

Previous to this, it should be stated, several American States had made appropriations of money for the purpose of investigation and experiment on the lines of the Congressional Commission, and most of the States have followed, and vied with each other in liberal co-operation in the general work of the Commission.

The scope of the Commission, it will be seen, included a systematic investigation of the waters of the United States; the life history of their food fishes, and of the foes and friends of the same; the influence of currents, temperatures, and other physical phenomena on the welfare of fish. It included also a review of various methods and seasons of fishing then in use, and how far these had tended to the depletion of certain fisheries. That there had been a very serious depletion of some American fisheries, and that measures for their repletion were urgently required, was speedily ascertained by the Commission. It accordingly at once gave consideration to measures for improving these fisheries—the multiplication everywhere of existing valuable food fishes and the introduction and acclimatisation of others.

In furtherance of these objects, and liberally supported by his Government, the Chief Commissioner and his staff lost no time. Their labours have been more largely conducted along the North Atlantic coast than elsewhere, for there the most important sea fisheries are located; but stations have also been planted on the Pacific coast, and the great inland lakes and rivers. At the present time about twenty of these stations, each with its separate skilled staff, laboratory, hatching apparatus, &c., are in full operation in the United States; and some idea of the magnitude and usefulness of their work may be gathered from such facts as that during the first eleven years of the operations of the United States Fisheries Commission no fewer than 341,096,071 fish were distributed from these stations among public waters, and that in the year 1885 alone, among many other distributions, 92,000,000 eggs of the whitefish were hatched and distributed. Operations on the same gigantic scale have been carried on continuously by the Commission, and have extended to over thirty species of fish and mollusca, including brook, lake and squassa trout; Atlantic, California, and land-locked salmon; striped bass and sea bass; whitefish, shad, sturgeon, smelt, herring, cod, haddock, alewife, mackerel, pike, perch, grayling, carp, tench, goldfish, &c.; oyster, lobster, clam, &c.

As illustrating the thoroughness of the work of the American Fish Commission, a few words may be quoted from the pen of Professor Brown Goode, one of the members of the staff, and himself a leading pisciculturist:—

“For twelve years the Commissioner, with a party of specialists, has devoted the summer season to work on the shore at various stations along the coast from North Carolina to Nova Scotia. A suitable place having been selected, a temporary laboratory is fitted up, with the necessary appliances for collection and study. In this are placed from ten to twenty tables, each occupied by an investigator, either an officer of the Commission or a volunteer. The regular routine of operations at a summer station includes all the forms of activity known to naturalists, collecting along the shore, seining upon the beaches, setting traps for animals not otherwise to be obtained, and scraping with dredges and trawl the bottom of the sea, &c.”

The American Commission has also prepared careful life histories of the principal fishes; and embryology in connection with fish culture has been a special object of study. The influence of the temperature of the water and of storms upon the local movements of fish have been investigated and recorded. Fish-ways to facilitate the running of fish over natural obstacles have been constructed. Many original and valuable improvements in the apparatus of fish capture and fish breeding have been brought into use, such as grill-nets floated with covered glass balls, for the taking of cod, thus obviating the use of hooks and the necessity of bait.

The construction of incubating apparatus, with special adaptation to the physical properties of the various kinds of fish spawn, has had special attention. The eggs of fish are classified by ichthyologists into four varieties:—(1) Eggs non-adhesive, and too heavy to float, such as those of salmon and trout; (2) eggs also heavy, but adhesive, such as those of the herring, &c.; (3) semi-buoyant eggs, like those of the shad and whitefish; and (4) free floating eggs, like those of the cod and mackerel. The first of these kinds are hatched in boxes and on trays or glass grilles, as has already been described; the second on twigs or glass frames, to which they adhere. The other classes require somewhat different treatment, owing to the necessity for carrying on the process of incubation while the eggs are in suspension; but this has been met by ingenious contrivances for the impounding and safety of free floating ova, while still keeping up that degree of agitation or circulation of the water which is necessary for successful hatching. For the hatching of the eggs of the lobster an ingenious automatic jar, the invention of Colonel Macdonald, who is better known in connection with his improved fish-ladders, is now in successful use.

Aquatic plants, upon which flourish water insects and mollusca, which in turn are fed upon by the fish, have been freely introduced into American fish nurseries. Three or four steamers and several sailing craft, specially fitted up for fish cultural work, have been placed at the disposal of the Commission. For the more rapid and safe conveyance of fish and ova from the various distributing stations, specially constructed railway cars, fitted with refrigerators, &c., are run at reduced freights by the various railway companies. The best information has been collected, and instruction given, as to the curing and packing of fish for market.

Space forbids the giving of further details of the active work of the United States Fish Commission. The results have been eminently successful and highly gratifying to the Government, which originated and has so liberally supported the work. The field of operations has by no means yet been covered, but the benefits already derived have been most marked. Rivers, such as the Sacramento, which, owing to immoderate and wasteful fishing—the direct result, probably, of the invention of fish canning—had been greatly depleted, have been marvellously recouped, so that even the canneries cannot now use up the available supply. The supply of salmon from the Sacramento has risen from 5,000,000 to 15,000,000 lbs. annually. The yield of fish from the Potomac has been trebled, and the same account is given of the Connecticut and other rivers, and of the lakes of the interior. From the Pacific coast alone no less than 81,302,400 lbs. of salmon were canned last year, the prime value of which amounted to £1,812,800. In short, it has been put beyond all doubt that by such endeavours as have been so well carried out by the United States Commission on Fish and Fisheries it is easy to sustain and to extend to almost any degree the supply of this leading article of food. Full information respecting the work of the American Commission, and the general progress of fish culture in that country, has been extensively diffused by means of the bulky annual report of the Commission, and many monographs and special reports by members of the staff and other experts. From time to time the work of the American fish culturists has received the highest commendation from authorities on the subject all over the world.