

LIST OF ILLUSTRATIONS.

| | To face page. |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| CHART A.—Dixon Entrance to Head of Lynn Canal, showing Locations of Salmon Canneries and Salteries..... | 48 |
| CHART B.—Cape Suckling to Unimak Pass, showing Locations of Salmon Canneries and Salteries..... | 48 |
| PLATE 1. Falls in Stream at Skowl Arm, Kasaan Bay, Southeast Alaska..... | 1 |
| 2. Photographing under Difficulties, near Loring..... | 4 |
| 3. Humpback Salmon from Stream at Head of Uganuk Bay..... | 8 |
| 4. Lake, West Branch of Skowl Arm, looking up. Spawning-beds in Stream, Skowl Arm, Kasaan Bay.... | 12 |
| 5. Cannery at Boca de Quadra. Salmon Saltery on Thorne Bay..... | 16 |
| 6. Salmon Saltery, Ketchikan..... | 20 |
| 7. Cannery at Loring..... | 24 |
| 8. West Branch of Skowl Arm. Barricade in West Branch of Skowl Arm..... | 34 |
| 9. Barrier in Salmon Stream at Head of Nichols Bay. Barricade in Salmon Stream near Hessa..... | 34 |
| 10. Second Barrier in Stream at Helm Bay. Dam in Outlet to Lake, Redfish Bay..... | 34 |
| 11. Barrier in Stream at Helm Bay..... | 34 |
| 12. Old Fish-lead in Stream at Karta Bay..... | 34 |
| 13. Barrier in Stream at McDonald Bay. Fish-trap in McDonald Bay..... | 34 |
| 14. Barrier in Stream entering First Inlet, south side of Moira Sound. Indian Fish-trap and artificial Channel in Stream, First Inlet, south side of Moira Sound..... | 34 |
| 15. Barrier across Stream at Moira Sound. Old Barrier Fences and Indian Fish-traps, Karta Bay..... | 34 |
| 16. Obstruction at Klakas, from above. Obstruction at Klakas, from below..... | 34 |
| 17. Totems at Kasaan Village. Cascade in Stream, Ketchikan..... | 40 |
| 18. Indian Grave and Totems, Klinkwan..... | 42 |
| 19. Oil and Guano Factory at Killisnoo. Gill net set by Natives, Lake Eyak..... | 44 |
| 20. Stream at McDonald Bay, looking into Small Lake. Stream near Mink Arm, Boca de Quadra..... | 60 |
| 21. Lake near Boca de Quadra..... | 62 |
| 22. Outlet of Lake near Mink Arm, Boca de Quadra. Rapids in Stream, Ketchikan..... | 64 |
| 23. Salmon Cannery, Metlakahtla. Stream at Nichols Bay..... | 66 |
| 24. Salmon Stream, east side, Port Chester. Salmon Cannery, Hunter Bay..... | 68 |
| 25. Lake at Nichols Bay. Looking up Lake from near Outlet..... | 70 |
| 26. Lake at Hessa; view from near Outlet, looking toward Head..... | 72 |
| 27. Outlet of Lake at Hessa..... | 72 |
| 28. Outlet of Hetta Lake, from above..... | 74 |
| 29. Kassook Lake, from Outlet..... | 76 |
| 30. Fishing Camp, south side of Moira Sound. A Tributary to Hetta Lake..... | 78 |
| 31. Widening of Stream draining large Lake, north side of Moira Sound. Spawning Beds in Stream near head of South Arm, Moira Sound..... | 80 |
| 32. Lake near Niblack Anchorage; view up Lake. Cascade in Stream draining Lake near Niblack Anchorage..... | 82 |
| 33. Lake No. 1, Dora Bay, looking toward Outlet..... | 84 |
| 34. Lake No. 2, Dora Bay, looking toward No. 1..... | 84 |
| 35. Lake near Karta Bay..... | 88 |
