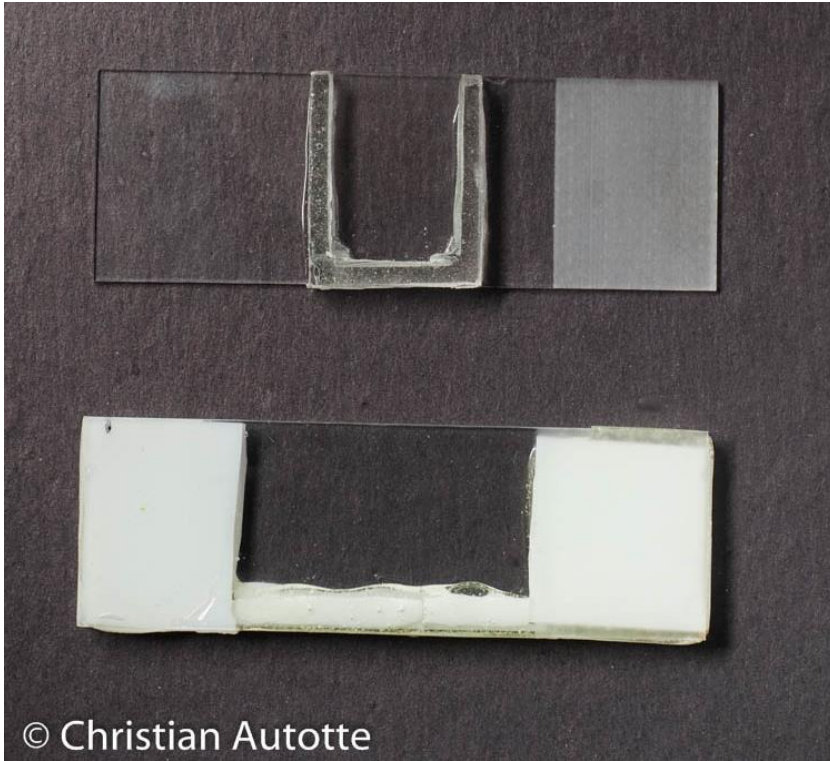


# MICRO-AQUARIUMS

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Well slides have been known for years and are used by many to observe larger organisms, like water fleas, without crushing them. Many things can be observed in well slides but they are not suitable for every situation.



Some large subjects, like mosquito larvae, phantom midges' larvae, small shrimps and the likes, may need to be photographed horizontally instead of from above. Since I love tinkering and have a certain fondness for gadgets, that has led me to make a few micro-aquariums. One version has been made with a "U" shape cut in a piece of Plexiglas; a piece of glass cut from another microscope slide was glued on top. A different version, somewhat larger, is made by gluing together two microscope slides with Plexiglas spacers.

The thickness of the slide may not be optimal for some use, compared to a regular cover slide, but I found the results quite acceptable with a 10x magnification.

Last spring, after making my new gadget I decided to try them out by photographing

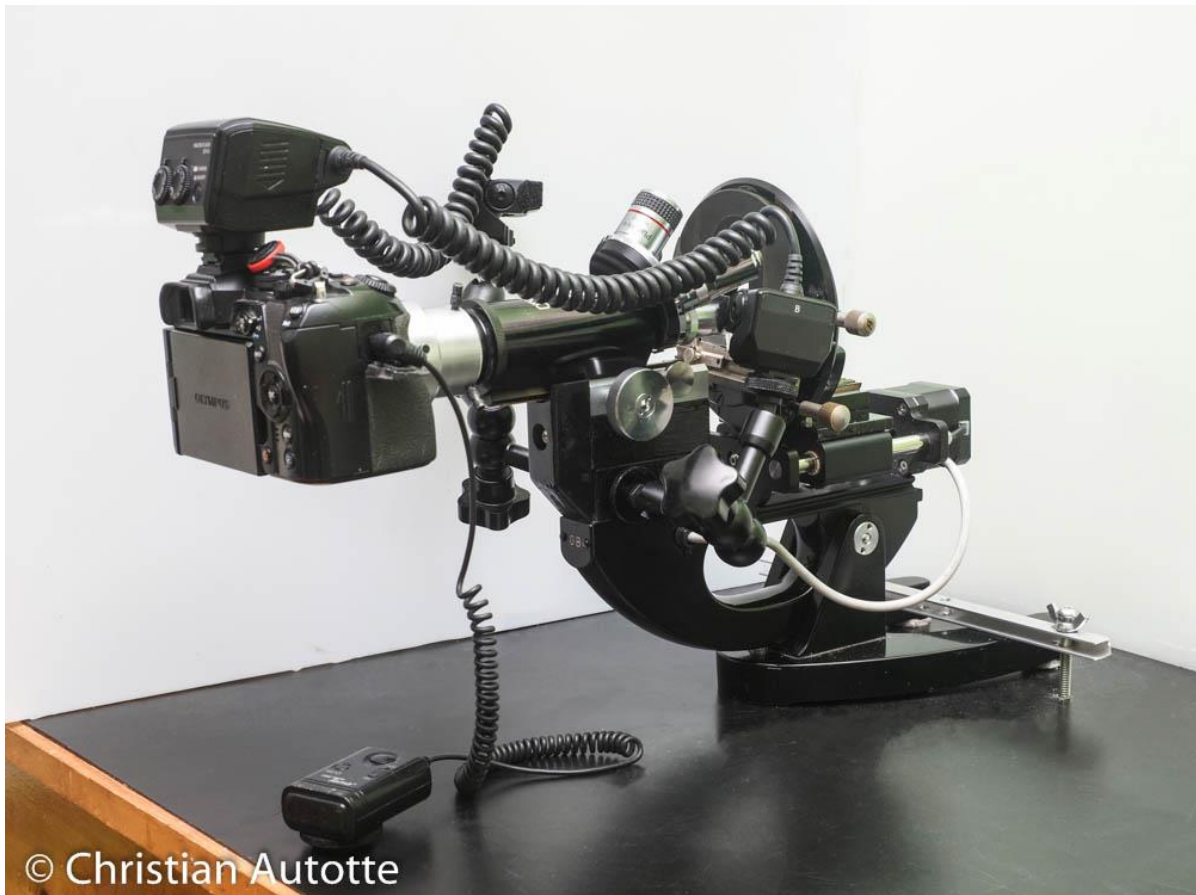
mosquito larvae that were readily available in a nearby pond. During that first attempt I had to overcome some technical difficulties. The first one was the stability of the whole microscope/camera assembly. Flipping the microscope horizontally was no problem for my old Olympus (which looks suspiciously like my old Zeiss... go figure...) but adding a camera was too much and it readily tipped over. Adversity never stopped a determined micro photographer: I drilled two holes in my work bench, tapped them with a 1/4 inch bit and used an aluminum bar across the microscope base to keep everything secure.

