

PANORAMIC PHOTOMICROGRAPHY

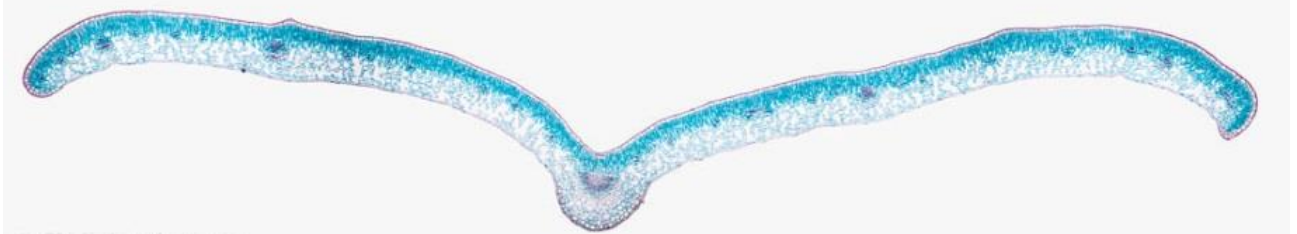
As a photographer, there are some specimens in my slide collection that I find a bit annoying. They're usually cross sections of leaves, those long and thin specimens that can't seem to fill a regular picture frame. Eventually, it dawned on me that those thin subjects might be better served with long panoramic pictures.



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From top to bottom: Cyrtomium (a kind of fern), Maple (Acer), and Winter jasmine, Nymphaea, all shot at 40x, assembled from 4 to 6 individual pictures.



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Lycopodium, group of 8 pictures, 40x

Most people will be familiar with panoramic photography: several pictures are taken while moving the camera, usually on a horizontal plane, and then assembled to create a narrow but wide image of a landscape. Many cameras, and now most smartphones, can do this kind of picture with a built-in feature. If your camera cannot do panoramic assembly by itself, it can also be done with different software. That will be the usual way of doing it with microscope photographs. Basic retouching programs, like Photoshop and Lightroom can do it most of the time. Their free alternatives, Gimp and Darktable, are also very capable. For more advance work, specialized software may be necessary, although I seldom found them essential for micro pictures. Some are freeware, like *Hugin Panorama Software* and *AutoStitch*; while others must be bought, like *PTGui* and *PhotoStitcher*.

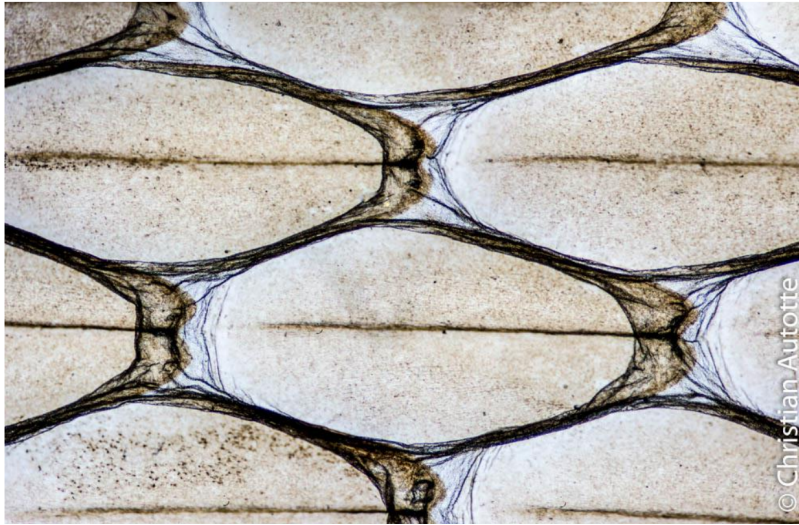
Landscape panoramas are usually done because the whole landscape cannot be seen in a single picture. Microscope panoramic pictures are often done because the subject is too big to fit in a single image, even when shot with the smallest magnification available. Of course, a macro lens may be able to take a shot, but unless you have the equipment necessary for 5 to 10x magnification, a macro limited to 1x may not yield acceptable pictures. On top of it, various microphotography techniques, like Rheinberg lighting or phase contrast, would be unavailable to regular photography.



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Gerris head, group of 4 pictures, 40x

To make a proper panoramic picture the trick is to have enough overlap between adjacent pictures; most experts recommend about 20% but you can usually get by with about 10%, as long as there are clearly defined elements that can be recognized by the assembling software.



Garter Snake skin, group of 6 pictures, 40x



Male mosquito head, group of 8 pictures (two deep in focus stacking and 4 sets for the panoramic), 40x



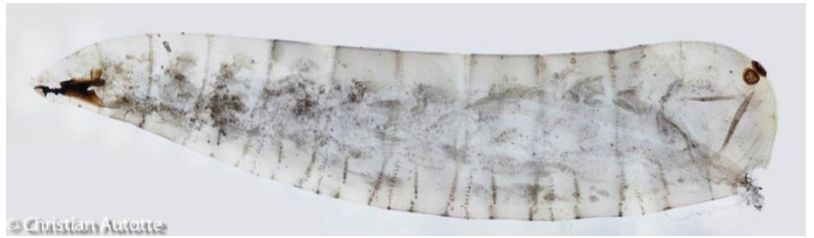
Centipede head, group of 6 pictures, 40x



Cat flea, group of 6 pictures, 40x



© Christian Autotte
Leech, group of 4 pictures



© Christian Autotte
House fly maggot, group of 6 pictures, 40x



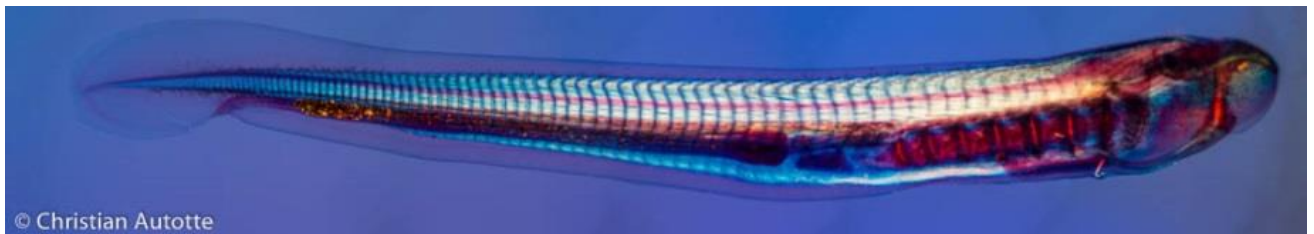
© Christian Autotte
Planaria, group of 2 pictures, 40x



© Christian Autotte
Planaria, group of 3 pictures, 40x



© Christian Autotte
Hydra, group of 3 pictures, 40x, phase contrast



© Christian Autotte
Ammocetes larvae, group of 6 pictures, 40x, polarized light

In the old days of film photography panoramic photography was almost non-existent. Most people were satisfied with the standard image ration, either 4x5 or the 3x2 of 35mm film. Those who wanted to do panoramic had to use special cameras that took elongated pictures and then figure out a way to print the resulting image; needless to say, it was all very complicated. Nowadays, not only can photographers assemble images together, they are free to crop their images as they see fit.

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