Journal of
THE MICROSCOPICAL SOCIETY OF SOUTHERN CALIFORNIA
Volume 3 Number 3 March 1998

COMMENTS ON IMAGES OF SCIENCE

Norman H. Blitch

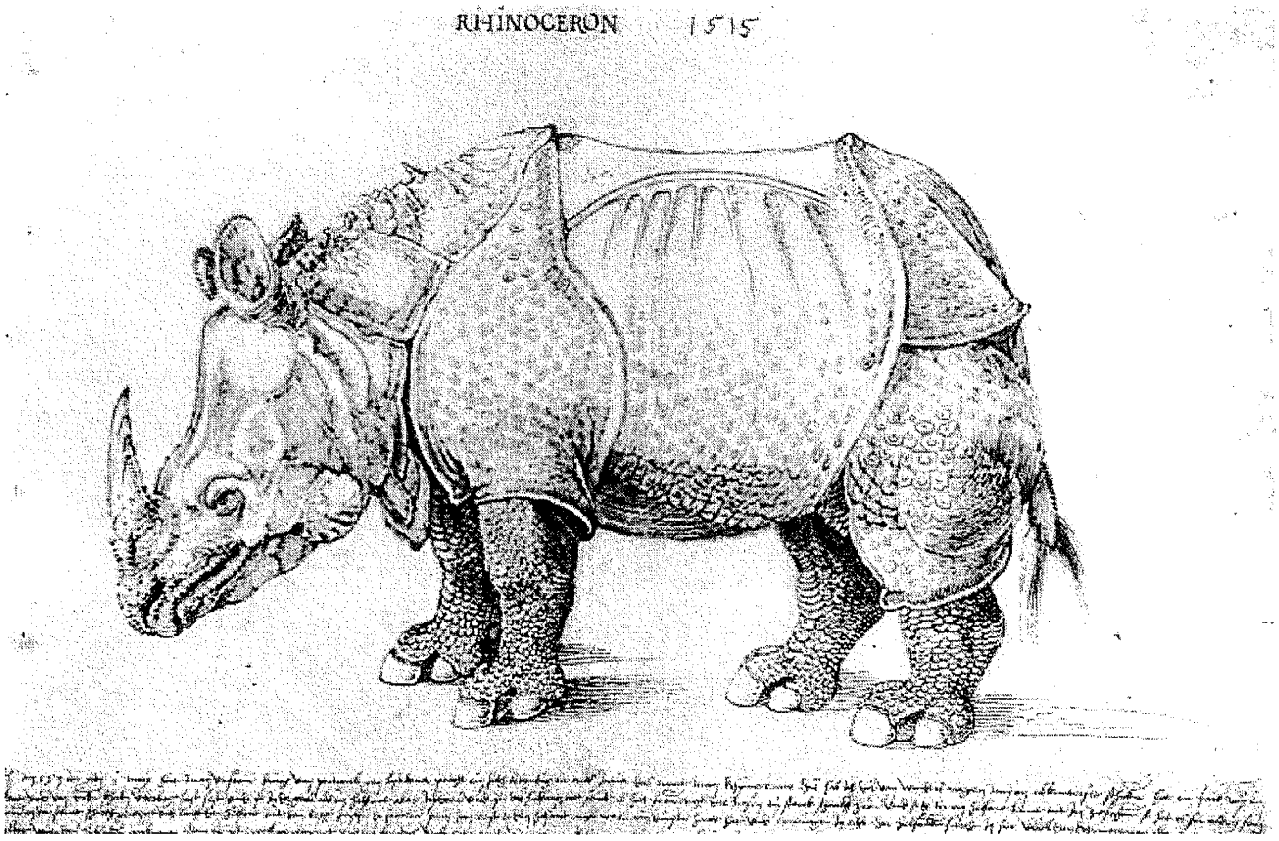

Plate I. Albrecht Durer's "Rhinoceros," 1515. Horn appears between beast's shoulders. Brian Ford, *Images of Science.*

Brian Ford, a distinguished author and historian of the microscope, recently addressed our society; his talk was both informative and well-received. Ford's numerous published works also speak for themselves, demonstrating his mastery of a wide range of subjects. His *Images of Science; A History of Scientific Illustration* published by the British Library in 1992, is focussed on the history and evolution of graphic art and its practical subtext, scientific illustration. There are eight chapters in Images of Science 1. The beginnings, 2. The hidden nature of mankind, 3. Illustrating the animal world, 4. Herbs, herbals and the birth of botany, 5. The nonliving world, 6. Mankind in the world, 7. The world in space, and 8. Hidden worlds, hidden purposes.

From the Paleolithic era to the present, graphic depictions of life have been drawn and sculpted in a variety of media. The purposes which motivated early man to depict the life around him have been subject to much speculation: to communicate, to keep records, to worship or express reverence, to instruct others, to decorate the surroundings, to illustrate one's history, and so on. It is most common to infer a religious motive in ancient works. At some point, the interpretation and dissemination of new ideas about the natural world became one of the driving forces of illustrative art. Copying, imitation and outright plagiarism soon followed.

In the fifteenth and early sixteenth centuries, particularly after the invention of movable type in about 1450, modern scientific illustration, representational and serving the didactic purposes of science, emerged. This is not to say that views of natural life, plant as well as animal, were thenceforth to be scientifically accurate. As Brian Ford emphasizes, the inaccuracies perpetrated in many early illustrations persisted, some even until today: "From the era of Leonardo we may discern parallel strands of activity: a scientific line of investigation which set out to advance zoological understanding and to embody these findings in illustrations and descriptions of an ever-advancing accuracy, and a second school which reiterated received views of earlier eras and perpetuated them in ill judged and inaccurate misrepresentations." Plagiarism in scientific illustration is not difficult to trace, from original work through successive imitations. Indeed, it is a truism that imitations become cruder and less detailed as copies are recopied.

Take Albrecht Durer's 1515 drawing of a rhinoceros (Plate I). Having never seen such a beast, Durer improvised from travellers' descriptions and occasional sketches. His conception was imaginatively drawn. As might be expected, however, it was anatomically inaccurate. The horn projecting from the rhinoceros's back does not occur in nature, yet was to be repeated time after time by subsequent illustrators as they copied Durer's work. Ford shows copies as recent as 1708 in which such Durer errors were repeated, almost two hundred years after the original Durer drawing was made (Plate II, a 1657 version).

As for text, there are grades and variations of plagiarism, ranging upward from pure theft to Henry Baker's usurping of Abraham Trembley's polyp studies (Baker, Henry, *An Attempt Towards a Natural History of the Polype*, 1743). This was tempered by the fact that Baker included a parenthetical "as first discovered by Mr. Trembley." But, however you excuse it, Baker rushed

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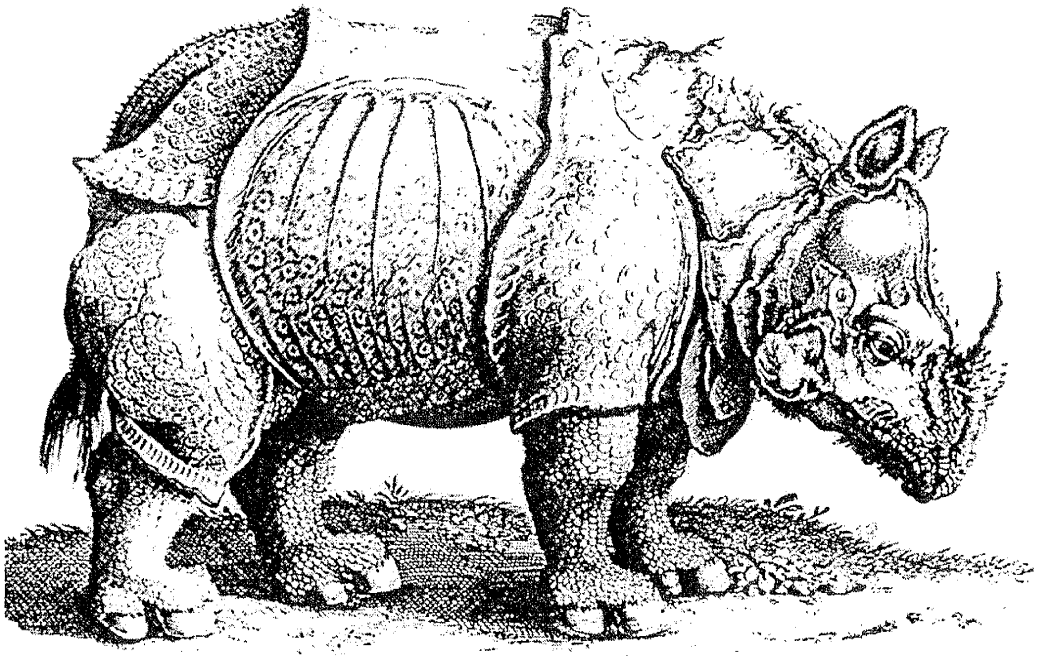


Plate II. Later version by J. Johnston, 1657. The horn grows longer. (ibid.)

to primacy over Trembley's original work (*Memoires pour Servir a L'Histoire d'un Genre de Polypes, 1744*).

Another typical example can be found in Brocklesby's *Views of the Microscopical World* (1851, New York), which takes precedence as the first book on microscopy published in the United States, over Joseph Wythes' *The Microscopist* (also 1851, Philadelphia) by virtue of an earlier copyright date. Brocklesby, it must be admitted, acknowledged in his Preface, dated 1850, that he had "drawn copiously from the writings of Grew, Adams, Pritchard, Mantell and others," and that "from these sources the greater part of the illustrations have been obtained." His major plates, poorly redrawn and badly reproduced, are taken directly from Andrew Pritchard's 1832 work, *The Microscopic Cabinet*, whose original drawings were done from nature by Dr. C. R. Goring, and hand-colored.

