

OBSERVATIONS ON THE PROGRESS OF THE
SALMON EXPERIMENT.

BY MORTON ALLPORT, F.Z.S., F.L.S.

Since our last evening meeting several large fish have been taken by a fixed net in the Derwent, immediately below the mouth of the Plenty, which fish differed so materially from the trout caught in the Plenty and those retained in the ponds, as to induce a belief that a veritable grilse had at length been caught. The first of these fish, a female weighing $4\frac{1}{2}$ lbs., was taken on the 26th December last, and is now before you. On a casual inspection, Judge Francis, Mr. J. Buckland, and I, each took this specimen to be nothing more than a well fed and exceedingly handsome river trout (*Salmo fario*), but upon careful examination of the teeth and fin rays, and comparing them with the descriptions given by Yarrell, I found that the teeth on the vomer were reduced to a single line, extending but a short distance back as they are found in the salmon trout (*Salmo trutta*), instead of being placed in a double alternating row, and extending far back, as they are found in the river trout (*S. fario*), whilst the numbers of the fin rays corresponded exactly with those of the salmon trout, and differed materially from those of the river trout. Yarrell gives such minute directions for counting the fin rays that it is scarcely possible to be mistaken in the number where the fish is as large as this specimen; but to guard as much as possible against error, Judge Francis kindly consented to check my figures by a separate examination, and arrived at the same result, as did Mr. Buckland on a subsequent occasion. As it was determined by the Commissioners to present this specimen to the Royal Society for preservation, I availed myself of the able assistance of our Curator, Mr. Roblin, and dissected out the pyloric appendages, the numbers of which seem to be relied upon as a good specific test by Dr. Günther, who gives 36 as the number for the river trout, whereas this fish has 42. The roe was found well developed, each egg being about the size of No. 4 shot. The next specimen, caught two days afterwards, was a female weighing $1\frac{3}{4}$ lbs., exhibiting the same characters as that last described, the vomerine teeth being those of a migratory salmon after its first trip to sea. The third specimen was a magnificent female fish, over 7 lbs in weight, identical in character with the first. This fish was in such excellent condition, and so much larger than we could exhibit in spirits, that the Commissioners determined to send it to His Excellency the Governor, that it might be put to what is after all the most practical test of its value to this colony, and his report of it was that

it was little inferior to salmon in quality. The fourth specimen was a female rather over 2 lbs. in weight, which was sent to Captain Montgomerie, of H.M.S. *Blanche*; and the fifth and last is the small specimen now on the table, also a female, which differs slightly from the others, and the roe of which is not nearly so far advanced. It has been frequently noticed in English rivers that the first salmon trout which ascend from the sea to the fresh water are almost invariably females, and the whole five taken here being females would of itself furnish strong presumptive evidence that they belong to a migratory species. I must now revert once more to an earlier part of the experiment. It will be remembered that the last of the salmonoids, caught in the estuary of the Derwent in December, 1869, was sent to the Zoological Society of London for identification, because I believed that it had passed the smolt stage, and had attained such maturity as to render its classification no longer a matter of uncertainty. That specimen Dr. Günther at once declared was a true salmon (*S. salar*). I have already given my reasons for believing that this fish was spawned in this colony, and need not go over the same ground again; but will now refer to the two small specimens sent to England by the same opportunity, and which were hatched in September, 1869, from eggs deposited by the salmon trout (*S. trutta*), which had been unnaturally detained in fresh water. These two fish were parr about 8 months old, and in reference to them Dr. Günther wrote to Mr. Youl the following letter:—

British Museum,

14th November, 1870.

My Dear Sir,—According to my promise I examined the two small salmonoids about which I was in doubt the other day.

I shall shortly state the result of my examination. *Externally*, they agree with each other in every detail; they have the large scales on the tail of a *salmon-parr* (11-12 above the lateral line); and they agree also in all the other external characters with salmon-parr, and are very different from young trout, or sea trout.

Internally, they differ from each other: in one of the specimens (*yours*) I find 54 pyloric appendages of the length usually seen in salmon-parr. In the other specimen there are only 36, and they are very short; such a number I have hitherto found in the common river trout only.

I remain,

Yours very truly,

(Signed) A. GÜNTHER.

To J. A. Youl, Esq.

We will throw over the one specimen which has the short number of pyloric appendages, and referring to the other we can only arrive at one of three conclusions—1st.—Salmon and salmon trout up to the smolt stage cannot be dis-

tinguished from one another by any scientific process at present known ; or 2nd.—Salmon trout detained unnaturally in fresh water have spawned, and produced a true salmon ; or 3rd.—We have accidentally, without our own knowledge, detained true salmon in fresh water, which, contrary to all former experience, have thriven and bred. Of these conclusions, the first seems the best, as it is borne out by the further progress of the experiment. One of the eleven parent fish was lately accidentally killed, and has been preserved. It is most certainly a salmon trout, and a beautiful specimen, exhibiting none of the deformity which is always apparent in these specimens of true salmon (*S. Salar*), which have been detained from sea for more than four years. A large number of the brethren of the parr, described by Dr. Günther, assumed the smolt dress in October last, and exhibited the usual restlessness, travelling round the pond seeking an outlet to get to sea, and one which jumped out and died on the bank is now before you. As time passed on these smolts did not (as true salmon smolts invariably do) revert to the parr markings, but grew apace, and assumed all the appearance and markings of the parent fish so completely as to leave not a shadow of doubt as to their species. Two beautiful samples are now on the table. Surely proof could not be stronger that the salmon trout can be detained in fresh water and reared in myriads with certainty. The parent fish, the smolt, and one of the young ones which has passed the smolt stage, will be sent to the Zoological Society by next mail, and will form one of the most interesting and practically useful exhibitions of pisciculture that the world has ever seen.