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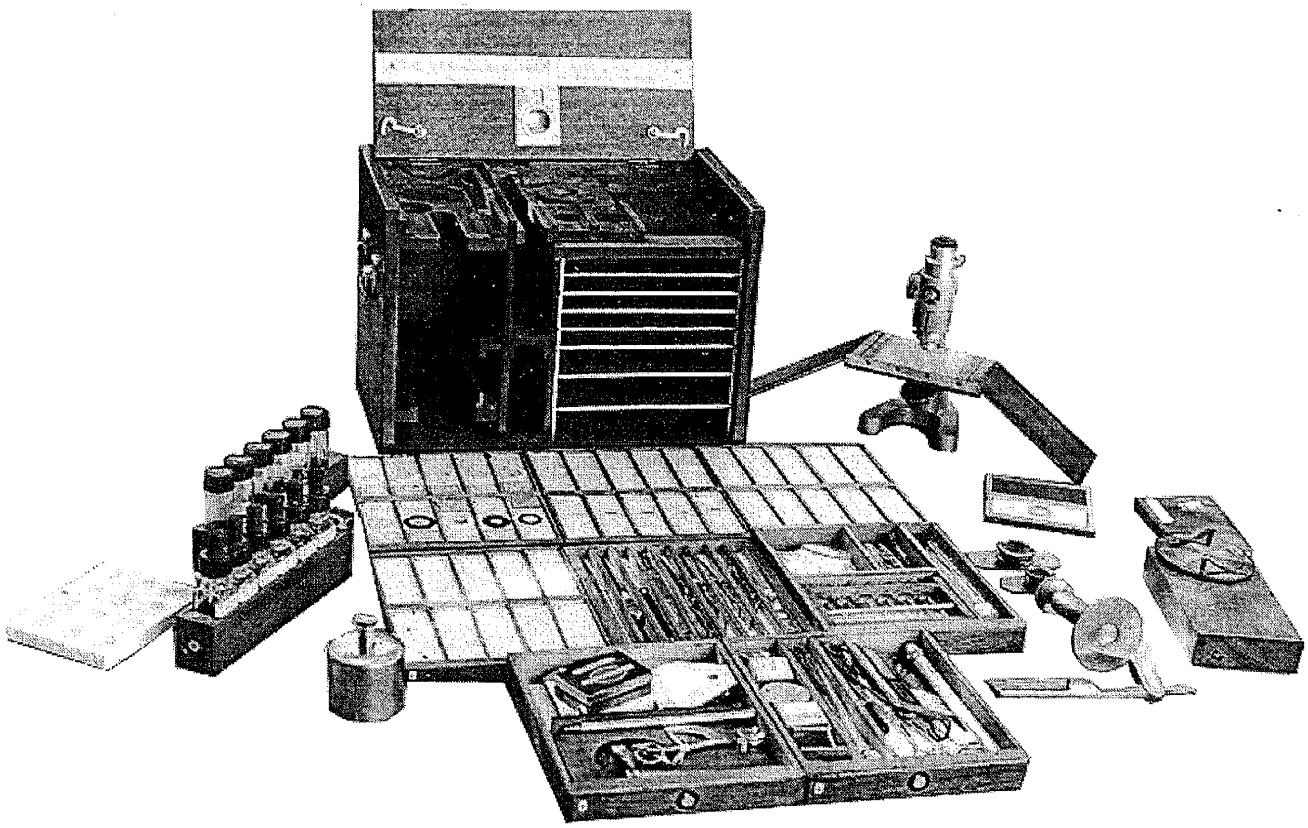
THE MICROSCOPICAL PRACTITIONER'S WORK CHEST

David L. Hirsch



The purpose of this discourse is (a):To evaluate, design, and fabricate a microscopical practitioners work chest; (b):To assemble and study the collection of vintage and contemporary instruments and apparatus used in the practice of microtechnique.

SELECTING THE CANDIDATE WORK CHEST. A search through several period books and catalogs relating to microscopy revealed a number of 19th century work chests which provided material for reference. Information so derived established criteria germane to the design of the work chest and selection and integration of the contents.

PLANNING AND DEFINING THE TASKS. A work breakdown structure entails dividing the overall project into a series of small related tasks. Since our objective is to design and build a work chest for holding materials and supplies used in microtechnique, we proceed accordingly to create the necessary 'job packages' which include the following; Conceptual Design and Development, Selection and Procurement of Materials,

Prototyping and Fabrication, Fitting and Final Assembly of the Work Chest, Finishing, and lastly, Outfitting the Work Chest.

CONCEPTUAL DESIGN AND DEVELOPMENT. To assure proper fit of the chest contents, gather all components and determine where the items will be situated in the chest. Where feasible, similar items should be close to each other, and easily accessible. Start with rough sketches showing arrangements of the components. To determine the actual arrangements, a brief series of full scale technical drawings should be made showing the necessary detail. To aid in gathering materials, prepare a Bill of Material listing the part, size, quantities and type of material. If the specified material or part is not available, consider the use of alternates.

FEATURES OF THE MICROSCOPICAL PRACTITIONERS WORK CHEST. The cover consists of a front panel hinged lengthwise at the top to a horizontal panel which, in turn, is hinged to the back panel of the case. Secured to the top rear of the top panel are a pair of wood brackets which are arranged to swing toward the rear of the chest. When the cover is fully opened, the extended brackets relieve stress on the adjacent hinges and keep the cover assembly from dropping backward. To close the chest, a pair of brass hooks secured to each side at the bottom of the front panel engage with a pair of round head brass wood screws in the outer edge of the chest floor close to each side. A front mounted brass flush bail is used for lifting the cover. A pair of 2.50" brass bails assembled at the center on each side of the chest act as handles for carrying the work chest. (Fig. 1).

Externally, the chest measures 12.25" wide x 8.00" long x 8.50" deep. The internal measurements are: 11.375" wide x 7.50" long x 7.563" deep. The internal volume is 645.17 cu. in. or 0.482 cu. ft. The chest weighs 16.5 pounds empty and 24.5 pounds with all of the contents in place. There are eight stacked drawers in the right hand side of the chest, all of which are 5.875" wide x 7.00" long. Starting from the bottom, 2 of the

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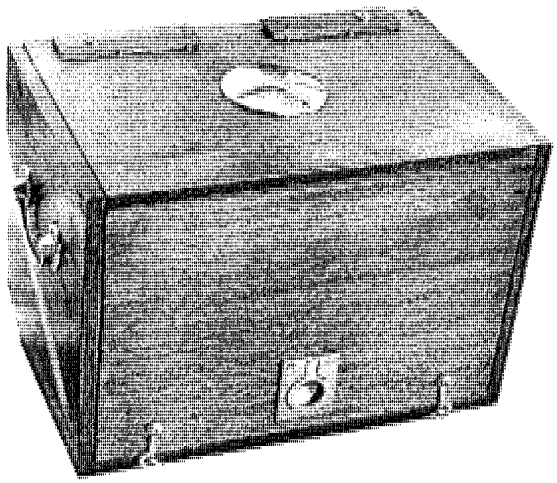

Fig. 1 The microscopical practitioners work chest

drawers are 1.00" deep. The third drawer is 0.875" deep and the remaining uppermost drawers are each 0.50" deep. (Figs. 2 and 3). The floor panels of all drawers consist of 0.030" thick epoxy impregnated woven glass. The center portion of the chest is divided into two stacked sections, each of which is 1.25" wide x 7.125" long x 3.19" deep. The lower section is fitted with a rack containing six glass vials with screw-on caps. The upper section is fitted with a rack containing six dropper equipped glass bottles. Both racks are removable from the chest. The left hand side of the chest is fitted with rails and ledges for holding a microscope, a porcelain sampling plate, a Thoma counting plate, a brass alcohol lamp and a dissecting stage attachment for the microscope. The surface immediately below the horizontal cover panel is partitioned for additional storage. The left hand section contains a pair of hand rests and a mounted lens for the retrofitted dissecting microscope, a hand held microtome and a straight microtome razor. The upper right hand section contains two sizes of live boxes, a turntable for preparing slides, and a small notebook.

SELECTION AND PROCUREMENT OF MATERIALS. With the exception of brass cabinet hardware and screws, most of the material used in the work chest came from the author's workshop. The wood case parts are made of 0.375" thick solid mahogany or mahogany veneer having a core of dense particle board. The drawer separators consist of 0.125" thick aluminum alloy sheet. Rack and door knobs are reworked from knurled and slotted brass terminal screws. The wood sections are joined using a high grade carpenters adhesive together with flat head brass wood screws. Brass parts including the side bails, flush handle, round escutcheon, hinges and hooks are from previous buys kept on hand.

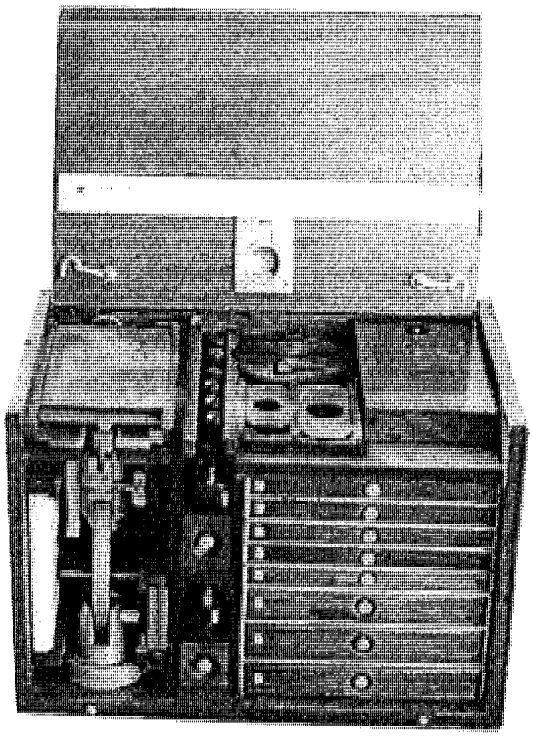

Fig. 2 Outfitted chest

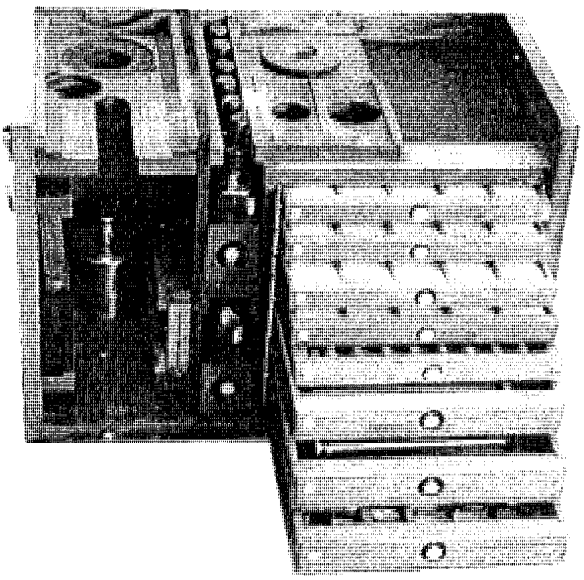

Fig. 3 Details of chest

FABRICATION AND ASSEMBLY. All of the wood and metal chest components are rectangular in shape, simplifying the task of cutting and squaring each piece. A radial saw is used for cutting the wood parts. The squaring operation is done with a belt sander. The aluminum drawer separators are rough cut with a hack saw then squared on the belt sander. The power and hand tools mentioned are easy to use and yield finished parts which are within acceptable tolerances. All parts fit together with a minimum of adjustment. Any slop-over of adhesive during assembly is instantly removed with a damp cloth to prevent marring of the wood

finish. All exposed edges of the aluminum drawer separators are deburred. Edges of wood parts are lightly rounded with fine sandpaper.

