# Newsletter

**Of the**

## New York Microscopical Society

**1 Prospect Village Plaza**
*(66F Mt. Prospect Avenue)*
**Clifton, New Jersey 07013-1918**
**GPS**: Latitude 40.8648N, Longitude 74.1540W

**Mar 2016** **Editor: (201) 791-9826** **Volume 10 (30) Number 3**


## NYMS Lecture Meeting at Clifton on Sunday, March 27, 2016

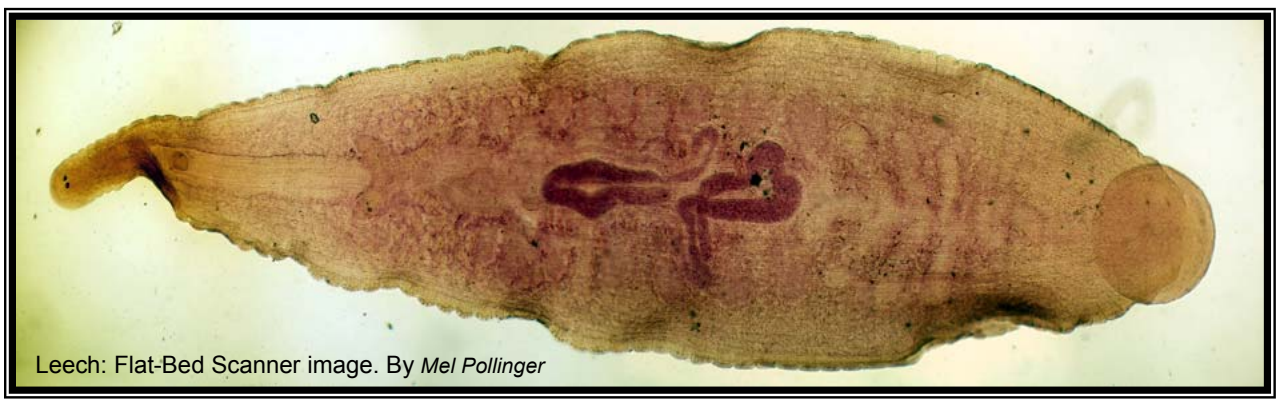
Microscopy of gemstones and their inclusions (starts at 2pm)
By Roland Scal, Ph. D.

The inclusions inside of gemstones are both geologically (and gemologically) significant and of importance in assessing a gem's overall quality. Mostly, a microscope is needed to fully assess them and magnification may reveal an internal "garden" or "Jardin" worthy of exploration. In a geological sense inclusions may distinguish between the several ways in which minerals form. For evaluating gemstones only a loupe is truly needed, but much of the minerals' internal beauty is left unseen.

The beauty and to a lesser extent the significance of internal inclusions in both natural and manmade gemstones and mineral specimens will be illustrated and discussed. There are several excellent texts on the subject and their author's pioneering work which will be touched on. A final point to be made is that inclusions can be as collectable as mineral specimens. In this regard a good quality microscope helps considerably. Microscopy is a hobby in itself, but microscopy of gems is a special branch that sometimes involves laboratory activity beyond just looking at gems in their natural state. Thus this talk will provide information on the gambit of topics related to the internal properties of gems and minerals and will touch on what is needed to pursue such studies.

Roland Scal is an associate professor of geology at Queensborough Community College where he teaches introductory geology, biology, and gemology.
He has been a NYMS member for 36 years and a fellow since 1986

Doors will be open at Noon. Refreshments will be available. For additional information, please contact Mel Pollinger (pollingmel@optonline.net), or call (201)791-9826, or by cell: (201) 314-1354 (meeting day only)



Leech: Flat-Bed Scanner image. By *Mel Pollinger*

Save a Tree: Get The Extended Newsletter: By Email Only

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*For additional information contact the Editor: Mel Pollinger at (201) 791-9826, or pollingmel@optonline.net*

Dues and Addresses

Please remember to mail in your Dues to:

**Mel Pollinger**
**Treasurer, NYMS**
**18-04 Hillery St.**
**Fair Lawn, NJ 07410-5207**

Junior (under age 18) $10 Annually
Regular $30
Student (age 18 or above) $20 Annually
Supporting $60 Annually
Corporate (includes one advertisement in NYMS News) $175 Annually
Life $300 (payable within the year)

To avoid missing notices:
Notify Mel Pollinger if you have changed your address, phone or email.

**Awards Given by the New York Microscopical Society**

**The New York** microscopical Society takes great pleasure in recognizing and rewarding individuals who have contributed to either the activities of the society or to furthering microscopy. These awards are described in our website and in a pdf file for our email newsletter recipients. All members are eligible to nominate individuals for these various awards, and are encouraged to do so.
John A. Reffner, Awards Committee Chairperson

**Awards Committee**

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To Order Your NYMS Lapel Pins

Send a check in the amount of $12.00 per pin to:
New York Microscopical Society
c/o Mel Pollinger, 18-04 Hillery Street, Fair Lawn, NJ 07410. To avoid shipping & handling charges, pins may be purchased directly at any NYMS meeting for $10.00.

**The Mission of the New York Microscopical Society** is the promotion of theoretical and applied microscopy and the promotion of education and interest in all phases of microscopy.

**Alternate Meeting Notifications**
Please note that due to time constraints in publishing, some meeting notices may be available by calling Mel Pollinger at 201-791-9826, or emailing: pollingmel@optonline.net

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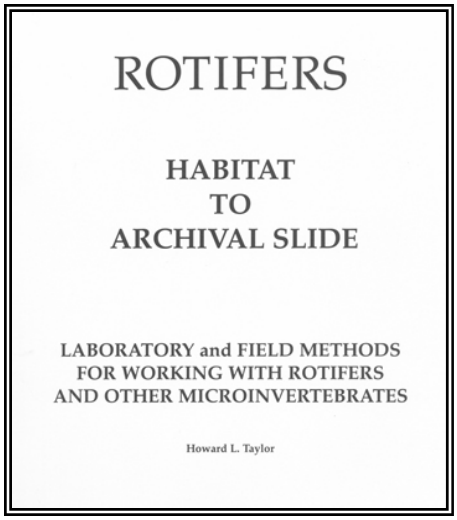
**Please remember to pay your dues**

***Buy and Read a Good Book on Microscopy.***




New sale item: Rotifers By former NYMS member, The late Howard L. Taylor. 73 pages of text and detailed drawings. Workbook style binding. Should be on every member's book shelf. Limited supply.

## What's Happening this Spring/Summer 2016

**April: Microscope Day at John Jay Collage.**

**McCrone Events**

**Meeting at Salmagundi Society**

**SCONYC events**

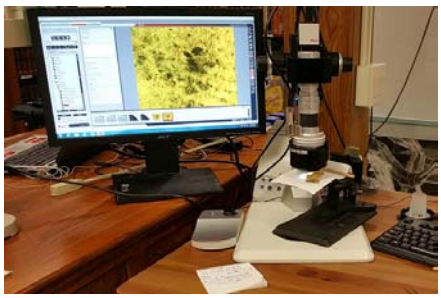
**Nature-photo Walk in NJ Meadowlands (tentative)**

**Open Microscope Lab days at NYMS**

**Nature/collecting hike on Ramapo Forest Reserve in Oakland, NJ, (Tentative)**

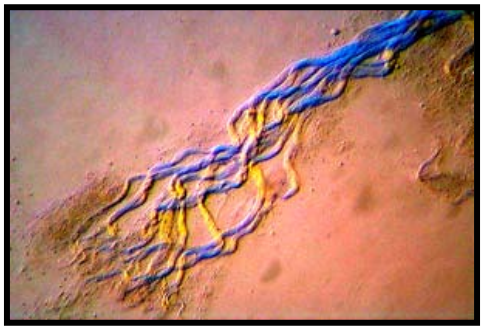
**Micromineral adventure at NYMS (mineral micromounts, sands, etc.) Tentative**

**Members may request additional events for Spring & Summer**



Latest addition to our NYMS microscopy classroom: by Leica

**From supplement front page**



As its name implies, bovine collagen comes from cows. More specificially, it is a naturally-occuring substance found in the skin, muscle, bones and tendons of cows. By isolating and purifying bovine collagen, scientists created a ready supply of collagen to aid the beauty industry in its economically-profitable battle against wrinkles and other facial deformities. (From ehow.com). More importantly, it is used in the manufacture of knitted and woven tubes and fabrics to repair damage to the vascular system. The image shows a collagen bundle under high magnification through polarized light . *Preparation and image by Mel Pollinger*

## McCrone Courses

Call or write for course information:
McCrone Research Institute: 2820 S. Michigan Avenue, Chicago IL 60616-3230
Phone: 312-842-7100

**Be A Volunteer – There's *Always* Something to do and see at NYMS.**
*If you wish to contribute some of your time to NYMS, please contact me at (201) 791-9826 or by email at pollingmel@optonline.net*

## Visitors Always Welcome to NYMS

Although most of our lecture meetings, workshops and classes are held in the NYMS Clifton facility on the last Sunday of the month, the building may be opened for special purposes at other times, by appointment only. For such an appointment, please contact Mel Pollinger by phone at (201) 791-9826, M-F noon to 9:30pm, or by email at pollingmel@optonline.net.

