

1877.

NEW ZEALAND.

INTRODUCTION OF CALIFORNIAN SALMON

(PAPERS RELATIVE TO THE).

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

No. 1.

Dr. HECTOR to Sir J. VOGEL.

(Telegram.)

New York, 17th June, 1876.

AMERICAN Fisheries Commissioners will deliver packed at Frisco, half-million salmon ova in November, and quarter-million white-fish ova, for lakes, in February, for four hundred pounds. Suggest vote to supplement societies. Success certain.

JAMES HECTOR.

Sir Julius Vogel, Wellington, New Zealand.

No. 2.

The Hon. SPENCER F. BAIRD to Dr. HECTOR.

United States Government Building, Centennial Grounds,
West Philadelphia, Pa., 21st June, 1876.

DEAR DOCTOR,—

I think I can, without difficulty, carry out your promise to Sir Julius Vogel in regard to the fish eggs, by delivering in San Francisco, to any agent of the colony, properly packed for shipment, a half of a million of salmon eggs in November, and a quarter of a million of white-fish eggs later in the year, for the sum of £400 sterling.

I have, &c.,

SPENCER F. BAIRD.

Dr. James Hector,

Commissioner from New Zealand, Centennial, Philadelphia.

No. 3.

Sir J. VOGEL to Dr. HECTOR.

SIR,—

Premier's Office, Wellington, 26th July, 1876.

I send you herewith copy of a telegram I received from you on the 18th July.

2. I understand from it that you wish the Government to place at your disposal an amount in excess of the subscriptions of the various Acclimatization Societies. You do not, however, name the amount you recommend; and, after some consideration, the Government have decided to authorize you to expend not more than £500 in addition to any means the Societies have placed at your command. This amount of £500 you must consider is to cover every liability of the Government on account of the shipment, and all expenses in America, on the seas, and in New Zealand. Anything in excess must be defrayed by the Societies.

3. On this understanding only, you are at liberty to draw on the Treasury for any part or the whole of £500.

4. The Government must stipulate for the right to determine how the ova shall be distributed. You will, in fact, see that the shipment is consigned to the Government.

5. I have to thank you for the interest you are taking in this very important matter.

I have, &c.,

James Hector, Esq., M.D.

JULIUS VOGEL.

No. 4.

Mr. E. Fox to Mr. R. J. CREIGHTON.

SIR,—

Premier's Office, Wellington, 29th July, 1876.

Supplementing my letter dated yesterday, I have been directed by the Premier to say that the letter to Dr. Hector has reference to a supply of salmon and white-fish ova for the colony.

2. Since it was written, Mr. J. C. Firth, of Auckland, has telegraphed to the Premier respecting a supply of ova which he anticipates will reach San Francisco in September or October.

3. I am to request that you will, as far as you can, assist towards the careful receipt and shipment of such ova.

4. You are not, however, to incur any expense on behalf of the Government unless you are authorized so to do by Dr. Hector, to whom specific instructions as to the liability which may be incurred are being sent.

R. J. Creighton, Esq., San Francisco.

I have, &c.,
E. Fox.

No. 5.

Sir J. VOGEL to Messrs. GILCHRIST, WATT, and Co.

GENTLEMEN,—

Premier's Office, Wellington, 2nd August, 1876.

I have been informed that, by the September or October mail steamer from San Francisco, there will be despatched a shipment of salmon ova for the Acclimatization Societies of Auckland and Canterbury.

2. The Government desire to aid those Societies in the attempt to introduce American salmon to this colony; and I have the honor to request that you will cause instructions to be given, so that at San Francisco facilities may be afforded for the careful receipt of the ova, and at Kandavau time may be allowed and assistance rendered to ensure their careful transhipment.

3. It is probable that in December, January, and February next ova may be received at San Francisco, through arrangements made by Dr. Hector on behalf of the Government; and I therefore ask that the instructions given to the captains and agents of the mail contractors' vessels may refer to these additional shipments, as well as to that on behalf of the Auckland and Canterbury Societies. Directions have been given to the New Zealand Mail Agents to assist as far as they can; and I am sure that you and your company will be ready to co-operate in a work which, if successful in the case of New Zealand, will be likely to lead to the speedy acclimatization of salmon in various parts of Australia.

I have, &c.,
JULIUS VOGEL.

Messrs. Gilchrist, Watt, and Co., Sydney.

No. 6.

Messrs. GILCHRIST, WATT, and Co., to Sir J. VOGEL.

SIR,—

Sydney, 22nd August, 1876.

We have the honor to acknowledge receipt of your letter of 2nd instant, respecting shipments of salmon ova expected from America.

We send by the outgoing mail copy of your letter to the General Agents at San Francisco, with a request that they will do all in their power to see the wishes expressed carried out, and every attention paid, so as to ensure success to the introduction of the ova.

We have, &c.,

GILCHRIST, WATT, AND CO.,

General Agents for the Contractors, San Francisco Mail Service.

The Hon. the Premier, Wellington.

No. 7

Mr. R. J. CREIGHTON to Mr. E. Fox.

SIR,—

San Francisco, California, 12th September, 1876.

In reply to your communications of the 8th and 9th July, written by direction of the Premier, and covering a letter to Dr. Hector, I have to state that Dr. Hector sailed by the previous steamer for New Zealand. He told me that he had arranged for the shipment of 150,000 salmon ova and a quantity of white-fish from the East, and that he would write, giving instructions regarding their shipment, but I suppose he overlooked doing so in the hurry of departure, as I received no letter from him.

Since then, I learned from Messrs. Cross and Co., who are acting for the Auckland Acclimatization Society, that the U. S. Commissioner of Fisheries telegraphed instructions to Mr. Livingston Stone, who is in charge of the breeding-ponds in this State, on no account to send salmon ova to New Zealand, inasmuch as the receipt of the first parcel had not been acknowledged, while the newspapers credited the supply to Columbia River, where there are no breeding-ponds, the fisheries being in private hands. Messrs. Cross have written to the U. S. Commissioner, and their explanation may be sufficient. Meanwhile I retain letter of instructions to Dr. Hector for another mail, and, should circumstances in my judgment warrant it, I will open it and ascertain the mind of the Government, as I propose, if necessary, making an effort to procure the ova on the terms arranged by Dr. Hector. As I have already explained, it may not be necessary owing to Messrs. Cross and Co.'s action in the matter. I shall not incur any expenditure on account of the Government unless authorized to do so. Would you be good enough to communicate the contents of this letter to the Hon. the Premier? and oblige,

E. Fox, Esq., Private Secretary, &c., Wellington.

Yours, &c.,
R. J. CREIGHTON.

No. 8.

MEMORANDUM by Dr. HECTOR *re* Salmon Ova.

As there appears from Mr. Creighton's letter, of the 12th September, addressed to the Private Secretary (Mr. Fox), to be some confusion between the orders sent by the Government and by the Acclimatization Societies for the shipment of salmon ova from America, I beg to state the circumstances, so far as I am acquainted with them.