FINISHING THE WORK CHEST. All metal fittings are removed before applying finish to the work chest. All wood parts and metal surfaces are checked for scratches, dents, gouges, or other surface defects, then sanded and filled in with a putty stick of the proper color. Next, all surfaces are wiped with a clean lint-free cloth lightly soaked with thinner, and the chest is allowed to dry before staining. An oil base filler-stain; cherry in this instance, is applied sparingly to all surfaces, inside and out with a soft, lint free cloth. After drying for about ten minutes, the stained finish is wiped with a dry cloth. Clear lacquer is applied in a dust free environment by lightly spraying both the interior and exterior surfaces all over, then left to dry. Two more light coats of spray-on lacquer are applied to the exterior surfaces only, and allowed to dry and set for at least one day. Finally, the outside surface is coated with paste wax of high quality and buffed to a bright luster. The metal fittings are wiped with a clean cloth lightly dampened with paint thinner, then left to dry. Two coats of clear lacquer, are applied one hour apart. The second coat is allowed to set for one day before installing the fittings on the chest.

OUTFITTING THE WORK CHEST. The contents of a work chest depend on the type of microscopical activity being pursued. The size and shape of the work chest was determined by the quantity, sizes and configurations of the contents. During the final phases of the fabrication, spatial clearances for the various items making up the chest are checked for the fit of each item. It is now 'Moving Day' and every item to be stored in the chest is placed in its designated location. If all of the items fit, take comfort in a job well planned, but be aware of Murphy's Law which in this case has to do with that IMPORTANT piece which you forgot to include in the contents of the chest. Again, careful planning will minimize the possibility of such an occurrence. By now, the chest appears filled to capacity but there may still be room available for storing those inevitable added items. (Fig. 7)

THE MICROSCOPE. The microscope shown in Fig. 4 can be used as either a single lens dissecting, or a compound microscope. The microscope used here is identified as a 'C&D Minimike,' made in England. Of extremely rugged construction, the base, tiltable arm and body are made of die cast zinc alloy, the rest being made of aluminum. Coarse focusing is facilitated by means of a tension adjustable friction drive. The draw tube allows for a magnification ranging from 100X to 200X. The microscope has a lens system of high quality.

THE DISSECTING STAGE RETROFIT. The body assembly of the microscope is removable as a unit from the split retaining sleeve attached to the top of the arm. A massively mounted double convex lens of 1.5" focal length also fits into the bracket and serves as a 3x dissecting lens. A ball mounted plane mirror is attached to the post portion of the 'horseshoe' foot to provide illumination from below. To enable the instrument to function as a dissecting microscope, it was necessary to retrofit the stand by adding hand rests and a dissecting stage assembly. The two opposite hand rests, 3" w x 6" long x 0.19" thick are made of mahogany and are attached to pegs located on the upper side edges of the dissecting stage assembly. The latter slips over the microscope stage and is secured thereto by a pair of knurled screws assembled to the mahogany bottom plate of the dissecting stage assembly. The upper plate of the assembly is made of 0.093" thick glass frosted on the bottom side and held in place by three brass strips, 0.375" which are secured to the wood portion of the stage using flat head brass wood screws. See Figs. 4 and 5.

THE WARMING PLATE STAND. (Fig. 6) An adjustable low temperature heat source is needed for purposes such as drying slides and evaporating solutions. A drying table assembly and an accompanying brass alcohol lamp were designed and fabricated for such purposes. The drying table base is made of mahogany, 5.5" long x 3.0" w x 0.50" thick. The base top has a 2.0" dia x 0.25" deep cavity for retaining the alcohol lamp. At the top rear of the base is a #1/4-28 NF threaded stud to which a two part, 0.25" dia. nickel plated brass post is assembled. At the top of the post, which is 8.50" long after assembly, a #8-32 NF stud and a knurled nut retain a 2.50" long horizontal arm, notched at the unsupported end to hold a quadrant balance. See Fig. 6. The warming plate assembly is made of 0.050 thick sheet brass, 4.875" long x 3.0 " w, having upper and lower sections separated by a 0.125" air gap. Matching holes are located at the rear of each plate. The double plate arrangement prevents heat from penetrating the metal platform too rapidly. The rear ends of the plates are bent slightly away from each other. The post passes through these holes and the plate assembly can be adjusted vertically by pressing the post ends of the plates toward each other, allowing them to move freely along the post. When the pressure is removed, the plates lock firmly against the post.

THE ALCOHOL LAMP. (Fig. 6) The 2.0" dia x 2.625" overall height alcohol lamp is made entirely of brass, topped with a screw-on cap to prevent the fuel from evaporating during storage. The exposed wick height is set with forceps.

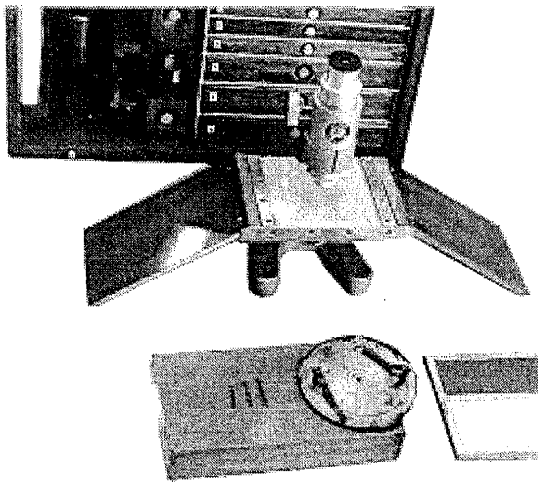

Fig. 4 Retrofitted microscope, turntable and Thoma plate.

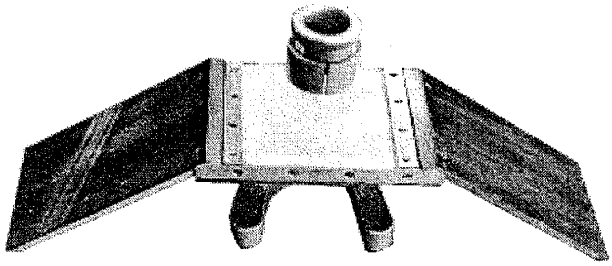

Fig. 5 Dissecting microscope

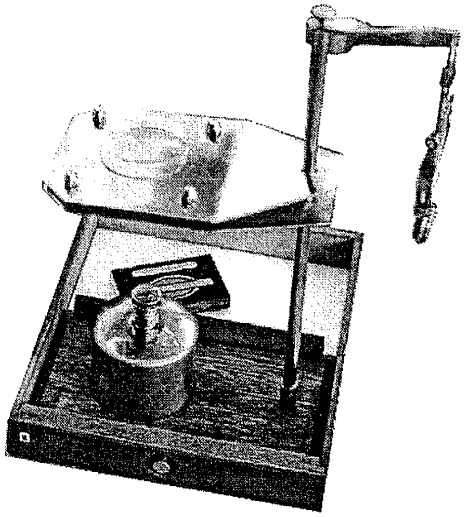

Fig. 6 Drying table and alcohol lamp

LISTING OF CONTENTS.The work chest contents represent a composite array of the items, both historical and contemporary, which were reviewed and considered for inclusion. The chest contents were gathered over a period of time and include items ranging from a circa 1870 mahogany based brass turntable by Dunscombe of Bristol to a modern wafer thin solar calculator the size of a credit card.The custom made devices were designed and fabricated especially for this project. The chest contains more than 130 individual pieces. (Fig. 7).

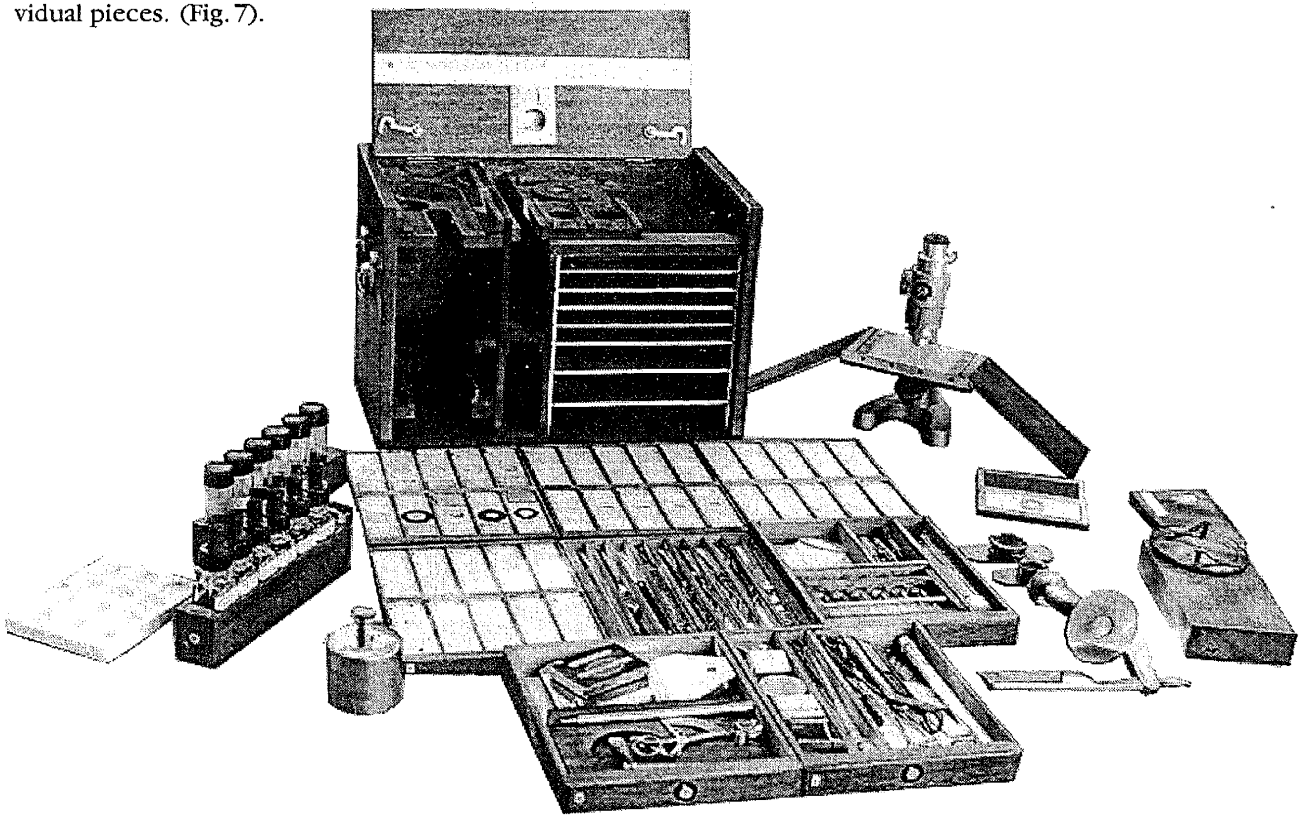

Fig. 7 Display of chest and contents

CUSTOM MADE DEVICES.

