

Chris Anthony

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My Microscope Page

When I was a young teenager [in the '50s] i was very interested in microscopes, I could not buy one but was allowed to use one in an opticians shop. I eventually studied biology as school and zoology and microbiology at university, then worked in University [as a microbial biochemist]. Now retired I have recently obtained some microscopes to play with. This web page is mainly trivial stuff that i have collected that is useful for me.

I have prepared a separate page to cover the protozoa etc that I have been looking at: [Microscopical Creatures](#)

My microscopes	Useful websites	Microscopes for children/students
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My Microscopical Creatures Page		

My microscopes

Wild M5 Stereo microscope Introduced in 1958

This picture is from the [Wild-Heebrugg site](#)
It has magnifications of 6x, 12x, 25x and 50x.
Mine has Zeiss 10x eyepieces and a substage for illumination from beneath [as in RHS picture].
It is magnificent for natural history.
This microscope can be bought from [Martin Microscopes](#)



Now part of Leica, these Swiss-made instruments are the highest quality. **Martin Microscope Company** was the second Wild microscope dealer in the US (see [Company History](#)). Used M5 stereoscopes are still in demand. The Leica MZ series microscopes have continued the Wild tradition of top of the line optics, but they are no longer made in Switzerland. There is an excellent history Wild Heerbrugg [here](#).

Click Ctl plus +
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VIDEOS can be speeded up by
downloading an [accelerator](#)

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Zeiss binocular microscope

**I think that the model is a Zeiss Standard RA.
Condenser includes phase contrast.
Objectives are Zeiss Neofluar 16, 40, 100x and
ordinary 3.5x and 10x; the higher ones are for phase
contrast.
Eyepieces are Nikon Wide Angle HKW 10x with
measuring graticule.**



Serviced by [Mazurek](#)



The firm of Carl Zeiss was founded in Jena in 1846 and grew to be the most dominant optical and fine mechanical firm in the world at the beginning of the twentieth century through 1945. It was then effectively separated into two firms because of the partitioning of Germany after World War II. The resulting firm became Carl Zeiss in Oberkochen (West Germany) and VEB Carl Zeiss Jena (East Germany).

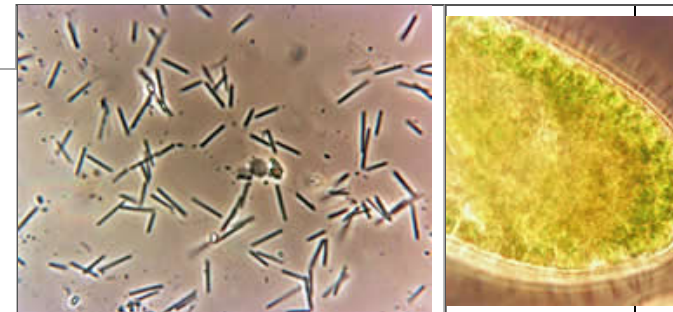
**Photography through the microscope:
Swift microscope eyepiece camera**

SWIFT Microscope EyePiece Camera 5 MegaPixel Digital Camera for Color Photography and Video Livestreams, with EyePiece Mount, USB 2.0 Connection, Windows and Mac Compatible. £95 from Amazon
This replaces an eyepiece in the microscope and appears on your computer screen. The programme that comes with the camera is extensive and excellent.

The top picture is the centre of a daisy taken with the Wild microscope at 6x magnification.
Lower left is Bacillus sp. About 1x15 microns. With Zeiss microscope at 400x magnification, phase contrast.



Lower right is (unknown) species of alga showing cilia.



USB microscopes. There are many of these available now on Amazon, usually costing less than £20.

They link to computer by USB cable. Objects are illuminated by a ring of LED lights. The software is excellent. One click takes photo and it can used as video camera also. At the lower power it is easy to use. The pictures are thrilling although frightening when you look inside your ear or mouth.