Chapter 8 of *Images of Science* is devoted to the microscope, under the heading "Hidden Worlds, hidden purposes," pages 165-202, offering a nice treatment of the development of microscopical illustration from the first examples of magnified snowflakes (probably using a single lens), in the mid-16th century. The examples of plagiarism and consequent degeneration are convincing. In spite of a lapse or two, however, the descriptive works of Jacob Hoefnagel (1575 -1640) and Robert Hooke (1635-1703), along with a few other microscopists such as Jan Swammerdam (1637-1680), Pierre Lyonet and Martin Ledermueller (1719-1769) formed the standards against which microscopical illustration may still be judged. In succeeding centuries, many other works on microscopy have been noted for the excellence of their illustrations, and the rela-

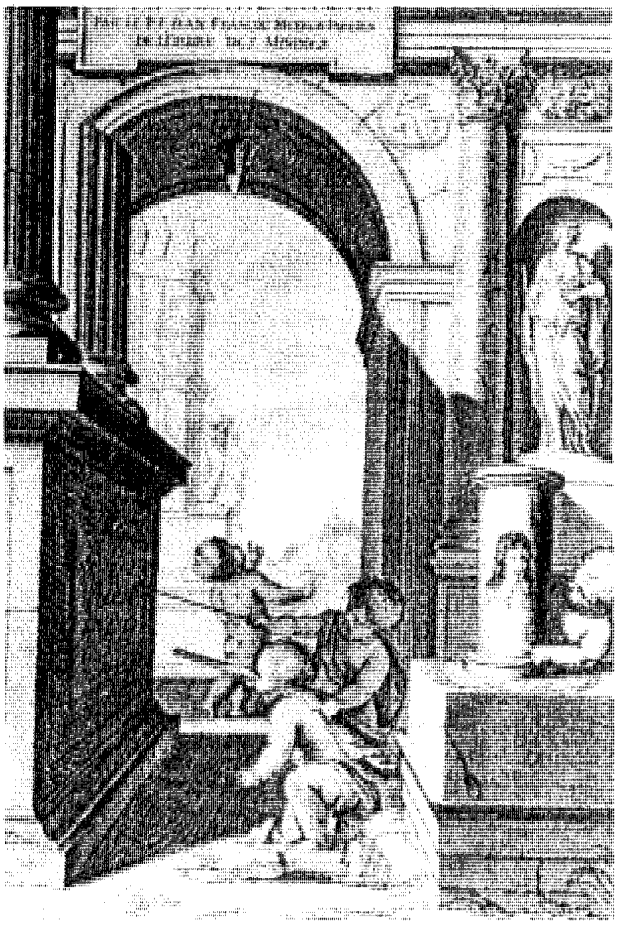


Plate III. Frontispiece: Jean Francois, *La Perspective Curieuse*, 1663.

tively less precise woodcuts or wood engravings of the early years were gradually replaced by engravings on copper and steel, producing illustrations of exceptional delicacy and beauty.

Needless to say, the illustrations done by the early masters were copied time and again. Typically bad examples are found in work published by Fillipo Bonanni (1638-1725), who was familiar (as quoted in his text) with the work of such microscopists as Malpighi, Redi, Swammerdam (See MSSC Bulletin Vol 2, No 1, Jan. 1997), Kircher, Hooke and others. Hooke images were re-engraved for Bonanni's *Observationes*, (1691) with some loss of detail in the process. Bonanni's own illustrations, in contrast to Hooke's, are poorly drawn. Even the depiction of his large microscope, which was legitimately innovative, demonstrates his lack of drawing ability and, notably, his lack of understanding of perspective. (The laws of perspective had of course been known since at least the 15th century, and were clearly set forth in Jean Francois Niceron's popular *La Perspective Curieuse*, published (1663) almost thirty years before Bonanni's *Observationes* (Plate III). This is not to disparage Bonanni, who had to his credit the first exemplars of the rack and pinion movement, the spring stage, the focussable substage and (arguably) use of the slider for permanent mounting, as well as advances in the taxonomy of snails and mollusks. But, his lack of drawing skill is not so much part of a progressive long-term degeneration of illustration as it is a sign of the wide variations in drawing talent that might characterize a population of scientists at a given time.

In *Images of Science*, Brian Ford cites numerous examples of the progressive degradation of illustrative drawings in works on microscopy. Ford says: "We here see scientific illustration turning through a full circle. From the first revelations of microbial life in the seventeenth century we have moved to a peak of popularity - when illustrative standards were of a high order - and on to a stage of degeneration and lack of interest." "And it is certainly true that some of the exciting drawings made by pioneers in a fervor of adventure and innovation many centuries ago are better, by far, than the dispirited and uninspiring diagrams that we can find today." However, when one considers that the eighteenth and nineteenth centuries saw many great natural sciences illustrators in zoology and ornithology such as Mark Catesby, John James Audubon, John Gould et al, perhaps the author could be asked to temper his conclusions a bit about the long-term degeneration of science illustration, and to agree that the overall quality of modern illustrators competes favorably with the illustrators of the past.

When tracing the lines of descent of microscopical illustration, some distinction should probably be made between the drawing techniques of Jacob Hoefnagel,

Plate IV. Insect drawings by Jacob Hoefnagel, "Insectarum Volatilium," 1630 Brian Ford, "Images of Science," 1992.

a master of line drawing (sometimes called outline drawing or contour drawing - See Plate IV) and the artists who became masters of "modeling." The latter approach was first brought to its full potential by Leonardo da Vinci in Italy, and was named by the Italians "chiaroscuro." It may be loosely defined as the characteristic degree to which drawings are "modeled," or given the illusion of three dimensions by varying the contrasting effects of light and dark "shading." The single line contour drawing typically uses flat planes of color or black on white with well-defined outlines. The outline drawing is useful in scientific illustration in general, and is especially useful when depicting transparent objects. Its ultimate employment in science is best typified by the complex engineering drawing of today. Either method, or both in combination, can transfer information with exactness According to Bonanni, Hoefnagel employed a form of single lens microscope, or perhaps a handheld lens, to observe his insects.

In microscopy, the best known of Hoefnagel's successors (in line drawing) was Tuffen West, who was important in his own right as a diatomist in the 19th cen-

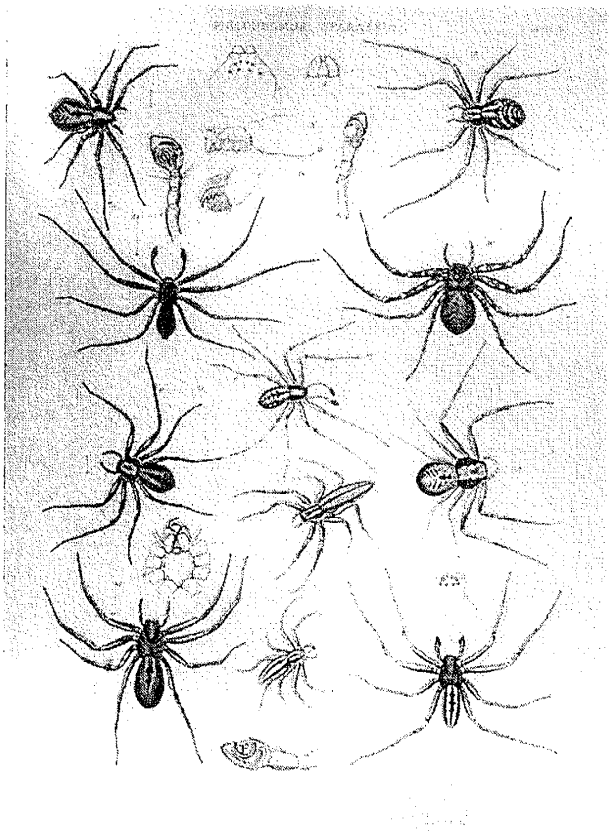
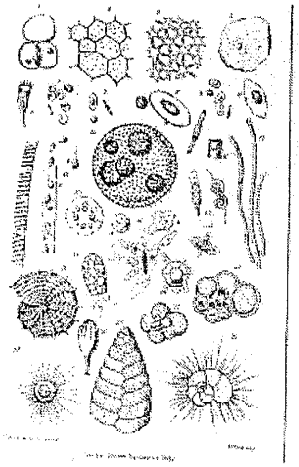


Plate V. Line drawings of spiders by Tuffen West, using flat planes of color.



HALF-HOURS

WITH

THE MICROSCOPE;

BY EDWIN LANKESTER, M.D.

TUFFEN WEST.

LONDON:

Plate VI. Line illustration by Tuffen West, *Half-Hours with the Microscope*, by Edwin Lankester, late nineteenth century. (Brian Ford, *Images of Science.*

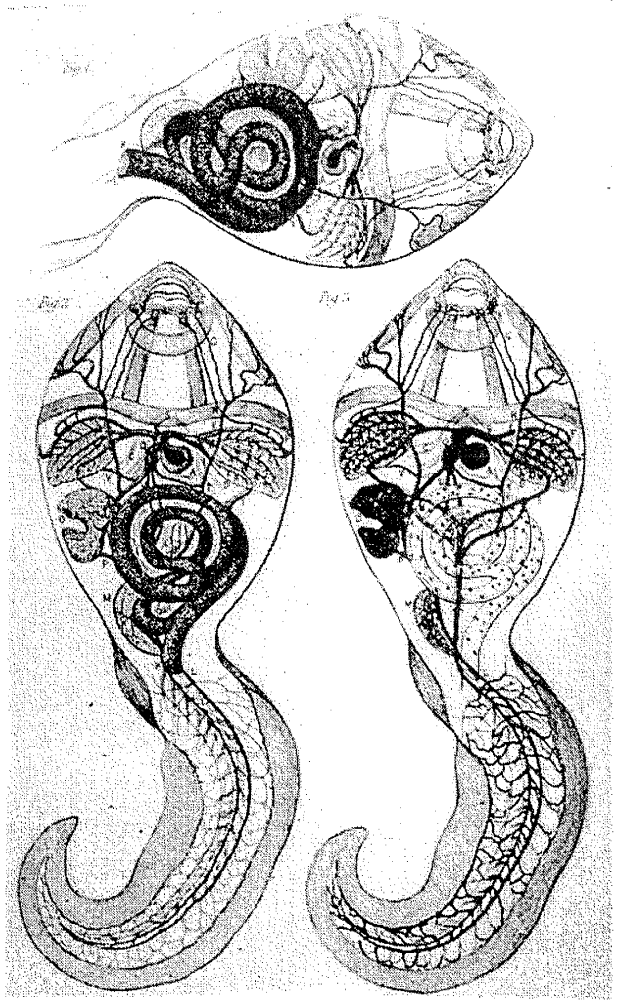


Plate VII. Line illustration by Tuffen West, "Tadpole Circulation," in *Transactions of the Microscopical Society of London*, Vol. 10, 1861.