1. Dissecting Microscope Retrofits: stage attachment and hand rests.
2. Alcohol Lamp, Brass
3. Vial rack.
4. Dropping bottle rack.
5. Forceps: Plain, straight and curved. Adjustable, straight and hybrid. Ferromagnetic Detector.
7. Warming Plate Assembly, Adjustable

Location In Chest Item

Left Upper	Eyepiece. Dissecting microscope. Hand rests. Microscope, Retrofit microtome; hand brass razor.
Right Upper	Turntable base for slide preparation . Cage, animalcule, brass, Varley's, 0.75" cell dia and 1.00" cell dia. Notebook, small .
Left Lower	Lamp, alcohol, brass . Specimen plate, chambered, porce lain. Stage attachment, dissecting microscope, mahogany microscope, compound monocular with dissect ing option. Slide, blood count Thoma, in wood case. Flask, Erlenmeyer, Pyrex. 4mm.
Center, Upper	Rack, dropping bottle, mahogany. Dropping bottles with distilled water and solutions of: Bismark brown, Gentian violet, Indigo carm, Methyl violet, Romanowski.
Center Lower	Rack, screw cap vials with: acetic acid, Canada Balsam, Chromic Acid, Glycerine, Potassium Bichromate and Potassium Hydroxide.
Right Lower	
Drawer A	(10) Slides, 1"x 3", Prepared
Drawer B	(10) Slides, 1"x 3", Blank
Drawer C	(10) Slides, 1"x 3", Blank
Drawer D	(10) Slides, 1"x 3", Blank Cavity
Drawer E	Dividers, Brass, 4"
	Forceps, Brass, 4.00", lg, Plain, Straight
	Forceps, Brass 4.00", lg, Curved
	Forceps, Brass 4.00", lg, Adjst., Straight
	Forceps, Brass 4.00", lg, Adjst., Curved
	Forceps, Brass 4.00", lg, Adjst., Hybrid
	Forceps, Brass5.00", lg ' ., Detect
	Marker, Diamond Tip, 6.00" lg
	Probe, Straight Tip, 5.25" lg
	Probe, Bent Tip, 4.38" lg
	Scale, Steel, 6.00" lg
	Scalpel, Straight Blade, 5.00" lg
	Scalpel, Curved Blade , 5.75" lg
Drawer F	Forceps, Cover Glass, Steel
	Litmus Paper, Blue, Acid Testing
Drawer F - Cont.	
	Litmus Paper, Pink, Base Testing
	Pipette, Blood Count, Leitz, 4.125" lg
	Rack, Test Tube, Mahogany
	Tablets, Stain, Indigo Carmine, 0.10 gm
	Tablets, Stain, Methyl Violet, 0.06 gm
	Tablets, Stain , Bismark Brown, 0.10gm
	Tablets, Stain, Gentian Violet, 0.10 gm
	Tablets, Stain, Romanowski, 1.50 mg
	Test Tube, 4mm dia x 76mm lg (6)ea.
	Watch Glass, 1.50" dia, (2) each
	Watch Glass, 2.00" dia, (2) each
Drawer G	Brush, Artists, #2
	Brush, Artists, #4
	Calculator, Solar, 3.375" lg.x 2.125" w
	Compressarium, Brass, 3.75" lg x 1.00"
	Cover Glass, Round, 15mm Dia.
	Cover Glass, Square, 18mm
	Cover Glass, Square, , 24mm
	Eye Dropper, 3.375" lg (2 ea)
	Haemostat, Locking, Curved Tip, 3.50"
	Holder, Test Tube, Steel, Wire, 4.75" lg
	Labels, Paper, Square, 0.875" sq.
	Magnifier, Linen Tester, 13 mm Lens
	Folding, Triple Lens
	Pencil, Mechanical
	Probe, Steel, 4.25" lg
	Scissors, Dissecting, Fine Tip, 3.50" lg
	Spoon, Spatula, Porcelain, 123 mm lg
	Stirrer, Glass, 5" lg
	Stirrer, Glass 6" lg, Scoop End
	Syringe, Hypodermic, 3cc
	Thermometer, 0 - 120F, 6.25" lg, Cased
Drawer H	Adjustable Warming Plate Assy.
	Balance, Quadrant, 0-50 gm
	Box of Matches
	Calipers, 5", Combination

IN CONCLUSION. Close attention to design, planning and construction of the Microscopical Practitioners Work Chest produced a precisely built, compact and fully equipped product rivaling its 19th century counterparts. Completion of the work chest posed a challenge well met. It is my hope that the information supplied in this article will provide viable reference material and will serve as an inspiration to every conscientious microscopist.

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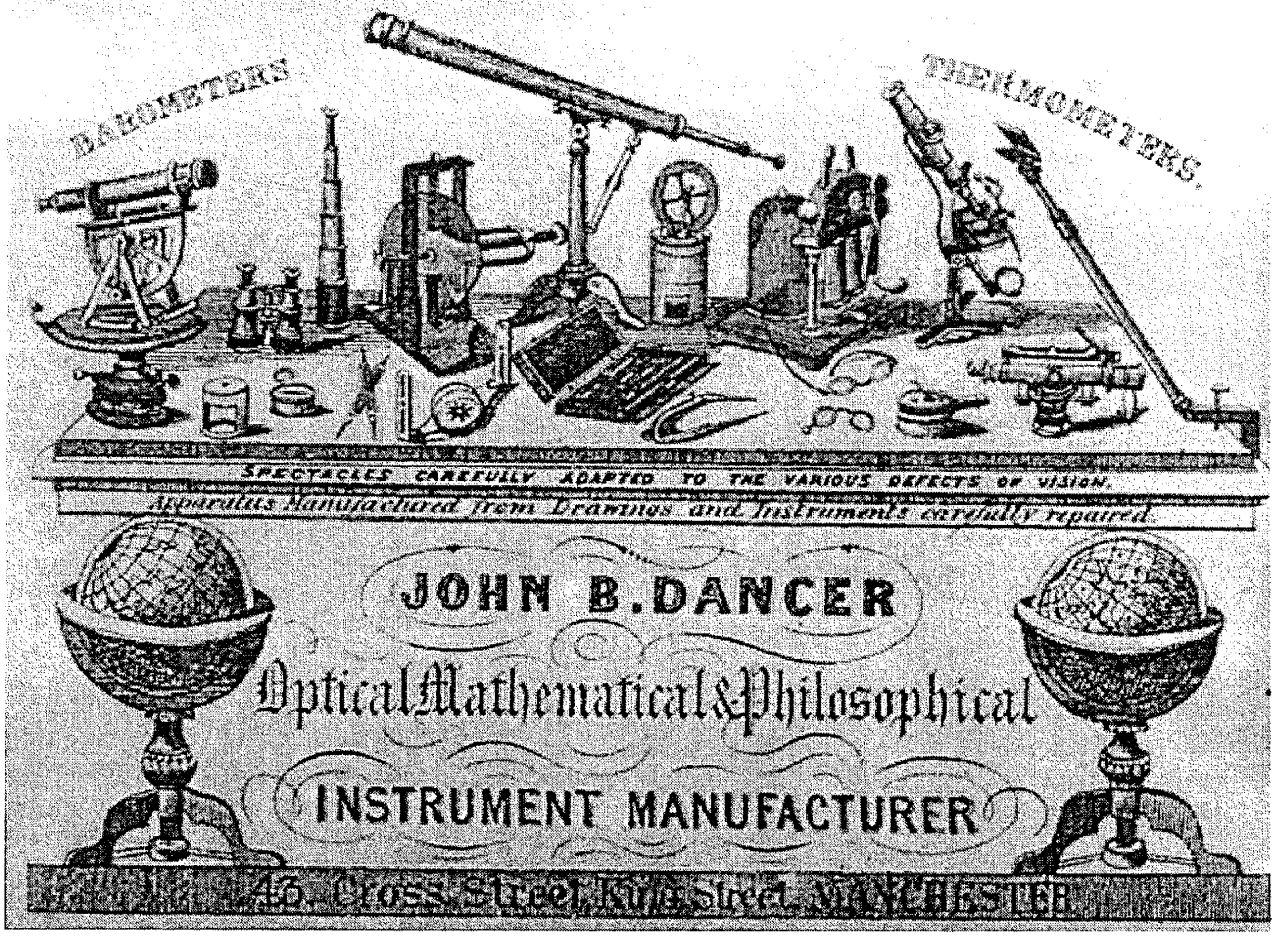


Trade card as supplied with one of J.B. Dancer's original and uniquely designed microscopes, the same microscope that is shown with him in the photo that was reduced to the micrograph shown in his catalog as #33. Courtesy of Barry Sobel.

WORKSHOP of the Microscopical Society of Southern California

by: **George G. Vitt, Jr.**
Date: **Saturday, 4 January 1998**
Location: **Steve Craig's Lab,** 29 persons attended.

Due to the wet and cold weather, the workshop was conducted indoors. After the show-and-tell, the weather cleared up, the sun came out, and members adjourned to the back garden for discussions, picking through the donated glassware. and photographing various items that had been brought to the workshop.

1. Guests: The workshop was favored by the presence of two guests: **William Buchman** of Los Angeles, a retired engineer, who had done work on lasers; and **Horst Schor** of Anaheim, who is conducting geological studies in Alberta, Canada.

2. Steve Craig announced that member **Jerry Adomian** had donated a large amount of lab glassware, etc., and that these items are now in Steve's garage and available as freebies. Steve then said that **Lloyd Matlovsky** had brought a small, wood cased, Leitz monocular microscope, c.1929, to one of our monthly meetings and that this item is missing. Its recovery would be much appreciated. Steve later announced that **Stan Baird's** excellent macro/micro photographic outfit, complete with the Olympus OM-2n camera and special lenses, is still available.

3. **George Vitt** offered for sale two VHS video tapes that had been made by **Tom McCormick** as copies of a photomicrographic tape made by **Paul Ottenheimer** of arranged diatoms and butterfly scales made by **Klaus Kemp**. Later, Tom asked that the proceeds be placed in the MSSC treasury. George also reported on a letter received from an old friend, **Fred Martin** (in Hawaii), and his interests in the microscope and tropical parasitology. Fred is an expert in Oriental Art, fencing and archery.

4. **Alan Roberts** announced that the antique instruments show is to be held on 31 January at the Airport Hilton Hotel on Century Blvd, Los Angeles. He stated that the parking ticket is your admission.

5. **Bill Davies** displayed a marvelous 'Monkey Microscope' of his own design and construction. It is accompanied with a bullseye condenser held aloft by another precocious long-armed monkey, the two fitting into a mahogany case whose brass handle consists of monkeys with hands intertwined. Bill furnished the following description and accompanying photos:

A Variation on the Moreau Monkey Microscope: The original Monkey Microscope is rare and is seldom seen offered for sale. Apparently, only about 100 of these were ever made. This version was inspired by the acquisition of a small brass monkey at a flea market. This particular monkey seemed to have the appropriate 'philosophical' facial expression for this sort of project and, a few months later, a suitable mounting base turned up. Additional items, such as the microscope tube and tube mount, were made to fit, and the result is shown in Figure 1. Recently, Jim Solliday offered some ensthusiastic comments and so the other accessory items: the 'monkey condenser' and a carrying case with a monkey handle, were added to complete the project. Optics were scrounged from junk microscopes. Overall height= 8.5"; base diameter= 6.5". Magnifier accessory: Height= 6"; Base dia.= 3.5in.

Jim Solliday gave a history on the development of the original "Monkey Microscope" which had to do with the turbulence between Darwinists and Creationists within the RMS. This microscope was offered as a whimsical and humor-provoking 'peace offering' by the incoming President Moreau. c.1889. A photo of the original microscope is shown in Fig. 2 courtesy of Larry Albright. Bill's excellent workmanship and the fine results were much appreciated by the membership! Bill may be reached on e-mail: <billdavies@mci2000.com>.

6. **Larry McDavid** displayed a set of cased wedge prisms used for testing peripheral vision capabilities. He then showed a rare "Sunshine Recorder" made in Germany c.1940. It consists of a spherical lens (about a 3" diameter glass sphere) mounted on a steel levelable base with latitude adjustment. This allows positioning the device with its axis parallel to the rotational axis of the Earth. About 0.5" from the rear surface of the sphere, concentric with it, and extending over about 180 degrees, is a flat metal circular arc. Onto the surface of this arc is attached a strip of special paper. As the sun makes its circuit, its focused image burns a visible path on the paper, giving a permanent record of the sunshine history for that day. This very intriguing instrument was originally made by Campbell-Stokes in the late 1800s. A question was raised as to the refractive index of the sphere necessary to produce the required focal length. Larry then showed the book *Invention of Meteorological Instruments* by W.E.Knowles, Middleton Pub.

