Wild M20 microscope by Michael Wilkman, Finland.

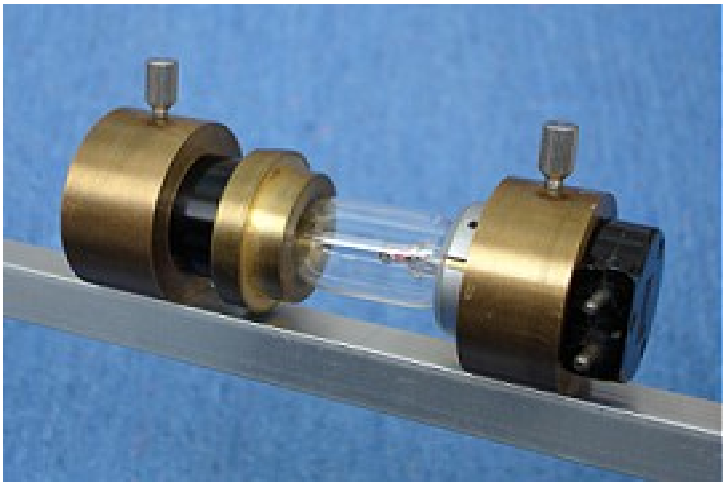
This is one of the most beautiful microscopes made before Leitz introduced their New Look in the late 1960's and early 1970's. The revolver for six objectives and the binocular tube (with its uncomplicated eye distance adjustment) were - to my knowledge - unique at the time.

However, the M20 has some weaknesses, notably in the K-stage, which is unnecessarily complicated, perhaps in order to differ from the corresponding Zeiss Opton stage. In the Zeiss stage the x-movement knobs are fitted directly to the spindle, whereas Wild uses a metal/plastic cogwheel transmission at each end. As the plastic wheels often are slightly off-center or elliptical it is difficult to eliminate the play. A rather thick grease has been used to minimise it.
Another (not especially Wild-related) source of play is wear of the long nut moving on the spindle. Thick (but not too thick!) grease helps here too. Too thick grease puts undue stress on the cogwheels. In an emergency the nut, when removed from the spindle, may be made slightly oval (0) by cautious squeezing in a vice.
The y-movement works on one side only (on both sides in the Zeiss stage), but this seems to cause no problems and is easy to adjust.
The rotatable Kd-stage is much simpler (but thinner too), with a directly driven x-movement (as in the Zeiss stage) and a separate y-movement knob on one side only.

The built-in illuminating system S is unnecessarily complicated too, using two mirrors instead of one. Besides, older models have a serious weakness. In them the correct position of the bulb holder is marked by a red, engraved ring only and it is possible to push the holder further in so the bulb touches the first, matted collector lens and causes it to crack. Newer holders have a 4,5 mm distance ring, which can be fitted to older ones too. A cracked lens has to be replaced, of course, but finding a replacement lens is another problem. Microscope-Business.com may have something.
Disassembling the illuminator is a little tricky. For convenience, first remove the bulb holder. Then loosen the small clamping lever (or screw) beside the illuminator and pull it out. Open the diaphragm and remove the small screw of the diaphragm ring to give access to the three fastening screws through the round hole and remove them. Keep the illuminator vertical with the collector up and pull it apart, taking care that the diaphragm ring remains in place and does not stick to the upper (collector) part. Keep the lower part vertical all the time and avoid disturbing the diaphragm unless you want some extra work.

After replacing the damaged lens (the innermost one of three!), take care that no dust particles remain on the lens surfaces and leave a slight slack in the fastening ring.
Before assembling, check that the collar for adjusting the diaphragm moves smoothly. If not, apply a little grease. When the illuminator has been assembled and all screws fixed, push it into the microscope base with the white dot up and tighten with the lever/screw. Make fine adjustments when using the microscope.

