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EARLY HISTORY OF THE MICROSCOPICAL SOCIETY OF SOUTHERN CALIFORNIA:

A Biographical Perspective, Part 1: 1937-1948

by
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June 17, 1999 (updated Jan 2003)

SUMMARY
For more than half a century, the Microscopical Society of Southern California has provided the opportunity for both the scientist and the amateur to share in their enthusiasm for the microscope. Throughout its history, the Society has made virtually no systematic effort to document and publish its early accounts.

Taken at the first Microscopical Demonstration and Photomicrographic Display held by the Microscopical Society of Southern California in 1948 .
From left to right: G. Lory, A. Hurt, Avis Gregorson, William Sokol, Edward Hamilton, William Martinsen, John Chesluk, and W. Sokol's son.

Mr. William Sokol was one of the earliest members of the Society. In March of 1980, at the suggestion of then president, Gil Melle, Mr. Sokol recorded his recollections of the formation and early history of the Society. This account was a brief four-page, handwritten document. Mr. Sokol had also preserved the papers he accumulated while serving as Secretary and past President. After gathering these documents together it was found that the records included minutes of the first official meetings. Also

preserved were the early meeting notification cards as well as important correspondence associated with Society business. Of equal importance was a small collection of early photographs illustrating the activities and equipment used by founding members. According to these records the Society was formally organized on March 6, 1941. The original name was established as the "*Los Angeles Microscopical Society*." However, many of the founding members were from areas surrounding Los Angeles, so on May 15, 1941, just two months later, the name was changed to the "*Southern California Microscopical Society*." The following historical account has been recorded as experienced through the participation of early members such as Mr. Sokol. As much information as possible about the activities of all the founding members has been included to create what I call a biographical perspective, and it was these founding members that created the complexion and character of the Society. This account is intended to document the early history only and is therefore limited to the first twenty-eight years, ending with the official termination of the name "*Southern California Microscopical Society*."

INTRODUCTION

Shortly after the availability of the achromatic microscope (circa 1830's), gentlemen with an interest in microscopy began gathering together for the purpose of promoting and further devel-

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oping the microscope. The social impact of this most important instrument was first felt in England and Europe, but soon found its way to America. By the late 1860's, American clubs and societies dedicated to the microscope began to surface. The San Francisco Microscopical Society has the distinction of being the first such organization on the West Coast. Established in 1870, it grew in size and reputation to such a degree that it attracted such prestigious visitors as Joseph Beck of London. However, after the great earthquake of 1906, the San Francisco Society was allowed to decline into obscurity. For the next few decades, activities in California associated with the microscope were left almost exclusively in the hands of its academic community.

Throughout the 1930's, economic and social difficulties stimulated a new migration of people to the West where opportunity was somewhat brighter than the older, more established East Coast. California was beginning to grow and had established itself as the entertainment capital of the world. Educators, scientists and medical men were in great need and began choosing California as their new home. All of this created a greater demand for the microscope and the need to make it more commercially available. The West Coast was now able to support a number of new businesses that specialized in supplying optical instruments, including microscopes and their accessories. As one might expect, it was the men who were interested in the microscope that set themselves up in the business of repairing and selling the instrument. A number of these same gentlemen were responsible for establishing the *Southern California Microscopical Society*.

THE MICROSCOPE GROUP (1937-1941)

Probably the man who started it all was a gentleman named Max Erb who at the time worked for the firm of Carl Zeiss. In the mid-1930's, Zeiss microscopes could be obtained from a business located on Olive Street in Los Angeles, while their West Coast offices were located at 728 South Hill Street. Max Erb was an enthusiastic fellow who enjoyed the microscope and sought out other individuals who shared his interests. One such individual was a machinist named Milton Gray who later joined in partnership with Max Erb, establishing the firm of Erb & Gray Instrument Co. However, long before this enterprise was to be born, Max Erb had brought together an association of gentlemen that became known as "The Microscope Group." According to early records, the original founding members were Max Erb, James Smith, Arthur Hurt and Edward T. Lowe, to be joined later by Milton Gray.

Photo of the founder, Max Erb (1948)

All of these gentlemen considered microscopy to be their avocation and with some it was also their vocation. It seems that, in addition to the microscope, these men shared an interest in the game of chess. A chess tournament was a good excuse to get together and cultivate their fellowship. Reading through Mr. Sokol's notes, I found that the early meetings alternated between microscopy and chess!

Milton Gray

In the beginning most of the meetings were conducted at the homes of the members. The first meeting of the group was held sometime late in 1937. This

date was substantiated by Mrs. Louise Erb, the wife of Max Erb, who told Mr. Sokol that they were married in 1938 and she remembered that The Microscope Group was formed and operating before the wedding. Because Max Erb was responsible for the formation of the Microscope Group, the duties of the President and Secretary were also assumed by him. This service is implied as he organized the meetings and made the phone calls that brought the group together. We shall therefore refer to him as the first acting officer and unofficial President of the Society.

THE DOCUMENTED HISTORY (1941-1948)

1941

After a few years of acquiring equipment and hosting various meetings, the group decided it was about time to establish a formal Society and conduct regular meetings. A plan of how to proceed was needed as well as a set of proper by-laws. The first meeting was set up at 12:00 noon on March 6, 1941, at Levy's restaurant. Present were the original members including Max Erb, James Smith and Arthur Hurt.

The construction of the organization was discussed as well as the appointment of a secretary who would record the business of the new Society. Arthur Hurt acting as the first Secretary faithfully recorded in type-written form the proceedings of the meeting. Without any objection the name of the organization was established as the *Los Angeles Microscopical Society* (LAMS).

A few weeks later, on March 27th, a meeting was held at the residence of Dr. John W. Budd. This meeting was occupied with activities of a technical nature. The principles of illumination were discussed as well as a demonstration of Dr. Budd's equipment. German literature on the subject was translated and provided by Max Erb. On April 24th, the Society convened at the Hematology Department of Children's Hospital. This meeting was devoted to the use and application of the fluorescence microscope.

The next meeting was also held at Children's Hospital and took place on May 15, 1941. On this date the name of the Society was formally changed to the ***Southern California Microscopical Society*** **(SCMS)**. The first books for the library were acquired courtesy of Max Erb. The books received were as follows: *The Microscope*., *Journal of the Biological Photographic Association* and Spencer Lens Company's *The Effective Use and Proper Care of the Microscope*.

Special class on photography techniques (1943), W. Sokol

In June of 1941, an executive committee was established, and the following members were appointed to the committee: Dr. John W. Budd., Max A. Erb., Major Arthur C. Hurt, Jr., and James Smith. From this committee, the Society's first officers were elected, as follows: Mr. James Smith, President; Mr. Max Erb, Vice-President; and Major Arthur C. Hurt, Jr., Secretary-Treasurer. Upon motion duly made, seconded and carried, an annual membership fee was fixed in the sum of $3,00. At the conclusion of this historic meeting the members adjourned from Children's Hospital and gathered at the home of Mr. Siegfried Rumann. Mr. Rumann presented a motion picture of living protozoa and active Spirochaeta pallida cinemicrographed using darkfield illumination. Refreshments were served while the host demonstrated his equipment and laboratory techniques. At the time Mr. Rumann also worked as a character actor in many of the Marx Brothers movies.