Nearly all claim to zoom to 1000x magnification. This is almost the limit for any light microscope and extremely difficult to use. One of the best (Amazon) now is: Jiusion 40 to 1000x Magnification Endoscope, 8 LED USB 2.0 Digital Microscope, Mini Camera with OTG Adapter and Metal Stand, Compatible with Mac Window 7 8 10 Android Linux (£14). Note there are only 2 magnifications – not a range as implied. The one I bought earlier was 20 – 400x magnification. Reviewers had said how difficult it was to use. So I wrote some better instructions (see below). I use a decent stand which makes it much easier to use. This is the Jiusion Aluminum Alloy Universal Adjustable Professional Base Stand Holder Desktop Support Bracket for Max 1.4" in Diameter USB Digital Microscope Endoscope Magnifier Loupe Camera (Aluminium Alloy) £17.



Pictures of a spider taken with USB. The spider was 5mm long. It took 2 minutes to set up and take these pictures.		
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The dead spider at 20X

Spider eyes at 400x Note reflections of the LED

Natural History Museum Pocket Microscope by TKC. 20-40x power with built in light source.	
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I bought [this on Amazon](#) for £7.50. This is good. Optics are excellent. It can be used to look at anything on a flat surface [the light then comes from above] or using a special slide when the light comes from beneath. Instructions are clear.

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Microscopes suitable for children and students

I was interested in finding suitable microscopes for children. Many that are sold look like 'real microscopes' but are very difficult to use and I do not recommend the ones that I have seen.

The field of view is tiny, lighting is poor, the light weight makes them unstable. They emphasise that they go to really high power but that is rarely of interest as images are poor.

An example of a typical bad 'toy' microscope is the [National Geographic 47 Piece 1200X Microscope set](#) £20. It claims it can be used at 1,200x. This is absurd as this is at the limits of a light microscope and even using a microscope costing thousands of pounds it is difficult to use such a high magnification.

Good alternatives are the Veho USB-linked microscope and the Natural history microscope [described [here](#)]. If these rouse the interest of children, then it would subsequently be better to find a 'student' microscope from a microscope manufacturer.

Although I have no personal experience of them, the student microscopes from [Brunel](#) look good [£40 - £200] and also the Apex microscopes [sold on Amazon]. [Apex](#) sell a low-power stereo microscope which is good for general natural history [£42] and a good-looking 'standard' microscope with built-in light source and condenser for £87 [normal price £125]. My attention has been drawn to a source (USA) for inexpensive microscopes but I have no personal experience of them ([Levenhuk](#)).

There are good buyers' guides on the webpages I have listed [below](#).

Warning: I have read that eyes/brains of younger children may not be sufficiently developed to be able to use binocular instruments like the stereo microscopes, and the microscope eyepieces may not be able to move close enough together to accommodate a child's size.

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Microscopes and Microscopy websites

General sites

[Microbus: Frontpage](#). A magnificent resource [examples are given below]

[Microbus: Microscope information](#) [advanced including phase contrast etc]

[Microbus: Microscope internet links](#)

[Microscopy UK](#). Great magazine site with many excellent links

[Ron's Pond Scum](#). Very nice site with beautiful photos

[Nikon resource for microscopy education](#); excellent formal interactive tutorials

[Rice university simple tutorials](#)

[Microscope forum](#); good source of tutorials

[Postal Microscopical Society](#). Founded in 1873 in UK.

