

140.—THE FISH-EATING UTRICULARIA, OR BLADDERWORT.**By Prof. H. N. MOSELEY.**

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

I felt sure that the specimen of *Utricularia** would be of much interest to you. I am sorry that probably I cannot procure for you any more specimens with fish entrapped this year. Mr. Simmis was unfortunately taken ill a few days after he brought his discovery to me and has been unable to set about preparing specimens since. The season for spawn of the common river fishes was already far advanced when the discovery was made, and I found it before I expected too late to get a satisfactory supply, and also have found the matter not so simple as I at first supposed. I found that a certain residual number of a certain batch of young fish remained weeks with the weed untrapped, either because the weed is only able to catch them when the weather is warm, or because they learn by experience (impossible), or because the plant soon loses its activity in confinement (?). Other experiments seem to show that possibly one certain species of young fish get caught. The matter evidently requires a great deal of investigation. I have only very few specimens, such as I sent you, and I intend to exhibit these at Montreal and possibly at Philadelphia, and to read a short paper on the matter. I can send you plenty of our living *Utricularia vulgaris* should you care to have it. I see Asa Gray in his manual refers to VAR. *Americana* as most common in the United States, but no doubt the two varieties will act alike as to young fish. You will no doubt at once try the plant with young carp. I have not found any case of a young fish already trapped by any specimen of the *Utricularia* taken from the pond in which it grows here, although there are many fish in the pond.

14 ST. GILES, OXFORD, June 20, 1884.

141.—MEMORANDUM OF SOME RESULTS OF FISH-CULTURE ALREADY ATTAINED.**By MARSHALL McDONALD.**

CARP.—The carp wherever planted under favorable conditions and receiving reasonable care and attention have grown, bred, and multi-

* The specimen has been figured under the direction of Mr. John A. Ryder (see plate I). Three of the figures are original; one is copied.—C. W. S.

EXPLANATION OF THE PLATE.—*Fig. 1.* *Utricularia vulgaris*, nat. size; plant in flower. (From Maout and Decaisne.) *Fig. 2.* A single cluster of leaves enlarged twice, showing the little bladders in position, one of which has seized a young fish by the head. *Fig. 3.* A single bladder enlarged sixteen times, showing the two branched filaments at the open end. *Fig. 4.* A bladder enlarged seven times; a young fish has been seized by the tail.

plied rapidly. Thirty thousand distinct bodies of water in every section of the United States have been occupied with this fish. These represent an aggregate area of 100,000 acres of waste water, which have been converted to profitable, almost spontaneous, production, yielding at a moderate estimate 20,000,000 pounds of food per annum and adding \$1,000,000 annually to the value of the products of the country.

BLACK BASS.—The black bass has been acclimated in all of the rivers of the Atlantic slope, and while not increasing the aggregate food product of the areas occupied by them, the introduction of this game fish has indirectly contributed to the prosperity of various sections by attracting sportsmen and summer residents.

TROUT.—The mountain sections of New York, New Hampshire, and Vermont have their game and fish well preserved through the efforts of the State fish commissioners; the trout streams being kept up by artificial propagation or planting, and by protection. The summer visitors who are drawn to this region by the fame of its hunting and fishing leave there annually \$15,000,000, according to the statement of the New Hampshire commissioner. The larger part of this is to be credited to the efforts in artificial propagation systematically carried on there.

CALIFORNIA SALMON.—The efforts to acclimate this species on the Atlantic slope and in the Mississippi basin have proved abortive, unfavorable temperature conditions, as I have elsewhere shown, having militated against success. This, however, is to be regarded as an experiment in acclimation rather than in fish-culture, the artificial propagating and planting of this species in the Sacramento River having carried the annual production of that river up to double the volume it had before planting was inaugurated, and added to its aggregate value \$300,000 per annum.

WHITEFISH.—The propagating and planting of this species in the Great Lakes was undertaken in the face of a rapid decrease, which foreshadowed the exhaustion of these fisheries in a few years. This decrease has been arrested, and the product is again slowly on the increase.

SHAD.—The results of the artificial propagation and planting of shad cannot, in the absence of accurate statistics covering the whole coast, be definitely stated. There is no question but the production of the Chesapeake area as a whole is steadily on the increase, though local causes determine local failures of the fisheries each season; local statistics, being the only measure of increase that we have, of course can furnish us no data by which we can determine the general advance in production. This, however, is shown by the decreased cost per pound of the shad from season to season in the face of a continually increasing demand brought about by increasing population and increased facilities for distribution, the price to-day in the markets of Baltimore and Washington being from \$12 to \$20 per hundred and from 3 to 4 cents per pound.

WASHINGTON, D. C., *May 4, 1884.*