

1876.
NEW ZEALAND.

SOUTHLAND ACCLIMATIZATION SOCIETY GRANT ACT,

(REPORT OF TRUSTEES UNDER).

Presented to both Houses of the General Assembly by Command of His Excellency.

The Hon. J. A. R. MENZIES to the Hon. the COLONIAL SECRETARY.

SIR,—

Dun Alister, 6th May, 1876.

I have the honor to enclose a copy of the Report of the Trustees under "The Southland Acclimatization Society Grant Act, 1869."

The Trustees have to request that the report may be printed and laid before the General Assembly at the next Session, and they trust that the success of this last shipment of salmon ova by the "Durham" will prove so successful that the experiment will be repeated this year. By the desire of the Trustees, I shall have the honor, in a future communication, to mention some suggestions which may tend to increase the probabilities of success in the next shipment, and at the same time lessen the expense.

I have, &c.,

J. A. R. MENZIES,

Chairman of Trustees.

The Hon. the Colonial Secretary, Wellington.

Enclosure.

REPORT of the TRUSTEES under "The Southland Acclimatization Grant Act."

THE fund arising from the disposal of the 2,000 acres given to the Southland Acclimatization Society, under the Grant Act of 1869, having now been expended, this trust terminates, and the Trustees think it is fitting that they should briefly report what has been done under the operation of the grant in the way of fish culture.

The reports of the Curator (Mr. Howard) in May and July, 1875, printed in the Journals of the Legislative Council, 1875, give in general terms much of the information which the Trustees desire to convey here.

Before the Grant Act passed in 1869, the Southland Acclimatization Society had formed breeding ponds near Wallacetown, in which brown trout were successfully reared from ova obtained from Tasmania, and subsequently distributed; and the Trustees take this opportunity to express their appreciation of the liberality with which the sister colony of Tasmania has on various occasions given ova, both of brown and of sea trout, to Acclimatization Societies in New Zealand.

In the view of a shipment of salmon ova from the United Kingdom in 1869, the hatching accommodation had to be greatly enlarged, and subsequent additions became necessary, and were made from time to time, until in 1875 the area was capacious enough to hatch 300,000 ova.

The first large shipment of salmon ova from Britain, in which Southland participated, came to Port Chalmers in April, 1869, in the "Mindora." The ova was distributed to Canterbury (7,000), Otago (100,000), and Southland (7,000); but the "Mindora" was 133 days on her voyage, and the ova were all dead. In 1871 the Southland Society obtained a small quantity of salmon ova (about 3,000) from Mr. Buckland, packed in bottles surrounded with sawdust, sent to Melbourne by a sailing vessel; they were delayed in transit to Southland, and none were hatched out.

In 1873 the "Oberon" brought to Port Chalmers 120,000 salmon ova, about 25,000 of which were forwarded to Canterbury, the rest to Southland. She sailed on 25th January, 1873, and the ova reached the Southland ponds on 4th May, the time (from packing the ova?) being reckoned by Mr. Howard at 11½ days—a period which exceeded the maximum time theretofore considered compatible with continued vitality. About 10,000 ova were placed in the hatching-boxes; the others, about 85,000, were useless from one cause or another. About 300 fry were hatched; most of them died afterwards, and ultimately only 96 of these salmon fry remained, and were removed at the age of one year to a pond near Aparima River, into which it was intended to allow them to go

when the proper time had arrived. The fry continued in this pond for some time, and thrived well; the Curator reported that in April 1875 they were strong and healthy; nearly all those he saw were about the same size—namely, seven inches; and that “the parr marks and shots along the upper side were getting very indistinct,” none of them having shown smolt scales during the preceding season. In June, 1875, the Aparima overflowed its banks, communicated with the pond, and the salmon were carried into the river. It was unfortunate that the flood in the river should have released the fish from the pond, and so withdrawn them from observation just before the time when their progress would have deserved to be and been watched with the greatest interest. If these ova had been hatched at Stormontfield, one half of the fry would, according to the opinions of some leading fish-culturists, assume the silvery scales of the smolt, and go to sea in May 1875, the other half in May 1876. In the case of these fry the period of hatching had been protracted; it is not unlikely that the time for assuming the smolt scales and going to sea would also be delayed, and actually occur, as Mr. Buckland has conjectured, at a season corresponding here to the month of May in Britain. We have lost the opportunity of watching the process on this occasion.