The micro-aquarium was then put in place with its mosquito larva. But I could not find the beast! I could focus on the edge of the aquarium and at the water line, but moving back and forth I could not locate the larvae even when it was right there! Then I realized that everything being in reverse I was trying to find the beast in the air instead of in the water... After that the problem of lighting the subject properly were easily solved: one flash was aimed at an angle and from the right, and eventually a second flash was pointed at a green background behind the aquarium.

The next hurdle was with the subject itself: mosquito larvae are called "wrigglers" for good reasons... Patience is a virtue, or so they say, but I am not always very virtuous. Not that they care, but those wrigglers were treated with a few cuss words on more than one occasion! As they would write in comic books: \*@#%&^\*!&#%&^\*!



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The old Olympus flips over easily, but with a camera mounted on its optical tube the weight was too much. A stabilization system was improvised with an aluminum bar screwed in the work table.



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When working with a single shot, depth of field is very narrow so the whole process is very much a hit and miss proposition and many pictures ended up in the garbage bin, also known around here as file #13. As anything else in photography things get easier with practice. After a few sessions the quality of the pictures made with this set-up got better. I even managed a few shots at 10x showing the siphon at work just below the water surface. Afterward, I started looking for subjects that would be suitable for this type of approach. Among those were newly emerge frog tadpoles at 4x. Barely bigger than the mosquito larvae, they looked very different from later versions of themselves with their external gills, which become internal in a few hours. Note also the pair of suction cups in place of their mouth.



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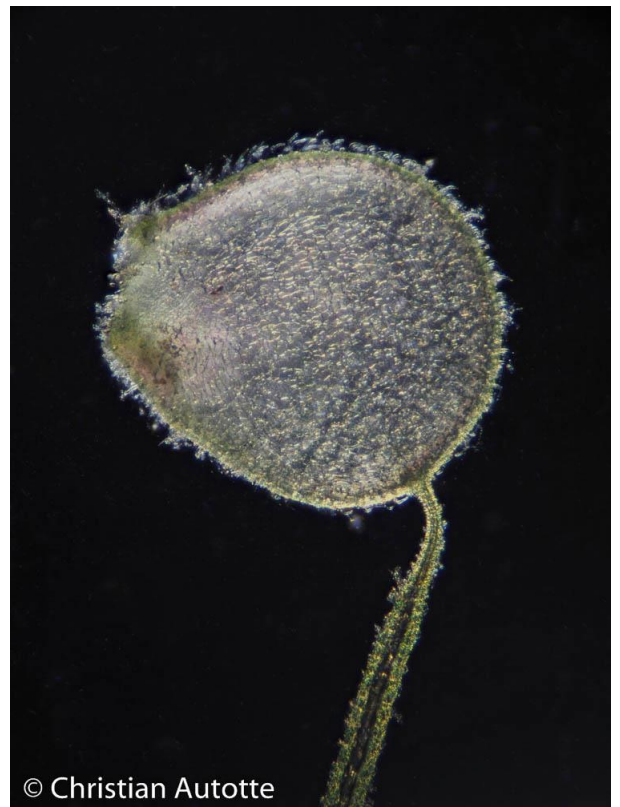
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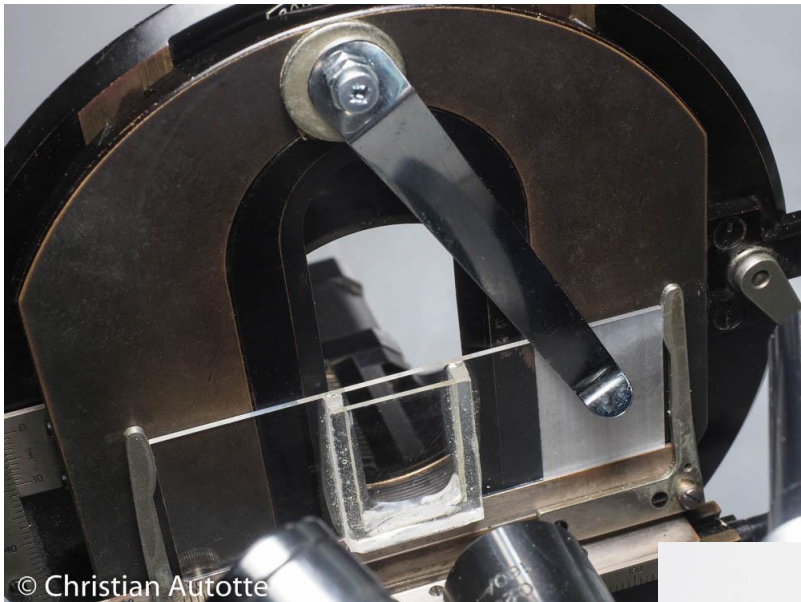
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All at about 4x

