

Restoring an AO 120 MICROSTAR

I have a few excellent binocular microscopes, which suddenly became irritable to use. I cannot get a singular image any more. I see two objects side by side. Tests showed that it is not the microscope's fault. One of my microscopes is an AO 150 student microscope, which I refurbished a few years ago and exclusively used on camping trips. To see if this microscope will work for me, I installed the binocular body on it. To my amazement, no problem, No double vision. These older American Optical microscopes have their binocular tubes converging. Now I got excited. I have a catalog of the AO 120 Microstar, which I requested of the company in the 70s. I could not afford it then, but for some reason, it was my dream microscope. I liked the looks and the specs.

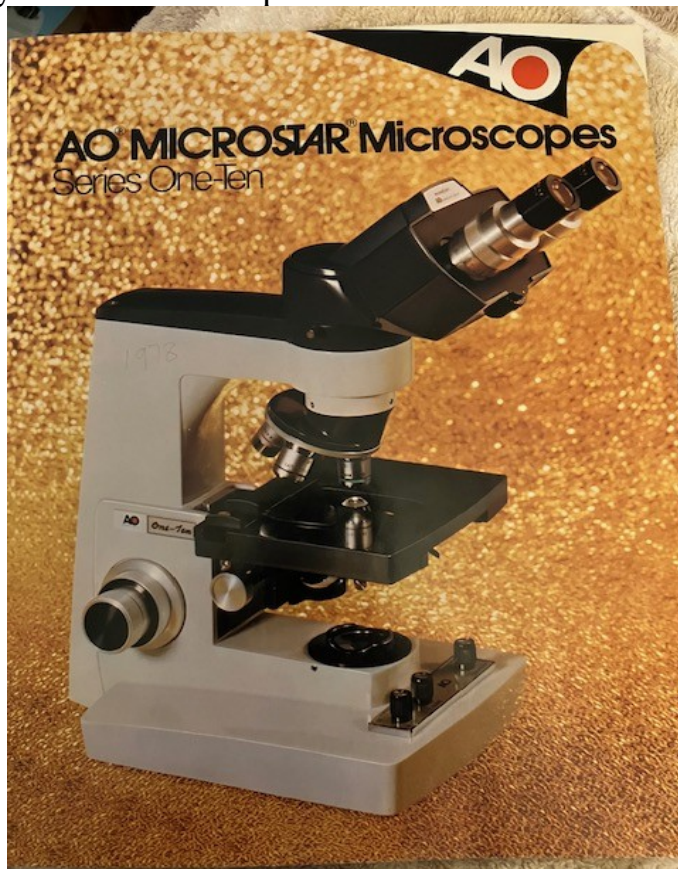
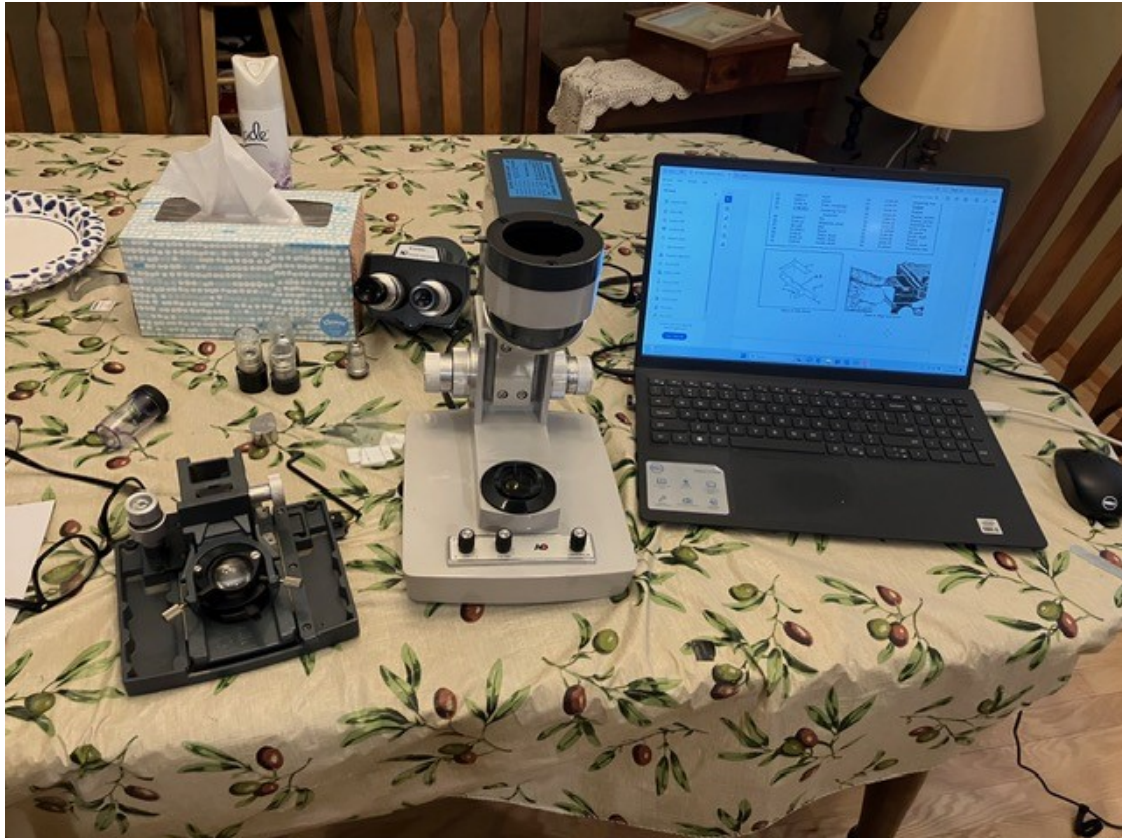


