REPORT OF THE LATE SUCCESSFUL EXPERIMENT FOR THE INTRODUCTION OF SALMON OVA AND SEA TROUT OVA TO TASMANIA.

BY M. ALLPORT.

On the 8th day of February last the ship Lincolnshire left Plymouth bound for Melbourne, having on board about 103,000 salmon and 15,000 sea trout ova stowed in an ice-house of rather larger capacity, but of much the same construction as that built in the ship Norfolk for the same purpose two years ago. The whole of the arrangements for shipping were superintended by Mr. James A. Youl, who again exhibited the determined zeal upon which so much depended in the former experiment. The method of packing the ova in the boxes, and the boxes in the ice-house, has been so thoroughly explained to the Fellows of this Society in the account given of the former experiment that I need not again give the details. After a rather long passage of 79 days, the Lincolnshire arrived in Hobson's Bay, on the 30th of April last, the ova and ice were at once transhipped to the steamship Victoria, again most liberally placed at the disposal of the Tasmanian Salmon Commissioners by the Victorian Government, and arrived in the Derwent on the 4th May, and by 8 p.m. on the following day the last of the ova were placed in the hatching boxes at the Plenty, the water, by the help of the remaining ice, being reduced to 45 Fahr.

On the present occasion a large number of the boxes were packed by Mr. Robert Ramsbottom, father of the superintendent at the Plenty, the remainder by one of his sons, and by Mr. Thomas Johnston. The boxes packed by Mr. R. Ramsbottom were all marked with his initials in pencil, and were found, on unpacking, to contain a far larger average of living ova than the others, though some of the latter were in better order than any of those brought by the Norfolk. I was most careful to examine the state of each box I unpacked, and invariably found that in the boxes packed by Mr. R. Ramsbottom there was rather less moss, and that the ova were more evenly distributed through it, being thus kept separate and never gathered into masses as in the others. To these causes I attribute the better average. In this opinion I am fully borne out by my able coadjutors in unpacking, Mr. John Buckland and Mr. W. Ramsbottom. One remarkable fact in the present experiment is the forward state of the larger portion of the ova, the fish being distinctly visible, furnishing abundant proof that the great majority, at any rate, have been successfully impregnated. This is especially observable in

the sea-trout, the pupils of the eyes in which last stand out as black spots on a yellowish white ground, the enveloping tissue being evidently more transparent than in salmon ova.

Many are so far advanced that I fully expect to hear of their hatching within a week. I estimate the proportion of living ova now deposited at above 45 per cent. of all sent out. Since the deposition of the ova in April, 1864, several great improvements have been effected by the Commissioners in the arrangements at the Plenty, the chief of which has been the alteration of the gravel in the breeding boxes. To explain the change and the advantages of the present plan, I must call your attention for a few moments to the habits of the salmon in a state of nature. In its own rivers the salmon chooses for its spawning beds shallow rapids running over a bottom of coarse river gravel, consisting of pebbles weighing from half a pound to 3 or 4 lbs., the spaces between which are of course large enough to permit the ova to roll down to depths varying from a few inches to a foot and a half. This is no doubt a wise provision of nature for the protection of the ova and the helpless young fry from their innumerable natural enemies, but has serious objections in artificial rearing. To begin with, it is absolutely impossible in the first instance to separate the dead from the living ova: all must be rapidly transferred to the water together, and the dead ova gradually picked out afterwards. In 1864 numbers of dead and living ova together got out of sight between the interstices of the gravel, purposely made to resemble as nearly as possible the natural spawning beds, and much of the living ova was assuredly destroyed by contact with that which was decomposing, to say nothing of the ill effects which the decaying ova would have upon the water generally. Again, it is now an ascertained fact that a considerable admixture of atmospheric air is indispensable in hatching the ova of most of the Salmonidæ, and that, consequently, the farther the ova are from the surface of the water the more tumble and splash you must have in the water to drive bubbles of air through and amongst the gravel. It follows that if in artificial rearing the ova are allowed to get some three or four inches down into gravel, a sharp stream of water must be directed over the artificial beds to supply them with the air necessary, but that if it is desired to keep the ova in sight they must be placed on fine gravel, and an even gentle stream of water about an inch or an inch and a half in depth must flow through the beds. As in the artificial process the boxes are thoroughly guarded from all possible enemies, the advantages are so manifestly in favor of keeping the ova in sight that the Commissioners have replaced the coarse gravel, formerly used, by an even bed

of very fine pebbles, on which the ova rest about an inch from the surface of the stream which flows gently and evenly through the boxes. The result is that the moment an egg becomes opaque, or in other words dies, it is removed and all danger to the neighboring ova is avoided.

Amongst the boxes brought in the ice-house was one containing a clutch of hen's eggs, which arrived to all appearance in a perfectly sound state for culinary purposes, but which I scarcely think were seriously intended to be hatched here. Whoever sent them with any such intention, must have a very limited knowledge of natural history, for in a state of nature the eggs of birds are rarely allowed to fall in temperature to a degree much below that of the outside of the parent bird's body, while the eggs of the salmon on the contrary are frequently in their own rivers reduced to within a trifle of the freezing point for weeks together without injuring the developing embryo. A small packet of garden bulbs was also placed in the box containing the hen's eggs, and this is more likely to prove a valuable experiment, for every bulb appears to have arrived in admirable condition. As these bulbs were consigned to the Victorian Acclimatisation Society, and were brought here by mistake, the Commissioners have, of course, handed them to Commander Norman to be returned to their destination.

Before concluding, I desire to call the attention of the Fellows of the Society to the leading article, on the subject of salmon, in *The Mercury* of yesterday, the 7th instant, and on the part of the Commissioners to disclaim having any such intentions as are, in that article, attributed to them. The writer urges the propriety of distributing, as soon as possible, fish hatched from the present importation of ova into various rivers of the colony, the Huon, Gordon, Mersey, Forth, &c., but he forgets to say *how*. The main object of the Commissioners is the thorough establishment of the fish in all rivers adapted for them, but to carry out the idea contained in that leading article would be the most certain way of defeating that object.

To turn the young fish into these rivers before they were able to protect themselves would be to consign them to certain destruction, therefore we must retain them in the breeding ponds till they become active fish; and to distribute one thousand of them safely when they had reached this stage, amongst the various rivers mentioned (even if it were possible, which I greatly doubt) would cost far more than the expense already occasioned by the whole of the experiments. Even if it was possible to distribute them, and at reasonable cost, it would be the height of folly to do it, for this reason—

It is only in well-stocked rivers in Great Britain that breeding fish can be caught for the purpose of obtaining ova for artificial rearing, and the long-coursed Derwent, stretching some 90 miles from New Norfolk to Lake St. Clair, will be but thinly stocked, even though we should be far more successful on this occasion than on the last. Until we obtain ova taken from fish in this colony the experiment cannot be looked upon as commercially successful, and to place any portion of the original stock of fish in other widely scattered waters, will be to increase the difficulty of obtain breeding fish to an incalculable extent. On the other hand, once obtain spawn from fish in the Derwent, proving the success of the experiment, and all difficulties vanish; breeding establishments would soon be formed on all suitable rivers, and millions of fish turned out.

Again, our Victorian neighbors to whose generous liberality the experiment owes so much of its success, would have just cause of complaint against us, if we made any distribution in which they did not equally participate, and the sole reason why they did not retain a portion of the present batch of ova, is that their Acclimatisation Society cordially agrees with the Salmon Commissioners here, that every fish (even if there were a million) should go into the one river till a return of breeding fish is obtained.