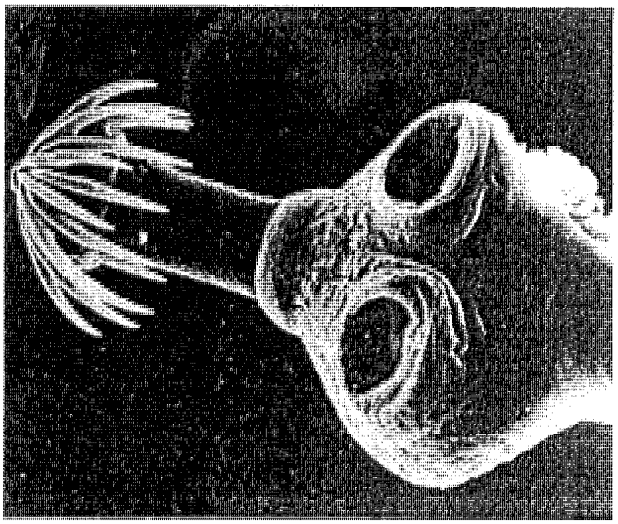


Plate VIII. SEM image of Acanthrocirrus tapeworm, From Jeremy Burgess. *Under the Microscope*, 1990.

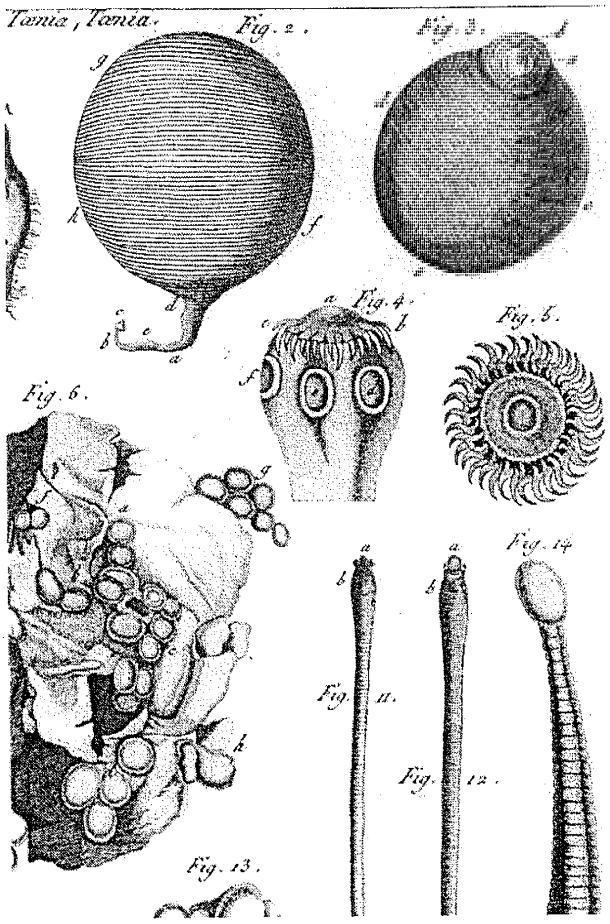


Plate IX. Pork Tapeworm Taenia, Plate 39, M. Bruguiere, *Tableau Encyclopedique et Methodique*, 1791 (detail)

tury. His illustrations ranged from exact drawings of diatoms to the beautiful spider drawings of Blackwell's *A History of Spiders of Great Britain and Ireland*, (1860-64) (See Plate V). They also included crowded illustrations of many of the smaller works, such as those by J. G. Wood and Edwin Lankester (See Plate VI) These latter were popularized and commercial, and though they sold in tens of thousands of copies were not comparable to West's best personal work (See Plate VII). Nevertheless, such works as Wood's *Common Objects of the Microscope* went through at least twenty one printings from the first, in 1861, to the most recent, in 1949, all under the same title, and still "illustrated by Tuffen West."

In summary, we can find in the works of many otherwise outstanding and prolific early scientists examples of poor scientific illustrations. Conversely, we can find examples of modern illustration which compare favorably with the early masters. Ultimately, we must measure scientific ilustrations, particularly in the case of photography, against the adequacy of information transmittal as well as against artistic excellence.

The use of photomicrography in scientific illustration is a whole subject in itself. We may compare the amazing detail provided by the modern Scanning Electron Microscope with that of the classic illustrations. As a single striking example, compare the SEM image (Plate VIII) with an early engraved image of a similar subject (Plate IX). In terms of information transmitted, the modern SEM is superior, but the eighteenth century engraving is credible indeed, and beautiful.

Brian Ford is a prolific and competent author in the field of microscopy, and this latest book is among his best. *Images of Science* is well-edited, well printed and well-illustrated, a credit to the British Library, as well as to its author. He has here undertaken a study of truly immense proportions, and has so far managed to provide us, in a single volume, a good start, with much more still to come. It is a pleasure to learn from a recent letter that we may expect more. Mr. Ford tells us that: "So far as "history" goes, I have a few publications due out next year, including book chapters on eighteenth century scientific publishing; another is on scientific illustration, and the third concerns the Leeuwenhoek specimens." We can hardly wait!

Photomicrographic Equipment For Sale

I have two sets of photmicrographic equipment, my own personal equipment, which I no longer use, and would like to sell.

First, Olympus PM 10AD Automatic camera with color temperature meter in virtually as new condition.

Second, I have circa 1970's Zeiss photomicrographic camera equipment consisting of the Basic Body II, Focusing telescope, special eyepieces etc, 4-stage photometer which uses a VACUUM photomultiplier tube - and looks like a prop from a 1930's science fiction movie, C 35 camera, shutter, adapter for bayonet mount leica camera, and fitted wooden case - all like new.

George Kleinman
e-mail gmkleinman@worldnet.att.net

Tel Home - (203) 256 5990
Tel Work - (203) 384-3591

OTHER VOICES

Herbert A. Gold

As you know, we share our Bulletin with microscopical societies all over the world. Several reciprocate by sending their publications to us.This new column will attempt to share with you, in an abbreviated fashion, some of the material we receive. For additional information on anything you read here contact Gaylord Moss or me.

The New York Microscopical Society publishes the *NYMS News*. In their January, 1998 issue we find that Dr. John H. Hartwig, a cellular biologist from Harvard is going to give an interesting presentation, *Platelet Shape Change: Release of the Beast Inside*.The study of a platelet's shape and functionality has become an important diagnostic medical tool now that innovations in light and electron microscopy make it possible to visualize life processes within a single living cell. Their workshops have "graduated" 12 members from the basic "Use of the Microscope" course and a follow on series,"Polarized Light Microscopy" has been scheduled. 1997 is the 120th anniversary of the founding of this Society and a commemorative yearbook is being completed. Several members participated in the **Nikon 1998 International Small World Competition.** This is an annual search for photo-micrographs which subsequently tour the world. Details for submissions for the 1999 event are available.

In the Winter 1997/98 issue of *The Journal of the Microscope Historical Society* we find a cover photo of a digitally magnified slide from the Postal Microscopical Society of a pair of mating Coleoptera (Rhagonychia fulva, "soldier beetle"). The remainder of *The Journal* is far less lascivious, thank heavens. There is a lively complaint about erroneous factors of magnification that appear in the captions of photo-micrographs published in otherwise erudite scientific journals. There is an amusing account of a collector's search for microscopes in Nashville,TN and Washington, DC. Two short articles, one on the Leitz Ore Dressing Stereoscopic Binocular Microscope and one on so-called "Cheap" Microscopes is followed by *Mechanical Fingers*. This is a well researched and illustrated article on the wide variety, mostly American, of accessories made to move a specimen around on the slide. These devices captured the attention of worthies of the stature of Joseph Zentmayer and William Wales. The column, *The Microscopist Bookcase,* reviews the works of Charles Aubrey Ealand (1921), Hugh Macmillan (1874), Popular Science Monthly Editorial Staff (1977) and Howard Tomb & Dennis Kunkel (1997).

Our friends north of the border, the Historical Microscopical Society of Canada, give our *Journal* a nice plug in their *Newsletter #31*, February 1998. That consideration alone would make this a worthwhile issue but there is more, much more. Two fine articles cover the story of Moritz Carl Hensoldt and the fine firm he founded. He and Carl Kellner can be said to have established the optical industry in Wetzlar, Germany. Kellner's firm eventually became Leitz and Kellner's buddy, Carl Zeiss, eventually took over Hensoldt. It makes an interesting, if not incestuous, story. They conclude the issue with the story of Joseph von Fraunhofer, the self-taught optical genius who lived but 39 years. In that brief period he revolutionized the manufacture of optical glass, designed the lenses for the 24 cm refractor that was used to discover Neptune, invented the diffraction grid and a solar spectrophometer, mapped the colorless black lines of the solar spectrum which are named for him as well as enunciating a law of optical diffraction which also bears his name. Just goes to show what you can get done if there's no TV.

I just know there will be no reciprocity forthcoming here, but have a look at the next issue of *Scientific American* anyway. Our friend, Brian Ford, will have a nicely illustrated article on the deft Delft draper,Antony van Leeuwenhoek.

If any of my dear readers have a publication whose content you would like to share with the membership, please let me know.

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WORKSHOP of the Microscopical Society of Southern California

by: **George G. Vitt, Jr.**
Date: **Saturday, 7 March 1998**
Location: **Steve Craig's Lab,** approx. 40 persons attended.

1. **Steve Craig** showed a substage lamp which he wished to be identified - which it was - Swift c.1970. He then showed a cased K&E Abney level. Steve reported on the recent NEPCON convention in Anaheim where he had spoken to Leitz, Zeiss and McBain people. Steve has been assembling much of Stan Baird's photo equipment, and some of it was on display. Steve then reported on the fine progress Doris Milan is making after her operation, and the whole group gave her a unanimous "Get well quickly" sentiment.

2. **George Vitt** reminded everyone that photomicrographs for the forthcoming art exhibition at the Palos Verdes Museum must be prepared in time for MSSC judgement during the April meeting.

3. **Leon Stabinsky** displayed a MacArthur type portable microscope, in which he said, the Australian Postal Microscopical Society is interested. These microscopes are available from a gentleman in England, who is rebuilding these English made units which had at one time been on the British market. They are constructed of rugged plastic, have a magnification of 20x and 30x and are available for £20, which includes postage. Leon uses a 'Super Mighty Light' with its acrylic light guide to provide illumination, which is brighter than that supplied within the microscope.

4. **Izzy Lieberman** showed a 7-ft long color printout chart of e-coli genes, pointing out that this was not a complete sequence of the base pairs.

