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MICROSCOPY IN THE HOME SHOP: MACHINING A DARKFIELD INSERT FOR THE OLYMPUS 1.25 NA BH2 CONDENSER

by Ted Clarke, July 2003

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Having a well-equipped home machine shop for precision machining allows me to design and build components for microscopes that are not commercially available. My interest in instrument making and machining began when I was an undergraduate research assistant at Northwestern University. The freshman engineering students are now required to take a design class that involves building their own inventions using a student shop that has very capable machine tools. Some of these graduates are likely to have home machine shops in the future. Since most microscopists are chemists or biologists, it is unlikely that they will have a chance to learn to use machine tools as part of their university education. In the old days, the high schools had machine shop classes where future microscopists could learn how to use basic machine tools. Our "enlightened" high school education system now considers such training unnecessary for students who will continue on with a university education. Thus, unlike in the old days, young microscopists are now very unlikely to have home machine shops. We are hoping that this series of articles will encourage microscopists to start a home shop of their own.

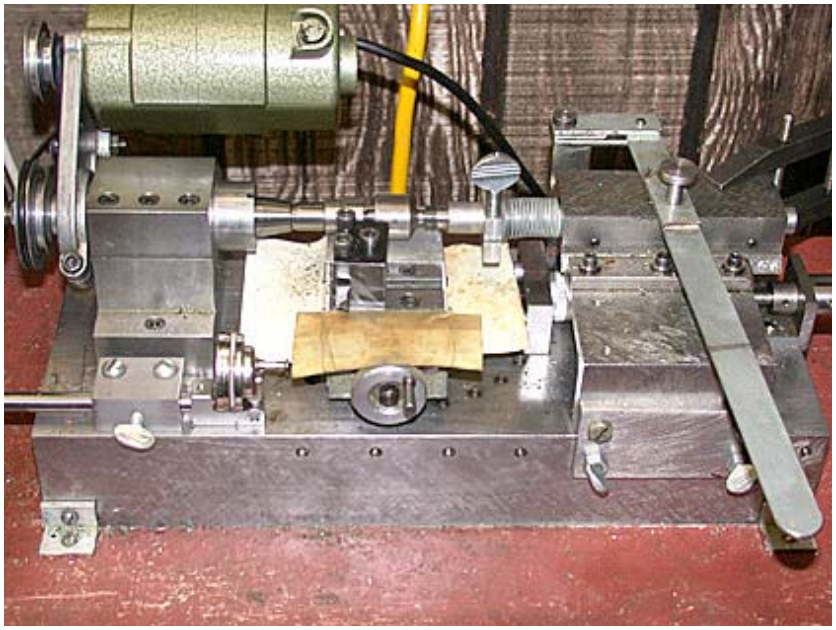

Figure 1.

My initial home shop tool was a Unimat, the first miniature lathe, drill press, and milling machine combination for home machinists. The more recently introduced miniature machine tool systems, from makers such as Sherline Products and

PRAZI, and available from a number of sources, would be suitable for microscopists wanting home shop machining capability. **Figures 1** and **2** show my modified Unimat lathe being used to turn the brass shim stock stops to the correct diameter for the prototype darkfield insert. Peter Cooke of MICA wanted this critical darkfield dispersion staining capability for the Olympus BH2 microscopes he uses for consulting and teaching microscopy courses. I rediscovered darkfield dispersion staining with a Monolux microscope which I modified so that it now has dual brightfield and darkfield capability for all of its objectives including the 60X 0.85 NA.

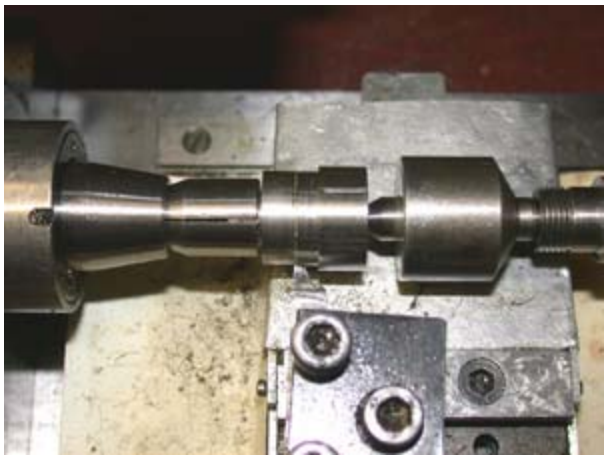

Figure 2.

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Figure 3.

(*"Rediscovery of Darkfield Dispersion Staining while Building a Universal Student Microscope," Microscopy Today, Jan/Feb 2003*, http://www.modernmicroscopy.com/article_pix/001/ABClarke2.pdf) The wire-spider-mounted darkfield stops for the fiber-optic source illumination system are precisely sized and centered to just block the NA of their mating objective. This article will show some of the machining operations used for the prototype insert made for Peter as well as the improved features of the inserts available through McCrone Microscopes and Accessories, see http://www.mccrone.com/.

Figure 5.

Figure 3 shows the modified Unimat drill press drilling system and miniature dividing head used to drill the wire spider holes in the ends of the insert bodies.

I find that a toolroom lathe is very helpful for my microscope projects. Mine is a rebuilt WWII Wade 8" lathe, with 3 and 4-jaw chucks to hold the metal stock being machined. A key feature of the toolroom lathe is its capability to hold the part being machined in a precision 5C collet - a specific size of a split-band or collar type of tool-holder chuck, which is particularly accurate for gripping parts. This lathe allows me to quickly machine the larger parts, such as the insert body for the Olympus condenser. **Figure 4** shows the blank for an insert body held in the 3-jaw chuck of the Wade lathe.

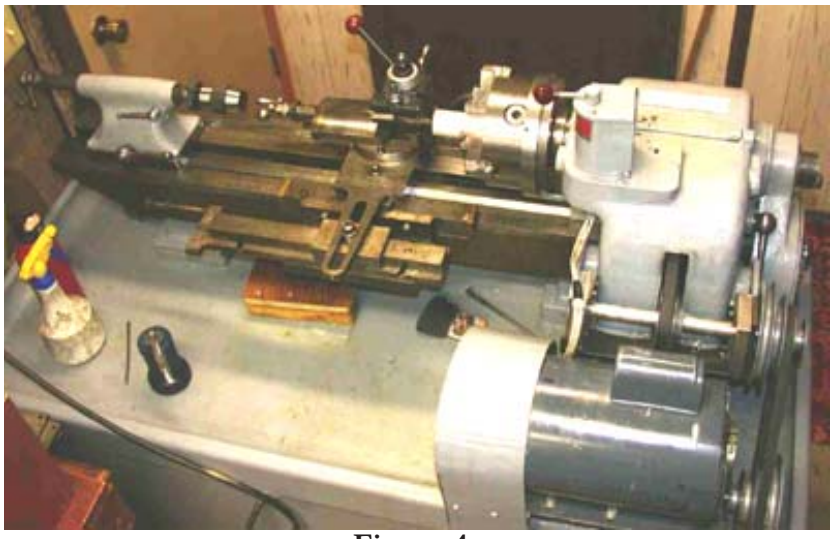


Figure 4.

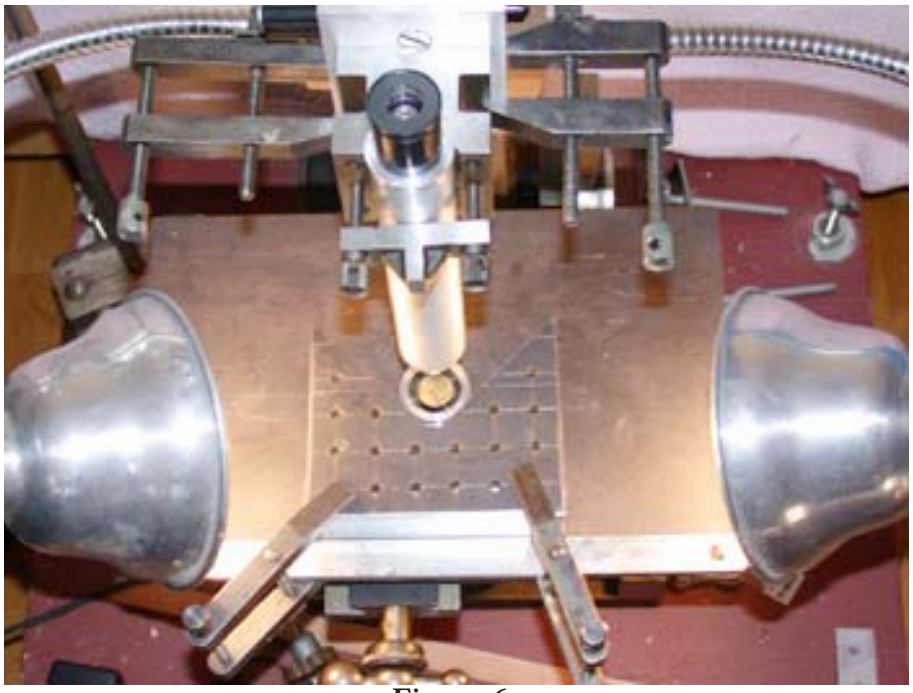


Figure 6.

Likewise, a metal-cutting band saw is much more efficient than a hand hacksaw for cutting the aluminum bar stock for the insert bodies. My metal cutting band saw is a rebuilt Delta brand. **Figure 5** shows the aluminum bar stock for the insert bodies being cut with the band saw. (The toolroom lathe and metal cutting band saw were affordable for me because they were purchased used, and not in operating condition.)

Centering of the stops in my photomicrography stand is done with the aid of a home-built microscope with a 5X objective and 10X eyepiece with a measuring graticule shown in **Figure 6**. The reduced diameter of the insert nose is located in a V-block as the assembly is rotated under the microscope to detect eccentricity. Drops of nail polish were used to attach the spider wires to the brass shim stock stops of the prototype design after centering.

The finished prototype insert made for Peter Cooke is shown in **Figure 7** along with the condenser it is fitted to, and a polarizer. The reduced diameter on the nose of the insert body is machined to be a precise fit in the inner diameter of the ring containing the iris diaphragm in the condenser. This precise fit is needed to maintain centering of the insert in the condenser. Unfortunately, a variation of over 0.25 mm was found when the rings in Peter's four condensers were measured, so the insert bodies had to be custom fitted to each condenser and are not interchangeable. Subsequent use of the

Figure 7.

Figure 8.

condenser inserts demonstrated that the wire spider mounting method for the stops was too fragile, and all the inserts were converted to a revised design shown in **Figure 8**.

The construction features of the revised design are shown in **Figure 9**. The three setscrews mate with a groove in the one piece stop body, resulting in a rugged design to withstand shipping and handling. Centering the stop with the set-up shown in **Figure 9** is much easier than with the earlier wire mounted stop. All of the surfaces that might scatter light into the condenser are painted with flat black model paint. Low production quantities do not justify the high batch cost of black anodizing the aluminum bodies and the stop used in the revised design. Black anodizing is not an operation feasible in the home shop.

There are a number of sources for equipment and information for the microscopist wishing to start a home shop. Of particular interest is the magazine, *The Home Shop Machinist* (www.homeshopmachinist.net). A good British magazine is the Model Engineers' Workshop. Lindsay Publications, Inc. has a catalog of unusual technical books, published in the past and present, which reveal skills and secret processes almost forgotten today (www.lindsaybks.com). Enco is one source for machines and tools (www.use-enco.com). The advertisers in *The Home Shop Machinist,* mentioned above, are also good sources of tools and machines. Advertised here also are a series of videos on various shop procedures, such as lathe work, milling, grinding, etc. □

Figure 9.

WORKSHOP OF THE MICROSCOPICAL SOCIETY OF SOUTHERN CALIFORNIA

recorded by Herb Gold and written by Jim Solliday

Date: Saturday, March 6th, 2004
Location: Izzy Lieberman's Residence

The workshop began at 9:08 at Izzy's residence with eighteen members present. The group met indoors rather then outside due to the morning chill. The desk in the living room was covered with exhibits. Items for sale were located in the kitchen. The aroma of fresh coffee filled the air and the usual doughnuts were available on the folding table.

Item one on the agenda was announcements; which began with a reminder that our next lectureship meeting would be at New Roads School and provided by Larry Albright. Larry has just returned from his second trip to Africa and has a spectacular collection of pictures to show. This was reported to be another great trip through Africa and should be superbly illustrated by Larry's digital projections. His slide show has captured nature at its best. This would be a good meeting to which to bring along a friend.