### *From The Editor...*

**if you have an email address:** Getting the newsletter by email means you can receive an **extended pdf version** that cannot be sent by "snail mail." Even if you only continue your USPS delivery of the newsletter, NYMS needs your email address for reporting priority events and special news. Being able to contact you quickly by email means better communication between you & NYMS■■ Mel

## Need to use a Microscope?

**The various microscopes that are presently set up on the main floor of the New York Microscopical Society building in Clifton, N.J. are there for the use of its members.**

Check out The Secret World Inside You at the American Museum of Natural History open till August 14, 2016!

## Microscope Cleaning Kit

A complete set of tools and accessories to keep your microscope in optimum operating condition. The kit is put together by our previous Curator/Educational Chairman, Don O'Leary, and available directly from NYMS, while they last, for only $40.00 plus shipping & handling, or may be purchased at a meeting. Call or email Mel Pollinger for details (see page two for contact numbers).

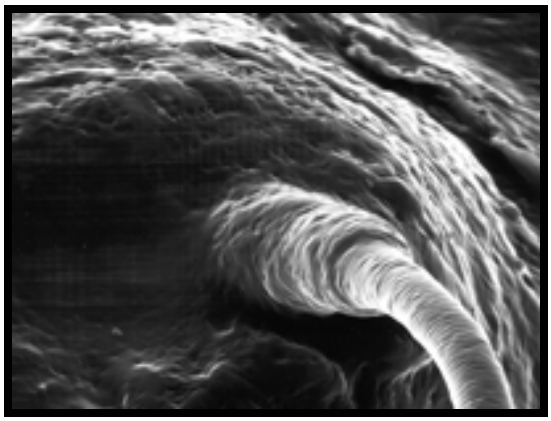
## *NYMS Meeting Dates*

***Most meetings of NYMS are usually held in Clifton on the last Sunday of the months of Jan., Feb., Mar., May, Sep., Oct. Exceptions will be noted in the Newsletter.***

**NYMS microscope slide collections are available for study at meetings and by appointment.**

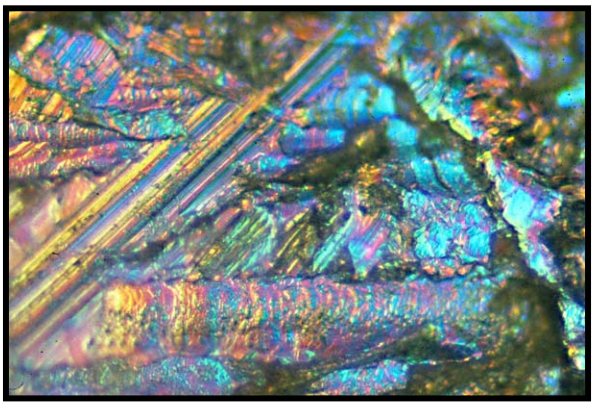
***Please be aware that our website is continuously updated.***

## Answer to Mystery Photo for Feb 2016



A hair by SEM – Did you guess correctly?

## Mystery Photo for Mar 2016



**Want to take a guess? Send it to me by email or call me: pollingmel@optonline.net, (201) 791-9826**

## Additional Historical NYMS Supplements

Email Newsletter recipients can also receive copies of NYMS Newsletter pdf back-Issues from 2007. Copies of older newsletters will be included in the supplement section as I convert them.

## *Attention NYMS Members*

***Got something to sell? Article to publish? Pictures for the newsletter? Looking to buy something? Want to use the library? Want to use a NYMS microscope? For any of the above, contact the Editor, Mel Pollinger.***

EASTERN ANALYTICAL SYMPOSIUM & EXPOSITION

**Supporting Member**

# N.Y.M.S. Supplement Section

March 2016

## In This Section:



See page 3

February 2016 Open Lab Meeting and group discussion led by Jan Hinsch

**Reflections on studying *Spirogyra* - a classic school biology subject and plenty of interest for the hobbyist.**

*by David Walker, UK*

One of the more distinctive filamentous algae is *Spirogyra* with its spirally arranged chloroplasts. For the microscopy hobbyist it offers plenty of interest and *Micscape* contributors have shared a selection of articles (see Related *Micscape* Articles section). This article concentrates on the aspects below from my own recent studies:

1) *Spirogyra* under a commercial Van Leeuwenhoek replica microscope. *My own interest in this algae was piqued when helping Wim van Egmond share his February 2016 Micscape article The Riddle of the 'green streaks'. Antoni van Leeuwenhoek: In search of the first microorganism he described. In this article he reassesses whether Leeuwenhoek did first describe Spirogyra in his letter to the Royal Society dated Sept. 7th 1674. Wim, in collaboration with a phycologist colleague Frans Kouwets, presents persuasive arguments that the later attribution of Spirogyra was not the most likely candidate—another organism matches the features in Leeuwenhoek's description much more closely. We agreed that it would be a useful complement to share images of Spirogyra taken through a replica Van Leeuwenhoek microscope.*

2) An admittedly self-indulgent sharing of my school level studies.

3) The usefulness of *Spirogyra* for exploring different lighting techniques including autofluorescence with simple filter additions to a typical transmitted compound microscope with darkfield facilities.

4) A good resource for attempting identification to species in Britain.

5) Some typical commercial prepared slides, including the set offered by the late Eric Marson of Northern Biological Supplies (NBS) showing conjugation.

**Sourcing the *Spirogyra***

My back garden pond rarely has filamentous algae and not to date *Spirogyra*, but I recalled sampling a local water trough some years ago where it did occur. In early February 2016 on a return visit there was a substantial algal growth and was pleased to find that this was a near mono-culture of *Spirogyra* and as a bonus it had been conjugating.

Right, June 2004 photograph. Water troughs hewn out of the local millstone grit (a coarse-grained sandstone) are an interesting upland habitat in the north of England where I live (see my June 2004 Micscape article). Some, like this spring fed trough, could be regarded as a slow moving river with its continuous water flow for most of the year. They also offer varied habitats in a small area, e.g. splash zones with bryophytes, damp mud, open water, rocky substrates etc.

***Spirogyra* viewed under a Leeuwenhoek replica microscope**

As is well known, Leeuwenhoek made his own single lens microscopes for his studies. Single lenses were superior to compound microscopes of the time and remained so until the development of achromatic microscope objectives in the early 19th century. I have two commercial replicas, the one shown below and the second sold by the Museum Boerhaave. Both have similar magnifications but prefer the former for use as it's somewhat larger and easier to handle.

Right. A modern brass replica made by Chris Kirby of Christopher Allen Replicas (UK) with simply engineered parts and aged to look authentic in a style typical of Leeuwenhoek's designs.

It is shown from the subject's side and has to be held close to the eye from the other side. The single lens is fixed between two riveted brass plates with dimpled apertures. The three screws allow focussing and subject orientation. The subject is mounted on the pin.

This replica is stated to have a ca. 100X magnification (at 250 mm) and was confirmed by my own measurements. The focal length is ca. 2.5 mm and subject field of view presented to the eye is ca. 0.8 mm.

Below. The replica mounted on a Sony NEX 5N digital camera body. There are no optical components other than the replica lens. The assembly was mounted on a tripod and pointed at either a curtained window (to control light aperture) or an indoors lamp.


The lens to sensor distance was 63 mm i.e. much less than the traditional 250 mm projection distance for formal studies. This projection distance was more practical for the setup and image just filled the APS sensor. A magnification more typical of what is seen by the eye is restored in either a screen or printed image.

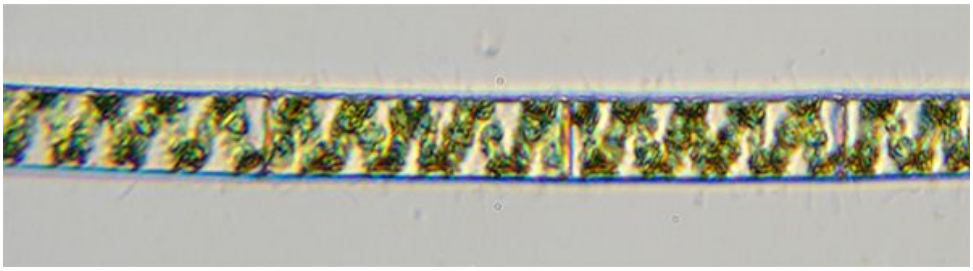
In letters earlier than Sept. 7th 1674, Leeuwenhoek described his use of fine capillary tubes for studying liquids such as blood or milk and may have used such tubes for his aquatic samples from Berkelse Lake. As Wim notes in his article, if he was reporting *Spirogyra* using such tubes it must have been a challenge persuading the long filaments to enter a narrow tube compared to the more likely candidate which Wim suggests.

