



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

February 2012

N.Y.M.S. (973) 470-8733

Volume 6 (26) Number 2

Meeting Announcement

2012 Winter Workshop

Sunday, February 26, 2012, 1pm to 5pm
NYMS Headquarters, Clifton, NJ

Minerals Under The Microscope

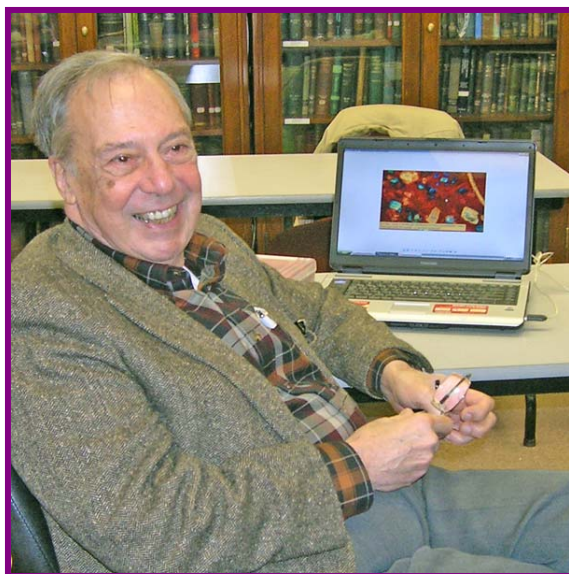
Explore this miniature world.

Bring your microscope or hand-lens, a suitable light-source and some micromineral specimens, mounted or unmounted. Bring some extra material to trade or give away. If you have a presentation, bring it along. If you have a camera for your scope, bring that, too. Also bring some of the gadgets you use for mounting micros and/ or studying them.

Refreshments will be available. Those attending will have a tour of our facility and also see our member-accessible microscopy lab and library. For additional information please contact Mel Pollinger (pollingmel@optonline.net) or (201)791-9826, no later than noon on Saturday, Feb. 25th, or cell= (201) 314-1354 (meeting day only)



Members Day Meeting
January 29, 2012 proved to be quite interesting and fun. Bill Neuberg (right), gave us a presentation on wax crystal growth. Jay Holmes' microscope (below) was fascinating.



NYMS Board of Managers

President

Angela V. Klaus, Ph.D., exp. June 2012
Department of Biology
Seton Hall University
400 South Orange Ave
South Orange, NJ 07079
klausang@shu.edu

Treasurer

Librarian & Newsletter Editor

Mel Pollinger, exp. June 2014
18-04 Hillery Street
Fair Lawn, NJ 07410-5207
(201) 791-9826,
pollingmel@optonline.net

Webmaster

Roland Scal, Ph.D., exp. June 2013
Dept. Biological Sciences & Geology,
M-213
Queensborough Community College
222-05 56th Avenue
Bayside, NY 11364-1497
Tel 718-631-6071
Fax 718-631-6678
rscal@qcc.cuny.edu

Vice President

Peter Diaczuk, exp. June 2013
John Jay College
445 W 59th Street
New York, NY 10019
Department of Sciences
212-237-8896
pdiaczuk@jjay.cuny.edu

Secretary

Craig Huemmer, exp. June 2012
NYPD Police Laboratory
chuemmer@hotmail.com

Board Member

John R. (Jr.) Reffner, exp. June 2014
Dow Chemical Company
727 Norristown Road
Spring House, PA 19477
Cell: (215) 527-1882
jrr1lp@gmail.com

Past President

John A. Reffner, Ph.D., exp. June 2014
John Jay College CUNY
97 Ocean Drive East
Stamford, CT 06902
(203) 348-8098, jareffner@cs.com

Curator & Education Chair

Don O'Leary, exp. June 2013
10 Sampson Street, Unit 113
Saddle Brook, NJ 07663
(201) 368-8849
dkoleary@verizon.net

Membership Chair

Mary McCann, exp. June 2012
McCann Imaging
161 Claflin Street
Belmont MA. 02478
(617) 484-7865 Fax (617) 484-2490
mccanns@tiac.net

Board Member

Gary Mayer, exp. June 2014
mayer@co.somerset.nj.us

Board Member

Seymour Perlowitz, exp. June 2013
perlowitzs@hotmail.com

Board Member

John Scott, exp. June 2012
Archivist & Associate Curator
nyconsnfdn@aol.com

Awards Committee

Chair: John A. Reffner

Members

Jan Hinsch
Don O'Leary
Mel Pollinger

Dues and Addresses

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

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 Mary McCann and Mel Pollinger if you have changed your address, phone or email.

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 by visiting the NYMS website.