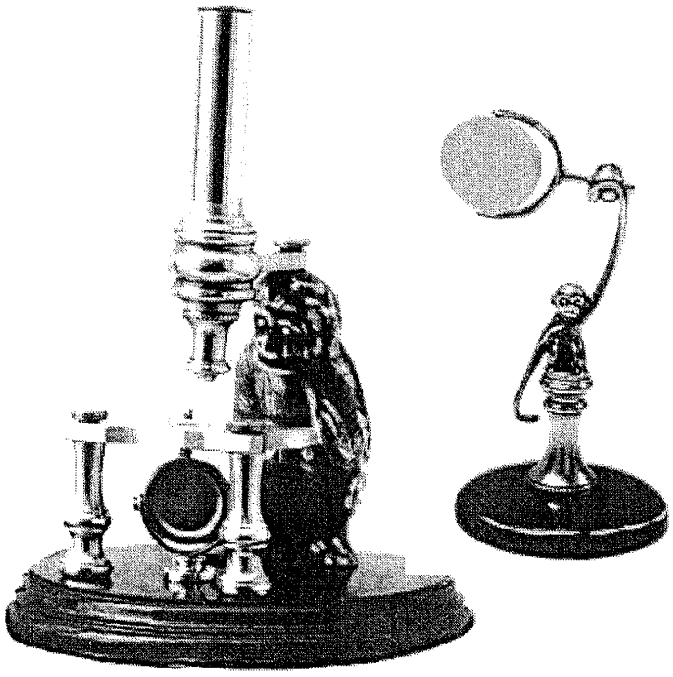


Fig. 1 Bill Davie's monkey microscope and bullseye condenser.

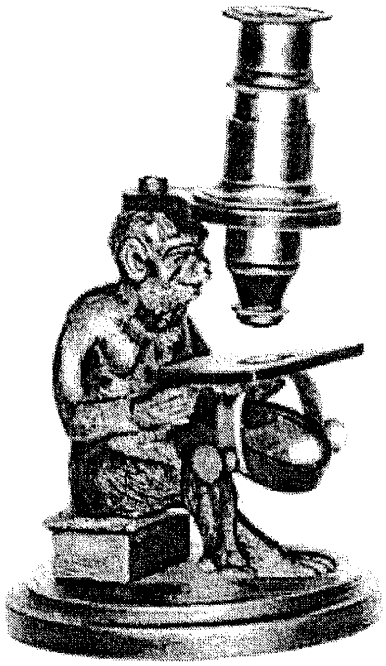


Fig. 2 Moreau's original monkey microscope. 3" high.

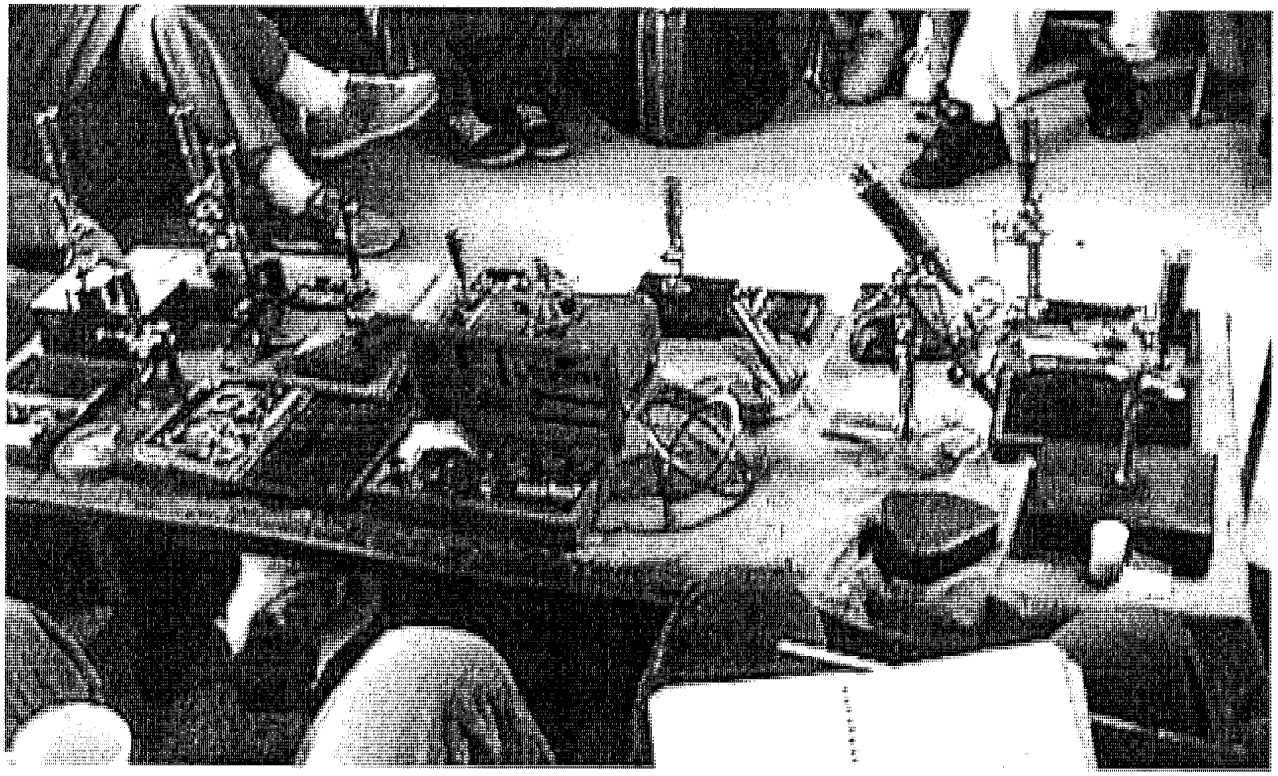


Fig. 3 Cary type microscopes on display for discussion at the workshop.

7. **Larry Albright** showed a miniature, cased, drafting set by Cary c.1854. The case was pristine, covered in Morocco, and 3" in length.

8. **Alan de Haas** brought a Nikon inverted microscope, complete with 35mm camera for photomicrography. (It now belongs to Steve Craig). Unlike some other such outfits made by other manufacturers, the stability of this equipment was improved by the provision of a separate support for the horizontally extended camera.

9. **Jim Solliday** showed some available wood coasters with a marquetry inlay of a Beck microscope, protected with a glossy coat of polyester resin. These are available for $12/set of 2. Jim then gave a history and evaluation of Cary and Gould as providers of scientific instruments, along with other such persons of the early 19th century. He then showed two cased compendium microscopes one of which was a Carpenter-Westley c.1830-40 which had belonged to William Sutton of the RMS.

10. **Leon Stabinsky** described his recent trip to New Zealand and Australia where he had scoured the museums and dealers and visited Mr.Dingley, President of the Australian Postal Microscopical Society. He had met the curator of the Univ. of Sydney which has a microscope collection and a good catalog of same. Leon then showed some very fine Cary made instruments: a miniaure sextant of superb workmanship and condition (arc of about 4" radius!) with exquisitely done scale divisions in the silver-inlaid strip; an inclinometer; and a equinoctial ring dial. He then discussed the styles of Carys' signatures. There followed a general discussion on the Carys, John and William, with Jim Solliday contributing biographical information on the two gentlemen.

11. **Gary Legel** discussed the use of the Sola voltage regulator, a passive device using resonant reactive elements, for the stabilization of AC line voltage without the production of excessive distortion of the sinusoidal waveform. He has several of these available. Gary then announced that he has for sale the Russian Stereo microscope Mod. MBS-10, complete with camera attachment, for $675 - exactly what he had paid for it. This microscope is to be recommended for its excellent optics and low price. Several MSSC members have this model and are quite happy with it.

12. **Ken Gregory** offered some fine small lidded wood boxes for the storage of both 2x3 and 1x3 slides, at very nominal cost.

13. **Jim Solliday** brought us up to date on the developments following the criminal attack and injury to our friend, Klaus Kemp, in England. There was a general discussion as to the way that MSSC could help Klaus in the upcoming court trial. It was agreed that letters must be sent to the presiding judge in which are to be stressed Klaus's absolutely unique abilities in the field of diatom research, as well as his exemplary, scholastic and peace-loving personality. Having the best acquaintance with Klaus, Jim is to write a definitive letter which other members can then use as a model in writing their own. The importance of using 'official letterheads' on all these letters was stressed. Please note that all this letter writing should be concluded expeditiously so that the judge in England gets them well in advance of the trial.

14. **Barry Sobel** showed a photomicrograph, connected with his specialty in kidney diseases, which illustrated that acceptable image quality can be obtained with a minimal photomicrographic outfit. He then displayed and described the following microscopes, and their makers:

William Cary was apprenticed to Jesse Ramsden and worked until the business was assumed by his nephews in 1825 when he died. Charles Gould (working for Cary) designed the "Cary Gould Type" of microscope popularized by the Cary Firm and sold widely. Gould's *Companion to the Microscope* was published in 17 editions! After 1894 the firm was renamed Cary & Co. until renamed Cary, Porter, and Co. about 1900. Cary was famous not only for his microscopes but all kinds of scientific apparatus including globes.

"Adams Universal Compound"-Type Microscope Signed "Cary London": English. Brass. Signed on the folding tripod base: "Cary London" with body tube mounted on the classic limb with rack and pinion adjustment fore and aft motion with a stage incorporating adjustable slide holders and articulated bullseye condenser, the lower pillar supported through a typical compass joint, supporting a plano-concave mirror, over a tapering pillar with additional accessories in a lined mahogany case. This type of instrument was first described by George Adams Jr in his *Essays on the Microscope* published in 1787. It differs from the slightly later "Jones Most Improved" type in that the latter has a sliding limb with a thumbscrew lock rather than the rack and pinion. In addition, it differs from the original Adams type, in its unique arrangement for the condenser mounted to the stage, allowing it to be used from above or below, a later development. This instrument may have been made by William Cary, who made microscopes at the time. This is a classic instrument of very high quality in great condition. It is apparently achromatic, being one of Cary's early achromatic models, it is rare. Exquisite condition # M-125

Fold-Out Cary-Gould Type Microscope By Dollond: English c. 1840. Signed on the pillar: *"Dollond London"* This is a rare form of Cary-Gould microscope popular especially in the first half of the nineteenth century. The fold-out feature is quite rare however and the instrument is complete with original lacquer and all original accessories. A wheel of objectives was added to the 2 Lieberkuhn objectives supplied with the instrument which focuses by rack and pinion. #M-202.

Gould-Type Pocket Microscope English c. 1840: Exceptional microscope in 4 inch wide plush-lined case in superb condition with sprung stage, rack and pinion focusing, lieberkuhn, hand forceps, extra objectives. 100% complete with all accesories, original lacquer intact. M-34.

Magnificent Cary-Gould Type Pocket Microscope: A fully complete signed "Cary" on the limb, microscope with all accessories, mounting on lid of the velour-lined case with removable accessory compartment and including 3 objectives, ocular, tweezers, ivory stage disc, 3 sliders with inventory list, stage forceps/needle with black and white specimen end, live box, ivory handled scalpel, ivory handled specimen needle. Rack and pinion focusing with 100% original lacquer. Box 4 x 5.5 x 1 5/8" also excellent. Microscope stands 7 inches above top of case.

Then followed a general discussion on the technological improvements during the 19th. century which revolutionized the making of microscopes: the development of machine tools, smelting, alloys tube making, etc.

15. **Stuart Warter** showed and described the following microscopes:

a. **Cary, London:** Gould's Improved Compound Microscope, known as the 'Cary-type microscope', was designed for William Cary in the 1820s. Pocket Microscope - 1st half of the 19th. Cent. While these microscopes were made past mid-century, the green velvet liner indicates its early manufacture.

b. **William Youle, 79 Leadenhall St., London** Optical, Mathematical and Philosophcal Instrument Maker, w.1822-1866. Pocket Cary/Gould Type M/S 1834-44. Wm. Youle was at 79 Leadenhall St. between the years of 1834 and 1844.

c. **Unknown maker, English:** Free-standing Cary/Gould type of microscope with folding tripod foot; unsigned; 2nd quarter of the 19th century.

d. **BANKS INVt, 441 Strand, London:** Robert Banks (Bancks) w.1796-1827. Simple and compound microscope; un-numbered; 1st quarter of 19th century; was in Strand Street 1796-1820. He made simple microscopes for Brown, Hooker and Darwin.

e. **Cary (attributed), London:** Cary/Gould pocket or box microscope usable as simple, compound or opaque m/s; unmarked; c.1830. Identical to a signed example by Cary with the same unusual features.