Leeuwenhoek is known to have also used mica plates or thin blown glass to mount aqueous subjects attached to the pin (1) and I adopted a similar method as shown using coverslip pieces but with a more suitable support. Hans Loncke shows modified pin designs for his work with the splendid Leeuwenhoek replica that he built (2). Perhaps Leeuwenhoek also made alternative supports to the pin for work with flat plates.

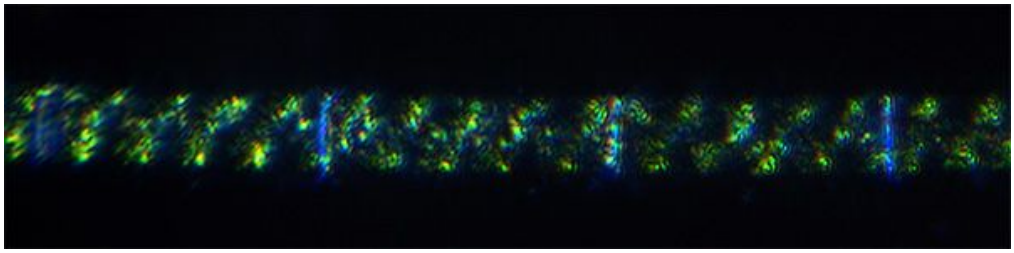
**Spirogyra viewed under a Leeuwenhoek replica microscope. Optical mag 100X. Typical filament diameters 36 µm.**

A darkened room with a vertical narrow light source was used to mimic Leeuwenhoek's suggestion for best use of his microscopes i.e. with a restricted aperture (3,4).

The Christopher Allen replica uses a hand ground 'convex' glass lens by the maker Chris Kirby (5). Leeuwenhoek was known to have made and used ground lenses or blown aspheric lenses (6).

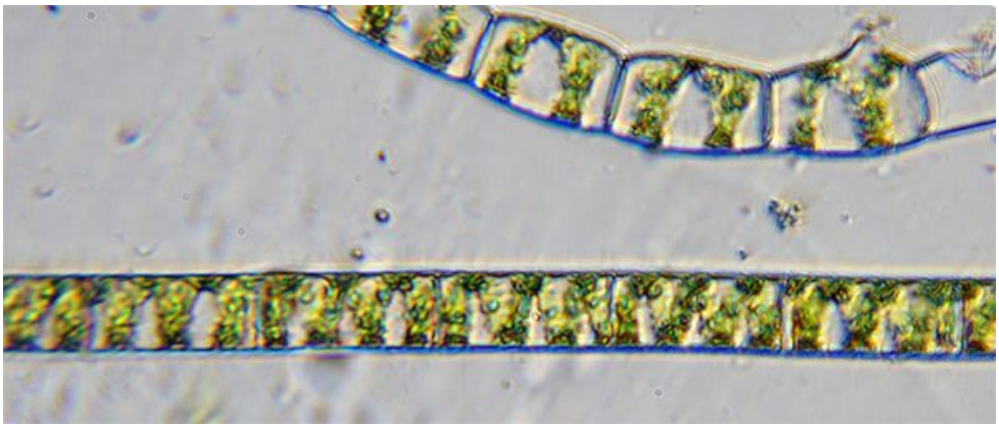


Above. The lens shows the cellular structure of the filament clearly and the spiral chloroplasts and pyrenoids. Residual aberrations aside, the image differs not that much from a modern achromatic objective on a compound microscope, see later section.



Above. The same filament as above except using darkfield. Leeuwenhoek could not have failed to create and value the use of darkfield illumination with appropriate subjects. When setting up the microscope with a narrow light source, until the lens is fully aligned a slightly off-axis view readily creates this form of lighting.

For a discussion of Leeuwenhoek's likely use of darkfield see Snyder (4) and Dobell (7).



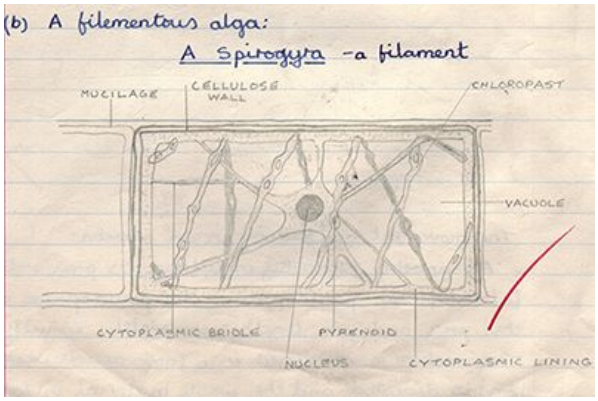
Above. The upper filament may be in the early stages of conjugation (or a different species!).

Right. A more general view of multiple filaments with ca. 50% of the full visual field is shown. The visual field of view of this 100X lens is ca. 0.8 mm which is comparable to that of a 16X modern compound microscope objective with 10X eyepiece (field. no. 18) and Optovar set at 1.25X on my Zeiss Photomicroscope III.

**School studies of Spirogyra in the early 70s**

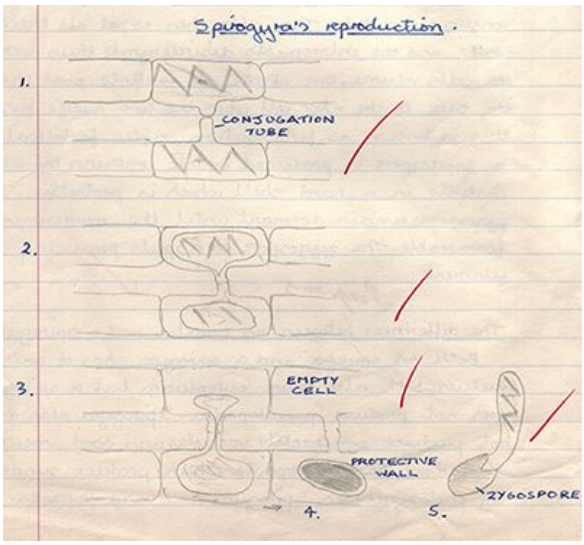
My first encounter with *Spirogyra* was in the early 70s when studying for the GCE 'O' level exam in biology at high school. At that time, the course included studies of typical examples of various groups. Amoeba was the single-celled animal, spirogyra the algae and advancing to more complex organisms like the hydra. A browse through some equivalent exam level textbooks using Amazon UK's 'Look Inside' feature suggests that this isn't now a typical modern approach in the UK.

They say that you never forget the schoolteachers who were of most influence and that is certainly the case for me. Mr Tan (or Tann?), the biology teacher at King Edmund Comprehensive, Rochford, Essex in the early 70s presented biology with an infectious enthusiasm and covered many aspects that still engage me as a hobbyist




today. Practical microscopy work used the LOMO Biolam, a model that I later bought and have used as a hobbyist for over 35 years. Being a bit of a hoarder, I still have my school notes when aged 15 and the drawings are shown below.

Left. Course work that likely required a redrawing of the diagram of an idealised cell from the accompanying textbook.


Left above. Own view of a specimen as seen under the LOMO Biolam microscope which were widely used in practicals.
Right above. Spirogyra was a popular example of an algae, partly because of its distinctive forms of sexual reproduction. The scalariform of reproduction is shown.