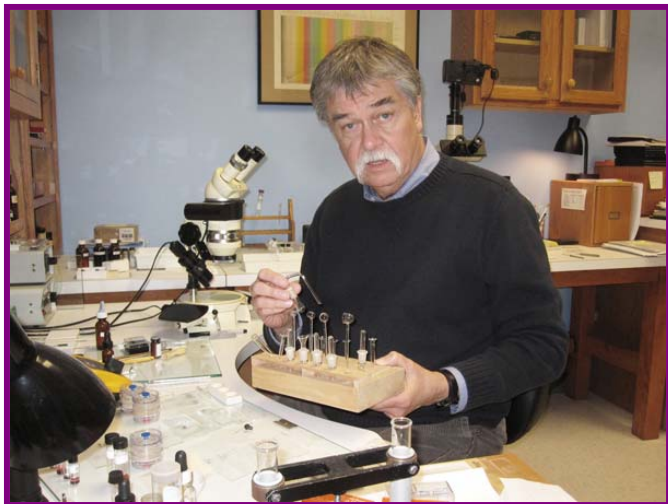


From The Editor... if you have email: Getting the newsletter by email means you receive an **extended pdf version** that cannot be sent by "snail mail." Even if you continue your USPS delivery of the newsletter, NYMS needs your email address for reporting priority events and special news. Being able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

Dues for 2012 is now due!

Buy and Read a Good Book on Microscopy.

Skip Palenik To Receive Abbe Award in 2012



Skip Palenik has had a lifelong fascination with the microscope that started when he received his first instrument at the age of eight. Since then he has devoted himself to increasing his knowledge of analytical microscopy and microchemistry and applying it to the solution of real world problems, especially those of forensic interest. He was fortunate in having worked closely with his mentor, Dr. Walter McCrone, for thirty-five years and to have studied forensic microscopy with Dr. Max Frei-Sulzer of Zurich. Skip and Peter De Forest taught a microscopy workshop at the New York Microscopical Society Centennial meeting in 1977 has been teaching analytical microscopy to forensic scientists ever since. He has published numerous scientific articles and book chapters on the applications of chemical and forensic microscopy. His most recent contribution is a chapter on the use of heavy minerals in forensic science. He established his company, Microtrace LLC, in 1992 to provide a resource for organizations and individuals in need of expert scientific analysis and consultation in the area of small particles and microscopic samples. His special research interests are the identification of single small particles, small amounts of complete unknowns and tracing dust and soil back to their origins.

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.



Adolph Feurst Dies

Dear Mel -

I'm so sorry to inform you that my husband of 60 years died on January 14th. Adolph loved the New York Microscopical Society and faithfully attended all the meetings when it was based at the Museum of Natural History. I often went with him to the meetings and found them fascinating. When the Society left for its New Jersey location, both its distance from New York and Adolph's increasingly fragile health prevented him from attending.

He also very much enjoyed your newsletter with its mystery photo.

I am enclosing the eulogy which was written by our two children, David and Ellen, and which was read at the funeral. Please feel free to share this with the members who remember him.

Sincerely,

Shirley Fuerst

Members who wish to receive the eulogy and additional details of the late Mr. Feurst's life should contact me for a copy; It will be sent by email or by sending me a S.A.S.E. Mel

Scheduled NYMS Outreach Events with the Central Park Conservancy :

On a Wing, at the Belvedere Castle, Saturday May 19th,
noon to 3 PM.

Family Fishing Day, on the Harlem Meer, Saturday June 23rd.

Social at the Dana Discovery Center on the Harlem

Meer, Thursday October 8th, 6:30 PM - 8

Volunteers to help and plan are needed and welcome.
Come join the fun
and help NYMS grow.

Guy De Baere

NYMS Member's Survey

What type of meeting subjects do you want NYMS to offer you? To tell us, please fill out and return the attached survey questionnaire to:

NYMS Survey
c/o Mel Pollinger, Editor
18-04 Hillery Street
Fair Lawn, NJ 07410-5207
Or email it to pollingmel@optonline.net

NYMS Welcomes Visitors

Although most NYMS events and meetings are held in Clifton, New Jersey on Sundays, the building may be opened for visitors at other times providing an appointment is made with Don O'Leary or Mel Pollinger at least two days prior to the desired appointment time. NYMS Headquarters at Clifton, NJ will be open by appointment only to members from 8:00pm to 10:00 pm most Tuesday evenings.

Those members wishing to visit must call Don O'Leary or Mel Pollinger to confirm. Don's cell-phone number is (201) 519-2176 or email: dkoleary@verizon.net. Mel's Home phone number is (201) 791-9826 or email: pollingmel@optonline.net

Dues for 2012 is now due!

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.

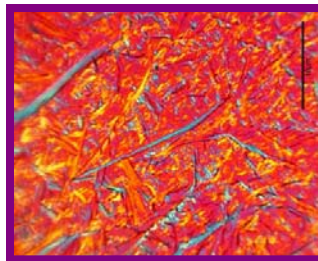
Microscope Cleaning Kit

A complete set of tools and accessories to keep your microscope in optimum operating condition. The kit is put together by our Curator/Educational Chairman and available directly from NYMS for only \$35.00 plus shipping & handling, or may be purchased at a meeting. Call or email Mel Pollinger or Don O'Leary for details (see page two for contact numbers).

Awards Given by the New York Microscopical Society

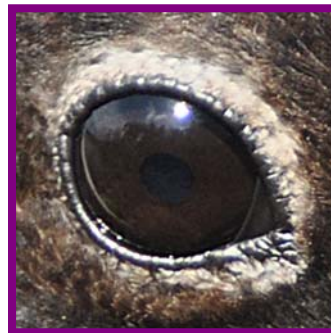
The New York microscopical Society takes great pleasure in recognizing and rewarding individuals who have contributed to either the activities of the society or to furthering microscopy. These awards are described in our website and in a pdf file for our email newsletter recipients. All members are eligible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

Answer to Mystery Photo for January 2012



A mixed fusion of two waxes. One melts at 150F, the other at 100F. The long needles are not a eutectic. They melt at 140F. Of course, none of the melting points are sharp. Image by William Neuberg. Did you guess right?