1946

After entry of the United States into World War II, the Society voluntarily curtailed most of its activities. There is some indication that among certain individuals work may have continued, especially for members associated with the Biological Photographic Association. However, the records clearly indicate that the Society was temporarily inactivated.

Early in 1946 the officers began efforts to energize the members and expand the roll of the Society within the local scientific community. On February 28, 1946, the Secretary, Major Arthur C. Hurt, Jr., sent a letter to Dr. John A. Comstock of the Los Angeles County Museum, Exposition Park. This letter was the first step taken by the executive committee to "revitalize the Society." This document is probably one of the most important pieces of correspondence associated with the early history of the Society and therefore shall be included in this account. Dr. John A. Comstock was Associate Director of the Science Museum at Exposition Park, Los Angeles. The letter reads as follows:

"My dear Doctor Comstock:

The Southern California Microscopical Society is an organization composed of serious workers in the fields of microscopy and photomicrography. To many of its members this work is not a profession but an avocation. The fact that many of these men are amateurs does not mean that they are "dabblers"; they actually are doing serious work in one field or another in which the microscope is a vital tool.

The Society was formed in March, 1941, by four men: Mr. James Smith, Mr. Max A. Erb, Mr. Edward T. Lowe and Major Arthur C. Hurt, Jr. At its inception it was conceived as an organization to appeal to all serious microscopists and photomicrographers, to provide a common ground on which they could meet to exchange ideas, to study methods of improving techniques and to devise new techniques in their chosen fields. The group grew slowly, and its members were selected carefully. Meetings were held monthly in rotation at the homes or laboratories of its members, no central meeting place being available. With the start of the war the activities of the organization were suspended due to the fact that many of the members were in the armed forces, and others were too busy in the defense effort to give time to the work of the society.

Now that the war is over, the members desire to revitalize the Society and see it take its proper place among the other scientific groups in Los Angeles. It is believed desirable that, if possible, the organization should affiliate in some manner with the Los Angeles County Museum. It is felt that such an affiliation could work to the advantage of the Museum and the Society.

The latter would be provided with a regular meeting place having a proper atmosphere, association with other scientific groups affiliated with the Museum and with the Museum personnel and a place to house collections of books, slides, specimens and other material which it is proposed to assemble. The Museum would bring into its sphere of cultural and scientific influence another group of serious workers interested in the pursuit of knowledge, and doubtless many of these workers would be glad to assist the Museum personnel in the solution of certain problems in the fields of microscopy and photomicrography and to donate some of their work to the Museum for such purposes as might be deemed appropriate.

We earnestly request that this application for affiliation be given careful consideration at the earliest possible date. In the event you should desire to communicate with the Society, may we suggest that you write the undersigned at his residence, 133 South Windsor Boulevard, Los Angeles, 4, California. Signed, Arthur C. Hurt, Jr., Secretary-Treasurer. Southern California Microscopical Society. February 28, 1946."

On March 15, 1946, Dr. Comstock returned to Major Arthur C. Hurt, Jr., a favorable response to the Society's request to be affiliated with the Museum. The following official response was signed by both Dr. Comstock and the Acting Director, Dr. Fred Gehring.

"Our Advisory Committee of the Museum staff has given consideration to the proposal outlined in your letter of February 28, and has approved the suggested affiliation of the Southern California Microscopical Society with the Los Angeles County Museum. Mr. Fred Gehring, the Acting Director of the Museum, presided at the meeting in which favorable action was taken on your proposal."

On the evening of May 15, 1946, at 7:00pm, The Southern California Microscopical Society held a meeting at the Los Angeles Athletic Club where the future of the organization would be discussed. This gathering was a sit down dinner utilizing the facilities of the Club. The President, Mr. James Smith, presided and called the meeting to order. A summary of the purposes and goals of the Society were outlined. Major Hurt reported that the officers of the Society had contacted the L.A. County Museum and that a request to become affiliated with it had been favorably approved. This new relationship provided a permanent base of operation in which the Society could work and grow. It was decided that meetings would be held quarterly at the L.A. County Museum and that the intervening meetings would be held at the homes or in the laboratories of the members or at such places as might be designated by the officers. The future activities and the agenda for the meetings were discussed. It was decided that projects would be assigned to each member, this would include reports on the microscopical literature. The following members were given the responsibility of providing regular reports on a pre-selected group of publications:

James Smith	The Microscope
Lloyd Matlovsky	Journal of the Biological Photographic Assoc.
Maj. Arthur C. Hurt, Jr.	Journal of the Royal Microscopical Society
Maj. Arthur C. Hurt, Jr.	Stain Technology
William C. Oke	American Mineralogist
Dr. John W. Budd	Pathological & Medical Journals
Edward T. Lowe	Camera & Photographic Journals

William Sokol, SMCS meeting (ca 1946)

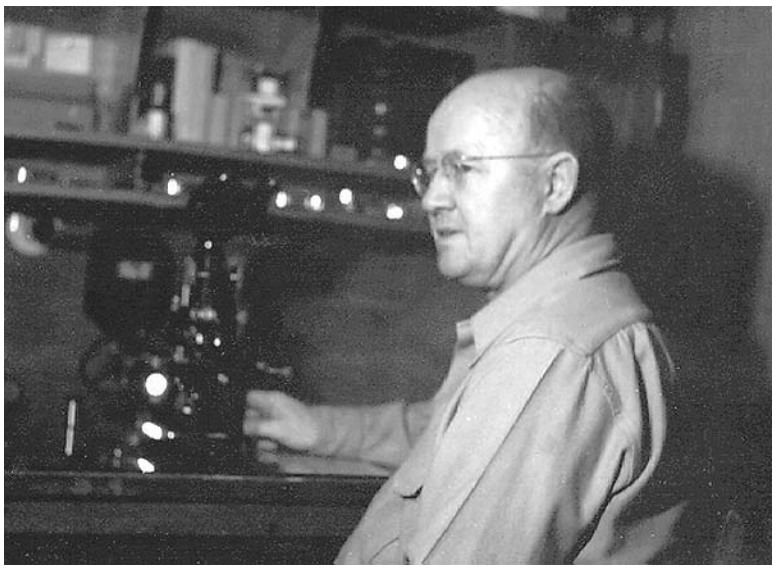
Mr. Milton Gray suggested the establishment of a card index of published materials on microscopy. He volunteered to prepare such an index for the year of 1946, and his offer was adopted by motion of the Society. I am afraid that it is not known what happened to these card files. They most likely remained in the Museum and have been subsequently lost as the years passed.

A number of regular meetings were held throughout the rest of 1946. This included a June meeting at the forensic laboratory of Mr. William W. Harper. The July meeting was held at the Los Angeles Tumor Institute and the August meeting at the Research Lab of the Union Oil Company of California. A dinner was served in the cafeteria of the Company after which Dr. Merrill and Dr. Naylor demonstrated the electron microscope. In September the Society met at the Photographic Dept of the Los Angeles County General Hospital. For the next few years this would become the most frequent alternative meeting place after the Museum.

The last meeting for the year was held at the home of the President, Mr. James Smith. By this time, the details for using the Museum had been worked out and the officers were able to bring before the Society a meeting schedule. It was decided that the Society should hold a regular meeting at the L.A. County Museum every second month, commencing in January of 1947, and that special meetings at alternative locations should be called whenever desirable. In preparation for the first meeting at the Museum it was decided that each member should provide an exhibit illustrating his or her area of interest.

