Journal of
THE MICROSCOPICAL SOCIETY OF SOUTHERN CALIFORNIA
Volume 7 Number 6 June 2002

FOSSILS ON DISPLAY

By Richard M. Jefts

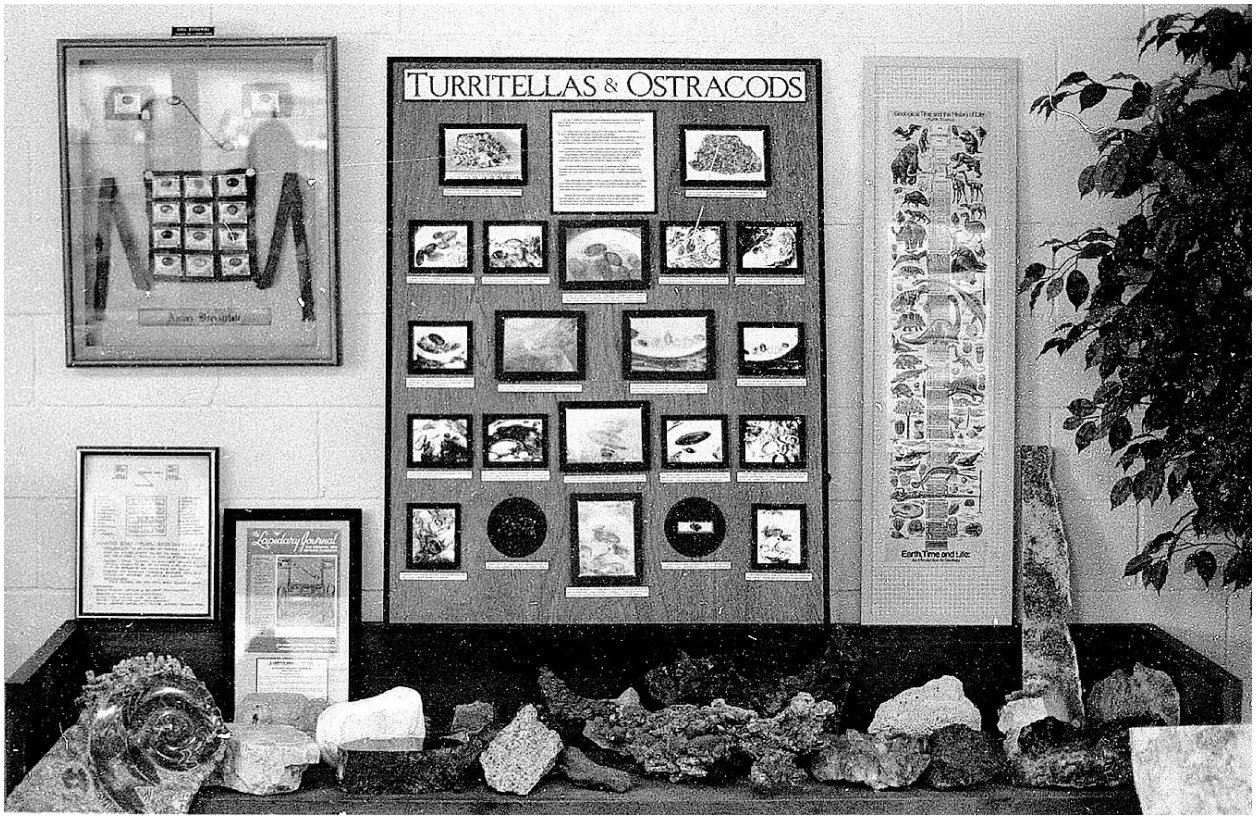

Fig 8 - The *Display Panel* on display at the *Fallbrook Gem and Mineral Society Museum*.

In the April, 1999 issue of this Journal, the article *"Turritellas and Ostracods: A Cursory Project of Interest"* offered another opportunity to demonstrate that microscopy can contribute meaningful insights into ofttimes lesser known but still interesting areas of inquiry.

Briefly, the article told of small gastropods of the Eocene epoch known as *Turritellas* – tapered and spiraled shells up to an inch or so in length, and upon whose death the emptied chambers and surrounding matrix frequently filled with subsequent mass inundations of microscopic bivalve crustaceans known as *Ostracods*.

Through varied geologic processes, these thick beds of now quiescent shells were buried under debris and volcanic ash and were subjected to silica charged ground waters. Through the action of slow silification, the calcium make-up of the shells was replaced, molecule by molecule, with silica, became petrified, fossilized and thus frozen both in time and in thick mineral beds of tan and brownish agate.

Long recognized among collectors, this geologically uplifted and now dry land fossil material is often referred to as *Wyoming Turritella Agate*, from the general area where large quantities have been extensively exposed and successfully collected.

The article suggested that although the larger *Turritella* shells are quite obvious and have indeed been long recognized, many persons may be unaware of their trapped and ubiquitous fellow travelers, the microscopic fossil *Ostracods* – remnants of an age that flourished some fifty million years ago.

Upon completing the work that led to the article, a few spare photomicrographs were mounted on simple cardboard backings and hung on a blank bit of wall space as nostalgic mementos of a pleasant and interesting project.

With the passage of time came the opportunity one evening to participate at a meeting of our local *Fallbrook Gem and Mineral Society*, and for a contribution, a short talk accompanied the showing of the spare and mounted photomicrographs from the April, 1999 *MSSC* article. The curator of the *Fallbrook Gem and Mineral Society Museum*, Mr. Garth Bricker, was just enough taken by the photos to suggest a somewhat similar display that might grace the halls or walls of the Museum, as something of unusual educational interest, and to so accompany and augment other already displayed fossil and fossiliferous materials.

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And so the fossil *Turritella and Ostracod Display Panel,* noted and illustrated here, came to pass – see Fig. 1 and Fig. 8 (see front cover). Great fun to design and an even greater challenge to build, here's how it was finally made up and put together.

A three foot by four foot sheet of three-ply wood, stained a dark walnut, was framed with half-inch quarter-round molding and spray painted an ultra-flat black. Five photomicrographs were added to the nine that were selected from those that were used to illustrate the *MSSC* article, and these fourteen photos, all black and white, were then arranged around five central and slightly larger photomicrographs that were reproduced in full color.

Regarding the illustrations, Fig. 1 through Fig. 8, and referring to the numbered and lettered diagram, Fig. 2, (and the finished *Panel* , Fig. 1 and Fig. 8), and the *Display Panel* and its offerings are noted thus:

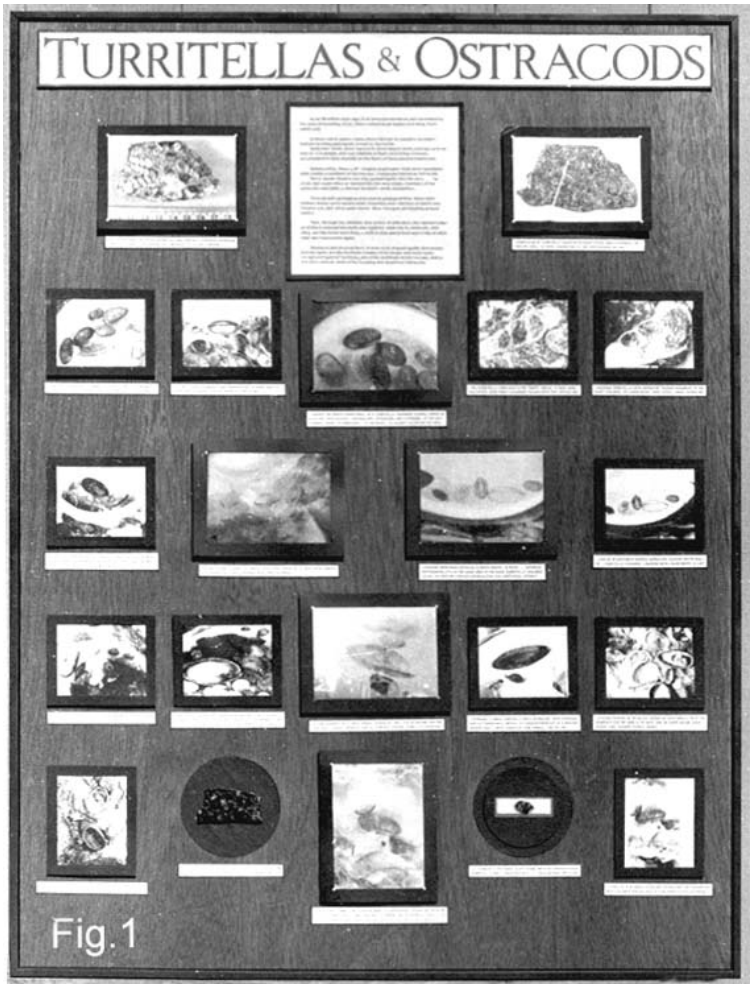


Fig.1 - The completed fossil *Turritella and Ostracod Display Panel.*

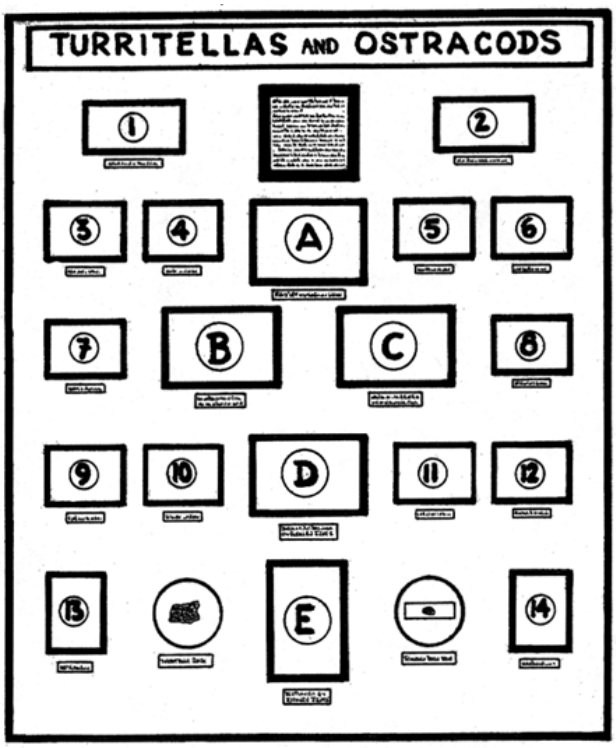


Fig. 2 - Diagram of the *Display Panel*..

Fig.1: The completed fossil *Turritella and Ostracod Display Panel*

Fig. 2: Diagram of the *Display Panel*. Again, the photo numbers and letters depicted in this diagram, are those referred to in all that follows. Photos Nos. 1 and 2 are B&W, 4.5"x6.5". Nos. 3 through 14 are B&W, 4"x5". The five photos A through E are 5"x7" in size and in full color.

Fig.3: Photo No. 1 is of a hand-sized chunk of surface-weathered Wyoming agate, with fossil *Turritella* shells exposed in stark relief. Photo Nos. 3 and 4 show groupings of the microscopic bivalve *Ostracods*.

Fig. 4: Photo No. 2 is a macrophotograph of a small sectioned slab of *Turritella* agate material. Note the single circled shell and the arrow. Photo No. 5 has a multi-chambered *Turritella* shell packed with microscopic *Ostracods*. The arrow points to the magnified image of the single shell that is circled and arrowed in Photo No. 2. Photo No. 6 is another *Turritella* shell with chambers packed with *Ostracods*.

