12670 Ventura Blvd.,
North Hollywood, Calif.,
October 13th, 1953.

John M. Buchanan, Esq.,
c/o B. C. Packers Ltd.,
Vancouver, B. C.

Dear Mr Buchanan: -

I duly received Mr Hyland's letter of the 28th ulto., and have to thank both you and that gentleman for the trouble and pains taken on my account. I also have to apologize for the delay in acknowledging these obligations but felt Mr Arthur Sager's very full and careful study of my viewpoints deserved an elaboration of my contrary conclusions. It has been the compilation of this data that occasioned the delay.

Enclosed herewith is a memorandum of my comments on the opinions Mr Sager expressed, which possibly he might like to see, if you think well of it. Please assure Mr Hyland that I will, of course, respect his desire that I should treat as confidential the information and opinions he procured for me. I certainly do not wish to jeopardize the possibility of hearing again from the same source.

With kindest regards and again many thanks,

Yours faithfully,

Comments on Scientific opinions as outlined in Mr Hyland's letter.

1. (a) Scientists are of the opinion an adequate food supply as concerns sockeye fry and fingerlings probably exists now in the Quesnel area and will continue to be adequate even under maximum capacity conditions.

(b) In 1920 I arranged for Mr R. E. Clanton, Master Fish Warden for the State of Oregon to investigate the Fraser river sockeye fishery, particularly in the Quesnel area. Mr Clanton reported the Quesnel feeding grounds were fully occupied by competitive and predatory species and his enquiries of old time sport fishermen and other pioneer observers found them a unit in stating that after the sockeyes had practically been eliminated, chubs, suckers and trout had increased in numbers at least twenty-five fold over what they had been when sockeyes frequented those waters. His opinion was the latter species could not be fully restored unless and until the other fishes were reduced to their earlier proportion of the total. They so fully monopolized the available food supply that any great number of salmon fry introduced into those waters would be starved to death. Gratifying as the expected escapement of close to one million fish in 1957 would be, that number falls far short of what Quesnel waters fed and supported before commercial fishing began and it is doubtful that even this million increase by 1957 would find ample subsistence unless the natural supply of foodstuffs is augmented.

Mr Clanton also reported the reduction of the undesirable species could be effected easily and cheaply by drag seining them in their spawning season when the adults sought shallow waters along the lake shores to deposit their spawn. He was opposed to their being reduced in numbers below their original natural quotas as he considered the original natural balance should be maintained. Some competitive and enemy associates were probably desirable, if not absolutely necessary, to develop in the sockeye instincts and characteristics needed to safeguard them in the attainment of their full development in both fresh and salt waters.

(c) I know of no attempt ever having been made by the authorities to determine whether any section of the Fraser river sockeye feeding areas is adequately stocked with food supplies. On the other hand they have long possessed the knowledge that feeding has an important effect on growth where the young sockeyes had no competition whatever for what foodstuffs were available.

About 1921 ~~of~~ or 1922 Mr Alexander Robertson, the very efficient superintendent of the Harrison Lake hatchery, liberated 275,000 sockeye fry or fingerlings in Grace Lake, near the hatchery,

and by means of a stockade prevented their egress from the lake waters. Grace Lake is small and is situated at an elevation high above the hatchery level and with a waterfall of fifty feet or more, which absolutely precluded the ascent of any species of fish past that obstacle. Mr Robertson designated this body of water as a "barren" lake inasmuch as there were no chubs, suckers, trout or other competitors therein to devour the ample food stocks that were present. The little sockeyes he planted in Grace Lake had the field all to themselves.

And the result? At the end of their first year, these introduced sockeyes had grown enormously. Compared to fingerlings of the same age that had been released in the larger Harrison Lake they were ten times as large! Grace Lake yearlings were as long as fully grown smelt, and in weight equalled at least two of the latter species. The Harrison Lake sockeye yearlings were about one and three-quarter inches in length and correspondingly less in girth and weight.

