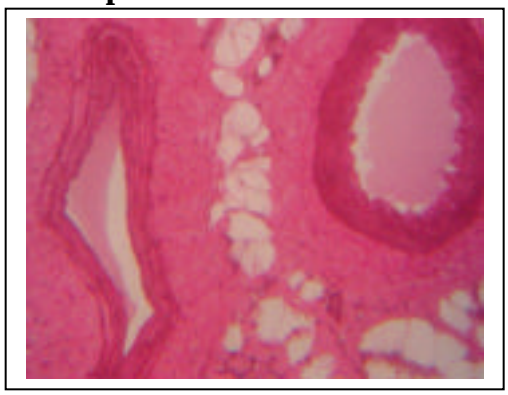
Digital Cameras in Microscopy and 35mm. Slide Copying

Digital cameras allow biologists to do a number of imaging operations that may not have been part of the original usage of the device. I would like to describe two uses that I have recently found for my digital camera in biology. I use a SONY Mavica Model 71 that produces JPEG images with a size of 640 X 480. JPEG images are cross-platform and work with Macintosh and Windows computers. I find this size to be quite adequate for my purposes plus the size allows me to put many images on a floppy disk that can be read by both platforms.

MICROSCOPY

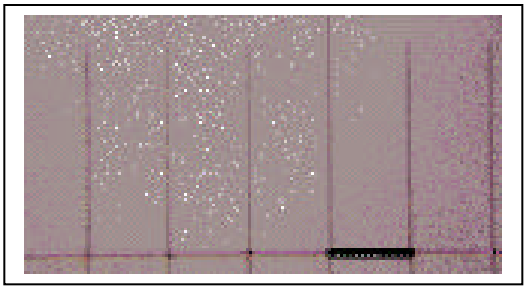
The image shown below was taken with the digital camera while it was hand held over the eyepiece of a microscope .



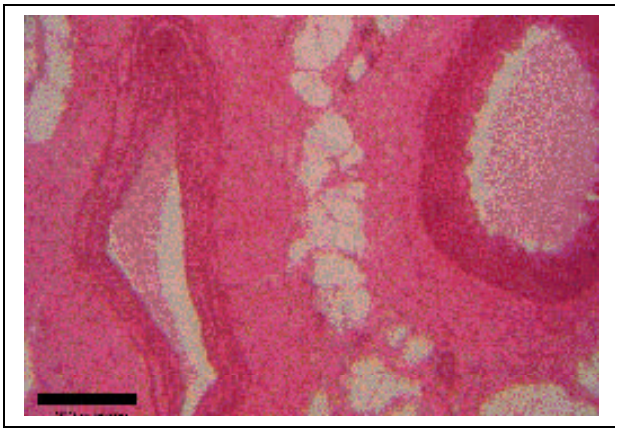
The microscope slide is showing a tissue section containing an artery and a vein. I opened the telephoto lens on the camera to 10X so I would not get a significant ring effect around the image.

The letters JPEG that are after this image's name refers to the suffix that is put on the compressed file. For example a compressed image is actually stored as Image.jpeg or Image.jpg. If you double-click on a .jpeg image it will invariably open up on a Window's graphic program or under QuickTime's Picture Viewer on the Macintosh.

When I originally took this image through the microscope I also took another image of a calibrated microscope scale without changing the telephoto setting.



The distance between the lines is 1/10th. of a millimeter or 100 microns. I select the paintbrush tool ‰ and the color black and I make a line between the two calibration lines. This line is then selected using the rectangle selection tool¤. The selection is then copied and pasted into the circulatory image. Using the Text tool Ë the line is labeled 100 microns.



If you wanted to do an analysis of this image comparing the relative size of the different vessels or their vessel wall thickness you could open

the image under NIH Image for the Macintosh or Scion Image for the PC. http://www.cipe.com/Software/Soft.html **When you open the image you would get a grayscale image rather than a colorscale one. This would be fine because color is not important in this particular analysis.**

Once you have a grayscale image you can select the LUT tool‡ , choose straight line and draw it across the thickness of the particular vessels you are interested in. Then select Measure ü - 1 under Analysis followed by Show Results ü - 2 under Analysis.

If you want to work with a colored image then you will need to convert the compressed image into an uncompressed 256 color file. This might be a .TIFF or .BMP format under Windows or a .TIFF or .PICT format for the Macintosh. There are Windows image converter shareware that can be found at http://www.zdnet.com/pcmag/ **. A Macintosh shareware applications known as Graphic Converter can be downloaded at**http://www6.zdnet.com/cgi-bin/texis/swlib/hotfiles/search.html?b=mac **.**

35MM. SLIDE COPYING

There are a number of reasons for wanting to digitized 35mm. slides. The slides are subject to fading and digitizing will allow you to enhance a faded image once you put it into a graphics program. If you make the copy with a digital camera you can get a JPEG image that can then be used in e-mail, presentation software or it put onto a WEB site.

Slide copiers have been sold for a number of years to fit on the front of 35mm. cameras and to then copy the slide onto new a slide film or onto print film.

I found that by taking an old 35mm. slide copier I could manually copy a slide by putting it into the copier, and then holding the copier in one hand against the lens of the digital camera, pointing toward a light source and taking the picture.

Using the 10X zoom on the camera also allows me to "crop" the slide image to a certain extent before I take the picture.

The JPEG image that is produced can be used in the previously mentioned applications without any further change.

http://science.exeter.edu/jekstrom/default.html