

(*Coregonus albus*), an excellent fish for the table, and likely to do well in the Cumberland lakes. Mr. Parnaby's establishment is the first in this country for the sale of fish for acclimatization, and I sincerely trust he will meet with the encouragement he so richly deserves; of course I will do all I can to help him, as to the details of collecting the ova, hatching them, transport of live fish, &c. There can be no doubt that if we succeed with the importation of American, Norwegian, and Swiss salmon and trout to England, our indigenous breeds will become greatly improved both as sport for the angler and also for the table.

FRANK BUCKLAND.

Salmon and Trout Breeding.

The fish-breeding season is now considerably advanced, and "turning out time" has arrived. The salmon, trout, charr, &c., hatched out in my museum have now quite absorbed their umbilical bags, and have been feeding for the last fortnight. Moreover, they are beginning to die in their troughs. This is a certain test that they require thinning and feeding. I have, therefore, sent several thousand fish to my friend Ponder, who has placed them in the nursery, close to Sunbury lock, the use of which has been so kindly afforded to Mr. Ponder and myself by the Thames Conservancy Board. These fish will eventually be turned out into the Thames.

For my own part I am trying a new experiment. I have taken all the minnows away out of my two lower tanks, where the water is about one foot deep, and have transferred the trout and charr to one compartment, the salmon to another, and the Coquet bull trout to a third, and there they can be seen as thick as tadpoles. These fish are as yet very tiny little things, but they are growing fast in their new places of abode. The little salmon have already tried to go up my miniature salmon ladder, and every morning several of them are found in the upper and middle steps. Talk of education, why these little fellows who begin to ascend ladders when babies, will surely be able to "lead the way" for the *profanum vulgus*, who have not been properly educated in ladder-jumping in the Science and Art Department.

The great difficulty in artificial fish culture is to rear the fish to, say, an inch long. I believe the mistake has hitherto been to turn them into too large places; anyhow we shall now see whether my doctrine be correct, namely, that when their umbilical bags are quite gone the fish should be transferred to a larger tank—not an out-of-door stream—my tank is made of zinc, about eight feet long and four wide—and "hand fed" for at least another month or six weeks. Mr. Edon, the attendant, has observed that the little fish will feed as their provender falls towards the bottom, and then they leave it alone. If, however, the gravel be stirred, they will run to the place where the cloud is, and pick up the little floating bits. I also give the fish plenty of little red worms—i.e., the worms that give the red colour to the mud on the banks of the Thames. These worms are always wriggling about, and attract the notice of the fish; moreover they are kind enough, apparently, not to mind being eaten up a bit at a time. I buy these worms by the pint from a man who brings them for sale. The charr sent me by Mr. Parnaby have done exceedingly well, and I propose to send a lot of them to Windsor for the Obelisk Lake in the Windsor Great Park. The few charr that survived out of the lot sent by Mr. Bennett, of Christiania, have also done well, but I am sorry to say that the "landlocked" salmon, salmon trout, and white fish from America, given me by Mr. Parnaby, have come to grief. They hatched out, and then died. I can give no reason why they died—possibly they were disgusted at the "Alabama" claims not as yet being settled.

I am more and more convinced that the indoor system of breeding is far more satisfactory than the outdoor system. The Duke of Sutherland has adopted it, and Mr. Dunbar, who has undertaken the management, reports a good crop of fish this year. The Duke's secretary, Mr. Wright, has been good enough to send me the following report:—"Our young salmon look in first-rate order; scarcely any die. I examined all the breeding-troughs repeatedly the week we were there, and I did not get a dozen altogether dead. We turned a few thousand out into an artificial pond we have made, and the remainder will be moved this week. There were two boxes without any gravel at all, nothing but the plain wood; into these a quantity of ova were placed, which it was thought was not properly impregnated, but rather than throw it away, it was put into these troughs, and singularly enough it turned out better than all the rest, more fish hatched out, and they did better on the plain wood, or at least quite as well as those on the gravel." I have also received a letter from Lord Abinger's keeper, in which he reports to his Lordship that the fish breed in slate troughs—not out of doors—for the Spean are doing very well. Mr. J. Napier reports advance in the operations carried out by the Forth Fishery Board at Loch Vennacher. So that we have now three places at least in Scotland where salmon breeding is going on. I hope in time that every district board will have its breeding establishment in England, Wales, and Scotland, for really the slate-trough system is so inexpensive, and so easily managed, that I have great hopes to see its adoption much more universal than it is at present. As regards breeding trout which do not go to the sea, there can be no doubt but that many hitherto barren lakes, streams, reservoirs, &c., can be readily stocked. I can't bear to see water without fish in it: besides which, live and healthy fish mean pure water, and pure water means improved public health.

P.S.—I hear that a Mr. Smith, of Groby, near Leicester, has had great success this year with the fish he has bred for the Earl of Stamford and Warrington.

FRANK BUCKLAND.

Trout Ova Collecting.

The next haul was in a brook, a very old friend of mine, which always contains fish. Keeping the men back, Mr. Bartlett and myself cautiously advanced. There they were, lots of fish on the beds; and now for a bit of manœuvring, so we put a net to command the junction of the brook with the stream, and another net a few yards above the beds. I then took a run and a jump slick into the middle of the stream. Experience has taught me this is the best thing to do. These trout are so dreadfully artful, that if they suspect there is anything or anybody about they are off in a moment; when, however, I jump right into the middle of the stream, they have not time to make up their minds, and bolt up or down the stream, thus getting into one or other of the nets. It may seem strange, but