In conversation with Mr. Spencer Baird, Chairman of the United States Fishery Commission, when at Philadelphia, in the beginning of June, I was made aware of the extensive establishment which the United States Government maintains for the breeding and dissemination of valuable species of fish; and, also, that some kinds of salmon found on the Pacific slope of the Continent had proved by experience to be most suitable for the purpose of acclimatization in other waters, from their hardy habits, great fertility, and high commercial value. I inquired whether it would be within the functions of the American Commission to co-operate with the New Zealand Government for the purpose of introducing salmon into that country. Professor Baird said he had full authority to do so, and that the Commissioners would take great interest in insuring the success of the experiment, which had already been tried on a small scale through the Auckland Society. He recommended that a large shipment should be made as the best way of insuring success, and, after some days' consideration, he informed me that the Commissioners would make no charge for the ova, and only required to be repaid the expense of packing and delivery of the boxes of ova in San Francisco. He proposed that half-a-million of salmon ova should be sent by the October or November mail steamer this year, to be followed in February by a quarter of a million of the ova of the white-fish (*Coregonus albus*), which is a very valuable species of salmonoid for acclimatization in our lakes, and estimated the cost at £400. Fearing that I might traverse arrangements entered into in the colony for the same purpose, and thus cause more ova to be sent out than could be reared in the breeding-houses in New Zealand, I inquired if any such order had been received, and being assured to the contrary, as such an arrangement could not have been made without Professor Baird's knowledge, I telegraphed to Sir Julius Vogel, on the 17th July, to overtake the San Francisco mail, informing him of terms on which the ova could be obtained, and suggesting a vote on the same terms as on former occasions—viz., that Acclimatization Societies should bear half the expense, at the same time forwarding a copy of the telegram to Professor Baird, who replied (21st June), "I think I can, without difficulty, carry out your promise to Sir Julius Vogel in regard to fish eggs, by delivering to any agent of the colony in San Francisco, properly packed, a half-million of salmon eggs in November, and a quarter-million of white-fish eggs later in the year, for the sum of £400 sterling."

On reaching San Francisco, on the 10th August, I spoke to Mr. Creighton, and also to Mr. Craig, of the New Zealand Insurance Company, and to the British Consul, Mr. Booker, all of whom agreed to see to the arrangements for shipping the ova in case instructions should have been sent by Government to the Fishery Commission, or if they arrived in San Francisco after I left on the 16th.

From Honolulu, finding no instructions had been directed there from the colony, I wrote to Professor Baird, telling him that, in the event of the Government of New Zealand approving of the arrangement I had entered into with him, the ova would be delivered to Mr. Creighton, and requesting him to address any further communication on that subject to that gentleman. At the same time I pointed out to him that the season was too far advanced for receiving so large a consignment of salmon ova this year; but I still hoped that the shipment of white fish ova would be approved of by Government, and sent as contemplated, and that the salmon ova could follow next season. I also wrote to Mr. Creighton, telling him that I had received no instructions at Honolulu, and leaving the matter in his hands in case he should receive any instructions.

On arriving at Wellington, on 16th September, I found that a letter of instructions from Sir Julius Vogel, dated 26th July, had crossed me between San Francisco and Honolulu, and that a copy had been sent to Mr. Creighton. This letter authorized the expenditure of £500, to cover every liability of the Government for shipment, and all the expenses in America, on the seas, and in New Zealand. Anything in excess to be defrayed by the Societies. Under the circumstances I recommend the vote still to be taken, although only a small part may be required this year for the white-fish ova.

Respecting the memorandum from the Hon. Dr. Menzies, I concur in the importance of carrying out to its completion, as he suggests, the experiment of acclimatizing the English salmon, which has so far been successful in the shipment by the "Durham" last year.

But any further expenditure I think should be directed to the introduction of American salmon. In case the funds voted are not sufficient both for the maintenance of the Southland ponds and for the introduction of American ova, I think the preference should be given to the former.

17th October, 1876.

JAMES HECTOR.

No. 9.

Mr. R. J. CREIGHTON to Mr. E. Fox.

SIR,—

San Francisco, California, 10th October, 1876.

In continuation of my letter of 12th September, 1876, I have to state, for the information of the Hon. the Premier, that through the active agency of Messrs Cross and Co., of this city, acting for the Auckland Acclimatization Society, Professor Baird, United States Commissioner of Fish and Fisheries, rescinded his previous order, and gave instructions to Mr. Stone, the officer in charge of the McLeod River establishment, to send supplies of salmon ova to New Zealand.

2. Messrs. Cross kindly permitted me to peruse this correspondence, and as Professor Baird expressed his keen sense of dissatisfaction at the want of courtesy by the consignees of the first shipment of salmon ova to New Zealand, I felt it to be my duty to explain how this had unavoidably

occurred. Professor Baird replied to my letter in a spirit of friendly interest in the experiment; and I have written informing him that the ova are on board, and that he will be kept fully apprised of the result of the experiment in every stage.

3. As this is the only occasion on which the Commission on Food Fishes of the United States has forwarded a supply of salmon eggs to a foreign country, it is important that it should be notified of the most minute facts observed during the progress of the experiment. If successful, the Commission will have added enormously to the food supply of New Zealand, thereby increasing the wealth and comfort of the population, and providing an inducement to settlement of the most valuable character.

4. I likewise wrote to Mr. L. Stone, United States Commissioner, Reading, California, in charge of the McLeod River establishment, explaining to him, substantially as I had previously done to Professor Baird, the cause of the non-acknowledgment by the consignees of the receipt of the ova, and impressing upon him the importance of sending the full quantity authorized. Mr. Stone having gone East about this time, I received no reply; but I am pleased to say that the ova arrived in good order to-day, and are packed in the ice-house of the "Zealandia," which has been set apart for this purpose.

5. The shipment for the New Zealand Government, addressed to Dr. Hector, consists of two crates, containing 84,000 eggs. Fifty thousand eggs are on board for Napier, a very large supply for the Auckland Acclimatization Society, and a parcel for Christchurch. The total supply is greatly in excess of the quantity supposed to be available by Professor Baird. This is a fortunate circumstance, inasmuch as it increases the chances of the success of the experiment.

6. Mr. Cheeseman, postal agent, and the commander of the "Zealandia," have charge of the shipment. Everything depends upon the transshipment and subsequent voyage to New Zealand, but as there is abundance of ice on board the risk is slight.

7. On receiving no further instructions by the last mail, I opened the letter of instructions to Dr. Hector, but I have not gone in any way to pledge the Government to pay money, other than as Dr. Hector had agreed to do. Professor Baird's letter, attached, will show the unsettled character of the arrangement, which does not appear to be understood by the Professor. The following extract from my letter to Mr. Stone on this subject, which is the only portion of this letter I need forward to you, will show the exact length to which I have gone in pledging the Government to pay money:—"Messrs. Cross and Co. and Mr. Duffy are in funds for the Auckland and Napier shipments, and the New Zealand Government will give effect to Dr. Hector's arrangement with yourself and the United States Commission at Washington."

8. The understanding here is that the cost of freight, ice, &c., shall be borne *pro rata* by the consignees. Messrs. Cross and Co. conducted the shipping business, and the Government will doubtless hear from them through the Auckland Acclimatization Society. The expense in this way will not be large.

9. I have to request attention also to that part of Professor Baird's letter, in which he intimates that applications for further supplies should be made early in spring. There was something like a scramble in the present business, and this is to be avoided in future. The colony is now in perfect accord with the United States Fish Commission, and if attention be paid to its requirements as to official recognition and information regarding the fish-breeding experiment, great and lasting good must result to the country.

10. I have not promised any gratuity to the commander of the "Zealandia," nor to Mr. Cheeseman, but I presume, if the ova are landed in good condition, their services will not be overlooked. As I take a deep interest in this matter personally, I should like to be informed of the result of the experiment, about which many of the leading citizens of San Francisco are anxious.

I have, &c.,

R. J. CREIGHTON,
Resident Postal Agent.

E. Fox, Esq., Private Secretary, Wellington.

No. 10.

Mr. R. J. CREIGHTON to the Hon. SPENCER F. BAIRD.

SIR,—

San Francisco, California, 20th September, 1876.

Messrs. Cross and Co., San Francisco, read to me your letter authorizing Mr. L. Stone to prepare for shipment for New Zealand, by the October steamer, three parcels of salmon ova. I have the honor to thank you, on behalf of the consignees, for the liberality of your order, and your kindness in overlooking the informal applications from New Zealand. The consignees will themselves, in due course, thank the United States Fishery Commission, and present their apologies for any seeming disrespect of which you may have had reason to complain.