| 36. Fishing Huts on Skowl Arm, Kasaan Bay. Stream at Dora Bay, looking out..... | 90 |
| 37. Stream at Helm Bay..... | 92 |
| 38. Cannery at Loring..... | 96 |
| 39. Flat along Thorne Bay Stream..... | 100 |
| 40. Head of Tidewater Stream at Thorne Bay..... | 102 |
| 41. Stream at Thorne Bay..... | 104 |
| 42. Waterfall in Stream at Duncan Canal. Mouth of Stream, Duncan Canal, showing Gravel Beds..... | 106 |
| 43. Kah-Sheets Stream. Stream at Loring..... | 108 |
| 44. Hatchery at Klawak. Cannery at Klawak..... | 110 |
| 45. Cannery near Wrangell. View of Klawak, looking west..... | 112 |
| 46. Cannery at Redfish Bay..... | 116 |
| 47. Gorge at head of Redfish Bay. Cascade near Hatchery, Redfish Bay..... | 120 |
| 48. Cannery at Pyramid Harbor..... | 124 |
| 49. Killisnoo. Yakuta..... | 128 |
| 50. Cannery at Orca..... | 130 |
| 51. Cannery at Lake Eyak..... | 136 |
| 52. Saltery at Head of Uganuk Bay, Kadiak Island. Rear view of Cannery at Kussilof, Cook Inlet..... | 140 |
| 53. General View of Karluk, Kadiak Island, showing Spit, River, Lagoon, and Village..... | 144 |
| 54. Outer Shore, Karluk Spit, Kadiak Island..... | 148 |
| 55. Seining at Karluk. A. P. A. Cannery at Chignik Bay..... | 152 |
| 56. Unused Salmon Cannery at Tanglefoot Bay, near Karluk..... | 154 |
| 57. Redfish Hatchery at Karluk..... | 156 |

| | To face page. |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| PLATE 58. Cannery at Uyak Bay..... | 158 |
| 59. Native Village on Uganuk Bay..... | 160 |
| 60. Summer Fishing Village on Stream at head of Uganuk Bay..... | 162 |
| 61. Pound Net in Chignik Bay..... | 164 |
| 62. Salmon Cannery of Pacific Steam Whaling Company at Anchorage Bay..... | 168 |
| 63. Chignik Lagoon, Chignik Bay, Western Alaska..... | 172 |
| 64. <i>Alutera monoceros</i> (Osbeck)..... | 273 |
| 65. Large Deerhorn Mussel, from which twenty-eight Rough Blanks have been cut..... | 289 |
| 66. Steam Dredge specially constructed for the Mussel Fishery, Muscatine, Iowa. Scow, with Dredge and Windlass, employed in Mussel Fishery of Mississippi River..... | 292 |
| 67. Mussel Fishing through the Ice, Winter of 1898-99, Mississippi River near LeClaire, Iowa..... | 296 |
| 68. Mussel Fishing through the Ice near Princeton, Iowa, on the Mississippi River, Winter of 1898-99..... | 296 |
| 69. Cooking Mussels to remove the Meats. Shore of the Mississippi in Midwinter. House Boat used in Mussel Fishery of Mississippi..... | 300 |
| 70. Loading Mussels on Scows at LeClaire, Iowa, for Transportation to Muscatine. Scows at LeClaire, Iowa, loaded with Mussels, about to be towed down the Mississippi by Steamer..... | 302 |
| 71. A Glimpse of the Mussel Business at LeClaire, Iowa, where the Mussels are bought from Fishermen, cleaned, and the Shells sent by Rail and Water to Button Factories. Button Factory, Muscatine, Iowa..... | 304 |
| 72. Interior of Button Factory. Grinding the Blanks..... | 308 |
| 73. Interior of Button Factory. Drilling Holes in the Buttons. Sorting the Buttons, Sewing them on Cards, and Packing in Boxes..... | 308 |