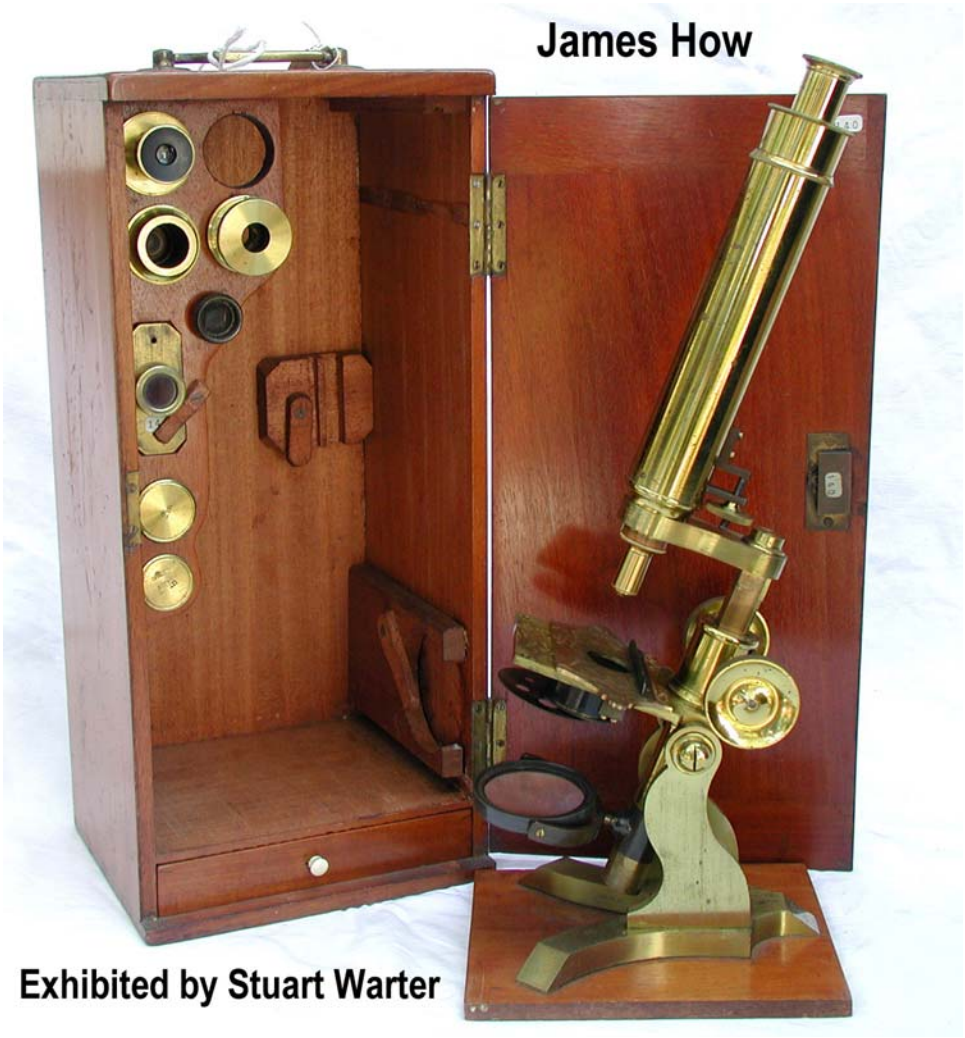
Jim reminded the group about an invitation to participate in a new online Biology Image Library service. This is a biomedical publisher who is encouraging people to make their images and movies available to the research community without losing any rights to their work. It would indeed be an ideal way for members of the Microscopical Society of Southern California to have their important images published. For more

information and if you wish to make contact with this new organization you can correspond with Ms. Chloe Williams, BioMed Central Ltd., Middlesex House, 34-42 Cleveland Street, London, W1T 4LB, UK. You can also email or check the following website, email: chloe@biomedcentral.com Website: http://www.biomedcentral.com .

Jim announced that the editor for the Newsletter of the *National Association of Science Writers* contacted him with a request to use images from the MSSC website. The News Letter is called *Science Writers* and was in the process of producing a special edition celebrating the organizations 70th year. The issue was to feature a timeline of notable events in science, medicine and technology from 1934 to 2004. They needed to obtain royalty-free graphics to accompany the text. They wanted to feature a single microscope and would need a higher resolution version for publication. We were promised that there would be a credit beneath the image indicating the source to be "Courtesy of the Microscopical Society of Southern California". The picture they are interested in is the ninth image down on the MSSC History page covering the historical 1948 Exhibition event. We will keep an eye on the progress and let the members know if this arrangement works out.

Jim informed the members that there would be a change in the forthcoming Saturday morning workshop schedule. The group would meet for the next three workshops at the home of Ken Gregory. This arrangement was needed to accommodate the fact that Izzy would be out of town during the usual meeting dates. In order to reduce confusion everyone should take note that for the months of April, May and June the group will be in Long Beach.

Members were also reminded that our hands-on workshop would be on the third Saturday of the month (March 20th). Pete Teti informed the members that our very knowledgeable rotifer expert Reino Mascarino would proctor this particular workshop. Reino describes this event as a Pond Life workshop where members will have the opportunity to set up microscopes and study concentrated collections of freshwater organisms.



Jim informed the group that our new treasurer, Herb Gold was now well integrated into his position. He had already established a list of paid and unpaid members and was in the process of collecting dues for 2004. Jim again thanked Herb for his good effort and willingness to take on a very difficult task.

Finally, the group was reminded that on May 5-7, 2004 was the PhotoImaging & Design Exposition, which would be held at the San Diego Convention Center. Additional information can be obtained from the website at www.PhotoImagingandDesign.com or you can call 800 827-8009. This information was intended for those members who have embarked on efforts to improve their knowledge of digital imaging.

Stuart Warter exhibited a very nice student stand by James How of London. The signature giving simply the address of "Foster Lane" indicating that the date of manufacture was between 1861 and 1875. Stuart took a few minutes to read from Carpenter's book, describing this microscope as being "fair and cheap". This was not in any way a bad description considering the remarks were set in a 19th Century framework. The word "cheap" did not imply "badly made" as it does today. At that time it indicated a very fair price for a nicely made instrument. In about 1855, James How succeeded George Knight & Sons of 2 Foster Lane, at which time he continued to produce a substantial line of microscopes. By 1884, ads place him at, 73, Farringdon St. London (RMS, 1884, ad). In addition to microscopes he became well known for his Rock Sections.

The instrument was rather complete with a number of interesting features. The stage was of novel construction having springs that held a sliding plate in place by tension to the bottom of the stage. In America a very similar stage design was used by Samuel Merset of Philadelphia and later by Bausch & Lomb of Rochester. The springs were attached to the sliding plate and wrapped around the base of the fixed stage. Included were two objectives having Society threads, one was of a divisible pattern having a slip on cap. There were also two eyepieces, a live box, wheel of stops and a polarizer/analyzer, all stored in a nice mahogany case. Even though the bulls-eye condenser was missing, the overall condition was quite excellent.

James Solliday exhibited a rare American microscope made by E.B. Meyrowitz of New York City (ca.1894). This microscope is identical to the Bacteriological models made by Bulloch, which were subsequently manufactured by Meyrowitz after Bulloch's death. In fact the complete signature on the foot reads as follows: "*Bulloch's Patent, E.B. Meyrowitz, Maker, New York, PAT'D 1880, 112.*" The overall pattern of the microscope is of the Lister type with a double-slide for the fine adjustment. A long lever hidden within the arm and actuated by a micrometer screw located on the top of the arm operates the fine adjustment. The coarse adjustment is by the usual rack and pinion. The body tube is 5-3/

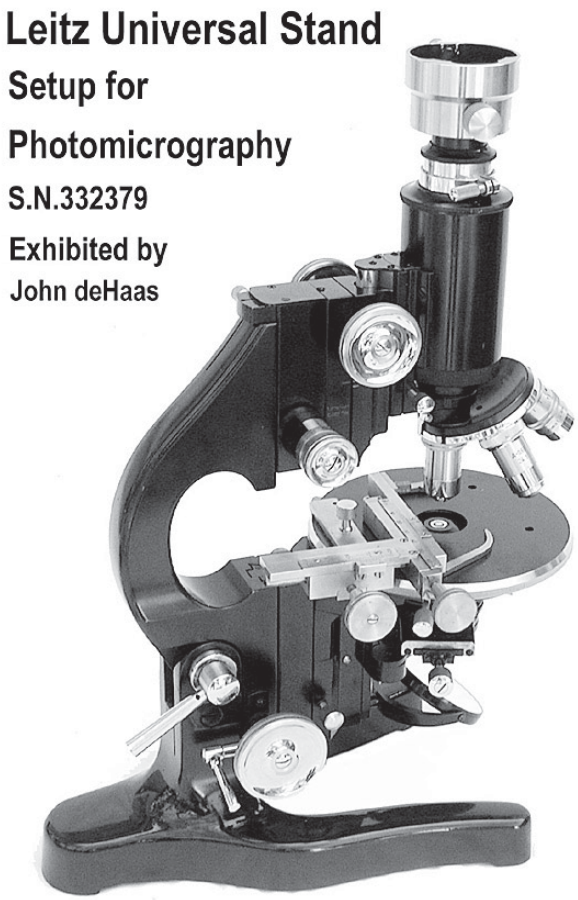
8 inches high with a draw-tube that extends another four to five inches. It features a circular stage measuring 3-3/4th inches in diameter. The top surface is made of glass having a knurled brass ring around the margin. Attached to the microscope at the specimen plane is a swinging stem with a mirror and a Bausch & Lomb Abbe substage condenser mounted on a sliding sleeve. The whole microscope stands on a large "Y" foot, which in turn supports a single brass pillar. The pillar terminates at a large cradle joint which facilitates the inclination of the instrument. The microscope is accompanied by three Bausch & Lomb "First Class" objectives. The first is a 1/12th inch immersion with a correction collar (marked, *First Class*). Next, is a B&L 1/6th inch with correction collar and marked, tube length 8.5 inch, finally there is a B&L 1-inch. There are 3 Bausch & Lomb eyepieces, including a ½-inch, 2-inch and a top-hat type 1-inch B&L. The microscope is all brass with the lacquer in very good condition. It is stored in a beautiful mahogany case with lock and key. It also features two sliding drawers, a live-box, camera lucida, diaphragm and a paper-wrapped French specimen slide.

In 1875, E.B. Meyrowitz established himself at, 104 East 23rd St., N.Y. New York and by 1885, he was located at 295 & 297 4th Avenue, New York. In 1890, W.H. Bulloch issued a catalogue, which stated that for the New York area, the "Meyrowitz Brothers" were "Sole Agents" (*The Microscope*, 1890, pp.7, ad). According to Padgitt, Meyrowitz himself was advertising as Bulloch's Sole Agents for New York and Vicinity (Padgitt, *History of the American Microscope*, pp.72). After the death of Bulloch, Meyrowitz purchased his patents. According to Mr. Tolman's Columbian Exhibition report, Meyrowitz "manufactured" stands made popular by the late W.H. Bulloch which included the Bacteriological. A total of three different models are mentioned (*American Monthly Microscopical Journal*, 1893, pp.219). In fact we now know that by 1893, E.B. Meyrowitz began manufacturing these stands himself. His most recognized model was almost identical to the Bacteriological. Meyrowitz issued a catalogue in 1898, which included all his new microscopes.

During Jim's presentation a discussion of divisible objectives came up, it was pointed out that one of the first examples of such lenses was by James Smith of London (ca.1842). Throughout the history of the microscope most of the makers at one time or another made examples of divisible lenses. Some featured slip-fitted sections, others were separable via screw threads. In the 20th Century some (Leitz) even had swinging front elements.

Ken Gregory exhibited a very nice Watson & Son, "Service No.1," ca.1950. It featured a circular stage with a built in mechanical movement. Small springs held the slide in place when the stage was in use. It also featured a rather large drawtube and a mechanical clutch to secure the scope when in the inclined position. The substage included an Abbe condenser with swing-out filter holders. Optics included three Watson objectives and a very large double-sided mirror, all stored in a nice fitted case and remaining in very good condition.

Ken Gregory also showed the group a copy of the 1976 Field Guide to Rocks and Minerals. Ken said the book was somehow soaked when it arrived in the mail; very unfortunate but it was still usable. Ken pointed out that plate 46 consisted of macrophotographs taken by our very own Alan deHaas. Alan then described to the group the type of equipment and methods he used to acquire the images. All those present were very impressed as the photos were of the highest quality.



John deHaas exhibited a very large Leitz first class Universal Microscope stand. It is referred to in the Leitz Catalogue as the "*Universal Microscope UNMIC*" with focusing stage arrangement. The serial number is 332379 and indicates the date of manufacturing to be around 1937-38. This stand is so arranged that for biological investigations it can be fitted with a monocular tube and then conveniently interchanged with a binocular tube, also a polarizing tube and even a photomicrography tube can be used. Changing tubes is accomplished in such a manner that the objective/nosepiece or the objective clutch changer remains attached to the microscope stand. The catalogue states that this method of interchanging tubes represents a patented design and consequently a unique feature remaining individual to the Leitz Works. The advantage is that only one microscope stand, and in general only one set of objectives are required for all observational methods. The

specimen remains untouched on the stage, while with other microscopes it is essential to transfer the specimen from one stand to the other. The base is of the large horseshoe type, the handle arm is massive and of curved shape providing plenty of space for the accommodation of large specimens. The pillar has a double joint and clamping lever to hold the stand at any desired angle, stops are provided at horizontal and vertical positions. This particular stand has only the monocular or photomicrography tube. The circular stage has attached a mechanical slide holder, but this is only one of many possibilities. This Universal can be set up for Polarization, interferometery, epi with illuminator, monocular, binocular and even a binocular stereo attachment.

In addition to the microscope, John exhibited a large collection of beautiful accessories. The most impressive was a special case packed with a full assemblage of epi objectives. These are to be used with the "Ultrapak" vertical illuminator. This hinged case has at least 20 objectives with built-on reflection, including a number with long glass dipping cones and special adapters. All the objectives on the nosepiece are apochromats with a number of compensating eyepieces. Also included was an attachment for using the Exacta camera. All came stored in a beautiful fitted case, not original to the scope. John proudly recounted the story of how he obtained the instrument and admitted that the scope and accessories were all purchased for $450. There was a great sigh of approval from the entire group!