5. **Stuart Ziff** showed and described the McMasters-Carr catalog #101 which fully illustrates and describes a vast gamut of tools, materials and supplies that any microscopist, machinist, researcher, etc. would ever wish to have for any sort of project, in the course of his career! It was added that a web page and a CD-ROM of essentially the same information is also available.

6. **Ed Jones** described the 3-day Workshop that he had recently conducted at the California Criminalistic Institute in Sacramento. He had also been giving full day classes at the American Academy of Forensic Science where people in attendance came from such distant places as Italy, Singapore and Alaska. He then described a sample of material, used in making Scottish kilts, that he recently obtained for analysis - soon discovering that it was composed of a variety of synthetic fibers and that there was 'not a shred' of genuine wool to be found! Surely, the Scots cannot be THAT frugal! One of Ed's many fields of expertise is the identification of fibers.

7. **Pete Teti** showed an India-made brass compass which was falsely marked "Stanley, London 1862". There ensued a discussion of counterfeit instruments, edged weapons, etc. currently being manufactured in India. Buyer beware!

8. **Jim Solliday** discussed, in great detail, the photomicrographs (8x10s or slides) that we will need for the April meeting, stating that we must provide 50 images for selection by the Museum. Jim had a supply of slide boxes containing the excellent wood sections by Ernie Ives, which some MSSC members had ordered during our Christmas party. He then showed George Needham's slide making device that Jim Fidiam had sent him. This was a specially machined aluminum cylinder that can replace the round turntable on a slide ringing turntable. The cylinder is placed on the spindle and a round cover glass is fitted into the upper shallow machined cavity. Giving the disk a good spin, a very small diameter ring can now be applied to the cover slip with an 000 sable brush and India Ink. Then, a diatom is placed in the center of this ring for the preparation of "type slides" of diatoms. It was noted that a "Rapidograph" drafting pen, with its smallest tip, can be used for making excellent circles.

9. **Richard Jefts** described the work he has been doing in establishing a technique to make microphotographs "a la Dancer." To demonstrate his current results, Richard passed around an 8x10 board on which he had mounted one such slide, centered over a hole in the board so that it could be observed by transmitted light using a hand-held magnifier. With his optical system he will standardize the size of microphotographs to 2x2.5mm. He has been using Kodak B&W Type 2416 film.

10. **Fred Hantsch** showed the book *100th Anniv. of the Smithsonian Institute*. This is a $60 book now available from Barnes & Noble for $12.95. Leon Stabinsky remarked that an encyclopedic book on scientific instruments, of several hundred pages, is now also available for $145, delivered.

11. **Barry Sobel** showed two instruments:

a) Colorimeter: French, c.1880. Hand Engraved: "Laurent, rue de l'Odeon Paris". Leon Laurent trained first with the eminent French instrument maker, Froment, and while working there he earned two medals including one at the Paris exhibition of 1867. After marrying the daughter of Jules Duboscq, (who had married J. Soleil's daughter, and thereby inherited the Soleil optical instrument-making apparatus), he suc-

ceeded Henri Soleil, son of J. Soleil, in 1872, after joining the firm 2 years earlier. He retired in 1892, thus dating this instrument to the period 1872-1892.

b) E. Leitz dissecting scope c.1900 signed: "E.Leitz, Wetzlar;" brass pillar with 3 of 4 original lenses, substage mirror, black painted horseshoe foot and detachable leather covered wrist rests in original case with key.

Barry also brought a panoply of rare microscope accessories, all finely exhibited in a glazed flat case. These accessories will be the subject of an article in the April MSSC Journal.

12. **Ken Gregory** showed a recent Astronomy magazine containing red-green 3-D anaglyphs, viewed by the included red-green viewing glasses. He then showed and described a recently found cased rolling disk planimeter by Coradi. Ken was able to locate a book in which the principles of this very instrument were described. He then showed a Swift Continental microscope with an English foot.

13. **Stuart Warter** showed a Queen microscope s/n 722, c.1882-3 featuring a round stage, substage rotatable stops and mirror. It was made for James W. Queen & Co. not long after their 1881 acquisition of the Acme works, and promoted for use by physicians. It is a "black & brass" instrument with under arm fine focus and, with case, is in very fine condition. Queen made somewhere near 4,000 microscopes in the 30 or so years before 1900; whereas Bausch & Lomb had made 30,000 by that same year - about 7 for every one of Queen's.

14. **Norm Blitch** displayed a large hand-colored copper plate engraving of a Dellabarre microscope, c.1777 which he had found at the recent book fair. It was identified as "plate #12." A photo of the same instrument is shown in Turner. The Dellabarre microscopes sported multi-element achromatic objectives with up to 8 elements! Mechanically, it was an ungainly looking instrument, its 2 hinged joints in the pillar allowing the tube to be placed in a horizontal position - where its stability would be quite precarious.

15. **Rock Currier**, a guest at the Workshop, related his interests, experience and business of supplying commercial quantities of high grade mineral specimens which he gathers during his world-wide and frequent trips. He has been to India for zeolite, the alti plano of Peru, Africa, Pakistan, Chile, Brazil, Russia etc. He has some 10,000 sq.ft. of space to hold his specimens, which he sells to the public.

16. **Chris Brunt** described his newly acquired GPS (global positioning system) which he uses with his Toshiba laptop computer and a CD-ROM which contains extremely detailed maps - (down to the house-number and hiking path level!) The GPS costs $150-170, and is accurate to 60ft. (a correction system is available to achieve finer positional accuracy). He described his use of the system on various trips. After the workshop, Chris demonstrated the system. It is recommended that you not get a GPS until you have talked to Chris!

17. **Larry Albright**, our program chairman, reminded those present to bring their photomicrographic art to the April meeting so that the membership could select those images that will be submitted to the museum for exhibition. As an added incentive, Larry mentioned that the exhibited pictures will bring good prices at the museum, after the show.

18. **Jim Clark** described his trip to the Galapagos Islands to observe the eclipse of 26 Feb. Due to unforseen circumstances, they had to spend a weekend during the eclipse on a 92-ft trimaran! Thus, they were 14 miles south of the absolute centerline of the eclipse. Afterwards, they snorkled with sea lions, sea iguanas, and penguins! Jim stated categorically that turtle soup was not being served on the Galapagos. Mock turtle, perhaps? Jim then showed a pocket microscope that he wanted identified. It was a Hensoldt. Jim also needed information as to what sort of attachment went 'substage', that was missing from his microscope. Several members said that they had the missing part.

19. **Gaylord Moss** described the article in Science News, *The Art of Scientific Photography*, concerning work being done at MIT media lab on the production of scientific/ technical photos/ illustrations which are also of high aesthetic quality. It seems that more information can be transferred to the observer if the photo is aesthetically pleasing. Gaylord then described an Optical Society of America lecture he attended recently where the speaker described the unbelievably complex optics work being carried out at Lawrence-Livermore on the fusion project. In essence, they are focusing 192 extremely high power lasers through 3500 meter diameter optics, with huge KDP electro-optically elements made from 500 pound crystals (which they grow from aqueous solution!) onto a tiny area to produce fusion energy.

20. **Dave Hirsch**, our MSSC Treasurer, reported on our ever-growing membership, that the treasury is well into the black, and that donations have been extremely generous. This is excellent news which underlines the good health of MSSC. Dave then showed his cased, c.1885, B&L Professional Model microscope with 3 turret objectives and sub-stage condenser, diaphragm and mirror. The microscope can be used with either a monocular or a binocular head.

21. **John de Haas** brought an 8X Leitz ocular for Ron Morris.

22. **Gary Legel** showed some 'art forms' he had constructed of lab glassware, using the clear adhesive, "Goop" to hold things together. These included a small binocular microscope (ALL of glass), and an artistically arranged 'board display' of miniature lab glass vessels. Gary then discribed, most entertainingly, his recent experiences on a fishing trip to British Columbia, where the 'bush pilot' was using his GPS to try to locate the particular lake (one of dozens) on which they wanted to land. The story had a happy ending. He did not mention, however, the number or species of fish caught!

23. **Herb Gold** showed a Chromolith caricature of (Sir) Frank Crisp, Secretary of the Royal Microscopical Society, which appeared in the English magazine, *Vanity Fair*, on 31 May 1890. The cartoon was done by Leslie Ward who signed himself, "SPY". Herb also showed a very nice copy of the 1893 English edition of Henry Van Huerck's book, *The Microscope: Its Construction and Management.* It illustrates the world-class stands of the day, including the eponymous (*) model Watson, which is embossed in gilt on the cover. He then showed a single pillar monocular stand by the noted Chicago maker, Walter Bulloch. The stand incorporated his patented swing-out stage and three original B&L objectives. Made in the 1880s for the New York instrument house, Meyerowitz, it retains most of its original lacquer.
[(*) eponymous: one whose name is so prominently connected with something as to be a figurative designation for it.]

24. **Peter Fischer** gave two huge color posters of the histology of the human ovary. He then gave an account of the latest developments vis-a-vis Leica, Inc. and the part a certain extremely wealthy Swiss citizen is playing in the recent acquisitions of microscopical firms by the British. A fascinating 'inside story'! (Names witheld to protect the innocent.)

25. **Bill Hudson** reported that he had acquired, through the courtesy of Izzy Lieberman, an 8-foot spectrograph. It needs some refurbishing, and Bill may write an article on this instrument for the Journal. Understandably, an instrument of this size has created a minor perturbation on the distaff side of his household.