16. **Fred Hantsch** informed us that the complete set of the *National Geographic Magazine* is available on CD-ROMs from CompUSA for $150 (usual price $200) and, reportedly, from the Price Club for $99! Each magazine is reproduced from cover-to-cover, starting with the very first issue of the 19th century!

17. **John de Haas** announced that micromount plastic black boxes, with covers, will be available at the next Mineral Symposium and that he will be able to get these for anyone needing them.

18. **Dario Solares** displayed how he had adapted his Nikon photomicrographic equipment (similar in principle to the Leitz 'Micro-Ibso' or the Olympus PM-6) for use with his Minolta cameras and his Mamiya Mod.645 SLR. His excellent machine work won high approbation. He also described the attachment he had made to enable the use of a ground glass for precise focusing of the image prior to attachment of the camera, the two having been made parfocal.

19. **Leo Milan** described his exposure tests of fast slide film and sheet film to attain the required contrast in photomicrography. There ensued a general discussion of image contrast management, where George Vitt suggested that the use of a computer and Photoshop software solved such problems as a routine matter. Leo then showed the book "The Diatoms" and a 5"x7" bound book of photomicrographs that he had taken.

20. **Bill Hudson** reported that his recent efforts on the home clothes drier and the re-wiring of the porch had temporarily interrupted his microscopical efforts!

21. **Pete Teti** showed the 48 page book *Through the Microscope* ($7.95 at Barnes & Noble), stating that it was fine for children since it described the use of common household items that can be applied to microscopy and illustrated such projects as the making of a simple microtome, as well as micro-slides.

22. **Dave Hirsch** reported that MSSC now has 81 members and "two possibles". He described his Skinner Test Set which was used in WWI to find breaks in telephone lines.

23. **Horst Schor,** one of our guests, described his ongoing mining reclamation work in Alberta, Canada where he investigated soil particle size to stabilize the deposits and the separation of sand from tar at temperatures around -40 deg.F! The objective is to re-create the natural typography for the eventual re-introduction of bison. This work is being done some 400 kilometers north of Edmonton.

24. **Jerry Bernstein** again very generously offered the loan of any of his microscopical equipment to members who lack such equipment for photomicrography.

25. **Herb Gold** showed an 1886 hard cover Negretti & Zambra catalog of scientific instruments all of which were very well described. He then showed an unusual and compact "Watchmaker's Microscope" which could hold various size movements in an adjustable stage underneath a simple compound microscope of 20x-30x. It seems that patents had been issued on the holder design. Herb also brought a Russian language instruction manual on a precision Russian astronomical theodolite that he recently obtained. George Vitt will undertake the translation.

26. **Ed Jones** reported that he has obtained a "Natural Fiber Set" from which he can provide the membership with samples of a large variety of natural fibers for slide preparation - which would be an excellent project for a workshop under his guidance. Ed then described certain reflective numbers, on an adhesive back, which are made visible by the retro-reflection of an incident beam of light by the action of microscopical transparent beads - which are either of plastic or glass. According to Bill Davies, these beads are called **"Ballotini"**, and are used on high-gain projecton screens. There was a discussion on the use of such beads as miniscule objective lenses for observing uni and bi-axial conocsopic figures, the normal microscope lens then acting as the Bertrand lens. Ed then offered some miniature ziplock bags for $2/100.

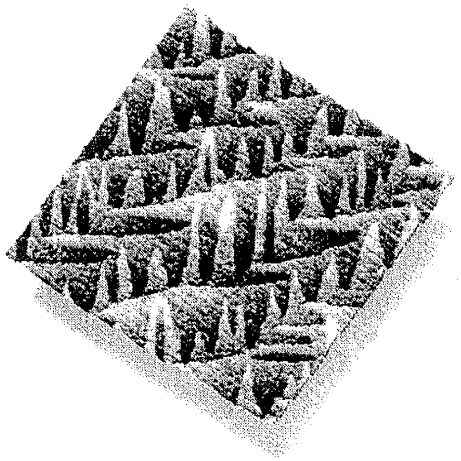
MSSC CHRISTMAS PARTY

On 20 December 1997, the MSSC members and their ladies gathered at the residence of member **Ernie Meadows** for the annual Christmas Party! Some 67 persons were present. Everyone agreed that this was the best Christmas Party that we have had to date! With the able work of Beverly Black (Steve Craig's daughter) - as well as **Steve** and **Millie**, a diverse and tasty holiday dinner was served. A large variety of desserts was brought by the members, and soft drinks and a delicious punch was constantly replenished. Conversations in all quarters were rampant and enthusiastic, greatly augmented by the lovely and congenial atmosphere that radiated from all directions of Ernie's home. We all admired his artistic and beautifully designed and constructed creations done in a variety of fine woods, as well as his fully equipped and beautifully kept machine shop. (Ernie insists that "one is never fully equipped"!) Several members brought microscopes to show and to look-through, and **John Field** brought an assortment of Klaus Kemp slides for sale. After dinner, **Jim Solliday** gave a fine slide show presentation, with his pre-taped commentary, on the study of snowflakes through the microscope, and the history of such investigations. The party broke up around 9pm and everyone helped in cleaning up and in the putting away of chairs. We all wish to thank Mr. & Mrs. Meadows for their generous hospitality which made possible such a fine get-together.

REMINDERS !!!

Contact Jim Solliday and then write your letter regarding Klaus Kemp. The January meeting (3rd Wed) will be devoted, in part, to the election of officers. Your attendance is of the greatest importance, since your vote counts! BE THERE!

Another example of the remarkable images that can be achieved with the scanning probe microscopes that are the subject of the January 21 meeting program. See page 22 for schedule and abstract.



Above: Epitaxial Si film grown on (100) Si. The surface is terraced because the substrate was miscut by 0.03 degrees off the 100 plane. Each terrace is one Si atom layer above or below the neighboring terrace (0.14nm height difference). Measurement was made on a full 8" wafer, directly from the manufacturer's wafer carrier. 1μm scan.

COMMENTARY

REFINISHING ANTIQUE INSTRUMENTS: Is It RESTORATION, REFURBISHMENT, OR RUINATION?

Stuart L. Warter

Recently, on Rick Blankenhorn's Gemmary Forum on Scientific Instruments (http://www.gemmary.com/rcb/insts/forum) a question regarding methods of relacquering brass raised some interesting discussion, along with a few hackles, until it was realized that the questioner was not actually referring to an antique instrument. The techniques discussed would certainly provide some protection to the brass, but would not provide anything like the colors of the old lacquers.

People interested in relacquering old scientific instruments might like to go to an older library (or old bookstore) and look at some of the formularies from the latter Nineteenth early Twentieth Centuries, in which a wide variety of lacquer formulations (and some techniques), including those for scientific instruments, can be found. A few of these are: *The Painter, Gilder, and Varnisher's Companion*, by WM. Brannt (1904, 26 editions by 1894); *A Manual of Painter's Colours, Oils, and Varnishes for Students and Practical Men*, by Geo. Hurst (6 editions by 1922); *The Universal Manufacturer - Money Making Formulae*, (anon.) 1916; and *Henley's Twentieth Century Book of Formulas, Processes, and Trade Secrets*, edited by Hiscox, Eisenson and Sloan (18 copyrights between 1907 and 1984).

Perusal of these formulae would impress the reader with the complexities of the formulae, their preparation, and of the processes of application. It would be immediately apparent that of the many ingredients called for, some are toxic, flammable or perhaps even explosive, and others - if the reader could even figure out what they are - are hard to find or well nigh unobtainable, if not prohibitive in cost. Preparation and application of these lacquers was (and is) labor intensive and time consuming and even hazardous. While a few hearty and ambitious souls have managed to come up with credible appearing products after much experimenting and practice, it would be nearly impossible to exactly duplicate (with historical accuracy) the originals.

Once the realization of this sets in, perhaps persons contemplating the removal of less than perfect lacquer from antique instruments will think twice and, in the interest of preservation of their historical artifacts, settle for whatever authenticity remains. Most serious collectors realize their obligation as custodians of history, and are aware that not only does the removal of original finish destroy part of the authenticity of the instrument, but it also lowers its monetary value and its desirability. The plain fact of the matter is that an instrument with less than perfect original finish will never be worth as much as one in "mint condition," but many collectors would prefer one with imperfect finish to one with none at all, recognizing that honest wear is part of the history of the instrument, and, in the event that the instrument has provenance, it could be worth even more (since such and such a famous person had actually used it)! Worse yet, the manner in which the finish might have been removed (with a buffing wheel, for example) may have irreparably damaged the surface of the metal. Such a destructive act results in the trashing of the piece, which will never again be the same, regardless of "how pretty and shiny it looks."

That said, there are cases in which the removal of remaining finish is justified and perhaps even necessary. The principal function of the lacquer coat is for the protection and preservation of the metal, as well as to enhance its appearance. When the finish is largely gone, and especially when the metal shows serious signs of corrosion, it is important that protection be restored to guard what is left of the metal surface from further damage. The last two words are of paramount importance here, because if the surface is improperly handled, more damage results, and things would have better been left as they were. If the surface is pitted, so be it; it can be saved from further destruction, but its surface cannot be improved without doing further damage to the authenticity of the piece. Like the human body, instruments get old. Life can be prolonged by judicious treatment, but overtreatment only hastens the end. A strict preservationist might even argue that a piece unfinished for a long period of time should be left alone providing it has developed a uniform patination, without pitting — such a coating actually provides protection to the metal beneath, sealing it from the atmosphere, as with bronze statues, old pewter, etc. -but most would think an instrument too ugly to leave in that state.

If the surface must be cleaned, it should be recoated.

Cleaning should be done carefully after complete disassembly - the subsequent recoating of any still assembled parts could result in their becoming so firmly bonded together that later attempts at separation could result in breakage or marring.Any parts stuck together or frozen with corrosion or congealed lubricants should be patiently treated with penetrating oil until they come free with minimal effort [especially screws, which are easily marred or broken off).Any oils or other solvents used here must be completely removed before the final finish is applied, or it will not adhere.

The surfaces of all metal parts not containing fixed lenses can be easily cleaned by soaking in an ammoniated metal cleaner such as the ultrasonic cleaning solution used by watch and clockmakers to clean brass movements (of course it works faster in an ultrasonic cleaning device, if one happens to be available), or if heavily oxidized, by gentle use of a household brass cleaner and a soft cloth (these do contain abrasives, and so should be used judiciously). Under no circumstances should a buffing wheel ever be used — this practice results in uneven removal of metal, softening of edges, and blurring of engraving, and often, when overheating results from overzealousness, heavy-handedness, or carelessness, actual melting of the metal surface itself, thereby doing irreversable damage.After rinsing and drying, a suitable finish should then be applied, allowed to dry, and the parts reassembled gloves should be used if necessary, to keep fingerprints off while handling the bare metal - acids in the skin oils will etch the metal, leaving permanent evidence of who is to blame (they will also prevent the new finish from adhering to those spots)!