Leitz, in describing the significant improvements of this high-end instrument stated in the catalogue that, "In reviewing the simple

microscopes used during the middle of the last century and in comparing its plain and inadequate design with the latest developments in microscope construction-the Leitz Universal Microscope, here described-one will readily conceive the tremendous progress made by optical science and the important place the Leitz Works occupy in this noble field of endeavor. The development of the Leitz Universal Microscope has been the result of many recommendations and conferences held with leading microscopists. Due to their suggestions combined with the never-ending efforts on the part of the Leitz Works, this instrument has been perfected and is now offered to those research microscopists who have repeatedly felt the dire need of a microscope of such universal application." The point that Leitz emphasized was the Universal's versatility. "The Universal Microscope is so arranged to permit all and every one of the known methods of investigation and a transition from the one to the other to take place in a most convenient, quick and precise manner. The required time and effort to change from one mode of observation to another is indeed negligible and the mechanical transition necessary will never absorb more than one minute, in most instances even less" (*Leitz Microscopes*, New York, 1938). It was the President's observation that this was one of the best microscopes John has displayed to date.

Larry Albright was back from Africa and spent a few minutes telling the group of his adventures. He assured the gathering that he would have a proper slide show ready in time for the next Lectureship meeting.

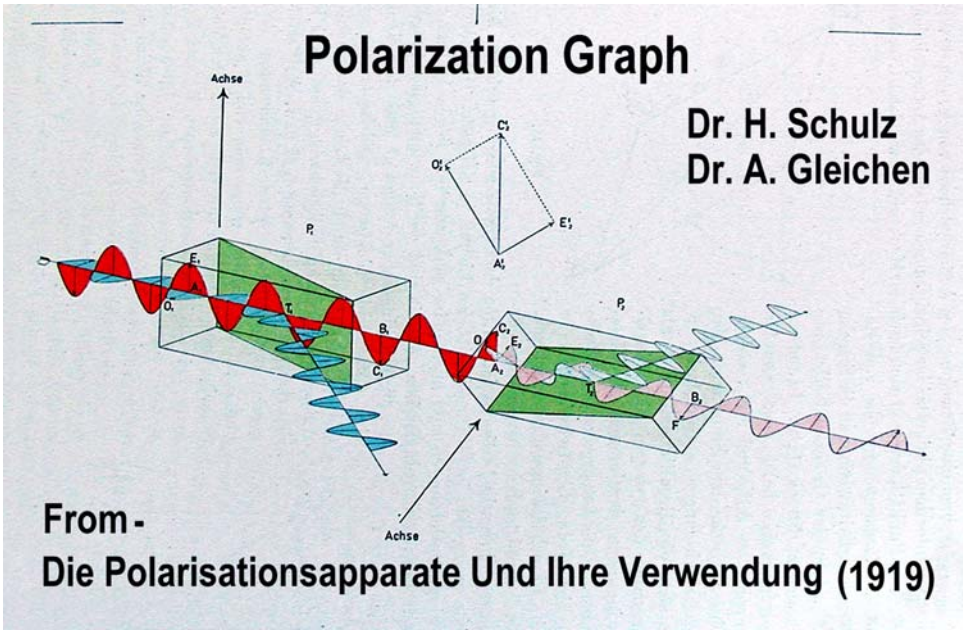
Bill Hudson exhibited what he described as a Melting Point microscope. It was intended for use on organic compounds and has a heating stage with an upper range of 300 degrees centigrade. There is also a thermometer imbedded in the stage, which is essential for identifying the organic materials. Bill believes that the scope was made in the 1950's. This was a rather unusual instrument and generated much interest within the group. For more information the McCrone website was recommended, see: modernmicroscopy.com.

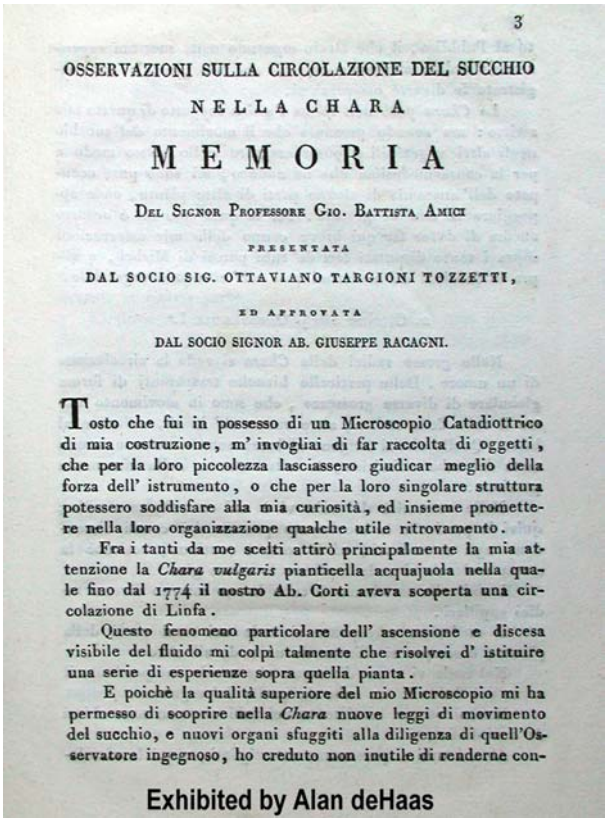
Gaylord Moss brought up an article that appeared in the L.A. Times on the subject of water. There was a discussion on the local quality of water.

Alan deHaas exhibited a rare 40x quartz lens with seven elements. The elements used in construction was said to be "suprasil." The lens was a 1.25 immersion and was designed for 200-436 angstrom. Alan passed the lens around the room and suggested that the members take note of the rather large rear aperture.

Alan also exhibited a superb Zeiss Stand "W", which remained in very good condition. This was a rather complete outfit with three separate stages, five condensers and three objectives. The stand did not have a focusing substage as the adjustments were done in the condensers themselves. On the base was mounted the original substage illuminator lamp housing. Along with the above accessories there were two rare photomicrography lenses. The mystery was a pair of stops with red plastic plates; no one was able to describe the purpose of these accessories. Alan said the scope was probably manu-factured around 1952.

Alan also exhibited a number of very rare and important micro-scope related books. The book that attracted the most attention was one authored by Schultz & Gleichen having a suburb color diagram showing how a Nicol prism diverted the light rays. The reason for the interest was that this was about the best illustration depicting polarization the members had ever seen (see figure). The proper title of this book was, *Die Polarisationsapparate und Ihre Verwendung,* by Schulz and A. Gleichen (1919). There were also two very rare publications by Amici; the first one that was held up contained the introduction of a catadioptric





3

OSSERVAZIONI SULLA CIRCOLAZIONE DEL SUCCHIO

NELLA CHARA

MEMORIA

DEL SIGNOR PROFESSORE GIO. BATTISTA AMICI

PRESENTATA

DAL SOCIO SIG. OTTAVIANO TARGIONI TOZZETTI,

ED APPROVATA

DAL SOCIO SIGNOR AB. GIUSEPPE RACAGNI.

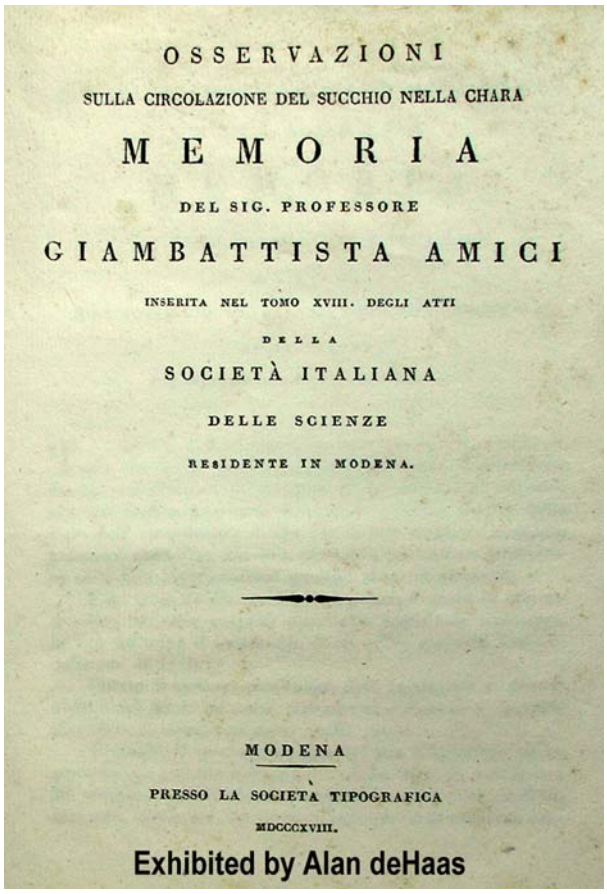
Tosto che fui in possesso di un Microscopio Catadiottrico di mia costruzione, m' invogliai di far raccolta di oggetti, che per la loro piccolezza lasciassero giudicar meglio della forza dell' istrumento, o che per la loro singolare struttura potessero soddisfare alla mia curiosità, ed insieme promettere nella loro organizzazione qualche utile ritrovamento.

Fra i tanti da me scelti attirò principalmente la mia attenzione la *Chara vulgaris* pianticella acquajuola nella quale fino dal 1774 il nostro Ab. Corti aveva scoperta una circolazione di Linfa.

Questo fenomeno particolare dell' ascensione e discesa visibile del fluido mi colpì talmente che risolvei d' istituire una serie di esperienze sopra quella pianta.

E poichè la qualità superiore del mio Microscopio mi ha permesso di scoprire nella *Chara* nuove leggi di movimento del succhio, e nuovi organi sfuggiti alla diligenza di quell'Osservatore ingegnoso, ho creduto non inutile di renderne con-

Exhibited by Alan deHaas



OSSERVAZIONI

SULLA CIRCOLAZIONE DEL SUCCHIO NELLA CHARA

MEMORIA

DEL SIG. PROFESSORE

GIAMBATTISTA AMICI

INSERITA NEL TOMO XVIII. DEGLI ATTI

DELLA

SOCIETÀ ITALIANA

DELLE SCIENZE

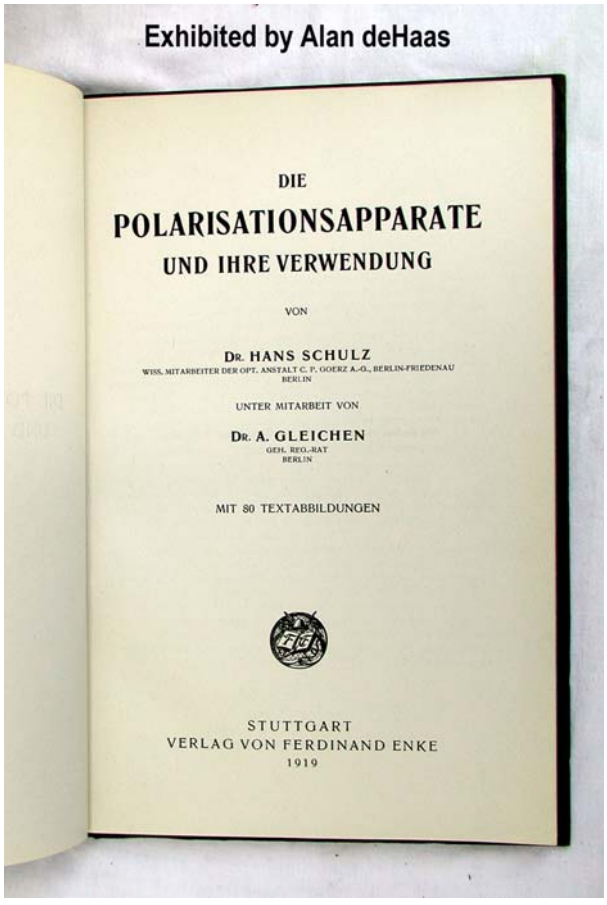
RESIDENTE IN MODENA.

MODENA

PRESSO LA SOCIETA TIPOGRAFICA

MDCCCXVIII.