But the most interesting point about this experiment was the later development. In the following season Mr Robertson again stocked Grace Lake with sockeye fingerlings but he doubled the number released. Again the resulting growth was phenomenal as compared with the Harrison Lake yearlings but it was less than half that achieved with the first season's plantings. The food supply available in the Grace Lakes area (which if I recall correctly, was about two acres in size) was sufficient to achieve maximum growth for 275,000 sockeye yearlings but only half enough for double that quantity. Even then the growth of the second year's stocking was five times better than what was achieved in Harrison Lake. All this happened where the only factor in food consumers were the little sockeyes and the falling off in growth cannot be ascribed to competition from other species.

Mr Robertson's accomplishments suggest two thoughts:

(i) that no fresh water feeding area in the Fraser river watershed possesses at the present time an adequate supply of food for sockeye fry and fingerlings, to say nothing of sockeyes plus chubs, plus suckers and plus trout.

(ii) that given food supplies much greater than are deemed adequate by the scientists today not only would our lake waters support a greatly increased number of fish than they did in the past, but the size of the individual fish could be vastly increased as well.

2. (a) The views expressed herein indicate scientists agree with Mr Clanton that predatory species should be controlled but not eliminated. However, they think it probable sea survival is seriously reduced when fingerlings (such as hatchery reared sockeyes) are protected from natural competitors in their fresh water feeding areas, and that "artificial" sockeyes were ill fitted for survival both in the lakes and in the sea."

(b) My own opinion is that the damage is done in their fresh water habitat and that after journeying to the sea their chances of survival to maturity are no less than young sockeye of ferae naturae lineage enjoy. Furthermore, I think the preponderance of evidence lies decidedly on my side.

(c) Around 1880 quinnat salmon and rainbow trout fry and fingerlings were shipped from California to New Zealand where fishes of their respective species were previously unknown. These were hatchery raised fish that had been protected against all enemies and competitors up to the time they were sent to New Zealand. Not only did these "artificial" transplanted fish thrive but they did so to an astonishing extent, greatly exceeding their California cousins in size and weight, in many instances more than doubling the latter's growth. There was here absolutely no evidence that sheltering these fish in their infancy stages had unfitted them for holding their own in adult life.

(d) In 1884 a sockeye salmon hatchery was built at Bon Accord, opposite to and a short distance above New Westminster. It was known then that sockeyes naturally required a long stay in fresh water before proceeding to the sea, and as no lake waters existed at Bon Accord or between there and the Gulf of Georgia it was realized all would be destroyed if released at or near the hatchery. Therefore, each year when the fry were advanced enough to be released they were taken up to Harrison River and liberated in the still waters of Harrison Bay. Apparently this bay lacks some of the characteristics of a real lake for the transplanted fry went out with or before the winter freshets set in but after having attained sufficient growth to enable them to survive the change from a fresh water to a salt water habitat. They and their progeny comprise the "sea type" sockeye run that so greatly puzzled Dr Charles H. Gilbert.

In no other section of the entire Fraser River basin have these "sea type" sockeyes been found and in the Harrison River area they are found only in that part where the Bon Accord hatchery outputs were planted. Furthermore the sea type constitute the only portion of the Harrison area stock that has never known at least a partial failure. This is another instance where sheltered surroundings and protection from natural enemies <u>did not</u> impede the fry's development in its fresh water habitat nor adversely affect its chances of survival while living in the open sea.

4. (a) Predators and competitors control.

I have already partly dealt with this subject in 1 (b) and 2 (b) and (c) but would like to enlarge on it somewhat further here.

Nearly fifty years ago Henry S. McGowan, a pioneer Columbia River canneryman, was a member of the Washington State legislature and on one occasion addressed the Senate on the destruction of hatchery reared salmon fry by the predatory fishes. He claimed most of the hatchery output was destroyed by these enemies and that no proper attempt was being made to overcome their depredations.

Fishery authorities denied Senator McGowan's statement. They claimed salmon fry immediately on being released, buried themselves beneath the gravel and remained safely hidden there. Of course within a hundred yards or so of the very point where the fry were liberated, predatory fishes could make minor inroads since the multitude present at the time of release was so great, but beyond this distance no harm resulted as all the fry would have taken shelter.