What is a suitable finish? As is obvious from the beginning of this article, therein lies the rub! Some people have been able to prepare reasonably decent pigmented lacquers; if one of these preparations is available (along with appropriate instruction), so much the better. But, if not, what to do? Two points seen pertinent here: first, protection of the surface from oxidation is the object, and no substance that will result in any sort of damage to the metal should be used. Second, nothing should be done that cannot be undone — the only irreversible step in this whole process should be the removal of the remaining original lacquer (so think long and hard before beginning - if in doubt, don't). If a suitable natural antiquarian lacquer is not available, a synthetic may be used, but it may not be advisable to use a hardening technique that provides permanent abrasion protection when only antiatmospheric sealing is required for a display-only piece.That way, when a suitable lacquer does become available, the temporary one can easily be removed. There are synthetic commercial brass finishes used for nautical brasses, furniture hardware, musical instruments, etc. I have even seen pigmented furniture preparations used with good appearing results (these are too soft to provide scratch resistance, but they do seal the surface from air). Avoid stains that might discolor the metal. Clear plastics like Varathane and Krylon have been used. I have had a modicum of success with Spar varnish that has been evaporated down to a honeylike color and consistency. A finish should be tested first on a piece of scrap brass obtained from a scrap metal bin in a metal supply house. Iron parts are less of a problem.They can be repainted easily after similar preparation. A variety of epoxy and rust preventative paints are readily available in hardware stores.

Before anyone gets too horrified at what seems like a cavalier anything goes approach to the last steps, one should remember that not everyone has the ability (or desire) to produce results like a professional metal finisher, and the intention here is to prevent further deterioration of already damaged pieces, not to make good ones better!

Prime candidates for this sort of treatment are extremely rare instruments that have been trashed by the buffing wheel or left in someone's barn for the better part of a century, and which deserve preservation for their historical value alone; more common instruments that might as well have been trash-canned but serve well for practice; and those of desired types that would otherwise be too expensive to afford if in better condition.The first type, in particular, should be preserved in as close to original condition as possible, in order to maximize their value to present and future historians.

In the final analysis, if an owner considers himself a temporary guardian of a historical object that could be around long after he is gone, he will follow the responsible course in determining that what is done to an instrument should be governed by what is best for that instrument itself. Unfortunately, such an idealistic viewpoint is not always shared in the real world, where other, perhaps more short-sighted viewpoints all too commonly prevail.

Missing Item

Lloyd Matlovsky had brought a small, wood cased, Leitz monocular microscope, c.1929, to one of our monthly meetings. (several months ago) If anyone has seen it please contact Lloyd at 213-256-6035.

II. *A Letter from Mr.* Ant. Van Leeuwenhoek, *F. R. S. containing his Obſervations upon the Hair mentioned in the foregoing Letter, &c.*

Delft, Nov. 22. 1707.

Honourable Gentlemen,

IN your Letter of the 24th of *October* laſt there was incloſed a ſmall Lump of a hairy Subſtance, which was diſcharg'd by a Woman about 50 Years old or upwards, after ſhe had taken a Doſe of *Spaniſh* Flies given her for an Ulcer in the Kidneys.

I viewed part of the hairy Subſtance thro' a Microſcope, and judged it to be the Hair or white Wooll of a a Sheep; which Wooll was broken into ſuch ſmall or ſhort Particles, that ſome of 'em were no longer than ſix Diameters of the breadth of a Hair; which I ſuppoſe could not proceed from the Body of a Man, but that it was rather found in the heel of ones Stocking. And the oftner I repeated my Obſervations, the more I was confirm'd in my Opinion; for I could not only diſcover the ſhort broken woolly Particles, but I ſaw alſo a great number of the Ends grinded to pieces as it were; inſomuch that not only the Bark (if I may ſo call it) or outſide of the woolly Particles were rubb'd off, but the inward little Hairs, of which the Wooll is compoſed, were ſo divided from one another, that they appeared with their ends like little Bruſhes.

Moreover under the ſaid Stuff or white woolly Parts, there lay very ſmall Particles compoſed of exceeding ſlender little Tubes or Pipes, which I look'd upon to be ſmall bits of Straw, and they were ſo ſmall, that one grain of Sand cou'd cover 'em; there were likewiſe other ſmall Particles of the ſame figure, but I did not take them to be Straw, but rather the outmoſt Husk or Skin of a Grain of Wheat or Rye; and under thoſe I ſaw one Particle cover'd all over with ſmall Hairs, ſuch as we ſee at the top of Wheat or Rye; as likewiſe ſome few little bits of Wood, ſomewhat thicker than a Hair of ones Head: there was alſo a ſmall Particle of the outmoſt Skin of a Man, for I could ſee the little Scales of which our outmoſt Skin is compoſed very plainly; Now theſe Particles that were not Wooll, might be very eaſily brought into the Stocking, in caſe one ſets ones bare Foot upon the Floor before one puts it on.

There lay moreover in the ſaid Matter an unſpeakably great Number of exceeding ſlender long Particles, which I imagine to be thoſe hairy Particles, of which a little Fibre of Wool (ſetting aſide the Bark or Skin of it) is compoſed; as alſo ſeveral earthy Particles, which I took to be part of the Dirt of the Floor or of the Foot itſelf.

There alſo lay a great many particular little Figures, which I could not diſcover what they were; and theſe laſt-mention'd Particles were ſo ſtrongly joyned to ſome little Hairs or Wool by the perſpired viſcous Matter from the Foot, as I ſuppoſe, that I could not ſeparate 'em but by the help of ſome Water: amongſt others I alſo ſaw two ſlender Particles lying, which I ſhould likewiſe have taken for the outmoſt Skin of a Man, were it not that they were larger than any of the Scales that I could ever take from my Skin, which are moſtly of an equal thickneſs, wherefore I gave over this Thought. In ſhort there appear'd to my Sight ſo many and ſuch particular Figures, that there was no Account to be given of them; only I obſerved amongſt 'em one ſmall Particle, not of a ſingle Feather, ſuch as it appears to our naked Eye upon the Body of a Bird, but rather of the fineſt Down; and the more I unravell'd or ſeparated the Particles of Wooll from one another, ſtill the greater reaſon had I to judge, that the Perſon who had worn the Stocking had been uſed to go often bare-footed upon the Floor.

Now ſuppoſing that theſe woolly Particles might have fallen into any Spoon-Meat thicker than ordinary, the Perſon might ſwallow it down without being aware of it; and if this had happened in ſome Countries, 'twould have been recorded for Witchcraft.

Now my reaſons for gueſſing that theſe woolly Particles ſhould come out of a Stocking, and that that ſhou'd be occaſion'd by the motion of the Foot, are theſe that follow: I my ſelf always wear heavy white woollen Under-ſtockings, and I lye in the ſame; inſomuch that I can wear them three Weeks together, becauſe I am not inclin'd to ſweat in my Feet; now having ſeveral times view'd the broken woollen Particles which lye in a heap as it were cleaving together under the Heel, and having alſo ſingled out of them ſeveral Fibres or Threads of Wooll, to prove that they are compoſed of little Hairs, and theſe woolly Particles exactly agreeing with thoſe that were ſent to me, I could no longer doubt that the ſaid woolley Particles that were ſo ſent to me, were any ways different from thoſe Particles that were found in the Heel of the Stocking; 'tis true that amongſt the woolley Particles of my Stockings I never met with any Wood or Straw, but the reaſon of that was, that I have not touched the Ground with my naked Feet for ſome Years, being unable to bear any Cold in my Feet; nay ſo far that in the Nights, even in the Summer time, I put a Tin or Pewter Bottle filled with warm Water to the bottom of my Feet, by which means I preſerve my ſelf, as I fancy, from that Plague called the Gout.

About a Year ago I had in my Houſe the Gut of an uncommon great and fat Cow, a part of which I blew up, but not much, leaſt the Membranes of it ſhould be too much extended, but I made no Draught of that Obſervation; but I imagined that I obſerved one Membrane of the ſame in which there lay abundance of little Fibres, lengthways, and very regularly one by another; and in another Membrane in the ſame place, lay other Fibres croſs-ways, that ran from the Centre to the Circumference of the Gut; from which Obſervation I ſuppoſe that that motion which we ſee in the Guts, as ſoon as they are taken out of an Ox, is the motion that Nature uſes, to protrude, and diſcharge the Chyle out of thoſe Parts.

I alſo took the Bladder of that Beaſt, and blow'd it up as big as two common Fiſts, to the end that I might better ſeparate or diſtinguiſh the Membranes of it, and ſo let it dry; and having cut it through at about two Fingers breadth from the Neck, I judged that there were twelve Membranes lying one above another, and I put the Microſcope (before which a little piece of that Bladder was placed) into the Hands of a Perſon that ſtood by, deſiring him to obſerve how many times double he ſaw the ſaid Membranes lye, who told me he alſo obſerved 12 of them: I was likewiſe of opinion that ſome of thoſe Membranes were diviſible into two, to the end that the Bladder might be extended into a larger ſpace.

Antony van Leeuwenhoek.

Member Profile
Pierino "Pete" Teti

Hand gestures explain a point. January 1998.

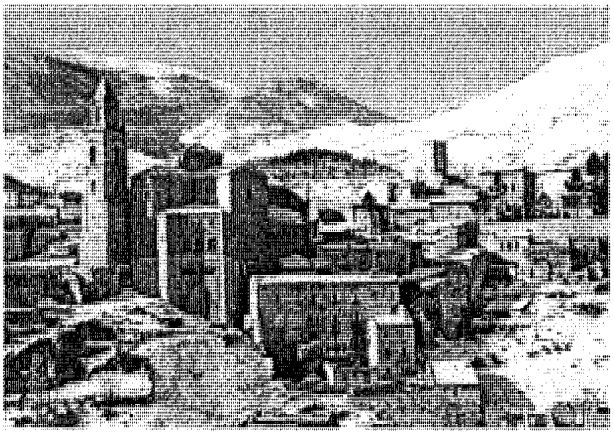
Boyhood home, second house on the left.

I was born in 1923 in a small village on the edge of Palena in the Abruzzi Mountains in central Italy. My parents were unschooled tenant farmers who scraped and survived with food grown on rocky mountain soil which could be cultivated only with hand tools to grow basic foods such as wheat, corn, vegetables and grapes. The little village consisted of about 25 families in homes with rough stone walls, all homes touching each other in a row along the road. The first floor was for domestic animals such as chickens, goat or, for those who could afford one, a cow and/or donkey. Each year we bought a piglet which grew and was slaughtered to make food which was preserved in ways such as dried salami for the rest of the year. I can still remember the screams of the dying animal and the scary carcass spread to dry hanging in the roof downstairs. None of the animals ever became pets. The only ones who could afford to feed a dog were shepherds who needed them for work. The upper floor of our home had a kitchen with a large fireplace for cooking and heating, a pantry and two bedrooms, all with clay brick floors. The top floor was a hayloft.

Most farmers were illiterate. The cultural center was the church in nearby Palena. There were no books in our home. We were instilled with the images of Dante's Inferno's hell and damnation. Anyone who had psychological trouble or a mental breakdown was thought to be possessed by the devil and they were hauled by a crowd to the church patron saint to have the devil's evil spirit exorcised from their souls. We children, who witnessed these events, were instructed to make the sign of the cross with sticks or our fingers if we ever encountered the devil. We walked with caution in the wooded countryside. It took me some time to overcome these superstitious fears.

Our perception of the world was limited to as far as we could see or walk. For children, this was still a wonderful life, with the joys of nature all around us and strong loving family ties, but adults were destined to poverty and hard work with little pleasures. Medical care was nonexistent for the poor. When my mother broke her arm, she just put it in a sling where it eventually healed crooked. When I fell down on the tiles and broke my nose, it was the same.

The only hope for a better life was to go to North or South America where one could find work, save money, and eventually return to buy land for farming and a better home in which to live. This is what my father did. He borrowed money for passage and worked in Pennsylvania coal mines, and sent money home to my mother. I do not remember meeting him until I was 10 1/2.



The town of Palena with original church tower not destroyed in the war.

1934 immigration card.

In Palermo with the army 1944

Army identification card.