In 1875 the “Timaru” brought to the Bluff 300,000 salmon ova, after a passage of 105 days; about 25,000 of the ova were taken to Canterbury; no fish were hatched out of the whole number. It appeared that many of the ova had been gathered thirty days before the vessel sailed (otherwise the time was shorter than by the “Oberon”). These were placed on wooden trays, and the Curator reports that the ova tasted strongly of turpentine; that possibly these ova may have been injured from this cause; and also that many of the ova were not fecundated.

In 1870 Mr. Butts, the Hon. Secretary of the Society, brought from Tasmania 100 sea-trout ova; only thirteen fish were ultimately reared; they were retained in the pond. These fish had the usual parr marks: one of them assumed the characteristic silver scales of sea-trout at fifteen months, the others did not in the following year, during which time they altered little in size, while the other increased in size rapidly; none of them showed a disposition to spawn until 1873, when the female, in smolt scales, went up the rill. No action was taken then; but in 1874 a female fish, probably the same, weighing at this time about 2½ lbs., having gone up the rill, the Curator placed her in the pond with the brown trout. Next day she and a large brown trout milt were in the rill turning over the gravel; she was stripped, 700 ova taken from her were fecundated with brown trout milt, and 500 fry hatched out from these were placed in the Oreti River in January, 1875. About forty of the fry were retained in the pond for a year longer, and became very handsome fish, resembling yellow trout, and having no parr marks. A sea-trout spawner, weighing about 3½ lbs., was stripped in 1875; the ova was fecundated with milt of male sea-trout; about 1,150 fry were hatched, of which 850 have been placed in the River Oreti, and 250 in the Wyndham. These fish have all the marks of parr; indeed they appear to be in every respect like parr, with which those who have fished in the Tay have been familiar.

Many brown trout had been reared in the Southland ponds before the formation of their trust ova having been obtained from Tasmania at different times. In 1871 the fish in the pond began to spawn, and thenceforward a great number of both fry and spawn were distributed by the Society.

From the preceding remarks, and the tabular statement attached, it will be seen that the Society, with the aid of this grant, has planted salmon in one river, sea trout in two river systems, and brown trout in all the large streams in the Southland district, except the Aparima, which has been reserved for and planted with salmon.

When contrasted with the results of the shipments to Tasmania, those to Southland show a comparative want of success which deserves notice, with the view of endeavouring to throw some light on the causes of failure. With regard to the element of time, it appears, from the Report of the Tasmanian Commissioners in 1864, that the salmon ova that arrived by the “Norfolk” in that year were placed in the gravel 96 days after having been stripped; that of these, out of 100,000 ova shipped, about 30,000 were apparently healthy, the result being about 3,000 fry hatched; and by the report of 1866, that from the ova that came by the “Lincolnshire” in 1866, which were placed in the gravel 104 days after the time when they were stripped, 6,000 fry were hatched.

In the shipments hither, the “Mindora” in 1869, was 133 days on her voyage, and the ova were all dead. The “Oberon” in 1873 was 114 days on the passage: out of 100,000 ova received in Southland, only about 300 fry were hatched, of which two-thirds survived for only a few weeks. In 1875, the “Timaru” was 105 days on the voyage: the ova had been stripped some time before, and all were dead on her arrival. In the three last cases, the period exceeded the time of the shipments to Tasmania. In the only instance of success with us prior to the arrival of the shipment by the “Durham”—that of the “Oberon”—it is probable that the ova had been stripped at least 120 days before they were placed in the hatching-boxes, and therefore not less than fifteen days longer than the period of the ova by the “Lincolnshire”—the most successful shipment.

