.  
 Gentlemen's key-belts.

## H. L. TODD, draughtsman, United States Fish Commission :

Drawings of fishes for photo-engraving process, with proofs of same.  
 (51.)

## A. J. TOWER, Boston, Massachusetts :

Oiled clothing worn by fishermen. (21.)

*a. Double goods, yellow. Fish brand.*

“All garments bearing the Fish Brand trade-mark are provided with a zinc-metal button which cannot break or rust, which is attached by means of a brass-wire staple passing through the button and fabric, thence through a stay or small button on inside of garment, and the ends of the staple securely interlocked in such a manner as to render the accidental detaching of the button an impossibility. An invaluable consideration to seamen.”

1. Officers' Long Coat, with inside sleeve, leather button-holes, patched elbow, epaulet on shoulder, &c.

This coat is an extra fine grade, and designed for officers of steamers and sailing vessels of all kinds. Price, \$39 per dozen.

## A. J. TOWER, Boston, Massachusetts :

## Oiled clothing worn by fishermen—Continued.

## 2. Long Coat. Patched elbows, inside sleeves, and epaulets.

This coat is the most universally used of any of the styles manufactured. It is very popular with subordinate officers on shipboard, and with farmers and truckmen in all parts of the country. Price, \$30 per dozen.

## 3. Jacket.

Designed with special reference to the requirements of fishermen, being short, waterproof and durable, and is the acknowledged favorite among the discriminating New England fishermen. Price, \$15 per dozen.

## 4. Fisherman's Apron Pants.

Used in connection with the jacket above described, and also independently while dressing fish in dry weather. This garment is an absolute necessity with fishermen. Price, \$15 per dozen.

## 5. Seaman's String Pants.

Used by seamen proper, being very conveniently adjusted to the wearer, an item of vast importance to the sailors of the merchant marine. The waist is made adjustable in size by means of a drawstring running through the waistband, hence the derivation of the name of the garment. Price, \$14.50 per dozen.

## 6. Frock or Half Coat.

A medium length between the long coat and jacket, and used chiefly in connection with long (hip) gum boots, by oyster fishermen; also by sportsmen, with (hunting) gum boots; they are also used in connection with pants. Price, \$22 per dozen.

## 7. Petticoat Barvell.

A very useful garment to fishermen, better serving the purpose of pants in warm weather, by permitting the free circulation of air around the body of wearer, and at the same time affording complete protection from wet when used in connection with gum boots. Price, \$10.50 per dozen.

## 8. Barvell or Apron.

Used chiefly by fish packers, pork packers, tanners, oystermen, and in fact any class of workmen at a bench where exposed to wet or oil. To leather dressers the barvell is indispensable, inasmuch as the waterproofing compound is unaffected by acids or chemicals. Price \$9.50 per dozen.

## 9. Sleeves.

Used in connection with petticoat and apron barvels, and are very convenient to fish packers in protecting shirt sleeves in winter, thereby obviating the necessity of turning shirt sleeves up, and exposing the bare arm in cold weather. Price, \$4 per dozen.

*b. Double goods, black. Fish brand.*

## 10. Long Coat.

Inside sleeves, patched elbow, epaulet on shoulder, &c., made of same material as the yellow coat of same style, and preferred by some for use on land on account of color. Price, \$30.50 per dozen.

**A. J. TOWER, Boston, Massachusetts:**

Oiled clothing worn by fishermen—Continued.

11. Jacket.

Used principally by fishermen and sailors; same style as the yellow jackets. Used also by miners. Price, \$15.50 per dozen.

12. Fishermen's Apron Pants.

The same as corresponding pants in yellow before described: highly popular among fishermen. Price, \$15.50 per dozen.

13. String Pants.

Same as the yellow string pants. Used by sailors and miners.

14. Petticoat Barvell.

Differs from the yellow petticoat barvell only in color. Price, \$10.50 per dozen.

15. Common Barvell.

Same as the yellow barvell. Price, \$9.50 per dozen.

16. Sleeves.

Same as the yellow. Price, \$4 per dozen.

*c. Oiled Hats.*

17. "Cape Ann" or Northeaster.