Bulbs can be difficult to find. The bulb used for the M20 is an Osram 70249 (6V, 20W) centered in a precision collar by Wild and thus very expensive. Many years ago, when working at an institution that had a few M20 and several Zeiss microscopes, I made a bulb-centering device to reduce costs. The collars of burnt out bulbs were removed and fitted to new bulbs. The Zeiss collar was easier to fit as it consists of a flat flange soldered to the bulb socket, whereas in the Wild collar the bulb is fixed by three small screws and secured by soldering. As the Osram 70249 was either difficult to get or expensive (or probably both), we had to use the commonly used Osram 70152, alias 8018 (also Philips 13347 W) (6V,15W), as Zeiss too did.



An M20 bulb holder is needed, with three holes made to give access to the bulb fixing screws. A suitable lens, for instance an eyepiece, is needed too, as is a power source giving a few volts.
A bulb collar is put in place in the holder (before this a spring has been inserted in the holder to ascertain that the collar will be in its outermost position) and a bulb with the two small tabs removed fitted into the collar, checking that the bottom contacts coincide. The front of the bulb is then pushed into a flange that can be moved a few millimetres radially in all directions. At the end of the bar, at a distance of 40 to 50 centimetres, is a card with a cross (or square or circle) onto which the bulb filament is projected and centered by moving the flange. The bulb is then fixed in the collar and - after being carefully removed from the holder - secured by soldering at the rear end. Fixing by the screws only is not reliable as the bottom contacts may push the bulb out of its correct position. - Collars are removed from old bulbs in a gas flame after loosening of the fixing screws.

A bulb in use should be checked now and then. The filament is quite close to the glass so the front darkens with time and may sometimes even bulge out, increasing the risk of lens damage.

The rapid development of the LED (Light Emitting Diode) will probably make ordinary bulbs obsolete even in this field (LEDs are already being used on stereo microscopes). The white LEDs have a continuous spectrum so they should be suitable for colour film. - I intend to look into the matter when I have the time (when Hell freezes or it rains pea soup or little hags).

Some parts of the M20 (at least the revolvers), originally made of brass, were later made of aluminium, which reduces the weight and cost, but does not give the same sense of durability.

A few years ago I bought a second-hand M20 with a nicely working K-stage. However, as I need a rotatable stage (important for polarisation and photomicrography) I have to modify it, which is not easy. There will be no space for a centering system so the stage has to be mounted very accurately. Besides, it will be 10 mm thicker so the condenser movement has to be modified too, but that is easy.

I have used the excellent Wild Fluotars for many years, first on an old monocular Hensoldt microscope and later on a binocular Meopta. The Fluotar 10/0,45 (later 0,40) is a brilliant star of the first magnitude, both in the normal and the phase version (the phase plate is easy to remove, as is the plate of the Ph 20/0,60 and Ph 50/1,00, should the need arise). I have an achromatic phase condenser too, consisting of a Wild achromatic-aplanatic condenser and interchangeable phase plates. Later I have acquired several Russian microscopes, both ordinary and stereo ones. Their optics is good and the apochromats (at least the Lomo 20/0,65) excellent (all originally of German design, I suppose).

The Meopta stage was comparatively easy to modify by combining it with a simple rotatable stage (it was even possible to retain the centering system), but this method would make the Wild stage too thick.

Finding microscope grease is a problem. Messrs Leica sell grease at an inflated price, but as I think they do not make it themselves, it should be possible to get it cheaper somewhere or to find some other suitable grease. I have been advised to use ordinary car grease, but am reluctant to test it on the M 20.
Wild used several kinds of grease, with different properties. I have a little left, but as they are over 30 years old, I much prefer to use newer and more modern kinds (which do not evaporate like the old ones, I have been told).

Nov.2005.
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Comments:

My Wild M20 has not been utilized yet, as I do not know what grease to use. Silicone grease seems slightly acid. Perhaps Nyogel 767A and/or 795A, as used for camera lenses, would be suitable.

LEDs are now commonly used on microscopes, but can they give the wide angle of light required for high power objectives? Perhaps the collector has to be modified or removed. Or would cutting off the convex front of the LED be a solution?

Oct.2012.

Published in the November 2012 issue of Micscape Magazine.
www.micscape.org