Now Mr. Youl says, in April, 1873 (N.Z. App. H. of R. 1873, H. 12), that he had always considered 100 days as the maximum time that eggs could be left in ice and afterwards successfully hatched—says this *à propos* of being about to open four boxes of ova retained from the shipment by the “Oberon.” These were opened 108 days after having been placed in the ice, and the ova were successfully hatched, the last of them on 9th May, exactly 116 days after having been packed in the box. Other authorities in Britain believe that the period of hatching may extend to 130 days. (“Russel on Salmon,” &c.)

From the Report of the Tasmanian Commissioners, 1864, it appears that the ova received by the “Norfolk” were stripped about 15th January; were placed in the ponds on or about 21st April; the last of them was hatched on the 8th June, being a maximum period of 144 days after exclusion from the parent fish.

A consideration of these circumstances leads to the conclusion that protracted time alone will not account for all the failures—certainly not for that of the shipment by the “Timaru.”

Then comes the question of packing. In the Report of 1864, the Tasmanian Commissioners observe that the ova were best in those boxes in which the moss was loosely packed and the ova subjected to the least pressure, and that the healthiness of the ova bore a direct relation to the goodness of the moss. The Report says:—“Where the moss retained its natural green hue and elasticity,

there a large proportion of the ova retained a healthy vitality; where, on the contrary, the moss was of a brown colour and in a collapsed or compressed form, few of the ova were found alive, and all were more or less entangled in a network of fungus." The Commissioners (Tas. Rep. 1866) think that the greater success of the shipment by the "Lincolnshire" was "probably in a great measure due to the lighter packing of the moss in which the ova were imbedded." Mr. Howard remarks (July, 1875) that when the boxes were full and the moss was green, the ova were invariably better; and also that the ova are always worthless when the moss is dry or has "cobweb." The sphagnum moss has been objected to; but, on the whole, the condition of the moss and the quantity in each box seem to be of more consequence than the kind. In any future shipment, the cause of failure, if owing to any defect in the moss, could be easily traced if the boxes were numbered and a record kept of any speciality in the packing of each.

The ova sent from time to time to New Zealand have been packed by the most experienced and careful hands. The Trustees are well assured that Mr. Youl and Mr. Buckland spared no toil and omitted no precaution in order to render every shipment a success; and the enduring gratitude of the colonists of New Zealand is due to these gentlemen—especially to the former, who has laboured longer, was the pioneer in the field—for the zeal they have shown and the patience with which they have met and overcome obstacles in the endeavour to naturalize salmon in the rivers of these colonies, persevering in their efforts under many discouragements, as those alone would with whom the work was a labour of love.

The materials of which the boxes are made deserve consideration. When made of pine, in some cases the ova contained have tasted of turpentine, which could have been derived only from the timber of the boxes or trays. Mr. Howard found the dead ova from the "Timaru" shipment taste disagreeably of turpentine after they had been soaking for a month in the hatching boxes. He thinks that, in constructing these boxes, zinc would be preferable to wood; and it would seem that if wood is the best material, some kind other than pine, such as plane, or timber from which the sap had been extracted, might be chosen with advantage.

It seems to be generally understood that a large abatement must be made on every shipment, on account of unfecundated ova. The proportion of such has been very large in some shipments—in that by the "Norfolk," for example, which took 100,000 ova on board (Tas. Rep. 1864). Out of 30,000 ova apparently healthy, Mr. Ramsbottom estimated the number unfecundated at 16,000; in the shipment of 104,000 ova by the "Lincolnshire" (Tas. Rep. 1866), out of about 40,000 apparently healthy, it was estimated that about 10,000 ova were barren.