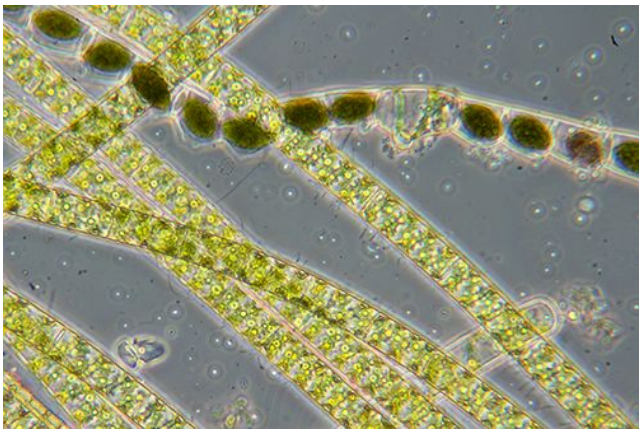
**Exploring *Spirogyra* using different lighting techniques including transmitted autofluorescence using a darkfield stop**

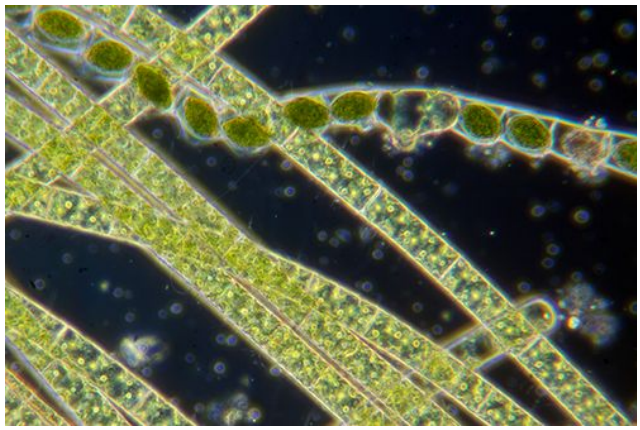
The ease of preparing temporary fresh mounts of algae such as *Spirogyra* and the variety of forms it offers if undergoing conjugation, make it an interesting subject to study. Chlorophyll is noted for its relatively bright autofluorescence (cf. weakly emitting fluorochromes) and it is possible to use a normal transmitted compound microscope using a darkfield stop and a couple of filters to explore autofluorescence—no special epi-fluorescent microscope with intense lamp is required. Although a digital camera with good long exposure capabilities is ideal to record and study the results.

The images below used a Zeiss Photomicroscope III with Canon 600D DSLR body with Zeiss 10x Kpl eyepiece on short collar for projection. The 'D' setting on a water immersed achromatic-aplanatic condenser was used for both the darkfield and the autofluorescence studies.

The next three images show the same view of fresh *Spirogyra* in a temporary water mount under different lighting conditions.

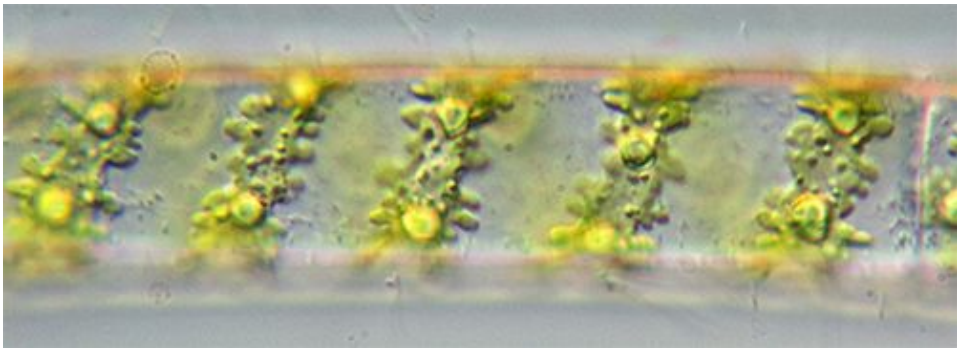
Left below. **Phase** with Zeiss 10/0.22 achromatic phase objective. One filament shows the completion of scalariform conjugation where the contents of one filament (designated the 'male') are transferred to a second (the 'female') to form a zygote.





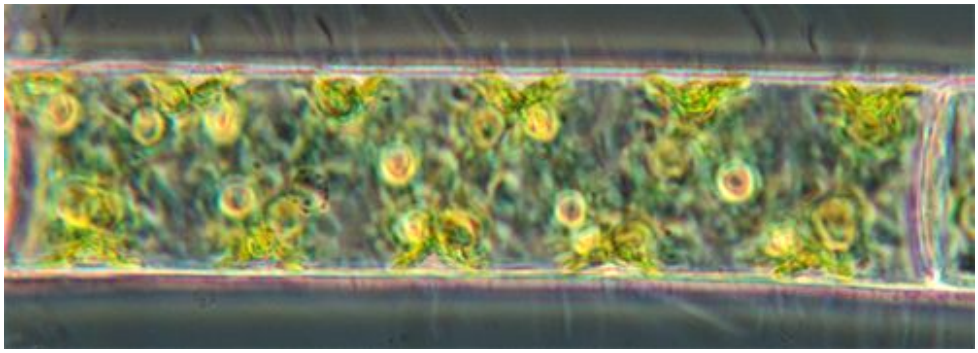
Right above. Same 10/0.22 objective with **darkfield** by using the larger Ph3 annulus (condenser water immersed).

Above. Zeiss 10/0.32 planapo objective with the Ph2 disc to create **circular oblique illumination** or COL (condenser water immersed).

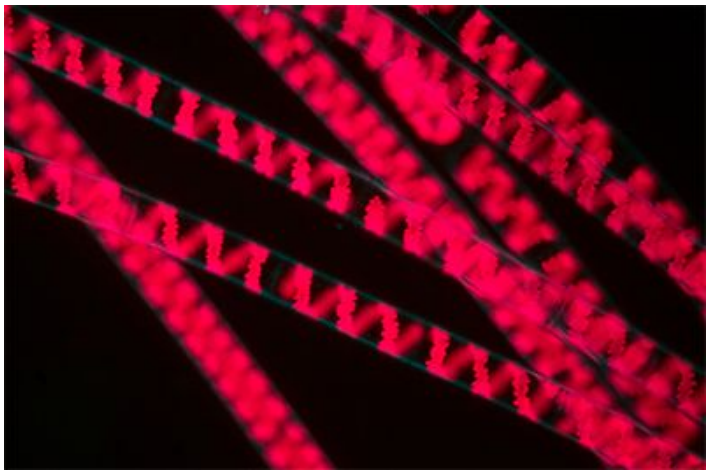


Above. Zeiss Neofluar 25/0.65 objective with **DIC** and the type II prism. The shallow plane of focus provides a clearer view of the spiral chloroplasts and pyrenoids compared with the same view using phase below.

Below. As above but using **phase** which gives a rather muddled view cf DIC.



Rather intriguingly, I was struggling to see either the nucleus or the cytoplasmic bridle, despite all the firepower the PMIII techniques offered. I had clearly drawn these features at school as shown earlier using brightfield on the LOMO. Whether they were indeed very clear for that species or it was wishful thinking knowing what the ideal cell in the textbook looked like, I'm not certain!



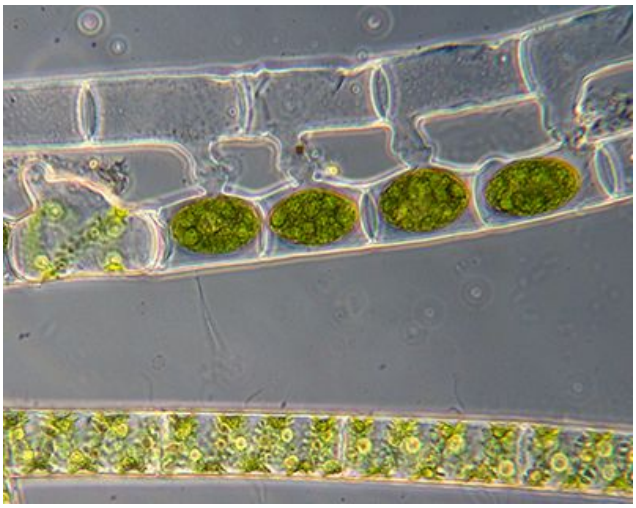
**Right. Autofluorescence** of the chlorophyll containing chloroplasts shows the spiral structure well.

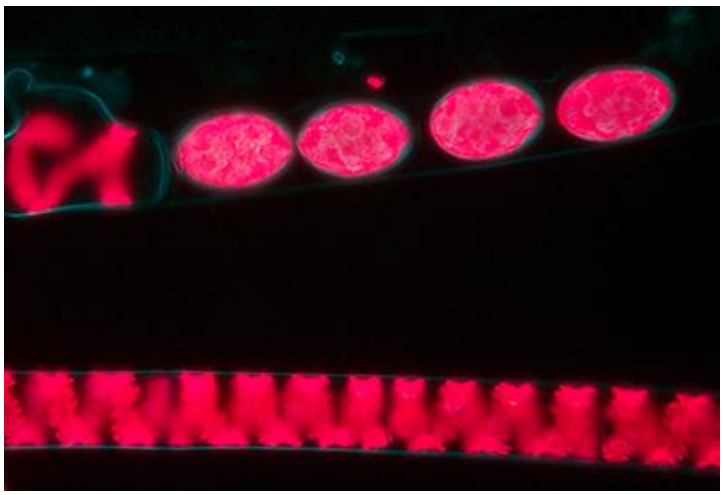
Zeiss 10/0.32 objective with darkfield using the water immersed 'D' setting on the condenser.
The standard 100W quartz halogen lamp at maximum intensity was used.
Exposure 30 secs ISO 800. Visual studies are possible with a standard 100W halogen lamp if the eyes are adapted in a dark room but photography is a better way to examine the effect.