Illustration 1: 1978 catalog

I searched eBay and found many offers of this model. I bought one unit, offered for less than \$100.- and later another one for \$130.-. I thought that this will give me enough parts to assure a working microscope. Actually, the first unit was in pretty good shape. It actually lit up and worked, but it needed some repair. The stage was wobbly and some knobs were very hard to turn.

To work on these microscopes, you need a metric Allen wrench set and some screw drivers. I also downloaded a parts manual for a similar unit. This helped, because some screw and fasteners are well hidden.

To repair the stage, it had to be removed. It is solidly fastened to the microscope, which is a good feature. Focusing is done by moving the nose piece. Because the objectives are infinity corrected this is OK. By loosening only one screw and removing all the objectives, the stage slides right out. Now you can get at the condenser stuff, which is an Abbe aplanatic type. Every thing there worked like it was new. I oiled the mechanical stage slider ways. The loose wobble was an easy fix. I loosened the rack and pinion mount and re tightened it. After reinstalling the stage, I could test the microscope.



This microscope came with four objectives. Three of them were OK I already owned some older objectives, which performed excellently in this microscope. This microscope has room for five objectives, so I fitted it with a 4X, 10X, 20X, 40X and a 100X oil immersion. Originally, this model had plan achromats. My older objectives were not plan, but I could hardly see the difference. This would only be evident in something like a blood smear photo. I really liked the visual images of this instrument. The brochure says that the illumination is done with a Köhler system. Maybe this is why the image is so brilliant? I tried to open the bottom, but this seemed to risky. So I ordered another model. This was advertised as is and no power supply. No power supply meant that the power cord was cut off. This instrument came with four good objectives, two good eye pieces, a well functioning stage with condenser and an untouched illumination system. The binocular head had a loose prism floating around.



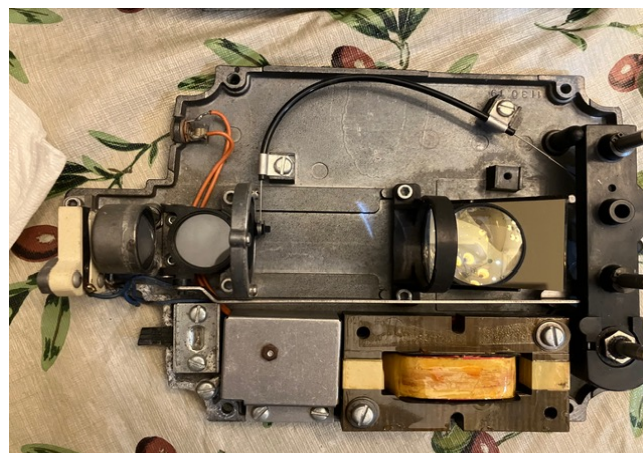
For the fun of it, I tried to repair the binoculars. To get to the screws, I had to remove the label.





