

XX.—REPORT OF OPERATIONS ON THE NAVESINK RIVER, NEW JERSEY, IN 1879, IN COLLECTING LIVING STRIPED BASS FOR TRANSPORTATION TO CALIFORNIA.

By H. W. MASON.

LIVINGSTON STONE,
United States Fishery Commissioner :

SIR: In accordance with your instructions, I went to Red Bank, New Jersey, on Wednesday, June 4, to procure striped-bass, fry, scallops, and eels, to experiment upon them to find means of keeping them alive, if possible, and, should the experiments warrant, to transport to Albany, N. Y., one hundred and fifty, more or less, of the striped bass; two hundred eels, and as many scallops as seemed advisable to be transferred to California.

Before starting for Red Bank I received several valuable hints from Mr. Eugene Blackford, of Fulton Market, and though he could not give me much encouragement, he showed much interest in the expedition, and gave me the benefit of valuable experience. He said at once that "bass fry" was wholly distinct from striped bass, and consequently saved me much time in studying the habits of the so-called "fry." In reply to my inquiry as to the practicability of procuring small striped bass, he warned me of the great difficulty of obtaining them, as the striped bass had not at that time appeared in the river. Scallops he rightly pronounced out of season, but kindly offered to try and get me a few to experiment upon.

As to the appearance of striped bass in the rivers in the East, Mr. Blackford is sustained, in spite of the contrary opinion of many fishermen, by the authority of the records kept at Red Bank. This year the first striped bass taken with hook and line at Red Bank was caught on the 9th of June, and this seems to be about the time that the bass usually strike in.

On reaching Red Bank I found that none of the arrangements which you had directed to be made had been attended to; the two men—I cannot say fishermen—employed to catch the bass had but a faint conception of what was wanted, and had provided themselves with an eel-seine wholly insufficient for my use; and even this they dared not haul, although provided with express authority, owing to the State law against seining; the tanks were out of repair, and had been packed away in the freight-house to shrink and fall to pieces. None of the

thousand eels which had been promised were ready, but the man offered to set his pots at once, pretty small eel-pot, to catch an eel 4 inches long. I immediately discharged the inefficient fishermen, and after considerable difficulty I found a man who had had experience in evading the law, and who had the only real seine in the vicinity. By promise of liberal pay, I secured his valuable services, together with those of his sons, and to them is due the credit of undertaking and carrying through the work that scarcely any one else could or would have brought to a successful issue. While Clayton was preparing his seine and finding men to help him, I instituted inquiries among those who had any reputation as fishermen as to the habits of the bass. Aside from the uniform opinion that bass could not be kept alive overnight, I found no two who agreed as to the primary facts. Only one could be found who had ever found a bass with the spawn in her. He said that he found it in February, but added the incredible story that it weighed thirty pounds. Some thought the bass spawned in the fall; others, in the winter; a few, in the spring, while scarcely any agreed with me that about June 1 was the time. Many said the fish spawned in the ocean; some thought in the brackish water; while others said that the ditches and brooks was the spawning ground. No one had ever as much as seen a bass less than 3 inches in length, and thought it a useless expenditure of time and money to look for them. This is one of the chief places for striped-bass fishing in the country. It is not my place to mention the lack of fish culture among the natives.

At high tide, Thursday, June 5, was commenced the series of hauls that lasted without interruption at every high tide for a week. The seine was hauled until midnight Thursday, and twenty fair-sized bass obtained; average length, 8 inches; average weight, $\frac{3}{4}$ pound. The water was salt, as the tide was high. The temperature of the water at six o'clock was 80°; at twelve o'clock, 78°. In the same water, at the same temperature, ten fish lived two hours after being put into the tank. In the same water, at 70°, the rest lived four hours, the water in both cases being constantly aerated. All the fish were dead at 3.30 a. m. Friday.

Friday morning, hauls were made farther up stream in hopes that something that might be denominated "fry" might be obtained. In three hauls no fish were taken; in the fourth, three small striped bass were caught and put in brackish water freshened with ice, temperature 65°. After several barren hauls, nine more were obtained. These were all the fish that could be induced to come ashore on Friday, and all but four lived to be placed in the San Joaquin River two weeks later. Not satisfied with the size of the small bass, I mailed two that died to you to obtain information, and also spent Saturday morning in exploring the mysteries of mud and water in every ditch and brook that empties into or communicates with the Navesink River, above Red Bank, but was unable to find anything that looked like a bass-fry. In a similar expe-

dition Sunday I succeeded in finding two specimens of fry that may have been those of the striped bass; the full bag beneath the throat showed them to be but a few days old. All further attempts to obtain specimens for preservation were fruitless.