The most comfortable hat made for fishermen and seamen generally. No fisherman would be without one. It is provided with a neck piece and ear laps lined with flannel, and affords a complete protection for these members in severe weather. This hat is black, with a medium soft crown and stiff rim. Price, \$6.50 per dozen.

18. Soft yellow.

The same in shape as the "Cape Ann," and lined with flannel, with neck piece and earlaps. Crown and rim soft and can be put in coat pocket. This cap is worn principally by officers. It is a favorite with seamen on the great American lakes. Price, \$6.50 per dozen.

19. Soft black.

Made in shape more like a common soft felt hat, and designed for use on land, and more principally by truckmen, farmers, &c. The material is lighter than used in the previously mentioned styles. Lined with red flannel and provided with neck piece and earlaps. Price, \$6.50 per dozen.

20. Yellow and black Squam.

These hats are made to supply a cheap trade, and are worn principally by sailors. They are stiff crown and rim and lined with Canton flannel. Provided with earlaps only. Price, \$3.50 der dozen.

21. Miners' (with leather).

This is a light-weight hat made in yellow and black, and worn exclusively by miners. It is provided with a leather on front, to which may be affixed the miner's lamp. The rim is straight and held in shape by reeds inclosed therein. The lining is of Canton flannel and provided with earlaps. Price, \$3.75 per dozen.

**UNITED STATES ALBUMEN MANUFACTURING COMPANY, Osterville,  
Massachusetts (Uno G. Hillman, superintendent):**

Albumen made from fish eggs. (27.)

**UNITED STATES BEACON LIGHT AND SIGNAL COMPANY, Philadelphia, Pennsylvania (J. M. Foster, agent):**  
Exhibit of beacons and signals. (6.)

**UNITED STATES DEPARTMENT OF THE INTERIOR:**

**CENSUS OFFICE;** Tenth Census of the United States. (C. W. Seaton, Superintendent.)

Statistics relating to the fisheries. (60.)

Reports and maps illustrating the condition of the United States in 1880. (60.)

**UNITED STATES PATENT OFFICE.**

List of patents relating to the fisheries complete to 1883. (60.)

**UNITED STATES NATIONAL MUSEUM, Spencer F. Baird, Director, Washington:**

Proceedings and bulletins containing numerous papers relating to the natural history of fish and other aquatic animals. (60.)

The collections of the National Museum have been extensively drawn upon in the preparation of the collective exhibit of the United States, in accordance with the provisions of the law authorizing the participation of the United States in this exhibition.

**UNITED STATES DEPARTMENT OF THE NAVY:**

**BUREAU OF NAVIGATION—Hydrographic Office.**

Charts of the Atlantic and Pacific coasts of North America. (6.)

**NAUTICAL ALMANAC OFFICE.**

Nautical Almanacs. (6.)

American Ephemeris. (6.)

**UNITED STATES DEPARTMENT OF THE TREASURY:**

**UNITED STATES LIFE-SAVING SERVICE, Sumner J. Kimball, Superintendent.**

Exhibit of apparatus and publications used by the service. (9.)

A.—Life Boats.

I.—New Jersey Life Boat for sandy beaches.

II.—The Long Island Life Boat for sandy beaches.

III.—Massachusetts Life Boat for rocky and shingly beaches.

IV.—The Dobbins Life Boat, self-righting, self-bailing, and self-ballasting, used at stations adjacent to harbors where there is a sheltered place for landing.

B.—The American Life Car, about 12 feet long. Will transport from a wreck to the shore at each trip six people, protecting them from exposure to the weather.

C.—Beach Apparatus Cart. Used at all stations of the Life-Saving Service, and loaded with all apparatus for making connections from shore to wreck, including gun, hawser, whips, breeches buoy, and shot-line.

The gear used with the apparatus cart is serviceable with either breeches buoy or life-car.

## UNITED STATES DEPARTMENT OF THE TREASURY:

Exhibit of apparatus and publications, etc.—Continued.

D.—Life-Saving Apparatus.

I. Merryman's Rubber Suit.

II. Life-Preserving Apparatus.

E.—Old and new types of beach ordnance used in making connections with wrecks.\*

F.—The illustrations of the patrol system, including patrol checks and other outfits.

G.—Shot lines and other cordage used in the service.

