

The average depth of the pond should, of course, be at least 3 feet, and probably a depth of 4 feet would be better in practice, as this would pretty effectually prevent frost from reaching the oysters on the bottom in winter, while the water would not be heated in summer as much as in shallower ponds. The culturists abroad are said to occasionally suffer losses from the water becoming too warm in their "claires" or ponds, many of which get no water except once in every fourteen days or during spring tides. From this cause also it is evident that considerable loss must be experienced from evaporation, while of course the warmth and quiescence of the water would tend to cause the microscopical vegetable organisms in the water to multiply rapidly and give off oxygen to the water, and in turn consume the carbonic acid gas given off by the oysters during respiration. In this connection I must not forget to mention the fact that I have known the water along some parts of the shores of the Chesapeake to rise to a temperature of 101° F. to 105° F., after exposure to the sun during the middle of the day, where the bottom was composed of dark or black mud, which would of course absorb the heat from the burning rays of the sun and again radiate it into the overlying stratum of water at night.

WASHINGTON, D. C., November 24, 1883.

10.—NOTES ON THE ACCLIMATIZATION OF FISH IN VICTORIA, AUSTRALIA.

By W. P. WHITCOMBE.

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

We have had a small fish acclimatization society here for some years. We have stocked our waters with English trout (*S. Fario*), with English perch, tench, and carp. Kindred societies on the seaboard have tried (with what success remains to be proved) to introduce some of the migratory *Salmonidæ*. We have not attempted this as our streams are not suitable. Indeed, I may say we are very badly off for permanent streams in this district, most of them becoming a mere chain of water-holes during the summer without any flow through them, and should the fall happen to be dry it is not uncommon for the streams not to run until the winter is well passed. Such dry seasons are not unfrequent. We have in this neighborhood some small lakes which we should like to stock with as good fish as we can. In some of them there are already English perch and trout, and in one a fish known here as the "Murray Cod" (*Oligorus Macquarientis* Gunther). This fish is a native of the Murray or Macquarrykion, is non-migratory, and is a good table fish, but not good as a sporting fish. The lake into which it has been introduced is fed by small streams which run only during wet weather, and as it lowers through evaporation in summer becomes

somewhat brackish—too much so for man to drink of it. The average depth of water in this lake may be about 12 feet, its circumference some 35 miles. Fish of the above kind taken in it are much better eating than those in the river of which they are natives. We have put some trout in this more than ten years ago, but there do not seem to be any in it now. At any rate none have been taken or seen. We have an elevation above sea-level of some 1,500 feet, and consequently the climate is cool, well fitted for any of the *Salmonidæ*. *S. Fario* grows to a great size. I have seen it 16 pounds weight, and frequently 7 and 8 pounds in the lakes; not the lake above described, but other smaller ones. In the streams it seldom exceeds 2 pounds. Now, my object in thus describing our waters is to find out whether they would be fit for Schoodic salmon, black bass, or shad. The two latter, if I mistake not, are migratory, so would be useless here, but your land-locked salmon (is it *S. namaycush* of Gunther?), I think, would do well enough provided it can propagate in still water. Streams are not to be relied on here, at least those which run into any of our lakes.

If your interest in pisciculture will lead you to give me the above information I shall be much obliged. I would also like to know when your Schoodic spawns. How long after spawning does it hatch? I think there would be no difficulty in getting a box of spawn put in the ice-house on one of the California mail steamers which would bring it here from San Francisco in less than thirty days.

BALLARAT, VICTORIA, AUSTRALIA, *September 17, 1883.*

ABSTRACT OF REPLY BY PROFESSOR BAIRD.

It is impossible to send the American shad to Victoria, as we have not learned how to transfer them over a much shorter trip to Europe. There would be no difficulty in supplying you with eggs of the land-locked salmon or lake trout. We have transmitted with entire success eggs of both the California salmon and of our white-fish (*Coregonus*) to Australia. The lake trout spawns on reefs in the Great Lakes, and does not need to ascend into running water. One of the best fish that could be introduced in your fresh waters would be the American catfish. It is very hardy, grows rapidly, is a capital article for food, and is measurably secure against the attacks of other fishes. It is not belligerent and interferes very little with its associates. I am about sending a stock of catfish to Belgium, and possibly I might be able to do the same to Australia.

Please designate some colonial or other agent in San Francisco to receive the consignment and carefully house them in the steamer.

I am somewhat disinclined to recommend the black bass. It is very pugnacious and voracious, and might disturb the balance of life in your waters, quite as much as have the rabbit and other old world species, life on the land.

WASHINGTON, D. C., *November 5, 1883*