Mystery Photo for February 2012



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 will also be getting copies of NYMS Newsletter pdf back-Issues from 2007. Copies of older newsletters will be sent as I convert them.

Got something you want to sell, trade or publish in the Newsletter and/or on the website? Write, call or send an email message to:

201-791-9826 or pollingmel@optonline.net (images ok)

or

Mel Pollinger, Editor

NYMS Newsletter

18-04 Hillery Street

Fair Lawn, NJ 07410



Supporting Member

NYMS Newsletter Extended

Section, February 2012

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 Houton.

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 ProspectAve.. 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

In This Section: Directions to NYMS

- Members Survey
- NYMS Courses Spring 2012
- Dues
- NYMS Antiques
- NYMS Bulletin
- EAS Call for Papers
- Sale items & Image

NYMS Member's Survey

What type of meeting subjects do you want NYMS to offer you? To tell us, please fill out and return the survey questionnaire to:

NYMS Survey
c/o Mel Pollinger, Editor
18-04 Hillery Street
Fair Lawn, NJ 07410-5207

Or email it to pollingmel@optonline.net

1. Do you use a microscope as a hobby, or for business?
2. What types of subject material interests you?
3. What optical techniques are you familiar with (phase contrast, polarized light, etc.)?
4. If NYMS offered programs that interest you, would you come to those meetings in Clifton, NJ?
5. What day would you prefer for meetings at Clifton?
6. What range of time would be suitable for you to attend?
7. Additional comments:

Please answer the above survey questions and mail or email the answers back to Mel Pollinger.



New York Microscopical Society
Bernard Friedman Memorial Workshops
Use of the Microscope & Polarized Light Microscopy
April 28, May 5, 12, 19, 26, June 2,9, 2012

A basic course on light microscopy which will cover the following topics:

Theory of microscopy, Kohler Illumination
Diffraction Theory, Contrast Methods
Polarized light, Phase Contrast, Interference
Hoffman contrast, Rheinberg, Dark-field & oblique Illumination

An advanced course on polarized light microscopy which will cover the following topics:

The nature of polarized light
The origin and interpretation of interference colors
Birefringence and crystal orientation, The Indicatrix
Compensation and variable compensators
Interference figures and their interpretation

The workshop will consist of seven consecutive Saturdays of lectures and hands on labs to cover the theoretical and practical aspects of microscopy. The course instructors are *Jan Hinsch* formerly of Leica Microsystems, Inc., *Dennis O'Leary* of Micro-Optical Methods, *Mary McCann* of McCann Imaging, *John Reffner* of John Jay College and N.Y.M.S. Instructor *Don O'Leary*.

WHEN: April 28, May 5, 12, 19, 26, June 2,9, 2012. 10AM to 4 PM

WHERE: One Prospect Village Plaza, Clifton, NJ 07013, accessible by public transportation. Information on car pools and transportation will be provided.)

COST: \$695 for NYMS members, \$725 for non-members (includes membership) Lunch and course materials are included. Checks made out to NYMS.

HOW: Register using form below. Limited to the first 12 registrants.
Send form to: Don O'Leary, 10 Sampson Street, Unit 113, Saddle Brook, NJ 07663

FURTHER INFORMATION: Call D. O'Leary (201) 519-2176, E-mail: dkoleary@verizon.net

PLEASE MAIL THIS APPLICATION WITH YOUR PAYMENT

Registration Form Use of the Microscope & Polarized Light Microscopy

N.Y.M.S. Member _____ (\$695) Non-Member _____ (\$725), April 28 to June 9

Registration for Use of the Microscope only (4 Sessions)

N.Y.M.S. Member _____ (\$395) Non-Member _____ (\$425), April 28 to May 19

Registration for Polarized Light Microscopy Only (4 Sessions)

N.Y.M.S. Member _____ (\$395) Non-Member _____ (\$425), May 19 to June 9

Name _____

Address _____

City _____ State _____ zip _____

Phone (W) _____ (H) _____

e-mail address _____.

Please send your application and payment directly to:

NYMS Spring 2012 Courses
c/o Mel Pollinger, Treasurer
18-04 Hillery Street
Fair Lawn, NJ 07410-5207

Dear NYMS Member,

Dues Are Due in January

NYMS Membership dues for 2012 are now payable. We are in the process of setting up a full program of speakers, courses, workshops and celebrations at our Clifton headquarters in 2012. NYMS values your support and participation.

Please make sure to include your current email address. Email communications are particularly useful for announcing any short-term program changes, and provide convenient means for sending supplementary materials. In addition email saves paper and postage - and saves you space. If you have a web site related to your microscopy interests please let us know – we'll add it to the roster.

And--Please include any of your Contact information that has changed in the last two years.