Specific subjects

[Introduction to Microscope parts etc](#)

General introduction.**Pond water investigation:** Microbus site covering everything to do with looking at protozoa etc**Pond creatures.** Magnificent Microbus site describing main groups of protozoa and microscopic animals.**The smallest page on the web.** Link from Microbus site Excellent on protozoa etc**Forays into 'consumercam' photomicroscopy** by Paul James [from magazine Microscopy UK]**Making digital camera microscope adaptors.** A pdf file of Paul James's article**Phase Microscopy; is it worth having?** by Paul James**TOP****To Download Instructions etc from this site****Use of phase contrast and oil immersion [Word]****Use of Veho USB microscope [Word]****Collecting and culturing protozoans [Word]****Identification of protozoans etc [Word]****Microscope; basics and beyond by Abramowitz [pdf]****Calibration table for my Zeiss [Word]****Calibration table for my Zeiss [Word]****Books on Microscopy for beginners [including me]**

I was interested in finding simple books for young beginners which would inform about microscopes and give sensible suggestions for use. I found very few [mainly on Amazon]. For most purposes I learned more by going to internet so here is a list of **Best sites**

The World of the Microscope (Usborne Science and Experiments) by Chris Oxlade, Corinne Stockley, and Kuo Kang Chen (Paperback - Jan 2008) . £4.21. Excellent, Excellent book.

Adventures With a Microscope by Richard Headstrom (Paperback - 1 Feb 2000).£9.99. Reprint of a 1941 book. It is arranged as a set of 'adventures' and the whole style is old-fashioned. That is, it is serious and thorough. Good illustrations. Although apparently for the amateur it would not be easy for children, but I liked it.

World in a drop of water; exploring with a microscope. By Alvin and Virginia Silversein. There is a Dover reprint [paperback] of this 1969 book. It has some good illustrations but it has only 64 pages of large writing [for use in schools]. It is worthless, especially compared with The world of the microscope [above].

A Manual of Elementary Microscopical Manipulation for the Use of Amateurs [Paperback] Thomas Charte White. This was published in 1887. You can get this hardback version for

about £40 [or £6 if you are lucky in your local bookshop] or as paperback from Amazon [£14.50]. I found this an enjoyable old book. Not suitable for children.

How to Know the Protozoa [2nd edition 1979; TL Jahn et al.]. 278 pages. Including keys for identification and plenty of drawings.

The Biology of Protozoa [1973, 1981; in the series Student Texts in Contemporary biology]. By Michael Sleight, previous Professor of Zoology at University of Southampton.

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Instructions for Veho VMS--400 USB microscope

I write this as a professional microbiologist. This microscope is excellent but, at first, it seems impossible to use at high power [400x] because of inadequate instructions. I recommend practising on a simple flat object like a small piece of printed paper. Press the microscope firmly down onto it [or put the object into the lens cap] and focus at 20x. Now use the focus wheel to change to high power by rotating anticlockwise as far as it will go from that 20x position and then very slowly moving back until focus is achieved. [Note that it looks as if it should be possible to rotate a short distance from the 20 mark to the 400 mark on the focussing wheel. This is not the case. It is necessary to turn the wheel in the opposite direction to the 400 mark.]

As others have commented, it is difficult to focus at 400x because the depth of field is small, the contrast is low and it is difficult to hold everything steady. This is not a fault of this microscope; it is true for the best professional instruments which overcome the problem by being very heavy, having precision engineered platforms for moving the object and special lighting systems (e.g. phase contrast). With the VMS-400 I recommend practicing focussing on a simple object as described above; it also may help to fix it to a heavy base or to place the object in the transparent lens cap. For smaller objects it is helpful to press them between glass slides for viewing at high power.

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My Zeiss microscope calibration

This is for use with 10x eyepiece with graticule [calibrated with a 1mm scale]

Objective	Magnification	1 division	10 divisions	100 divisions
3.2x	32x	32 microns	320 microns	3.2 mm
10x	100x	10	100	1 mm
16x	160x	6.3	63	0.63 mm
40x	400x	2.5	25	0.25 mm
100x	1000x	1	10	0.1mm

NB: The 3.2x is rarely used [the Wild M5 would be better for low magnification].
The 100x objective requires the use of immersion oil.

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CONTACT ME: [Email](#)

THANKS for help to [Hugh Anthony](#) and [Carl Gore](#)

 [logo design](#)