The filters best used for chlorophyll autofluorescence from past experience were intentionally 'leaky' i.e. some blue excitation light was allowed to pass the barrier filter as it defines non-fluorescing components e.g. the cell walls in pale blue darkfield. Small e.g. 18 mm filters as used in the Zeiss III RS head are fine.

Excitation, 1 Schott BG12 filter (two would be usual for the deep blue excitation set in the III RS epi head). CM500S filter (or a BG38) to remove residual red from the light. Both filters sit on the field lens plate.

Barrier filter. Barrier '478 nm' filter from the III RS epi head. The barrier '500 nm' should be used for the Zeiss deep blue set but the 478 nm lets some blue pass. This filter sits in the PMIII filter holder supported on a card collar.



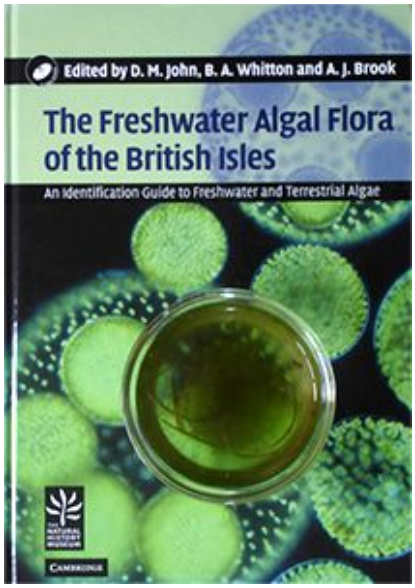


The two images above are of the same view to compare phase and autofluorescence. Two parallel filaments have completed the scalariform form of sexual reproduction. The zygotes are shown and the empty 'male' filament cells. The chlorophyll rich zygotes show well in addition to the chloroplasts in the lower filament. Exposure 30 secs ISO 800. Zeiss Neofluar 16/0.4 objective.

**An attempt at identifying to species**

Identification to species usually requires the reproductive forms to be present. As this was the case with the sample above collected from the water trough, I had a stab at an ID. I'd treated myself some years ago to the splendid *The Freshwater Algal Flora of the British Isles* edited by John, Whitton and Brook pub. 2002 (shown below right with dish of *Spirogyra*). This was a more affordable two figure sum at the time but the second edition pub. 2011 is now typically £140. The flora includes a key, supported with many illustrations, to the 50

or so species of the 400 in the *Spirogyra* genus which they note have been reported in the British Isles.

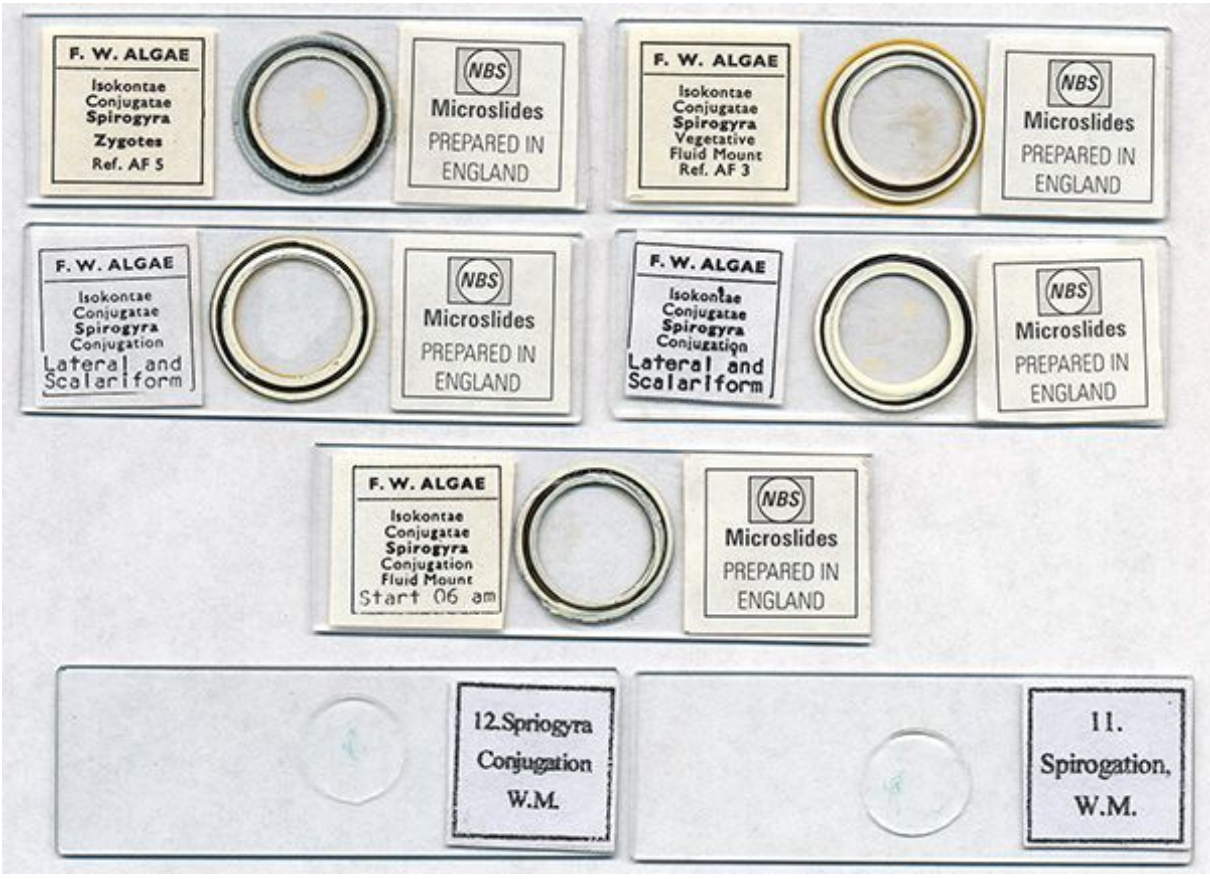


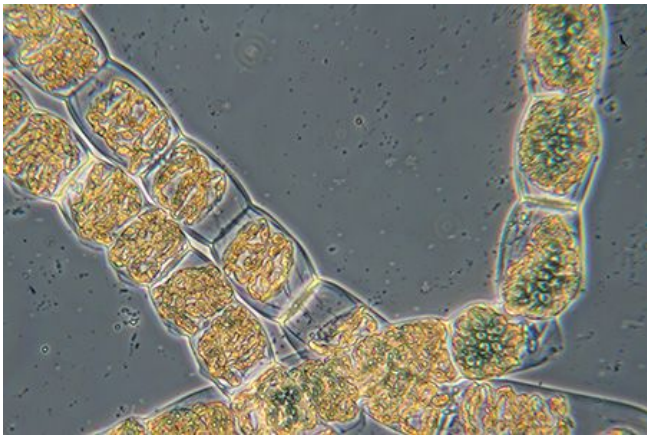
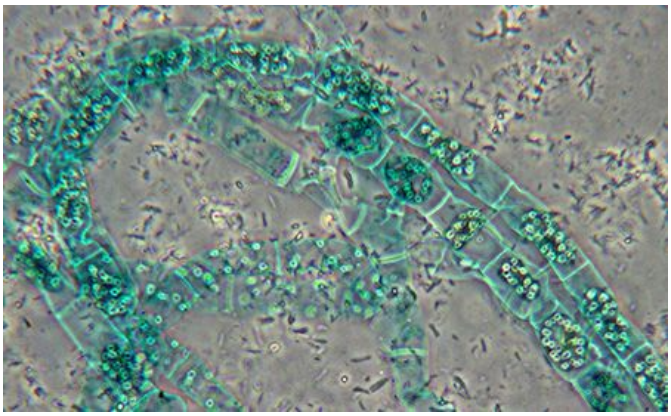

For the dominant species present, the typical measurements were: filament diameter 36 µm, cell length 68 - 130 µm, ellisoidal zygotes 58 µm x 30 µm Chloroplasts 1 per cell? If I've keyed out correctly (having never used the key before) it is *Spirogyra varians* (Hassall) Kützing 1849. Noted as 'probably cosmopolitan'. Mountain streams are included as a habitat which the slow flow through the upland water trough it was collected from could be regarded as. Although a feature noted on the zygotes for this species is 'mostly with a distinct suture line' which I could not see.