H.—Drawings and specifications of Life Boat Stations at various points on the coasts of the Atlantic, Pacific, and Great Lakes.†

I.—Medicine chest and other appliances for resuscitating the wrecked.

K.—Papers and documents used in the service or explanatory of its work.

L.—A collection of paintings, illustrating the operations of the service; exhibited by the Century Company of New City.

UNITED STATES COAST AND GEODETIC SURVEY, J. E. Hilgard, Superintendent.

Collection of about one hundred and twelve charts published by the Survey, being charts of the Atlantic and Pacific coasts of North America. (6.)

Divisions A, B, and 14 of the Atlantic Coast Pilot. (6.)

Apparatus for the scientific investigation of the waters—densimeter and salinometer—invented by Professor J. E. Hilgard. (40.)

LIGHT-HOUSE BOARD.

Map showing the positions of the Life Saving and Light Stations of the United States. (9.)

Charts of the following Light-House Districts: First, second, third (including Lake Champlain), fourth, fifth, sixth, seventh, eighth, eleventh, twelfth, and thirteenth. (6.)

Reports of the Light-House Board for the years 1872, 1873, 1874, 1875, 1876, 1877, 1878, 1879, 1880, 1881, and 1882. (60.)

Drawings and Specifications for Light-Houses, Beacons, Buoys, Light-Vessels, and Light-House and Buoy Tenders. 6 volumes. (6.)

\* This gun was the first ever fired in the American Life-Saving Service, and was instrumental in saving 251 lives from the English ship "Arychat."

† The location of these stations is marked with green circles on the large map furnished by the Treasury Department.

## UNITED STATES DEPARTMENT OF THE TREASURY :

## LIGHT-HOUSE BOARD—Continued.

*Pictures of Light-Houses, Tenders, Light-Vessels, etc.:* (6.)

First-order Light-House on Thatcher's Island, Cape Ann, sea coast of Massachusetts. (Photograph.)

Second-order Light-House on Minot's Ledge, sea coast of Massachusetts. (Oil painting.)

Fourth-order Light-House on Southwest Ledge, Long Island Sound, Connecticut. (Water color.)

Day or Unlighted Beacon on Sea Flower Reef, Long Island Sound, Connecticut.

Screw-pile Light-House at Cedar Point, Potomac River, Virginia. (Photograph.)

Screw-pile Light-House on Thimble Shoal, Hampton Roads, Virginia. (Indian ink.)

First-order Light-House on Cape Henry, entrance to Chesapeake Bay, Virginia. (Water color.)

Second-order Light-House on Hunting Island, sea coast of South Carolina, entrance to Saint Helena Sound. (Photograph.)

Rear Beacon of Paris Island Range. Guide into Port Royal Sound, South Carolina. (Water color.)

First-order Light-House at Saint Augustine, sea coast of Florida. (Photograph.)

First-order Light-House on Fowey Rocks, sea coast of Florida. (Water color.)

Fourth-order Light-House at entrance to Calcasieu River, Gulf coast of Louisiana. (Photograph.)

Western River Stake Light. (Water color.)

Third-order Light-House at Cleveland, Ohio. (Water color.)

Second-order Light-House at Grosse Pointe, Illinois. (Photograph.)

Second-order Light-House on Stannard's Rock, Lake Superior, Michigan. (Water color.)

First-order Light-House at Piedras Blancas, sea coast of California. (Indian ink.)

First-order Light-House at Pigeon Point, sea coast of California. (2 photographs.)

Fourth-order Light-House on Mare Island, entrance to Straits of Karquines, California. (Indian ink and sepia.)

First-order Light-House at Point Reyes, sea coast of California. (Photograph.)

First-class Light Vessel with Steam Fog Whistle. (Photograph.)

Light-House Tender "Dahlia." (Indian ink.)



**UNITED STATES DEPARTMENT OF THE TREASURY:****LIGHT-HOUSE BOARD—Continued.**

Light-House Tender "Manzanita." (Water color.)

*Models.* (6.)

Second-order Light-House on Minot's Ledge, sea coast of Massachusetts.

Light Vessel No. 40 on Five Fathom Bank, entrance to Delaware Bay.

First-order Light-House on Fowey Rocks, sea coast of Florida.  
Scale,  $\frac{3}{4}$  inch to 1 foot.

