

S. GEORGE V, A. 1918

"It is interesting to observe that, although this fish enjoyed steady land feeding, it had only attained one-tenth of the weight it would, in all probability, have reached had it spent the last four years of its life in the natural manner in the sea, and the scales shew that the feeding has been, as one might expect, of a regular character, and it would be impossible to estimate the age in the regular way. The absence of a spawning mark is at first sight particularly striking, although this is not so surprising when one remembers that a great deal of the erosion of scales takes place after the fish has ceased feeding and left the sea, and while it is in the river before spawning."

Masterman² makes reference to salmon that were bred in tanks at the Plymouth Marine laboratory. He says: "Through the courtesy of Dr. Allen, the Director of the Plymouth Marine laboratory, I was enabled to examine the scales of young salmon which were bred in the tanks, and for two successive seasons were 'stripped' of ripe ova and milt. Their scales show no trace of worn edge or of spawning mark." He gives a photograph of a scale of one of these salmon (see fig. 27).

Similar experiments have been carried on with the British "sea-trout", the migratory trout of the British coasts, the name applied to it by those who consider the "brown trout", said to be non-migratory, a different species and even by those who think the two are of the same species, developed under different conditions. Tate Regan⁴ definitely states "In the British Isles there is only one species of trout." Lamond⁵ gives an approving review of the arguments presented by Regan and in discussing one of these, viz., that sea trout, if prevented from going to the sea, will live and breed in fresh water, makes reference to an experiment carried out at Howietoun under the supervision of the hatchery superintendent, John Thompson, whose notes are recorded thus: "The parents were caught in a tributary of the river Forth, brought to Howietoun and spawned on November 23, 1886. There were 450 ova laid down to hatch of which some 350 hatched out successfully in February, 1887, and the fry (some 250) were shifted from the hatchery house to one of our ponds, in June of the same year and then fed the same as other fry. The young fish were again shifted into a larger pond in June, 1888, when the average size was found to be about three inches. In August, 1889, some specimen fish, about six inches in length, were taken from the pond by Dr. Day for examination and comparison with common trout, *S. fario*, and we were all agreed that it was impossible to distinguish them by the eye from *S. fario*. In April, 1890, the fish were again moved to another pond and I spawned some of the females in November of the same year, crossing the ova with milt from *S. leuvenensis* and *S. fontinalis*. A few fry of the former were hatched out and reared but were afterwards mixed with other fry. The remainder of the parent sea-trout were afterwards, I think, turned out into a reservoir, when about five years old. They never attained to any great size."

In all the cases mentioned, apparently the only difference observed between the fish retained in fresh water and those normally migrating is the difference in size, the retained specimens growing much more slowly than the normal migrating specimens. The scant supply of food in the fresh water as compared with the supply in the sea, which is commonly given as the reason for the slower growth in fresh water, apparently cannot be the controlling cause in all of these cases, since in some of them at least the fish may have been fed as much as they wished for. Possibly the lack of any necessity for special activity in search for food accounts for a similar lack of appetite and a sluggishness in digestion and a general condition that is not conducive to rapid growth. This would also account for any differences in external appearance and in

² Masterman, A. T. Report on investigations upon the salmon with special reference to age determination by study of scales, Fishery Investigations, Board of Agriculture and Fisheries, Series I, Vol. I, 1913, p. 31, London.

⁴ Regan, C. Tate. The Fresh Water Fishes of the British Isles, 1911.

⁵ Lamond, Henry. The Sea Trout, 1916.