**Some commercially prepared slides**

The late and sadly missed Eric Marson of Northern Biological Supplies (NBS) offered a splendid set of fluid mount spirogyra slides. They included examples of both the scalariform and lateral forms of sexual reproduction. The former is the commoner 'ladder' form where two filaments come side by side, the lateral form is where adjacent cells in the same filament undergo reproduction. Sadly, only one of the fluid mounts is still in good condition, the others have dried out and are now unusable. I believe that one or more of these samples also formed the basis of Eric's paper which he published in the Quekett *Journal* (8) on his meticulous observations on aspects of selected *Spirogyra* species and their reproduction.

Many of the good value large slide sets contain examples of spirogyra. My brother Ian and I have an unbranded 100 slide set with two examples as shown. Unfortunately, this may be an example of false economy rather than selecting slides of particular interest from a well established preparer. The quality of the mounts are variable and the mount has crystallised in many slides, making any photography using contrast enhancement unsuited as shown. Note also the curious labelling 'Spriogyra Conjugation' and 'Spirogation'.



Left above, filaments from the 'Spirogyra, Conjugation, Fluid Mount, Start 06 am' slide by NBS above. The slide remaining fluid from the set.
Right above, filament from the unbranded slide 12 shown above. The mount has crystallised giving muddled views if contrast enhancement is used. The filaments looks as if they have been stained.
Both slides using a Zeiss 10/0.22 achromatic phase objective in phase.

The author David Walker welcomes any comments / corrections.

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1. M. Folkes, 'Some account of Mr. Leeuwenhoek's curious Microscopes, lately presented to the Royal Society', *Philosophical Transaction*s, 1724, XXXII, 446. As quoted by Dobell ref. 7, p. 316. (Link is to open access paper.)
2. e.g. Hans Loncke in his *Micscape* July 2007 article 'Making an Antoni van Leeuwenhoek microscope replica'.
3. Brian J. Ford, 'The Leeuwenhoek Legacy', 1991, Biopress, London, p.73 side note where the author cites ref. 3b.
3b. Antoni van Leeuwenhoek in his letter dated June 1st 1674 to H. Oldenburg Secretary of the Royal Society, *The Collected Letters of Antoni van Leeuwenhoek = Alle de Brieven van Antoni van Leeuwenhoek*, 1939, vol. I, letter no. 8 [4], p.115. (Link is to open access letter.)
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4b. Barnett Cohen, 'On Leeuwenhoek's Method of Seeing Bacteria', J. of Bacteriology, 1937, 34(3), 343-346. (Link is to open access paper.)
5. Phil Greaves, 'Replica Leeuwenhoek microscopes', on the Quekett Microscopical Club website accessed February 2016.
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8. J. E. Marson, 'Observations on Sexual Reproduction in species of *Spirogyra*', *Microscopy (The Journal of the Quekett Microscopical Club* now the *Quekett Journal of Microscopy)*, 1992, vol. 36 (part 9), 712-717, 720.


**Acknowledgement**


Thank you to the *Digitale* Bibliotheek voor de Nederlandse Letteren (DBNL) website for both hosting and making freely accessible the first fifteen volumes of the 'Collected Letters of Antoni van Leeuwenhoek'.


**Related *Micscape* articles**

*'Spirogyra'* by Jan Parmentier, *Micscape* January 1999.
'Conjugation in Spirogyra', by Wim van Egmond, *Micscape* 1998. Part of Wim's *The Smallest Page on the Web* suite.
'Forays into fluorescence. Simple transmitted blue light autofluorescence of mosses and algae imaged with a digital SLR.' by David Walker, *Micscape* March 2009.


*First published in the February 2016 issue of Micscape Magazine.*
*Reprinted in the NYMS Newsletter with permission.*

## Corning Glass News From Jay Holmes, AMNH

Fun microscope stuff! An Exhibition at the Corning Museum of Glass upstate!

https://www.cmog.org/collection/exhibitions/microscopes?utm_source=All+Subscribers&utm_campaign=cf0af61a24-2016_Evening_for_Educators2_23_2015&utm_medium=email&utm_term=0_0454fc673b-cf0af61a24-64730005

# CORNING MUSEUM OF GLASS

Join Museum staff for a preview of our upcoming exhibitions. *Revealing the Invisible: the History of Glass and the Microscope*, opening April 23, tells the stories of scientists' and artists' exploration of the microscopic world between the 1600s and the late 1800s. *Fragile Legacy: the Marine Invertebrate Models of Leopold and Rudolf Blaschka*, opening May 14, presents the marine invertebrate models of the Blaschkas within the context of both marine life and glass conservation. Our science educator will give you a sneak peek of the microscope-related activities featured in our Spring Break MakerSpace (April 23-30) and an overview of each exhibition's curriculum connections.
In-service credit is available; check with your district for approval. Stay for our popular free art happening 2300° immediately following. Registration is requested. Contact edu@cmog.org or +1 (607) 438-5429 to make a reservation or for more information.

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From Guy deBaere

# New York Mycological Society's Emil Lang Lecture Series for 2016

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Lawrence Millman is the author of 16 books on the Arctic, ethnography, and fungi. His most recent book is *Giant Polypores & Stoned Reindeer: Travels in Kingdom Fungi* . He has studied fungi in places as diverse as Western Samoa, East Greenland, a meteor crater in northern Quebec, Costa Rica, Panama, and Nantucket. With fellow mycologist Bill Neill, he found a polypore (*Echinodontium ballouii*) in 2006 previously thought to be extinct. More recently, in Massachusetts, he found a tooth fungus, *Radulomyces copelandii*, that had never been documented in the New World before. He lives in Cambridge, MA.

Photo: *Hygrocybe miniata*, Tom Bigelow

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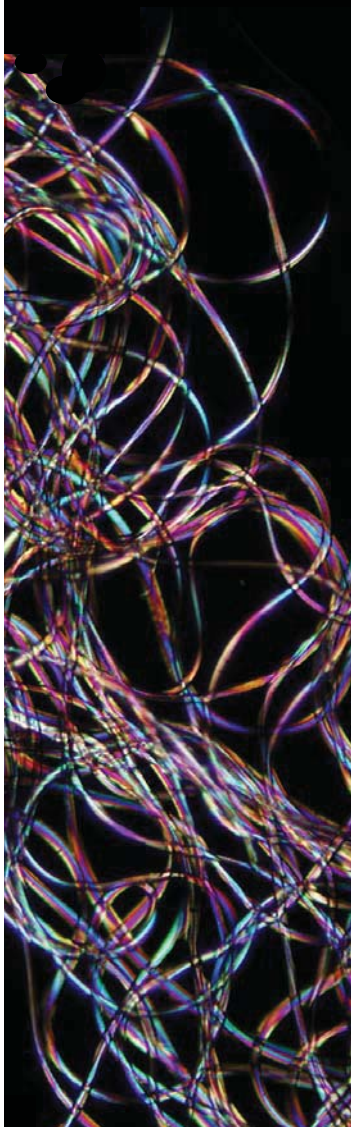

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Using polarized light microscopy (PLM), students study crystallographic and optical properties of asbestos minerals, the various substances likely to occur (and often confused) with asbestos, and the procedures for sample preparation and fiber identification. Both serpentine and amphibole asbestos types are included.

**Microscopy of Explosives (1722)***
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This is an advanced course in the microscopy of bulk explosives, pyrotechnics and explosive residues. Organic, inorganic, military, commercial and improvised explosives are covered. Using chemical microscopy to identify explosives was one of Dr. Walter McCrone's first research projects, and McCrone Research Institute continues to teach the methods he developed.

**Applied Polarized Light Microscopy (PLM) (1201) [same as Forensic Microscopy (1204)]**
*April 18–22, 2016*
Students will acquire the basic knowledge and practical skills to apply polarized light methods in their areas of interest and will appreciate the potential contribution of more advanced methods and techniques. The materials examined emphasize particle analysis, including fibers, paint, glass, hair, explosives, soil, drugs, etc.

**Advanced Indoor Air Quality: Advanced Fungal Spore Identification (1635)**
*April 18–22, 2016*
This course is designed for working laboratory analysts with moderate knowledge and experience in fungal identification based on spore and actual growth. Participants learn important morphological characters necessary for fungal identification at genus level and, to a lesser extent, at species level. Fundamentals of mycology, including ecology, biology and classification of fungi, will be discussed.

**Asbestos Fiber Counting [NIOSH 582] (1616)**
*May 2–6, 2016*
The NIOSH 7400 method, using phase contrast microscopy (PCM), is detailed, including means for QA/QC procedures. Students will learn to properly calibrate and use sampling equipment, align and calibrate the microscope and apply the NIOSH 7400 protocols, prepare samples for analysis, and apply the procedures for collection and quantitation of ambient dust samples.

**Food Microscopy (1560)**
*May 9–13, 2016*
This course, employing stereo, polarizing, phase contrast and fluorescence microscopy, was developed for scientists and technicians in the food and allied industries, who are called upon to study food ingredients in new product research and development, quality control, competitive analysis, and cases of suspected contamination.