Fig. 5: Lower left quarter of the *Display Panel*: Photo No. 7 shows isolated *Ostracods* orientated along the white rim of a cross-sectioned *Turritella* shell chamber wall. Photo B, in color, showing grouped *Ostracods*, with one displaying scattered red surface particulate material. Photo No. 9 shows

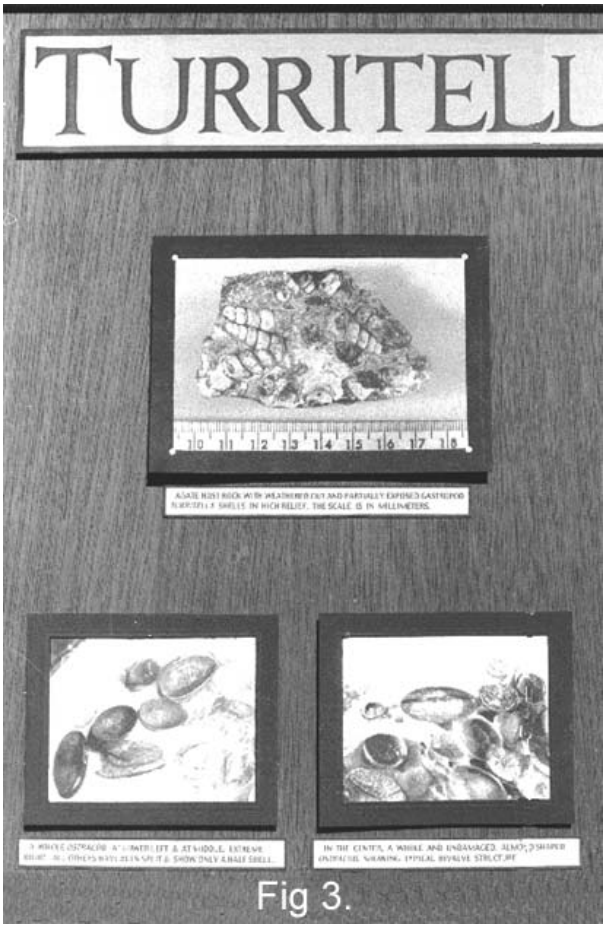


Fig. 3 - Weathered Turritellas and microscopic Ostracods.

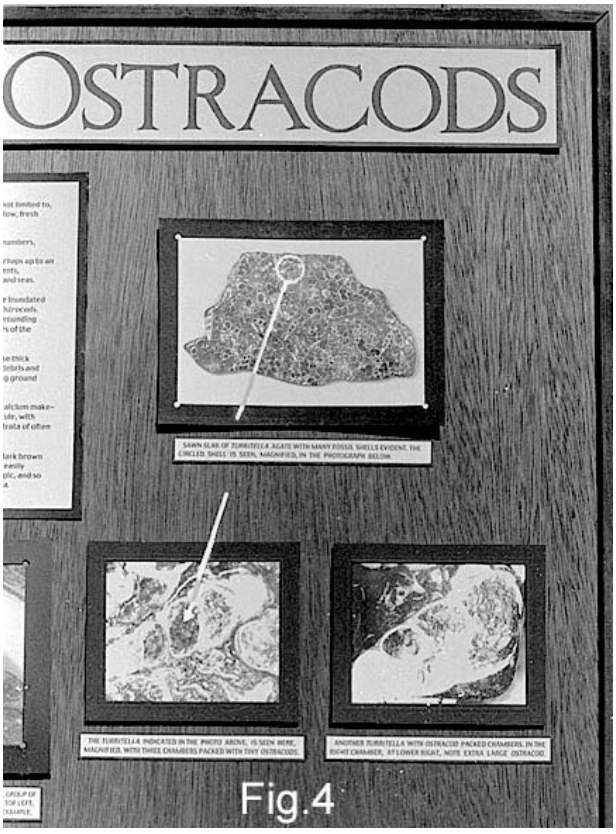


Fig. 4 - Sectioned agate, Turritella chambers and packed Ostracods.

microscopic *Ostracods* with particle size material scattered over their surfaces. Photo No. 10 - this was the largest *Ostracod* found during the original project; split in half, it contrasts markedly with two other much smaller *Ostracod* shells. Photo No. 13, black in color and split in half, these *Ostracods* show a tendency to nest, like beakers or Chinese boxes. The lower central black disc serves as a background for a small sectioned slab of *Turritella* agate, cemented in place.

Fig. 6: Lower right quarter of the *Display Panel*: Photo C is an unusual grouping of differently shaped and colored *Ostracods* against the rim of a *Turritella* chamber wall. Photo No. 8 is the same area as in Photo C, but a separately taken photograph. Comparing the two indicates how color can add both interest and further information. Photo No. 11 is another extremely large and partially shattered *Ostracod* with some internal detail, accompanied by two complete and undamaged

Fig. 5 - Ostracods in B&W and color and cemented slab of sectioned agate.

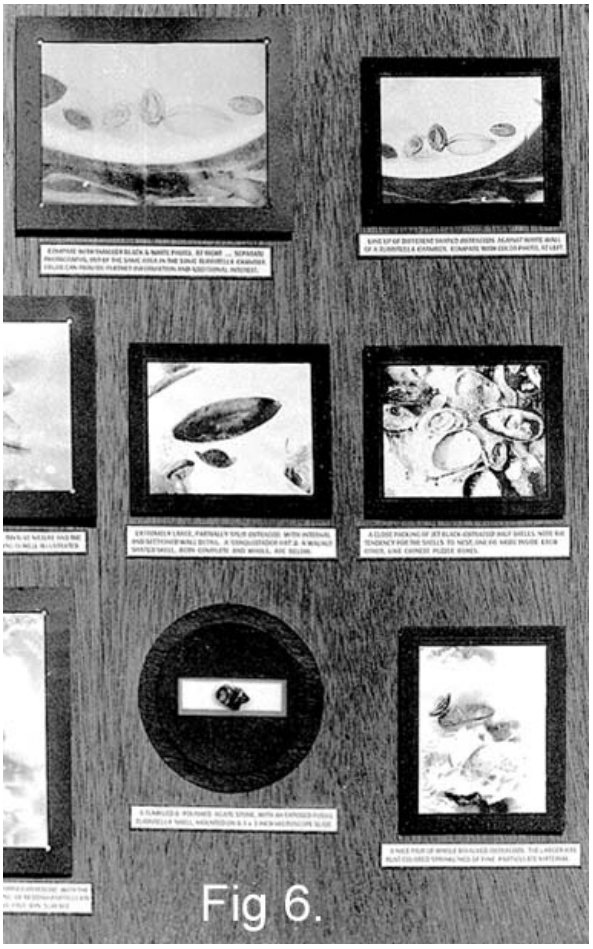


Fig. 6 - Ostracods in B&W and color and a Turritella shell in a tumbled agate stone.

smaller specimens. Photo No. 12 is another example of massed microscopic *Ostracods*, jet black in color and showing the tendency, again, to nest, one inside the other. The lower central black disc serves as a background for a small, single and tumbled agate stone, with an embedded but nicely exposed *Turritella* shell, mounted on a 1"x3" glass microscope slide. Photo No. 14 is a nice pair of whole and undamaged *Ostracods*, with surface sprinklings of rust red particulate material.

Fig. 7: Photos D and E are very fine examples of complete and whole microscopic *Ostracods* with bright red particulate material scattered over their surfaces.

Fig. 8: The *Turritella and Ostracod Display Panel* on display in the *Fallbrook Gem and Mineral Society Museum*.

Each of the nineteen black-framed photos, plus the two bottom black background circular mounts, has its own separate and descriptive caption.

At the top center of the *Display Panel*, seen in Figs. 1, 2 and 8, a black framed text offers a brief story of the *Turritellas* and the *Ostracods*, their fossil formation, subsequent reclamation and one form of their current geologic presence, as is depicted with this *Display Panel* of photographs and associational material.

A tribute to the two very broad and general disciplines of Geology and Microscopy, the fossil *Turritella and Ostracod Display Panel* has been well received and is now a permanent feature in the *Fallbrook Gem and Mineral Society Museum*.

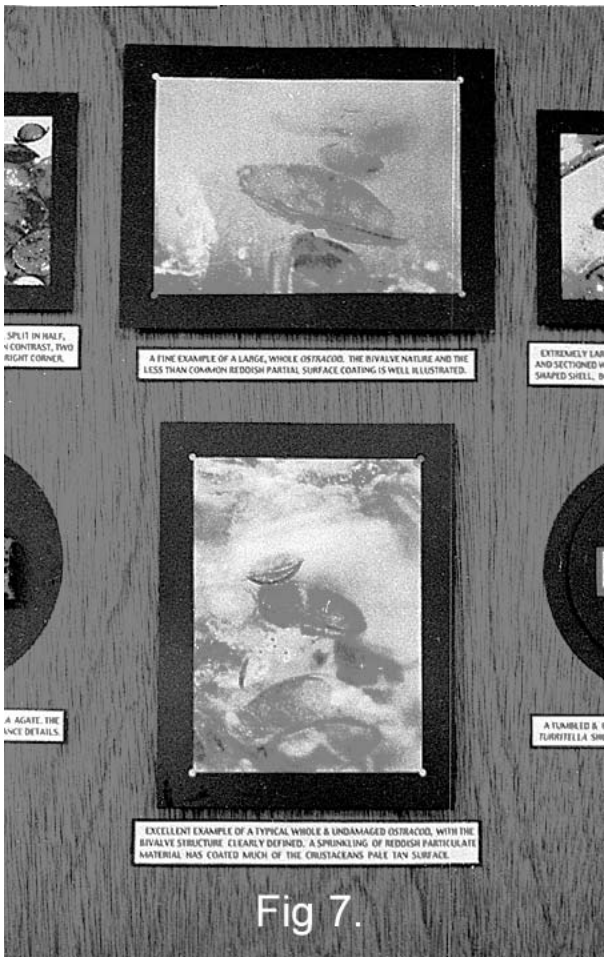


Fig. 7 - Ostracods in color with red surface sprinklings

Production notes for the photographs, shown in the *Display Panel* (see figure 2):

Photos 1 and 2 were taken with a 35mm Minolta, a standard 50mm lens and supplementary lenses of 1 to 4 diopters.

Photos 5 and 6 were taken using a 35mm Pentax with the standard 55mm lens on a long auxiliary extension bellows.

For photos 3 and 4, and 7 through 14, a Leitz Ortholux was used in conjunction with a Minolta camera body, rather than the more usual Olympus PM – 6 camera. A convenient optical combination was a 12.5x wide-angle Leitz Periplan GF ocular, with a 3x Wild Fluotar objective. Because of the 1.25x lens/factor built into the Ortholux, this yields a final magnification of 47x on the film negative. With an Enlarger factor of 4, the 4"x5" B&W photos have a finished image magnification of 188x. All specimens recorded on B&W film were both uniformly photographed and enlarged to allow relative size comparisons.

All lighting was incident. For photos 1, 2, 5 and 6, a convenient two lamp setup was used. For photos 3 and 4, 7 through 14, and A through E, fiber optics were used, on twin flexible arms of an Olympus Highlight 2000.

