Newsletter
Of the
New York Microscopical Society

30 North Mountain Avenue, Montclair, New Jersey 07042-1841

February 2008 | N.Y.M.S. (973) 744-0043 | Volume 2 Number 2

Meeting Announcement

New York Microscopical Society, 2008 Spring Lecture Series

" The Use of Insects in Forensic Investigations "

Louis N. Sorkin, B.C.E., Entomologist/Arachnologist, Division of Invertebrate Zoology, American Museum of Natural History

Wednesday, February 27rd, 2008, 7:30 pm
American Museum of Natural History, People Center, New York, NY

This presentation will focus on medico-criminal investigation, urban and structural pests, stored products pests, and medically important arthropods. Bed bud infestations will also be discussed. Images from the AMNH's new Leica stereomicroscope, digital montage microscope, and Microptics system will be featured.

Lou Sorkin has provided entomological expertise to numerous entities including: homeowners, steamship companies and operators, marine surveyors, cargo underwriters, admiralty attorneys, insurance agencies, salvage associations, importers, exporters, building owners and managers, diagnostic laboratories, metropolitan police departments, hospitals, museums, public and private schools, authors, and book publishers on various aspects of general, applied, medical, veterinary and forensic entomology. He has presented his work to health care professionals, pest control operators, school classes, and science societies

NYMS Members and their guests are welcome to join the speaker for dinner ($25.00 all inclusive) at 5:45 pm at Calle Ocho (http://www.calleochonyc.com/), 446 Columbus Ave., NYC. Please reserve your place(s) with Angela Klaus by noon Jan 23rd. Angela can be contacted by email (avklaus2@yahoo.com) or by phone (201-988-6251).

A scene from "Life on The Seashore," by James A. Emerton, 1880

Polarized Light Microscopy Course – See Insert

(see page 2 for alternate meeting notifications)

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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.

Dues and Addresses

Please remember to mail in your Dues to Mary McCann, Membership Chair (see this page for address).

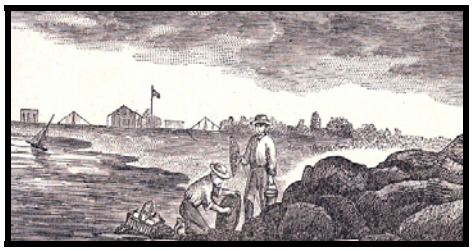
Junior (less than 18 years old) $10
Annual $30 (students >=18 years old $20)
Supporting $60
Life $300 (payable within the year)
Corporate $175 (includes one advertisement in NYMS News)

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

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 by visiting the NYMS website.

Buy and Read a Good Book on Microscopy.



Collecting at The Seashore

(Front page: NYMS Library # 510)

Other than ploughing the open sea for plankton, there are three basic areas of the shore that offer the most interesting specimens for microscopical study; the rocky jetties, the tidal pools and the floating debris at the waters edge. These areas are easily accessible and require little equipment for the collection of specimens. A few clean jars and a plastic scoop are sufficient for a successful hunt, a plankton net would be a bonus for running the waters edge. The specimen containers should be large enough to carry sufficient sea water so as not to suffocate the delicate creatures from lack of oxygen■ Mel

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Low Power Phase Contrast

by

Robert R. Pavlis, Girard, Kansas USA

Ordinarily we can see transparent objects because light is deviated by its being both refracted and reflected when it meets a refractive index change. Thus when we sit down to dine we have no difficulty locating the crystal water glasses that are sitting in front of us. When we observe objects by transmitted light using microscopes the light is refracted and reflected the same way that it is when we are dining and drinking water from the crystal glasses. However, because microscope objectives generally take in a fairly large cone of light, much of the refracted and reflected light also reaches our eyes causing clear objects to appear indistinct. Furthermore, the wider the cone of light taken in by the microscope the more indistinct things appear.

Because low power objectives typically have a rather small numerical aperture, they take in a rather narrow cone of light, so objects that differ by index of refraction are typically much more visible than with large numerical aperture lenses. For that reason many people feel that phase contrast is not necessary for low power objectives at all.

However almost everyone who has ever used low power phase objectives realises that, even for very low power objectives, phase contrast is still a very good thing!

Unfortunately microscope manufacturers make very few phase objectives below 10x. They are so uncommon, in fact, that I decided to write this article about them for this issue of Micscape.

If one examines dozens of microscope turret phase condensers one is very unlikely to find even one with a phase annulus for any objectives below 10X!!! (I have worked with microscopes for many years and have NEVER seen such a condenser!)

When I found a 4X phase objective for sale at an eBay auction a while back I placed a bid on it because I thought it would be a great addition to the Wild M40 microscope that I had refitted. This instrument is described in the July 2006 edition of Micscape. To me the Wild M40 is about the ideal instrument for observing living specimens, so if I have an opportunity to upgrade it in any way I tend to do so. Because this instrument does not use a phase ring turret condenser there is never a problem with phase rings sizes, because ones can easily be produced in any size as described in the above Micscape reference.