Exhibited by Alan deHaas



Exhibited by Alan deHaas

DIE

POLARISATIONSAPPARATE

UND IHRE VERWENDUNG

VON

DR. HANS SCHULZ

WISS. MITARBEITER DER OPT. ANSTALT C. P. GOERZ A.-G., BERLIN-FRIEDENAU

BERLIN

UNTER MITARBEIT VON

DR. A. GLEICHEN

GEH. REG.-RAT

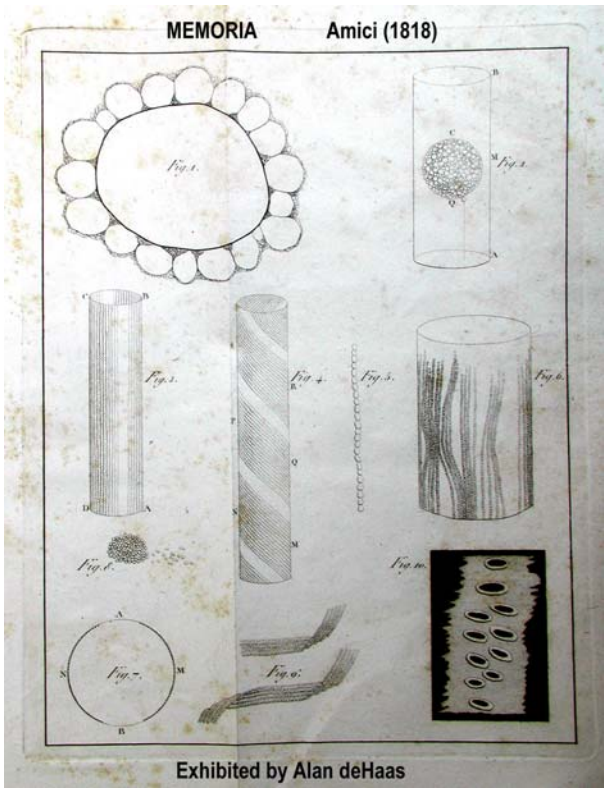
BERLIN

MIT 80 TEXTABBILDUNGEN

STUTTGART

VERLAG VON FERDINAND ENKE

1919



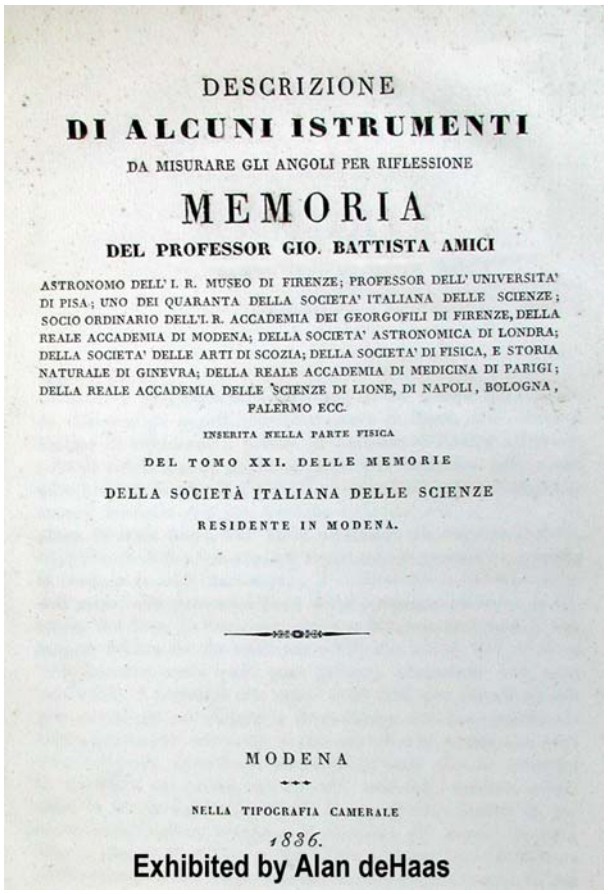
MEMORIA Amici (1818)

Exhibited by Alan deHaas

microscope (1818). The title of this book was, *Osservazioni Sulla Circolazione del Succhio Nella Chara MEMORIA*, by Prof. Battista Amici (1818).

The second book was entitled, *Descrizione di Alcuni Istrumenti da Misurare Gis Angoli Per Riflessione MEMORIA* (1836). Both of these works were published in Modena, the title pages can be seen in the illustrations. Finally, Alan held up a book on photomicrography entitled, *Anleitung zur Mikrophotographie*, by L. Heim & F. Skell (1931). A very informative discussion on the value of good books continued for some time.

The President brought the meeting to a close at 11:50am. □



DESCRIZIONE

DI ALCUNI ISTRUMENTI

DA MISURARE GLI ANGOLI PER RIFLESSIONE

MEMORIA

DEL PROFESSOR GIO. BATTISTA AMICI

ASTRONOMO DELL' I. R. MUSEO DI FIRENZE; PROFESSOR DELL' UNIVERSITA' DI PISA; UNO DEI QUARANTA DELLA SOCIETA' ITALIANA DELLE SCIENZE; SOCIO ORDINARIO DELL'I. R. ACCADEMIA DEI GEORGOFILI DI FIRENZE, DELLA REALE ACCADEMIA DI MODENA; DELLA SOCIETA' ASTRONOMICA DI LONDRA; DELLA SOCIETA' DELLE ARTI DI SCOZIA; DELLA SOCIETA' DI FISICA, E STORIA NATURALE DI GINEVRA; DELLA REALE ACCADEMIA DI MEDICINA DI PARIGI; DELLA REALE ACCADEMIA DELLE SCIENZE DI LIONE, DI NAPOLI, BOLOGNA, PALERMO ECC.

INSERITA NELLA PARTE FISICA

DEL TOMO XXI. DELLE MEMORIE

DELLA SOCIETÀ ITALIANA DELLE SCIENZE

RESIDENTE IN MODENA.

MODENA

NELLA TIPOGRAFIA CAMERALE

1836.

Exhibited by Alan deHaas

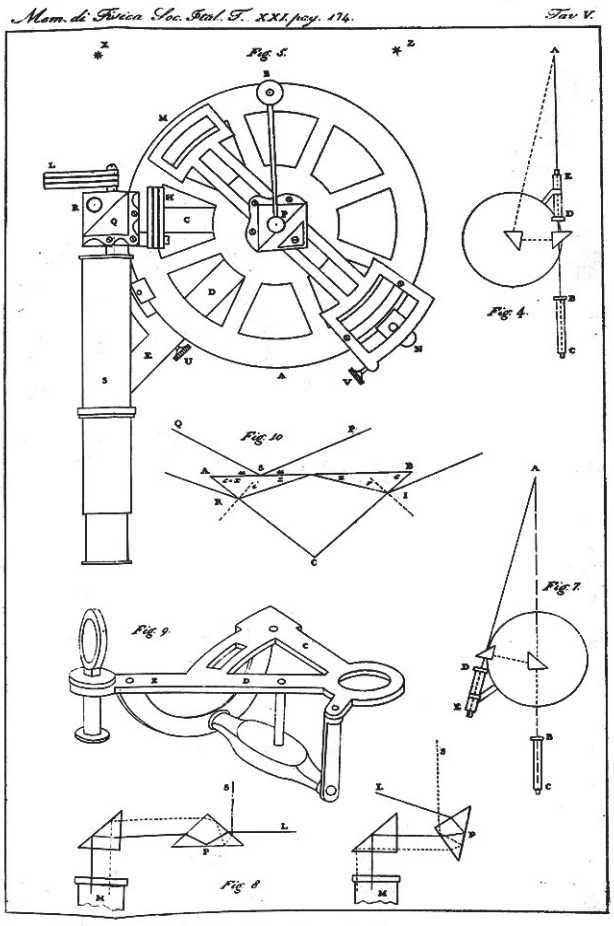


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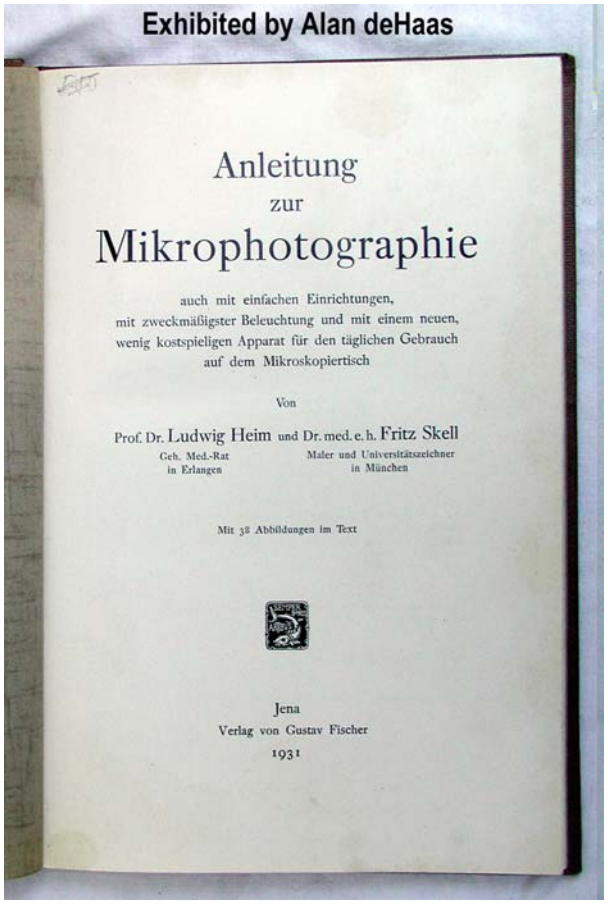
Fig 5. Fig 4. Fig 10 Fig 7. Fig 9. Fig 8

Exhibited by Alan deHaas



Exhibited by Alan deHaas

Anleitung

zur

Mikrophotographie

auch mit einfachen Einrichtungen,
mit zweckmäßigster Beleuchtung und mit einem neuen,
wenig kostspieligen Apparat für den täglichen Gebrauch
auf dem Mikroskopiertisch

Von

Prof. Dr. Ludwig Heim und Dr. med. e. h. Fritz Skell

Geh. Med.-Rat in Erlangen — Maler und Universitätszeichner in München

Mit 38 Abbildungen im Text

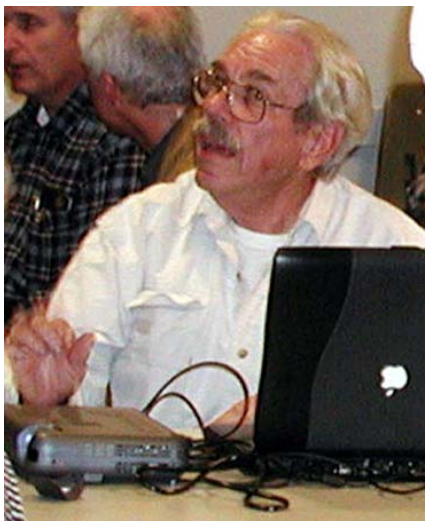
Jena

Verlag von Gustav Fischer

1931

MSSC Monthly Meeting

Wednesday, March 17th, 2004 at New Roads School



At this meeting, Larry Albright gave a presentation on his latest African photo Safari. He presented numerous images of African wildlife taken during the trip and described the process he goes through to acquire such images of animals using digital equipment.

After this, Alan deHaas gave another talk in his lecture series on the technology of the microscope, this one focusing on binocular optical systems. □

Hands-on Workshop

Saturday, March 20th, 2004 at New Roads School reported by Pete Teti

At this hands-on workshop, MSSC member, Pierrino Mascarino held an interesting session on pond life attended by nine members.

Reino started with a short talk demonstrating a variety of pond life equipment. First he displayed a special kind of net, made of 250 micron nitrex fibers, attached to the end of a six-foot pole. He uses this net to dip for specimens in pools of stagnant water at the edge of drying rivers. Secondly, he displayed long hip-high rubber boots for wading into marshes to catch specimens in the deeper water.

Reino provided the group with five quartsize beakers of greenish water full of algae and live active creatures. White baked enamel pans were then filled with samples of this water. Live specimens were clearly visible scampering all over and under the clumps of algae.

Members sampled the water for further microscopic investigation. Reino helped members identify each animal observed, and showed them where to look for further information about its habitat, species and behavioral characteristics in one of the many excellent scientific guides Reino had brought to the workshop.

Some of the specimens observed and shared with each other were: daphnias, cyclops, fairy shrimp, rotifers, spirogyra, diapomus and others.

Many thanks to Reino for hosting this workshop, and also to Alan deHaas for his assistance with lighting techniques. □

WORKSHOP OF THE MICROSCOPICAL SOCIETY OF SOUTHERN CALIFORNIA

recorded by Herb Gold and written by Jim Solliday

Date: Saturday, April 3rd, 2004
Location: Ken Gregory's Residence

The workshop began at 9:15 at Ken Gregory's residence with fourteen members present. The group met outside under the canopy, which provided enough shade to keep everyone comfortable. Two large folding tables were covered with exhibits; the sales table also had some interesting items. Ken provided his usual good hospitality with coffee, pastries and fruit set out for the members to enjoy. The meeting began with announcements. A reminder that the May Pond Life meeting was next month and members should keep an eye out for collecting sites. The May meeting is always one of the highlights of the year and a time when the members get to share their experiences at the microscope. Each year something new shows up that no member has seen before, and we expect this meeting will be the same.

The group was also reminded that our next hands-on workshop would be at the laboratory of Prof. Ed Tarvyd on May 15th at 9:00am, at Santa Monica College. Prof. Tarvyd will be exhibiting and discussing rare sands collected from locations around the globe. Samples will be available and descriptions provided. We will be dissecting

Bryozoans as well as studying the discharge of nematocysts from live specimens. Prof. Tarvyd has finally moved into SMC's new Science Building and will describe the innovative features of his new lab. It was also announced that Ed Jones would be giving the June hands-on workshop on preparing and mounting animal hairs.

Finally, there was a discussion about the fact that our good friend and founding member Steve Craig was in the process of moving to Northern California. With all that Steve has contributed over the years, this group will indeed miss him very much. It is with a very heavy heart that we see this wonderful fellow move out of range of our daily activities. However, he will remain on the membership list and receive all the publications of this organization. A few pictures of his going away party have been included in this issue.

