

XI.—REPORT ON THE TRANSPORTATION OF A COLLECTION OF LIVING CARP FROM GERMANY.

BY DR. O. FINSCH.

The fish came from the well-known and reliable fish-cultural establishment of Mr. Rudolph Eckhardt, in Luebbinchen, near Guben, province of Brandenburg, Prussia. There were 100 specimens of the finest kinds of carp, principally mirror-carp (*Cyprinus carpio, rex cyprinorum*), one and a half years old, and measuring from 6 to 8 inches in length.

Lübbinchen is about one and a half hour's ride from the railroad station of Guben, whence the fishes were shipped on the evening of the 21st of April to Hamburg, by an express courier train, which was allowed to carry fish at the same rates paid for passengers' goods.

I did not get a telegram from Mr. Eckhardt until the 22d of April, and, therefore, had only time to receive the fish at the depot. They had been on the way about eleven hours, and were apparently in excellent condition; they were in four coal-oil barrels, each containing 25 fish. Seven fish were found dead in one barrel when they arrived at Hamburg.

Following the instructions of Mr. Eckhardt, I filled up the barrels with fresh water, pumping it in until the water flowed off quite clear, and appeared entirely free from the least mud or slime; then the barrels were replenished three-quarters full.

Owing to the condition of the Elbe, the large transatlantic steamers cannot always reach Hamburg, and are sometimes compelled to anchor near Stade or Glückstadt; this was the case on the day of our departure. We started on the 23d of April, at 10 o'clock a. m., in a small steamer, which conveyed the passengers and their goods to the Lessing, of the Hamburg Mail Packet Steam Navigating Company, and embarked on the Lessing at about 4 o'clock in the afternoon, near Stade. As I had not been advised of the shipment of the fishes from Guben until quite late, I did not have time to purchase a sufficient quantity of ice at Hamburg; however, I could not very well have taken a greater quantity on board the local steamer, whose carrying capacity was somewhat limited, and was crowded with passengers and their goods. There were 560 passengers on board.

I received the following orders from Mr. Eckhardt: "Place the fish, if possible, in the ice-house; if this cannot be done, put the barrels on ice covered with sawdust; put two pounds of ice into each barrel once or twice during the day, and keep the temperature at 4° or 6° Reaum. (about 40° or 45° Fahr.); if the fish cannot be placed in the ice-

house or on deck, put them under the deck, but in a room where there is sufficient air; at any rate, the ice should be regarded as the most important thing, as well as necessary for the resorption of air."

As the air in the ice-house, and even in the other rooms below deck (owing to the presence of 5,000 pounds of fresh meat), was not pure, we placed the four barrels—which were very heavy and required four men to handle them—on deck amidships. Captain Voss kindly instructed the steward to give me all the ice I needed; and the first officer, Captain Froboes, was kind enough to take a supply of fresh water from the Elbe in small barrels, which were placed at my disposal in the life-boats, to keep the water cool.

When starting from Hamburg on April 23, the day was quite warm, and having no ice on the small steamer, we pumped in air by means of an air pipe, which refreshed the fish considerably. Temperature of water, $4\frac{1}{2}^{\circ}$ to 5° (40.1° to 41° Fahr.). One fish died.

April 24.—In the North Sea; cool weather; water $5\frac{1}{2}^{\circ}$ (41.9° Fahr.); pumped in air several times.

April 25.—At Havre; very warm day; water 6° (42.8° Fahr.); put in ice twice; aerated the water frequently; six fish dead.

April 26.—In the channel; filled up with fresh water; used ice three times; aerated several times; water 6° (42.8° Fahr.); ten fish have died.

April 27.—In the Atlantic; put in ice twice; aerated; water remained at 5° (41° Fahr.) constantly; thirteen fish dead. All these fish were dying in one barrel, the same in which we found the seven dead fish when they arrived at Hamburg. In order to discover the cause of this mortality, I had all the fish transferred into another barrel, which had been filled with fresh water, and noticed that most of them were relieved in a half hour's time; and those which had been swimming on their sides when in the other barrel became quite brisk again. The barrel from Luebbinchen was cleaned thoroughly, and was found to contain a great quantity of mud; six times the water had acquired a black color, and it was very evident that the barrel had not been cleaned properly (as it should have been), and which unfortunately was the immediate cause of the death of so many fish.

