

135.—A FISH-EATING PLANT.**By G. E. SIMMS, Jr.**

[In the Fishing Gazette, May 31, 1884.]

I have recently discovered amongst the aquatic weeds placed in my aquarium, where I have also a large number of newly-hatched perch and roach, a novel and unexpected enemy to the pisciculturist in the bladder traps of *Utricularia vulgaris*, which is capable of catching and killing young fry.

My attention was first drawn to it by observing that several of the tiny fish, without any apparent cause, were lying dead on the weeds, while the rest of the brood looked perfectly healthy and in good condition. At first I was somewhat puzzled at the strange position in which they were lying, and in trying to move one with a small twig I was still more surprised to find it was held fast by the head, in what I thought, when I pulled the plant from the water, were the seed vessels; and a still closer examination revealed the strange fact that others of the little fish had been trapped by the tail, and in one or two instances the head and tail of the same fish had been swallowed by adjacent bladders, thus forming with its body a connecting bar between the two.

At first I was undecided how to act, for I could bring to memory no instance in which I had seen the existence of a piscivorous plant—*i. e.*, one preying on vertebrates—recorded in any book I had ever read, and I was unwilling to make such an assertion without the opinion of some one better capable of forming a judgment on the subject than myself; so I placed one or two good specimens in a glass jar and went to the Museum, where I was fortunate enough to see Professor Moseley, who immediately verified my suspicions.

According to Bentham's Handbook of British Flowering Plants, the *Utricularia vulgaris*, or greater bladderwort, is widely distributed over Britain, and although it is local, yet where it is found it grows luxuriantly, seldom appearing in the rivers, but chiefly confining its presence to still ponds and deep ditches, the places where it is most likely to work mischief to the young fry.

A peculiar fact in connection with it is that it has no roots at any time of its life, and the floating, root-like branches which are covered with numerous capillary and much divided leaves are interspersed with tiny green vesicles, which were supposed by a former school of botanists to be filled with water, by which means the plant was kept at the bottom until the time of flowering, when the water gave place to air, and the plant then rose to the surface to allow its bloom to expand.

As a matter of fact, these vesicles exercised no such function, their

real work being to entrap minute crustaceans, worms, larvæ, &c., for its support, and without a good supply of which it is impossible to keep it alive in an aquarium.

Their form is that of a flattened ovoid sac, or, in other words, when seen under a low-power microscope, they are precisely like a human stomach, and they are attached at their hinder extremities each by a very short and fine pedicle or foot-stalk in the axil of the leaves.

Each, too, has an opening at the opposite free extremity, somewhat quadrangular in outline, from either side of which project two branched processes, called by Mr. Darwin antennæ.

In fact, I do not suppose they could have received a more appropriate name, because in appearance the whole bladder intimately resembles an entomostracan crustacean, the short foot-stalk representing the tail.

On either side of the quadrangular entrance several long bristles project outwards, and these bristles, together with the branches of the antennæ, form a sort of hollow cone surrounding the entrance, and there cannot be the slightest doubt that they act as a guide for the prey.

The entrance is closed by a valve, which being attached above slopes into the cavity of the bladder, and is attached to it on all sides except at its posterior or lower margin, which is free, and forms one side of the slit-like opening leading into the bladder.

Differing materially from the color of the bladder itself, which is of a brilliant green, the valve is colorless and transparent, and is extremely flexible and elastic.

Animals enter the bladders by bending inwards the posterior free edge of the valve, which, from being highly elastic, shuts again immediately.

The edge is extremely thin and fits closely against the edge of the collar, both projecting into the bladder, and it is extremely difficult, if not impossible, for any animal to escape, although I have observed a long worm do so at the expense of a part of its body; yet, as a rule, it is a case of "all who enter here lose hope."

To show how closely the edge fits, it was found that a daphnia, which had inserted its antennæ into the slit, was held fast a whole day, and on other occasions long narrow larvæ, both dead and alive, were seen wedged between the valve and the collar with their bodies half in and half out the vesicle.

When a fish is caught, the head is usually pushed as far into the bladder as possible till the snout touches the hinder wall. The two black eyes of the fish then show out conspicuously through the wall of the bladder.

So far as is known, there is no digestive process in *Utricularia* neither is there any sensibility to irritation. Mr. Darwin was unable to detect either, his opinion being that whatever nutriment the plant obtained from its prey was by absorption of the decaying matter, and it would appear that the longer of the two pairs of projections composing the quadrifid processes by which the vesicles are lined, which pro-

ject obliquely inwards and towards the end of the bladder, acts, together with the spring valves at the mouth of the bladder, in utilizing each fresh struggle of the captive for the purpose of pushing it further inwards. If any of my readers wish for specimens of this interesting plant I shall be enabled in a few days to forward them at a very nominal cost.

Of its destructive powers all I can say is, that out of 150 newly-hatched perch placed in a glass vessel only one or two were alive two days subsequently, and I hope in a few days to be in a position to speak of its powers *en natura*.

I must also tender my hearty thanks to Professor Moseley for his unselfish kindness and courtesy in furnishing me with notes and all necessary information, at a time when his hands are full with this term's work, and any one who knows rightly the duties of an Oxford professor will agree with me that the position is an arduous one. Such men as Professor Moseley are few and far between, for, like fishermen, I find that among scientific men there is an amount of jealousy which ought not to exist, and I therefore regard the action of Mr. Moseley in this matter with such feelings of gratitude as are not easily obliterated.

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139.—A CARNIVOROUS PLANT PREYING ON VERTETBRATA.

By Prof. H. N. MOSELEY.

[From Nature, May 22, 1884.]

An interesting discovery has been made during the last week by Mr. G. E. Simms, son of a well-known tradesman of Oxford. It is that the bladder-traps of *Utricularia vulgaris* are capable of catching newly-hatched fish and killing them. Mr. Simms brought to me for examination a specimen of *Utricularia* in a glass vessel, in which were numerous young roach newly hatched from a mass of spawn lying at the bottom. Numbers of these young fish were seen dead, held fast in the jaws of the bladder-traps of the plant. I had never seen *Utricularia* before, and am indebted to my colleague, Prof. Burdon Sanderson, for the identification of the plant and a reference to Cohn's research on it. Mr. Simms supplied me with a fresh specimen of *Utricularia* in a vessel with fresh young fish and spawn, and in about six hours more than a dozen of the fish were found entrapped. Most are caught by the head, and when this is the case the head is usually pushed as far into the bladder as possible till the snout touches its hinder wall. The two dark black eyes of the fish then show out conspicuously through the wall of the bladder. Rarely a specimen is seen caught only by the tip of the snout. By no means a few of the fish are, however, captured by the tail, which is swallowed, so to speak, to a greater or less distance, and I have one specimen in which the fish is caught by the yolk sac. Three or four instances were observed in which a fish had its head swallowed by one