| 74. Sample of "Niggerheads," illustrating Waste in sawing Blanks..... | 310 |
| 75. Large "Niggerheads," showing possible numbers of Blanks that may be sawed..... | 310 |
| 76. Specimens of two "Niggerheads" and one "Yellow Sand Shell," showing proper Utilization of Material..... | 310 |
| 77. "Niggerheads" (<i>Quadrula ebena</i>)..... | 314 |
| 78. "Yellow Sand Shell" or "Yellow-Back" (<i>Lampsilis anodontooides</i>). "Black Sand Shell" (<i>L. rectus</i>)..... | 314 |
| 79. "Mucket" (<i>Lampsilis ligamentinus</i>). "Slough Sand Shell" (<i>Lampsilis fallaciosus</i>)..... | 314 |
| 80. "Lullhead" (<i>Pleurobema œopus</i>). "Warty-Back" (<i>Quadrula pustulosa</i>). "Butterfly" (<i>Plagiola œcuris</i>)..... | 314 |
| 81. "Deerhorn" or "Buckhorn" (<i>Tritigonia verrucosa</i>). "Hatchet-Back" (<i>Symphynota complanata</i>)..... | 314 |
| 82. "Bluepoint" (<i>Quadrula undulata</i>)..... | 314 |
| 83. "Pocketbook Clam" (<i>Lampsilis ventricosus</i>)..... | 314 |
| 84. "Pocketbook Clam" (<i>Lampsilis capax</i>)..... | 314 |
| 85. Samples of Undersized Mussel Shells used in Button-making..... | 314 |
| PLATE I. South Side of T Wharf, the Wholesale Fresh-fish Center of Boston..... | 337 |
| II. Water Front of Fulton Fish Market, the Wholesale Fresh-fish Center of New York City..... | 338 |
| III. Inclosure for Live Lobsters at Vinal Haven, Me. Fish-floats or Live-cars in rear of Fulton Fish Market, New York City..... | 344 |
| IV. Boiling Live Lobsters preparatory to Shipping in Ice, showing Boiler, Steam Tank, Cage, etc..... | 352 |
| V. Packing Live Hard Crabs in Barrels for Shipment at Oxford, Md. Floats for Soft Crabs at Oxford, Md. Green Turtle Pen, Fulton, Tex..... | 356 |
| VI. A Retail Fish Stand in Fulton Market, New York City. A Retail Fish Market in New York City..... | 358 |
| VII. Shipping Room of Cincinnati Fish and Oyster Company, Cincinnati, Ohio. Dressing, icing, and Boxing Fresh Halibut at Gloucester, Mass..... | 362 |
| VIII. Storage Room of Ammonia Refrigerating Plant at Cincinnati, containing Lake Herring..... | 370 |
| IX. Freezing Room of Ammonia Plant at Cincinnati, Ohio (Cincinnati Fish and Oyster Company), showing Coils of Circulating Pipes, Fish Pans, etc..... | 374 |
| X. Pans of Frozen Whitefish, showing Arrangement of Fish in the Pans..... | 378 |
| XI. Storage Room of Ammonia Refrigerating Plant, containing Pike, Herring, Carp, etc..... | 380 |
| XII. Freezing Room of Ammonia Plant at Boston, Mass., showing Method of Suspending Fish for Freezing..... | 382 |
| XIII. Fish Storage Room of Ammonia Plant at Minneapolis, Minn., containing Miscellaneous Fish. Fish Storage Room of Ammonia Plant at Cincinnati, Ohio, containing Sturgeon, Lake Herring, etc..... | 384 |
| XIV. Storage Room of Ammonia Plant at Minneapolis, Minn., showing Arrangement of Circulating Pipes..... | 386 |
| XV. Drying Codfish in Flake-yard at Gloucester, Mass..... | 388 |