NYMS MEMBERSHIP CONTACT INFORMATION

Name: _____

Email address: (please print clearly) _____

Address for Newsletter? Email : __Y/N Home _____

Work _____

Microscopy Related Website _____

Address: _____

Telephone: Work _____ Home: _____

Microscopy interests:

I do Light _____ Electron _____ Other (what?) _____ microscopy

I use microscopes at Work _____ Home _____

I use microscopes for Research _____ Teaching _____ QC _____ Hobby _____ other _____

Mostly I view specimens that are: Biological ____ Industrial ____ describe? _____

Or Other (what?) _____

I also enjoy viewing (what?) _____

In microscopy I am a Professional _____ Amateur _____ Beginner _____

**Are you interested in working on NYMS Committees? Awards _____ Membership _____ Education _____
Library _____ Finance _____ Curator _____ Program _____ Publications _____ History _____**

Checks should be made out to NYMS. Updated contact information may be included with your check to the address below, or it may be sent by email to me at mccanns@tiac.net,

Mary McCann

Regular Membership: \$30 per year. Supporting Membership: \$60 per year. Life Membership is \$300, payable within 1 year Corporate Membership: \$175

Junior Membership (18 or under): \$10

Student Membership (over 18 & a student) is \$20

Thank you for your response!

Mary McCann

NYMS Membership Chair

161 Claflin Street

Belmont MA 02478

New York Microscopical Society

Antique Microscope Collection

**On Display at the Headquarters of the
In Clifton, New Jersey**

Images by Mel Pollinger

Text by Jan Hinsch

**The microscope was made by
Watson & Sons of London late 19.
or early 20th. century.**



There is a similar one pictured in the catalog of the Billings collection fig. 220, except that it has two fine focus screws. That particular version is called the "van Heurck Model". Van Heurck is a Belgian Microscopist with input in the design of some of the features. His book "The Microscope" evaluates just about every microscope of the era and he was, among other things, a noted diatomist. NYMS has at least one copy of "The Microscope" in its library. Van Heurck knew Ernst Abbe who sent him an experimental monobromonaphthalene immersion objective of nA 1.6 for evaluation. Some micrographs of *Amphipleura pellucida* are shown in Carpenter.

You will find plenty of information on the internet.
www.arsmachina.com
www.br.fgov.be/public/general/history/vanheurck.php

(from NYMS Newsletter January 2009)

**Monocular, polarized light
microscope, SN 146775, ca 1911
Continental type, single pillar with
inclination joint.**



All brass construction clear laquered except for the substage which is nickel-plated. Cast iron horseshoe base, black enameled. Rotating stage, 1 degree divisions and veneer. Signed Ernst Leitz, Wetzlar. Height 335 mm with drawtube set at 170mm. Analyzer (prism) on slider. Condenser with swing-out front lens, R&P height adjustment. Prism polarizer in cylindrical sleeve, rotatable with markings at 0-90-180-270 degrees. Drawtube with receptacle for Bertrand lens on slider. The draw-tube permits focusing of the Bertrand lens. Lambda and lambda/4 plates to fit compensator slot, which is E-W oriented above the objective. Objective 10:1. Eyepiece #1, registration pin, focusable eye lens, Huygens 5x, crosses lines made from spider web.

This microscope was missing an objective, lambda & lambda/4 plates, and a Bertrand lens. For the photograph these were borrowed from a companion microscope

Note on technical details:

The objective is screwed into a changer ring, which is held by a centering clutch at the bottom of the tube. The axes of the centering screws are at 90 degrees and act against springs located at diametrically opposed points. The centering action therefore can always be resolved into two linear, perpendicular directions, which makes the procedure predictable and intuitive. This method was introduced in 1908 and was succeeded by a later design (Berek 1925) where the centering screws are part of each collar and no re-centering is necessary when the objectives are changed. Even when nosepieces with centerable holes became available the clutch remained a popular option for U-stage work and the use of long compensator wedges, which can protrude to either side of the slot without restraint. With the atrophy of analytical uses of the polarizing microscope the clutch, along with many accessories, became extinct. NYMS owns 6 of these instruments and I look at them as tokens of the dedication to discourse and teaching all things microscopical by members of nearly a century ago.

(from NYMSNewsletterFebruary 2009)



A Culpeper Microscope in the NYMS Collection

The society owns two microscopes that are representative of 18th Century design. One pictured here, a so-called Culpeper microscope (Edmund Culpeper 1660-1740), is remarkable for its excellent condition and completeness of components and accessories. It is also historically interesting because the optics are from the pre-achromatic era and provide a point of reference by which to gauge the spectacular progress that achromatic optics delivered. A number of specimens on ivory sliders are among the accessories. The objects, such as insect parts, fish scales etc are dry mounted between mica disks and give no inkling of the development of micro technique that lay ahead and contributed just as much to the power of microscopical investigation as did the advances in optics. Culpeper introduced 3 variants of his instrument beginning ca 1720. Around 1790 the cardboard tube of the original gave way to an all brass revision. In its final stage a rack & pinion was added for focusing to replace the sliding action of its predecessors. The instrument in NYMS collection is of that last type. (from NYMS Newsletter March 2009)



R. & J. Beck, Binocular Brass Microscope, 1865 or later.

R. & J. Beck are the nephews of J.J. Lister who showed the way to achromatic correction of microscope objectives. This microscope in the NYMS collection owes its distinctive appearance to the design of the base. Instead of an inclination joint the stand is connected to the base by a triangular hinge, which permits the tube to be locked in one of four positions: vertical, inclined (2 positions) or horizontal. It has all of the important features of a state of the art microscope of the period, such as rack and pinion drive for coarse and a micrometer spindle for fine focus. The NYMS instrument is fitted with a binocular tube of Wenham design. A prism splits the objective pupil into two halves and directs one to the left eye and the other to the right. With this arrangement stereoscopic vision is possible with moderate power objectives.

