

184.—EXPERIMENTS IN PENNING SEA-FISH.

By SMITH E. HUGHES.

[From letters to Prof. S. F. Baird.]

Five or six years ago I believed Sea Grove, N. J., now called Cape May Point, would become a watering-place. I thought that the mouth of Old Pond Creek could, by artificial means, be made a harbor for small boats, accessible at high tides, so I built jetties and wharves, and had a basin of about $1\frac{1}{2}$ acres dug out, the mud and sand being used to fill up the wharves. I succeeded in making it accessible for small boats about three-fourths of the time, and several boat-loads of lumber and material were delivered in that way, but in less than three years it resulted unfavorably.

I then determined to make the basin a place for storing fish, as they could be caught in abundance in May and June of each year and be disposed of in July and August. In order to do this, I fixed gates between the jetties, entirely controlling the flow of water. I also put in iron grates to hold the fish. When all was ready, I put in a few hundred pounds of trout or weak-fish as an experiment. They all died but about fifty or one hundred pounds, which lived without much care until the 25th of November following. The survivors grew to be large, fine, fat fish.

The meadows above for some weeks previous to that time had been very dry, and about the 24th of November there came a cold and heavy rain, which washed the meadows, and the water flowing into the basin killed the balance of the fish in one night. I attributed the loss of these fish to impure or poisonous water. Some of the fish may have died in handling. Last season I cut off the fresh water and put in the basin about 5,000 pounds of fish. I drained it off so as to give about one-half fresh water from the bay every day. I think that the hawks carried off one-fourth or more of the fish, for it did seem that all the hawks in Cape May County fed there. They were shot at and some of them killed, but we could not drive them away. I then covered the whole basin with wires about 5 feet apart. If I had not done this I believe every fish would have been carried off. It being still and clear water, the hawks had little trouble in seeing and capturing their prey. When the bay was a little rough we could see them by tens and twenties for miles away making straight for my basin. I assure you it is a waste of time and money to stock ponds with any kind of fish when hawks abound, unless they are protected in some way.

By some mismanagement with the man in charge a quantity of creek water got in the basin again and killed some fish, but this was made good at the next flood tide, and the balance lived, and were taken out

in the latter part of August in as fat and nice condition as fish could be. I feel satisfied that from June to August some of them increased from one-fourth to one-third in size. With two seasons of experience I fancied that I knew the cause of disasters and could make the business a success the next year.

So this last spring I threw up banks to cut off the back creek water entirely and replaced the wires over the basin from 3 to 5 feet apart. I also put in a trunk, with lumber, from the basin to about 30 feet beyond low-water mark in the bay through which the tide ebbed and flowed. I then built a wharf, from which we could work the nets and catch all the fish we wanted on flood tides, sending them in through the trunk into the basin without handling them at all. The whole arrangement seemed to work well, and I suppose we had over 20,000 pounds in the basin with but very little loss of fish. It was a grand sight to see them swimming about in the basin. The account spread, and many people came from a distance to see them.

On last Monday I received word from my men to come down immediately. I arrived on Wednesday morning, and to my surprise found half or more of the fish dead. I was satisfied that all would die if left in the basin, and so I took out the grates and raised the gates and let all that were afloat, dead and alive, out into the bay. I assure you it was a disappointment to me; not only the thought of so many fish dying, but the expense and trouble of my whole arrangement seemed to be a total loss.

Now I ask if you will be kind enough to explain to me why this sudden change should take place with the fish. My men tell me that on Sunday, June 23, they looked fresh and lively up to 9 o'clock at night, when they left; by Monday noon great quantities were dead. On Monday night after sunset they heard a great commotion in the water all over the pond, some of the fish jumping 2 feet out of the water, and before I arrived on Wednesday I judge more than half were dead when I let them go. There is at high tide on an average 4 feet of water which would be let off to 2 feet for a change. They had on that day the same change, about one-half the water as usual for weeks before that.

The water flowed in and out at the same place, and as only about one-half the water could be changed each day, much of the old water must have remained at the upper end of the basin. As an evidence of this, much grass grew on the muddy bottom at the upper end. I do not think many of the fish remained in it except at high tide, and when the water was let off a few apparently sick fish remained among it. It is all a mystery to me, as old fishermen tell me that the fish feed among this grass in the sounds; others tell me they think they were poisoned by some one intentionally. I cannot think so. But I do believe there was disease among them, or that such quantities of fish in the amount of water exhausted the oxygen from the water to such a degree as to make it poisonous. The fish when dead looked well; the eyes were bright

and glistening, the gills fresh and red, the fish bright and healthy, without discoloration or loss of scales.

