

Photomicrography with an old Leitz Microscope and a modern Compact Camera

Antique and Modern combined

Roland Luts

In the year 2008, I acquired an old Leitz microscope that is now (in 2018) just over one hundred years old. I thought it would be interesting to try to use this old device in connection with a modern and low-cost compact camera to make some photographs in order to see what was the outcome.

I will show some photographs I made through this microscope with the aid of the SONY Cybershot 16 Megapixels camera. The oculars that came with the device were used and the camera was hand-held.

A few things about this microscope:

I have always been surprised how 'ancient' microscopists could make such detailed drawings of very small objects with that kind of instruments but when all optics is well cleaned and aligned, this microscope gives very detailed and sharp images when viewing through the ocular with the eye.



The microscope

A mirror (concave at one side and convex at the other side) below the condenser is for use in daylight but can also be used with the light from an electric lamp. This mirror can be turned in any desired position. If needed, the condenser under the stage can be swung out of the light-beam as can be seen in the picture to the left.

Three numbered objectives and three numbered narrow-field oculars came with the apparatus and have been mutually calibrated in 1916 (see the picture below).

Mikroskop Nr. 165837				
Vergrößerungen bei 170 mm Tubuslänge und 250 mm Bildweite (Wenn das Mikroskop mit Revolver versehen ist, wird der Tubusauszug auf Strichmarke 152 gestellt)				
Objektive	Okulare			
	I	II	III	
3	51	82	103	
6	240	384	480	
8	346	553	691	

Wetzlar, den 1. September 1916 E. Leitz.
Zweig-Geschäfte: Berlin N. W. Luisenstrasse 45. Frankfurt a. M. Neue Mainzerstrasse 24.
St. Petersburg Woskressenski 11. London W. C. 18 Bloomsbury Square. New-York 30 East 18th Street.

Calibration certificate of the magnification (from the year 1916)

There is no mechanical stage and therefore it is not easy to scan a slide in order to find the subject to be studied, but once it has been located, the glass slide can be hold in place with two metal clips and the specimen can be studied.



Engraved serial number



Objectives

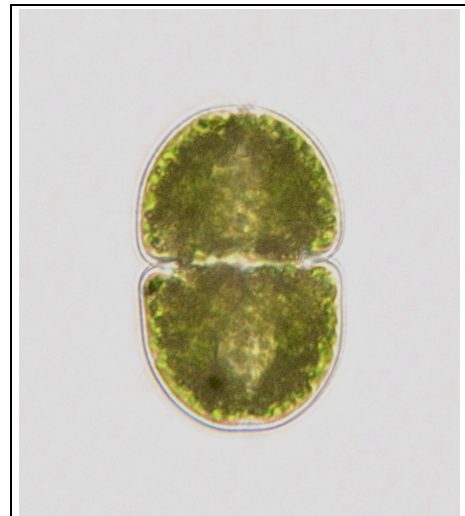
The objectives are not spring-loaded and for this reason focusing is a dangerous thing to do!

Photographs

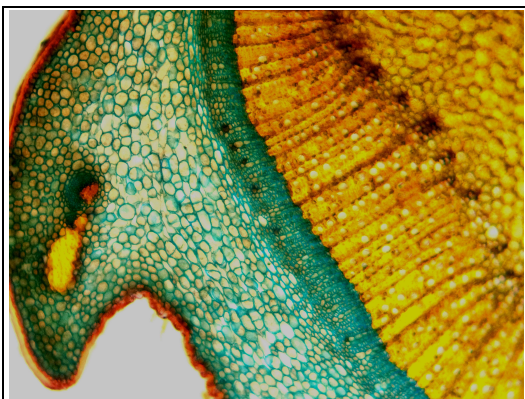
Objects from 50 μm up to 2 mm have been taken. In some cases, especially at lower magnification, there is a lot of colour distortion at the sides of the photograph (vignetting). This can be fixed with Photoshop but I left it as it is. In daylight pictures have a purplish background (see the 3 at the end) but I only noticed it on my computer screen. A filter in the tray under the condenser or regulating the white balance of the camera can prevent this. Sharpness largely depends on the camera I used.