*The prerequisite for this course is McCrone's Applied Polarized Light Microscopy (1201)/Forensic Microscopy (1204) course or equivalent.

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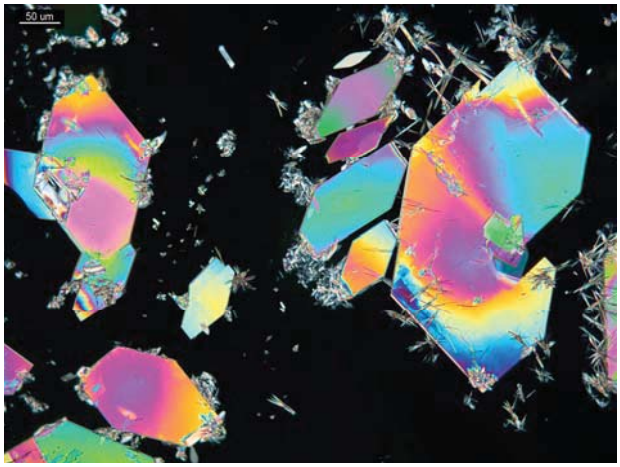


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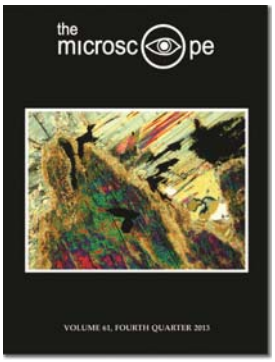


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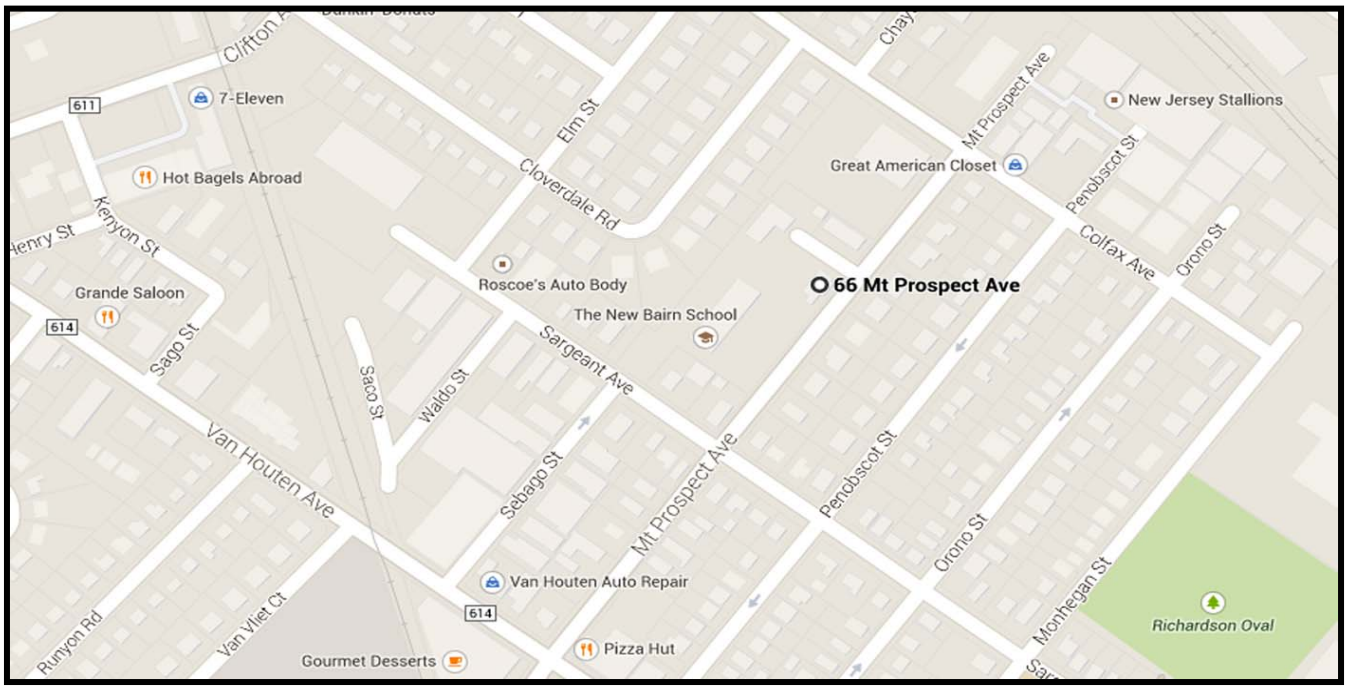
*Education ☐ Library ☐ Finance ☐ Curator ☐ Housing ☐ Program ☐ Publications ☐ History ☐*
*Who referred you to NYMS?.....*
***Academic and Honorary Degrees:***
*Degree Conferring Institution Date*
*.....*
*.....*
*.....*
*Scientific Publications.....*
*.....*
*.....*
*Membership in Scientific Societies.....*
*.....*
*Date of birth (optional if over 18).....*
***I have enclosed a check for $..... to cover my application fees** for membership {Annual $30, Supporting $60, Life $300(payable within the year), Corporate $175(includes one advertisement in NYMS News), Junior $5 (under 18 years old)}.Student (over 18) $20*
*I understand portions of the above information may be used in NYMS publications.*
*I would prefer my home ☐ work ☐ address/ phone included in the NYMS Directory.*

*Signature.....*Date.....
*NYMS Headquarters: One Prospect Village Plaza, Clifton, NJ 07013 Telephone (973) 470-8733*




## Directions to NYMS Headquarters

**One Prospect Village Plaza**
**(66F Mount Prospect Avenue)**
**Clifton, NJ 07013**

**GPS: Intersection of Colfax & Mt. Prospect:**
**Latitude 40.8656 N, Longitude 74.1531W,**
**GPS: Our building: Latitude 40.8648 N,**
**Longitude 74.1540 W**

**From George Washington Bridge:**
Take Interstate Route 80 west to Exit 57A, Route 19 South. Take Route 19 to Broad Street and continue two lights to Van Houten Avenue. Turn Left. Go to second light, Mount Prospect Avenue and turn left. Building 66F is on the left side , one and a half blocks from Van Houton.

**From Lincoln Tunnel:**
Follow exit road to NJ route three west. Continue to Bloomfield Avenue exit. Turn right to Circle and go three quarters to Allwood Road West. Mount Prospect Avenue is a few blocks on the right (a small street) Turn right and go to first light (Van Houton) continue. Building 66F is on the left side , one and a half blocks from Van Houton.

**From North:**
Take Garden state Parkway South to Route 46 Clifton Exit. On 46 Make second exit to Van Houton Ave. Continue to third light Mount Prospect Avenue and turn left. Building 66F is on the left side , one and a half blocks from Van Houten.

**From Route 46 coming from west:**
Take Broad Street Exit in Clifton and follow Directions above from GW Bridge.

**From route 46 coming from East:** Take Paulson Avenue Exit in Clifton and follow to Second light, Clifton Ave turn right. Go to next light, Colfax, turn left, go three blocks and turn right on Mount Prospect Ave.. Building 66F is half block on right.

**Public transportation from NY:**
Take NJ Transit train from Penn Station to Secaucus Transfer Station. Change trains to Bergen Line to Clifton (call NJ Transit for schedules). From Clifton Station cross under tracks to first street and go left one block to Mount Prospect Street, turn right and Building 66F is one half block on Right.

