

113.—SHIPMENT OF WHITEFISH EGGS TO THE BALLARAT FISH ACCLIMATIZATION SOCIETY.**By W. P. WHITCOMBE, President.**

[From a letter to Prof. S. F. Baird.]

Acting on your advice we placed the care of the consignment of whitefish eggs in the hands of Mr. Creighton, of San Francisco, who evidently did everything needful there, and the case was safely consigned by the steamship City of Sydney to Sydney, where we had requested Messrs. Gilchrist, Watt, & Co. to tranship to one of their large steamers plying between that port and London, calling at Melbourne. These gentlemen carried out our wishes, and the consignment was brought on in the steamship Liguria to Melbourne, arriving there on Monday, the 16th of February, 1885. Messrs. Gilchrist, Watt, & Co. wrote us from Sydney to the effect that all the ova except those in the top tray were in good order. With our secretary, Mr. Cooper, I proceeded to Melbourne on Monday night, and arriving at the Liguria on Tuesday morning found that a mistake had occurred. The ova had been placed in the refrigerating chamber of the Liguria, and the captain having no ice (as these ships make their own ice as required) and finding his refrigerating chamber getting, as he thought, too cold, removed the box to the coolest place he could find outside the refrigerator; but this was unfortunately much too warm, and on bringing the box on deck we found that it had a most unpleasant odor. We placed it at once in ice, and were able to commence unpacking on Wednesday, the 17th, at Ballarat. We found all ova in two top trays gone; they had hatched and become putrid; as were all in the centers of the other trays, but in the corners and at the sides we found ova apparently good; and we carefully picked these out into iced water, and placed them to the estimated number of 30,000 to 40,000 in water at a temperature of 40° in our hatching boxes. By evening it became evident that the experiment was a failure, as nearly all were hatched and dead, and by next morning all were gone. On examination with a lens it seemed that nearly all, except those we picked out, had hatched in the trays.

Should you make a further attempt I will send a trustworthy man to Sydney to take charge from there. A few hundredweights of ice would have enabled us to bring the ova by rail and thus save a day at least. Had thin slips of wood been placed between each tray so as to allow better ventilation, or at any rate to take off any pressure caused by the moss, it would have been better. The center of each tray was simply a flattened, homogeneous, greasy paste, without any trace of ovum or fish discernible; it was only at the edges and corners of the trays that there could have been any visible ova even at Sydney.

BALLARAT, AUSTRALIA, *February 23, 1885.*

NOTE UPON THE FOREGOING BY FRANK N. CLARK.

I am very well satisfied that they would have reached Melbourne in substantially the same condition in which they were received at Sydney had they not been exposed to a considerable rise in temperature between these points. The low temperature provided from San Francisco to Sydney would undoubtedly have carried them along considerably farther than to Melbourne. They were packed the same as our most successful consignments from this station to New Zealand and points less remote.

The results of my refrigerator experiments with whitefish eggs on flannel trays show that after eggs have been held some time at a low temperature (32 to 34° F.), a rise in temperature of 8 to 10°, or even 4 to 5° if the eggs are well advanced in development, will invariably cause premature hatching in a few hours if the increased temperature is sustained. The eggs simply collapse. In these experiments no weight of any kind was imposed on the eggs, nor was there a lack of ventilation, but when subjected to the increased temperature the whole egg structure would seem to weaken or relax, and collapse would follow. This is not the case with eggs recently removed from water, unless they are far advanced, but I have seen whole trays of comparatively young eggs (flannel trays, in a refrigerator) collapse in twenty-four hours on a rise of 9° after having been held thirty-two days in a temperature of 32° to 34°. It is evident, therefore, that on a journey of several weeks they should be more carefully guarded as to temperature later on than at the beginning. In this instance the weight of moss probably hastened the collapse, but a layer of moss is indispensable for a long journey, to prevent drying out, a condition that would be fatal. All the conditions for successful shipments from this place to Melbourne are easily within reach, but such shipments are out of the question unless the temperature can be carefully guarded for all of that part of the journey beyond San Francisco.

NORTHVILLE, MICH., *April* 14, 1885.

REPORT BY MR. CHARLES CREIGHTON.

Previous to my father's departure for Honolulu he desired me to report the condition of the ova upon their arrival at Ballarat, Victoria.

I am in receipt of a letter from Mr. J. Sisson Cooper, honorable secretary of the Ballarat Fish Acclimatization Society, dated February 24, in which he reports that the ova arrived in Sydney in splendid condition, but that in shipment from that port to Melbourne on board the steamship Liguria, the captain of this steamer, fearing that the ice-room was too cold, removed the ova to another part of the ship, in consequence of which they all hatched out and were destroyed.

SAN FRANCISCO, CAL., *April* 1, 1885.