A few weeks later Senator McGowan again addressed his colleagues on the subject. He produced dozens of photographs of predatory fishes surrounded by their stomach contents. These fish were caught at varying distances below every salmon hatchery in Washington State but in no instance was the capture made within a mile of the point of release of the hatchery fry. The photographs demonstrated predatory fishes were a distinct menace. Under each picture was listed the number of salmon fry the stomach had contained and an estimate was given of how many enemies it would take to consume in a given time the entire hatchery output.

I cite Senator McGowan's demonstrations because in the fifty years that have since elapsed absolutely no progress seems to have been made in controlling predatory inroads on salmon fry. Over thirty years ago Mr Found refused to accept Mr Clanton's control recommendations because he was "not satisfied in my own mind that chubs, suckers and trout are any menace to salmon fry". Even today, after another twenty years delay, the savants feel a great deal more investigation must be undertaken before they can submit a complete report. They appear to think the unsatisfactory results of past years have been principally due to (i) lack of survival of the young salmon after reaching the sea and (ii) the increase in the number of their enemies.

(b) I think it will probably be found that the apparent lack of survival at sea of young salmon is really a failure to survive the perils of their lake existence. With the increase of enemy and competitive species, due to the lessened sockeye runs in the first half of this century, the competition

for food must cause starvation amongst those least fitted to survive. Adult fish would have the best chance; weak fry and fingerlings would be the losers. Until an adequate food supply is made available to all the fish life in our lakes I believe this condition will prevail and our salmon fry will be the ones to suffer.

As evidence of this result I think the situation here in California and doubtless in many other places as well, gives ample proof. Here millions of trout fry and fingerlings are annually released in hundreds of small lakes all over the State to furnish sport for non commercial fishermen. The take of these fishermen in the open season is but a mere fraction of the total number of trout liberated and if there were a sufficient supply of food available to the uncaptured surplus the waters should in a short time be alive with adult trout of comparative growth and size to those found in Grace Lake from Mr Robertson's plantings. Such however is not the case. Comparatively few adult trout exist from one year to another. They do not suffer from enemy species. No lake today possesses an equal number of trout to what they contained when Mexico ceded the country to the American government. The only plausible explanation for the heavy annual losses would appear to be lack of sufficient food to sustain so vast a number as the hatchery crews plant, and I believe the same conditions prevail in the feeding areas of British Columbia and Alaska.

I think I have shown in the case of the shipments to New Zealand and in that of the Bon Accord hatchery sockeye fry that the sea survival does not drop. I can see no reason why the increase of enemy species cannot be rigidly and constantly controlled as has been, and is being, done with almost all other forms of animal life, both in water and on land, and also has been accomplished with products of the soil. Shad, striped bass and Japanese oysters were successfully introduced into Pacific Ocean waters while fresh water species have also thrived after being liberated here. In the vegetable kingdon grain crops have been increased one hundredfold over what the same land originally produced. There are more domestic cattle on the prairies today than the bisons, in their palmiest time, ever totalled, and California alone annually produces more baby chicks by hatchery methods than the world's total number of jungle fowl from which our domestic fowl was derived.

What has been done with these and countless other forms of life, is possible with salmon as well. Every advance step in hatchery accomplishments; every successful response to fry plantings in the Upper Fraser areas, in the Thompson River section, at Birkenhead and in Harrison Bay; all prove that salmon is not the one exception to the general rule that the past lack of success might indicate. The poor results only demonstrate how half heartedly we faced the problem in past years.

The splendid accomplishments of the Sockeye Salmon Commission in its restoration work is more than an indication; it is proof that our supply of sockeye salmon can in time, be built up to proportions equally as great as has been done with almost all other forms of life. It is but begging the question to defer experimentation pending the scientists' studies as to sea survival, adequate existing food supply and losses to predators. It was for this reason I suggested that in some one section, such as Chilcotin district, Mr Clanton's control over other species should be carried out and the supply of foodstuffs augmented until they approached what Grace Lake contained at the time of Mr Robertson's accomplishments. If this is undertaken by the International Pacific Sockeye Salmon Commission I feel satisfied it will prove the crowning achievement of the long lists of accomplishments they already have ~~to~~ so successfully performed.