**If you plan to come by bus or train, please copy the links below into your browser:**
http://www.njtransit.com/sf/sf_servlet.srv?hdnPageAction=TripPlannerItineraryTo
http://www.njtransit.com/sf/sf_servlet.srv?hdnPageAction=BusSchedulesP2PTo
http://www.njtransit.com/sf/sf_servlet.srv?hdnPageAction=TrainTo

# New York Microscopical Society Items For Sale

29-Feb-2016

## N.Y.M.S. Microscope Covers

| Item # | Size | Member Price | List Price |
|---|---|---|---|
| MT-003 | Small Microscope or Stereo, 15"W x 17"H | $18.00 | $20.00 |
| MT-004 | Lab Microscope or Large Stereo, 20"W x 18"H | $23.00 | $25.00 |
| MT-005 | Large Lab Scope, 22"W x 21"H | $28.00 | $30.00 |
| MT-009 | Large Lab Scope with Camera, 9"W x 19"Deep x 23"H | $31.00 | $33.00 |
| MT-010 | Universal Scope with Camera, 11"W x 25"Deep x 23"H | $36.00 | $40.00 |
| MT-012 | X-large Scope | $45.00 | $50.00 |

## N.Y.M.S. Microscopes (see below for images)

| | | | |
|---|---|---|---|
| 185 | Monocular Dissecting Microscope | $85.00 | $99.00 |
| 131 | H.S. Student Microscope | $190.00 | $245.00 |
| 131-FLU | H.S. Student Microscope (Fluorescent) | $200.00 | $255.00 |
| 125-LED | H.S. Student Microscope (LED) | $240.00 | $309.00 |

## Other Items

| | | |
|---|---|---|
| NYMS Glossary of Microscopical Terms | $30.00 | $35.00 |
| NYMS Patch | $5.00 | $7.00 |
| Microscope Cleaning Kit* | $40.00 | $45.00 |
| NYMS Lapel Pin | $10.00 | $15.00 |
| NYMS Engraved Pen | $7.00 | $10.00 |
| Rotifer Book by Howard Taylor | $20.00 | $40.00 |

*When available

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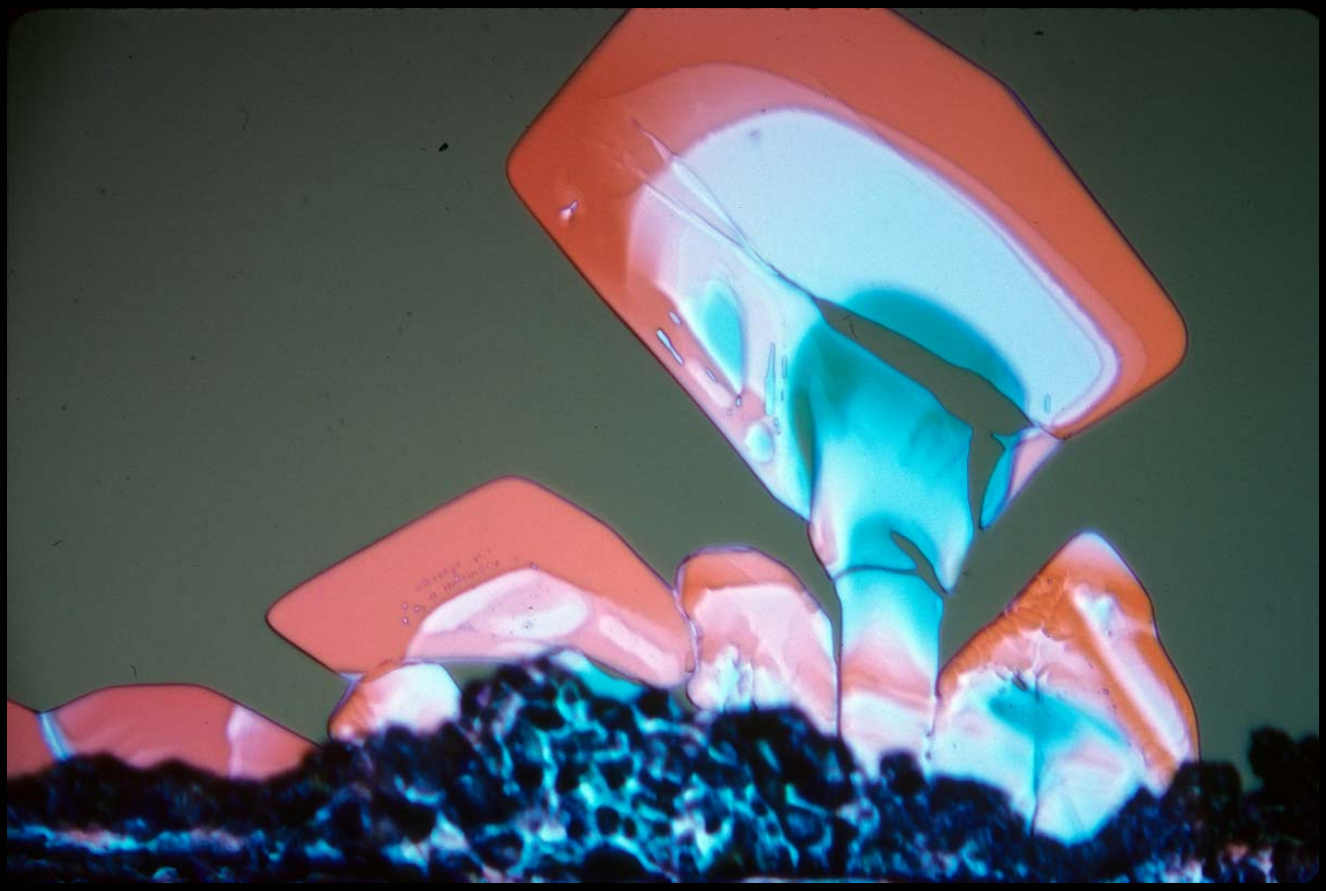
Model 131: Tungsten

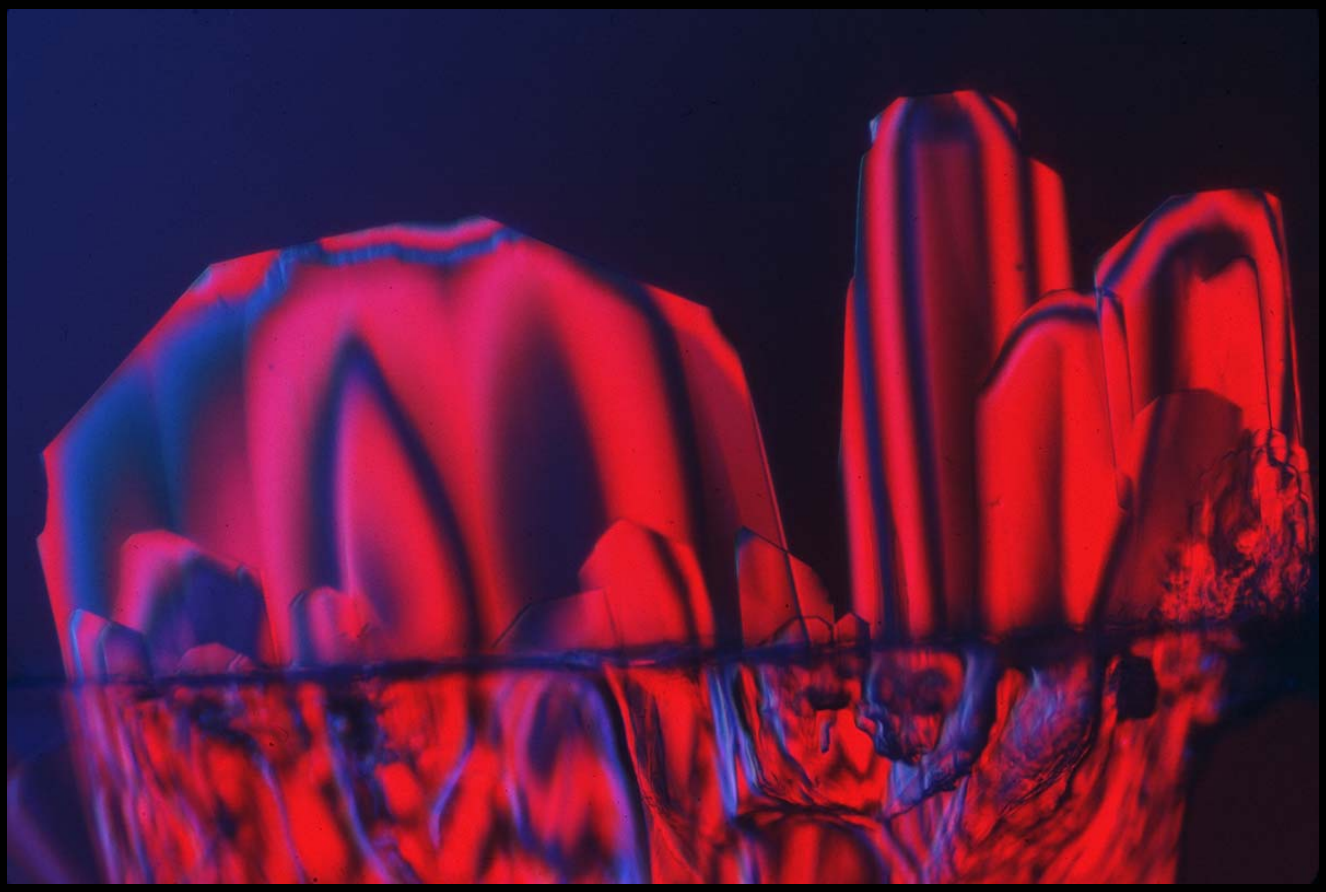
Model 131-FLU: Fluorescent


Model 185: 20x

Model 125-LED Cordless



Mono&TriSodium Phosphate, 25x (P1430131)a6x4x200: Mel Pollinger



L-Histidine,100x (P1440329)a6x4x200: Mel Pollinger