1947

The first meeting at the County Museum took place on January 28, 1947. The meeting was presided and called to order by Mr. James Smith. The content of the meeting comprised the presentation of prearranged exhibits and photomicrographic illustrations. Examples would include a series of 2x2 color slides on Ansco film by Mr.



President James Smith in his lab at home (1947)

Smith, featuring the mineral micro-mounts displayed by Mr. William Oke. Dr. John Budd presented a series of color prints of cancer lesions, in the various phases, before, during and after treatment. Mr. Edward Lowe and Major Arthur C. Hurt, Jr., also displayed a series of photographs as well as the vertical photomicrographic bench used in the process. The first meeting at the Museum was adjourned with a vote of thanks to Dr. John Comstock for his courtesy in arranging a permanent meeting place for the Society.

Along with the convenience of having a secure new home, the Society had been growing quite rapidly. It was becoming difficult for the Secretary to list all the members and guests on one typewritten page. The documented account of the March 25th meeting is recorded on no less than three pages. This second meeting held at the Museum was very important as the President announced that nominations were open for the new officers for the coming year. After the ballot was cast, Mr. Smith announced that Major Arthur C. Hurt, Jr., had been elected President. He thereupon turned the chair over to Major Hurt.

The new President then presided over the election of Dr. John W. Budd as the new Vice-President and Mr. Max Erb as the new Secretary-Treasurer. Also of significance at this meeting was the election of the Society's first Honorary Member. Upon motion duly made and carried, Dr. John A. Comstock was awarded the status of honorary membership. It seems that Dr. Comstock became a very active member contributing greatly to the success of the Society. Throughout the rest of the year 1947 the meetings were held at the regular intervals established by the committee.

Before the new year arrived it was proposed by Mr. William Sokol that the Society sponsor its first annual exhibition. This exhibition was to provide an opportunity for the membership to display the products of their work and bring the members together in an effort to educate each other as well as the public. The President appointed Mr. Sokol to head what was to be called the Demonstration Committee. Also appointed to the committee were Mr. Max Erb and William Oke. According to Mr. Sokol this was the first such event ever held in Southern California and to the author's knowledge this statement is correct.

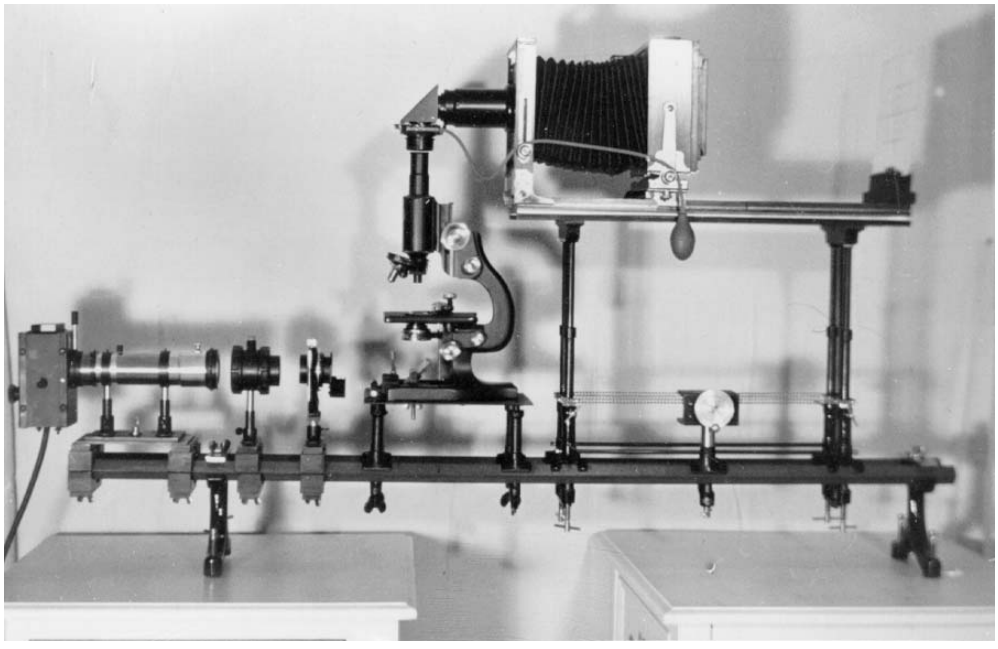
Taken at the first Microscopical Demonstration and Photomicrographic Display held by the Microscopical Society of Southern California in 1948 from left to right: Bill Sokol, Milton Gray, John Chesluk, unknown, Max Erb (with camera in hand)

The announcements and program flyer described the event as "The Southern California Microscopical Society Presents its Microscopical Demonstration and Photomicrographic Display." The term, Microscopic Exhibition, was not to be used due to the objections of the Museums director, Dr. Brested. The use of the word "Exhibition" was reserved for exhibits sponsored solely by the County Museum. A letter, along with an application card, was sent to the membership. The demonstration was to be held on January 27, 1948, at the Junior Section of the L.A. County Museum of History, Science and Art. In order to prepare a program catalogue, the application cards needed to be filled and returned no later then January 1st.

The displays consisted of a wide range of subjects including, microscope slides, photomicrographs, micro-mineral mounts, methods of illumination, differential staining techniques, fluorescence microscopy and all manner of apparatus including photomicrographic equipment. Instructions for mounting the photomicrographs and identification labels were also required. Several commercial dealers were also invited to exhibit the latest in microscopical equipment. The event was considered to be a complete success with 21 demonstrations and over 108 individuals participating. As a result of the tremendous turnout, the President, Major Hurt, proposed that the Society continue the demonstrations on an annual basis. In the tradition established by this first occasion, the Society to this day continues to dedicate the month of November to the annual exhibition. □

Above: Ed Lowe, a founding member (ca. 1949)
Below: Photomicrographic system built by Ed Lowe and purchased by W. Sokol (ca. 1947)

PART 2: 1948 - 1971 WILL BE CONTINUED IN THE NEXT JOURNAL.



WORKSHOP OF THE MICROSCOPICAL SOCIETY OF SOUTHERN CALIFORNIA

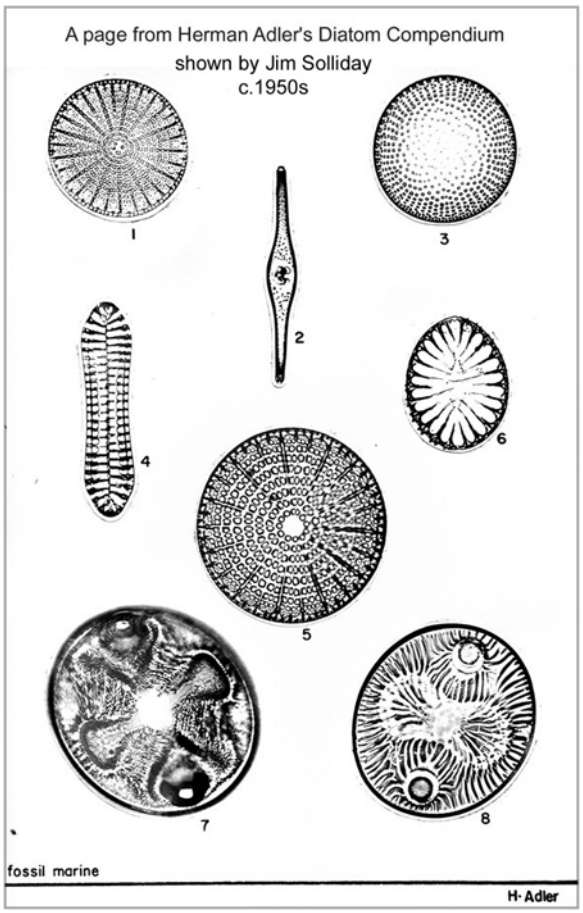
by George G. Vitt Jr.