The guest speaker for the next Wednesday meeting (April 21st) will be Dr. Shijie Wu, who is an applications scientist for Molecular Imaging, Inc. The title of his presentation is *Scanning Probe Microscopy-Under Controlled Environments*. Dr. Shijie Wu joined Molecular Imaging in 1998, specializing in the development of the Scanning Probe Microscope. He received his Ph.D. from the University of Guelph, Canada, in the field of Physical Chemistry. He will introduce newly developed technology that can be applied to the areas of life science, material science and nanotechnology. He will illustrate methods of combining electrochemical control with Scanning Probe Microscopy; one can manipulate an electrode surface and study the changes in real time with resolutions ranging from atomic to micron scales. This is going to be a very informative evening and one that none of us should miss.

Jim announced that in July he would be providing a hands-on workshop on techniques for mounting diatoms. A number of diatom samples would be provided but mounting supplies should be brought in by members. In particular, participants should obtain proper mounting media. Common mount medias like Permount and Canada balsam are not adequate for mounting diatoms. The use of a high refractive index mounting media is needed and Jim recommended that members obtain the newly introduced Zrax media, which

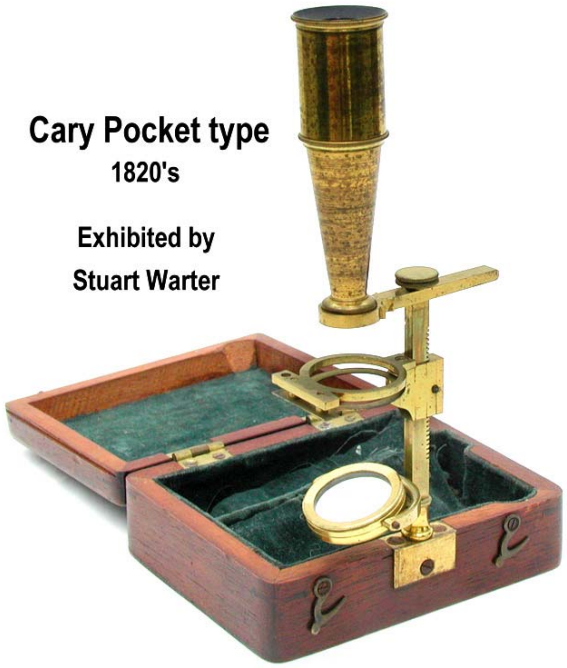
is available from Bill Dailey. This media is very much like the original Hyrax developed by Dr. Hana in the 1940's. Its refractive index is about 1.70 when dry. Bill normally sells this product for $35 an ounce, but for MSSC members he is offering a one-time group rate of $20 a bottle. Jim will provide a sign-up sheet for those members interested in taking advantage of this exceptional offer.

The group was then reminded that on May 3rd, the Richard Opfer Auction house of Maryland would be putting on the block a large collection of antique microscopes. Many of the instruments available are from the collection of John Bell, a long time friend of a number of our members. Most of the best items are 19th Century Bausch & Lomb instruments, including a number of very rare Griffith Club Microscopes.

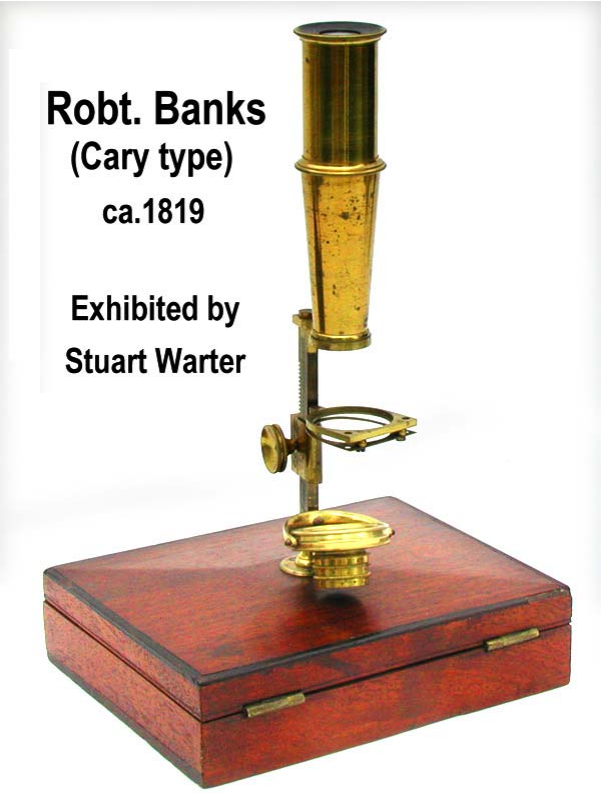
Finally, Jim talked about a new idea for a special meeting that would require members to prepare and present results of their own microscopical work. It was proposed that the month of September be reserved for a Society Photomicrography Exhibit. Members should begin preparing images that they wish to present at this theme-oriented meeting. It is hoped that many of the talented MSSC members would take advantage of this event to present images obtained through their microscopes. The meeting would include a poster section, as well as a section for slide projection and one for digital projection. Posters could include methods for acquiring digital images, photomicrography setups and special techniques developed by members. Photomicrographs could be on any possible subject found under the microscope. The main idea is to dedicate a meeting to the talents and work of our membership. More announcements on this plan will be made in the near future. Jim requested any suggestions be sent to him as soon as possible.

Stuart Warter exhibited five very portable Cary-type microscopes. He began by talking a little about the origins of this pattern and the ancestors from which they came. This included remarks about Benjamin Martin, Adams, W&S Jones and finally Gould and his association with Cary. By the late 1820's, to 1830's instruments referred to as "Pocket Compendiums" were made available to the public.

The first instrument that Stuart talked about was a very tiny Gould type referred to as an "Improved" pocket microscope. Normally this form is found to have the instrument mounted on the front lip of the tiny mahogany box. The entire microscope stands about 4 to 5 inches high and features a mirror that is less then an inch in diameter. The arm that carries the bodytube can be removed and used as a simple compass microscope. This can be done by placing the stage-forceps in the hole that normally secures the arm to the top of the limb. A single lens is used for observing the specimen. All the accessories are stored under velvet cloth in the tiny case. The entire thing is not much bigger then a cigarette pack and easily fits into a person's shirt pocket.

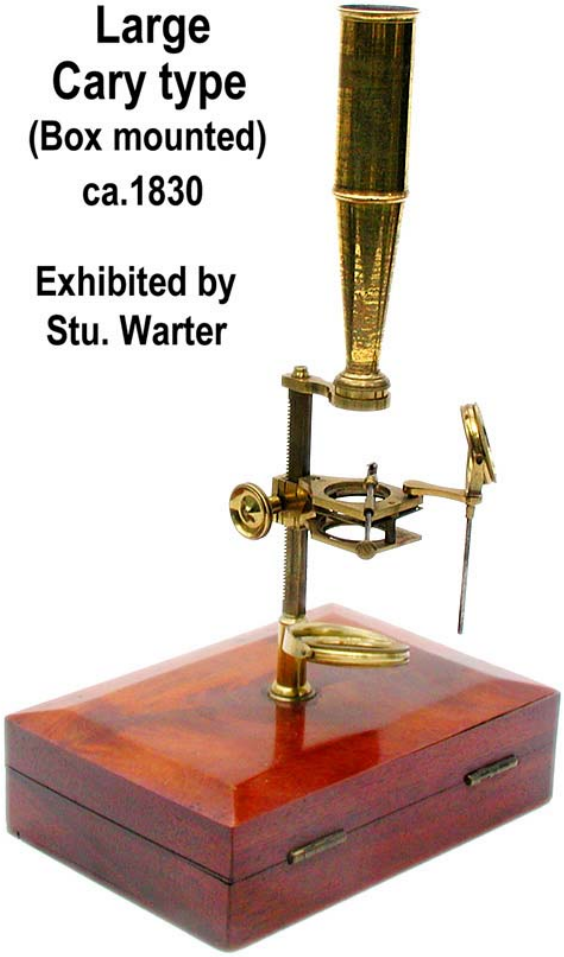


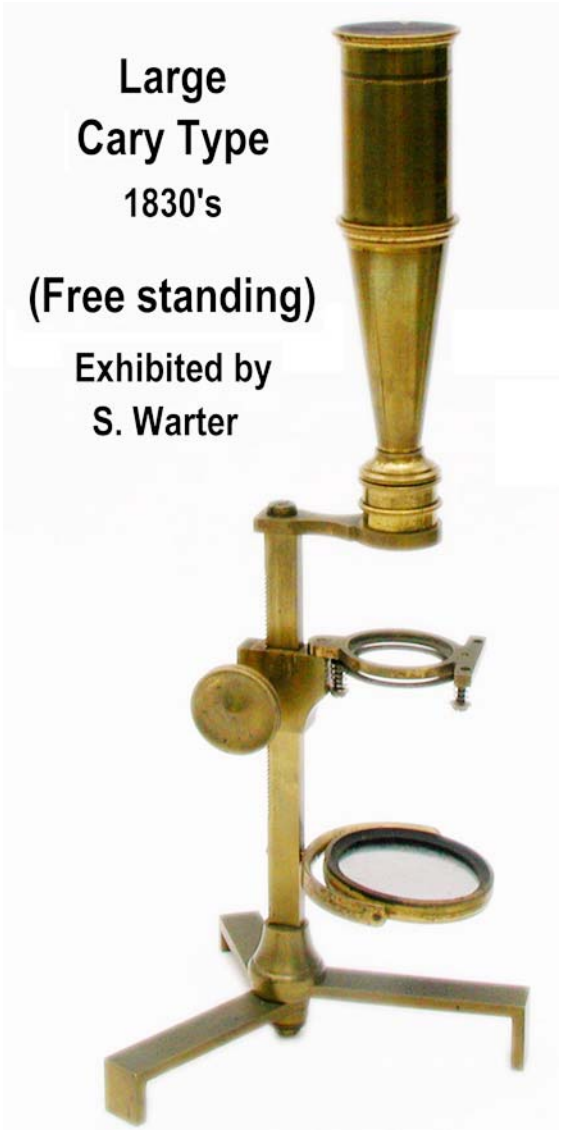
The next little microscope was made by Banks and actually preceded the Gould type. Stuart said that it was probably made in the 1820's and had just about all the same features as the usual

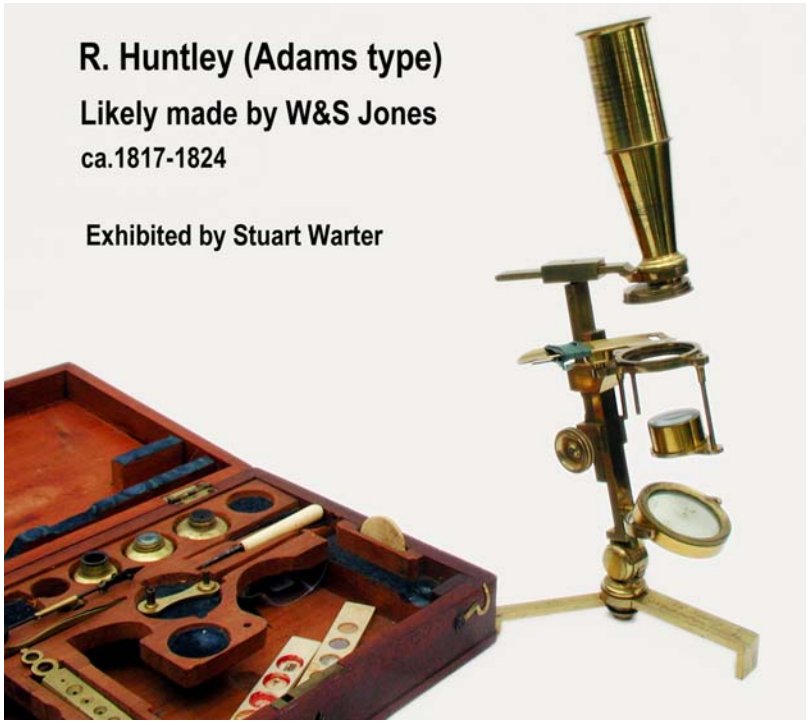


Gould-Cary type. The most important difference was the obvious system of storing the lenses on the reverse side of the mirror. Although a little larger than the first example it was also a rather small microscope.

The third instrument represents the most common form and is often described as the Cary type. Although it is well known that Gould, Cary's workman and manager actually perfected the design. In this pattern the microscope is typically mounted on the lid of the mahogany box. It includes all the usual accessories and when secured in the case can be packed away in the coat pocket.



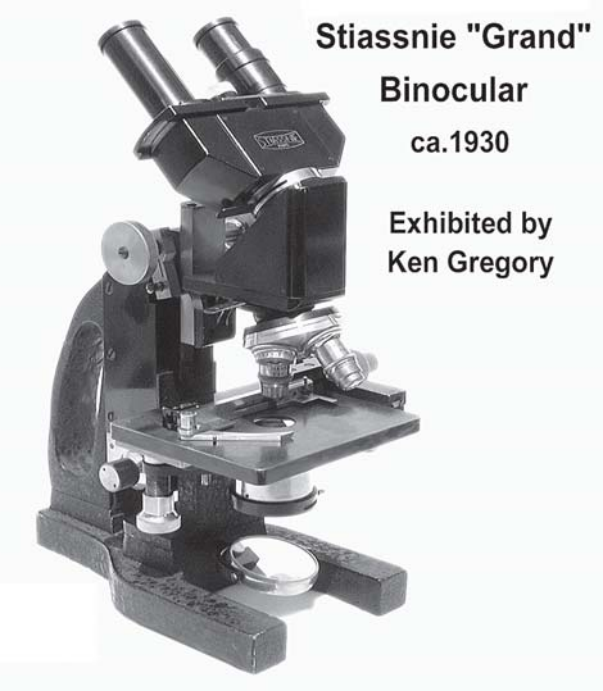




The fourth instrument was a larger free standing Cary type having a folding tripod foot. This example is not quite as portable as the others but possesses most of the same working features. All the accessories are almost identical to those found in the other small compendiums.

