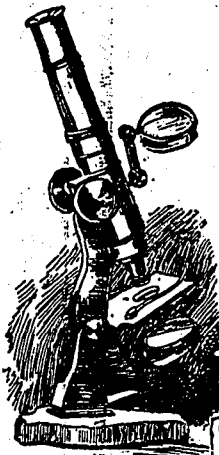


THE MICROSCOPE AT THE POND SIDE.

(From the Youth's Companion.)

I was recently permitted by the authorities to make a microscopic "dredging expedition" in the lakes of Prospect Park, in Brooklyn, N. Y., and as a sort of continuation of a former article under the same caption, I will give an account of some of the things which I found there. It should be said that those ponds are not exceptionally good



for this purpose, and that any pond, especially if it has upon its surface the small green plant called duckweed, may yield better results.

The articles found were drawn up with a hook at the end of some thirty or forty feet of strong twine. The hook was made by twisting two pieces of copper wire together and passing them through a sinker, as shown in Fig. 1. The wire should not be too stiff, for in that case it will not yield if it catches on anything immovable at the bottom, and the hook will be lost.

Fig. 2 represents about three inches of slender submerged twig "fished" up in this way. There were not "millions in it," but literally thousands on it, for it was crowded with life.

First, were a number of animal trees, presenting to the unassisted eye a fluffy appearance, but under the microscope a perfect tree-like colony of animals, called *Cercherium polyplumum*.

In Fig. 3 we have the "trunk" of one of these singular animal trees. It has a transparent stalk, and delicate transparent "branches" with ramifications extend in every direction, in precisely the same manner as the branches and twigs diverge from a trunk of a tree. In the place of leaves, however, we have in our animal tree from a dozen—according to its age—to five hundred or a thousand living animals, averaging about the one five-hundredth of an inch in length, each one extended on its tiny stalk.

This beautiful "tree" belongs to the same family as the *Vorticella*. The individuals—polyps (see Fig. 4)—have a similar bell-like shape, the same ciliary action at the mouth of the bell, and the "tree" grows by the subdivision of the polyps composing it.

To see these immense numbers of tiny forms expanded, all putting forth this independent ciliary action in quest of food, and on the slightest alarm disappearing, leaving not a trace behind except a small, white, round lump of jelly; then, on recovering from their fright, reappearing in all their beauty, is indeed a marvellous sight.

Next we perceive (Fig. 5) hundreds of animal trumpets called *Stentor Mulleri*, singly and in groups of ten to fifty. They are about one thirty-second of an inch in length. Some are pale brown, and others (*Stentor ceruleus*) pale blue; others again (*Stentor viridis*) pale green.

Busy as they seem to be, waving the mouth of the "trumpet" to and fro, no sound is heard; for either the *Stentor* is too modest to attract attention by its music, or our ears are not quick enough to catch the strains.

They attach themselves to the twig by a suckerlike disc at the small end of the trumpet.

When expanded, the mouth is seen surrounded with a fringe of cilia in full action, bent on securing "a good square meal." When at rest, they contract themselves into a kind of ball; but when expanded, they stand out, firmly and distinctly, the members of the group being as close together as they well can be.

If left undisturbed, they will, after fulfilling all their functions, probably die where they have lived, although their span of existence is not known; but if disturbed, they immediately contract themselves, give up their grip, forsake their homes, and using their cilia as propellers, wander forth in search of fresh fields.

Even without a lens we see a strange object stretching itself out over the heads of the *Stentors*. It is *Hydra vulgaris* (Fig. 6). It takes the name *Hydra* from that old fable of the Greeks about a monster which infested the neighborhood of Lake Lerna. The legend was that this monster

had nine heads, and that as soon as one was cut off, two immediately grew in its place. To slay this monster was one of the labors which Hercules accomplished. We shall presently see that the name thus given to this animal is singularly appropriate.

Its body consists of a long, thin hollow tube, which seems to be composed of globules of jelly, which is protoplasm; and it is crowned with from five to ten arms, similarly formed, called tentacles.

These it moves about, apparently without purpose, in all directions. Their position changes constantly, and they also increase or decrease in length and thickness every moment. If they are decreasing in thickness they become so attenuated as to look like a string of extremely delicate beads.

What is the *Hydra's* purpose? It is not a gymnastic exercise, intended to furnish amusement to the observer, be assured. These long, slender tentacles are really fishing lines; and woe betide the unwary little animal that comes in contact with them.

The tiny beads of protoplasm of which they are composed, seem first to exert a paralyzing influence on the ensnared prey; and then hitherto concealed barbed, poisonous darts issue forth, which speedily "settle" the poor captive, and render it incapable of further resistance. Then the arms twist around it, and convey it to the mouth, which is a simple opening into the tubular body, situated at the junction of the arms; there the victim is gulped down without further ceremony.

As the *Hydra* does not possess, or, if it possesses, does not exercise any powers of discrimination, we sometimes perceive that it has "caught a Tartar," in the shape of one of the free swimming diatoms, whose covering of flint—silica—is not an easily digested substance. Still the *Hydra* does not seem to mind a trifling mistake of this kind, and as it is never troubled with dyspepsia, it keeps on fishing, and quietly corrects its error by disgorging its uncomfortable prey in the same unceremonious manner, and through the same aperture.