Date: Saturday, 4th January 2003
Location: Izzy Leiberman's Residence

1. Jim Solliday announced that the next Workshop will take place at Izzy Lieberman's residence and that nominations should be submitted in time for the elections meeting which takes place on 15 January. He urged members to submit their biographical profiles for the Journal.

2. Dave Hirsch, MSSC treasurer, announced that "the dues are due" and that the MSSC treasury now has over $4,000 in the bank!

3. Jim Solliday showed several books: "Applied Ore Microscopy" by Dr. H. Freund; Several books by Brian Ford (who will be visiting us shortly) - "The Revealing Lens", "Optical Microscopy Manual", "Single Lens", and "Images of Science". Jim then described the work on diatoms of the late Herman Adler, one of our earliest members, who lived in Palo Alto, CA. He showed a 3-ring binder that Adler had compiled in which were full descriptions and tipped-in photomicrographs of diatom species that had been collected locally by fellow members. Other similar binders by Adler are at the California Academy of Sciences. Among Adler's collections were some 15,000 microslides, many of which were of arranged diatoms.



4. George Vitt described his recent experimental findings in the use of Photoshop for converting 35mm color negatives to positive color images of good color fidelity. Basically, the process consists of the following steps: The color negative is photographed with the Nikon 990 camera; the image is loaded in Photoshop; the orange filter incorporated in the film is adjusted to a neutral grey; the image is inverted; Levels are adjusted so that the narrow histogram fills the full dynamic range. Curves are used to correct any film non-linearities in the shadow and highlight areas. George invited anyone who may be interested in learning some of these Photoshop techniques.

5. Ken Gregory presented a 1933 Spencer microscope, Spencer Model C42 (Spencer catalogs 1923, 1926) or 38 (1937 Braun catalog). This microscope "was designed for use in the chemical laboratory (suggestions of Drs. E.M. Chamot and C.W. Mason, Cornell University", and "may be used for ordinary microscopical examination, for metallurgical research, and for studies in polarization in work on chemicals, alloys, ceramic materials, drugs, seeds, leather, fibers, textiles, rocks, minerals, woods, cellulose, sugars, etc." (Braun, 1937). Besides the standard microscope features, the scope is equipped with a 120 mm diameter revolving graduated stage, polarizer and substage condenser with diaphragm, and eyepiece analyzer. The three Spencer eyepieces all have crosshairs and are notched. The polarizer and analyzer have their own felt-lined wood case with appropriate slots in the case.

In addition, for comparison, Ken presented a Zeiss polarization apparatus containing also an eyepiece analyzer to enable the conversion of an

ordinary microscope to one with polarization capability.

Also shown was a wood case containing a B&L polarization set including a substage polarizer with position for a 1st order red retardation plate (included), rotatable analyzer above the objective, and a series of filters and stops for Rheinberg illumination.

6. Stuart Warter showed a monocular brass microscope that had been sold by a dealer located in Tientsin, China (c.1858-1900?).

7. Larry Albright described his recent African safari where he did multimedia recording with screen preview. For this he had constructed a preamplifier for a condenser microphone, the output being fed to a digicam.

8. Dario Solares showed a 4-objective turret that he had modified on a lathe to replace an existing 2-objective turret. He had constructed a wooden jig to align and hold the turret in the lathe while it was being machined.

9. John deHaas showed a recently acquired Chinese made 10 X 50 binocular which he bought new for $20 at Pic-N-Save on national Blvd.

10. Bill Hudson showed a mini hot-plate with digital readout, which he uses for melting point measurements. It was made by Pure Research, Box 6433, Incline Village, NV 89450.

11. Jack Levy showed several books, one of which dealt with smallpox vaccination.

12. Jim Fitzsimmons described the new Epson Mod. 7600 inkjet printer with which he had made several 16" x 20" prints of digital photos taken by George Vitt. These prints were made with printer resolution set to 720 x 720 dpi. Using archival pigment-based inks (lifetime of 100 years). The unit costs $3,000, and the cost per square foot of print is $1.50, which includes all material.

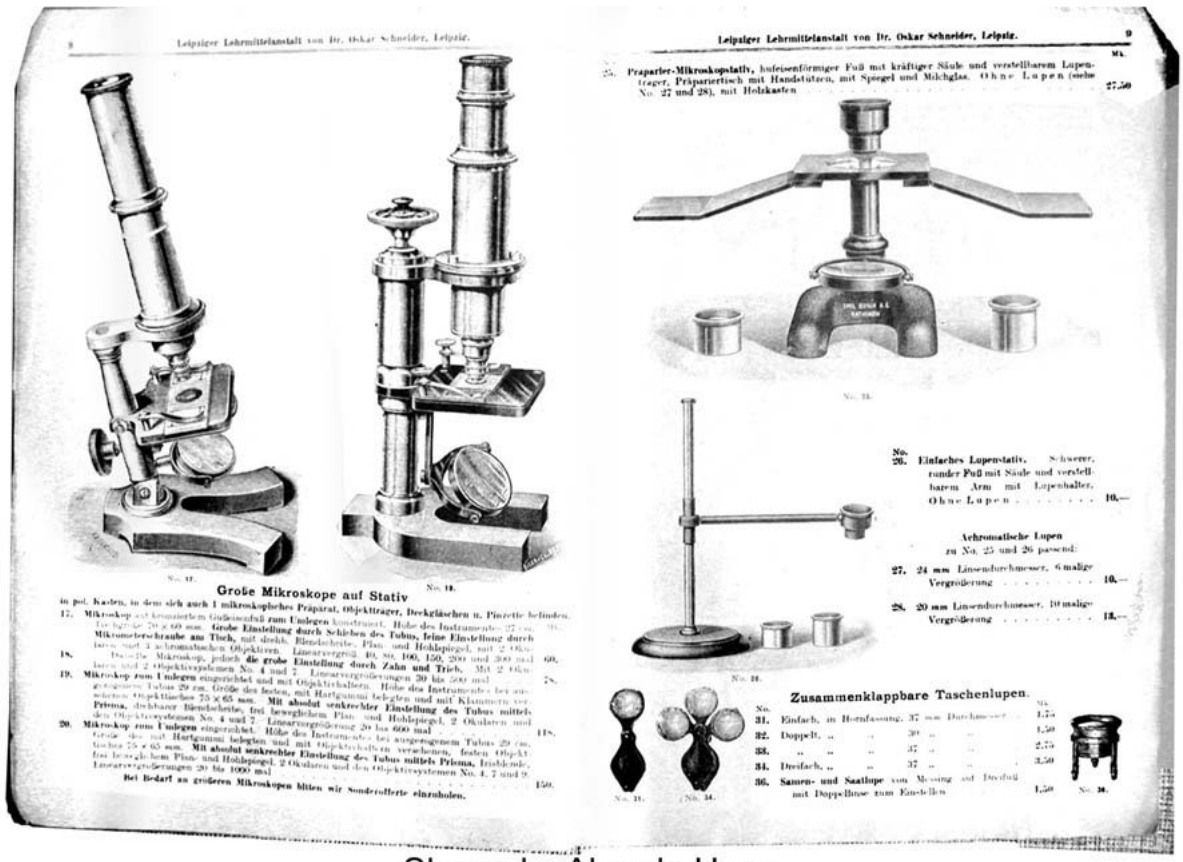
There was a general discussion about a Pond Life field trip and several ideas were presented.