2. Permit me to explain, however, that the first shipment of ova, through Mr. Duffy, of San Francisco, for Napier, never reached its destination. The steamship having it on board went direct to Sydney, and, failing to obtain a fresh supply of ice there, it was found that the ova had begun to hatch out on arrival in Auckland, New Zealand, on the up trip; whereupon Mr. J. C. Firth took a portion of the eggs and placed them in the Auckland Acclimatization Society's ponds; the result was that a considerable proportion was saved, and young, healthy fish were deposited in a few streams in the Province of Auckland. So far, the experiment was a success; but writing of it, credit was given by the local Press, entirely through ignorance of the facts, to Columbia River, and not to the McLeod River establishment of the United States Fishery Commissioners. Had the ova arrived at their destination, doubtless the mistake would not have occurred.

3. Finding that ova of California salmon could be successfully introduced into New Zealand (experiments from Great Britain theretofore having failed), the Auckland Acclimatization Society, in concert with a similar society in Christchurch, in the Middle Island of New Zealand, in which there are many suitable streams, applied through Cross and Co., as you are aware, for 150,000 eggs; Hon. Mr. Ormond, Superintendent of Hawke's Bay, applied, through Mr. Duffy of this city, for 50,000;

and Dr. Hector, while in Washington, also applied for 50,000 on behalf of the New Zealand Government, for which, also, he was Commissioner at the Centennial Exposition. (I have used the figures in Dr. Baird's letter as the quantities applied for.) These are the parcels of which you have been pleased to authorize the shipment, and for which, I have no doubt, you shall be officially thanked.

4. I have noted your remark to Messrs. Cross, and will communicate the same to the New Zealand Government and the other parties interested, that "This contribution has been made by the United States Fishery Commission from its establishment at McLeod River, California, and that the credit arising from the successful experiment should be assigned to the United States Government for its action in the matter; also that the consignees shall address their acknowledgments, as well as an account of the condition of the eggs, and their subsequent experience of the fish, to you, as Commissioner of Fish and Fisheries, Smithsonian Institution, Washington."

5. I feel this explanation is necessary under the circumstances, and because I also know that very great regret will be felt in the colony when they learn that any difficulty has arisen through an informality and apparent want of courtesy on their part. Very great interest is taken in this matter in New Zealand, and the liberality of the United States Government, through its Fish and Fishery Commission, will be gratefully acknowledged by that country.

I have, &c.,

ROBERT J. CREIGHTON,
Resident Postal Agent for the New Zealand Government.

The Hon. Spencer F. Baird,
United States Commissioner of Fisheries, Washington.

No. 11.

The Hon. SPENCER F. BAIRD to Mr. R. J. CREIGHTON.

United States Government Building, Centennial Grounds,
West Philadelphia, Pa., 28th September, 1876.

DEAR SIR,—

I am in receipt of your letter of the 20th of September, and trust that Mr. Stone will be able to meet my request to supply a series of salmon eggs to the several colonies of New Zealand.

Owing, however, to the comparatively late period of the application and of the transmittal of instructions, it is barely possible that the full measure can be given. Future applications should be made early in the spring.

My request to Mr. Stone, to send 50,000 eggs to Dr. Hector at Wellington, was on my own motion. When I saw the Doctor last in Philadelphia, he proposed to obtain a grant of money from the colonial authorities for the entire service, without specifying the stations or quantities, since which I have not heard from him.

I have, &c.,

ROBERT J. CREIGHTON, Esq.,
Postal Agent, New Zealand Government, San Francisco, California.

SPENCER F. BAIRD.

No. 12.

Mr. R. J. CREIGHTON to the Hon. SPENCER F. BAIRD.

DEAR SIR,—

San Francisco, California, 10th October, 1876.

I am in receipt of your favour of the 28th September, and have to thank you for your courteous attention, and the readiness with which you complied with the informal applications from New Zealand for salmon ova. I have already written to the colony explaining the position of the United States Fishery Commission in this matter, and I have no doubt you will be kept fully informed of the result of the experiment through its several stages. I am happy to state that the ova arrived to-day, and was packed in ice in the ice-house of the "Zealandia" mail steamer, which has been appropriated to its use. It is an iron air-tight chamber on deck, and will suit admirably. It will not be disturbed during the voyage to Fiji, where a transshipment takes place. This is the only point of difficulty, but I do not apprehend much danger to the eggs, the time occupied being so short.

2. Dr. Hector wrote to me from Honolulu stating generally the arrangement or understanding for the supply of eggs from the McLeod River establishment; but as his instructions from the New Zealand Government passed him on the way, I think it is better to let the question of money rest until he has had an opportunity of writing from the colony, after consulting the Government, which he has had by this time. I may say, however, that the New Zealand Government has funds at its disposal for this purpose to an amount greater than is likely to be required. In all likelihood the whole question will be definitely settled by next mail. Dr. Hector informs me that he had arranged for a supply of white-fish from the East next spring, but for the reason already stated I cannot go into details. However, the entire service will be satisfactorily arranged I have no doubt.

3. In his letter, Dr. Hector informed me that he had written to you, but as his correspondence came by sailing-packet, doubtless it did not reach you so soon as it otherwise might have done. I enclose copies of this correspondence to the New Zealand Government.

I have, &c.,

R. J. CREIGHTON,
Resident Agent, New Zealand Government.

The Hon. Spencer F. Baird.

No. 13.

The Hon. the COLONIAL SECRETARY to the Hon. SPENCER F. BAIRD.

SIR,—

Wellington, 16th November, 1876.

Upon the return of Dr. Hector from the Centennial Exhibition at Philadelphia, and having received his report of his proceedings in the United States, it becomes my gratifying duty to tender to you the thanks of the Government of New Zealand for the eminent and valuable assistance rendered by you to this colony in the person of its representative at the Exhibition.

I desire, further, to thank you for the hearty co-operation of the Commission over which you preside in the efforts of this country to obtain a stock of food-fish from America. You will be glad to hear that the first consignment to the Government of 84,000 salmon ova, contributed by Mr. Stone, the officer in charge of your establishment at the McLeod River, has arrived safely and in good order so far as yet reported on. You will no doubt be informed of the result of the separate shipments to private order from Auckland, Hawke's Bay, and Canterbury, by the local Acclimatization Societies at those places.

I shall have pleasure in sending you advices of the further progress of the Government importation by future opportunities.

I have instructed Mr. Creighton to ascertain from Mr. Stone, and to draw for, any amount that may be due from the Government of this colony to the United States Commissioner on account of the shipment of ova per "Zealandia" in October.

We shall be very glad to receive, through your kind offices, a shipment of white-fish ova in February next, as has, I understand, already been arranged for by Dr. Hector, and shall always be thankful to yourself, the Commission, and the United States Government for your further co-operation and assistance on future occasions in our endeavours to increase the stock of food-fish in New Zealand by importation from America.

The Hon. Spencer F. Baird,
Chairman, United States Fishery Commission.

I have, &c.,
DANIEL POLLEN.

No. 14.

The Hon. SPENCER F. BAIRD to the Hon. the COLONIAL SECRETARY.

United States Commission, Fish and Fisheries, Washington,

21st December, 1876.

DEAR SIR,—

I have the honor to acknowledge the receipt of your letter of November 16th, and beg to say, in reply to that portion of your letter relating to any assistance rendered to Dr. Hector, the Commissioner at Philadelphia, that it was duly warranted by the eminent personal and scientific qualities of Dr. Hector himself. I beg to assure you that no one stood higher in the regard of all Americans who were brought in communication with him, or among his fellow Commissioners, than he did, and his premature departure was a source of unceasing regret.