A small protuberance, also ending in some tiny arms, may be seen on the body of the *Hydra*. This is a young one, growing out of its parent's side—a true offspring, you will say. This is called the budding process; and in the summer it often takes place as many as twenty times in a month, "Buds" have even been

seen on the young *Hydra* while it was still attached to the parent.

Two or three of the young often may be seen growing simultaneously on one parent; and as "like parent like child," the old and the young may sometimes be seen pulling with all their might, at the opposite ends of a worm which has had the misfortune to be caught.

In the winter the *Hydra* multiplies from eggs; but it has another, an artificial, mode of propagation, which is so marvellous that when first published it was not only discredited, but ridiculed by scientific men, and was not accepted until the most absolute and undeniable proof of its truth was given.

The experiments, first made by Trembley, a French microscopist, and by Johnston, are summed up as follows:

"If the body is halved in any direction, each half in a short time grows into a perfect *Hydra*; if it is cut into four, eight, or even minced into forty pieces, each continues alive, and develops a new animal, which is itself capable of being multiplied in the same extraordinary manner.

"If the section is made lengthwise, so as to divide the body into two or more slips connected by the tail, or base, they are speedily re-soldered, like some hero of fairy tale, into one perfect whole; or if the pieces are kept asunder, each will become a polyp.

"Thus we may have several polyps with only one tail between them; but if the sections be made in a contrary direction,—from the tail toward the tentacles,—you produce a monster with two or more bodies and one head.

"If the tentacles—the organs by which they take their prey, and on which their existence might seem to depend—are cut away, parts are reproduced, and the lopped-off parts remain not long without a new body. If only two or three tentacles are embraced in the section, the result is the same, and a single tentacle will serve for the evolution of a complete creature.

"When a piece is cut out of the body, the wound speedily heals, and, as if excited by the stimulus of the knife, young polyps sprout from the wound more abundantly, and in preference to the unscarred parts. When a polyp is introduced by the tail into another's body, the two unite and form one individual; and when a head is lopped off, it may safely be engrafted on the body of any other which may chance to want one.

"You may slit the animal up, and lay it out flat like a membrane with impunity; nay, it may be turned outside in, so that the stomach surface shall become the epidermis, and yet continue to live and perform all its functions. The creature suffers very little by these apparently cruel operations, for before the lapse of many minutes the upper half of a cross section will expand its tentacles, and catch prey as usual; and the two portions of a longitudinal division will, after an hour or two, take food and retain it."

There are two other specimens of *Hydra*, one of which, *Hydra fusca*, has a large number of tentacles, which can be extended to a length of seven or eight inches. The third, *Hydra viridis*, is considerably smaller than either of the foregoing, and of a brilliant green color. All the forms when at rest, or when circumstances do not favor their extension, contract themselves into a globular form.—Stephen Helm.

WHAT IS THE END OF LIFE?

The end of life is not to do good although many of us think so. It is not to win souls, although I once thought so. The end of life is to do the will of God. That may be in the line of doing good, or winning souls, or it may not. The maximum achievement of any man's life after it is all over is to have done all the will of God. No man or woman can have done any more with a life; no Luther, no Spurgeon, no Wesley, no Melancthon, can have done any more with their lives; and a dairy-maid or a scavenger can do as much. Therefore, the supreme principle upon which we have to run our lives is to adhere through good report or ill, through temptation and prosperity and adversity, to the will of God wherever it may lead us. It may take you away to China; or you who are going to Africa may have to stay

where you are; you who are going to be an evangelist may have to go into business; and you who were going into business may have to become an evangelist. But there is no happiness or success in life till that principle is taken possession of.—Professor Drummond.

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ADVERTISEMENTS.

LITTLE NELLIE IS HAPPY.

Little Nellie writes us from a New Brunswick town, and tells us about her baby brother aged six months.

We are permitted to publish in this issue of the *Northern Messenger*, a few extracts from Nellie's interesting letter.

She says: "When baby was born, I was glad, as I often wished for a brother. When baby was a month old, I heard mamma say, that he was very delicate, and that it would require great care and attention to preserve the little life. Mamma fed little baby brother on very nice milk, and tried a food that the druggist sold. At the end of two months, dear little brother was very thin and weak; and I became afraid, because often mamma would cry when she held baby in her arms."

"One day I read about your Lactated Food in the *Moncton Times*; I ran to mamma and asked her to try one package of it. She smiled through her tears, and told me I might go and buy a tin.

"Now for the joy part, dear sirs! I want very much to tell you how the Lactated Food worked. Mamma fed baby with your great food for three days, giving it nothing else; and we all noticed a change. My baby brother got brighter and could keep the nourishment on his stomach. Mamma continued with Lactated Food; and, every week, dear brother was getting fatter and stronger, and was taking good long sleeps. Our doctor was astonished, and said that your Lactated Food saved my dear little brother."

We trust that every boy and girl who reads Nellie's letter, will follow her example, and urge their dear mothers to try Lactated Food if baby brother or sister is weak, sickly, cross and peevish. If you have no baby in the house, tell your friends who have a baby, all you know about Lactated Food, which has saved so many precious little lives. Tell mamma, that if she has not tried Lactated Food, to send her address at once to Wells & Richardson Co., Montreal, and they will send her free a full sized package. Mention the *Northern Messenger*.

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