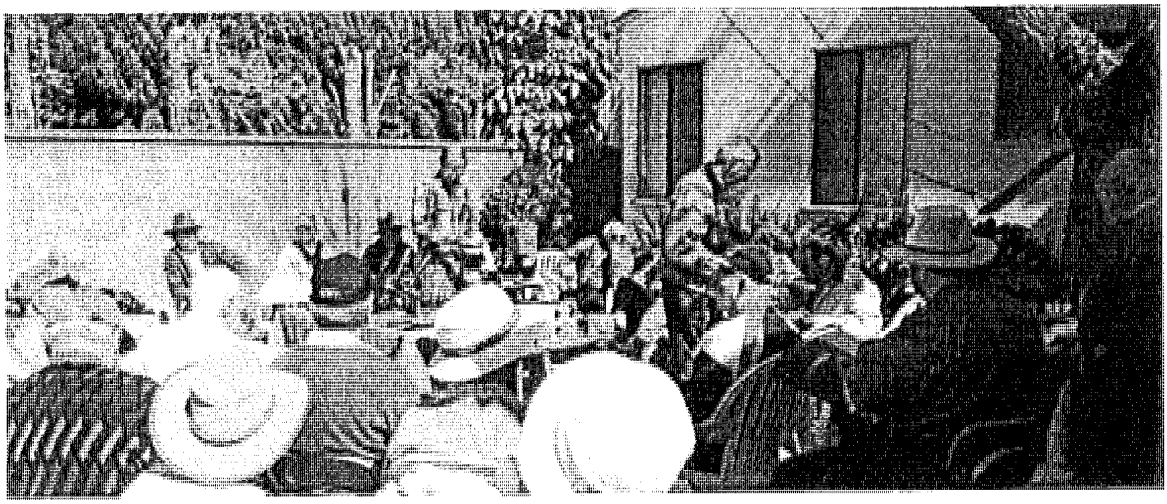
26. **Larry McDavid** displayed a pristine tangent galvanometer by the American maker, Bennel. In regard to the forthcoming photo exhibit, he said that Photo Center, Inc., Logan Avenue, Costa Mesa, CA does good Type R enlargements (positive color slides to paper, i.e., positive-to-positive). Larry then showed some excllent 8x10" enlargements of photos he had taken of some of his scientific instruments. The lighting, arrangement, color and detail were of the highest quality. He then described the weather system he has installed at his residence which can computer plot any selected pair of variables. In the case of inches of rainfall, the system has a resolution of 0.01" of rain.

27. **Alan de Haas** brought many 'freebies' which were exhibited on one of the tables. He also brought one of the first Zeiss lenses used for producing demagnified images, at 365nm, of artwork for microcircuits. The lens has a NA= 0.358, weighs about 10-lbs., and is cased in a foot long black anodized aluminum cylinder. Alan put this lens up for sale (any low price would do) with proceeds going to the MSSC treasury. Thanks Alan!

28. **Ron Morris** brought several items for sale: A Leitz Orthoplan microscope with automatic photomicrographic system (Gary Legel is the new owner); a Leitz Labolux microscope; and an Olympus rotating stage for the BHT microscope. Ron then described the construction of microelectronics with a feature size of 0.35 microns using a wavelength <250nm (deep UV).

29. **Steve Craig** reported on his newly acquired HP film scanner of high capability and reasonable price. Steve had several copy stands for sale.

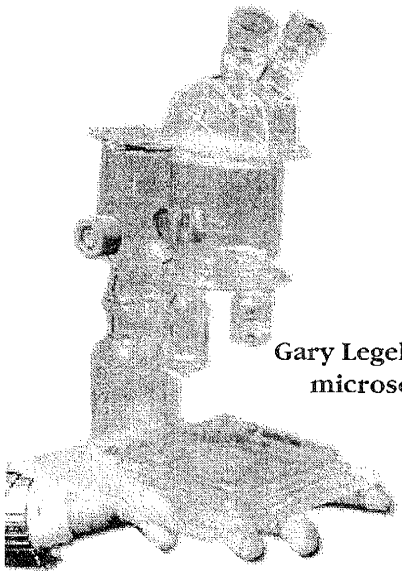
This was, without doubt, the best attended workshop to date! After the Workshop, at 12:30pm, many members adjourned to Coco's for food and more talk.



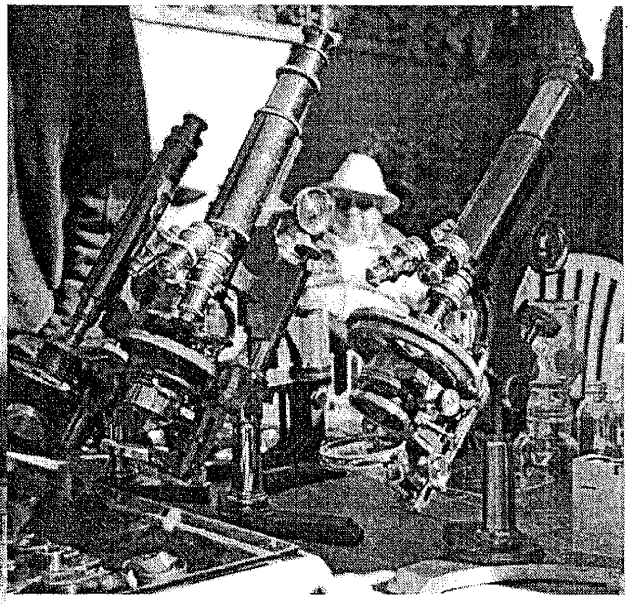
The group during show and tell

The Workshop of 7 March 1998.

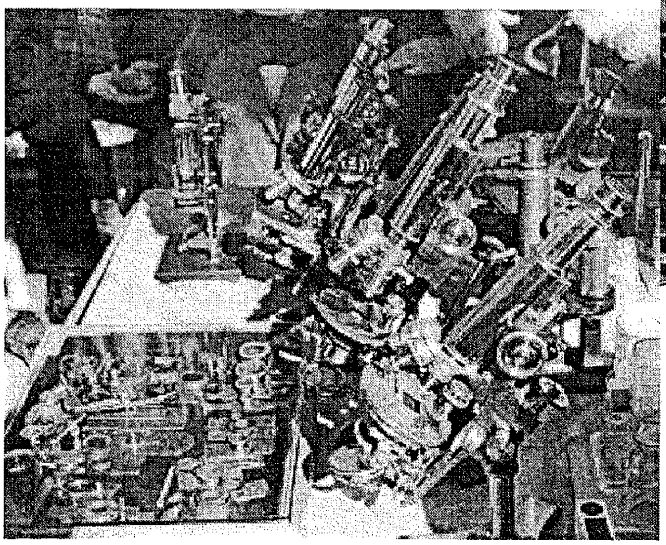
Photos by George G. Vitt Jr.



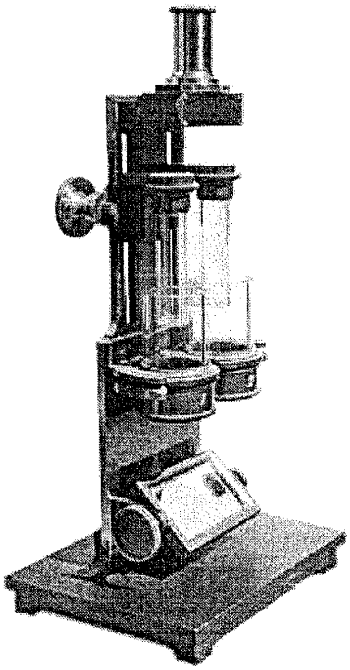
Gary Legel's glass microscope



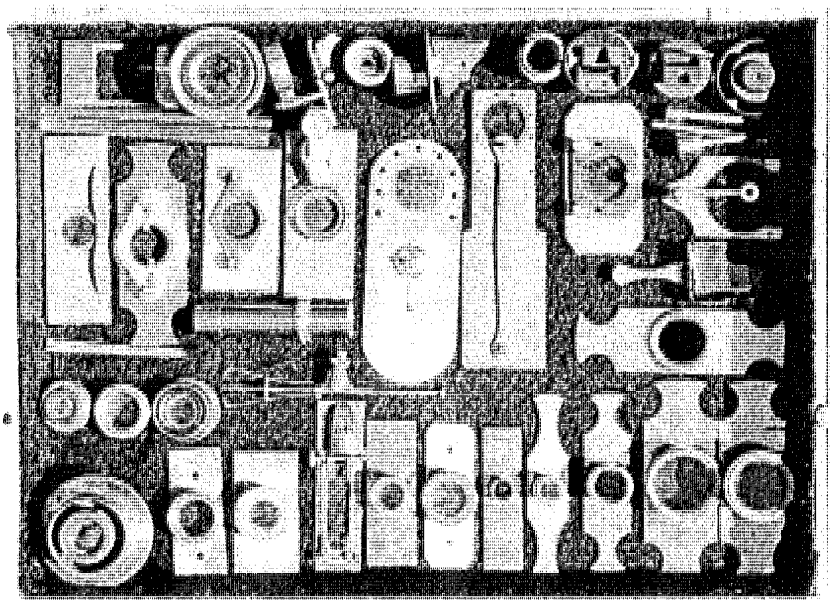
Microscopes with Ken Gregory in background



The display table



Barry Sobel's Laurent c. 1880 colorimeter



Barry Sobel's accessories in display case

MEMBER PROFILE

Kenneth M. Gregory

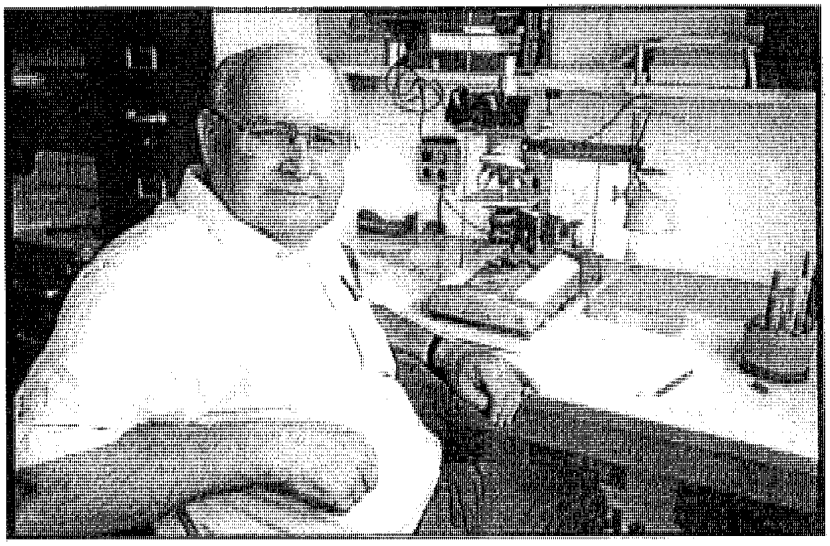
In 1859, my ancestors left Missouri by wagon train and headed for California where they settled in Ione, Amador County. Several generations later, I was born in 1939 in Turlock, California. My father was an electrical engineer working for the Turlock Irrigation District. After WW II, we lived in Modesto, California until I graduated from Junior High. My parents then moved the family (I have an older sister, younger brother) south to Turlock where I went to High School and afterwards attended Modesto Junior College. My early exposure to nature and science was via Boy Scout camping trips and family vacations to state and national Parks in California. I took up the clarinet in 5th grade and played into High School. The National Geographic and Scientific American magazines were always available for reading.