| XVI. Dressing and Washing Cod for Drying. Codfish Salted in Butts preparatory to Drying..... | 392 |
| XVII. Drying Codfish in Flake-yard at Gloucester, Mass..... | 394 |
| XVIII. Establishment for Preparing and Handling Dried Codfish at Gloucester, Mass..... | 396 |
| XIX. Codfish Station at Pescada, Cal. Codfish Station at California City, Cal..... | 400 |
| XX. Codfish Station at Southwest Harbor, Me. Interior of Boneless Fish Loft at Gloucester, Mass..... | 404 |
| XXI. Drying Salmon at Unalaska, Alaska. Chinese Shrimp drying on Shore of San Francisco Bay, California, showing Shrimp, Nets, etc..... | 416 |
| XXII. Dressing and Salting Mackerel on Board of Vessel in Gloucester Harbor..... | 424 |
| XXIII. Salting, Weighing, and Packing Mackerel on New England Coast..... | 432 |
| XXIV. Pickling and Branding Mackerel on the New England Coast. Dressing and Brine-salting River Herring or Alewives on the North Carolina Coast..... | 436 |
| XXV. Hoghead Smokehouses at Washington, D. C. Fish Suspended above Hogheads for the Purpose of Cooling after Smoking..... | 474 |
| XXVI. Herring Smokehouse in Maine..... | 478 |

| | To face page. |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| PLATE XXVII. Carrying Herring Horse filled with Sticks of Herring into Smokehouse, Coast of Maine | 486 |
| XXVIII. Manner of Stringing Certain Varieties of Fish for Smoking at Washington, D. C. 1. Smoked Potomac Herring. 2. Smoked Labrador Herring. 3 and 4. Salted Shad before and after Smoking. 5 and 6. Lake Herring before and after Smoking | 492 |
| XXIX. Smoked Columbia Salmon, showing Manner of Dressing and Hanging. Packing Finnan Haddie .. | 494 |
| XXX. Drying and Smoking Halibut at Gloucester, Mass | 496 |
| XXXI. Drying Halibut for Smoking at Gloucester, Mass. | 498 |
| XXXII. Haddock. Finnan Haddie | 500 |
| XXXIII. Splitting and Cleaning Haddock preparatory to making Finnan Haddie | 502 |
| XXXIV. Picking Haddock in the Preparation of Finnan Haddie. Smoking Finnan Haddie | 504 |
| XXXV. Interior of Baltimore Oyster-canning House; Washing, Assorting, Weighing, and Placing Oysters in Cans. Capping and Processing Room of Baltimore Oyster-canning House | 506 |
| XXXVI. Salmon Cannery, Friday Harbor, Washington. Room where Cans are made and Retort Room | 512 |
| XXXVII. Salmon Cannery at Karluk, Alaska; Seining on Karluk Beach | 514 |
| XXXVIII. Interior view of Baltimore Oyster-canning House, showing Arrangement of Steam Boxes, Cars, etc. Oyster-shucking Room, Baltimore, Md. | 518 |
| XXXIX. Dressing Herring for Sardines in Maine. Frying Sardines at Eastport, Me | 526 |
| XL. Landing, Cleaning, Washing, and Flaking Fish at Sardine Cannery, Eastport, Me | 530 |
| XLI. Sardine Canning. Interior of Freezing Room on Pacific Coast, containing Salmon and Sturgeon .. | 534 |
| XLII. Interior of Fish Cannery at Provincetown, Mass. | 540 |
| XLIII. Female Sturgeon with Roe exposed, and Appliances for making Caviar, Delaware River. Shed for Preparing Caviar on the Columbia River | 548 |

TEXT CUTS.