I reattached the prism with superglue. Since the angle of the prism did not change and the position is not as critical, I am confident that this binocular head will work. For some reason I ended up with two of those heads. Both have one problem, the thumb wheels to change the distance to your eyes, do not work. To change it, you have to grab the tubes. This is one flaw I noticed on the design. Mechanically, it is kind of complicated, because the distance of the eye piece to the tube lens should not change. All these links get stiff with age, which the thumb wheel design could not handle. There is no way a user could get in there to lubricate it.

Now the illumination. I enjoyed taking it apart with no risk involved. Actually it came apart easily with no damage done.

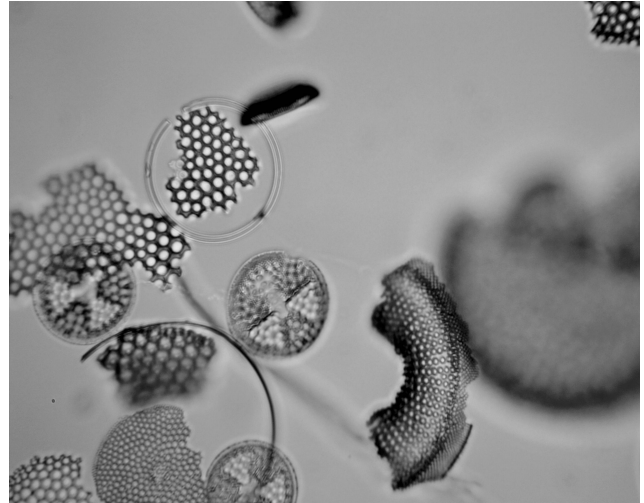
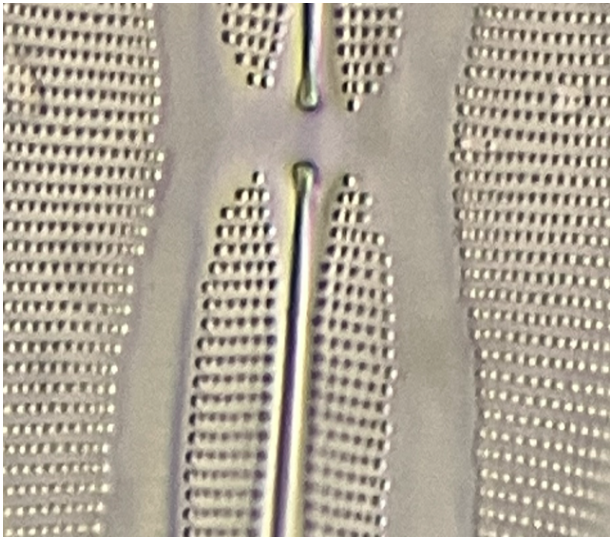


Way on the left is the place where a halogen bulb holder (missing on this unit) slides in. Next to it is a lens. The round piece next to this is a neutral filter, which can be put into the system by a knob in front of the base. Then further to the right is another lens system with iris diaphragm, which can be controlled by a button from the front on the base as required for Köhler. On the bottom of the picture is the transformer and the circuitry to control the light intensity by another front button. The brochure says that its Köhler with a highly corrected lens system. In my opinion, this is a little stretch, because the lens next to the bulb has one side matted. This makes the lens the light source and true Köhler is not accomplished but visually it sure looks close to it.

Well, I had fun, learned something and ended up with a nice, new looking microscope, which I really enjoy.



I have them sitting in our living room so that I can frequently just sit and relax looking at creation wonders. Pictures take with my cheap phone.



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