In his book of 1865 "The Achromatic Microscope" Richard Beck devotes 15 pages to this instrument, which he calls the "Popular Microscope". If we accept 1832 as the earliest date of the achromatic microscope objectives then 33 years separate our instrument from that historic date. During this brief period the development of the compound microscope advanced further than in its entire previous history. The objective aperture increased 5-fold; adjustable correction for cover glass thickness variations is introduced. So are condensers for bright and dark field illumination.

Richard Beck's book is a fascinating inventory of the technology of the microscope and micro technique in 1865. With his microscope next to the text this scholarly account becomes an adventure.

(from the NYMS Newsletter April 2009)



Smith, Beck & Beck, London, England; Compound Monocular Microscope; circa 1865.

This microscope is illustrated and described by its maker Richard Beck in his book "The Achromatic Microscope" of 1865. The catalog of the Billings collection shows a sample from ca 1862 on page 54. What I find interesting is the mechanical tube length of ca 160 mm at a time when "real" English instruments tended to be of 250 mm tube length. The author explains that this microscope is the result of an all out attempt to reduce the instrument to its essentials without sacrificing its utility or versatility with the aim of reducing the cost. He calls this model the "Universal Microscope", perhaps to preempt the notion that this is an inferior instrument.

A single pivot point has replaced the compass joint; the focusing mechanism incorporates a chain drive. Beck points out the convenience of use and the anatomically favorable positioning of the controls resulting from this novel design.

This validity of Beck's approach becomes apparent if we compare his to the continental microscopes of the period, which laid the foundation for the microscope to become the most important tool of biology.

Note: The microscope is signed on the base, "Universal Microscope, Smith, Beck, & Beck, London, 5570."

(from the NYMS Newsletter May 2009)

The Griffith Club Microscope

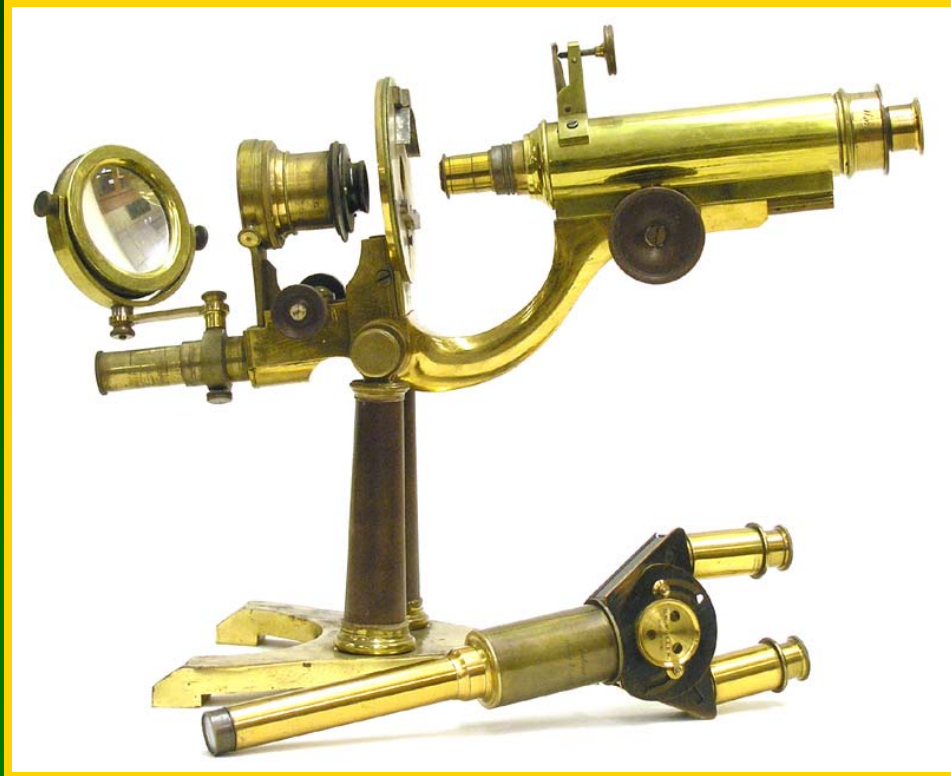
Billings: AFIP # 192-60-4713-339, page 90, Fig.167
Date of manufacture C. 1886

This brass microscope is called the **Griffith Club Microscope** after its inventor and was produced by Bausch and Lomb and others. Its name hints at the suitability of this design to be used successively by several people seated around a circular table. The base terminates in three balls as points of contact with the worktable. The instrument glides and rotates more easily as it is passed from one observer to the next. A light source was offered with this microscope that could be rigidly attached to the base and thus the orientation to the stand was not lost in the process. The pillar joins the limb at a point close to the center of gravity of the limb. At 5 1/4 inches the pillar is unusually long; as a result the tube can be used at inclinations that approach horizontal orientation and is therefore more adaptable to the differing height of various persons.