Specimen of Coral from Fowey Rocks, Florida.

First-order Light-House on Sand Key (near Key West), Florida.  
Scale,  $\frac{1}{2}$  inch to 1 foot.

Crib used in the construction of Spectacle Reef Light-House.  
Coffer Dam used in preparing the reef and laying the lower courses of Spectacle Reef Light-House.

Builder's model of Light-Vessel.

Courtenay Automatic Whistling Buoy.

**UNITED STATES DEPARTMENT OF WAR:**

UNITED STATES ARMY SIGNAL SERVICE. W. B. Hazen, Brigadier and Brevet Major General, Chief Signal Officer, U. S. A.

*List of instruments:* (9.)

2 Barometers.

2 Maximum Thermometers.

2 Minimum Thermometers.

3 Exposed Thermometers, with supports and cup, muslin and wicking for wet bulb.

2 Water Thermometers.

1 Water Thermometer case with cord.

2 Anemometers, one for interior and one for exterior.

1 Self-register, double.

1 Barometer, self-registering, Eccard's (Transmitter and Recorder).

1 Wind Vane, large, with attachment complete (one used at Paris).

3 Rain-gauges—one copper, one galvanized iron, and one small size.

1 Signal Service Telescope.

1 Signal Service telescope holder.

1 Signal Service marine glass.

2 Call-boxes.

2 Phones and 2 Transmitters, Eccard's.

1 Anemometer Post,  $4\frac{1}{2}$  feet high.

1 Signal Lantern, red, large.

## UNITED STATES DEPARTMENT OF WAR:

## UNITED STATES ARMY SIGNAL SERVICE—Continued.

- 1 Signal Lantern, white, large.
- 100 feet Cautionary Signal Halyards.
- 1 Cautionary Signal Indicator.
- 1 Wreck Knapsack.
- 1 A Tent.
- 1 Folding table.
- 2 Folding chairs.
- 2 Box sounders.
- 2 pairs Pliers.
- 1 Dash Lantern.
- 1 Cable box for coast line.
- 1 Testing box-line.
- 1 Tool box, Signal Service.
- 1 Banner, silk, embroidered, Signal Service, U. S. A.
- 1 set of flags, international.
- 1 set of flags, life-saving.
- 2 Flags, 8 feet, red, cautionary.
- 2 Flags, 6 feet, red, cautionary.
- 2 Flags, 8 feet, white, cautionary.
- 2 Flags, 6 feet, white, cautionary.
- 2 Signal Kits, complete, with 2-foot flags.
- 1 Circuit map, framed.
- 1 Map, showing cautionary display stations, framed.
- 1 Map, enlarged, sea-coast line, framed.
- 1 Map, large, weather.
- 1 set Annual Reports, C. S. O., bound.
- 1 set International Bulletins, bound.
- 1 set Monthly Weather Reviews, bound.
- 1 set Daily Bulletins, &c., bound.
- 1 set Tri-daily Weather maps, bound, large.
- 1 set Professional Papers.
- 1 set Signal Service notes.
- 6 Cipher books, 6 sets cipher cards.
- 6 Instructions to Observers.
- 12 Instructions to Voluntary Observers.
- 1 Signal Service Manual.
- 6 Manuals, Military Telegraph, latest edition, and Instructions for constructing Military Telegraph Lines.
- 1 Army Regulations.
- 1 set Telescope blanks (filled out) for transmitting cautionary signal orders, showing method of ordering signals *up* or *down*, with explanatory messages, giving character of storm.

**UNITED STATES DEPARTMENT OF WAR:****UNITED STATES ARMY SIGNAL SERVICE—Continued.***Manifold forms and carbon paper.*

- 1 set of manifold forms 107, filled out.
- 1 set of manifold Press Reports, filled out.
- 1 set of manifold River Bulletins, filled out.

**VAN ALTENA & SCHELTUS, Milwaukee, Wisconsin:****Samples of "The connecting sinker or fish-hook holder. (14-16.)**

A contrivance "that can be used for the double purpose of connecting or disconnecting, in a twinkling, the hook, catgut, or snell with the line, and also serving as a sinker at the same time, thereby having the great advantage of avoiding the trouble and annoyance of tying and untying the string on and off the hook, &c." Prices for 1883: No. 1 (smallest size), \$3.50 per dozen; No. 2 (middle size), \$4 per dozen; No. 3 (largest size), \$4.50 per dozen.