I beg also to express my gratification of the safe arrival of the eggs of the Californian salmon, as presented to the various colonies of New Zealand by the United States Fish Commission. I have full faith in the probable success of the experiment, and should an additional stock be desired will take great pleasure in furnishing them, if the establishment is kept up by the United States. I shall be glad to have the further advices promised in regard to the fish from time to time.

One-quarter of a million white-fish eggs will be sent to San Francisco in the course of the present month, with instructions to place them in charge of Mr. Cross and Mr. Creighton, for transmission to Wellington.

Hoping that these may arrive in a satisfactory condition,

The Hon. the Colonial Secretary.

I have, &c.,
SPENCER F. BAIRD,
Commissioner.

No. 15.

Mr. G. S. COOPER to Mr. R. J. CREIGHTON.

SIR,—

Wellington, 16th November, 1876.

I am directed by Dr. Pollen to acknowledge the receipt of your letters addressed to Mr. E. Fox, under date the 12th of September and 20th of October, with enclosures to the latter, upon the subject of the shipment of salmon ova to New Zealand; and I have much satisfaction in informing you that the supply addressed to the Government, which was shipped from San Francisco per "Zealandia," and transhipped into the "City of New York" at Fiji, arrived safely and in good order so far as yet reported on. They were transhipped at Port Chalmers for the Bluff, and thence forwarded to the Makarewa Ponds near Invercargill, where the process of hatching is proceeding so far satisfactorily.

The Government are writing to Professor Baird conveying their thanks for this the first shipment of eggs consigned to them by the United States Fishery Commissioners, and thankfully accepting the offer of further aid.

The Government have also confirmed the order for white-fish ova in February next.

I enclose a copy of Dr. Pollen's letter to Professor Baird.

I am now directed to request that you will be good enough to ascertain from Mr. Livingston Stone the amount that is due from the Government of New Zealand to the United States Fishery

Commission, or to the branch of it which he represents, in respect of the Government's share of the recent shipment, and to authorize you to draw for the same upon the Colonial Treasurer.

In conclusion I am directed to convey to you the thanks of the Government for the trouble you have taken in giving effect to their wishes upon this subject.

R. J. Creighton, Esq., San Francisco, California.

I have, &c.,
G. S. COOPER.

No. 16.

Mr. R. J. CREIGHTON to Mr. G. S. COOPER.

SIR,—
San Francisco, California, 7th November, 1876.
In continuation of my letter by last mail, on the subject of salmon ova for New Zealand, addressed to Mr. E. Fox, for the information of the Premier, I enclose a note from Professor Baird, in which he states that no charge will be made for the shipment by last steamer, beyond the cost of packing at the station and transportation to San Francisco. He also intimates that the white-fish, which Dr. Hector arranged for, will be forwarded in due course. I shall attend to his request, and write reminding him of the matter. I think the liberality of the United States Fish Commissioners should be suitably and promptly acknowledged by the New Zealand Government. In the matter of acclimatization much might be done if the Societies would place themselves in the hands of the Government, and permit them to conduct the negotiations. It would be an easy matter to arrange for distribution in the colony.

The Under Secretary, Wellington, New Zealand.

I have, &c.,
R. J. CREIGHTON.

Enclosure in No. 16.

The Hon. SPENCER F. BAIRD to Mr. R. J. CREIGHTON.

DEAR SIR,—
United States Government Building, Centennial Grounds,
West Philadelphia, Pa., 20th October, 1876.
In reply to your letter of the 10th of October, I beg to express my gratification at hearing the salmon eggs were duly received, and would be shortly forwarded by the "Zealandia." I am not entirely satisfied as to the propriety of enclosing them in an air-tight ice-house, as they will require a certain amount of oxygen for their proper development.

I do not propose to make any charge for supplying the eggs for the present shipment, merely reclaiming the cost of packing at the station and transportation to San Francisco. Possibly, in any additional contributions of magnitude, I may feel bound to assess a portion of the actual expenses. The white-fish are provided for, and I hope will be furnished at the proper time. May I ask you to remind me of this by letter, to reach me about the 1st of January?

Robert J. Creighton, Esq., San Francisco, California.

I have, &c.,
SPENCER F. BAIRD.

No. 17.

Mr. R. J. CREIGHTON to Mr. G. S. COOPER.

SIR,—
San Francisco, California, 3rd January, 1877.
I have to state, in reply to your letter of 16th November, 1876, that I put myself into communication with Professor Baird and Mr. Stone, as therein directed. I have not heard from the latter. I enclose correspondence.

During my absence in Southern California two boxes of white-fish eggs arrived, as advised by Dr. Baird, and were placed in the ice-house here waiting the departure of the mail. Preparations were made for their reception on board the steamer, and yesterday I saw the box for New Zealand packed in ice in a loose case, and drove with it to the vessel, where it was transferred to the ice-house in my presence. It will be similarly packed for transfer at Kandavau. Next steamer the second instalment of 125,000 white-fish eggs will be forwarded. I trust these will arrive safely. As I have not been furnished with any account for salmon shipment, I cannot draw upon the Government for any amount. I am greatly indebted to Hugh Craig, Esq., Agent for the New Zealand Insurance Company, who, in my absence from town, gave the necessary instructions.

G. S. Cooper, Esq., Under Secretary, Wellington.

I have, &c.,
ROBT. J. CREIGHTON.

Enclosure 1 in No. 17.

Mr. R. J. CREIGHTON to Mr. L. STONE.

SIR,—
San Francisco, 14th December, 1876.
I have the honor, by direction of the New Zealand Government, to request that you would be good enough to inform me the amount that is due from said Government to the United States Fishery Commission, or to the branch of it which you represent, in respect of the Government share of the

recent shipment of salmon ova to Dr. Hector's address, for which I am authorized to draw on the Colonial Treasurer of New Zealand. As I am going out of town for a few days, should your letter not receive prompt attention you will understand the cause of the delay.

I have, &c.,

Livingston Stone, Esq.,

United States Fish Commissioner, Reading, California.

R. J. CREIGHTON,
Resident Agent, New Zealand.

Enclosure 2 in No. 17.

Mr. R. J. CREIGHTON to the Hon. SPENCER F. BAIRD.

DEAR SIR,—

San Francisco, 14th December, 1876.

I have much pleasure in informing you that the shipment of salmon ova arrived at its destination in excellent order, and that the hatching out has been successful. The Press of New Zealand has acknowledged the liberality of the United States Fish Commissioners, and I am advised that the Colonial Secretary has written to you expressing the thanks of the New Zealand Government for your considerate attention to their requests. Mr. Firth, president of the Auckland Acclimatization Society, writes in similar terms, and doubtless you will have received a letter from him before this reaches you. I forward to your address a copy of the Auckland *Southern Cross*, containing a notice of the arrival of the consignment of eggs, and I have arranged to forward to you copies of the San Francisco *Evening Post*, containing a special article on the subject.

In obedience to instructions, I have requested Mr. Stone to inform me the amount of indebtedness by the New Zealand Government on account of their share of the shipment, on receipt of which the money will be paid.

I trust there will be no difficulty in the way of supplying the white-fish arranged for by Dr. Hector, which you requested me to remind you of about the new year.

I am certain the success of the experiment hitherto will be a source of satisfaction to yourself, as unquestionably it is to all classes in New Zealand.

I have, &c.,

R. J. CREIGHTON.

The Hon. S. F. Baird, Washington, D.C.

Enclosure 3 in No. 17.

The Hon. SPENCER F. BAIRD to Mr. R. J. CREIGHTON.

National Museum, Smithsonian Institution, Washington,
12th December, 1876.