27 QUEEN STREET, GERMANTOWN, PHILA., PA., *June 30, 1883*

I have decided to go down after a few days and put in a few more fish. After coming so near to making the experiment a success, and with the experience I have gained in the last few years, it may result in success in the future. I now feel almost assured that my place is adapted for the purpose of penning fish, with some additional expense of having it dug deeper and arranged so that the water will flow in at one end of the basin and run out at the other end at every tide. When once attained, the principle will be followed by many fishermen, and perhaps companies will be formed to carry on the business along the coast and bays, taking trout and some other fish while coming in during the spring—May and June—and striped bass in the fall of the year—November and December.

No person has any conception of the number of fish passing in and out of the bay until they learn something of it by actual experience. Although thousands of tons of valuable fish are destroyed annually by porpoises, sharks, and other fish of prey and by the hawks, there could be thousands of tons captured for wholesome and cheap food without their being missed from the waters. The capturing of them and transferring them into the basins is attained without even lifting them out of the water and with but very little loss.

27 QUEEN STREET, GERMANTOWN, PHILA., PA., *July 10, 1883.*

REPLY BY PROFESSOR BAIRD.

As far as I can judge, the difficulty must be the warmth of the water in the shallow inclosures to which you refer, and the deficient supply of oxygen for so large a number of fish.

In our experience of carrying fish, we find that for a difference of temperature of 50° and 70°, nearly three times as much water is required for the latter as for the former. As the water is now probably well up to 70°, this would be, in itself, an explanation.

I would strongly advise that, if possible, you put a few of the fish in your inclosure, say 20 or 30, and see how they behave.

We have succeeded in penning up striped bass in a basin on an island in the Susquehanna River and keeping them until June. The number of fish, however, was in much less proportion to the water than that indicated by you.

The practice of penning fish is in vogue in France, where, however, I presume the depth of water is considerably greater and the temperature less. There is no reason why it may not be done here also. I am working in that same direction, constructing basins for penning codfish, mackerel, and other northern species, to hold them until their eggs are

ripe and they can be treated by artificial impregnation. I doubt whether the matter of furnishing hiding-places for the fish is particularly important. This, however, can be managed by bringing in floating seaweeds to form a surface over the water and serve to oxygenate it. This floating green scum cannot in any way injure the water or fish.

WASHINGTON, D. C., *July 5 and 14, 1883.*

185.—METHOD OF CATCHING CARP WITH A HOOK.

By PAUL QUATTLEBAUM.

[From a letter to Chas. W. Smiley.]

I use a beardless hook for two reasons. It can be taken from the mouth of a fish with greater ease and does less injury. I often catch carp for visitors to examine, and then return them to their native element. They may also be removed to other ponds in good condition. For catching small fry I use no cork; for large fish I prefer one, with lead enough on the line to sink the hook a few inches in the water, but they will take it at any depth. Late in the afternoon or early in the morning is the best time of warm weather. When the sun is shining brightly, and its rays strike deep down into the waters, the carp retires from his feeding-grounds and remains at rest until the shade of the evening lures him from his quiet retreat. On warm cloudy days, when trained to artificial feeding, the carp may be caught at any hour, but less readily about noon. It is a waste of time to angle for them in cold weather. It is well known that the carp declines all food in freezing weather, and that the appetite varies with the temperature of the water to a certain degree. In my ponds, near Leesville, I can catch either kind of carp as above stated from April to December. I train them to come to the surface of the water for food so as to enjoy the pleasure of seeing them scramble for it. The cheapest of light bread, made of midlings or shorts, expressly for the fish, is what I use. The same answers for baiting the hook, but a piece of waffle, cut the right size for the fish you desire to catch, is better, being tougher and not so easily taken from the hook by the fish. I first collect the fish together by throwing in a handful of small bits of bread—say one-half inch square—then I drop in my hook, attached to a strong line at the end of a suitable cane, and in less than a minute I am almost sure to bring a carp to grass. More time is generally consumed in putting the bait on the hook and taking the fish off of it than in luring him to take the bait.

The young fish hatched early last May are now 5 or 6 inches long.

LEESVILLE, S. C., *July 30, 1884.*