Microscopes of that period usually had independent drives for coarse and fine focus. Not so the Griffith; here the fine focus is linked to the coarse focus by a worm gear. The number of dovetail interfaces is thus reduced from two to one.

(from the NYMS Newsletter Summer 2009)





Robert B. Tolles Microscope

A microscope very similar to this one from the NYMS collection is shown on page 57 fig. 106 of the catalog of the Billings Collection which was made by the Boston Optical Works (Robert B. Tolles) sometime after 1867.

Robert Tolles ranks among the most innovative of the founding fathers of American microscope making. He is credited, together with Charles Spencer, with a new style of correction collar for water immersion objectives. NYMS owns a number of Tolles objectives and even by the high standards of 19th century mechanics they are just admirably executed. Tolles developed an incident light objective with a between-the-lenses reflector and, as shown in this photograph, a binocular attachment of unique prism construction with symmetrically arranged eyepiece barrels. Like all 19th century binocular tubes the prisms split rather than duplicate the objective pupil and what results is a stereoscopic effect. This binocular attachment was made on a very small scale because it was expensive to make.

Note: The microscope is signed "Robert B. Tolles, Boston."

(from the NYMS Newsletter September 2009)



The Continental Microscope

The horseshoe base microscope was evolved beginning about 1840 by Hartnack, from his drum type microscope. This design set the stage for the production of microscopes on an industrial scale which science demanded. Ernst Abbe at Carl Zeiss adopted it and perfected the condenser. The fine focus was accomplished by a micrometer spindle of 0.5 mm pitch which was sufficiently free from play to do justice to Abbe's high aperture optics (apochromats). By the end of the 19th century more than 100,000 instruments were in use, produced by at least a dozen makers internationally. To distinguish it from the larger and often more complex microscopes from England it was called the continental microscope.

The NYMS instrument is a comparatively modest version. A sliding tube of the rigid type that does not permit to alter the tube-length serves for coarse focusing. The condenser is limited to rather small illuminating apertures and lacks the complications to achieve oblique illumination.

The horseshoe-type microscope was the dominant type from about 1879 to 1902. At that point Leitz introduced a novel fine focus drive which was arranged in horizontal fashion. In one form or another it became the new standard.

The Continental microscope however continued to be made as a lower cost alternative well into the 1920s.

(from the NYMS Newsletter October 2009)



Made by Henry Crouch of London

The catalog of the Billing's microscope collection was used to identify this instrument. It is with reasonably certainty that it was made by Henry Crouch of London no earlier than 1882. Seven of his microscopes are pictured in the catalog of which the oldest dates from before 1860 and the most recent one from before 1900.

The fine focus consists of a micrometer spindle that is located near, and acts upon, the triple objective nosepiece. The condenser height is adjustable by rack and pinion. For many of his microscopes Crouch preferred the type of base that we call the English foot. I find it interesting that this style base reappears 1903 in modified form in the *Leitz Stativ A with English foot*, my favorite period instrument on account of its balance, grace and innovative technology. Conversely, Crouch successfully adopted the continental form of fine adjustment for his instrument after 1889.

(from the NYMS Newsletter November-December 2009)

Historic Microtomes



Regarding historic microtomes Brian Bracegirdle's book "A History of Micro Technique" is an excellent source. According to Mr. Bracegirdle hand microtomes of the general style depicted here have their roots in an instrument made by Ross in the 1850s.

These instruments roughly have the shape of a mushroom. The stem is hollow and threaded on the inside. A threaded spindle and object holder runs the length of it. To the bottom of the spindle a drum is attached. Turning it by one revolution advances the spindle by 0.5 mm. A circular glass plate on the top acts as a guide for a razor blade that is run free hand across it to cut the material. The simplicity is so compelling that hand microtomes continue to be available commercially. The Science Company in Denver, Colorado for example offers an instrument that closely resembles the one depicted here. At \$ 70.00 it will not bankrupt the enthusiast.

(from the NYMS Newsletter January 2010)



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COLLECTING RECENT DIATOMS

By JOSEPH F. BURKE

Diatoms are grouped as *recent* and *fossil*, distinguishing those now living from those found in diatomaceous earths and other deposits of fossil character. Recent diatoms, having completed their life cycle, are being deposited at the present time. Under suitable conditions these diatoms eventually would form fossil deposits. Diatoms are further grouped as *fresh-water* and *marine* and sometimes as *brackish*. The remarks that follow apply to diatoms found in all waters in a living condition. The *plankton* diatoms are a further grouping of floating forms, usually fragile, many with long, siliceous extensions.