I had the usual run-in with crystal sets and even a 4 inch reflecting telescope (back in those days you could still see the Milky Way at night from your back yard). My High School chemistry project was to silver a 6 inch mirror my father had ground and polished. As a Senior, I refurbished the High School's 12 inch reflector telescope, dismantling and painting the mounting frame, installing new dome rollers, etc. The mirror was sent off to be re-aluminized. When the project was completed, I was able to easily view the rings of Saturn and Mars. That year, Mars was the closest in decades, appearing as a 1/4 inch red circle in the eye piece. In my last two years of High School, I worked part-time after school in a photo studio in Turlock.

On entering Modesto Junior College, I declared a major in Physics (a legacy of early astronomy). After classes I had a part-time job behind the desk at our local Public Library. Having been raised in the heart of the Bible Belt in central California I became quite interested in human evolution (opposites attract?) and had some resources available where I worked. After my two years at Modesto Junior College, I transferred to UC Berkeley, continuing one more semester as a Physics major. However, my interest in evolution prevailed and I changed my major to Anthropology with an emphasis on physical anthropology and received my BA degree in 1962. I had planned to pursue an MA in Anatomy, and then a Ph.D. in Anthropology, but at the end of the first semester as a graduate student in Anatomy, the Anatomy Department invited me to be a Ph.D. candidate in Anatomy. Since I had become hooked (rat-toothed forceps and hemostats) on Anatomy by that time I switched immediately. My Ph.D. thesis involved the application of the Golgi staining technique to measure the dendritic branching of cortical neurons in rats subjected to removal of the pituitary gland at 4-6 days of age.

Along the way to finishing my degree, I married another Anatomy graduate student. My wife, (we were divorced in 1973), received her Ph.D. and later also earned an MD in Psychiatry. I received my Ph.D. in 1967 in Anatomy. We have three adult children; my oldest son lives in Long Beach (recently married in late 1997); my youngest son (also recently married in 1997) lives in San Diego and is a computer program-

High School graduation
1957



My Olympus BHA research microscope at CSULB showing special tilting stage for making stereo pair drawings of neurons.

mer. My daughter, the youngest, graduated from Georgetown University Law Center in Washington D.C. last May and is employed in that area. While in Washington D.C. to attend her graduation, I was able to schedule a visit to Walter Reed Army Hospital where there is a historical display of the development of the microscope on exhibit (part of the Billings Collection).

My first faculty appointment was in the Department of Anatomy, at the Downstate Medical Center, SUNY, Brooklyn, N.Y. where I was one of 5 neuroanatomists teaching 203 medical students. After five years in New York (my 5 years in exile), we returned to California (Southern part) where my wife accepted an appointment at CSULA in the Psychology Dept. I landed a one year appointment at UCLA in the Anatomy Department. During that year I also had a Joint Appointment with UC Berkeley, and flew back and forth 2 days a week for 10 weeks to teach a Neuroanatomy course at my old alma mater, replacing my former research advisor, Dr. Marian Diamond who was on sabbatical leave. The next year, I joined the faculty at the California State University at Long Beach (CSULB) and have been there ever since. During the Summers of 1976 and 1977, and 1996, I was invited to teach Gross Human Anatomy at UC Irvine. I have also collaborated on various research projects conducted by collegues at the University of California at Irvine (UCI) since the 1970s. In the mid 1980s, I was a ""technical advisor" to the Disney film GROSS ANATOMY. The Disney special effects people came down to our Department twice to view cadavers so they could go back and recreate artificial cadavers to use in the movie.

My research at CSULB involved subjecting various vertebrate brains (frog, rat, rabbit, cat) to the Golgi staining procedure, processing the brains, embedding them in Parlodion, sectioning at 100 microns., and mounting the sections on slides in serial order. I then draw the stained neurons using an Olympus BHA microscope fitted with a drawing tube. I designed a tilting microscope stage that was made in our machine shop. By tilting the stage 5 degrees first to the left and drawing the neuron(s), and then drawing the same neuron(s) with a right tilt, I am able to obtain stereo pair images which were then reduced down to about 1 1/2 inches wide. I presented the results of this procedure at one of LAMS' major show-and-tell sessions several years ago.

I joined LAMS in October 1994. After seeing the resources some members were devoting to acquiring antique scientific instruments (i.e. old microscopes), I was determined NOT to get caught up in or infected by the old microscope collecting fever. (I was already starting a collection of old Albert system clarinets, of various types of modern clarinets, and also old simple system wood flutes). Six months later my resolve collapsed when I found and bought an early 20th century Reichert microscope for $65. Once you get infected with the "brass collecting virus" it simply overwhelms your defense mechanisms (and budget) as you flit from one antique mall and show to another in an endless quest for more brass and glass. As many of you know Stu Warter and I make frequent excursions and expeditions into the hinterlands of southern California, clearing out any and all instruments worthy of collecting. Our territory extends from San Diego to Santa Barbara and we certainly contribute to our national oil import deficit, not to mention the local economy. My sister lives in northern California and periodic trips north require that I visit most of the antique malls on the way. Two summers ago I visited my daughter in Seattle, checking out most of the malls along the way.

I'm going to have to bring this narrative to a close, since the "brass collecting virus" is starting to act up again and I'm getting a twitching sensation in my legs, especially in my right "gas peddle" foot.

WHAT ABOUT RUSSIAN OBJECTIVES?

Alessandro Bertoglio

The other day Larry Albright sent me a copy of some E-mail he found on the internet. It was a bit of correspondence sent from Italy by a Mr. Alessandro Bertoglio addressed to the diatom network. His message was very interesting and something I thought our members might like to read for themselves. It seems Mr. Bertoglio is part of an amateur group of microscopists in Italy called the **Gruppo Microscopisti di Torino**. They not only study diatoms but actively evaluate the objectives they choose to do the work. The following is a wonderful account of his lens selecting process and the results he obtained. Mr. Bertoglio might be a fellow microscopist with whom some of you would like to correspond. The following is the text of Mr. Bertoglio's communication. (Some editing provided to clarify the terminology). J. Solliday.

Alessandro Bertoglio

Being an amateur I could not spend a great deal of money on my microscope, but in my study of diatoms I always have a need for very high resolution. I have resolved this problem to my satisfaction and above all inexpensively. The ingredients are quite simple: I now use Naphrax (diatom mounting media), blue violet Kodak Wratten 47 filters, a 90X 1.30 n.a. Lomo apo objective and a Lomo 1.40 n.a. aplanatic achromatic condenser. Naturally, setting the microscope up with proper Koehler illumination and using the condenser with oil helps. Previously I used canada balsam with achromatic phase contrast optics. I now use bright-field illumination with highly corrected apochromats, which seems to produce better results because the Naphrax provides all the added contrast I need. The Wratten filter 47 should be easily acquired. It furnishes a short wavelength of light that allows for better resolving power. These filters should be used only with apo optics because the achromatic elements are not corrected in this band and furnish unsatisfactory results.

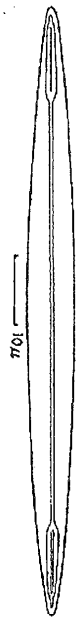
The Russian Lomo apo objective 90X 1.30 (also available in the U.S.A at Lomo North America Ltd: GEK. Inc., see their web home-page at http://www.comet.chv.va.us/gek/) is an exact copy of a famous pre WWII Zeiss objective. It offers superb images and costs less then a tenth of the equivalent objective manufactured by the firms of Nikon, Zeiss or Leica. Today, Lomo also produces a plan apo 100X 1.25 n.a. objective but direct comparison of the two favors the older model (90X). The 100X gives a lower contrast image. The condenser (also manufactured by Lomo) is a precise copy of an old Zeiss condenser. It is quite inexpensive and is still considered one of the best available. At minimum expense I am able to successfully obtain excellent results, at a resolutions of at least 50 striae in 10 microns. By the way I am not a representative of or am I sponsored by Lomo.

I have succeeded in resolving the striae of Nitzschia dissipata (Kutz.) Grun. to between 40 and 50 striae in 10 microns, this agrees with the work of K. Krammer and H. Lange-Bertalot, *Susswasserflora von Mitteleuropa band 2/2.* Also, Amphipleura pellucida (Kutz.) Kutz. is quite easy to resolve. At 900X the striae alveolate in Pinnularia nobilis (Ehren.) Ehren. and Pinnularia maior (Kutz.) Rab. shows some evident inner striations on their whole length. At 1350X and even better at 2300X, these striations appear to be composed of very small dots (0.16 to 0.18 microns according to SEM images). This has also been seen by S.V. Dodge with his light microscope (*Quekett Journal of Microscopy*, Vol.37, part 2, pp.117-122, 1993). In this circumstance, however, Mr. Dodge used for his observation a very expensive Nikon 100X 1.40 n.a. apo objective, the same condenser I use, with a monochrome interferential blue filter and annular illumination.

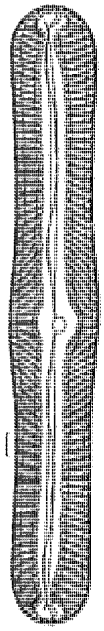
Finally, with some of my colleagues at the Gruppo Microscopisti di Torino, I have conducted a full test between my Lomo optics and a very expensive Leica microscope equipped with a 100X 1.32 n.a. phase contrast apo of modern construction. We used the same filters and examined the same specimens. We found that in pure resolution our cheap bright-field (Lomo) set demonstrated slightly superior images. The Leica equipment was comparable to a Ferrari and the images furnished by the phase apos were wonderfully sharp, but those achieved by the bright-field Russian set appear more transparent and natural. Sometimes the contrast produced by the phase system in combination with the Naphrax appears excessive and does produce problems, chiefly in photomicrography. Admittedly, the appearance of a Pleurosigma or Navicula cuspidata with such a luxurious optical system is really quite unforgettable. (Editorial note: If the visibility index is too high when studying the larger diatoms like Arachnoidiscus, diffraction is produced obscuring the margins of the specimen. The delicate forms such as Pleurosigma angulatum are not affected as much by this effect. In fact with most smaller and delicate forms the contrast is hardly ever high enough). My experience in photomicrography suggests that images taken with high contrast film such as Kodak Technical Pan and developed in Agfa Rodinal, will provide better con-

trast, producing images equivalent to those with the Leica apo phase system. However, there may be a problem with microscopes using the long barrel (DIN) optics. The 90X 1.30 n.a. Lomo is a short (RMS type) objective. If your scope cannot elevate the stage high enough you will not be able to focus the image without an adapter. There are some stands such as those made by Leica that are not able to do this. I hope my experiments can be of use to some of you. If you wish to comment on my results, please contact me at: Alessandro Bertoglio, G.M.T. Gruppo Microscopisti di Torino, via Fratelli Carle 32, 10129 Turin, Italy. Phone: Italy 011 596436 or E-mail : A.Bertoglio@agora.stm.it

Nitzschia dissipata

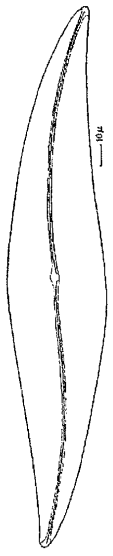


Amphipleura pellucida



Pinnularia nobilis

Navicula cuspidata

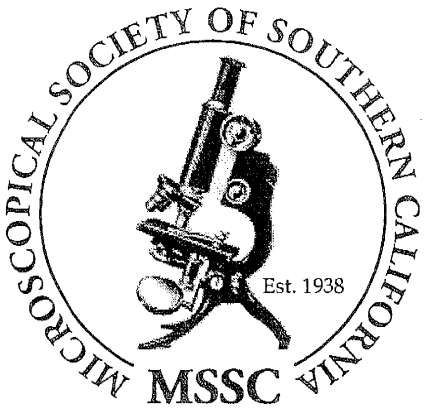


Pleurosigma angulatum

PROPOSED MSSC LOGOS

VOTE FOR YOUR CHOICE ON THE ENCLOSED BALLOT.