All B&W photos were taken on 35mm Kodak 2415 Tech Pan film, and developed in Kodak HC – 110, dil. D.

The enlarger used was a Beseler 67 cp, calibrated for height versus magnification, plus various Ilford Multigrade filters.

The enlarging paper was Ilford Multigrade IV, medium weight, glossy and resin-coated.

The prints were developed in Ilford Universal.

The five color photomicrographs, A through E, were taken on Kodak 35mm Ektachrome, using the same optical configuration noted above. However, the greater print size of 5"x7", results in final image magnifications of approximately 310x.

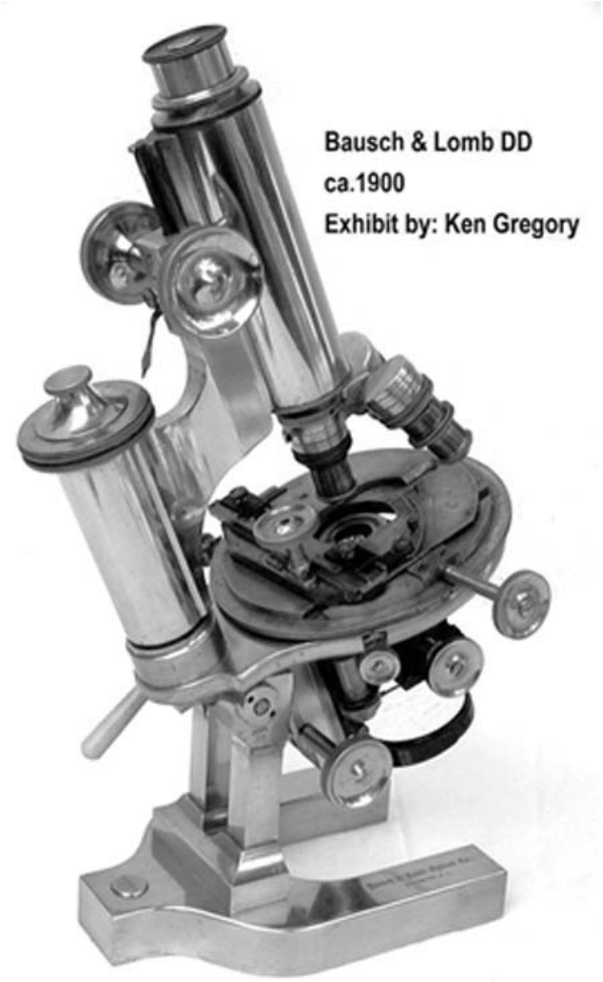
WORKSHOP OF THE MICROSCOPICAL SOCIETY OF SOUTHERN CALIFORNIA

by: Jim Solliday

Date: Saturday, 1st June 2002
Location: Dr. Ken Gregory's Residence

The workshop began at 9:00am sharp as Ken had business to attend to and needed the meeting to be over by 12:00pm. The gathering came together under the shade in the back yard and was called to order by the President, Jim Solliday. Attendance was low because there had been a hazardous materials spill on the 710 Freeway, creating tremendous problems with local traffic. No doubt a few members turned and went home in frustration over the delays.

Announcements were made concerning the next few Wednesday night lecture meetings: in June we are to have a program on archaeology and the microscope and in July a class on the technology associated with DNA testing. It was noted that Alan deHaas kindly donated two brand new folding tables for use at the workshop (our gratitude is once again extended to Alan). It was also apparent that Ken Gregory had begun a major remodel on the rear of the house. This project will result in a substantial expansion of the living room



and patio area. Future workshops will be held here with greater room, comfort and without concern for bad weather. We all look forward to the new 'facility' and the added space that will be provided in the near future.

The group was reminded of the upcoming hands-on workshop that will be held this month on the fourth Saturday (22nd June). Normally the special workshops are held on the third Saturday but because this June has five Saturdays it will be the weekend after the main lecture. The subject will be Rheinberg illumination and the techniques for making color filters for your own microscope. This class will be held at the Newroads School on June 22, 2002, beginning at 9:30am.

Allen Bishop pointed out the differences between the Bausch & Lomb Model DD and the DDH, reminding the group that the DDH ('jug handle') was the direct predecessor to the model DDS. As the DDH was only made for a very short time it remains one of the rarest models of the Bausch & Lomb line. The fact that one just sold on ebay for $140.00 proves that bargains can still be had.

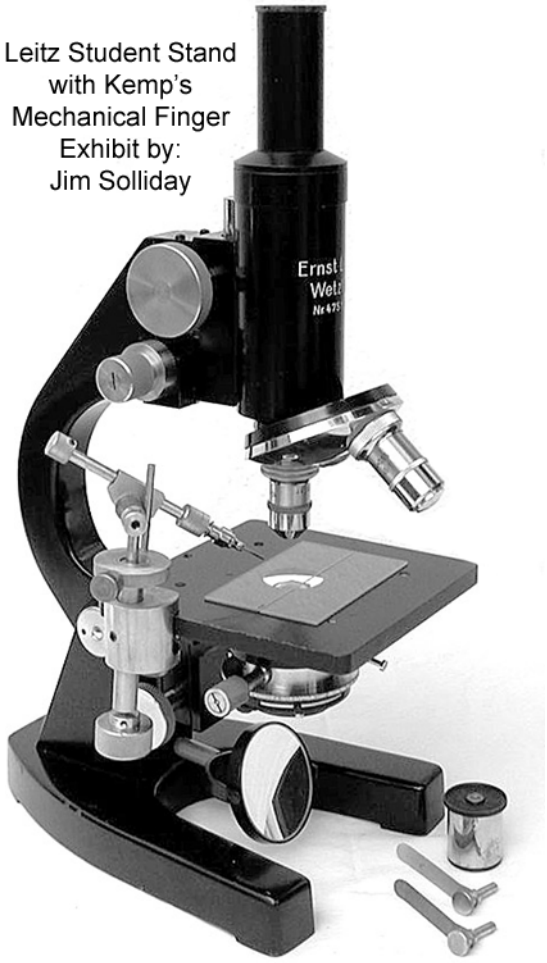
Ken Gregory exhibited a very nice Zeiss model S with the **Siedentopf** (Bitumi) binocular attachment. The 'non-word' Bitumi is an example of a telegraph ordering code. Zeiss introduced the "Bitumi" binocular body in 1924 which within a short time, became an essential accessory on the many Zeiss microscopes as an option to monocular viewing. This device allows the tube-length to

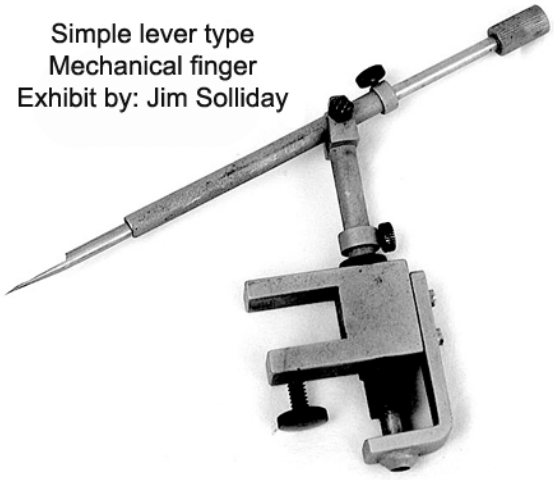
Zeiss "S" Model (Final version)
with "Butumi" binocular body
ca. 1938
Exhibit by Ken Gregory

remain the same when the inter-ocular distance is adjusted. In 1926 the design was improved allowing transfer of the motion to both sides of the binocular system. This became the final form.

Ken also exhibited a wonderful example of a Bausch & Lomb model DD (ca.1900). When Ken obtained this stand the condition was very shabby. Ken's restoration work has, however, transformed this microscope into something that simply amazed the group. The lacquered brass finish turned out to be one of the best jobs we have ever seen. Congratulations Ken. He also exhibited a magnificent Zeiss Stand 'SCE', which had a rack and pinion adjustment to the stage. This convenient feature allows the focusing of the entire stage and is independent of the normal rack & pinion used for focusing the body-tube. When using an incident illumination system for metallurgical work you could now avoid the irritation of disturbing the light path when focusing on the specimen. This alternative focusing option provides great convenience and saves time. Today, almost all microscopes are focused only by the stage movement. This is a very rare microscope; one which we were very happy to see as part of Ken's growing collection. Ken described to the group his plans for remodeling his house and kindly extended his invitation to the Society to continue to have its scheduled workshops despite the construction. Thus far he has ended up with about a 1000 "used" red bricks which he offered for free to anyone who was willing to take them to a new home.

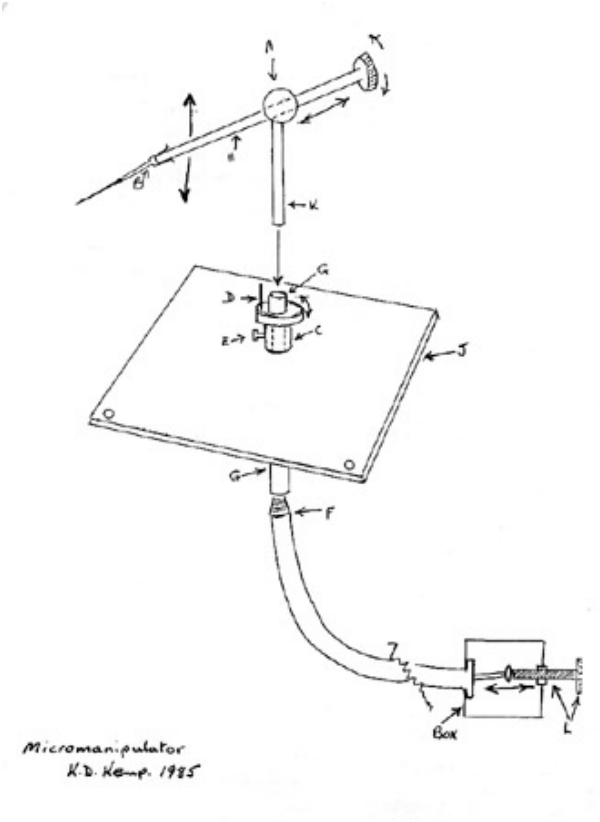
Jim Solliday exhibited a Leitz student stand with a brand new micro-manipulator mounted to the stage. This all-brass mechanical finger was just made for Jim by Bill Dailey, a friend of Klaus Kemp. The design was patterned after the one developed and used by Mr. Kemp (see illustration). Mr. Kemp's original hand drawing has been included in order to show the genius evident in the design. The important advantage of this finger is that the filament that deposits the diatom moves only in a vertical direction. In comparison to the lever type of finger, this motion is more accurate and straightforward in function. In use, the lever type describes an arc, even though the intent is for vertical motion only, thus slightly off-





setting the diatom from its target. The Kemp-type finger, moving only in the straight vertical direction remains accurate in its final placement of the diatom. To illustrate this movement, Jim exhibited three types of mechanical fingers. The first was the simple lever type (probably used by J.D. Möller) that attached to the side of the stage as a 'C' clamp would. This pattern consisted of a simple arm attached to a post by means of a small cradle joint. The post is then attached to the stage with the "C" clamp base mentioned above. The arm itself can be rotated and extended in a sleeve or small tube (see the illustration). A thin filament is then attached by the use of beeswax to the end of the arm. The filament can be selected from a number of sources including a hair from the mane of a horse, a whisker from a rat, cat or even a human nose. Today, most workers use a small fiber-optical filament or a piece of stretched glass tube heated over a flame. This simple type of finger is best used for mounting individual diatoms but with reasonable effort and concentration can be used for producing arrangements. The second form of mechanical finger on display was a nosepiece-mounted lever system. This is a spring-loaded lever that can be adjusted up and down by means of a micrometer screw. This is a great deal more delicate and accurate than the simple-lever type mentioned above. The micrometer screw allows the worker to make controlled movements with much greater precision than can be done by hand. However, the difficulty with the arcing movement of the arm is still a problem. When in use, this type of manipulator is mounted between the objective and the nosepiece of the microscope.