Fresh-Water Collecting

Fresh-water collecting is available to nearly everyone. Standing and flowing water both offer opportunities. The abundance of material and the number of species collectable vary considerably with the season of the year. The seasonal variation differs according to latitude. In the quiet water of ponds diatoms will be found. They occur in various situations. *Spirogyra* species often act as hosts. When these lack their usual yellow-green color and appear brown, it is likely that diatoms are present in great abundance. The alga may be gathered and transported in newspaper, later to be transferred to a large jar of filtered water and beaten with a glass rod to separate the diatoms from their host. The diatoms in suspension are poured off through an ordinary coffee or tea strainer of 40 or 50 mesh into a second jar and there allowed to settle. In the process of settling they should be kept from bright light. Under the influence of the latter they give off oxygen, the adherent bubbles of which carry the diatoms to the surface. The addition of formalin to the water would prevent this, but when the diatoms are allowed to settle over night it is not necessary and there is still the opportunity of watching them alive under the microscope. The jar and strainer can be taken into the field and instead of carrying away the alga, it can be squeezed by the handful above the strainer until the jar is filled with water and diatoms in suspension. This method often affords very clean gatherings. In the spring when water flowing into the pond carries much suspended silt, the collection will not be clean and it is well to make a number of gatherings at different locations with a view to selecting the cleanest for preservation.

A similar method is used in collecting in sphagnum bogs of the type occurring in the pine barrens of New Jersey. Handfuls of a

Sphagnum species may be carried away or, by squeezing above a jar and strainer in the field, made to give up the diatoms associated with this moss. If the muddy substratum is avoided, a clean gathering results.

On the stems of water plants, some diatoms live in a gelatinous substance that can be scraped off and transferred to a collecting bottle.

A different type of pond collecting is that done on the surface of mud, an inch or two below water level. Under the influence of sunlight, diatoms form a brownish layer on the surface of the mud and, by careful work, may be lifted with a spoon into the collecting bottle. If the light is strong and the day advanced, these diatoms in producing oxygen are lifted in a thin mat with some adherent mud to the surface of the water and may then be collected. Mud gatherings present difficulties in washing and mounting, but they include many species that will not be found in the cleaner types of collecting. It may be well to refer here to a refinement in collecting so often advised in literature. The method is to place a piece of white cloth over the surface of the mud. Under the influence of sunlight the diatoms migrate through the interstices of the woven material to the upper surface, from which they are carefully scraped. This requires considerable time, all of the species of diatoms present may not have the mobility needed to penetrate the cloth, and in scraping some mud may be forced through the cloth. Although there may be a loss of species, this method has the advantage that by careful operation a small quantity of clean material is obtained. A variation of the method would be to use two pieces of cloth, one above the other. The upper one should be slightly smaller. When the diatoms have penetrated to the upper surface, the top cloth with the diatoms is carefully peeled off, the mud remaining below the bottom cloth. There are other refinements in collecting, mostly dependent upon the mobility of diatoms.

In flowing water some of the finest collections are to be had where the foam gathers in an eddy or is held by a fallen branch. If the foam is brown, it may be a rich source of diatoms that, after rising to the surface, have floated with the current. This brown appearance does not always indicate diatoms, but a gathering should be made for microscopical examination.

Where the flow of water is fast, the diatoms are carried down stream unless anchored in some way. They may be in the mud at the bottom of the stream and can be gathered in the quiet eddies or pools. They may be on certain plants such as *Elodea* and even on submerged grasses. These can be gathered, placed in a jar with water and beaten to dislodge the diatoms. Some species attach themselves to dams, boulders and other objects and can be scraped off. Place a stone or brick immediately above the point to be scraped to divert the water and to prevent the scrapings from being washed away.

One should watch for the brownish appearance that indicates diatoms. Take generous gatherings. There should be a reserve of material in the event that an accident cause the loss of the first cleaning.

A quarter of an ounce in bulk of a clean gathering, in a half ounce bottle, is as much as is likely to be needed. The usual gathering is less than this amount. Be careful in collecting and storing. Deal with the gatherings as they are brought from the field and if it is not intended to clean them immediately, add formalin after placing them in storage bottles. Some gatherings do not degenerate, but many do and the gases generated blow the cork out with a scattering of the material.

Marine Collecting

Mud scrapings on tide flats, diatoms with adherent bubbles floating in shallow pools, and gatherings of brownish foam offer opportunities similar to fresh-water collecting.

In localities where the receding tide leaves ripples in the sand, a search should be made while the ripples still hold water. Fine brown floating material may offer a pure gathering. With a spoon or with fingers transfer it to a bottle of sea water. If sand is transferred with the gathering it usually sinks at once as the grains are large. The diatoms in suspension can be poured into a second bottle and allowed to settle.

Along the shores and in bays and harbors, many forms adhere to and may be scraped from piling, from the bottom of rafts, from boats left at anchor and, when accessible, from buoys.

Marine diatoms are often associated with other plants, especially with algae. Collect the red seaweeds and examine them microscopically for closely adherent forms and for those attached by stipes. The seaweed should be placed in water and hydrochloric acid added. Not much is needed. The diatoms are loosened and after a time the seaweed in the jar should be beaten with a glass rod and the water poured off into a second jar where the diatoms are allowed to settle. The green seaweeds are not as a rule a good source of diatoms, but some harbor them. Other plants such as eel-grass should be examined below water level and scrapings made where material is found. Filamentous forms of diatoms may be entangled with floating algae and can be separated in great purity and quantity. Nearly a half pint in bulk of one species was gathered in this way.