A



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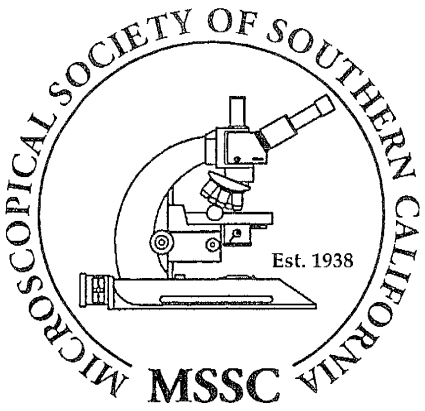

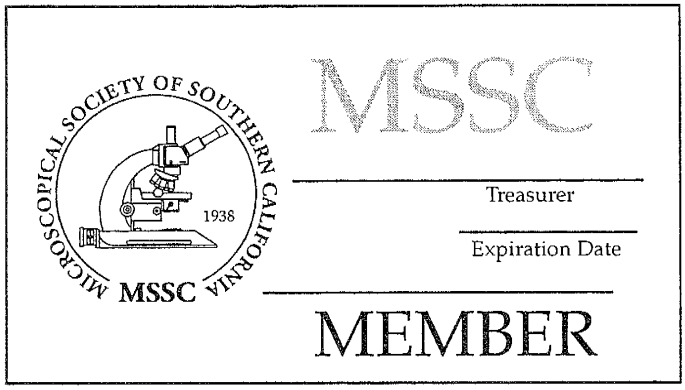

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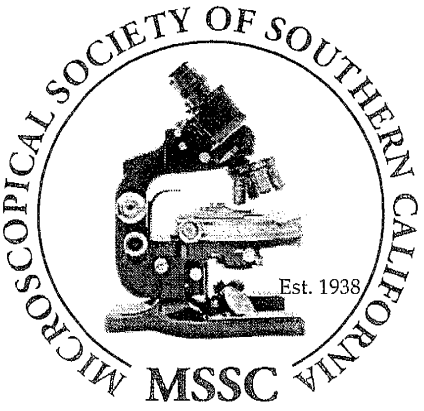

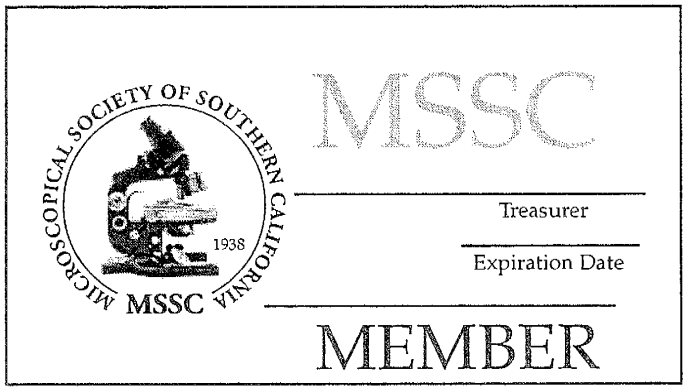

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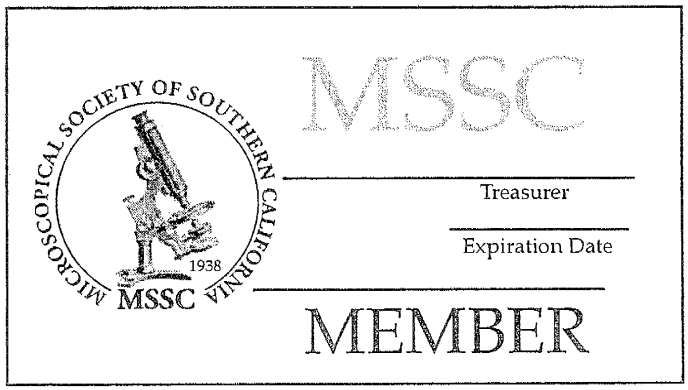

ANOTHER CRISIS!!
TO POLISH OR NOT TO POLISH

David L. Hirsch

At MSSC meetings and workshops, or over a snack at our favorite eating place, topics of a quasi-microscopical nature often come up. One topic, which finds us gored by the horns of dilemma, begs the question: Polish or perish? The outward appearance of any scientific instrument, such as a microscope, is characterized in two ways; by the surface finish and by the type of protective coating which covers the surface. Surface finish is determined by the extent of roughness and/or waviness. Roughness is indicative of closely spaced surface irregularities. On surfaces produced by machining and abrasive operations, roughness includes irregularities produced by the cutting action of tool edges, abrasive grains and by the feed of the machine tool.Surface waviness refers to surface irregularities having greater spacing than the surface roughness. On machined surfaces, such irregularities can result from machine or work deflections, vibrations, etc. Irregularities or similar geometry may occur due to warping, strains, or other causes.The surfaces of brass instruments such as microscopes can be lapped, ground, honed, micro-honed, super finished, etc, to a finish of approximately 4 micro-inches. To properly restore a microscope to it's original finish, it would have to be disassembled and finished by one of the forementioned processes. Most likely,a heavy handed, underpaid fellow will jam the part into the wrong buffing wheel, using the wrong abrasive, until the part 'takes on a shine". Never mind, that important signatures and graduations are buffed into oblivion, or that a flat surface takes on an 'orange peel' texture. This is all well and good if the buyer is not a discriminating collector, but would rather have an impressive thingamajig in his office or library to impress his guests. The creation of a 'finished' surface involves cleaning, polishing and finally, coating with a protective material. Polishing, particularly when it involves vintage scientific instruments, has long been a bone of contention between those who earn their living buying and selling scientific antiquaria and those who maintain that polishing is anathema to objects scientific. Two schools of thought prevail, as expounded by the polishers, referred to by one dealer as 'Bermondsey Burnishers,' and the anti-polishers,A.K.A,'Marblehead Moralists.' Abridged articles from past issues of the Bulletin of the Scientific Instrument Society (SIS) are quoted here to illustrate the divergent viewpoints.Mr. Jack Gould, an octogenarian residing in Coxwell Oxon. (Oxford), England provided the tinder for the conflagration to follow. In the 1985 issue No. 7 of SIS, he writes:"Long ago, I spent my schoolboy pocket money on old scientific instruments, often to save them from falling into the hands of children, experimenters, or meddlers who would destroy them. In those far-off days after World War II, Culpeper microscopes, 4 inch Gregorian telescopes,sextants and the like fetched but shillings. They were bought as reservoirs of lenses and brass tubes. I had good mentors, gentlemen acquainted with optics who guided me in telescopes, microscopes and photography. Years later, I still buy old instruments, often to save them from a later generation of vandals, namely some members of the antique trade and its sub-species, the "blue rinse brigade." Persons submit instruments to unknowing and uncaring attention of dealers armed with buffing wheels and Brasso. Livingnear traps to relieve tourists of money, I am appalled by what I see in 'shamtique' shops displaying old scientific instruments buffed and brassed to scientific extinction, with exhorbitant price tags.We should educate people in the care and preservation of old instruments. We could save interesting and valuable instruments. How to do this is another matter, but if those black sheep in the trade would show responsibility, so might their less informed followers." The firestorm, started in early 1986, was sparked by an article titled,"The Ghost Scales of John Bird, written before his untimely death, by Saul Moscowitz, President of Historical Technology, Inc., Marblehead, Massachusetts. The article appeared in the ninth issue of the SIS Bulletin. The last paragraph of his article reads: "Lately, the question may be raised as to why John Bird did his layout work on the "faint scales". Sextant No.3 provides the answer. On this relatively well cared for instrument, some of the scale has already been lost. JUST IMAGINE WHAT WOULD HAVE HAPPENED IF ONE OF THE "BERMONDSEY BURNISHERS" HAD GOT HIS HANDS ON ONE OF THESE SEXTANTS!. Its faint scale would truly have become a ghost scale, having vanished forever." "Bermondsey Burnishers" refers to dealers in scientific antiquaria, operating from stalls in the Bermondsey section of London, England. The polishing issue is becoming a cause celebre as others join the fray. A prominent London dealer in old scientific instruments offers a smashing reposte to the earlier writer:"Clearly Mr. Gould does not earn a living dealing in instruments. If so, he would realize that there is a plethora of ordinary late 19th - or early 20th-century instruments which arrive, in a state of distress and disrepair. When polished, these pieces sell as coffee-table items. Better quality, older pieces go undisturbed to proper collectors.Several times in recent years overseas buyers of large and expensive but late instruments have insisted, against our better advice, on having them polished as well - indeed they would buy them only if they were polished. I would like to