DEAR SIR,—

I propose to send about or after the 20th of December a quarter of a million of white-fish eggs to the Acclimatization Society at Wellington, care of Dr. James Hector, and I beg that you will kindly take charge of the shipment of these, paying the necessary expenses of transportation from Northville, Michigan, and of fitting up any provision on the steamer for their safe transmission. The weather will be so cool, that a delay of some time in San Francisco will probably not affect them. It is probable that these eggs will be sent to Mr. B. B. Redding, Fish Commissioner of California, with some for the California Commission. Please see Mr. Redding on this subject. I cannot tell here when the steamer leaves, but hope the eggs may go on soon after reaching San Francisco.

I have, &c.,

SPENCER F. BAIRD.

R. J. Creighton, Esq., San Francisco, California.

Enclosure 4 in No. 17.

The Hon. SPENCER F. BAIRD to Mr. R. J. CREIGHTON.

United States Commission, Fish and Fisheries, Washington,
22nd December, 1876.

DEAR SIR,—

I am duly in receipt of your letter of the 14th of December, informing me of the safe arrival of the salmon eggs in New Zealand. It is indeed gratifying to know that such a brilliant success has been experienced; and I trust it may be in my power to assist in having subsequent shipments, not only to New Zealand, but to other points in Australia.

I am in momentary expectation of receiving the announcement of the shipment from Northville, Michigan, by Mr. James W. Milner, my deputy, of a lot of white-fish eggs for New Zealand. 500,000 are to be forwarded to San Francisco, of which 250,000 are intended for Wellington, and 250,000 for the California Commissioners. To save expense, and to ensure greater care of the eggs, I directed that all be addressed to Mr. B. B. Redding of the Central Pacific Railroad and Fish Commissioner of California.

The consignments are to leave at intervals of about a week, so as to avoid the risk of injury to the whole. I have also asked that each consignment be so arranged that it can be divided into two lots of 125,000 each. If, for any reason, as that of the departure of a steamer after the arrival of the first lot and before that of the second, it would be better to take all of consignment number one for New Zealand, I have no doubt that Mr. Redding will consent to it. Of course you will see that all proper precautions are taken for the packing of the eggs on the steamer.

I have, &c.,

SPENCER F. BAIRD,
Commissioner.

R. J. Creighton, Esq., San Francisco, California.

No. 18.

Dr. HECTOR to the Hon. the COLONIAL SECRETARY.

SIR,—

Colonial Museum, Wellington, 8th February, 1877.

I have the honor to report the receipt of the case of white-fish ova, referred to in Mr. Creighton's letter of the 3rd January, and to inform you, that in accordance with your instructions, it was sent on to the Secretary of the Acclimatization Society, to whom I telegraphed, so that he might take delivery of it at Lyttelton.

From Professor Baird's letter of the 22nd December, it appears that this case contains 125,000 ova, or one-half the total number that were ordered, and that the remainder is to follow by next mail steamer.

I opened the outer case and ascertained that there was a sufficient quantity of ice round the inner box to maintain the ova at a low temperature until they reached the hatching-ponds, and so far as I can judge the shipment has been successfully conducted up to this point.

As the rearing of the young fish will be attended with some difficulty, and require different treatment from that adopted for the young salmon and trout, I have extracted the information in the enclosed memorandum for the guidance of those who conduct the experiment, chiefly from the Reports of the United States Fisheries Commissioners.

The Hon. the Colonial Secretary.

I have, &c.,

JAMES HECTOR.

Enclosure in No. 18.

MEMORANDUM respecting the American Salmon and White-fish, recently introduced into New Zealand.

1. CALIFORNIAN SALMON (*Salmo quinnat*, Richardson.)

This fish has been placed in the sub-genus (*Oncorhynchus*), which differs from the true *Salmo*, in having more rays in the anal fin. In habits and general form it closely resembles the *Salmo salar* of the Atlantic, and it is probably identical with the North Pacific salmon, *Salmo* (*Oncorhynchus*) *lycaodon* of Pallas (Gunther, vol. vi., p. 155).

The most important difference from the Atlantic salmon is its endurance of much higher temperatures at the period of spawning, as the eggs are matured in the summer and hatched in the autumn of a mild climate, instead of being developed during a rigorous winter, and hatched out in spring.

The Californian salmon spends the greater part of its life in the sea, and especially frequents deep-water inlets.

There are three "runs" of this salmon up the rivers in each year—the first is in spring, during March and April, when the prime fish, of largest size and best quality, after frequenting the estuaries in large numbers during the winter months, start up the rivers, the full-grown fish working up to the source of the streams, where they spawn in July and August. So far as yet observed, the adult fish all die after spawning, and never return to the sea. In August there is a second run of fish up the rivers, but at this season they are of inferior quality. The third run is of smaller-sized fish, in the month of October, just before the winter sets in. There are no salmon in the rivers during the winter months from November to March, at which season they are caught in the sea.

The young fish hatch out in October, after sixty days' immersion when the water has an average temperature of 48° to 50° F., but after forty-eight days' with an average temperature of 58° to 60°.

It has not been ascertained where the young fish spend the winter months. It is an important fact that in ascending to the breeding-place the gravid fish must frequently pass through river water having a temperature of over 76°.

The average size of the full-grown salmon in the Sacramento River and its tributaries is about 20 lbs. weight, but fish weighing from 40 lbs. to 50 lbs. are not uncommon. It is a large handsome fish, with silvery scales, and a deeper body and less delicate look than the salmon of Europe, but in quality as food they are quite equal to it. When in prime order their flesh is firm, sweet, rich, juicy and high coloured. As a game fish they are active and powerful, and are freely caught with hook and line in salt and brackish water. In fresh water the best bait is salmon roe, but they also give good sport with the artificial fly. The climate of the upper tributaries of the Sacramento River, where the best salmon-fishing in California is found, closely approaches to that of the New Zealand mountain vallies. The winters are mild, a very little snow falling occasionally with the rains. The days in summer and autumn are hot, but the nights are cool, there being a great range of temperature in the twenty-four hours. Thus, in September (corresponding to March in New Zealand) the thermometer has been known to rise from 55° at sunrise to 100° at noon.

The foregoing observations indicate the *Salmo quinnat* to be well adapted for thriving in the seas and rivers of New Zealand, and the success which has attended the recent shipment of ova shows that a few large importations would, in the course of a few years, thoroughly stock our waters, and introduce a lasting and remunerative industry, as it is from this species that the chief supply of preserved salmon is now manufactured. The consumption of this article in New Zealand and the Australian Colonies in one year, as shown by the import returns for 1875, was very large, the New Zealand share having a value of £10,000. The business of canning on the Pacific Coast has now reached enormous dimensions. In 1875, 16,000,000 lbs. of canned fish was prepared for exportation, and last year seventeen cannaries were at work, though not fully employed, owing, however, to a deficient supply of fish, and not to any falling off in the demand.

2. WHITE-FISH.

The species of white-fish, the ova of which are now being imported, is the *Coregonus albus*, the most valuable of a large number of species of that genus, which are distributed throughout the fresh-water lakes and streams of the Northern Hemisphere between latitude 46° and the Arctic Circle.

The representatives of the genus in Britain are the *vandace* of Loch Mabin and Lake Windermere, the *powan* of Loch Lomond, the *pollan* of the Irish lakes, and the *gwyniad* of certain lakes in Wales.

In America there are several species, some of which ascend rivers from the sea, while others, of which *Coregonus albus* is one, are chiefly confined to lakes. The American Commissioners express the opinion that few fish will better repay efforts for their multiplication than this white-fish, and large sums are being spent in the propagation and introduction of this species to the various northern and winter stations, where they are not found naturally.

