

**INTERNATIONAL FISHERIES  
EXHIBITION; LONDON,  
1883. FISH CULTURE**

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International Fisheries Exhibition; London, 1883. Fish Culture by Francis Day

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*International Fisheries Exhibition*

LONDON, 1883

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# FISH CULTURE

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BY

FRANCIS DAY, F.L.S.

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## FISH CULTURE.

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FISH culture comprises several objects, the chief of which are an augmentation in the number, and an improvement in the breed of the fishes of a district, country, or even of the ocean, by means of direct cultivation, not only of the finny tribes but also of the food upon which they subsist. It likewise embraces whatever facilitates their ascent and descent of rivers, rendered necessary for spawning purposes to continue the race, or for nutriment to maintain the life of the individual. Many of these subjects appear to have received more consideration in ancient than in modern times, and up to a recent period, in distant countries, as China, than in more civilized Europe.

The Chinese are commonly credited with having been the people who first turned their attention to fish culture, collecting and disseminating the spawn, and artificially rearing fry which they employed for the purpose of stocking every available piece of water. The Egyptians likewise in times past must have taken considerable pains in this occupation, but it has been surmised that their earlier vivaria were of two kinds, sacred and profane, the occupants being destined for either the altar or the table. The boundaries of ancient Egypt are well known, and the conformation of the barren deserts on its east and west show but little alteration: but her population must have largely diminished, for we are assured by Diodorus that 1700 Egyptians were born on the same day as Sesostris, which would represent a population that could not be less

than 34,000,000. The agricultural resources of the country would have been far too small to supply sufficient food for such multitudes, and a fish diet must have been largely partaken of. At that period fish culture was extensively practised, and the ruling powers and the ruled vied with each other in augmenting the fish supply in all the numerous tanks, lakes, canals, and rivers of the country. Lacépède computed that Lake Mœris alone might have produced 18,000,000,000 fish of two feet long each.

In the Roman republic fish culture was carried on for the purpose of augmenting the general food supply, and Belonius observes that the waters of the Propontis were more profitable for the fishes they produced, than a similar extent of the best land could have been by its pasturages and its harvest. Lucullus, we are told, dug large trenches or canals from his fish ponds to the sea in the vicinity of his house at Tusculum, in the Gulf of Naples. Fresh-water streams ran down the canals to the sea, and up them sea-fish which spawn in fresh water or anadromous forms, ascended to deposit their ova. When these fish had entered, the gates at the exit of the canals were closed, and while their eggs were developing into young and growing to an eatable size, the parents which had spawned were being employed as food. Varro observed that there existed two forms of stews, the one supplied by fresh, the other by salt water—In the first, advantage being taken of springs and the conformation of the ground, constituted the poor man's pond, whereas none but the rich could enjoy the proceeds of a sea preserve: this latter being pleasing to the eye but expensive to the owner and better adapted to empty his purse than satisfy his appetite. But in time some individuals who had studied fish culture to advantage made large fortunes by salt water vivaria. Roman authors have left us detailed accounts of how their various stews were formed,



subdivided and supplied with water; how exotic fishes were sometimes brought from long distances; how their sea ponds were usually stocked from the neighbouring ocean; and lastly, how they obtained fish spawn in the sea which they successfully reared in rivers and lakes. While the high admiral Optalus under Claudius brought from the Carpathian Gulf vast supplies of the hitherto unknown fish, *Scarus*, and deposited it along the coast from Naples to Ostia, where he continued to cruise about and inspected the fishermen's nets for five years, during which period he suffered none of the species to be captured.

The discovery of how to artificially fecundate fish ova has been claimed for many different persons, in various ages, and in widely separated countries. In the fifteenth century a monk named Dom Pinchon appears to have practised it, breeding and rearing fishes in wooden boxes through which a stream of water flowed. The bottom of these boxes he lined with sand or gravel, while their ends were protected by wicker basket-work. Stephen Ludwig Jacobi, a wealthy landed proprietor, residing at Hohenhausen, a small town in Westphalia, as early as 1758 appears likewise to have made many experiments respecting the artificial breeding of salmon and trout, adopting much the same plan as Dom Pinchon, except that he secured both the upper surface and ends of his troughs with fine gratings and deposited them in the stream at a suitable depth leaving the eggs to be naturally hatched. He gave an account of his discovery in a letter to Buffon, which was deemed so important that the British Government granted him a pension.

Lacépède, writing at the commencement of this century, deplored the loss of fish-ponds in France, remarking that formerly they produced large returns, but had then ceased to yield anything, so that much evil and no good has attended their abolition. In Germany the landowners make more

by their carp and pike than many agriculturists obtain in Great Britain from their sheep and cattle kept in a similar space. In this country stews were attached to most large houses in the country, and every monastic establishment, but with the emancipation from fasts and greater facilities of transit from place to place the necessity for these vivaria diminished or almost disappeared. It is only now that meat is becoming so expensive, and likewise fish, due to pollution of waters and too much license having been permitted to fishermen and poachers, that the necessity appears to have arisen for some remedy for the present dearth of the finny tribes as shown by its excessive cost.

To the French Government is due the credit of first turning fish culture in Europe into practical channels. In 1842 they commenced their experiments, and in 1848 the establishment at Huningue came into existence near the Rhine and the Rhone canal, while it possessed springs in the vicinity which could be utilised for the incubation of fish eggs. Here but comparatively few of the ova were hatched, for when the eyes of the embryo became visible, showing that they might travel with comparative safety, they were distributed to wherever it was considered they could be turned to the best account. When this establishment first commenced work, the rivers and lakes of France were exceedingly deficient in fish, but by a distribution of about 20,000,000 ova annually they became restocked.

In Great Britain, as already remarked, the Government appear to have been one of the first in Europe to appreciate the importance of Jacobi's re-discovery of how to artificially impregnate fish ova. In 1837 Mr. John Shaw succeeded in fecundating and hatching salmon eggs, also in rearing the young; while Gottlieb Boccus asserted that he had successfully reared young trout at Chatsworth and Uxbridge as early as 1841. The Galway salmon fisheries

were restocked by Messrs. Ashworth by means of artificial propagation in 1854. In Scotland the establishment of Stormontfield was commenced in 1853 on the Tay, the rental of that river in 1828 being £14,574, but which gradually diminished until 1852, when it had decreased to £7,953. In 1858, the rental rose to £11,487, and in 1862 it had reached the value it had in 1828. This rise not being due to increased value of salmon in the market, but to augmented numbers of fish in the river.

As animal food becomes dearer, and the price of fish augments, it is remarkable how British fisheries have been treated, and the slight amount of statistical evidence which has been collected and made public, while no Government official is now engaged on the artificial propagation of fish, or in experiments upon how to augment the supply of this necessary article of food. In fact, the British Government, respecting freshwater fisheries, is now behind almost every country, in that it gives no assistance to the fish culturists, and keeps up no establishments of its own in order to maintain the necessary number of fish in our waters.

In Norway pisciculture commenced about 1850.

In Germany, artificial fish breeding has become extensively disseminated in all parts of the country, while their natural propagation is carefully tended. Likewise the cultivation of fish ponds is assuming an importance they have not had since the abolition of monastic establishments.

In Italy, lagoons appear to be somewhat extensively employed by the fish culturists, who capture young fry in the sea and rear them in these large vivaria.

In Greece the state maintains twenty-four establishments for fish culture, the principal being in lagoons, and the captives being disposed of while in a fresh condition.

In the United States of America a Fish Commission was first appointed in 1871, to investigate the alleged diminu-