13. Gaylord Moss described a recent review on the Nikon D100 camera - titled, "Good By Analog - Hello Digital". There followed a general discussion on digital photography.

14. Alan deHaas described a study on plaque buildup as a result of using chlorinated water, pointing out that ozonation of water is widely used in Europe where such arterial plugs are less frequent than in the US. He then showed several books: The very rare "Photography as an Aid in

German Catalog of School Supplies, 1911

Shown by Alan de Haas



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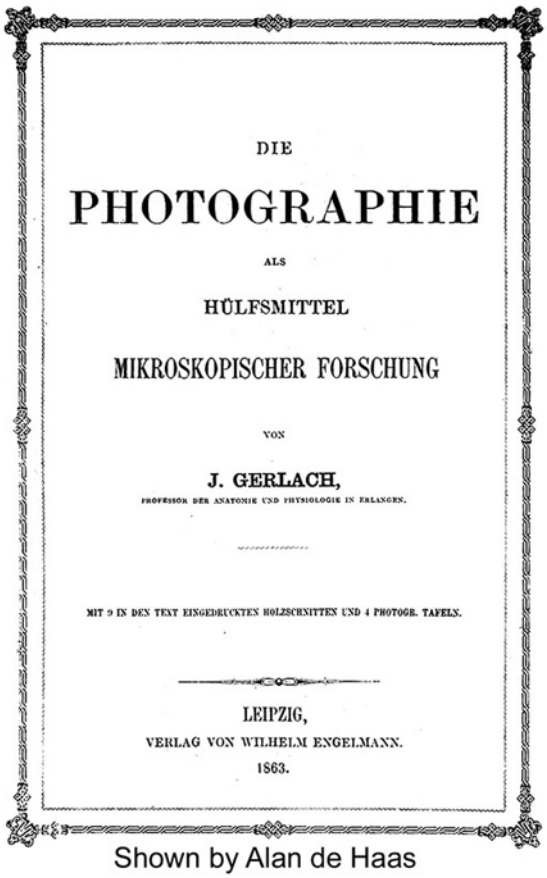


DIE

PHOTOGRAPHIE

ALS

HÜLFSMITTEL

MIKROSKOPISCHER FORSCHUNG

VON

J. GERLACH,

PROFESSOR DER ANATOMIE UND PHYSIOLOGIE IN ERLANGEN.

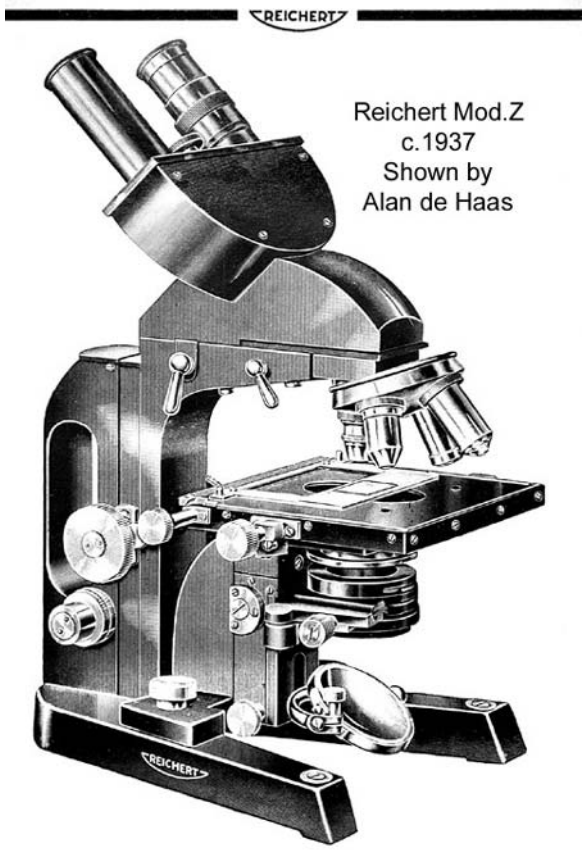
MIT 9 IN DEN TEXT EINGEDRUCKTEN HOLZSCHNITTEN UND 4 PHOTOGR. TAFELN.

LEIPZIG,

VERLAG VON WILHELM ENGELMANN.

1863.