The excellence of the white-fish as an article of food is described by all travellers in the northern regions of America, where it forms the staple diet of the Indians and trappers during a large part of the year. It is a plump-bodied fish, free from small bones, with firm delicately-flavoured flesh in large white flakes. It is highly nutritious, but at the same time free from the rich oil which renders the salmon so cloying to the appetite when constantly used as food.

The size of the full-grown fish is pretty uniform if caught in the same locality; but in some places they reach a weight of 20 lbs. and even 40 lbs., while in others the average is about 2 lbs. weight, the difference being no doubt due to the paucity or abundance of their favourite food, which consists of small crustaceans and shell-fish. They grow rapidly, the weight increasing about $\frac{1}{2}$ lb. for each year's growth, the fish of the first season, or about eighteen months old, generally weighing $1\frac{1}{2}$ lbs. They are very fertile, the number of eggs deposited by the female being about 10,000 for every pound-weight of fish. They have the great advantage of being in season and procurable at all times of the year, although they have regular migrations from the shallow to the deeper waters of the lakes, and to the shoals at the outlets of the lakes for the purpose of spawning. This takes place in the month of November, or just before the winter sets in. At this time the temperature of the surface water is about 43° in the larger lakes. When owing to the shallowness of the water in which the ova are deposited the temperature falls to 34° to 35° during winter, they do not hatch out until April, but the usual period is 100 days between the spawning of the ova and the emergence of the young fish.

In the case of the ova recently imported, the period seems to have been under eighty days, as they were spawned about 15th November, and the young fish hatched out in Christchurch on the 3rd February, which goes to prove that the low temperature in their native waters only retards the development of the ova, and that it is not essential that they should remain dormant for so lengthened a period. This is a very important question as affecting the propagation of this fish in New Zealand, as, if the continued low temperature of the great lakes of North America is essential, there is no lake in New Zealand where there is a chance of this fish being successfully reared. But if the absence of the extreme cold will only lead to a more rapid development of the embryo, there is no reason to doubt that some at least of the larger and deeper lakes, such as Wakatipu and Wanaka, and especially Te Anau, will prove suitable. The waters of Lake Erie attain a surface temperature in summer of 75°, at which season the white-fish return to the cool deep waters; but in other lakes, which are deeper and without undercurrents, at that season the white-fish run to the shores, and especially to the entrance of rapid rivers or a broken rocky coast, where the splash of the waves favours more thorough aeration of the water.

The surface water of the above-mentioned New Zealand lakes has rarely a higher temperature in summer than 52°. On the 6th instant Mr. Worthington ascertained the temperature of the embayed surface water at Queenstown, Lake Wakatipu, to be 53° at sunrise and 55° at 2 p.m. In winter I found the surface temperature at the same place to be about 46°, and, although we have no information on this point, it is probable that much colder water is to be found at all seasons in the profound depths of this and all the great lakes of the South, so that, as far as mere temperature is concerned, the white-fish would feel at home, provided the winter temperature on the gravelly banks where the rivers enter the lakes is sufficiently low for the proper development of the ova.

It is very desirable, however, that the experiment should be tried under the most promising conditions.

The first shipment having been hatched out at Christchurch, I recommend that the whole of the young fish obtained should be placed in Lake Coleridge as soon as they can be removed, and that the shipment expected by next mail steamer should be forwarded, with a sufficient quantity of ice, to the Makarewa Ponds to be hatched, and the young fish transferred to the Te Anau and Wakatipu Lakes. As the shipment will, no doubt, arrive, like the last, in one parcel, and the chance of success in the South is so much greater provided there is a sufficient supply of ice available, I cannot recommend that this second consignment of ova should be intrusted to the Auckland Acclimatization Society.

Their application is for the purpose of stocking Taupo Lake, but I find that the water at the outlet of Taupo Lake only varies from 54° in winter to 63° in summer, which differs so materially from the conditions that control the natural distribution of the fish, that there would be very small chance of their thriving.

The chief difficulty in propagating the white-fish arises from the circumstance that the ova are coated with an adhesive mucus, that renders their manipulation more difficult than in the case of the salmon ova. The young fish are also more difficult to rear, and it has never been successfully done yet except by turning them adrift in suitable water at a very early age to shift for themselves, as their food consists of minute infusoria, or similar diet, that cannot be artificially imitated. The minced meat on which the young salmon thrive so well will not answer for the white-fish, according to the evidence quoted by the American Commissioners.

JAMES HECTOR.

No. 19.

Dr. HECTOR to the Hon. SPENCER F. BAIRD.

Colonial Museum, Wellington, New Zealand,
9th February, 1877.

DEAR PROFESSOR BAIRD,—

You will be glad to hear of the safe arrival of the first case of white-fish ova, though I fear the experiment in this instance will only be a partial success. This is owing to the new arrangements

of the postal service having required a transhipment of the ova at Auckland to a local steamer, which had no ice on board, and was, moreover, bar-bound for several days before she started on her voyage down the coast. The ova were transferred from the ice-house of the large steamer in Auckland harbour on the 29th January, and did not reach the breeding-ponds at Christchurch for five days afterwards. I opened the outer case on the evening of the fourth day, when the vessel called at Wellington, and there still was a small quantity of ice, sufficient to retard the development, I hoped, for twenty-four hours longer. Had the steamer gone straight from Auckland to Nelson, which was the arrangement I anticipated, the ova would have been in the hatching-ponds within forty-eight hours of their removal from the ice-house of the large steamer. As we have no ponds at Wellington, the Government decided to entrust them to the Christchurch Society, where they have a very good hatching establishment. The water the ova were placed in is stream water, that springs from gravel, and has a temperature of 56° Fahrenheit. The Secretary report that over 200 young fish have come out, and says they are three-quarters of an inch long (five days old), very transparent, with bright yellow eyes, are very lively, and appear to be doing well.

The Auckland Society wish to get the next shipment for Taupo Lake, but I am afraid the temperature will be too high, being from 57° to 63°. I would rather trust the Southern lakes, which vary from 46° to 53°, winter and summer. I will report the further results by next mail, when the second shipment will have arrived. With renewed assurance that your kind attention is thoroughly appreciated in the colony,

The Hon. Spencer F. Baird.

I have, &c.,
J. HECTOR.

No. 20.

EXTRACT from Letter from the Hon. J. A. R. MENZIES to the Hon. the COLONIAL SECRETARY.

21st February, 1877.

I ALSO enclose a memorandum of the distribution of the fish from the ponds; and the Commissioners desire me to repeat the information conveyed in my telegram of yesterday, that the hatching-boxes are clear and ready for the reception of the white-fish ova mentioned in your letter of the 20th November, 1876.

J. MENZIES.

MEMORANDUM.

MR. HOWARD reports that the distribution of fish from the Southland ponds since last report, May, 1876, was as follows:—

October, 1876.—Salmon fry hatched from ova received from United Kingdom by S. S. Durham, placed in Aparima River 1,500

Californian Salmon Fry.

January and February, 1877.—Into affluents of Oreti River, viz.,—

Stag Creek	...	...	...	...	...	3,600
Winton Burn	...	...	...	...	...	1,200
Irthing River	...	...	...	...	...	8,200

And on 17th February, Mr. Howard reports that he had from 3,000 to 4,000 fry still in the ponds, and would on 20th remove all but about 100, kept for purposes of observation, into the Irthing.

Brown Trout.

September, 1876.—To Wellington (ova)	...	...	...	...	1,700
October, 1876.—To Waimatuku (fry)	...	...	...	...	500
November, 1876.—To Makarewa (fry)	...	...	...	...	125
" To Morley (fry)	...	...	...	...	800
" To Holmes's Wash Creek	...	...	...	...	1,000
" To Otaupiri	...	...	...	...	1,500
January, 1877.—To Waikaka	..	...	...	...	250
					<u>4,175</u>

No. 21.

