1st November 1921.

Alex. Robertson, Esq.,

Harrison Hot Springs, B. C.

Dear Mr. Robertson:-

I have to acknowledge receipt of your favour of the 24th inst., but before replying to same want to apologize for the delay in Mr. Clanton's report reaching you. I wrote you on the 20th ulto., and intended mailing it direct to you on that date, but Major Motherwell requested me to send copies to each of the government inspectors and hatchery superintendants, and gave me the names of the parties. When all were ready I took them over to the Dominion Fisheries office with the request that they make sure the addresses were all right and then mail them. Four days later they called up to ask if it had been my intention to have them mail the reports and that they had been holding them meanwhile to get further instructions from me. It was due to this misunderstanding that the reports were sent out so late.

As regards the migration of large fingerlings in advance of smaller ones I would think this was only natural, and that the impelling motive was the vigorous state of the stronger fish. I believe that in judging the actions of one class of animals much can be gained from observing other classes. If you take chickens, for example, you will find that out of a given hatch some will thrive and grow faster than others. Of two cockerels of the same age one will develope its sexual powers much quicker than another, and at the same time will possibly attain to twice the size and weight. It is also found that the more developed bird is the most energetic and goes farther afield in its search for succulent tidbits. The weaker bird remains nearer home and trusts to luck to obtain sufficient food there.

There seems no reason why the same proceedure may not be applicable to fishes as well. The large and vigorous fingerlings, seeking a wider feeding range as food grows scarcer in the spring, would be the first to proceed seaward. The less advanced ones would tarry behind until the scarcity of food caused them in turn to migrate. And the departure of the greater bulk of all the fingerlings might leave sufficient available food still in the lake waters to cause the weakest of the weak to continue on in the lake waters for

yet another season, thereby creating the class known to spend two years in the lake waters before proceeding to the ocean.

If this reasoning is correct it does not discredit the theory that the migration of fry is due to lack of food. In Dr. Gilbert's investigations he makes no mention, as far as I recollect, of whether the yearlings contained food when they started migrating, but he does mention that in the stomachs of fry hardly any traces of f food were found. This would bear out the contention that ~~xxxxx~~ food shortage was responsible for fry migration, especially when Gilbert further informs us that cohoe fry contained abundance of food, including even ~~xxx~~ young sockeyes.

I have no doubt but that the depredation of other fishes is accountable for the destruction of a large percentage of young fry and perhaps drives many of the young sockeyes to migrate in their fry stage. Not only will these enemies prey on the salmon, but will consume food which in the original scheme of nature was intended for salmon consumption. For example let us say that a given lake in its primeval condition held 1 million salmon and 1 million salmon enemies, and that the natural balance between them was maintained by nature throughout countless generations. Then commercial fishing results int the capture of half the available salmon supply. This would leave the enemy species with 50% more food than was formerly available for their consumption; it would give their off spring an increased opportunity to live and develope; and eventually would cause them to increase in numbers sufficiently to make up for the loss in the ranks of the salmon. Then we would have the waters of such a lake stocked with 1½ million salmon enemies against only half a million salmon. With the odds three to one against them it seems inevitable that the salmon should go to the wall.

Clanton points out in his report that it was the consensus of opinion of old Quesnel residents that chub and suckers are immensely more numerous in those waters to-day than they were when salmon abounded there. We know that similar conditions apply elsewhere as well. Burnaby Lake for example, once was a good trout fishing lake, but to-day hardly a trout is taken from its waters, while chubs and suckers can be caught by the hundreds in a single day. It is not reasonable to suppose that salmon can be restore to such waters, (in the face of such increase in the number of their enemies), simply by prohibiting all fishing for a term of years. It must be done by planting fish therein and protecting them until they attain such growth as will enable them to take care of themselves, and also by simultaneously reducing the number of the natural enemies.

From following the results of Dr. Gilbert's study I do not think your 4" long 6 months old migrants would mature any quicker by proceeding to the sea in their first fall than they would had they remained in the lake for, the usual period. Furthermore it is doubtful if they journey as far as the sea even after leaving the lake waters in their first six months. Clanton found that with the

PS What effect did last week's flood conditions have on the Harrison and other lakes spawning beds, and the egg deposited therein? I learn there has been considerable destruction in northern B.C. waters through floods experienced there last month and in September (KS)

spring salmon on the Columbia that those leaving in the fall drifted down from eddy to eddy in a leisurely fashion, and spent six months or so on the journey. There is nothing unreasonably in supposing that well developed sockeyes 4" long might not do likewise.

There has as yet been no meeting of canners to consider the recommendations made by Clanton in his report. Consequently I cannot yet say what action will be taken upon it, but my efforts are being directed to getting the canners to undertake the work as a private proposition supplementary to the Dominion Government efforts, and in localities they do not contemplate operating in - for the present at least.

As to the eggs required in such operations we naturally would expect the Government to donate these out of the take at Birkenhead after allowing for all they could care for themselves in rearing ponds (artificial and natural) at the various points where the Government is operating. Everybody that has studied the situation discredits the fry releasing system as obsolete and destructive. The announced intention of the Department is to install rearing ponds in connection with all their hatcheries "as fast as funds available will permit their doing so." For this season Major Motherwell publically stated they would have accomodation for 8 or 9 million fingerlings. This, on the basis of the egg take of the past few years would mean a surplus which they could not hold in rearing ponds of something like 40 million, which would have to be released in their fry stage.

Now if we come along and guarantee to install the ponds and pay the cost of rearing to the fingerling stage 10 million young sockeyes which otherwise would have to be turned out as fry, I do not think the Government would hesitate for a moment to comply with our offer. The mere fact that they themselves are abandoning the old system as fast as they can obtain money to do so, is the best evidence of their believe that fry releasing is a failure. They cannot justify the continued releasing of fry when rearing ponds are available, nor do I think they be so narrow minded as to think of refusing. I am sure the Departmental officials are as desireous as any canner to see the Fraser sockeye fishery restored, and while they naturally might like to secure all the credit for accomplishing this object, they would not refuse outside assistance on such selfish grounds when they lacked the funds to undertake all of the work themselves.

In your letter of the 27th you mention $400. as being too low for putting Seton Lake hatchery into operating condition. Perhaps you are right, but Mr. Clanton told me he was surprised in what excellent shape the Provincial government have kept this plant. He said all the necessary equipment was on the spot and in perfect shape to use at once and that the man in charge had seemingly spent his time in keeping all repairs promptly attended to so that but little in this respect would be necessary for us to do.

Yours sincerely