| | Page. | | Page. |
|----------------------------------------------------------------------------------|-------|----------------------------------------------------------------------------------------|-------|
| Red Salmon (<i>Oncorhynchus nerka</i>) | 5 | Skeleton of Floating Fish-house at Skowl Arm | 87 |
| King Salmon (<i>Oncorhynchus tshawytscha</i>) | 7 | Sketch of Karta Bay Stream | 89 |
| Coho or Silver Salmon (<i>Oncorhynchus kisutch</i>) | 8 | Sketch of Helm Bay Stream | 91 |
| Humpback Salmon (<i>Oncorhynchus gorbuscha</i>). Searun .. | 9 | Naha Bay and Lakes | 95 |
| Dog Salmon (<i>Oncorhynchus keta</i>) | 10 | Sketch of Yes Bay Stream and Lakes | 98 |
| Steelhead (<i>Salmo gairdneri</i>). Adult | 11 | Sketch of Stream at head of Thorne Bay | 101 |
| Red-throated Trout (<i>Salmo mykiss</i>). Adult | 14 | Cannery near Wrangell | 104 |
| Dolly Varden Trout (<i>Salvelinus malma</i>) | 15 | Sketch of Kah-Sheets Stream | 108 |
| Transport Ship at Chignik | 16 | Sketch of Klawak Stream and Lake | 112 |
| Cannery at Chilkat | 18 | Plan of Klawak Hatchery | 114 |
| Fish Scow at Dook, Chignik | 19 | Sketch of Redfish Bay Lake | 118 |
| Stern-wheel Steamer used in towing Fishing Boats and setting Nets, Chignik | 20 | Hatchery at Redfish Bay | 119 |
| Cutting Machine | 23 | Sketch of Herring Trap at Kootznahoo Inlet | 122 |
| Filling Machine | 24 | Sketch of Vicinity of Orea and Odiak | 133 |
| Topping Machine | 25 | Sketch of Lake Eyak | 135 |
| Soldering Machine | 26 | Fish-wharf on Lake Eyak | 136 |
| Test Kettles | 27 | Sketch of Kussilof River and Vicinity | 142 |
| Retorts and Test Kettles | 28 | Sketch of Vicinity of Little River | 159 |
| Cooling a Day's Pack | 29 | Cannery at Uganuk Bay | 160 |
| Lacquer Room | 30 | Sketch of Uganuk Stream | 161 |
| Redfish Hatchery at Karluk | 35 | Chignik Lagoon Trap | 170 |
| End view of Barricade, showing Construction | 37 | <i>Sigmistes caulis</i> Rutter | 191 |
| Catch of Halibut on deck of Steamer <i>Albatross</i> | 44 | <i>Alutera monoceros</i> , from India | 276 |
| Cleaning Halibut on deck of Steamer <i>Albatross</i> | 45 | Parra's "Lija barbuda," from Havana | 277 |
| Halibut (<i>Hippoglossus hippoglossus</i>) | 46 | Diagram of Interior of Unio | 280 |
| Herring (<i>Clupea pallasi</i>) | 47 | Diagram showing position of Unio plowing its way through the bottom of the river | 280 |
| Sketch of Hunter Bay Lake System | 69 | Anatomy of female <i>Lampsilis luteolus</i> | 281 |
| Sketch of Klakas Stream and Lake | 70 | <i>Unio gibbosus</i> Barnes | 282 |
| Sketch of Nichols Bay Lake System | 71 | <i>Quadrula ebena</i> Lea | 283 |
| Hessa Lake and Outlet | 72 | <i>Lampsilis luteolus</i> , Male | 284 |
| Saltery at Kassook | 76 | <i>Lampsilis luteolus</i> , Female | 284 |
| Sketch of Kegan and Outlet | 79 | <i>Unio ventricosus</i> , showing rest periods | 286 |
| Sketch of Vicinity of Old Johnson Stream | 81 | Tongs and Rake used in Mussel Fishery | 294 |
| Sketch of Nowisk-Kay Stream | 82 | Crowfoot Dredge or Grapple, showing Muscels attached to the Hooks | 295 |
| Sketch of Kithraun Stream | 84 | Saws and Saw-holders used in making Buttons | 307 |
| Sketch of Old Tom Stream | 85 | Diagrammatic view of sensory Components of the cranial nerves of <i>Menidia</i> | 317 |
| Sketch of Brown and Johnson Stream | 86 | | |