Dr. HECTOR to the Hon. the COLONIAL SECRETARY.

SIR,—

Colonial Museum, Wellington, 28th February, 1877.

I have the honor to report the arrival of the second shipment of white-fish ova, and to enclose an extract from Professor Baird's letter on the subject. Before their arrival in Auckland arrangements had been made for supplying half a ton of ice, with the view of keeping the ova in a low temperature during the voyage down the coast. I have just examined the box, and find that there will be sufficient ice to last for five or six days longer, judging from the quantity melted since the "Taranaki" left Auckland. This should be quite sufficient to ensure the ova reaching the Makarewa ponds on Monday next in good order.

I have, &c.,
JAMES HECTOR.

The Hon. the Colonial Secretary.

Enclosure in No. 21.

EXTRACT from Professor BAIRD's Letter to Dr. HECTOR, dated Washington, 19th January, 1877.
YOURS of the 13th December is to hand. I hope that the first instalment of the white-fish eggs has reached you in good condition. I directed that the entire shipment of three or four hundred thousand eggs should be divided into two lots, so as to insure the greater certainty of the safe arrival of some of them.

Give me timely notice if you want more Californian salmon eggs or those of the white-fish, and I will do what I can to meet your wishes to any extent. The order for salmon eggs should be received by May next.

I have written to Mr. Firth, who announces a satisfactory result of his experiment, that, in the event of extra eggs being called for from Australia, New Zealand, Chili, and the Sandwich Islands, and an extension of operations on the McLeod River being required, I might have to charge a small sum for the eggs themselves; but in any event the amount will be but small.

I shall be delighted to have a good collection of your New Zealand fishes, and hope you will send them duly labelled. Can you not get for us some specimens of the new genus of fish allied to the amphioxus? I believe it comes from Moreton Bay.

No. 22.

The Hon. SPENCER F. BAIRD to Dr. HECTOR.

United States Commission, Fish and Fisheries, Washington,

DEAR DR. HECTOR,—

7th April, 1877.

Your letter of the 9th of February has been duly received, and I regret that there was even a partial failure in the eggs of the white-fish. If you can arrange for a better connection for the next season I would be glad to send you more; and should you want any salmon eggs, please advise me by the 1st of July.

I have, &c.,

SPENCER F. BAIRD,
Commissioner.

Dr. James Hector, Wellington, New Zealand.

No. 23.

The UNDER SECRETARY to the Hon. SPENCER F. BAIRD.

SIR,—

Wellington, 31st May, 1877.

With reference to the offer which you kindly made in your letter of the 7th ultimo, addressed to Dr. Hector, I have the honor to request that arrangements may be made for the transmission to this colony during next season of 500,000 of the ova of the Californian salmon, and 250,000 of the ova of lake white-fish (*Coregonus albus*).

I have, &c.,

G. S. COOPER.

Professor Baird, Commissioner,

United States Fisheries Commission, Washington.

No. 24.

Mr. S. C. FARR to Dr. HECTOR.

Canterbury Acclimatization Society, Christchurch,

22nd March, 1877.

DEAR SIR,—

I have to acknowledge, with thanks, the receipt of your memoranda *re* American salmon and white-fish and add that I am very sorry it did not reach us until the information contained in the last clause relating to white-fish was too late.

It is with the deepest regret I have to inform you that we believe every one of the fish has been lost, although hopes are entertained that some may turn up in our races.

The loss seems to have occurred in the following manner: When they were first hatched out, it was observed from time to time that the numbers increased in the lowest boxes, which, after careful watching, the discovery was made that they, with perfect freedom, passed through the perforated zinc placed at the lower end of the box. This has always been found sufficient to prevent our smallest trout escaping; and, having heard of the great weight the white-fish grew to be, it seemed consistent to think, ere the ova reached us, that no other preparation was necessary than had been for trout and salmon, which had been so signally successful in the same boxes the same season. However, experience proved the fact, and fine muslin was strained over the zinc, which for a time had the desired effect; but it was soon found that the food (finely-grated liver) clogged that material, so that it required constant attention,—and from close inquiries we find this was given early and late,—and the evening previous to the discovery of the loss the Curator had attended to them himself. The next morning he found the water overflowing the boxes, and all but six or seven of the fish gone. Search was made for them, a few found dead on the floor of the house, but nothing equal to the number we had in the boxes; so that, as we have a race running through the house, we trust that ere long some of them may turn up.

Much as the loss may be and is deplored, I trust the above explanation of the cause will be accepted with good grace, so that the disaster may not prevent us from receiving the favour of a similar consignment next season, it being our aim and desire to do all that we can to foster and acclimatize everything useful and of benefit to the general public.

Before concluding, I think it necessary to append my opinion in reference to the ova received, supposed to be white-fish. To this I demur, and can only conclude that some mistake has been made, for the following reason: The eggs were about the size of those from the herring, consequently the inference would be they were too small for so large a fish as described in your memorandum.

I give this for what it is worth, and with the hope that, if the Government have been subjected to a mistake, such may be prevented in the future.

The ova received are probably from some such fish as our whiting, of the genus *Clupea*, and not *Coregonus albus* as supposed.

I have, &c.,

S. C. FARR,

Honorary Secretary.

Dr. Hector, Colonial Museum, Wellington.

No. 25.

Dr. HECTOR to Mr. S. C. FARR.

DEAR SIR,—

Colonial Museum, Wellington, 5th April, 1877.

I delayed answering your letter about the white-fish until I could look into the matter of the size of the ova, as you seem to doubt if they were white-fish.

The only other lake fishes that breed in the Fall are the lake herring, the siscowet, and the great lake trout. The following is a table of the relative sizes of their eggs:—

			No. per lb. of Fish.	No. per oz. of Ovary.
Lake Trout (<i>Salmo</i> , sp.)	...	...	700	300
Siscowet (<i>Salmo</i> , sp.)	...	...	700	376
Lake Herring (<i>Argyrosomus</i>)	...	...	8,000	8,000
White-fish (<i>Coregonus</i>)	...	...	12,000	3,000

The *Salmo quinnat* has very large eggs, but they still average about 700 per lb. weight of the fish.

From these figures you will see that the egg of the white-fish is very minute compared with that of salmon or trout, and that the size of the egg bears a remote relation, if any, to the size of the fish.

I am sorry for the failure that has occurred, but will send full information on the subject by this mail to Professor Baird, and seek his advice.

I will particularly request that an inquiry be made into the circumstances under which the ova were collected, so that any doubt may be removed as to unfair or unskilled dealing in the matter.

I have, &c.,

JAMES HECTOR.

S. C. Farr, Esq., Christchurch.

No. 26.

Mr. S. C. FARR to Dr. HECTOR.

Canterbury Acclimatization Society, Christchurch,

12th April, 1877.

DEAR SIR,—

I beg to acknowledge yours of the 5th instant, and to thank you for the kind information therein contained.

The doubt expressed by me in reference to the white-fish was somewhat encouraged by the box of ova received by the late Curator, which were a very large size, almost equal to the salmon ova received by the Society, and which Mr. Johnson stated to the present Curator were the ova of white-fish from America.

Probably the inquiry you suggest will not be without its good results.

I have, &c.,

S. C. FARR,

Honorary Secretary.

Dr. Hector, Colonial Museum, Wellington.

No. 27.

Mr. H. HOWARD to Dr. HECTOR.

MY DEAR SIR,—

Salmon Ponds, Wallacetown, 10th March, 1877.

You will have already learned the bad state of the white-fish ova by telegram, but, as I believe you take a very great interest in the acclimatization of the American fish, I trust a few more particulars will not prove tedious.