Saturday the seine was hauled as far up stream as the boats would float, but no bass less than 3 inches in length were caught, and but six in all. A pair of shad having just spawned were taken in 3 feet of water, over three miles from tide-water. The bass in the tanks did finely with brackish water, 64° to 67°. Aëration was constant. Watched, myself, Friday and Saturday nights, and experimented with ice and salt water until I found what degree of saltness seemed to suit them best. Also tried a few bass in clear spring water, but they did not thrive therein. Put fifty small eels, caught in the mud with a net of mosquito bar, into the tin tank filled with spring water, temperature 55°; found that they needed no care.

The tide was high late Saturday night, and no haul was made until nearly midnight. To avoid handling the fish, the tanks, ice, &c., were taken in the fishing boats. Seven fine medium-sized bass were taken in the course of four hauls, and put into a tank under similar conditions as the small bass.

In spite of continued threats of arrest, the men were almost constantly at work Monday and Tuesday, but very few fish were taken; the air and water were very warm, 90° and 82° respectively, and it was with difficulty that the fish were brought to the wharf alive. An awning was rigged over the tanks and every precaution was used to ward off the sun's rays, which I found almost instant death, especially to the larger fish. At times the fish would come to the top of the water for some hours in spite of every effort to keep them down; again, they would stay perfectly quiet on the bottom for several hours. I was unable for some time to explain their actions, but finally it occurred to me that at low tide the water from the river being fresher than at high tide, when the water in the tanks was renewed at low tide and ice in considerable quantities added, the water became too fresh and the fish suffered. This led to the necessity of adding salt in some form in order to maintain a steady degree of saltness. The sea salt was tried and to my surprise and pleasure worked to a charm. After Wednesday morning fresh spring water with sea salt added was gradually substituted for the turbid water from the river, until, when I left, Thursday noon, at least half the contents of the tanks was made up of artificial brackish water. About a handful of salt to a pail of water seemed about the right proportion.

Tuesday night I put fifteen medium-sized bass in a wooden car and sunk them in the river where the tide ran strongly. In the morning seven only were alive, showing how easily bass will die when put under restraint.

The hauling was continued Wednesday, but as I had sixty small bass, 2½ to 4½ inches long, and thirty medium-sized bass, 6 to 8 inches long,

I thought best to be sure of some at least, and so staid myself with the fish on the shore for the first time, the men going out alone with an empty tank, ice, and thermometer. As might have been expected, they made a large haul of 139, mostly small, and lost all but twelve before getting back to the wharf. This rather disheartened them, but after considerable argument they were persuaded to try again Thursday; and very fortunately in the first haul we took seventy-five small bass and six large, and succeeded in bringing every one safe to the tanks. The tanks were thoroughly washed and filled with water, half from the river, high tide, and half from a spring, with sea salt added.

Thursday noon took the train from Red Bank, the tanks being expressed to the Grand Central depot, charge, \$15. A large truck, and three men from Adams Express Company, met the train at Jersey City, and at five o'clock the tanks arrived at the Grand Central, and on examination only one dead fish was found.

Finding that a baggage car was run through to Chicago without change I made arrangements to have the tanks taken in that car, discharged the boy I had brought from Red Bank to help, and congratulated myself that I had one hundred and thirty-three small bass, alive and in good condition, thirty-four medium sized bass, and four hundred and fifty, more or less, small eels. The trip to Albany was uneventful, and with the delivery of the fish I gladly relieved myself of the responsibility that had weighed rather too heavily for comfort upon me during the ten days of my service.

As to scallops, Mr. Blackford answering to my telegram that it was "impossible to get scallops," I started Sunday afternoon for Canarsie, Long Island, the center of the scallop fishery. I took with me "Uncle Dan," experienced in scallops and scallop-fishing. We arrived at Canarsie about midnight, being obliged to walk the last five or six miles. In consideration of a heavy fee, a man was found willing to undertake the work of catching the scallop, but, after raking from three until eleven Monday morning, we were obliged to return without as much as seeing a single scallop. I sent a man to the very end of the island to procure the scallop at the Grand Central Depot, Thursday. The trip must have taken at least three days, and as I saw nothing of him there his search must have been unsuccessful. About two weeks earlier the scallop were plenty.

The difficulty of obtaining the bass, requiring the services of from four to eight men day and night for a week, made the expense of my experiments more than it would have been under more favorable circumstances (as a week later in time), but I did not dare to relinquish in the least particular lest I should lose all I had, and leaving the account to speak for its own necessity I respectfully submit this report of my ten days at Red Bank.

HARRY W. MASON.