Mr. Buckland says (to Agent-General, 30th January, 1873), "that unless the fish are properly manipulated, a large number of the eggs will prove to be 'blind';" but this will scarcely account for the large proportion of blind eggs. It is not unlikely that other causes may operate more effectively than the lack of mechanical dexterity in handling the fish. The amount of ova taken from individual spawners at one time, and the period of the season at which the fish are stripped, may have some connection with the barrenness of so many ova, for it may be assumed that of the ova taken from any spawner, those alone that are mature will be susceptible of fecundation. Seeing that large fish continue on the spawning bed for a week or longer, it is probable that the ova gradually mature then, and are not all ready for exclusion at the beginning of that period. If this should be so, then if all or nearly all her ova happened to be taken from any fish at one time, some would be immature and necessarily prove infertile.

Mr. Buist remarks in his report, 1854, that Mr. R. Ramsbottom, when obtaining the ova that were first placed in the hatching boxes at Stormontfield, "with great knowledge and tact selected the fish that were fully ripe," selecting the eggs so successfully "that apparently not one in forty has been added."

Into the question of extremes or alternations of temperature as causes of failure, the Trustees do not enter as the data before them at present will scarcely justify an expression of opinion.

The Trustees refer to these points suggestively, having no doubt that due weight will be given to each when the next shipment is under consideration.

The shipment of salmon ova by the "Durham" has arrived in a condition such as to justify the hope that it will be not less successful than any previous one to this hemisphere. In the view of a large number of fry being reared, the Trustees would remind the Government of the recommendation of the late Dr. Gray (N.Z. App. H. of R. 1872, G. 26), to place the young fry in one or more "subalpine" streams, in small rather than in large ones, as they would have fewer enemies, and be less disturbed. The experiments that were made in 1868 on the temperature of New Zealand waters show, as Dr. Hector has remarked (App. H. of R. 1869, D. 2) that only the rivers flowing south into or near Foveaux's Straits fulfil what is believed to be a necessary condition to the successful acclimatization of salmon, namely—giving an average temperature under 50°, the average temperature of the sea in the Strait, 52°, being also favourable. Taking into account the character of the waters, of the affluents and of the estuaries, of the various rivers flowing into the sea, into or near Foveaux's Straits, the Trustees have agreed to suggest that of the fry reared from the salmon ova shipped by the "Durham," three-fifths should be placed in one of the affluents of the River Oreti, and of the rest, two-thirds in the Aparima and one-third in the Wyndham. All these rivers contain abundance of food in the form of water-lice, snails, &c., while shrimps and echini, the spawn of which is supposed to be a favourite food, abound in the sea, and a rapid growth of the fish may be confidently anticipated; instances of remarkably rapid growth have occurred in the ponds, where some of the brown trout, when removed as yearlings to the Makarewa River, were found to weigh nearly a pound; many of them at seven years old have been estimated by the Curator, and some proved, to weigh 8 or 9 lbs.

The Trustees wish to direct the attention of the Government to the urgent recommendation of Mr. Buckland in the letter above quoted to the following effect:—"At the end of the second year build a fishing weir right across the river, to test at a very slight expense whether the salmon really come back or not."

The Trustees recommend that His Excellency the Governor be advised to prohibit, under the pro-

visions of "The Salmon and Trout Act, 1867," the use, for a time, of nets or engines of any kind to capture fish in the waters, salt or fresh, of any rivers in which salmon have been planted.

And, finally, the Trustees earnestly urge that an Act of Parliament should be passed to prohibit all fixed nets or engines for the capture of fish in New Zealand waters.

April, 1876.

Postscript.—In the end of 1875, the Provincial Government of Otago, in concert with the General Government, ordered a shipment of salmon ova to be sent by steamer to Melbourne, and accordingly they were packed in the steamer "Durham." She sailed from England on 22nd January, 1876. The ova coming to New Zealand (90,000) were at Melbourne transhipped to the intercolonial steamer coming to the Bluff; landed there (with the exception of a few boxes sent to Canterbury), and placed on the Southland hatching-boxes on 1st April; thus these ova, brought all the way from Britain by steamers, were placed in the hatching-boxes sixty-nine days after sailing, and, as near as can now be ascertained, eighty-seven days after having been taken from the parent fish.