**PROF. A. E. VERRILL, Yale College, New Haven, Connecticut:****Publications upon marine invertebrates and deep-sea research. (60.)****ADOLPH VOSS, Gloucester, Massachusetts:**

- Bait mill. (6.)
- Boom-crotch supporter. (6.)
- (See Collective exhibit.)

**O. C. VOSS, Gloucester, Massachusetts:**

- Snug-stow anchor. (6.)

**DR. C. A. WHITE, United States Geological Survey, Washington:**

Monograph of the land and fresh-water fossil mollusks of North America, containing essay upon the evolution of fresh-water mollusks and fishes from marine forms. (56.)

**W. A. WILCOX, Secretary Boston Fish Bureau, Boston, Massachusetts:**

- Exhibits showing methods of reporting the statistics of the fish markets of New England. (60.)
- Reports of the Boston Fish Bureau. (60.)

These reports are issued daily (during the busy fishing season several times a day); also, weekly, monthly, and annually. They contain receipts of all fish arriving in Boston, both foreign, domestic, and from fishing vessels. Receipts of fish at all the leading out-posts are daily reported; movements of the fish and fishing fleets, from day to day; success and prospects of the catch; market quotations of sales are daily reported by telegraph from all important localities, with reports from agents and correspondents at all leading ports in the United States and British Provinces of all matters of interest in connection with the fishing industry; also, weekly statistics and comparisons of receipts, catch, prices, &c., with former years.—*W. A. Wilcox.*

**WILCOX, CRITTENDEN & CO., Middletown, Connecticut:**

- Boat and vessel fittings, old and new styles, in great variety. (6.)

**JOSEPH C. WILLETTS, Skaneateles, New York:**

- Angler's Rack for carrying blankets, guns, &c. (19).  
 Angler's Home-made creel. (19.)

**C. A. WILLIAMS, New London, Connecticut:**

- Implements used in the whale and seal fisheries. (1.)

**J. & W. R. WING, New Bedford, Massachusetts:**

- Slab of baleen or whalebone from Bowhead whale (*Balaena mysticetus*) taken in Pacific Arctic Ocean by bark Fleetwing, in May, 1882. (32.)

**LIEUT. FRANCIS WINSLOW, United States Navy, United States Fish Commission, Washington:**

- Publications, charts, and photographs illustrating the natural history of the oyster and oyster-culture. (55, 60.)

**WOLFF AND RIESING, Eastport, Maine:**

- Preparations in oil. (26.)  
 Oil sardines.  
 Preparations in spices, vinegar, &c. (26.)  
 Mustard sardines.  
 Marinée sardines.

**GEORGE WOLTZ, Washington:**

- Model of Potomac shad-lighter. (4.)

**EVERETT P. WONSON, Gloucester, Massachusetts:**

- Exhibit of stuffed fishes, prepared by Davidson's method of Ichthy-taxidermy. (51.)
1. Codfish.
  2. Norway Haddock.
  3. Fresh-water Perch.

**REUBEN WOOD, Syracuse, New York:**

- The Reuben Wood Trout-fly. (15.)  
 The Reuben Wood Bass-fly. (16.)

**LIEUT. WOOD, United States Navy, United States steamer Fish Hawk:**

- Self-detaching apparatus for lowering small boats. (6.)

**WOODBURY MILLS, Baltimore, Maryland:**

- Samples of canvas used on fishing vessels. (5.)

**JAMES WORRALL, Columbia, Pennsylvania:**

- Model of sluice fish-way. (37.)

**ISAAC H. WRIGHT**, Baltimore, Maryland:

Submerged hatching box, with float for suspending it at any depth below the surface. (35.)

**WILLIAM G. WROTEN**, Maryland:

Bucket for transporting and hatching fish ova. (35.)

**JOHN WYETH & BROTHER**, Philadelphia, Pennsylvania:

Fluid Extract Sea-Wrack (*Fucus vesiculosus*); Bladder wrack, used for reducing morbid obesity or excessive fatness. (32.)