The most elaborate of the microscopes that Stuart presented was one signed by R. Huntley and was described as an Adams type. This was indeed a very beautiful little instrument and came with a complete set of accessories. The two most prominent features were first a double-slide limb and second that the microscope could incline on a large compass joint. The entire instrument was supported on a folding tripod foot having the signature on the first toe. Stuart indicated that this particular instrument was likely manufactured between 1817 & 1824 and was probably made by W&S Jones. Stuart passed around an illustration of an almost identical microscope manufactured by Adams and published in one of his books. Two additional features that can be associated with Adams and W&S Jones are the turret or wheel of lenses and the aquatic motion of the arm. It should also be noticed that the coarse focus moves the arm and body-tube rather then the stage like the usual Cary types. Finally, there is a slide with apertures having mounted lenses that can be inserted just under the body tube. This acts as a sort of nosepiece and permits a change of objective with the movement of the slide. This device can be seen in the illustration sitting in the case. Stuart's entire presentation was outstanding and provided a great deal of information about the typical small-bodied microscopes of the second quarter of the 19th Century.

Ken Gregory began by contributing a large supply of laboratory glassware to the Society. This included several tin boxes of petri dishes, tubes, beakers and volumetric flasks. The supply of petri dishes will come in handy for the forthcoming Pond Life meeting. Ken's generosity



is much appreciated and the members expressed their thanks.

The first microscope that Ken exhibited was something that had caught the eye of a number of the fellows about which no one dared to inquire. On the table was a Seibert Greenough-type stereo-microscope with a pair of sunglasses mounted above the eyepieces. This created a sense that the scope was being used and no one knew quite what to think. However, in his traditional good humor Ken announced that for those who are curious about the stereoscope, it was an "April Fool." We were not disappointed and all had a good laugh, as Ken has not yet missed a year coming up with something unique every April!

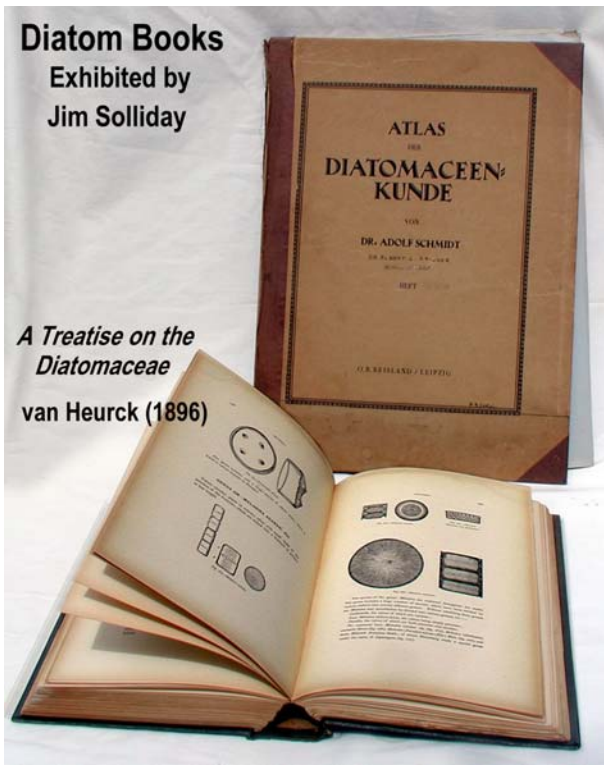
The most impressive item that Ken exhibited was a large example of a Stiassnie "Grand" Binocular research microscope. Besides its unique overall

look it has a number of interesting features. Ken pointed out the coaxial mechanical stage and a clutch on the coarse focus. It also featured a convenient reversible binocular body which was mounted on a platform supported by a massive "D" handled limb. Considering all the advanced features of this scope it was amazing to see the whole instrument resting on a conventional horseshoe foot. One factor that motivated Ken concerning this instrument was that a few years ago Allen Bishop introduced into the Journal a picture of this microscope that was entitled, "Has Anyone Seen this Scope?" Today we have a beautiful live example to match the original catalogue engraving published earlier.

To illustrate the tremendous advances in the design of microscopes, Ken exhibited his Stiassnie "Grand" binocular next to an early all brass Verick Continental scope. He used the Verick because of its early association with Stiassnie. As we know, Maurice Stiassnie succeeded Verick in 1882 but did not use his own name until sometime after 1885. The smaller Verick scope was manufactured sometime in the mid 1880's. The group was very impressed with the case that this Grand binocular was stored; it was both refinished and refitted by Ken for this particular microscope. It was mentioned that the box was originally made for the Reichert "Z" stand. Finally, Ken showed two versions of his folding Stiassnie Continental stands, these along with his entire eight-piece collection, all by Stiassnie.

John Field described to the group his experience at the magnificent Nethercutt Collection Museum. The Nethercutt Museum is located in Sylmar and is a beautifully appointed facility found in the foothills of the San Gabriel Mountains. Among the treasures on display is one of the world's outstanding collections of restored antique and classic automobiles. They are displayed in a recreation of an opulent automotive Grand Salon of the 1920's and 1930's. Just the sort of thing this group seems to like very much. The museum contains about 60,000 square feet holding over one hundred-specialty automobiles all, which have been nicely restored to their original elegance. This museum is also well known as a historical resource with one of the largest automotive research libraries and archives. This is the best place in the area for viewing the many historical changes and developments in automotive design and engineering. It was suggested that those members who are interested come up with a field trip that would provide the opportunity for a scheduled visit to the museum. John passed around a very nice color brochure of the museum with all the information needed for a future visit.

A discussion arose on the subject of collections and what should happen to them over the course of time. John talked about the well-known Golub collection (antique microscopes) that was given to the University of California at Berkeley. A few thought about the conditions in which instruments should be stored and preserved were discussed. There seemed to be consensus that it was probably best to manage the sale and distribution of your own collection while you still had the opportunity. This was due primarily to the circumstances surrounding many of the



collections that we have seen donated to institutions that eventually lose interest and adjust priorities as a result of changing times. It was felt that it was best to keep the instruments in the hands of those who truly care for them.

Jim Solliday began by talking a little about the ongoing discovery of new planetary systems found around distant stars. The number of such discoveries continues to grow and emphasized the need for newer technology with higher resolution. The confirmation of other planetary systems is new to the consciousness of humans and settles a number of old questions and debates.

Jim exhibited a number of rare reference books illustrating his favorite subject, the diatoms. The first was a number of plates issued by Dr. Adolf Schmidt, which were parts of his over all series known as the *Atlas der DiatomaceenKunde* (The Schmidt Atlas). This was a very long and labor-intensive project that started in the 1880's and continued through the 1940's. It remains the most extensive work on the diatoms and is a must if you need to identify unknown specimens. Every few years a new set of plates were issued that built on the previous publications. All the plates were issued as individual leaves so as to make it convenient when using it next to the microscope. Jim stated that very few complete sets remain today and most workers rely on the recently published reprint. However, there is nothing like the original engraving for creating an appreciation for the delicate work that was so carefully done. Included among some of Jim's leaves were well made photocopies that helped fill in the missing plates.

In addition, Jim exhibited a copy of van Heurck's *A Treatise on the Diatomaceae* (1896), English edition. This was actually a summary volume of the work that van Heurck had pursued over much of his lifetime. Wynne Baxter, a dedicated British amateur who worked from the Dutch translated it into English. This book contains a large number of beautifully engraved plates making it very convenient for reference. Like Dr. Schmidt, van Heurck printed sets of plates over a period of years, which were issued under the title of *Synopsis Des Diatomees de Belgique* (1880-85). A complete copy is extremely rare and was privately published by the author in eight parts. It usually is found in two volumes including text and an atlas having 3037 figures of diatoms. It was very likely that this great volume of work is where much of his Treatise came from.

Jim finally exhibited a beautiful example of a Lomo portable Russian microscope. This instrument was made in 1960 and was patterned after the Zeiss Lr traveling stand. Technically this is a Lomo Model MGA-1, Serial No.N601217. This was a very well-made microscope, which came in an aluminum magazine type storage case. Supplied separate from the case is a binocular body-tube, model AY-12, Ser. No.N601043 (note:

Larry Albright talked about a specific drill-bit pattern that was used to tie Terry McNicols to a robbery of explosives. This was an example of the use of the microscope in solving a crime.

Herb Gold exhibited a rare poster that illustrated the Zeiss Stand "W". The poster was titled *Routine and Research Microscope Stand W*. When unrolled, it appeared to be in wonderful condition.

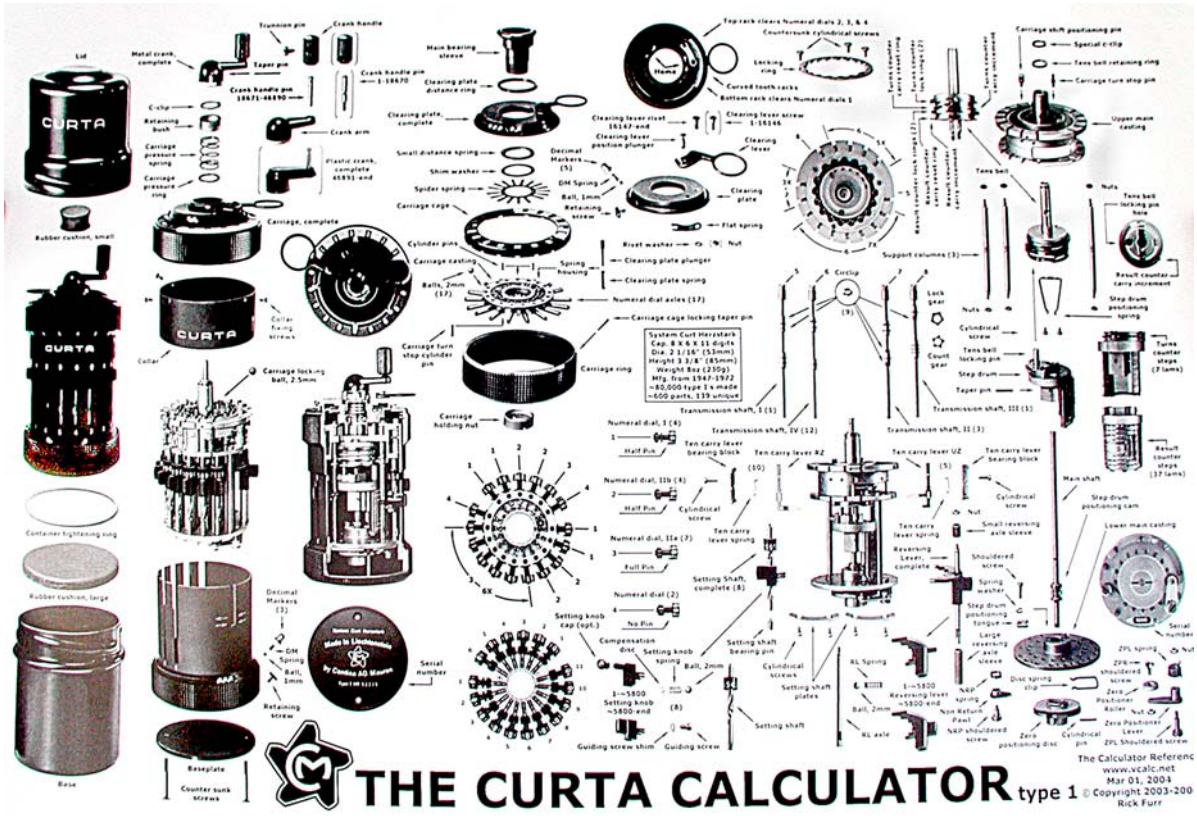
Pete Teti gave a report on the Pondlife hands-on workshop, which had been instructed by Reino. It was said to have been a great success with all who attended having plenty of microscope time. Reino exhibited and shared a very nice array of wonderful live material, techniques were talked about and the members had the time and opportunity to study the results.

in Soviet equipment, the first two numbers in the serial number represent the year made). This binocular attachment is a copy of the Siedentopf pattern. The microscope is mounted on a 6.5-inch by 3.5-inch rectangular base. A block shaped limb houses the Meyer fine focus. This system features a set of reduction gears and a toothed lever. A large "C" shaped arm is mounted to the backside of the focusing block (limb) on a substantial dovetail. The coarse focus rides on this same dovetail system. It has a four-place nosepiece that mounts to the arm on a dovetail. The stage is nearly 3.5-inches by 4 1/8-inches in size. The substage features a rack & pinion with a sleeve-mounted Abbe condenser. Mounted to the limb is a double-sided mirror. The body tube is stored in the case and is a monocular with a 45-degree inclination. The objectives include a Russian MN 90x, 40x, 9x and a B&L 3.5x. Stored in the case are three filters, pin-key, stage-clips, plastic can with oil vial and a well-made portable mechanical stage. The overall condition of this instrument is like new. Jim told the group that the first time he saw one of these beauties was at a Society field trip held at Fort Tejon in 1982. At the time they could be purchased from a London dealer for $250, by 1986, they were no longer available.