It was observed that in most—in nearly all of the boxes—the moss was fresh and green, rather close-packed and compressed in those placed near the floor of the ice-house. All the moss tasted of turpentine more or less strongly. Of the ova that came to Southland, from 25,000 to 30,000 were apparently healthy, and of those it appeared that about two-thirds were not fecundated.

The hatching is now in progress, and for the present the Curator is unwilling to say anything more definite than an expression of his confident anticipation that this will prove a more successful shipment than even that by the "Lincolnshire."

The Trustees believe that the mode adopted in this instance, of bringing the eggs from Britain by steamers, is that which is most likely to effect the naturalization of salmon in New Zealand—an object which would probably be secured by one other successful shipment; and they trust that arrangements will be made for another shipment in December.

J. A. R. MENZIES,

Chairman of Trustees.

2nd May, 1876.

DISTRIBUTION of FRY from Southland Ponds.

1. *Salmon Fry, 1874.*—To Aparima Pond, 96 fish carried into Aparima River, June 1875.
2. *Sea Trout.*—Fry bred in 1870. They spawned in 1875: in 1876, fry placed in Oreti, 850; in Wyndham, 250. Ten large fish retained in breeding-pond.
- 2A. *Half-bred Sea Trout.*—Fry reared 1874, placed in Oreti in 1875, 500; in Makarewa, 1876, 40.
3. *Brown Trout:*—

| — | 1869. | 1870. | 1871. | 1872. | 1873. | 1874. | 1875. | 1876. |
|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Upper Waiau | 100 | ... | ... | ... | ... | ... | ... | ... |
| Wakatipu (lost in transit) | ... | ... | ... | ... | ... | ... | ... | ... |
| Otamita... .. | 50 | ... | 100 | ... | ... | ... | ... | ... |
| Waiau (Stewart's) | ... | 47 | ... | ... | ... | ... | ... | ... |
| Waihopai | ... | 100 | ... | 100 | ... | ... | 500 | ... |
| Centre Creek | ... | 50 | ... | ... | ... | ... | ... | ... |
| To Queenstown (Corporation) | ... | 100 | ... | ... | ... | ... | ... | ... |
| Wyndham (lost in transit)... .. | ... | ... | ... | ... | ... | ... | ... | ... |
| Makarewa (large fish in 1876) | ... | 350 | 82 | ... | 220 | ... | 500 | 40 |
| Waikiwi | ... | 117 | ... | 100 | ... | ... | ... | ... |
| Omut (Riverton)... .. | ... | ... | 60 | 50 | ... | ... | ... | ... |
| To Dunedin Society | ... | ... | ... | 210 | ... | ... | ... | ... |
| Puni Creek | ... | ... | ... | 100 | ... | ... | ... | ... |
| Winton Creek | ... | ... | ... | ... | 205 | ... | ... | ... |
| Upper Mataura (Howell's) | ... | ... | ... | ... | 160 | ... | ... | ... |
| Benmore | ... | ... | ... | ... | 310 | ... | ... | ... |
| Waimatuku | ... | ... | ... | ... | 147 | ... | ... | ... |
| Oraura | ... | ... | ... | ... | ... | ... | 500 | ... |
| Morley | ... | ... | ... | ... | ... | ... | 500 | ... |
| Oreti (at Lowther) | ... | ... | ... | ... | ... | ... | ... | 750 |
| Wyndham | ... | ... | ... | ... | ... | ... | ... | 750 |
| Mimiau | ... | ... | ... | ... | ... | ... | ... | 500 |
| Waikaka | ... | ... | ... | ... | ... | ... | ... | 350 |
| Titiroa | ... | ... | ... | ... | ... | ... | ... | 250 |