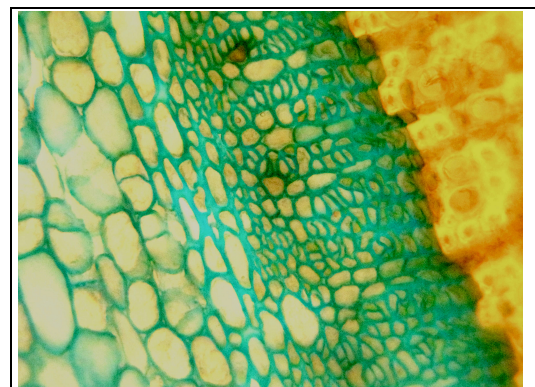
Cosmarium turpinii
length: 54 μm



Cosmarium quadratum
length: 49 μm



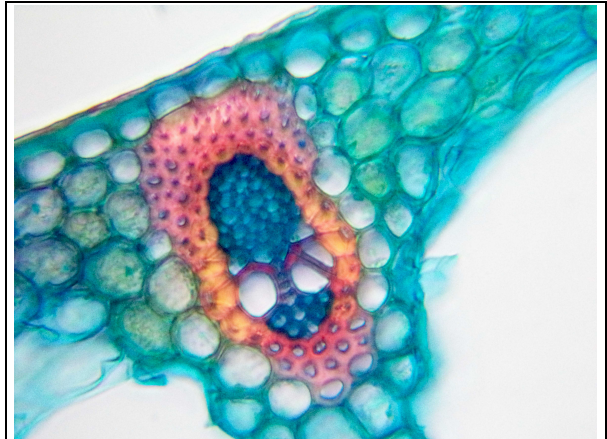
Cross section of a *buxus* stem – stained with Wacker W3Asim



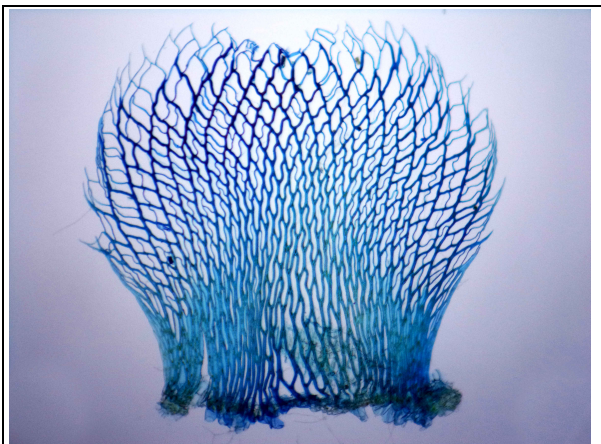
Cross section of a *buxus* stem – stained with Wacker W3Asim enlarged view



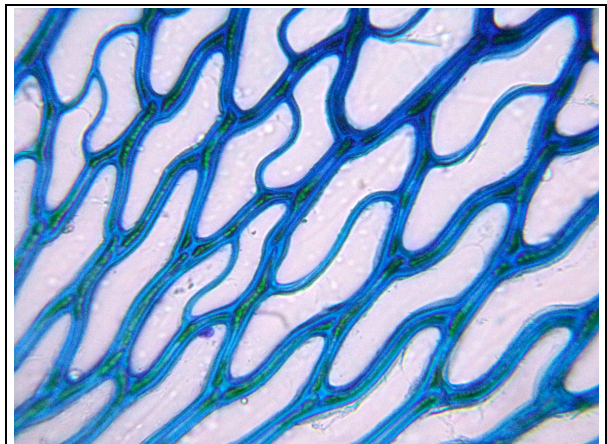
Carex leaf - cross section - stained with Wacker W3Asim



Carex leaf - cross section - stained with Wacker W3Asim - high magnification



Sphagnum fimbriatum - stem leaf
Stained with methylene blue



Sphagnum fimbriatum - stem leaf - High magnification - stained with methylene blue



Leucobryum glaucum - cross section of part of a leaf
not stained

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