Salt water marshes and meadows afford a good collecting ground, particularly where they have been ditched for mosquito control. The surface of the water in ditches reached by the tides is often covered with bubbles especially in bright sunlight. These can be skimmed off repeatedly until a bottle is filled and usually afford a good collection of diatoms. The sides of the ditches can be scraped where they have a brownish coating or can be pressed with a spoon held horizontally, bowl upward, allowing water and diatoms to fill the latter. Algae floating in the ditches can be squeezed above jar and strainer. The soft mud of pool bottoms affords rich material at times. Temporary pools in beach sand, formed by one storm and destroyed by the next, sometimes produce diatoms in enormous numbers.

Some diatoms occur in gelatinous tubes and can be collected

during the late winter and early spring. They are found attached to piling and in other marine locations. They should be watched for in fresh-water collecting as well. Some of these diatoms have power of motion within the tube and afford an interesting microscopical study. Two species, in separate genera, occasionally occupy the same tube.

Plankton Collecting

Plankton diatoms present interesting collecting. They form a study in which there is a good deal of specialization. Many works have been published on the plankton diatoms only, and many of the general publications on diatoms give but brief treatment to the plankton forms. Marine plankton diatoms are usually collected with the plankton net made of bolting cloth. This cloth is expensive and for casual collecting substitutes can be improvised. The net is towed slowly through the water, from a boat, and the plankton diatoms with other forms of plankton are concentrated in a glass tube at the small end of the net. From this tube they are transferred to a collecting bottle and a little formalin is added as preservative. The season for these diatoms varies with the latitude. Near New York the late fall and winter months are perhaps best. These diatoms can be collected quite readily at times from a pier, bridge, or other stationary object past which the tide carries a flow of water. Fresh-water also presents opportunities for plankton collecting, especially in large lakes where a water-supply intake can be passed through a suitable collecting filter.

Equipment

The large jar mentioned above may be of pint or quart size. Another size more generally useful for field collecting is the half-pint jar. The kind with rubber ring, glass top, and wire clamp, sold for household use, is very satisfactory. In smaller bottles the half, one, and two ounce sizes, with corks, are useful. There is room for personal preference, but one or more of these sizes in the round, wide-mouthed type represents a good choice. When a corked bottle is used, place a small piece of paper, preferably waxed, to cover the bottom and sides of the cork when the latter is forced into the bottle-neck. This keeps the cork free of diatoms and permits its further use after washing. When diatoms are left living in field bottles, some of their number become attached to the sides. Because of this it is well to transfer collections promptly to storage bottles and to thoroughly clean the field bottles and their corks with soap and brush. Storage bottles and corks should not be used for more than one collection. It is better to buy them in quantity and discard used bottles and corks. The chemical cleaning of small bottles is time consuming and not worth while.

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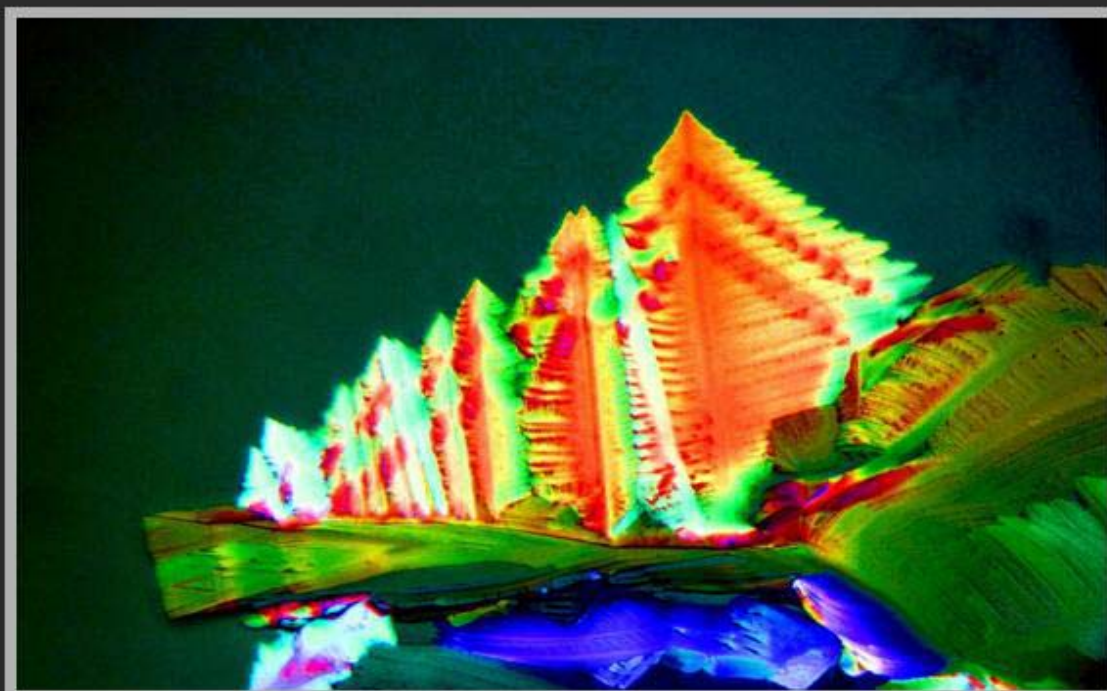
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