know what Mr. Gould would have done in these circumstances had his living depended on it.The people in my shop sigh with impatience when an elderly gentleman comes tottering in, and after a careful peer around, mutters about everything being over-cleaned, finally points a trembling finger at something and asks: "How much is that?". They know perfectly well that the old boy has absolutely no intention of buying the thing, but he will produce the important information that he got a better one in 1952 for half a crown. If Mr. Gould wishes to dispose of his collection, I would be pleased to hear from him. My assistants can hardly wait." By this time, the dealer is hot to trot, because about a year later he writes another scathing letter to the editor stating: "Your recent editorial prompts another dig at the anti-polishing brigade. As for polishing the instruments, there are at least 11 Auction sales taking place in London each year, yielding around 2500 items. Another 1500 or so are sold in the provinces. Probably 80% of all these are late Victorian and not very interesting and the auctioneers often struggle to get a decent price for them. When they are acquired by dealers, the old maxim is proved time and time again. "If something does not sell well, polish it, move it, put up the price and then it will. Dealers who disagree could better spend their time explaining to their clients the evils of collecting polished instruments. When the demand peters out, so will the supply. Or perhaps these particular dealers would buy up many more instruments to save them from destruction. I am glad to say that one of my sons wishes to continue this business after me; so we shall be polishing things for a long time to come." In the horror film spoof: *Young Frankenstein*, three people seek admittance to the Frankenstein abode. When the caretaker states: "I am Frau Blucher," lightning flashes, thunder crashes and stage coach horses rear in terror. Here, we have a similarity to the cue which prompted that fiery reposte by the London dealer in his latest Letter to the Editor appearing in issue Number 53 of the SIS Bulletin. The word, "polishing," becomes fulminatory, like the name: "Blucher." As in past letters on the same subject, a mere mention of polishing triggers a Pavlovian albeit vitriolic response targetting the anti-polishing faction. The polish/no polish issues have enriched the English language, giving rise to such expressions as: "Bermondsey Burnishers," "Blue Rinse Brigade" and kindred appelations. Such expressions of reproach are aimed at those who (wantonly?) polish scientific artifacts. Conversely, the anti-polishing proponents are a zealous clique who look upon polishing as anathema. Careful restoration, or polishing as deemed necessary, enhance the marketability and hence, the market value of historical scientific instruments, depending on the type of clients being served. We must credit most dealers and their ilk with sense enough todetermine whether or not an object should be polished. The astute dealer knows full well whether the instrument is worth more in its as-received condition, or as a candidate for the buffing wheel. If the "foreign tourist" wants a polished gew-gaw for his den, so be it, if he is willing to pay the price. Granted, there have been horror stories entailing valuable artifacts which have been rendered valueless through polishing by persons ignorant of the artifacts' true value. That, fortunately is the exception rather than the rule.In a larger sense, those dealers out there with rouge stained fingers are not decimating whales, creating oil spills or destroying rain forests. They are legitimate businessmen meeting the demands of the marketplace and they are not destroying national treasures. The pitfalls of polishing and finishing will always be matters of contention. Bringing an historical technology artifact to a 'showroom fresh' condition is best left to those artisans trained in restoration of scientific instruments.If you must "have a go" at it, a good source of information is Chapter 14, "Cleaning and renovation of Scientific Instruments" from the book, *Collecting and Restoring Scientific Instruments*, by Ronald Pearsall. The 1974 edition of the book was published by Arco Publishing Company, Inc., New York.

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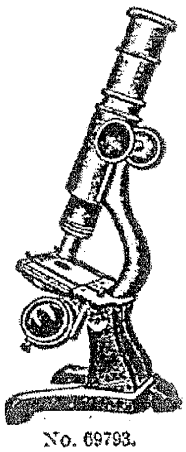
No. 69790.

No. 69790. Gem Miscroscope. This is a neatly finished instrument, designed for the use of those who wish to pursue their investigation beyond the powers yielded by a simple microscope. The low price at which it is sold, its simplicity and compact form has made it a very popular instrument. The lenses are accurately ground and are of such power as to render minute objects, animal, vegetable and mineral distinctly visible. The Gem Microscope is substantially made with a vertical brass body 6 inches high. It has one eye piece and one objective giving a power of 40 diameters or 1,600 areas; has a mirror beneath the stage for the illumination of transparent objects, two glass slips, one prepared object and one pair of brass tweezers, all packed in a nice French polished case. Each.....$2.25
Postage, 25 cents.



No. 69793.

No. 69793. Students' Microscope. American model mounted on substantial, well japanned, iron base and has inclination joint for adjusting to any angle, has a fine rack and pinion movement, one eye piece and one dividing objective giving power from 80 to 350 diameters, has revolving diaphragm with adjustable mirror under stage for illuminating transparent objects with two rings for holding steady in position. It has a society screw which permits the use of other objectives that can be purchased when needed. The instrument is very attractive in appearance, substantial in construction, powerful but low priced, which brings it within the reach of all, weight 5 lbs.
Price complete packed in neat wood case, each.....$15.00

Advertisements from Sears Roebuck and Co. Catalog 1897 - Courtesy Richard Jefts

MSSC Meeting Notes for 18 February 1998

David L. Hirsch

UP AND COMING. By now, most of our corresponding members have heard of the well publicized 'El Nino.' To date, the little kid has dumped more water on us here in Southern California than we have had since annual rainfall in the Golden State was first recorded. This slight inconvenience did not dampen our enthusiasm, even though the last two workshops had to be held indoors. We thank STEVE and MILLIE CRAIG for their hospitality and the use of their living room to accommodate the unusually large number of MSSC members and their guests. The capricious El Nino forgot to turn on the showers the evening of our regular meeting and the fine weather was instrumental in bringing in forty members and two guests.

MARS. To the hedonistic gourmet, Mars might induce the vision of a cholesterol laden candy bar, but to the rest of us, the Red Planet comes to mind. We are no longer held back by the limitations of even the most powerful reflecting telescope or the radio telescope in probing our solar system and beyond. American technology has produced sophisticated space hardware, including the Viking Orbiter and the Viking Lander which have extended the frontiers of science, first to the moon and now, to the planet Mars. Voyager, is another story. Our speaker of the evening, ALAN SAILOR, gave an excellent talk on the Minerals of Mars. Alan is associated with both the Rockwell Science Center and the California Institute of Technology and is a student and a collector of meteorites. Alan explained the formation of various types of meteorites and discussed what is known of the composition of Mars from 12 meteorites that are believed to have come from that planet. Mr. Sailor's enthusiasm for his subject was infectious and brought forth a constant stream of questions from the audience, making for a lively, and enlightening evening. Questions continued after the talk with the viewing of polished meteorites from Mr. Sailor's collection.

SELLER'S TABLE. In addition to the sales items, there is usually a plethora of freebies available, including slides, glassware, chemicals, literature and other items too numerous to mention. In addition, several microscopes were offered for sale. Attention: Corresponding members and absentee regulars; If you are interested in any of the sales items, (assuming they were not sold) call me at (310)397-8357 and I will relay your request to the proper party. RON MORRIS offered a Leitz circa 1929 binocular stand with a triple objective nosepiece and a mechanical stage for under $400. MAURICE GREESON showed a Schutz-Correl monocular stand with a unique fine focussing arrangement using a graduated collar on the base of the body tube. Including the case, the price was $150. Maurice's analytical balance by Philip Harris of Birmingham sold on sight. An Oberhauser drum type microscope, circa 1855, with a tilting stage was offered for $300.

SHOW AND TELL Several interesting items were displayed, including: a Baker binocular microscope circa 1850 with dual objectives, and a circa 1912 Spencer Colorimeter. The piece de resistance was a superb Walter H.Bulloch compound monocular stand, circa 1881. This instrument is shown on page 142, fig 266, in Billings Microscope Collection, second edition. HERB GOLD, the proud owner of this pristine microscope was prevailed upon to bring it to the coming Workshop where it will be properly displayed to our microscopical multitude.Show and Tell is a feature of both regular meetings and workshops. The member brings in one or more items from his collection. By definition, collectors are persons who acquire their SECOND microscope, or other scientific object. First, the object is displayed for all to see and admire. Then, the owner describes the instrument and tells of its provenance. All attendees at MSSC meetings and workshops are invited to bring in their microscopes and microscopically related equipment. Chronometers, Napier's Bones, Gunter rules and other non-microscopical objects of virtue are acceptable, on occasion.

FURTHER MEETING NOTES

Alan deHaas

At the February meeting, Alan Sailor of the California Institute of Technology gave a marvelous introduction to the study of the composition of meteorites. His talk was accompanied by electron micrographs and photomicrographs of thin sections including, chondrites, phenocrysts etc. Mr. Sailor passed around three gorgeous polished specimens which I must refer to as "solar system jewelry." The talk stimulated a continuous stream of questions covering everything from specimen preparation to the statistics behind the analysis of the meteorite contents.

Scientific investigations rarely produce evidence of a true one-to-one correspondence between a standard and a test subject. We were all amazed, therefore, when to the question, "how do we know that a particular twelve meteorites that have been found are indeed of martian origin?" Mr. Sailor showed us a graph illustrating just that type of relationship. The concentrations of the entrained gaseous element isotopes in the twelve meteorites is identical to that in the martian atmosphere.

MARCH MEETING

Wednesday, March 18 at 7 PM
Crossroads School
1714 21st Street
Santa Monica, CA

DEEP IN A DROP

Zane Price

A color and sound film made in 1959 about the microscopic life in a pond showing rotifers, paramecia and such for grade school instruction.

Additional film clips of parasitic life made in research programs at UCLA documenting such things as the life cycle of cat and dog tapeworms and the fertilization of sea urchin eggs.

Presented and narrated by our distinguished member Zane Price who for many years was the Director of the Electron Microscopy Laboratory in the Department of Infectious Diseases at the University of California at Los Angeles. (UCLA) See member profile MSSC Journal of October 1997, p. 197.

Editor's Notes

April Meeting Exhibition Selection. During the regular meeting on April 15, we will have a showing of microphotographs for the upcoming MSSC exhibition at the Palos Verdes Art Museum. Members will vote to choose 50 pictures, which will then be submitted to the museum for their final selection for the exhibit. This is a unique opportunity for us to show thousands of people, the art and wonder, of what can be seen through the microscope. Please bring as many pictures as you can to make the show a success. The best format for the meeting selection is the 35 mm slide, although prints will also do. The final format will be 8 X 10. Corresponding members, please send in your offerings to our VP Jim Solliday for showing at the meeting.

Back Issues of the Journal. Anyone who has not received the complete issues of the current fiscal year, from July, 1997, please let me know and I will send the missing issues. Also, copies of all previous issues from the first issue of September 1996 are available for $3.75 each. After the selection of the new MSSC logo, I will make up a cover for members who bind their issues as a yearly volume.

Gaylord Moss