

have taken place in those boxes in which the moss had been most loosely packed, and the ova subjected to the least amount of pressure.

The Commissioners have already communicated to Mr. Youl their observations and conclusions on this point. By him, and by other pisciculturists in England, the subject will doubtless be duly investigated. The point involved is one which experience and observation can alone decide.

It is impossible for the Commissioners to say, with accuracy, what was the number of ova placed in the ponds in an apparently living and healthy condition. Mr. Ramsbottom had, with some hesitation, estimated them at 30,000, or a little more than a fourth part of the number embarked in the "Norfolk." From this number, however, it has since been discovered that a large deduction has to be made on account of those that have been found sterile in consequence of deficient fecundation. A large portion of the ova of this character have maintained, during the whole progress of hatching, and many of them even still preserve, their brilliant and healthy aspect, but on close examination are found to contain no embryo fish within.

Mr. Ramsbottom has estimated the number of these unfecundated ova at not less than 16,000. The number of healthy trout ova placed in the ponds is believed by Mr. Ramsbottom not to have exceeded 300; and his opinion is confirmed by the Commissioners present at the opening of the boxes, and other observers.

Immediately before commencing the operation of depositing the ova in the breeding troughs at the ponds, blocks of ice were placed in the small stream which flows over them, which had the effect of reducing the temperature of the water from 55° to 44°. This was continued while the ice lasted,—a period of two days,—and was found amply sufficient to carry the ova safely through the critical stage of transition from the low temperature in which they had previously existed to the higher temperature of the ponds to which they now became exposed. All danger, however, from this source, if any existed, was effectually prevented by a natural and considerable fall in the temperature which took place in the water of the Plenty before the supply of ice had become exhausted, and which has since remained very uniform, not exceeding 49° nor falling below 39°.

With a view to provide an additional guarantee against total failure, a portion of the ova were subjected, in accordance with the advice of Mr. Youl, to the process of hatching in an apparatus entirely apart from the ponds, and consisting of two tubs filled with gravel and supplied with a slender stream of iced water from a large cask with which they were connected. In this manner a small portion of ice, reserved for the purpose, was found sufficient to maintain the water at a reduced temperature for some time after it could no longer be applied to the larger apparatus connected with the ponds. In these tubs, however, no greater success was achieved than in the larger breeding troughs.

The salmon ova were deposited in the ponds on the ninety-first day from the date of their embarkation on board the "Norfolk;" and, with the exception of the contents of two small boxes of greater age, about the ninety-sixth from their exclusion from the parent fish, and thus four days within the period beyond which it has always been represented by Mr. Youl that it would be highly dangerous to delay their immersion in their native element.

The ova having been thus all deposited in the ponds, it is unnecessary for the Commissioners to inform your Excellency that their progress towards maturity was watched with intense anxiety.

Two boxes have been mentioned as containing ova of a greater age than the others. These had been taken from the parent salmon about the 6th of December, 1863, had lain for six weeks in the ice vaults of the Wenham Lake Ice Company, and were therefore forty-five days old at the time of embarkation in the "Norfolk," and one hundred and thirty-six days when placed in our ponds. They had been sent out by Mr. Youl with the special object of further ascertaining for what period the process of hatching might be retarded beyond the natural period. Of these ova few were found to have survived, but most of those that were still living already exhibited the eyes and outlines of the fish within. Among the others of shorter age, and especially the trout ova, the same encouraging proofs of development were soon perceived.

On the 4th of May, the first trout made its appearance, followed on the succeeding day by the first salmon that had ever been seen in Australia, or south of the equator.

The further hatching of the trout and salmon proceeded very slowly for some days, but then became more rapid, especially among the trout. Among these the process was completed about the 25th day of May, producing upwards of 200 healthy fish. The hatching of the salmon was more protracted, and was not concluded until the 8th of June, on which day the last little fish was observed making its escape from the shell. As they continued to make their appearance from day to day, their numbers were counted by Mr. Ramsbottom with tolerable accuracy up to about 1,000, after which it was no longer possible to keep any reckoning.

It is impossible for Mr. Ramsbottom, or the Commissioners, to make even an approximate estimate of the number of young salmon now in the ponds. That they amount to several thousands they have no reason to doubt; and, as the mortality amongst the ova after deposition in the ponds was very moderate, and quite insignificant among the young fish, there is reason to hope that they may exceed rather than fall short of expectation.

Although the first living salmon was discovered in one of the troughs containing a portion of the younger ova, there is no doubt that it was preceded by some hatched from those of greater age, although, from being concealed under the pebbles, they were not sooner noticed. That they had preceded the others, however, is evident from their superior size, and other marks of greater advancement. From these older ova not more than four or five fish have been produced.

The trout have now entirely lost their umbilical appendages, and receive their morning and evening meals of boiled liver from the hands of their keepers. The salmon are rapidly advancing to the same condition.

Having been urged by Mr. Youl not to admit the trout into the same rivers with the salmon, the Commissioners have decided in the meantime to place the former in the circular clearing pond under Mr. Ramsbottom's immediate eye and care, where they will doubtless thrive and multiply, and at no