Shown by Alan de Haas



Reichert Mod.Z
c.1937
Shown by
Alan de Haas

From book by Wasserman, shown by Alan de Haas

Handbuch
der
pathogenen Mikroorganismen

Unter Mitwirkung von

Geh. Ober-Medizinalrat Dr. **Rudolf Abel,** Berlin; Prof. Dr. **Apolant,** Frankfurt a. M.; Geh. Hofrat Prof. Dr. **Th. Axenfeld,** Freiburg i. Br.; Prof. Dr. **V. Babes,** Bukarest; Stabsarzt Dr. **Walter Bierast,** Halle a. S.; Stabsarzt Prof. Dr. **Boehncke,** Frankfurt a. M.; städt. Ober-Tierarzt Dr. **J. Bongert,** Berlin; Dr. **H. Braun,** Berlin; Prof. Dr. **C. Bruck,** Breslau; Prof. Dr. **H. Bruns,** Gelsenkirchen; Prof. Dr. **E. Bürgi,** Bern; Prof. Dr. **Buschke,** Berlin; Prof. Dr. **Calmette,** Lille; Ober-Tierarzt Dr. **S. Carl,** Karlsruhe i. B.; Dr. **H. Carrière,** Bern; Prof. Dr. **M. Casper,** Breslau; Prof. Dr. **H. Conradi,** Frankfurt a. M.; Prof. Dr. **G. Cornet,** Berlin-Reichenhall; Ministerialrat Prof. Dr. **Dieudonné,** München; Prof. Regimentsarzt Dr. **R. Doerr,** Wien; Prof. Dr. **F. Doflein,** Freiburg i. Br.; Prof. Dr. **Dujardin-Beaumetz,** Paris; Wirkl. Geh. Rat Exzellenz Prof. Dr. **P. Ehrlich,** Frankfurt a. M.; Prof. Dr. **van Ermengem,** Gent (Belgien); Dr. **Eyre,** Guy's Hospital, London; Prof. Dr. **M. Ficker,** Berlin; Stabsarzt Dr. **W. Fornet,** Berlin-Halensee; Prof. Dr. **E. Friedberger,** Berlin; Prof. Dr. **U. Friedemann,** Berlin; Stabsarzt Prof. Dr. **Fülleborn,** Hamburg; Dr. **H. A. Gins,** Frankfurt a. M.; Prof. Dr. **Fr. Glage,** Hamburg; Prof. Dr. **E. Gotschlich,** Alexandrien; Prof. Dr. **Gougerot,** Paris; Reg.-Rat Prof. Dr. **Haendel,** Berlin; Prof. Dr. **M. Hahn,** Freiburg i. Br.; Dr. **Hallwachs,** Znin; Prof. Dr. **M. Hartmann,** Berlin; Dr. **O. Hartoch,** St. Petersburg-Bern; Privat-Dozent Dr. **O. Heller,** Bern-Dresden; Oberstabsarzt Dr. **Hetsch,** Freiburg i. Br.; Prof. Dr. **B. Heymann,** Berlin; Prof. Dr. **von Hibler †,** Innsbruck; Oberstabsarzt Prof. Dr. **Hübener,** Berlin; Hofrat Prof. Dr. **Hutyra,** Budapest; Prof. Dr. **M. Jacoby,** Berlin; Prof. Dr. **Jadassohn,** Bern; Prof. Dr. **C. O. Jensen,** Kopenhagen; Prof. Dr. **G. Jochmann,** Berlin; Ober-Medizinalrat Prof. Dr. **Joest,** Dresden; Dr. **Victor Jollos,** München; Prof. Dr. **Kartulis,** Alexandrien; Dr. **Fr. Keysser,** Jena; Prof. Dr. **Kitt,** München; Prof. Dr. **Josef Koch,** Berlin; Dr. **Otto Köhler,** München; Prof. Dr. **W. Kolle,** Bern; Prof. Dr. **H. Kossel,** Heidelberg; Prof. Dr. **R. Kraus,** Wien; Dr. **Krumbein,** Bern; Prof. Dr. **E. Küster,** Berlin; Oberstabsarzt Dr. **Kutscher,** Karlsruhe; Prof. Dr. **K. Landsteiner,** Wien; Dr. **Lange,** Berlin; Geh.-Rat Prof. Dr. **O. Lentz,** Berlin; Dr. **J. Leuchs,** Würzburg; Prof. Dr. **W. von Lingelsheim,** Beuthen (Ober-Schlesien); Dr. **B. Lipschütz,** Wien; Dr. **E. Loewenstein,** Wien; Dr. **Loewenthal,** Berlin; Prof. Dr. **A. Looss,** Cairo; Prof. Dr. **A. Lustig,** Florenz; Dr. **Martin Mayer,** Hamburg; Prof. Dr. **El. Metschnikoff,** Paris; Dr. **K. F. Meyer,** Philadelphia; Prof. Dr. **G. Michaelis,** Berlin; Prof. Dr. **J. Morgenroth,** Berlin; Marine-Oberstabsarzt Prof. Dr. **Mühlens,** Hamburg; Prof. Dr. **M. Neisser,** Frankfurt a. M.; Prof. Dr. **F. Neufeld,** Berlin; Geh. Reg.-Rat Prof. Dr. **von Ostertag,** Berlin; Physikus Dr. **M. Otto,** Hamburg; Stabsarzt Prof. Dr. **R. Otto,** Berlin; Hofrat Prof. Dr. **Paltauf,** Wien; Prof. Dr. **J. Petruschky,** Danzig; Prof. Dr. **Ernst P. Pick,** Wien; Dr. **H. C. Plaut,** Hamburg; Dr. **Kurt Poppe,** Berlin; Priv.-Doz. Dr. **C. Prausnitz,** Breslau; Prof. Dr. **H. Preisz,** Budapest; Priv.-Doz. Dr. **Ernst Přibram,** Wien; Priv.-Doz. Dr. **H. Reiter,** Königsberg i. Pr.; Dr. **Hans Ritz,** Frankfurt a. M.; Priv.-Doz. Dr. **M. Rothermundt,** Bern; Marine-Generalarzt Prof. Dr. **Reinhold Ruge,** Kiel; Prof. Dr. **Hans Sachs,** Frankfurt a. M.; Prof. Dr. **Scheller,** Breslau; Prof. Dr. **Claus Schilling,** Berlin; Prof. Dr. **M. Schlegel,** Freiburg i. Br.; Priv.-Doz. Dr. **W. Schürmann,** Bern; Prof. Dr. **Sobernheim,** Berlin; Priv.-Doz. Dr. **C. Stäubli,** Basel; Dr. **Steffenhagen,** Berlin; Dr. **Robert Stein,** Wien; Dr. **Titze,** Berlin; Dr. **E. Tomarkin,** Bern; Geh.-Rat Prof. Dr. **Uhlenhuth,** Straßburg i. E.; Geh. Med.-Rat Prof. Dr. **A. von Wassermann,** Berlin; Dr. **M. Wassermann,** Berlin; Prof. Dr. **W. Weichardt,** Erlangen; Dr. **Weinberg,** Paris; Dr. **von Werdt,** Innsbruck; Geh. Med.-Rat Prof. Dr. **E. Wernicke,** Posen; Prof. Dr. **A. Wladimiroff,** St. Petersburg; Reg.-Rat Prof. Dr. **Zwick,** Berlin

Herausgegeben von

Dr. W. Kolle und **Dr. A. von Wassermann**

o. Professor der Hygiene u. Bakteriologie an der Universität und Direktor des Instituts zur Erforschung der Infektionskrankheiten in Bern

ordentl. Honorar-Professor in der medizin. Fakultät der Universität Berlin, Geh. Med.-Rat