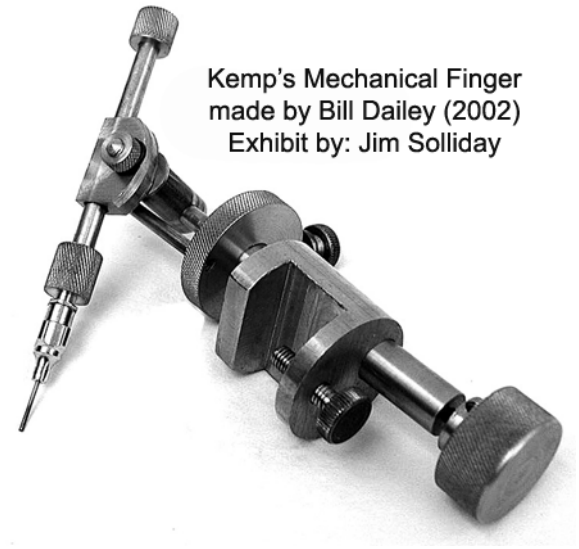
Towards the top of the stem which holds the finger is mounted a fork that fits over the threads of the objective. This keeps the instrument at the correct location above the stage. With the Kemp design, as well as the example made by Bill Dailey, one of the most important features is the ability to swing the working parts of the instrument out of the way when changing objectives. A post that projects from the central cylinder arrests and maintains the finger in proper alignment with the stage. When one needs to move the finger, the act of swinging it away from the post serves to remove it from conflict with the objectives. When the desired objective is in place, the finger is then swung back into its original position with almost no effort or inconvenience. The vertical motion and the swing-out feature make the Kemp design the most valuable pattern yet devised for this purpose. As can be seen in the illustration, Kemp's original design is a bit simpler than the final form he uses today, but, all the important features are present. His design was first drawn up in 1985, and has evolved to the form now available from Bill Dailey. The following key should help describe the original drawing included.



A. Clamping screw allowing the arm holding the needle to be adjusted both in and out.
B. Hypodermic needle holder with mounted drawn glass needle.
C. Collar that can be rotated by the use of the stop screw (E)
D. Post to stop or rest the whole needle assembly on allowing it to be centered at the proper field. (It also permits the arm to be easily swung out of the field when convenient).
E. Clamping screw.
F. Cable release for remote control of the finger.
G. Hollow tube that accepts the support post (K).
H. Arm that holds the needle. It is required to be able to move both forward and backward as well as rotate 360 degrees.
J. This base plate can be clamped to the stage of the microscope.
K. Support post that fits into (G).
L. Screw for adjusting the cable release, this can be situated to suit the user. It can rest on the table or hang from the underside of the stage. All the up and down movement of the finger is controlled from this point.

If you would like one of the new mechanical fingers, contact Bill Dailey and place an order, the price is a $120.00. The following is Bill's email: dailey@sas.upenn.edu.

Jim also spent some time demonstrating the techniques associated with mounting individual diatoms. Two slides were placed on the Leitz microscope. One was referred to as the storage slide and the other was the target slide. The target slide is spread with a "diatom adhesive" and should have a target ring drawn with India ink. The storage slide should contain all the forms the worker intends to ultimately mount on the target slide. Both slides are held together with one hand and moved back and forth across the optical axis of the microscope. On the storage slide the worker chooses a diatom and centers it, then lowers the finger until the filament comes in contact with



Kemp's Mechanical Finger
made by Bill Dailey (2002)
Exhibit by: Jim Solliday

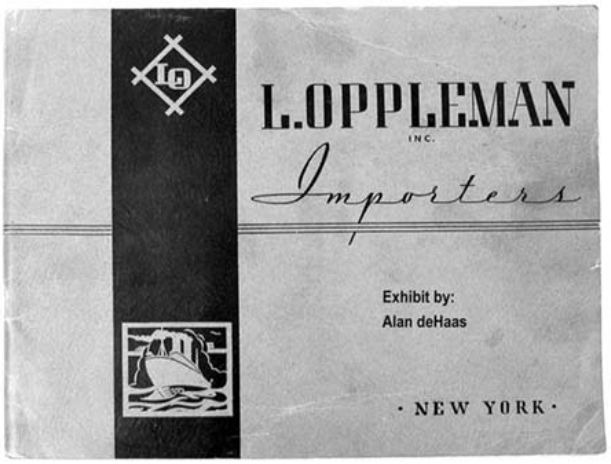
Nosepiece mounted
Mechanical finger
Exhibit by: Jim Solliday

the diatom. The filament is then lifted away from the top of the slide and left in place. The two slides are then shifted in the reverse direction, centering the target slide in the field of view. The location for the diatom is found and the arm of the finger lowered, allowing the diatom to come in contact with the adhesive on the surface. The finger is again lifted and the process begun again until all the forms are placed in the position the worker desires. The procedure can also be done on cover-slips rather then the surface of the slides. The covers are simply held on the surface of the two slides as described above. When the mounting demonstration was over, Jim provided all the members present with a sample of cleaned diatomaceous material for their own use in mounting specimens. The material consisted of recent forms removed from seaweed located along the coast at Palos Verdes California. Finally, Jim mentioned that the Leitz microscope used for the demonstration was for sale.

Alan deHaas placed on view for the members one of the volumes from the *E-H Schmitz, Handbuch Zur Geschichte Der Optik; Volume 3b, Das XIX Jahrhundert,* published 1991. This was described by Alan as one of the best publications he has yet come across. The cover featured a photograph of Prof. Ernst Abbe indicating the general content of this Volume (see illustration). Privately published in the 1980's and early 1990's they are in German only, and fifteen volumes were printed. More were projected but evidently never produced. Alan also held up a very useful and quite large catalog by Eimer & Amend (1927). The main point of interest being the 100 pages dedicated to contemporary microscopes. Just about any microscope available at the time was illustrated and described in this catalog. The second catalog exhibited by Alan was a paperback published by L.O. Oppleman, Inc. of New York. This firm was known for importing scientific products mainly from Japan. Microscopes possibly from Olympus were included for sale from

E.-H. SCHMITZ
HANDBUCH ZUR GESCHICHTE DER OPTIK

BAND 3b
DAS XIX. JAHRHUNDERT



the pages of this catalog (see illustrations). Most of the offerings were inexpensive children's and student stands.


L. Oppleman Catalogue (1938)

MICROSCOPES

153X POWER MICROSCOPE

Tilting model microscope stand 8" high, with horseshoe base. Finished in black or ivory. Double wheel geared focusing equipment. Lever lock for tilting stand in any position. Fine lenses of clear optical glass, highly polished. 153X magnification certified by laboratory tests. Adjustable beveled mirror.

No. M50—In felt lined wood carrying case with 1 prepared and 2 plain slides...*List Each* 2.75

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These leader microscopes offer both excellent value and good construction. Black crystalline frame. Tubes, clips, etc., are highly nickel plated. Slide focusing tube for adjustment. Highly polished objective and ocular lenses in screw-in mountings. Complete with 1 prepared and 2 plain slides.

No. M1175—150X, 7½" high. Stationary stand.....*List Each* 1.00

No. M1177—50X, 5½" high. Tilting stand. *List Each* .75

160X POWER MICROSCOPE

A large tilting stand model microscope offering exceptional value. Heavy base and stand finished in black crystalline, overall height 8". Draw tube, clips and mountings highly nickel plated. Adjustable beveled mirror. Ocular and objective lenses of clear optical glass, highly polished. 160X magnifications.

Complete in felt lined wood carrying case with 10 prepared slides fitted into cover.

No. M402.....*List Each* 2.00

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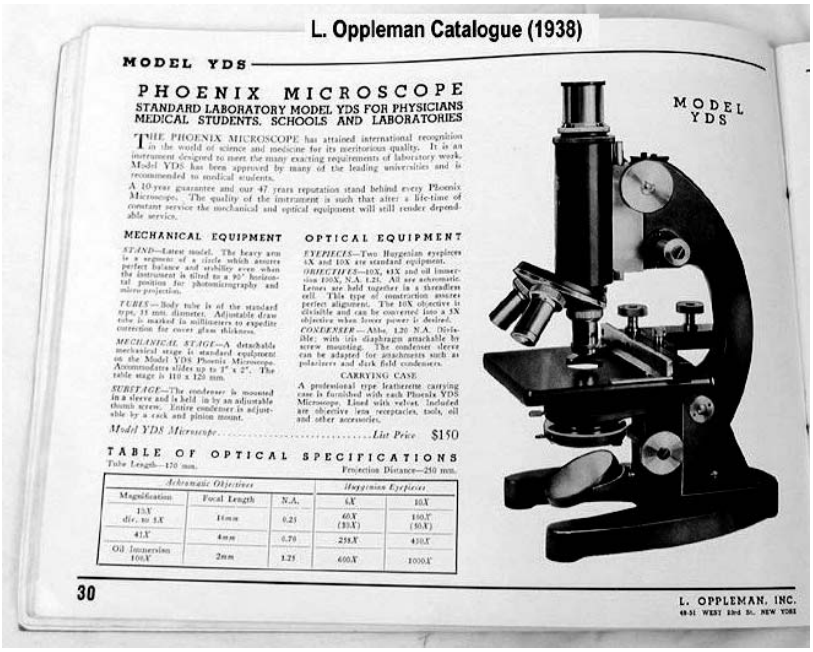
In response to the demonstration by Jim Solliday, Alan talked a little about the diatom work that was done by members of our Society in the past. We talked about Herman Adler and his lifelong work with diatoms. Mr. Adler passed away in 1991 and left a substantial library and collection to the California Academy of Science. Among his instruments were three examples of nose-mounted mechanical fingers, all but one being turned over to the Academy. Mr. Adler was one of the most skilled and accomplished mounters of diatoms on the west coast. His arrangements are very valuable and much sought after by collectors. Originally, he came from the diatom group within the New York Microscopical Society. This group was led by the beloved Joseph F. Burke of the Staten Island Institute of Arts and Sciences. Mr. Burke was the Honorary Curator of Diatoms at the New York Botanical Garden from 1940 to 1961. He was famous for his regular field trips and workshops for the New York Microscopical Society. Mr. Adler was a regular participant and contributor to these activities. See the short biographical account of Mr. Burke included in this edition of the Journal.