April 28.—Put in ice three times; notwithstanding, the temperature reached 7° (44.6 Fahr.). The balance of the fish which had been taken from the unclean barrel died, making the total loss thirteen, although the barrels had been filled up with fresh water.

April 29.—Put in ice; water 6° (42.8° Fahr.); six fish died.

April 30.—Used ice once; water 5° (41° Fahr.); two fish died.

A dissection of dead fish show that they were all in excellent condition, being fat and well fed. Although we had very fine weather and the ship rolled very little, the sea being nearly smooth, some of the carp had injured their snouts. To prevent any rolling we hove up the barrels (now only two) into the life-boats, where they remained suspended between the davits, and had no greater movement than a lamp

in the cabin. These changes for the better were accomplished through the kind and timely assistance of Captain Froboes, the first officer, who took a great interest in the matter.

May 1.—Put ice in; water constantly 5° (41° Fahr.); three fishes died.

May 2.—Put ice in; water constantly 5° (41° Fahr.); one fish died.

May 3.—Put ice in; water constantly 5° (41° Fahr.); five fish died.

(Several times each day air was pumped in.)

May 4.—Put ice in; fresh water; water from 5° (41° Fahr.) to 6° (41.8° Fahr.); three fish died.

May 5.—Put ice in; fresh water; water 5° (41° Fahr.) to 5½° (41.9° Fahr.); five fish died.

May 6.—Put ice in; fresh water; water 5½° (41.9° Fahr.) to 6° (42.8° Fahr.); two fish died.

(Air pump was used every day.)

As we approached the coast the weather became warmer, and I put in more ice than we had been accustomed to use during the past five days; we also replenished the barrels with fresh water.

We arrived about 7 o'clock p. m. at the pier in Hoboken, where Mr. Fred. Mather, who had been commissioned by Prof. Spencer F. Baird, was awaiting me to take charge of the fish on their journey to Washington. Our aggregate loss was 77 dead fish, leaving 23, which comprised our live stock, which may be considered, however, as a satisfactory result. The uncleanness of the one barrel above mentioned was the cause of the unusual mortality during my trip.

My experience on this trip teaches me that it is easy and practicable, *with the assistance of a keeper*, to bring over living carp from Germany. The transportation, however, should take place during the colder months—from November to March. During these months there is an abundance of room on the steamers, and the fish can be placed in a cool room down in the dark, where the sea air, and particularly the damp air from the banks and during foggy weather, cannot have a disastrous effect upon them. I do not think the sea air good for so purely a fresh-water fish as the carp, as it is too much charged with salt; the salt forms a sort of incrustation, during foggy weather, on the beard and woolen clothing when exposed on deck for any length of time. Fresh water should be used in order to counteract the evil influences of sea air. Fresh water and ice should be at hand in large quantities. If I could have obtained a sufficient quantity of fresh water, which would have enabled me to fill up the barrels daily, I am positive the death rate among the fish under my charge would have been correspondingly light. Ice is also absolutely necessary to keep the temperature below 6 degrees Reaum. (45° Fahr.). Pumping air is also very good, as it carries the air below the surface and produces a circulation at the bottom of the barrels. Whenever the fish (on this trip) were suffering for want of air, and gasping, I immediately employed the air-pump, and the fish would go quietly to the bottom of the barrels, which, in my opinion, is a favorable sign.

While too high an estimate cannot well be placed upon the beneficial results of the air-pump, I cannot close without reiterating my former expressions in favor of the two principal accessories to the successful transportation of carp, namely, *fresh water and ice*.

As it is impossible for one man to fill up and handle the barrels during the voyage, the assistance of the captain and crew is often necessary, and in this connection I cannot speak too highly of Captain Froboes, the first officer of the *Lessing*, who manifested great interest in the enterprise and rendered invaluable assistance. I have also to thank my zealous assistant, Mr. Ernst Rehre.

Very respectfully,

DR. OTTO FINSCH.

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