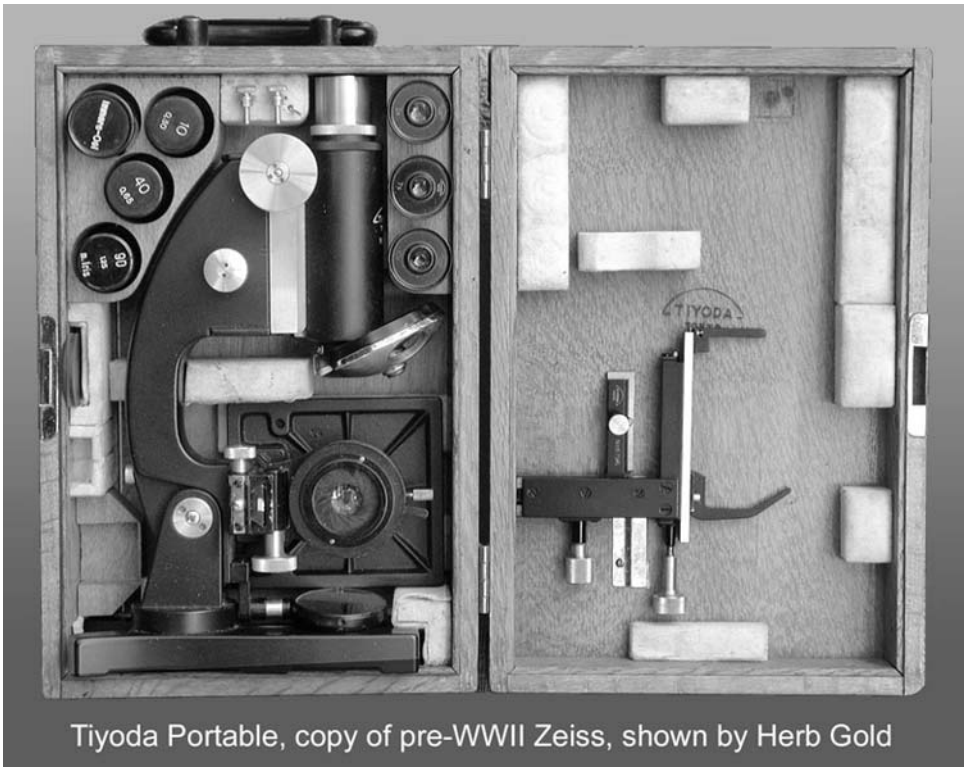
Zweite vermehrte Auflage

Siebenter Band

Mit 22 Tafeln und 372 Abbildungen im Text

Shown by
Alan de Haas

Microscopic Research", by Gerlach (in German), with tipped-in photos made by the author. Gerlach was the first to use a carmine-glycerin stain in histology; "Handbook of Pathological Organisms", by Wasserman and others, 1913, 2nd edition, in Nine Volumes; Book of Pharmacology, c.1910; a German 1911 catalog for the instruction of Jr. High School level students in the use of scientific equipment.



Tiyoda Portable, copy of pre-WWII Zeiss, shown by Herb Gold

15. Ellen Cohen read a description of exhibits shown in the Museum of Jurassic Technology.

16. Dr. Fred Kahn discussed problems with smallpox vaccination when confronted with a genetically altered virus.

17. Herb Gold showed a cased portable microscope by Tiyoda.

18. Pierrino Mascarino described Olympus VANOX microscope repair manuals (obtained on eBay), covering Models LB, XTR, XTR Stereo, and Motorized VANOX. Then he enumerated some locations for pond life collecting: pond at the Arboretum, Will Rogers State Park, Hollywood Reservoir. There followed a discussion on the collecting and keeping alive specimens under changes in ambient temperature.


Immersion Oil Bottle, Tiyoda, Japan, c.1940, shown by Herb Gold

19. John Fedel described the recent visit he and his wife made to the San Francisco Exploratorium. □

MSSC Monthly Meeting

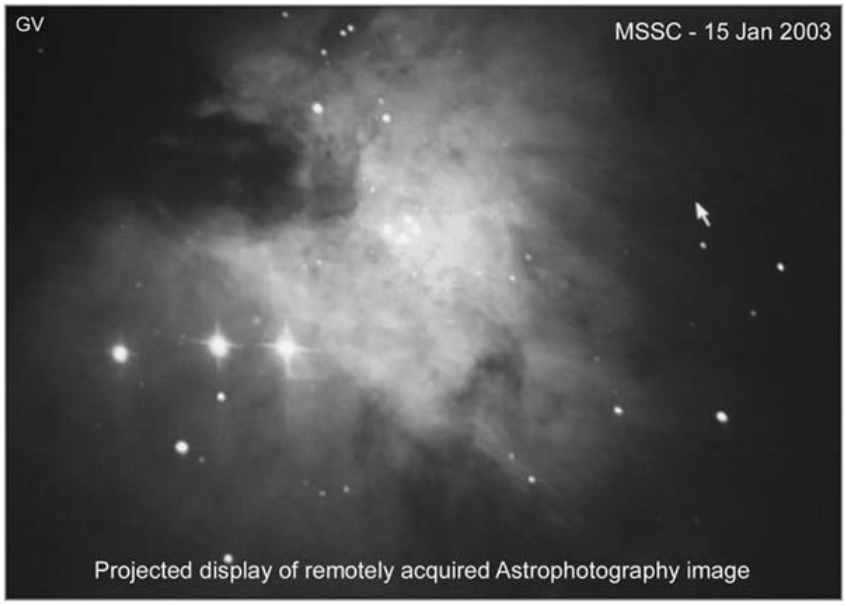
Wednesday 15th January 2003
at New Roads School
reported by Leonie Fedel

Jim Solliday opened the meeting by reminding everyone that the annual membership dues are due. A copy of the September, October and November 2002 Journals were handed out to members.

Two votes were held tonight, one for approval to move the Journal production from monthly to bimonthly in 2003, and the other for biannual vote for MSSC Officers.

Jim informed members that Brian Ford was coming to Los Angeles on January 20th, 2003 and that he would be taking Mr Ford out to dinner at the Fish Company in Los Alamitos. Any members interesting in joining them were welcome to do so. Jim then introduced our speaker for the night, Mr Arnie Rosner.

Mr. Rosner, a member of the Orange County Astronomers Association, has established a system of internet access to a remote observatory. Tonight he demonstrated the system accessible through the website www.arnierosner.com. The telescopes are located in a remote part of Arizona which provides perfect access to the night sky. Using a computer with an internet connection, Mr. Rosner linked up with the observatory in Arizona and guided the telescopes to various locations in the sky. One star system



looked at was M42. Photographs were taken using a mounted CCD camera and the images transmitted back to the classroom and projected on a screen for the members to study.

Dario Solares was the lucky winner of two free hours access to Mr Rosner's internet site to use the system.

After the main lecture, Alan deHaas gave another talk in his series on the use of illuminators and proper illumination. Tonight he focused on the question "does one really need an expensive lamp?" Alan discussed how the essence of a good lamp for illumination of the microscope is in the bulb itself and specifically in the way the filament is made. Most filaments are made up of a piece of wire formed into a cylindrical-shaped coil, but the best bulbs are formed using a ribbon filament. However these are harder to find and draw a large amount of current.

Alan proceeded to discuss the many different forms of lamps available including an AO and a Zeiss. He felt the AO was one of the best lamps at producing a uniform light source without necessarily being the most expensive. Alan explained how the AO uses three lens (2 plano-convex followed by 1 asymmetrical double convex lens) to focus the light source. Finally, Alan explained how a very satisfactory lamp could be made for approximately $20 by putting a 3" focus hand lens and a 5" focus hand lens 1' apart inside a cardboard tube, and using this to focus the illumination from a Tensor desklamp. □

ILLUMINATION - CRITICAL VERSUS KOEHLER

by Alan deHaas

The manner in which an optic or optical system treats a wavefront is determined by a group of mathematical constraints and manufacturing tolerances: refractive indices, dispersions, surface curvatures, centration, figuring of the surfaces - then the attention is given to maintaining the calculated curve and its polishing, et cetera. Once designed and manufactured, the ability of an optical system to form an acceptable image is fixed.

A microscope, no matter how configured, is still just a collection of light transmitting elements. From objective to eyepiece all the characteristics are mathematically definable. That definition, or, how the optics act on the data passing through the system is called the optical transfer function, and it operates on any incoming wavefront in exactly the same manner: just as a resistor in an electrical circuit passes a calculable current for any applied known voltage. I will consider the image forming part of the microscope to be just a black box that provides a known output from a known input.

Given such a black box, what then can be done to improve the fidelity of the final image reaching the eye or film plane?

Play with the illuminant. The actual source, glowing gas or filament, will make very little difference but for color temperature and the ease of obtaining a uniformly illuminated field. The manner in which the light is brought to the specimen, however, makes a very big difference. No matter which method one chooses, it pays to secure the best illuminant one can. It makes no sense to acquire at great expense an apochromatic objec-

tive and achromatic condenser and then feed it from a chromatically aberrated source. All that has been done is to assure that the chromatic aberration of the source has been relayed correctly to the specimen and to the costly black box.