L. Oppleman Catalogue (1938)

MODEL YDS

PHOENIX MICROSCOPE

STANDARD LABORATORY MODEL YDS FOR PHYSICIANS MEDICAL STUDENTS, SCHOOLS AND LABORATORIES

THE PHOENIX MICROSCOPE has attained international recognition in the world of science and medicine for its meritorious quality. It is an instrument designed to meet the many exacting requirements of laboratory work. Model YDS has been approved by many of the leading universities and is recommended to medical students.

A 10-year guarantee and our 47 years reputation stand behind every Phoenix Microscope. The quality of the instrument is such that after a life-time of constant service the mechanical and optical equipment will still render dependable service.

MECHANICAL EQUIPMENT

STAND—Latest model. The heavy arm is a segment of a circle which assures perfect balance and stability even when the instrument is tilted to a 90° horizontal position for photomicrography and micro-projection.

TUBES—Body tube is of the standard type, 33 mm. diameter. Adjustable draw tube is marked in millimeters to expedite correction for cover glass thickness.

MECHANICAL STAGE—A detachable mechanical stage is standard equipment on the Model YDS Phoenix Microscope. Accommodates slides up to 3" x 2". The table stage is 110 x 120 mm.

SUBSTAGE—The condenser is mounted in a sleeve and is held in by an adjustable thumb screw. Entire condenser is adjustable by a rack and pinion mount.

OPTICAL EQUIPMENT

EYEPIECES—Two Huygenian eyepieces 4X and 10X are standard equipment.

OBJECTIVES—10X, 43X and oil immersion 100X, N.A. 1.25. All are achromatic. Lenses are held together in a threadless cell. This type of construction assures perfect alignment. The 10X objective is divisible and can be converted into a 5X objective when lower power is desired.

CONDENSER—Abbe, 1.25 N.A. Irisible; with iris diaphragm attachable by screw mounting. The condenser sleeve can be adapted for attachments such as polarizers and dark field condensers.

CARRYING CASE

A professional type leatherette carrying case is furnished with each Phoenix YDS Microscope. Lined with velvet. Included are objective lens receptacles, tools, oil and other accessories.

Model YDS Microscope.....*List Price* $150

TABLE OF OPTICAL SPECIFICATIONS

Tube Length—170 mm. Projection Distance—250 mm.

Achromatic Objectives			*Huygenian Eyepieces*	
Magnification	Focal Length	N.A.	4X	10X
10X div. to 5X	16mm	0.25	40X (35X)	100X (90X)
43X	4mm	0.70	258X	430X
Oil Immersion 100X	2mm	1.25	600X	1000X

MODEL YDS

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L. OPPLEMAN, INC.
49-51 WEST 32nd St., NEW YORK

Among the equipment exhibited by Alan was a pair of Zeiss Cassegrain (mirror-type) condensers for ultraviolet or infra-red photomicrography, one having a numerical aperture of 0.4 and the other 0.6. The exact application for which these condensers were to be used remains unknown to both Alan and the group.

Finally, Alan showed a unique Goerz Polarimeter. The specimen is inserted after drawing out the eyepiece, rather than through a door in the side of the body-tube. This item was likely made during the 1930,s or 1940's and can be seen in the illustration.

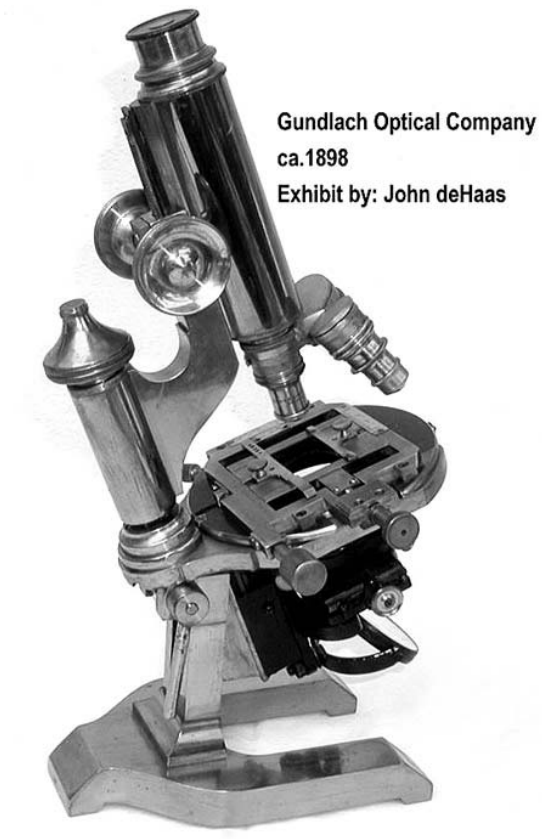
P**ete Teti** exhibited a Bristoline microscope for which he only paid $60.00 or $70.00 dollars; he intended to turn this instrument over to a family member or friend. This once again demonstrates that one can find a very nice microscope for a reasonable price if you keep your eyes open.

Larry McDavid reported that he received the Nikon Eclipse L150A microscope he previously described. It has 50 to 1000X magnification with 10X eyepieces and bright field/dark field episcopic illumination with polarizers. The long working distance 100X objective has a NA of 0.90 and is air-spaced, not oil immersion. Larry is still waiting for the video imaging system to be installed, however and promises some pictures when complete.

Stuart Warter introduced the group to a very unusual J.B. Dancer student microscope with a height of 14 inches. This microscope was intro-

duced in the 1873 catalogue as his 'New Cheap' microscope. It was to have replaced Dancer's small Lister limb microscope that was produced for quite a number of years. The basic difference was that this new model was of the bar-limb pattern having uprights and a reverse claw foot. The foot itself was of cast iron and featured as part of the casting the signature of the maker. The fine adjustment is located on the arm and sensitive enough for making measurements of up to 1000th of an inch. The main tube has a knurled ring, which allows ones to lock the drawtube in the position of choice. The other curious feature of this microscope is the eyepiece, which had only a single achromatic eyelens element with no field lens.

John deHaas exhibited a very rare and quite large microscope made by the Gundlach Optical Company of Rochester, New York. John stated that this particular Gundlach was rather poorly made and the brass was substandard when compared with other well-known makers of the time (see illustration). It should be noted that this model must have been one of the last in the Gundlach Optical Company line, as it is of the standard Continental pattern. This design was introduced in the late 1890's and certainly after 1896. By 1902 the firm had been purchased by the Gundlach Manhattan Optical Company of the same City.



Reino Mascarino brought in the limb of an Olympus Vanox microscope, which was set up for examination by the members with the intention of resolving the problem of attaching the 100-watt illuminator. His problem was quickly resolved to which he expressed satisfaction and gratitude.

The meeting was adjourned a few minutes before 12:00 and the group moved to the local Coco's restaurant for lunch.

Biographical Notes on Dr. Joseph F. Burke.
Joseph Burke was a consummate diatomist who dedicated most of his life to the popularization of his favorite microscopic life forms. During his long-standing membership with the New York Microscopical Society he spearheaded the Society's educational efforts dedicated to the diatoms. He was responsible for regular classes and workshops associated with every aspect of the subject. His

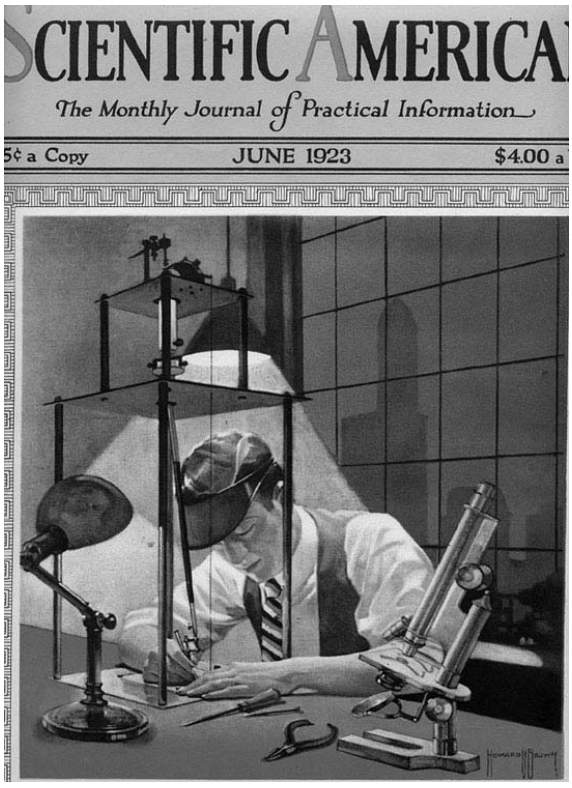
classes required the members to acquire specific books and literature as part of their study. The two publications that he always required new members to purchase were *Taylor's Notes On Diatoms; An Introduction to the Study of the Diatomaceae* (1929), and *Dr. Pascher's series of Die Süsswasser-Flora Mitteleuropas; No.10: Bacillariophyta (Diatomeae) by Friedrich Hustedt* (1930). These books were essential reading for the workshops, and a must if you were to keep up with the program. He also scheduled a great many field trips, which were well attended and sent the participants up and down the eastern seaboard I still have a few of Mr. Burke's invitation post cards that were sent out to Mr. Bill Sokol, who began his interest in diatoms through the influence of the this active program. Mr. Sokol was originally from New Jersey and later became a long-time member of the Los Angeles Microscopical Society (now the MSSC) before his death in 1994.

Mr. Burke was awarded an honorary Doctor of Sciences degree at the *Wagner College Commencement Exercises* on May 31st of 1990. This was a great source of pride for both Mr. Burke and the *Staten Island Institute of Arts and Sciences (SIIAS)* with which he was associated for many years. Mr. Burke's interest in the Natural Sciences first brought him to the Institute in 1924 when he enrolled in a nature study group at the Museum. He continued his associated with the *SIIAS* as a volunteer and also as a member of the Board of Trustees. Mr. Burke's friendship with William T. Davis, back in the 1920's, led to his continuing pursuit of knowledge in the field of Natural Science and his association with the Museum. His continued participation led to the eventual formation of may study groups and organizations at the Institute.

On April 15, 1928, Mr. Burke was elected a member of the *Staten Island Institute*, and he continued that happy membership until his death. For much of that time you would find him in the attic of the Museum pursuing his continuing study of the diatoms (one-celled microscopic plants), which held his interest for most of his life. His love of the subject earned him the title of Honorary Curator of Diatoms at the *New York Botanical Garden* from 1940-1961.

Mr. Burke was elected a life member of *SIIAS* in 1932 and the same year was named Honorary Curator of Books and Minerals. He was named to the Board of Trustees in 1934. He was also the Editor of *Proceedings*, the annual publication of the *SIIAS* Archives. He was named Member Emeritus, Board of Trustees of *SIIAS* after continuing active membership for more than 50 years. His most important publication was *A Review of the Genus Aulacodiscus* (1963-1974). This was a joint authorship between Burke and John B. Woodward and was published by the *Staten Island Institute.* This was a monumental work on the *Aulacodiscus* having 360 pages and 30 full-page plates. Most of the photomicrographs used in the plates were taken by Colonel A. Brigger, who incidentally was also a member of our Society and the finest amateur diatomist on the west coast.