The ova were detained in Dunedin until Tuesday night, when they left by "Wanganui," not reaching the Bluff till sundown on the following day, and were opened at the ponds on Thursday morning. I regret to say there was little or no sign of ova having ever been there, except here and there a smear of glutinous-looking substance with a vile smell. No one unacquainted with its original contents could have ever supposed ova were there at all. This is the more strange, that even in the shipment of salmon ova from London by the "Mindora," which was 133 days on the voyage, the ova were perfect in form though opaque. I have never yet seen a similar case to the present. This led me to try the moss to see if the destruction of the ova was caused by insects, but a powerful glass showed no signs of insect-life of any kind; the moss, however, has a very strong pungent smell, like ammonia, quite sufficient, I should imagine, to destroy the vitality of the ova, but then, would it have destroyed all form and shape of the egg? There is another peculiarity of the packing, which some people would think

sufficient to destroy the vitality—the box was nailed and not screwed. I am not, however, a great believer in the extra sensibility of ova, especially in their forward state; and I have even dropped a newly-taken ovum from some distance on to the ground, and afterwards hatched it; and I have reason to believe that all the last salmon ova were taken some days previous to shipment; in fact, I suspect were kept until the fish were visible (about twenty-five days, according to temperature), or I cannot account for the perfect fecundation of the ova sent, and their hatching out so soon; in fact, hundreds of the salmon were hatched and dead on arrival.

With regard to the salmon, you will be glad to hear they were a most unqualified success (with the exception mentioned above): very nearly 18,000 have now been turned out by the direction of the Commissioners, and about 200 kept for observation. All those turned out have been taken as far as possible up the Oreti, and placed chiefly in the five rivers at Lowther. This river (Oreti) should be stocked surely, as all have gone into its affluents. The fish grow very rapidly, and are now 3 inches long, quite as large as English fish at six months old: they are the most active fish I have ever had under my charge. When you have leisure, I should feel much obliged if you could recommend me some trustworthy history of these different American fish, as I do not know their peculiarities; for instance, are they as erratic in their first visit to salt water as English fish, &c.? I should also feel obliged if you could give me Mr. S. Baird's address, as I should like much to give him a little information about the time occupied in transit of the ova to this extreme point, in case the Government feel inclined to try other shipments.

If you would care for specimens of the ova of the salmon (American), I have some by me, as also a few of the young fish (in spirits); there is a very marked difference between both, and the Home ova and fish. The young fish rise most readily to the flies thrown to them, whatever the adult fish may do. Should you require any information regarding the fish here, I should always most willingly give it.

Dr. Hector, Colonial Museum, Wellington.

I have, &c.,
H. HOWARD.

No. 28.

EXTRACT from Professor BAIRD's Letter to Dr. HECTOR, dated Washington, 14th May, 1877.

DEAR SIR,—

I am in receipt of your letters of 4th and 5th April, and, with you, regret the failure of the experiment in regard to the white-fish. The suggestion, however, that possibly there was some mistake in the eggs, intentional or otherwise, was enough to produce a slight feeling of irritation, not toward you, of course, but at the person who could imagine that in a matter of this kind any error could or would be committed.

These eggs are all taken in the Detroit River, to which the white-fish of Lake Erie resort for the purpose of spawning. The fish are secured in large sieves, and many of them are kept alive for a considerable time before the spawn is removed. There are no *Clupeidæ* in the lakes except a very broad species having no resemblance whatever to the white-fish, and which does not spawn till autumn.

The suggestion of there being any possible relation between the size of the fish and that of the egg is not warranted at all by the facts. The egg of the cod-fish is extremely minute, that of the striped bass (*Roccus lineatus*), which attains sometimes a weight of 75 lbs. or 100 lbs., is not the fiftieth of an inch in diameter. The egg of our white-fish is smaller than that of the European species; a consignment received from Germany of *Coregonus maræna* took every one by surprise from its superior dimensions.

Of precisely the same hatching of eggs as those sent you, millions of young fish have been hatched and safely deposited; and I myself have seen a small number from the same hatching-house and the same stock, having, unmistakably, all the characteristics of the genus *Coregonus*.

James Hector Esq, M.D.

I have, &c.,
SPENCER F. BAIRD.

No. 29.

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

SIR,—

Dun Alister, Wyndham, 2nd June, 1877.

At a recent meeting of the Commissioners appointed to manage the Southland Salmon Ponds the following resolution was agreed to—namely, "That the Commissioners, being impressed with the belief that another importation of salmon ova from the United Kingdom is necessary to insure their naturalization in the colony, and being desirous to plant American salmon and other fish in various other rivers and lakes in the colony, recommend that £1,000 should be placed on the Estimates with the view of obtaining shipments of salmon ova from the United Kingdom by steamers to Melbourne, and of salmon, white-fish, and other ova from America by the Californian mail boats."

In accordance with the instruction of the Commissioners, I have now the honor to communicate this resolution, and, in doing so, venture to express the hope that the Government will place on the Estimates for this purpose even a larger sum than that suggested above, in order that more than one experiment may be repeated by the Melbourne boats.

The Hon. the Colonial Secretary,
Wellington.

I have, &c.,
J. A. R. MENZIES,
Chairman of Commissioners of Salmon Ponds.

No. 30.

The Hon. Dr. POLLEN to the Hon. J. A. R. MENZIES.

SIR,—

Wellington, 14th June, 1877.

I have the honor to acknowledge the receipt of your letter of the 2nd instant, forwarding a resolution of the Commissioners appointed to manage the Southland Salmon Ponds, recommending that further shipments of fish ova should be imported from Great Britain and America; and, in reply, to inform you that the Government had, prior to the receipt of your letter, determined to ask for a vote for the purpose in the next session of Parliament.

The Hon. J. A. R. Menzies.

I have, &c.,
DANIEL POLLEN.

No. 31.

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

SIR,—

Dun Alister, 26th June, 1877.

I have the honor to acknowledge the receipt of your letter of 14th instant, informing me that the Government had, before receiving my letter of 2nd instant, determined to ask, in the next session of Parliament, a vote for the purpose of importing fish ova from Great Britain and America; and, after communicating with the Commissioners, to express their gratification at the decision of the Government.

The Hon. the Colonial Secretary,
Wellington.

I have, &c.,
J. A. R. MENZIES,
Chairman of Commissioners of Salmon Ponds.

No. 32.

Mr. F. SUTTON to the Hon. the COLONIAL SECRETARY.

SIR,—

Wellington, 27th July, 1877.

I have the honor to request, on behalf of the Hawke's Bay Acclimatization Society, that it may be supplied with 50,000 salmon ova out of the quantity which I understand has been ordered by the Government.

I should feel obliged if you would issue instructions for the same to be separately packed, in order to facilitate matters on its arrival, it being understood that we pay proportionate share of the expense of transit.

The Hon. the Colonial Secretary.

I have, &c.,
F. SUTTON,
Honorary Secretary.

No. 33.

Dr. HECTOR to Professor BAIRD.

DEAR SIR,—

Wellington, 28th July, 1877.

I am directed by Government to ask you to be good enough to have the next shipments of salmon ova, packed, if possible, in cases containing 50,000 ova each, in order to facilitate their transit to the different districts throughout the colony.

The Government propose to distribute the ova as follows:—

Auckland	...	...	...	...	...	2
Napier	...	...	...	...	...	1
Nelson	...	...	...	...	...	1
Greymouth	...	...	...	...	...	1
Wellington	...	...	...	...	...	1
Christchurch	...	...	...	...	...	1
Dunedin	...	...	...	...	...	1
Makarewa	...	...	...	...	...	2
						10=500,000

The Hon. Spencer F. Baird.

I have, &c.,
JAMES HECTOR.

By Authority: GEORGE DIDSBURY, Government Printer, Wellington.—1877.