Understandably, in my village, school was not a priority for boys. Learning to work on the farm was the important thing. I remained practically illiterate up to the age of 10. However, for as long as I can remember, I was very curious about how things worked and how they were made. My lifelong drive to learn and make things has given me great pleasure to this day. I loved the yearly visit of the threshing machine and speculated on how the big leather drive belt stayed on the flat wheel with no flanges. I liked to hang around the local craft shops to watch things being made or repaired. The farmers had no planes, but used shards of broken glass to shape the wooden handles for their tools. I watched carpenters carve designs on wooden doors, blacksmiths make horseshoes and wrought iron fixtures, stone cutters chisel door and window frames, shoe makers repair shoes and painters decorate walls. My mother wove yards of cotton cloth on a large loom, spun wool to knit into socks and sweaters and did needle work designs on towels and table cloths.

At age 9, with an old dull hatchet, I split two logs and made a crude pair of skis and also made a crude sled. By watching stone cutters I learned enough to make my own flat rounded stone for a game similar to bocci. We boys played for buttons as coinage since no one had any money. We would all put our buttons on a prime stone and the one who went first would slide his stone along the roadway to hit that stone and knock all the buttons off. He got to keep all the buttons that were closer to his sliding stone than the prime stone. The other players all slid their stones in turn, winning those buttons that were closer to their stone than to the prime stone. Sometimes, desperate losers twisted their suspender buttons off to try to win back their losses. I remember getting a scolding from my mother who knew that the lost buttons had not just fallen off.

In 1934, Mussolini was enlisting all young boys into the youth-fascist movement. My father did not like what was happening in Europe, so he sent for the family to come to the United States and abandoned his hard earned land and home in Italy. Mussolini had stopped emigration from Italy, but father had become a U.S. citizen so we were allowed to leave.

School in America was different, especially since I could speak no English. Although I was 10 1/2 years old, I, with my two brothers, were put into the first grade to learn English. As fast as possible, with good grades, we were allowed to skip grades and almost caught up with our own age group. During this period I had my own newspaper route and worked at night as a pin boy in a bowling alley. Coming to America was like coming out of the night. I had books and crayons and paper to draw on, there were tools to work with, there was a WPA financed boy's club which used the YMCA facilities where I could use a jigsaw and a lathe. My father was against my going to the YMCA because they had a pool table which my father equated with gambling and corruption. He only changed his mind when I made him a fine pipe rack and tobacco box; the stand was turned from a baseball bat. I made many balsa stick model airplanes and won a technical prize for one with working flap controls. My drive to see how things worked got me in trouble when I took the back off of my father's pocket watch and then removed the mainspring cover to see the spring. Satisfied, I tried to put it together again, but found that regardless of how much I turned it, the holding screw would not screw in. In desperation, I just put the cover on with the screw loosly put in place and then snapped the back and replaced it in its drawer. Some days later, my father accused me of messing with his watch which I could not deny. After a thorough tongue lashing he said, you dummy, and explained about screws with left hand threads.

In my 10th grade, I entered a technical high school where I majored in drafting. The school was excellent with one week of academic classes alternating with one week of industrial experience. The goal of the school was to make graduates ready for immediate industrial jobs around Pittsburgh.

From the eleventh grade, I went directly into the U.S. Army. I had hoped to be trained as an aircraft mechanic, but since we were at war with Italy, my homeland, I was sent to be a medic on the U.S. Army hospital ship, the "Chateau Thierry." I ended up in charge of seven men operating the hospital laundry unit. The ship served throughout the European theatre visiting, North Africa, France, Italy, England and one trip to the Phillipines. We even carried some wounded German prisoners to captivity and felt that the Germans were already losing when we saw that they were bandaged with toilet paper.

After the war, at age 22, I returned to school and took advantage of the GI Bill for veterans to enroll in a small teacher's college and earn a bachelor's degree in art and education.

In 1950, I moved to California and started my first job teaching arts and crafts and mechanical drawing at the Black-Foxe Military school. This was a first rate school for wealthy people and I had the children of many famous people like Jimmy Stewart, Dorothy Lamour, Errol Flynn and Joe Di Maggio as students. I worked six days a week, teaching, driving a school bus and on weekends took on field trips the kids who were left there by parents while they were away. I took further courses at the University of Southern California where I earned a further BA and master's degree. From 1955 to 1985 , I taught at several schools in the Los Angeles area and became art department chairman at two of them, where I both taught and organized courses for new teaching graduates.

Presently, I am semi-retired, teaching as a substitute teacher several times a week. I have been teaching for a total of 46 years.

Through the years, I have collected a library of both art and technical books that fascinate me. My main project now is to complete an optical animation apparatus that I started to build some years ago. It includes a 5 inch diameter spinning six sided transparent prism which is phase locked to a 70 mm film strip running past a lens system. It includes a registering table so that one can draw and paint animated graphic sequences and then project them for viewing and editing. It will then be combined with sound to make a form of abstract sound and light art. True to my history of learning how things work, I decided to build this system myself which will, I hope, do the same job as the extremely expensive professional animation setups.

My fascination with microscopy, which induced me to join the Microscopical Society, started around 1980 when I saw some of Maurice Seiderman's color photomicrography and he answered my questions by directing me to join what is now the MSSC. I am fascinated with microscopic images as another source for art subjects.

In a final story from my distant past, I have been told that my presence on this earth was secured by a basket of grapes. When, before they were married, my father offered my mother a basket of grapes, she accepted it by pulling it up to her second story window on a rope. This gave the approval for my father to ask her father for permission to court her. So, here I am, the result of a basket of grapes that was not made into wine.

DIGITAL INSTRUMENTS SCANNING PROBE MICROSCOPES

The page below is taken from a brochure for Digital Instruments scanning probe microscopes. For further information on these remarkable instruments contact:

Digital Instruments
112 Robin Hill Road
Santa Barbara, CA 93117

Tel: (800) 873-9750
Tel: (805) 967-1400
FAX: (805) 967-7717
www.di.com
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Our product line defines the state of the art in ambient scanning probe microscopy. No matter what your work area, we have a NanoScope SPM that will provide you with the capabilities you need to succeed:

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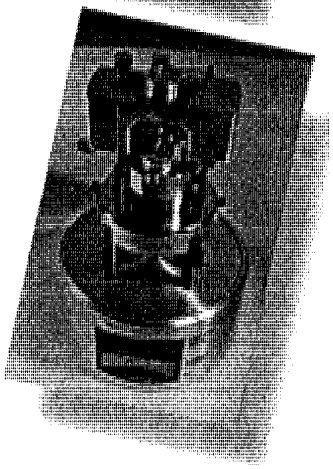

The highest resolution full-function AFM in the world. Proven in over 600 installations for analysis of conductive and non-conductive samples. Ideal for smaller samples where true atomic resolution and superior flexibility are required. You can easily switch among contact, non-contact, TappingMode, lateral force (friction), magnetic force, and electric force techniques, as well as optional STM and electrochemistry adapters. Optional fluid cells let you examine samples in their natural state. Top-view optics and video capabilities are also available.

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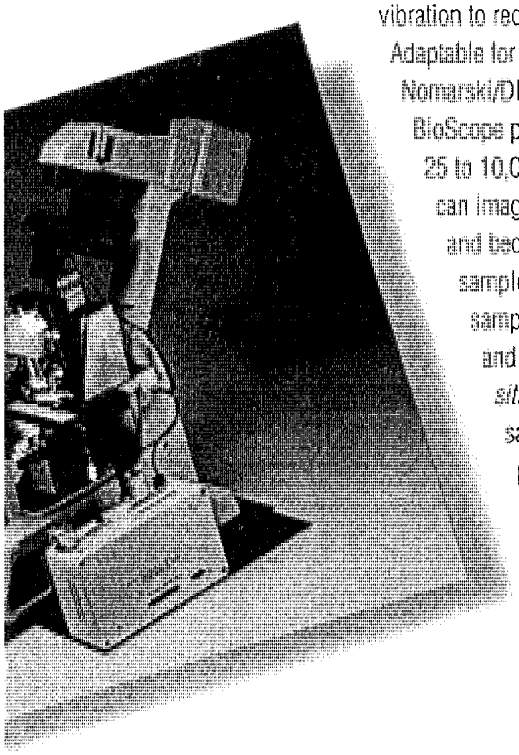
The first atomic force microscope specifically designed for biotechnology, life sciences and other biological applications. The BioScope incorporates our industry leading AFM with an inverted optical microscope specially modified for rigidity and low vibration to reduce noise and improve image quality. Adaptable for brightfield, fluorescence, phase contrast, Nomarski/DIC and other optical techniques, the BioScope provides an effective magnification range of 25 to 10,000,000X. Nanometer resolution means you can image even the smallest biological structures, and because the optical microscope views the sample from underneath, manipulating your samples and aligning structures of interest is easy and convenient. View your sample in air or *in situ* on a slide or petri dish with little or no sample preparation — even observe processes in real-time as they occur. It's the SPM of choice for biologists who aren't specifically trained to do physics.



MICROSCOPICAL SOCIETY of SOUTHERN CALIFORNIA

JOURNAL MAILING LIST JANUARY 1998

Akersten MD, William Mus.Nat.Hist. Idaho State Univ. Pocatello ID 83209 208-236-2680
Albright , Larry 1704 Mandeville Lane Los Angeles CA 90049 310-471-0424 310-399-0865 albrite@Plasma-Art.com
Barnett , Peter D. 3053 Research Drive Richmond CA 94806 510-482-3060 510-222-8883 pbarnett@crl.com
Barta, Jr. MD, Frank R. 1850 Whitley Ave., #303 Los Angeles CA 90028 213-465-7105 213-662-5955
Battle, Don 2339 - 23rd.Street Santa Monica CA 90405 310-450-2245 310-450-5150;ex.9755
Bell, John 106 Highway 201 South #303 Ozark AL 36360 334-774-5149
Bennet , Kevin E. 819 - 4th. St. S.W. Rochester MN 55902-2975 507-280-9101
Bernstein, Jerry 2661 Butler Ave. Los Angeles CA 90064 310-473-8552
Bird , Timothy J. 320 NW 16th Street Corvallis OR 97330 503-757-3087
Blankenhorn , Rick C. P.O. Box 2560 Fallbrook CA 92088 619-728-3321
Blitch, Norman H. 1725 Sunrise Lane Fullerton CA 92833 714-879-7236
Brunt, Chris P.O. Box 325 Topanga CA 90290 310-455-3102
Burton, Gloria 1923 Midvale Avenue Los Angeles CA 90025 310-473-0890
Cavaleri (M.S.of M.) , Mark E. 3M Center: Bl.201-1E-15 St.Paul MN 55144-1000 612-733-3247
Christensen, Daniel W. PO Box 68 Clifford VA 24533 804-277-8738 804-277-8054FAX
Clark, Jr., James D. 11518 Valle Vista Road Lakeside CA 92040 619-443-6154 619-286-7700 jjclark@cts.com
Craig , Steve 3455 Meier Street Los Angeles CA 90066 310-397-8245 scraig@leonardo.net
Cytron, Dan 637 Strand St. Santa Monica CA 90405 310-396-2432
Davies, William & Pamela 430 Pirate Road Newport Beach CA 92663 714-631-7226
de Haas, Alan 2734 Midvale Ave Los Angeles CA 90064 310-475-5623 310-475-2873
de Haas, John 3516 Sawtelle Blvd # 104 Los Angeles CA 90066 310-391-5205
del Cerro MD, Manuel 14 Tall Acres Drive Pittsford NY 14534 716-275-4027 mdelcerro@medinfo.rochester.edu
Eisenberg, Jerome T. 5416 Rhea Avenue Tarzana CA 91356 818-343-6528 213-851-5000
Faust MD, Robert 18370 Burbank Blvd. #511 Tarzana CA 91356 818-788-3065 818-788-1166
Fidiam , James F. 773 Euclid Avenue Berkeley CA 94708 415-524-5417
Field, Dianne Farison 2335 Benton Street Santa Clara CA 95050-4432 408-246-1383
Field MD , John Austin 2335 Benton Street Santa Clara CA 95050-4432 408-246-1383 408-236-4265
Fischer, Peter Gerhard 5543 Shoreview Drive Palos Verdes CA 90274 310-375-9250 310-784-1419
Ford, Brian J. Rothay House, Mayfield Rd. EASTREA Cambridgeshire PE7-2AY
Giordano, Raymond V. PO Box 985 Acton MA 01720 508-263-5504
Gold, Herbert A. 2065 Balmer Drive Los Angeles CA 90039-3047 213-665-8391 herbgold@concentric.net
Golubovs , Paul 11240 Briarcliffe Drive San Diego CA 92131 619-549-3331 619-578-5540
Gonzales , Lee P.O. Box 231 Lone Pine CA 93545 619-876-5056
Greeson, Maurice M. 232 Long Beach Blvd. Long Beach CA 90802 562-436-6102
Gregory, Kenneth M. 2124 Ocana Avenue Long Beach CA 90815 310-596-1762
Grohs, Anneliese 6031 Mossbank Drive Rancho Palos Verdes CA 90275 310-378-6345
Hantsch , Fred L. 936 Berkeley Street Santa Monica CA 90403 310-828-0286
Harding , Lynn 103 West Aliso Street Ojai CA 93023 805-646-0204
Hawk , Alan A.F.Institute of Pathology Washington DC 20306-6000 -
Herman, Al 1200 Lachman Lane Pacific Palisades CA 90272 310-454-4266 alherm@loop.com
Hesse , Kenneth 1221 La Paloma Glen Escondido CA 92026 619-747-3195
Hirsch , David L. 11815 Indianapolis St. Los Angeles CA 90066-2046 310-397-8357
Hudson, William 23963 Sapphire Canyon Rd. Diamond Bar CA 91765 909-860-5729
Jefts, Richard M. PO Box 2437 Fallbrook CA 92088 760-731-6091
Jones, Jr. , Edwin L. 2425 Scoter Avenue Ventura CA 93003 805-654-8548 805-654-2333
Julian S., Pulido 11619 Cozumel St. Cypress CA 90630 714-987-8756
Kile , Daniel E. 333 Salem Street Aurora CO 80011 303-341-0135
Kleinman M.D., George M. 20 East Common Rd. Easton CT 06612-1505
Krause, Bill 9 Wilton Rd. Hornsea East Yorkshire UK HU 18-IQU
La Rue , Budd J. P.O. Box 219 West Chicago IL 60186-0219 -

