Another Tip Collecting Serial Ultrathin Sections

I do quite a bit of serial sectioning and would like to offer the following advice:

1) Cut the sections with as small a face as possible. They can be as much as one millimeter wide, but try to make them something like 0.1 mm high. This will allow for as many as 20 sections on a 2 mm slotted grid.

2) Get a bunch of locking tweezers, and from the time the grid is picked up until it is put into the microscope, do not put the grid down onto filter paper (as for a normal grid). So, after picking up the ribbon of sections, leave the grid in the tweezers to dry, and when post-staining the grids, leave them in the tweezers to dry. If the grids are put down onto filter paper, the formvar may rupture.

3) Maintain a positive attitude, and if things aren't going your way; stop and come back to it another day (the blocks will always be there for you, but if you get burned out you won't be there for the blocks).

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Another Lens Cleaning Tip

Here is an odd way that I thought up to clean oil from an objective without using solvents that may attack lens cement.

Remove the lens from the scope. I usually like to view the oil contamination using a stereoscopic microscope. Wipe excess oil away—I like using Ross Optical Paper. Using a cotton applicator wrapped in Ross optical paper, apply a small amount of Dawn dishwashing detergent. Gently work the surface to emulsify the oil into the detergent using the optical-papered applicator. Add a small amount of water if needed. Do not allow fluids to go much beyond the lens area!

At this point, hold the lens vertical with the back focal plane pointing up. Apply a small amount of deionized water on the final lens element from the side of the objective to create a hanging drop. I usually use a wash bottle or 10cc syringe. The surface tension of the water will create a small drop around the optical surface. Start a stream of deionized water flowing through the small drop to wash away the oil/water suspension. After about a minute, stop the water flow while allowing a small drop of water to stay on lens. At this time, blow the water off using CO_2 or some other clean compressed gas. This will eliminate streaks. Upon inspection, if contamination can still be seen, repeat the process and then the problem should be solved.

It's weird but it works.

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The "Whistle" Test

In a recent discussion on the Microscopy Listserver about noise interference in the TEM, I recalled what a service engineer told me about checking for noise interference. Every mechanism has a resonate frequency and a loud enough noise at that frequency will cause it to "buzz" or vibrate. The stage of the TEM can be quite susceptible to this. When looking at the image on the TEM through the binoculars at a magnification of 200,000 times or higher, and talking to a class around the TEM at the same time, the image may be seen vibrating or looking fuzzy at certain times while talking. I make it a point to tell users of the TEM not to talk while taking a photo, and not to take a photo while the noisy air compressor is on.

To pin this interference down more precisely, perform the "whistle test": load a sample with a fine structure and sharp edges, go to fairly high magnification (>200,000X) and focus carefully. Then while watching the image carefully through the binocular viewer, whistle a low note and slowly go up in frequency. Look for the whistle note that causes the image to blur. If this is not seen, the stage is very stable and will probably not be bothered much by middle frequency sounds. If the phenomenon is seen, the troublesome frequencies will be known, and can be avoided or muffled, and as well, which noises to avoid during photos.

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