Omission from May's workshop notes: *"Engraving Spy Messages on the Head of a Nail",* shown by Jim Clarke



The Magpie and the Packrat

by Dave Hirsch

In his introduction to the book of compiled microscope catalogs titled: "Maison Nachet: Catalogs of Stock from 1854 to 1910", Prof. G. LE. Turner writes, *"The collecting of old scientific instruments is gaining rapidly in popularity, no doubt for the reason that it satisfies intellectual curiosity, as well as the simple magpie instinct."* Prof. Turner's use of the term 'magpie' may be considered controversial, because the magpie is a bird "distinguished for its chattering and thievish habits". Alluding to someone as a magpie is apt to earn the caller a retort. The term 'pack rat', which in itself may be offensive to some people, seems more appropriate, because it applies to "One who collects or hoards, especially unneeded items". Furthermore, the word 'unneeded', bears scrutiny because of the adage which states "One man's trash is another man's treasure."

Collectors of objects microscopical, range in their objectives (no pun intended), from the specialist to the catastrophically indiscriminate collector, or pack rat. The specialist is concerned with objects in the microscopical milieu, and may be so far to the right, that his collection features only one type of item - compressaria, for example. Next in the collector's spectrum might be the person who collects microscopes of a given maker. Finally, there is the collector of microscopes, accessories, books and other objects of microscopical relevance, regardless of origin. This category appears to be the most popular, and the collector may also have a secondary interest in scientific instruments in general. In addition to microscopically oriented artifacts, he will collect diverse instruments such as spectroscopes, sextants, barometers, chronometers and other scientific objects of virtu.

Vintage microscopes and related accessories are fonts of knowledge both from the historical and the scientific aspect. The collector thus possesses examples relating to historical development, besides displaying the instrument maker's attention to details of form, fit and function. In a practical sense, the collector-cum-microscopist can go back in time and repeat the observations carried out by the original owner and therefore experience discoveries as if for the first time.

The astute collector will want to learn all he can about the instruments in his possession. To fulfill this need, a reference library is mandatory. He will collect books relating to the provenance and function of microscopes. Books by Beale, Carpenter, Hogg, etc., for example, might still be found in antiquarian bookshops or through dealers in vintage scientific instruments. The same holds true for catalogs, originals of which are relatively scarce. Catalogs such as the previously mentioned Nachet reprints, are another source of detailed information concerning the maker's products, as are publications of microscopical societies, such as the Royal Microscopical Society (RMS), the Postal Microscopic Society (PMS) and of course our own MSSC.

The collector might have a totally unrelated side interest, such as baseball cards. This is a deviation in our collecting activity which applies to many of us. The serious collector of microscopes and related books and paraphernalia is far from being a pack rat - until he deviates from his microscopical milieu and begins to acquire non-microscopical objects, such as firearms, coins, stamps and the like. 'Pack ratting' is a progressive and obsessive condition whereby the person is reluctant to get rid of any material object because he will "have a use for it, eventually".

The certified pack rat is situated at the tail end of the collector hierarchy. He collects - everything! His home, from cellar to attic; his garage and any other available space is crammed with objects which "may come in handy, someday". To the

bonafide pack rat, that day never comes, and he may be oblivious to the reality that one day, he will join his fellow gatherers in that great collector's conclave in the sky. He will then look down in horror on a bunch of rampaging people, similar to a feeding frenzy amongst the sharks, groping through his treasures which may end up in the trash can, a thrift shop or at a yard sale conducted by his next of kin.

A gentleman of my acquaintance, is the human equivalent of Neotoma cinerea; alias the pack rat. We met quite by accident some years back, in an antiquarian bookstore in Manchester, England. He struck up a conversation after he noticed the R&J Beck portable microscope I was carrying. I had purchased the instrument earlier that day in a nearby antique shop. His interest and knowledge of old microscopes seemed extensive, and he spoke at length about his collection of pre-1900 instruments. Finally, I was invited to his home to examine his collection of microscopes and accessories.

I expected that my new-found friend would escort me to his 'Instrument Room'. Instead, he fetched a few microscopes for me to examine. The instruments he retrieved, were somewhat disappointing. I had my mind set to salivate over a Cuff, or perhaps a Ross or a Martin. Instead, he showed me some drab-looking French drum microscopes, a Society of Arts stand, and what may have been the piece de resistance from his collection, a seedy Crouch monocular from the 1870 period. The microscope was in a case held together by twine. The case also contained fragments of wood which had broken away from its interior, intermingled with a quantity of mixed accessories and mouse droppings.

My preservationist alter-ego cried out in horror at the sight of such wanton sacrilege and I offered to purchase the Crouch, if, for no other reason, than to bring it back to its original form. My host refused to part with the ensemble, stating that he would restore the microscope set when he "got around to it".

I tried to be diplomatic, making sure that my comments were sincere, without being patronizing. It seems that I said the things he wanted to hear, because he asked me to visit his cellar, where he kept most of his collection. I was a bit apprehensive, hoping this was not a ploy to do me in and swipe my newly acquired Beck microscope. My paranoiac suspicion was totally unfounded even though he inquired several times if I wanted to sell the microscope.

The cellar was dank and musty, with overhead beams less than five feet above the dirt floor. The low overhead reminded me of a gun deck aboard the HMS *Victory*. The environment was just right for growing mushrooms, or for putting up sauerkraut. Under these conditions, I witnessed a sight most atrocious. Here, stood a large mahogany case crammed with books, many of which were heavily encrusted with mold and efflorescent substances. I was appalled after reading the titles on some of the books. I saw two volumes by Pritchard, *"History of Infusoria"* (1861) and *"History of Infusorial Animalcules"* (1852) and other books well known to the microscopist and collector. Most of the books were first editions. Included in this sorry mess were dozens of valuable 18th and 19th century volumes, in sundry stages of deterioration, thoughtlessly forced to spend their last days in a damp and lightless environment. Dealers and collectors of antiquarian books would kill for less.

The rest of the area was loaded with stuff that he had picked up at flea markets, yard sales and possibly from neighborhood trash cans. Various items such as a baby scale, bird cages, tobacco tins, stacks of yellowed newspapers and castoffs of every description filled most of the available space. In these dismal surroundings, reposed the accumulations of a person well deserving of the title of Pack Rat. On the plus side, his stock of goods could give historians and archaeologists excellent insight into the industrial output of 19th century civilization.

continued on page 24 ...

MSSC Practical Workshop No. 3
Rheinberg Illumination

delivered by Jim Solliday, reported by Pete Teti

9:00am 22nd June 2002 at New Roads School

On June 22nd, 2002 Jim Solliday conducted a hands-on workshop for members of MSSC illustrating Rheinberg color contrast illumination.

Jim began by showing some slides of diatoms to illustrate the effects of Rheinberg illumination. He then provided members with a set of the necessary materials (much of it at his own expense) to make special color filters. The first job in making multiple color filters requires a special tool to punch-cut circular filters of different colors. These filters were cut again in segments of halves, thirds or quarters. Various segments were combined to make one multicolored filter. The finished Rheinberg filter is then placed between the condenser and light source. The effects of Rheinberg color contrast illumination on diatom specimens is very dramatic. The illuminator not only shows the diatom specimen with extreme clarity but it also becomes stunningly beautiful to view.

We greatly appreciate the knowledge Jim shared with us at this workshop, on both microscopy in general and more specifically on his expertise in making and using the Rheinberg color contrast illumination filters.

There follows an article written by Jim providing the information he gave out at the workshop:

Inventor: Julius Rheinberg (1896), first published in the *Journal of the Royal Microscopical Society* (JRMS, 1896, pp.373)

The Authors Definition:
"*On an addition to the methods of Microscopical Research, by a new way of Optically producing Color-Contrast between an Object and its Background, or between Definite Parts of the Object itself*" (JRMS, 1896). Sometimes referred to as **Optical Staining**.

Justification:
One of the fundamentals of microscopy is the method and mode of illumination.

Rheinberg's Motivation:
Experiments were done to find a method, without chemical staining, of causing an object and its background to appear differently colored (optical staining) and so secure greater visual contrast. The goal is to cause an object, when viewed through the microscope, to assume any desired color upon a background of any other color and by this produce a greater contrast then normal (RMS, 1896).

Savile Bradbury wrote a short paper on Rheinberg illumination in which he described it as having three important advantages: *"It's informative, it's attractive and it's cheap."* He defined it as, *"related to dark ground illumination, a condition where all the direct light entering the objective is of one color whilst the light diffracted or scattered by the object itself has a different, contrasting color."* The filter is fitted into the front focal plane of the condenser; usually the filter holder is located sufficiently close to this plane of the condenser for success.

Explanation:
The way in which this result can be obtained is to place transparent filters, the central and peripheral (marginal) parts of which are differently colored or are colored in certain parts only, in an appropriate location within the axis of the illumination (RMS, 1896).

Julius Rheinberg developed three different methods for producing his color contrast.

1. **Substage Rheinberg filters**, using the maximum numerical aperture of the condenser. This produces contrast between the object and the background, to be used primarily with low power objectives.

2. **Color Mixing** (producing primarily a white background with colored objects), used with all powers.

3. **Diffraction method** using a filter within the objective, used with all powers.

The workshop will be concerned only with the first method (substage color filters), as the second two methods did not achieve general use and are beyond the scope of this workshop.

Equipment Needed:
The essential supplies needed to put together your own Rheinberg filters are few but sometimes troublesome to find. At the end of this lesson plan you will find a list of locations and outlets where most of the supplies can be found. If your microscope does not have a filter holder as part of your substage condenser, you may wish to replace it with one that does or cut a tube out of black PVC that can be placed on to your field-lens (on the illuminator) at the base of your stand. The Rheinberg filter can be held just beneath your substage condenser at the top of this supporting tube. In my case I use an Olympus Vanox microscope that does not have the filter holder, so I have replaced the condenser with a substitute. The following is a list of supplies need for the project.