Jim then reminded the group that this month's hands-on workshop (April) would be instructed by Alan deHaas on mounting crystals for viewing by polarized light. Alan would bring the chemicals required for preparation and suggested

Curta Calculator
Type II
ca.1958

Exhibited by Larry McDavid

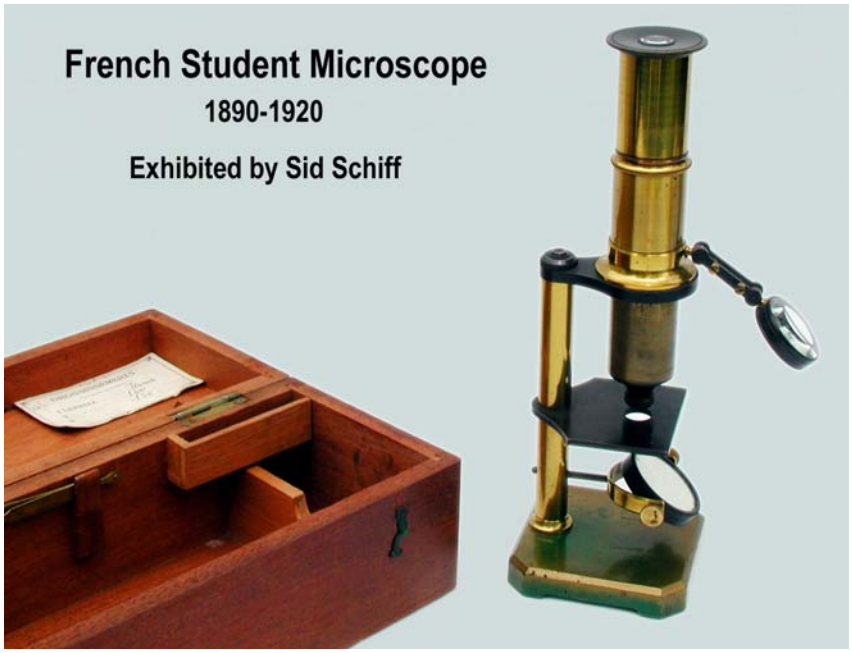


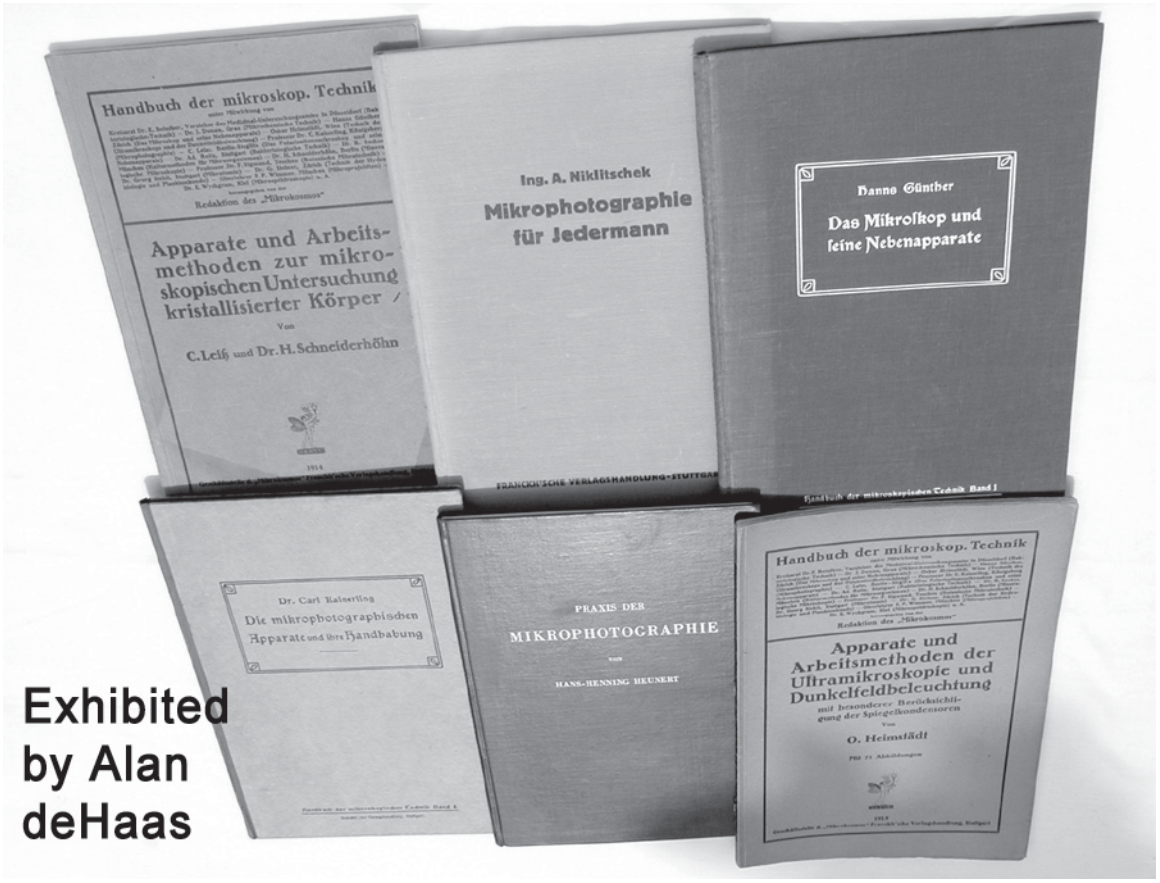
Curta Calculator Chart, exhibited by Larry McDavid

that participants bring a microscope, polarizers and a good alcohol lamp. The full report on this workshop will be included in this edition of the Journal.

Larry McDavid exhibited a perfect example of a Curta Calculator complete with its storage can. This example was made ca.1958 and was described as a Type II. Larry provided a very interesting history and talked about the service the company provided at the time. He also produced a poster that illustrated the instrument and provided an exploded drawing of all the parts. See the illustration for a good idea of how interesting this poster was.

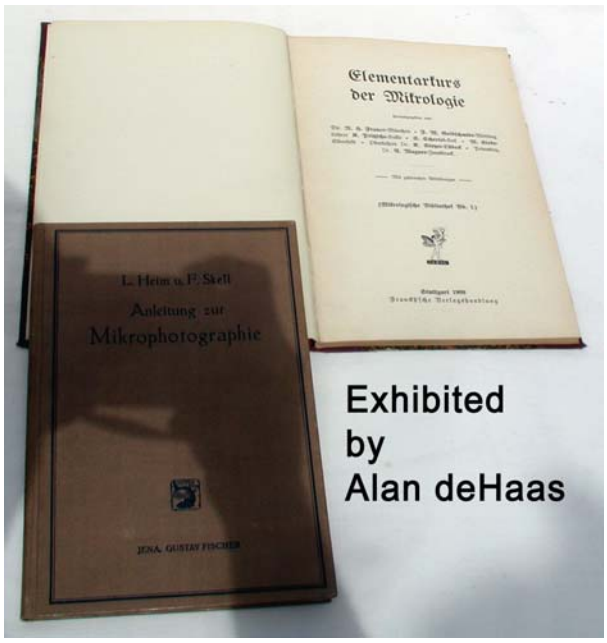
Sid Schiff exhibited a French student microscope. It came stored in its original hardwood box and was probably made sometime around the turn of the Century. It can be described as a small side-pillar type with a square





foot and attached bullseye condenser. The focus was facilitated by an adjustable drawtube.

Alan deHaas began by stating that he had with him everything you need to know about microscopy in a stack of books only 2-1/2 inches



high. And indeed there on the table was a stack of German books about 2-1/2 inches in height. Between the years of 1880-1920, there was a great proliferation of teaching and discovery in bioscience in Germany. This subsequently led to a proliferation of books that related to the subject. This included books dealing with microscopy and photomicrography. There are a great number of titles in German entitled "*Das Mikroskop*". Other fields that include good information on the microscope are disciplines such as the Earth Sciences and Crystallography. Alan then talked about and passed around the following books: *Elementarsurs der Mitrologie* (1909), *Anleitung zur Mikrophotographie*, L. Heim u. F. Skell, *Mikrophotographie für Jedermann*, Ing. A. Niklitschek (1937), *Das Mikroskop und seine Nebenapparate*, Hanns Günther (1917), *Praxis der Mikrophotographie,* Hans-Henning Heunert, (1959), *Die Mikrophotographischen Apparate und ihre Handhabung*, Carl Kaiserling (1918), *Apparate und Arbeitsmethoden zur mikroskopischen Untersuchung Kristallisierter Körper,* C. Leif und H. Schneiderhöhn (1914), *Apparate und Arbeitsmethoden der Ultramikroskopie und der Dunkelfeldbeleuchtung*, Oskar Heimstädt (1915). Both of the last two entries were from the *"Handbuch der mikroskopischen Technik"* series.

The President brought the meeting to a close at 11:50am. Jim thanked all the members for their participation. □

HANDS-ON WORKSHOP

Saturday, April 17th, 2004
at New Roads School
reported by Pete Teti

Our second hands-on-workshop for 2004 was held at the New Roads School located at 3131 Olympic Blvd. Our instructor, Alan deHaas, brought all of the necessary materials for the group to share. Pete Teti brought a dozen or more chemical powders.

Initially, Alan demonstrated the proper preparation of the microscope. The optical system must have two polarizing filters inserted in the proper locations. One filter is placed in the drawtube between the objective and the ocular lens; the other is placed between the light source and the underside of the slide over the condenser.

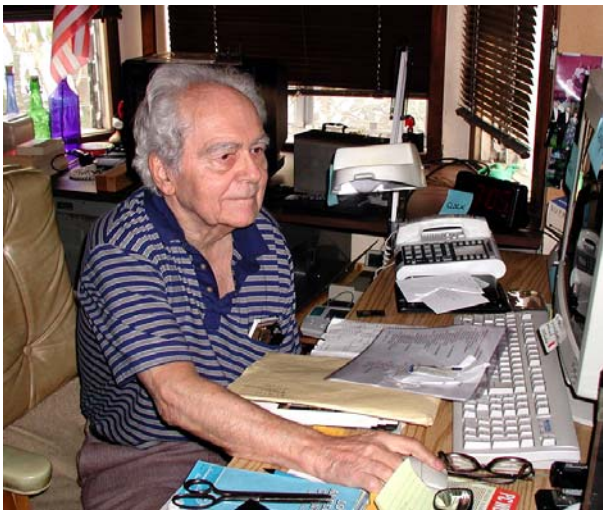
The process of preparing the chemicals on the glass slide is simple but requires a good deal of patience. The glass must be perfectly clean, then a small amount of chemical powder (about the size of 4 or 5 grains of salt), is placed on the slide. The slide is then held above the flame of an alcohol burner. The chemical quickly melts and spreads evenly on the surface of the glass. Immediately a cover glass is squeezed over the liquid, making certain no bubbles are caught between the glasses.

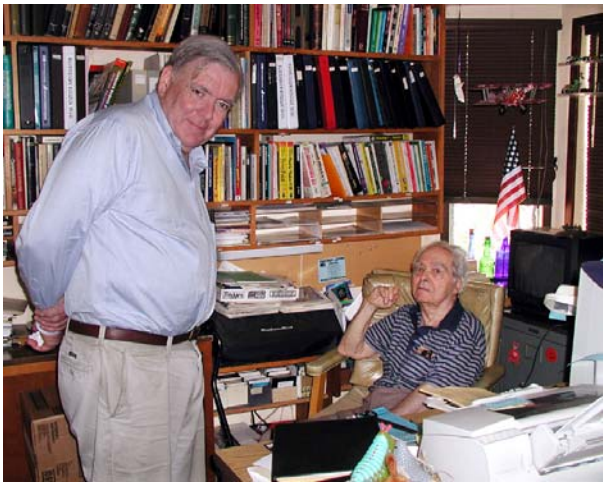
The slide is now placed on the microscope stage, focused and observed (it is actually best to pre-focus the stage). The liquid chemical cools, crystallizes, grows and spreads into fantastic and colorful patterns. By moving the slide and or by turning one of the polarizers many more changes of colors and patterns occur.

Searching and discovering new color patterns is a unique visual adventure while watching polarized chemicals under the microscope. By the end of the class it was clear that a good time was had by all who attended. We thank Alan deHaas for giving us a wonderful learning experience. We also thank his father, John deHaas for his enthusiastic assistance. □

Steve Craig's Farewell Party

MSSC founding member Steve Craig is moving North. Steve has contributed greatly to the MSSC over the years, and will be missed greatly. It is with a heavy heart that we see this wonderful fellow move out of range of our daily activities. However, he will remain on the membership list and receive all the MSSC's publications. Here are a few pictures of his going away party:





MSSC Monthly Meeting

Wednesday, April 21st, 2004
at New Roads School
reported by Leonie Fedel

At this meeting, Dr. Shijie Wu presented a program entitled *"Scanning Probe Microscopy under Controlled Environments"*. Dr. Wu has a Ph.D. from the University of Guelph, Canada, in the area of physical chemistry, onserving the structure of the solid-solution interface using in-situ x-ray diffraction, Atomic Force Microscope (AFM) imaging, and electrochemistry. He joined Molecular Imaging - a developer and supplier of AFM and Scanning Probe Microscope systems - as an applications scientist in 1998.