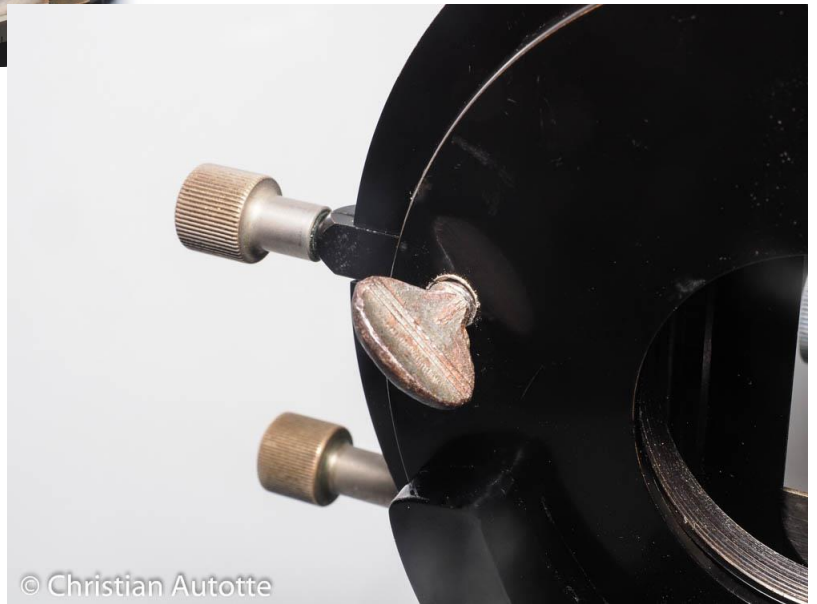
Bladderworts (*Utricularia* sp.) are carnivorous plants that catch underwater organisms with globular traps (the “bladders”) that can suck in water fleas, small mosquito larvae, even fish fry. Compared to the mosquito larvae, the bladderworts were a breeze to photograph. Since they did not move I was able to take a series of pictures and stack them, thus increasing depth of field as needed. Placing a “twig” with several bladders in the micro-aquarium made it possible to select any of a number of potential targets and vary the compositions. Of course, when a single bladder had to be photographed I was also able to isolate one in a regular well slide and photograph it in darkfield. As the old saying goes: There’s more than one way to skin a cat...



Another old saying states that necessity is the mother of invention. Whenever I would flip the microscope horizontally, the slide had a tendency to fall off. At first, I would simply place a small block under the handle to keep the stage at a slight angle, and it worked, more or less. I have lost count of how many modifications were made on that old microscope, so I decided to make another one... I modified the stage by adding a single clip which can be swung in position and hold the slide securely in place.

That stage is also of the rotating type (taken from an old broken down Zeiss). When working, it has a tendency to rotate on its own. So since the stage was taken down and the drill was out...

I drilled a hole and used a 1/4 inch tap to fit a thumb screw under the stage; tightened lightly it stops the stage from rotating on its own. Of course, that kind of tinkering is not something I would recommend on a priceless antique, but this old microscope is nothing of the kind.



One last detail... You may have noticed the recorded magnifications that were used in making these pictures: 4x and 10x. Normally the use of ocular and lenses should give 40x and 100x magnifications, but that's on a microscope with a specific optical tube length. The old microscope that I use has an optical tube of variable length. When I use it, I tend to reduce the tube to its shortest length, which gives me unorthodox magnification factors. So a chart was made to figure out the magnifications: a millimeter scale was photographed and proper measurements made with it.

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