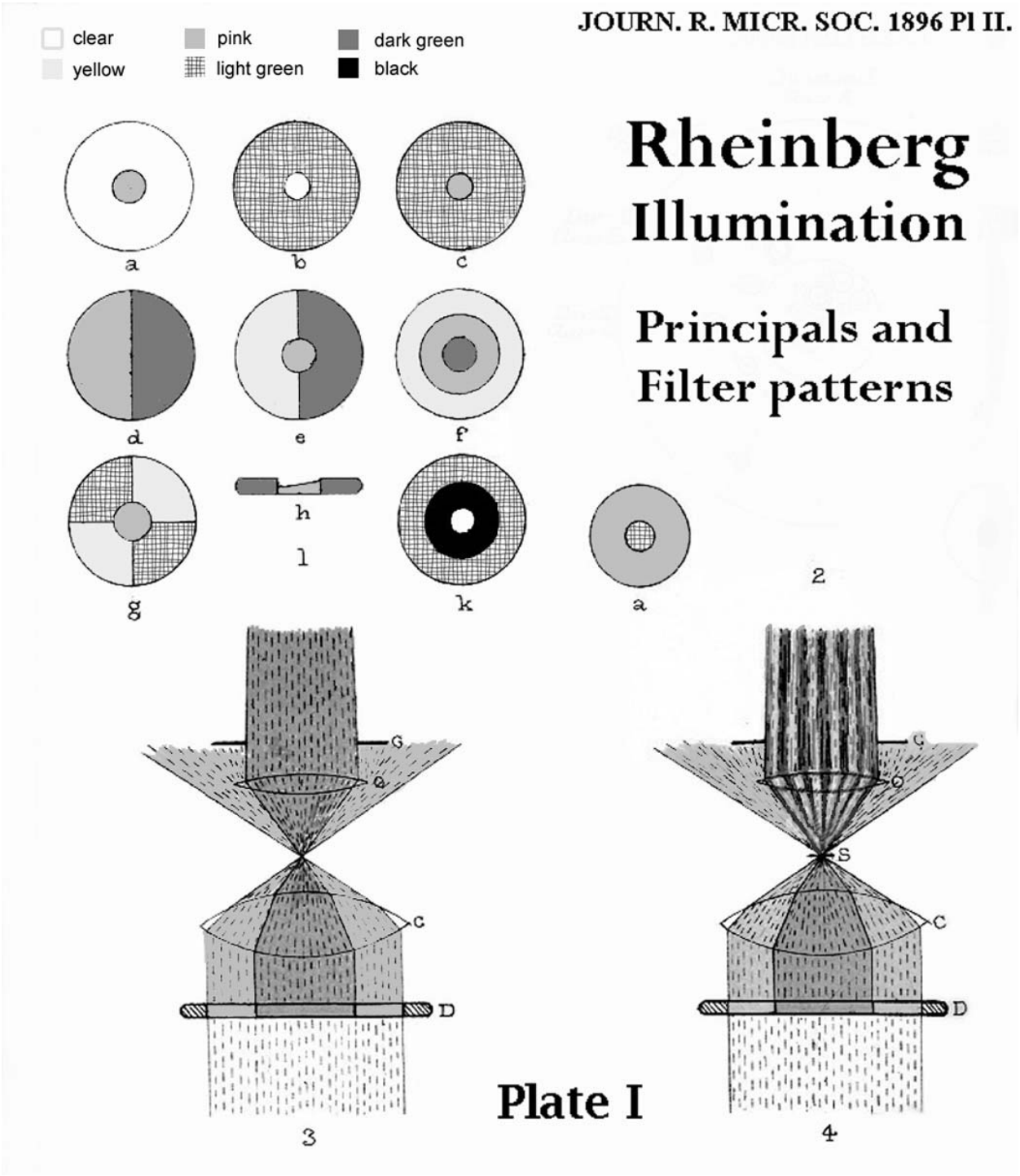
1. Filter blank of the size that will fit into your substage filter mount. A common light blue filter will suffice. If none are available a plastic sheet 1 to 2 mm. thick can be found at a home supply outlet. If you have a drill press you can use a holesaw to cut out a number of plastic discs that will serve the purpose nicely.
2. Acetate or gelatin filter sheets (often found at professional camera stores).
3. Spray mount artist's adhesive (liquid cements or glue often dissolve the acetate).

4. For cutting the acetates you can use a circle cutter and a set of hollow or hole punches.
5. A circle template (mechanical drawing circle guide) for measuring and centering.
6. Pinhole stop or focusing telescope (used for determining axial stop size).
7. Quadrille graph paper (4 squares per inch) and pencil for centering target.
8. Tweezers for manipulating your cut pieces of color film.
9. 2mm thick paper boards for your work surface.
10. X-acto knife and scissors for fine trim work.

Methods:

With supplies at hand and ready to go, the first step is to determine the size of the stop you will need to produce the proper Rheinberg effect. One very important point is to know that for best results each objective on your microscope should have its own set of filters. Any Rheinberg filter that is made for your 10x objective will not work on your 40x objective. The stop used for the 10x should be about 30% smaller in diameter than the one for the 40x. It should be remembered that the numerical aperture of the 40x is much greater and requires a larger stop in order to provide the proper background color. The proper stop size for the 40x will almost completely obscure the N.A. of the 10x and leave no cone of light for the illumination of the specimens. What I suggest is to prepare a set of Rheinberg stop gauges. Five filter blanks (that fit your substage condenser) are selected which will be fitted with darkfield stops. Five stops are cut using your set of hollow-punches, you can use either mirrored paper or black crate paper. You should have four or five different sizes; say a stop of; 9/16th, ½, 7/16th, 3/8th and ¼ inches. These stops are centered and pasted onto your filter blanks and on the back side are affixed circular labels that are marked with the appropriate size. After placing the first gauge into your filter holder you will remove your eyepiece and insert a pinhole stop. A focusing telescope can be used if available. You should have the condenser racked fully up (almost in contact with the slide); a slide should be on the stage with an area selected that is **without a specimen**. Replace each gauge moving them side to side while in position until you find the size that covers the entire back focal plane of the objective (with 20% overlap which will insure complete central coverage). If you examine the diameter of the back focal plane, there should be a 20% overlap extending outside the field. This will determine the size of the axial stop you will use with this particular objective. If you have a focusing telescope you can also close down the diaphragm of the condenser until it appears on the edge of the field, back it off about 20% and remove the condenser and measure the diameter of the aperture opening. This will give you the size of the stop for the objective used during the procedure. The advantage of making the stop gauges is that they can be used instantaneously whenever desired and in addition serve as darkfield stops for all your objectives (up to the 40x).

Now that you know the proper size of the central stop you can proceed with the assembly of the filter. Using a circle cutter or scissors, cut out a circle of film that will cover the entire filter blank.

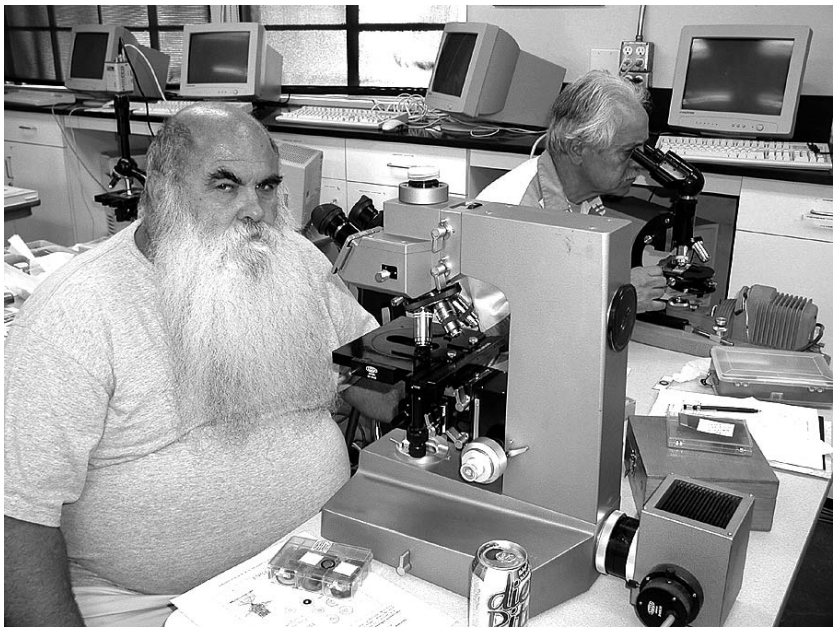


This will be the color that will end up on the outside margin of the filter (the annular filter ring). It should be the color you wish for the specimen. This color should be a contrasting color compared to the central stop. You do not want a color that will mix or blend with the central color; it should be on the opposite side of the color chart such as two primary colors. The central stop needs to be at least three times darker then the outer color. A good example would be a dark blue stop with a bright yellow rim. Remember that when in use some of the blue will be optically mixed with the yellow producing a yellow-green color on the specimen. The yellow ends up being brought closer to the blue in the process. You might wish to avoid using a color like red on the outer ring as red will result in illuminating the specimen and because it is of a rather longer wave-length than

say, green, will produce a hazier image at the higher powers. In the case of those two colors you would want red in the center and green on the outside.

Now that you have cut your 'yellow' piece, you should lay down your grading paper and draw a cross using the papers lines as a guide. Using the drawing circle guide, draw a circle the size of your microscope's filter, making sure the circle is situated so that the crossing lines are directly in the center. Using the circle guide over the crossed lines draw a smaller circle the size of the stop you intend to use for the middle of the filter. It should end up perfectly centered and will be used to guide your cut and placement of the final stop. You will need a hard board that will act as a table surface for cutting with your holepunch (you cannot use pine or any soft wood). It helps to add a piece of 1mm. thick paperboard over the hard wood. Next locate the holepunch of the same size as your central stop. Take your target and place it on the board surface, then center your yellow filter of film within your target. Using the central circle you previously created as a guide, punch out a hole from the center of the yellow filter. Trimming the inside edges with your X-acto knife if needed. You should now have a yellow filter with a hole punched from the center. Next, place your dark blue film on the board and tap out a circle the size of your central hole diameter. You now have all you need for assembly of the filter.

Lay down a piece of paper towel and place the clear filter blank in the center. From about a foot away apply spray adhesive to the blank.There should be no excess and you need only a very spotty or thin coating of adhesive. Next, place the blank filter with the sticky side up back on your target. With your tweezers carefully add the yellow annular ring over the blank; next add the blue central stop. The film should stick perfectly and can even take a little squeeze between the thumbs to help firm it in place. What I always do is add a second blue central stop over the top of the first. This gives you the proper density and reduces the amount of color mixing. Acetate film usually does not come in the proper density for the central Rheinberg stops. The finished filter does not need to be perfectly clear and can be a bit diffuse without any negative effect.



You should now have a usable Rheinberg filter. The background will be blue and the specimen will be bright yellow-green. You can produce any arrangement of filter you need. For example the outer color ring can be divided into two, three or even four colors. It requires more manipulation with your cutting and applying onto the sticky surface of the blank, but with a little practice it usually comes out perfectly. You can also follow the same procedure when making filters with larger central stops.

References:

Journal of the Royal Microscopical Society, 1896, pp.373, Transactions of the Society,
The Illustrated Annual of Microscopy (1898).

Sources for Supplies:

Color acetates and gelatins can be obtained from: Product, RSCOLX or Rosco cinegel.
Calumet Photographic, Inc.
1430 South Village Way, Suite A. Santa Ana, CA 92705, 714-285-0143 (ask for sample packs).

Color sheets of acetates, plexiglass sheets (blanks), X-acto knifes, spray adhesive.
Pearl Art & Crafts
7227 Edinger Ave. Huntington Beach, CA 92647, 714-903-5100

Sterling Art
18871 Teller Ave. Irvine, CA 92612-1614, 949-553-0101

Aboveground Art Supplies (Grafix, acetates). 2 Paper Ave. Toronto, Ontario, Canada, M4M 2V6, 416-469-0304. Their retail store is at 74 McCaul St. Toronto, Ontario M5T 3K2, 416-591-1601

Hollow punch sets can be easily found on ***eBay*** or hardware stores.

Fiskars Circle Cutter:
McLean & Ballard Hardware
5843 Margate Blvd. Margate, FL 33063
800-441-4223 and 954-972-1711,
www.acehotline.com

The Magpie and the Packrat by Dave Hirsch

Continued from p18 ...

So much for magpies and pack rats, so be forewarned! - The next time you stoop to pick up an empty Bic lighter (the flint and spring might be salvageable) or, come across a remnant of two by four lumber (it will save you a trip of the lumber yard), please resist the temptation to retrieve. You will be surprised how quickly your living space can fill up with stuff you may find a use for some day, but never do. Save your energy and reserve your enthusiasm (and cash) for the pleasure of learning about and collecting microscopes, accessories and books! □

MSSC Meeting

Reported by Leonie Fedel, Meeting photos by George Vitt and Jim Solliday

7:00pm 19th June 2002 at New Roads School.