AFM is the only technique available today that can image, probe, and manipulate biological structures in environments simulating in-vivo conditions. Living cells can be imaged without fixation in buffers at 37°C. By placing an AFM on an inverted light microscope, one can combine the information from light techniques with AFM measurements. Examples of in-situ imaging of biological species ranges from cells to molecules, probing local properties such as elasticity, charge and conductivity and manipulation of structures such as pulling or moving bio-molecules.

This presentation focused on the Scanning Tunneling Microscope (STM) and AFM imaging under controlled conditions in the life sciences, material sciences, and nanotechnology fields. Dr. Wu also covered some of Molecular Imaging's more recent developments, PicoPlus™, PicoTREC and MacMode.

Dr. Wu discussed how many experiments, particularly biological ones, benefit from imaging under controlled conditions. Electrochemical measurements are carried out in solution, mostly with the absence of dissolved oxygen. Dr. Wu explained how by combining electrochemical control with scanning probe microscopy, one can manipulate an electrode surface and study the changes in real time with resolutions ranging from atomic to micron scales.

Many polymer blends are very sensitive to environmental and temperature conditions. The humidity, temperature, solution composition or a combination of these parameters affects the topography and the physical properties of the surface. He also presented some new applications combining temperature and environmental control, as well as developments for local conductivity and impedance measurements used in battery and fuel cell studies. □

PicoSPM with open access to the sample.

MSSC Monthly Saturday Workshop Announcements

The MSSC holds a workshop from:

9:00am to 12:00pm on the first Saturday of every month

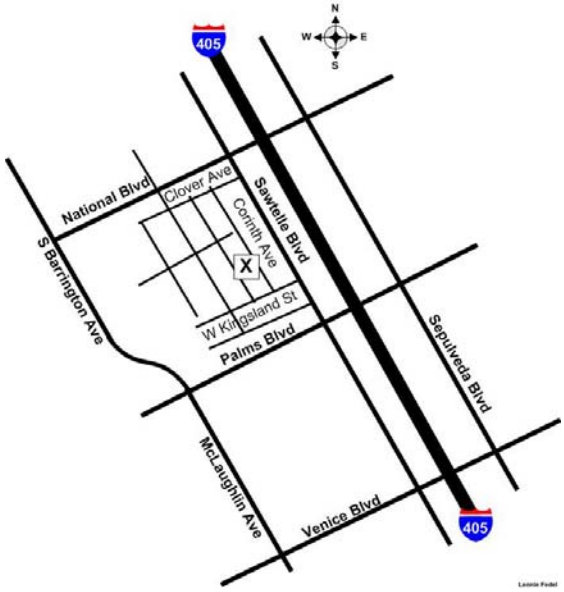
Locations alternate between two members' houses, Izzy Leiberman's and Ken Gregory's.

The workshops provide a chance for fellow microscopists to talk about our favorite subject. You are invited to bring any manner of items related to microscopy to share it with the fellowship. If you have something you would like to sell, please feel free to bring it and set it up at the sales table. All are encouraged to participate and join in the fun.

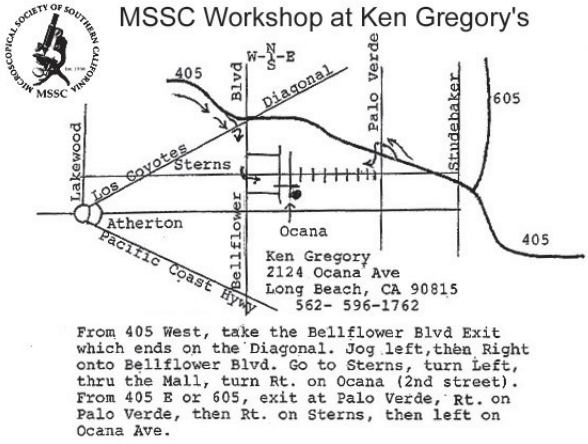
An optional lunch after each workshop will be held at the local Coco's.

The schedule for 2004 is as follows:
January 3, 2004, Izzy Lieberman's
February 7, 2004, Izzy Lieberman's
March 6, 2004, Izzy Lieberman's
April 3, 2004, Ken Gregory's
May 1, 2004, Ken Gregory's
June 5, 2004, Ken Gregory's
July 3, 2004, Izzy Lieberman's
August 7, 2004, Izzy Lieberman's
September 4, 2004, Ken Gregory's
October 2, 2004, Izzy Lieberman's
November 6, 2004, Izzy Lieberman's
December 4, 2004, Ken Gregory's

Izzy Leiberman's Residence:
3300 Corinth Avenue
Los Angeles CA 90066
310-391-6076



Ken Gregory's Residence:
2124 Ocana Avenue
Long Beach, CA 90815
562-596-1762



HANDS-ON WORKSHOP ANNOUNCEMENTS

9:00am, Saturday, May 15th, 2004
Santa Monica College

Ed Tarvyd will give a practical workshop on illuminating marine life. His collection includes sand specimens from across the globe, as well as materials recovered from the bottom of the Long Beach Harbor, including bryozoan clusters, jellyfish with their nematocysts (which are the stinging cells from the tentacles of the jellyfish) and other tide pool creatures. If possible bring along a suitable microscope and illuminator, and covers and slides to view the specimens. A few microscopes will however be available for those without access to one.

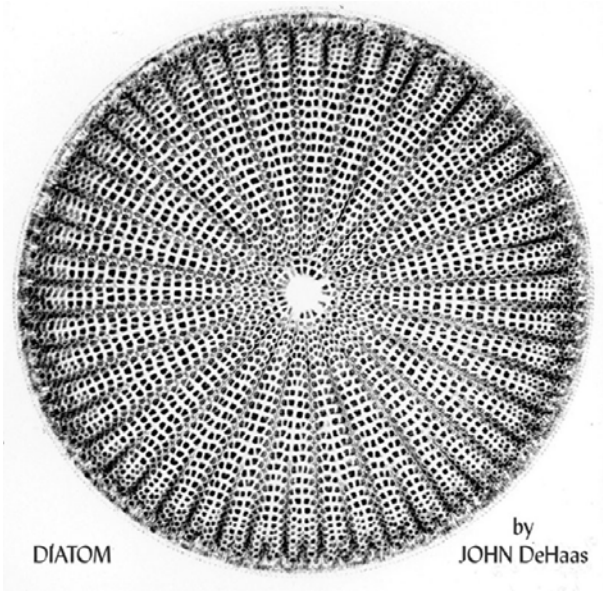
To reach Santa Monica College exit the Santa Monica Freeway at Bundy Drive South and go under the freeway South until you get to Pearl St. Next, turn right and go about 19 very short blocks until you get to the College. Turn right on 20th St. and the No.1 parking lot is along that entire block. The science building is not to far from the corner of Pearl St. and 20th St.

9:00am, Saturday, June 19th, 2004
Science Room of New Roads School

Ed Jones will lead a workshop on identifying animal species from the morphological characteristics of their hair and the art and science of hair comparison under the microscope. Several textbooks covering the identification of animal hair will be available, with many photomicrographs of animal hair. Ed will provide samples of hair for attendees to use to make slides. Please bring with you a biological brightfield microscope with 10X and 40X objectives, blank slides and coverslips, mounting media and fine forceps. Coverslips for the longer hair samples should be 50mm x 22mm or 60mm x 24mm. A normal 1" x 3" glass slide is 25mm x 75mm. If you use a mounting medium such as Permount or balsam, you will also need to bring along a slide tray to transport home your wet slides - it takes a couple of says for them to dry fully. If time permits Ed may show you how to make scale casts showing the cuticle structure of different animals hairs. Ed will provide the necessary nail polish and acetone for making scale casts.

9:00am, Saturday, July 24th, 2004
Science Room of New Roads School

This will be a practical workshop on mounting diatoms. The diatoms will be provided. Hot plates will also be available. You will need to bring along a suitable microscope and illuminator, and covers and slides to view the specimens, as well as some high refractive mounting medium (Jim Solliday is making an order for this, so contact him if you require some.) A few microscopes will also be available for those without access to one.



MSSC Monthly Meeting Announcements

7:00pm, May 19th, 2004

The Pond Life program is undoubtedly one of our best attended and most exciting meetings! Members are strongly encouraged to bring pond water, ditch water, fountain water or anything that lives in water. Microscopes, illuminators and pipettes and tools to play in the water are required.

7:00pm, June 16th , 2004

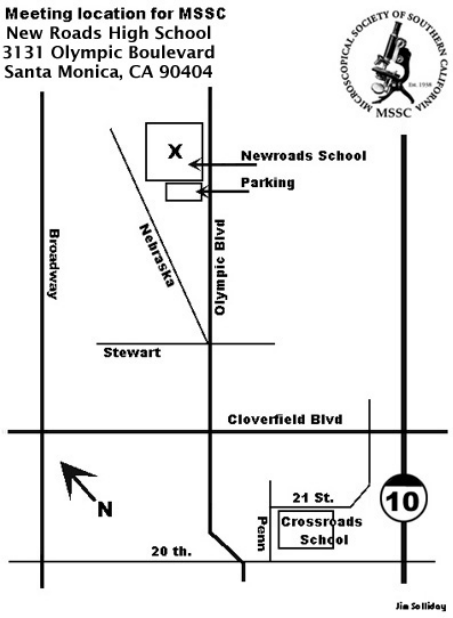
At this meeting, Dr. Jack Green , Professor of Geological Sciences, Department of Geological Sciences, California State University, Long Beach will give a presentation entitled "A Semester of Optical Mineralogy in About an Hour." After a survey of light phenomena – Snell's Laws, critical angles and Brewster's Law, the details of the operation of the Nikon petrographic microscope are covered. A review of some thin sections introduces the student to basic vocabulary: analyzer and polarizer, mineral textures, relief, index of refraction, pleochroism, birefringence, retardation, etc.

7:00pm, July 21st , 2004

At this meeting, Dr. Rick Behl, Associate Professor of Geological Sciences, from California State University, Long Beach, will give a presentation entitled, "Analysis of sea bed cores and implications for climate change." Sediments are deposited and therefore help us understand the surface of the Earth. Dr. Behl's research focuses on the sedimentology of modern and ancient continental margins and deep-sea upwelling systems, which are particularly good recorders of ancient environments. His recent research deals with abrupt environmental shifts along the California margin linked to climatic and tectonic change.

7:00pm, August 18th, 2004

At this meeting, Gregg Kleinberg returns to give a talk on digital photomicrography. Over the years Mr. Kleinberg has come to the conclusion that the PAXcam is perhaps the best system for this purpose and he will present the PAXcam digital microscope camera and Pax-It! software. PAXcam is a high performance, economical digital imaging solution which features two megapixel resolution, a USB-2 interface with near real-time full screen display, focus bar. The accompanying image management software includes a searchable database, 3D deconvolution (image stacking) functions for both compound and stereo microscopes, measurement, graphic overlays, image enhancement, and much more. The second half of the meeting will be a presentation (courtesy of Stuart Warter) of a new computer program called Micro-CT, Gateway to the 3-D Microworld.



All meetings are held at New Roads School (see map above). Optional dinner beforehand at Coco's restaurant at 5:30pm (near Ocean Park and Bundy, Santa Monica). □

Editor's Note

Please send any articles, photos, member profiles, notifications of forthcoming events and website summaries for inclusion in forthcoming journals to me at:

Leonie Fedel
3273 Provon Lane
Los Angeles CA 90034-2714
(310) 839-9881,
email: editor@msscweb.org

The preferred route is via email, with text and graphics as attachments. Text in the following formats: plain/rich text format/word documents, graphics in the form of jpgs. If you need any help in converting information to these formats, please contact the Editor, who will be happy to help.

The MSSC Editorial Committee makes decisions concerning Journal content and style and consists of:

Jim Solliday (President)
Pete Teti (Printing & Distribution)
Alan deHass (Education Chair)
Leonie Fedel (Layout Editor)
Allen Bishop (Copy Editor)
George Vitt (Image Editor)

MSSC Website

www.msscweb.org

The MSSC website offers a history of the Society, meeting and workshop schedules, journal archives, membership details, links to other microscopic resources on the internet, a news and events notification page and a seller's page. There are plans to add a catalog of the MSSC Slide collection. Keep your eyes on the 'What's New' page for details of new site additions. Some areas of the website (such as the Journal archives and membership lists) are only accessible to currently paid members. Members should send an email to Leonie Fedel editor@msscweb.org to request their username and password if they have not yet received one.

2004 Dues

Members dues are collected at the beginning of each calendar year for the period Jan to Dec. For 2004 the dues structure is:

$50.^{00}$ for Regular Members for 2004.
Regular Members are geographically advantaged and can attend meetings and workshops.

$40.^{00}$ for Corresponding Members for 2004.
Corresponding members reside in geographically remote areas and are not able to attend meetings. Corresponding members may also include disabled persons who reside geographically close but are unable to attend meetings and workshops.

Payment accepted in the form of cash or checks in US funds made out to "Herb Gold - MSSC".

Please remit dues to:

Herbert A. Gold, (Treasurer)
2065 Balmer Drive
Los Angeles, CA 90039-3047
323-665-8391
email: herbgold@sbcglobal.net
