

However, last fall I saw them peddled through the streets, and the fishermen told me they could catch scarcely any other kind, and they sold as well as perch or bass. I have not had an opportunity to taste any of them, therefore am no judge of their flavor.

Respectfully,

E. E. SHEARS.

SUGGESTIONS TO FISH CULTURISTS.

By GARRICK M. HARDING.

WILKES-BARRE, PA., *January 16, 1880.*

Prof. SPENCER F. BAIRD,

U. S. Commissioner of Fisheries:

MY DEAR SIR: In reply to your esteemed favor of recent date, permit me to say that for ten years past and upwards public attention has been largely directed throughout the Northern States of the Union to the subject of fish-culture. Formerly the interest felt in this matter was mostly confined to sportsmen, but the rapid increase of population, the growing necessities for food, added to the fact that our forests were fast passing away, our mountain streams and wooded lakes denuded of their shade and converted into other than purely nature's uses, have, altogether, awakened a general interest in the subject. While the actual number of those personally engaged in fish-culture is limited, yet the whole mass of our people may be said to be looking now with encouraging favor upon the enterprise.

Individuals associate together in a sort of *quasi* corporation and purchase ponds and inland lakes, rent creeks and even small rivers, stock them with fish of various kinds, always observing, however, adaptabilities both as respects the waters and the fish. Thus sport and supply go hand in hand. Nor are the owners or controllers of such waters alone benefited. These ponds and inland lakes are the sources which make up the rivers that flow, often in large volume and for great distances, through the country to the sea. They too become stocked, teem with choice fish. The public at large thus have brought within their reach, without cost, the sport and supply which, in the beginning, seemed designed only for the few.

In order to have the most satisfactory results from this system of buying or controlling ponds and inland lakes, experience has shown that the outlets should be secured by a galvanized-wire screen of a mesh not greater than three-quarters of an inch in size. If brook trout, black bass, or pickerel be the fish with which any such water is stocked, the small fry, appearing generally the first year but surely after the second, will find their way through the meshes of the screen in numbers sufficiently great to stock abundantly in three or four years every commingling and suitable water below. Brook trout, however, should never be

placed in a pond or small inland lake along with either black bass or pickerel. They are the fish of fishes, and deserve to have a domain exclusively to themselves, always excepting the minnow and possibly the shiner. These latter are the natural if not necessary food for brook trout. Indeed, the culture of all three together is always advisable.

Black bass and pickerel may be placed together in any natural or artificial reservoir large enough to be dignified as a pond, though the former will thrive much better where the water is not less than from 12 to 30 feet deep, with rocky shores and a rocky or gravel bottom; the latter will thrive in a less depth with mud for a bottom and marshes for surroundings. Cultivated together, each will prey upon the other, but the black bass will get ahead at last.

The easiest and of course the best, indeed the only, fish to cultivate in rapid and mountain streams is the brook trout. And yet in the States of Pennsylvania and New York, or at least in the newer portions of them, the streams best adapted for this purpose are absolutely valueless for the cultivation of any sort of fish whatever. Most of the creeks and small rivers rise and flow through forests of pine and hemlock. They are dammed up at intervals and set back in some instances for distances varying from one to four miles. Great bodies of water are thus accumulated, and into these, especially in the winter time, millions of logs are thrown, some 12 feet in length with a diameter from 8 to 40 inches, and some anywhere from 12 to 40 feet in length with diameters corresponding. Spring time comes, and in addition to the melting snows and the usual rains of the season, which of themselves commonly swell these streams into torrents, the gates of the dams are hoisted and these logs plunge along through gorges at a frightful rate down towards the places of lumber manufacture, tearing away banks and overhanging shade, filling up natural holes for fish rest and hiding, and destroying in one way and another all fish-life outright. Even with such floods of natural and stored waters the weight of lumber is often so great that a "drive" of only a few miles is attained. The dams are closed again, myriads of little fish that have taken refuge in overflows or pools formed for the moment outside of the main channels, die as the waters recede. The logs *jam*, as it is called, and, piling one upon another from shore to shore for miles, they sink down crushing to death the large fish in great numbers. This work of incidental fish-destruction is repeated from day to day, and will continue to go on until lumbering of this sort shall be at an end. In the mean time all attempts at fish-culture in streams of this character may as well be abandoned. Success will be impossible.

I have thus, sir, given you my views and the results of my observations appertaining to the subject which, I am rejoiced to see, you have so much at heart.

Very respectfully,

GARRICK M. HARDING.