To my surprise, I had the winning bid. When the Nikon 4x phase objective arrived I put it into the objective turrert of the Wild M40 and machined a phase ring for it similar to the ones described in the article referenced above. Because of the low numerical aperture of this objective I discovered I needed to make an extraordinarily small phase ring. I attempted to make a tiny metal disk only about 3.0 mm in diameter with the lathe. I turned some bar stock down to this size, but the disks were so tiny that I kept losing them when I cut off the sections! Thus I turned to paint. I put a black dot of paint on a cover slip instead. This takes a bit of patience. Getting small dots the right diameter takes a lot of trials to get one just the right size!

When I had the phase ring finished I tried it out and found the results very very disappointing—as the phase effect was only in the central part of the image.

The result was a bit less disappointing when I carefully adjusted the condenser and light source. However, no matter how I adjusted it, I could not get a satisfactory image over the whole field.

After analysing the problem a while I realised that the problem was that the low power objective covers a much wider image area. This makes vertical positioning of the phase rings much more critical than for other phase contrast objectives. The solution occurred to me when I woke up one morning at 2:00. I got out of bed to make the measurements. (continued on page 4)

(Low Power phase, continued from page 3)

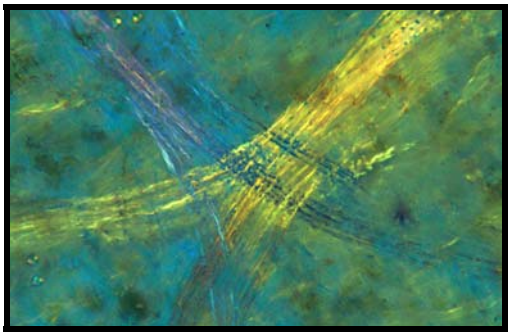
I removed the phase ring entirely. I placed a slide with pond water on the stage and brought the organisms on the field into focus. I carefully focused and centred the condenser so I could see the edge of the field stop of the light source when it was stopped down. I adjusted the field stop so it was just at the edge of the field. When I moved an index card into the light path from the front just below the light source the field darkened from the bottom. When I moved it into the light path just above the condenser it darkened from above! When I moved it into the light path between about 15 mm and 20 mm above the condenser plane the field darkened evenly. The phase ring needed to be here! (Not near the condenser lens as with the Wild 10X and higher objectives.)

I tried to go back to sleep again, but I was too excited. I got up a bit before 4:00 and searched my supply of brass stock. I found a round bar of 360 brass that was perfect. I measured off a piece and cut it off with the band saw. I carefully faced the ends of the brass piece and then carefully turned down the end of the piece that would fit into the Wild condenser so that part of the piece above the turned section would be 18 mm long. Even at 4:00 in the morning this must be done with great precision. I aimed for a diameter of 29.97 mm. After working with it a few minutes I took a micrometer and measured the diameter. It was exactly 29.97mm! I took it to the microscope. It was a perfect fit. (Machinists know that removing metal is a one way proposition. Once you cut something too small you can not put more metal ba Now it was time to bore out the brass bar. The goal was to hollow it out to about 15 millimetres except to on the side opposite the turned end. There it would be only the correct size for the outside of the phase ring.

I drilled to within three millimetres of the end of the bar with a 10mm bit, and then bored the hole to 16mm diameter leaving a flat surface 3mm thick at the bottom. Several years ago I obtained at an auction sale a set of drill bits in the so called "number and letter gauge" sizes. The larger sizes are represented by letters. Z is the largest, A much smaller. The size below A is #1, and after that increasing numbers indicate a smaller drill size. The set obtained at the auction has all sizes from Z down to #60. This is a truly bizarre way to denote drill bit sizes! The diameters of these drill bits are all irrational numbers in any measurement system, and there is no formula to determine their diameters. Hence one needs a special table to know the size of any given bit!

Read the full article with images in the January 2008 issue of Micscape Magazine <http://www.microscopy-uk.org.uk/mag/indexmag.html>. The above was printed here with the permission of the author.

Answer to January 2008 Mystery photo



Composite image of a birefringent fiber bundle under crossed polars. Dr. Ben Glassman, Joe Orosz and Peter Diaczuk were on the money. FYI – I used a smear of a ripe mango for the fiber bundle.

February 2008 Mystery Photo

Mystery Photo – Do you think you know what it is? Email or phone me your answer. > Mel

Got something you want to sell, trade or publish in the Newsletter? Write, call or send an email message to:
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1. **Regular mail, folded images: Do nothing.**
2. **Email with undamaged full color images, pdf file: Needs your active email address.**

Please make sure you have paid your dues or this could be your last newsletter.