Lamb, Sec.,PMS , Colin G. 32 Clement Ave.,Balderton Newark,Notts. U.K. NG24 3NT 01636-77888
Laxer, Jack 16952 Dulce Ynez Lane Pacific Palisades CA 90272 310-459-1213
Layfield , Herbert A. 14439 Hayward Whittier CA 90603 562-696-7383
Legel, Gary 1306 Sheppard Fullerton CA 92631 714-870-0439
Lieberman, Isaiah U. 3300 Corinth Avenue Los Angeles CA 90066 310-391-6076
Lind M.D, Myron 4915 Tyrone Ave. Apt. 321 Sherman Oaks CA 91423 818-783-2610 alind4915@aol.com
Loro , Bert 943 Foul Bay Road Victoria, B.C. Canada V8S 4H9 250-592-1693
Loxton, Edit.,PMS. , Fred 86 Haymoor Rd., Poole, Dorset U.K. BH15 3NU 01202 731545
Martella , David J. 11-F Brooklyne Court Princeton NJ 08540 609-683-5664
Matlovsky, Lloyd 1304 E. Cerrito Circle So.Pasadena CA 91030 213-256-6035
McCormick, Thomas J. 5924 Bonsall Drive Malibu CA 90265 310-589-5552 310-828-1098 tommcc@cerfnet.com
McCormick, MD, James B. 2740 West Foster Ave. #110 Chicago IL 60625 -
McDavid, Larry 185 South Alice Way Anaheim CA 92806 714-630-5672 Lmcdavid@Lmceng.com
Meadows, Ernest 707 Greentree Road Pacific Palisades CA 90272 310-459-4788
Meek, Parke 2701 Main Street Santa Monica CA 90405 310-396-3477
Micro Soc., R. Winsby, Manchester 214 East Lancs. Road Swinton, Manchester U.K. M27 1QJ 061-794-4182
Microscopical Club , Quekett Brit.Mus.Nat.Hist, Cromwell London U.K. SW7 5BD -
Microscopical Soc., Royal 37/38 St. Clements Oxford U.K. OX4 1AJ
Microscopical Soc., San Francisco Morris Planet.,Cal.Acad.Sci. G.G.Pk; San Francisco CA 94118 -
Milan, Leo J. 3320 Stoner Avenue Los Angeles CA 90066 310-391-9654
Molnar, Charles J. 2570 Burgener Blvd. San Diego CA 92110 619-276-6348
Moorehead, Wayne 10449 Placer River Circle Fountain Valley CA 92708-7128 714-965-1590 WayneKip@ix.netcom.com
Morris , Ronald F. 1561 Mesa Drive #25 Santa Ana Heights CA 92707 714-557-6567 714-573-6765 ronald.morris@tus.ss1.com
Moss , Gaylord E. P.O. Box 9130 Marina Del Rey CA 90295 310-827-3983 310-827-3983 mosss@worldnet.att.net
Ordonez NYMS , Eugenia 11 West 53rd. Street New York NY 10019
Ottenheimer, Paul N. PO Box 472 Mantua NJ 08051 -
Paris, Robert S. 12420 Cascade Cyn Dr. Granada Hills CA 91344 818-366-2432
Porter, Thomas S. 7812 Yarmouth Avenue Reseda CA 91335 818-343-1359
Price, Zane 12424 Everglade Los Angeles CA 90066 213-398-0861
Pulido, Julian S. 11619 Cozumel St. Cypress CA 90630 714-897-8756
Roberts, Alan & Roberta 221 Oceano Drive Los Angeles CA 90049 310-476-6277
Rudnick, Tim 330 Market Street Venice CA 90291 310-396-9972
Samuels, Allan A. 2800 Bard Ranch Road Prescott AZ 86301 520-717-0120 samuels@mwaz.com
Sci.Instr.Society , Willem Hackmann Hist of Sci. Mus., Broad Street Oxford OX1 3AZ U.K. -
Selzer, Richard 1643 3/4 Westwood Blvd Los Angeles CA 90024 310-827-2755
Shaw , Christopher A. 5801 Wilshire Blvd. Los Angeles CA 90036 213-857-6317 chrissha@bcf.usc.edu
Skladany, James D. 470 W. 25th St. San Bernardino CA 92405-3728 909-886-1101
Sobel M.D, Barry J. 16133 Ventura Blvd.,#360 Encino CA 91436-2424 818-986-5887 818-986-6009 ak657@LAFN.org
Soc. of Canada , Historical Micro. RR #2, Priceville Ontario Canada NOC-1KO 519-369-2955
Solares, Dario D. 521 26th St. Santa Monica CA 90402-3145 310-394-6280
Solliday, James D. 1130 S. Austin St. Santa Ana CA 92704 714-775-1575 714-546-1315
Stabinsky, Leon 9610 Quartz Avenue Chatsworth CA 91311 818-886-1979
Taylor, Peter C. 2960 Fillmore St. #7 San Francisco CA 94123 415-922-6768
Teti, Peter A. 974 Edgecliffe Drive Los Angeles CA 90026 213-660-9259
Vitt, Jr. , George G. 2127 Canyon Drive Los Angeles CA 90068 213-464-6503 gvitt@worldnet.att.net
Warter , Stuart L. Dept. Bio. Sciences, Cal State Long Beach CA 90840 714-847-0529 swarter@csulb.edu
Wise , Joseph 1714 - 21st. Street Santa Monica CA 90404 310-829-7391
Wissner MD, Dr. Allan 31 Wood Avenue Ardsley NY 10502-1025 914-693-4628
Worden, Bill 2132 Walnut Ave Venice CA 90291 310-390-5757 fantods@leonardo.net
Wright , Myron 13720 Karen Street Anchorage AK 99515 ( ) 345-6014
Yaruss, Gary S. 1189 Cynthia Court La Verne CA 91750 909-593-4242
Yates , David J. 15002 Heath Drive Poway CA 92064 619-679-7879
Ziff, Stuart 1045 24th St. Santa Monica CA 90403 310-829-5116 kndm67@prodigy.com

JANUARY MEETING

Wednesday, January 21 at 7 PM
Crossroads School
1714 21st Street
Santa Monica, CA

Scanning Probe Microscopy

Michael Serry, Applications Scientist
Digital Instruments

Break for Coffee and Refreshments

ELECTION OF MSSC OFFICERS
Nominations from the floor and voting for all offices for 1998

SOME SUPERB VICTORIAN SLIDES
Photographs by Jim Solliday

Editor's Notes

This promises to be an outstanding meeting starting with an education on the remarkable capabilities of scanning probe microscopy as shown on pages 12 and 20 of this journal. Digital Instruments makes some of the finest devices in the field and we are fortunate to have Michael Serry give the presentation.

After the coffee break, we have the critical task of electing the MSSC officers for the coming year. Think ahead as to who you would like to nominate to guide the MSSC for the 1998. I think that we all had a wonderful time in our microscopical fellowship in 1997 and we want it to continue in the same happy manner.
Offices to be voted on are: President, Vice President, Secretary, Treasurer, Program Chairman, Workshop Chairman and Editor. Individuals may be reelected, but at a recent officer's meeting the general opinion was that establishing a yearly election, even as a confirmation, is a sound procedure to ensure the healthy future of the society.

After the elections, Jim Solliday has a selection of his photographic art showing some exceptional Victorian slides. For Jim to consider them exceptional means that they will be really worth seeing.

Gaylord Moss

ABSTRACT OF PRESENTATION ON SCANNING PROBE MICROSCOPY

by Michael Serry

Scanning Probe Microscopy (SPM) is a collection of techniques in which a tiny, highly localized probe raster-scans the surface of a sample for topographic and other information. Using control electronics and a computer, the probe-sample interaction is monitored to construct a digital map (or image). The resolution of the image is often a few nanometers, and sometimes in the sub-angstrom range. There are application-specific probes designed to address different surface characterization needs. The nature of the information that each image type contains is determined by the nature of the interaction between the probe and the sample surface. In the Scanning Tunneling Microscope (STM), the first SPM, the probe is a sharp metal tip, which is used to characterize topography and some electrical properties of conductive or semiconductive samples. In the Atomic Force Microscope (AFM), the probe is a very sharp tip (few nm radius of curvature), integrated into the end of a microfabricated cantilever beam. As the sharp tip scans the sample surface, the interaction between the sample and the tip is accurately monitored in order to construct an image. The simplest AFM image types are topography images and friction maps, where relative variation in the coefficient of friction on the surface is revealed. With TappingMode(AFM, the most popular SPM technique, images can reveal information about the elastic, visco-elastic, and adhesive properties of the sample at or immediately beneath the surface. More specialized AFM techniques are used to map electrical and magnetic properties of the sample.

This presentation will start with a few historical notes about the inception and proliferation of SPMs. It then continues with the introduction of some of the popular and useful SPM techniques today - including TappingMode AFM. The basic principles behind the workings of an SPM are presented along with images, demonstrating the usefulness of SPMs. A variety of application areas are emphasized including biological, materials science, polymers, semiconductors, data storage, and optics. Comparison with other microscopic techniques is made throughout the presentation.

Annual Southern California
SCIENTIFIC & TECHNICAL
Antique & Collectible Show
L.A. Airport Hilton, Sat. Jan. 31, 1998
Free 1-5pm; 10-1 Admission $5
(Hilton $7parking ticket admits one free)
Fair organized by **The Rational Past**
Info: Al or Bobbie Roberts (310)476-6277