Jim Solliday called the meeting to order and made an announcement. He gave the Society's heartfelt thanks to Alan deHaas for donating two new worktables for use in workshops. Dave Hirsch also thanked Alan for donating the proceeds of his 'tail gate' sale of microscope related equipment at the Saturday workshop in May.

Jim mentioned that there was an article which may be of interest to members in the *Microscopy Today* magazine, on setting up the digital camera for taking photomicrographs.

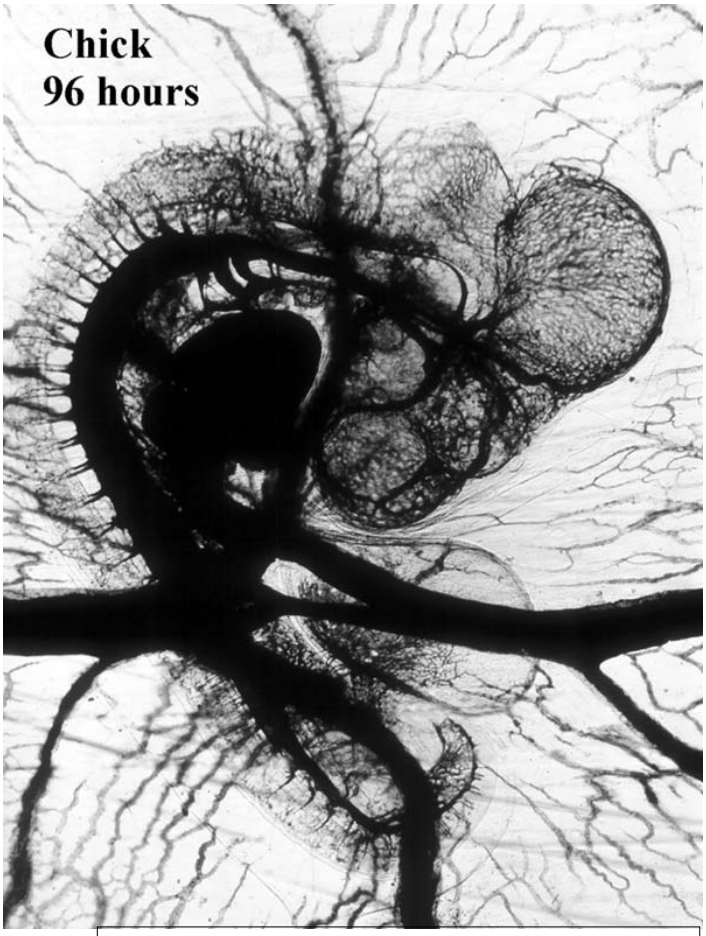
John Field was present at the meeting and he described the exhibit the Society helped put together called *"History of the Light Microscope"*. This can be viewed at San Francisco International Airport until August, 2002. See www.sfoarts.org for details.

Jim welcomed a new member, Roy Hackett to the meeting and to the Society. He also welcomed Paul Soper (Leonie Fedel's father) who was visiting from the UK.

Jim then explained that the speaker for this meeting was to have been Gary Hard, a forensic scientist who was going to give a talk on the Anthropology of the Microscope. Mr. Hard, unfortunately, had to cancel at the last minute due to being stuck in traffic caused by a large accident on Los Angeles' notorious freeways. The Society will try to reschedule Mr Hard for later in the year.

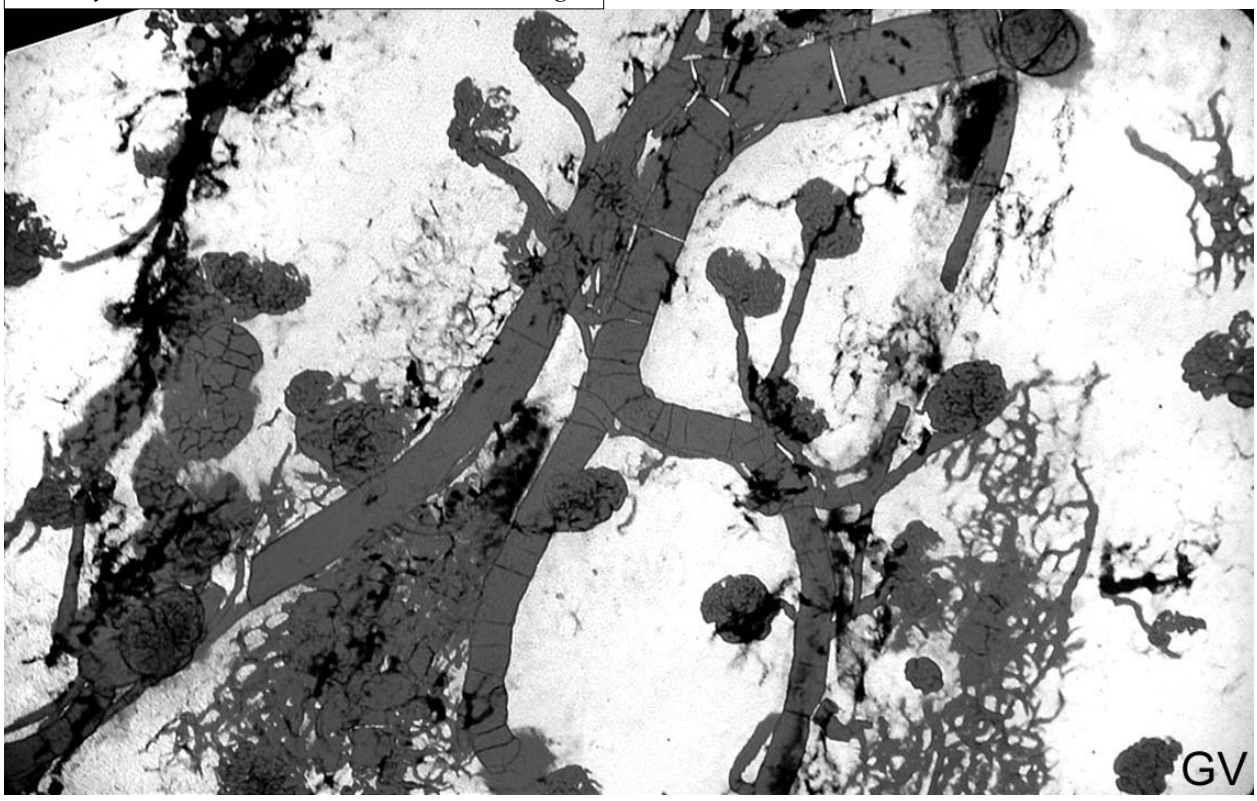
Instead Jim Solliday and Stuart Warter gave a presentation of slides from various makers covering insects, diatoms, animal tissues and the embryonic development of the chick. Dr. Field gave an informative improptu lecture on the kidney photomicrographs.

The meeting adjourned at approximately 9.30pm.



Injected Chick Embryo at 96 hours

19th century slide showing the wax injection of a kidney which John Field disucssed at the meeting

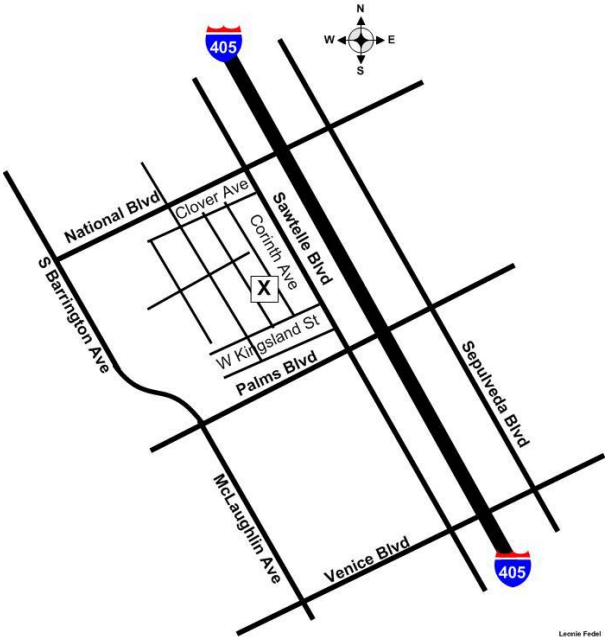


Saturday Workshop Announcement

9:00am 6th July 2002

At the home of Izzy Lieberman

3300 Corinth Avenue
Los Angeles CA 90066
310-391-6076



This workshop will be held at Izzy Leiberman's. Activities will start at 9:00am. As usual this is a chance for good friends and 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.

Lunch after the workshop will be at the local Coco's. If you have any questions please send me a message. I look forward to seeing all of you at the workshop...

Jim Solliday (MSSC President).

Practical Workshop Announcement No. 4 - Microscope Maintenance

9:00-12:00am 20th July 2002
at New Roads School

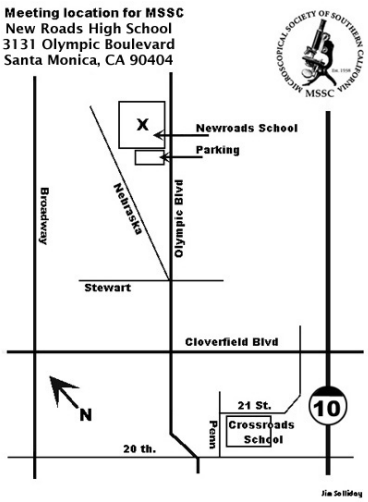
Alan de Haas and Allen Bishop will lead this workshop on maintenance and care for the microscope. Contact Pete Teti for further details and to sign up for this or future workshops. Tel (323) 660-9259 or email tetip@earthlink.net.

MSSC Meeting Announcement

7:30pm 17th July 2002

at New Roads School

Our guest speaker will be Emily Foley with a presentation entitled Biotechnology for Dummies focussing on DNA fingerprinting through the use of DNA separation and analysis by gel electrophoresis. Following the presentation, members will participate in running DNA samples through the gel electrophoresis apparatus, analyzing the results, and ultimately identifying the murderer in a given case study. Dinner beforehand at Coco's restaurant at 5:30pm (near Ocean and Bundy, Santa Monica)



EDITOR'S NOTE

Many thanks to the MSSC Editorial Committee for their support, advice and hard work in assessing material for the Journal, polishing up the graphics, reading the drafts and getting the Journal printed and distributed. It is the hard work of this whole team that produces our outstanding Journal. My job being to coordinate the contributions and layout the print quality product is only part of the process!

It is your Journal and to stay a success it needs your contributions too. Please send any articles, photos, member profiles, notifications of forthcoming events and website summaries for inclusion in forthcoming journals to me at:

Leonie Fedel
10945 Rose Avenue #209
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(310) 839-9881, email: mssc@attbi.com

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 would be happy to help.

Leonie Fedel (Editor)

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

Jim Solliday (President)
Dave Hirsch (Treasurer, Printing & Distribution)
Alan deHass (Education Chair)
Leonie Fedel (Layout Editor)
George Vitt (Image Editor)
Allen Bishop (Copy Editor)

Want to advertise in the Journal?

We are also happy to include advertisements within the Journal either from individual members wanting to sell an item to other members, or from companies wishing to promote their products and services to the MSSC membership. If you wish to place such an advert, please contact our Treasurer, Dave Hirsch for further details and charges.

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