The first lens, or, lens group, in front of the lamp is designed for efficiency - delivering as much of the light as possible to the microscope's condenser. It is not configured to provide a chromatically correct bundle. Although the total available light to the specimen will be reduced, it will very often pay to use a naked source, thereby allowing the achromatic condenser to be the first optic the light passes through. (This is an easy way to secure critical illumination.)

In the Koehler method of illumination the light is brought to a focus at the aperture stop at the rear of the condenser and is, from there, passed through the specimen and relayed to a zone near the back focal plane of the objective. The accuracy of this depends on the position and quality of the condenser. This makes it fairly easy to match the numerical aperture of the condenser with that of the objective, or, to make any adjustments necessary for securing a slightly higher contrast by reducing the aperture of the condenser or, equivalently, changing its position. The black box must now operate on the light which has been diffracted and refracted by the specimen, the medium in which it resides, the slide (and perhaps oil) below and the coverglass and air, water, glycerin or oil above. You should be acquainted with the ray tracing presented in the microscopy literature which shows that the illuminant bundle in passing through the instrument is imaged in different planes than the wavefront coming from the specimen, (e.g.: Refer to the drawings of Koehler illumination in the Zeiss pamphlets.)

Please note that the light is operated upon by the specimen - it too is a form of optical element in that it perturbs the wavefront issuing from the condenser. The specimen is usually not of the same index as the mounting medium in which it is placed; image formation is, after all, dependent on some refraction at the specimen. And, one hopes that the specimen has some zones which may be defined as edges: diffracted bundles must also be generated. An edge occurs not just at the conjunction of a transmissive zone with an opaque zone: an edge can also be generated at the border of two transmissive materials having different refractive indices. The degree of difference in the r.i. and the abruptness of the transition in part regulate the balance between diffracted and refracted rays.

In the case of Nelsonian or "critical" illumination, as it is usually called, the illuminant is imaged in the plane of the specimen. Due to this simple difference from the Koehler method, the illuminant bundle and image data are imaged in the same planes of our black box. The action of the specimen on the illuminating rays is the same as it was before, but, with the source in the plane of the specimen one receives a different product: both mathematically and visually. It would seem from the results of applying critical illumination, that the percentage of diffracted versus refracted rays making up the image, has been altered. The resolution is greater and so is the contrast. The math behind this is, quite frankly, frightening, (at least to me). But, it should be realized that light rays converging (Koehler method) at a boundary of two different refractive indices in the plane of the specimen and forming an image of the entrant aperture in the back focal plane of the objective will give rise to an image different from that yielded by that same zone when the effective illuminant is actually in the specimen plane (critical).

It would appear in comparison with the Koehler method of illumination, that in critical illumination, resolution determining input apertures do not have as great an effect on final image formation. A less than 0.3 n.a. cone from the condenser is perfectly adequate for resolving the details (of a test diatom that usually requires a 0.45 n.a. cone.

(I ask that the reader refer to the description of my variant of critical illumination demonstrated at the November 2002 meeting, see Vol 7, No. 11, November 2002.)

The classic sources used in obtaining the finest critical illumination are the ribbon filament lamp, limelight and the broad side of a wick from an oil or kerosene burning lamp. If one has sufficiently sensitive eyes, a broad-wicked candle will suffice. The main consideration in source selection is this - after the minification provided by the condenser, the image of the source in the specimen plane should still be large enough to fill uniformly, from edge to edge, the field observed by the objective. For photomicrography this means holding the center to edge illumination intensity to within 1/4 or even 1/8 of a stop. For some photomicrographic films of high contrast the uniformity of field illumination has an even tighter constraint.

There is no question that limelight provides the best source, second only to the sun. But, limelight, would in this day, be considered overly cumbersome and difficult to apply. The 6v, 18a ribbon filament lamp is by far the easiest to use. It is still obtainable, as is the transformer to drive it. Please remember that no bare source shows chromatic aberration. Only when the light emanating from it has been passed through a lens will such problems arise. Make sure that the optics immediately associated with the lamp are of a sufficient quality. Preceded by the appropriate heat absorbing filter, an old 50mm f1.4 lens from a 35mm camera makes a good source optic for most lamps.

Any source requiring a ground glass for uniform field illumination will require a slight defocusing of the condenser (usually not objectionable), so that the hills and valleys of the ground glass are not viewed along with the specimen. □

WORKSHOP OF THE MICROSCOPICAL SOCIETY OF SOUTHERN CALIFORNIA

by George G. Vitt Jr.

Date: Saturday, 1st February 2003
Location: Izzy Leiberman's Residence

Zeiss Jena objectives shown by A. de Haas

In the absence of Jim Solliday, Dr. Stuart Warter, MSSC VP, presided over the meeting. He announced that Dario Solares had won two hours of remote operating time on the astronomical telescope system in Arizona, which had been featured as the main presentation at a previous MSSC meeting. Congratulations to Dario!

1. Dr. Fred Hunt discussed aspects of smallpox vaccination stating that there was a certain very small mortality rate due to the vaccination, and that a 3:1 dilution of the vaccine does not reduce its efficacy. In answer to a question, he added that currently there is no vaccine for genetically altered smallpox, such as "camel pox". George Vitt noted that Russia's Catherine the Great had herself vaccinated, very shortly after the invention of the process, as an example for the population to follow, and that a medal had been struck to commemorate this occasion.

2. Pierrino Mascarino described his recent collecting trips at the Los Angeles river, and demonstrated his new collecting net equipped with a 15 micron mesh and a long multi-sectioned pole. He highly recommended the use of such a net.

3. Julian Pulido stated that he is quite eager to learn the use of Photoshop in the preparation of images he created in his metallographic work.

4. Alan deHaas showed an example of a relatively recent Zeiss 6.3X Neofluor objective in which the back elements had decemented due to the non-hardening cement (a gel) that Zeiss had used in its construction. Alan noted that Zeiss-Winkel Neofluors made in the 1950s had no such problems due to the use of a hard cement. Alan then showed four other items:

a) A Zeiss plan achromat 1X, 0.03 NA, whose back element extends well into the microscope body tube.

b) A Zeiss 25X, 0.5 NA, s/n 000006, infinity corrected, 17mm working distance, with a plane glass protective window over the front element. Alan noted that the mounting thread needs an adapter in order to fit the Society thread.

c) A Zeiss 40X, 0.5 NA objective, 17mm working distance, catadioptric optics, with non Society thread.

d) A cased Reichert jug-handled, convertible dissecting microscope, s/n 55730, c.1910 featuring an image erecting prism cluster.

5. Stuart Warter showed a Lorus digital watch with an unusual LC display which shows white numerals on a black background - which is the opposite to the majority of such displays. Stuart then showed two microscopes:

a) A brass stand by Grunow Bros. (Julius & William, New York / New Haven), c.1863, with fine focus achieved by movement of the stage. The

objectives are bayonet mounted (not Society thread).

b) A brass stand by Grunow, s/n 982 (late production), which had been refinished by Ken Gregory. The instrument's substage mirror is on an articulated pivot and, most unusual, the eyepiece optics consist of a single piece of glass!

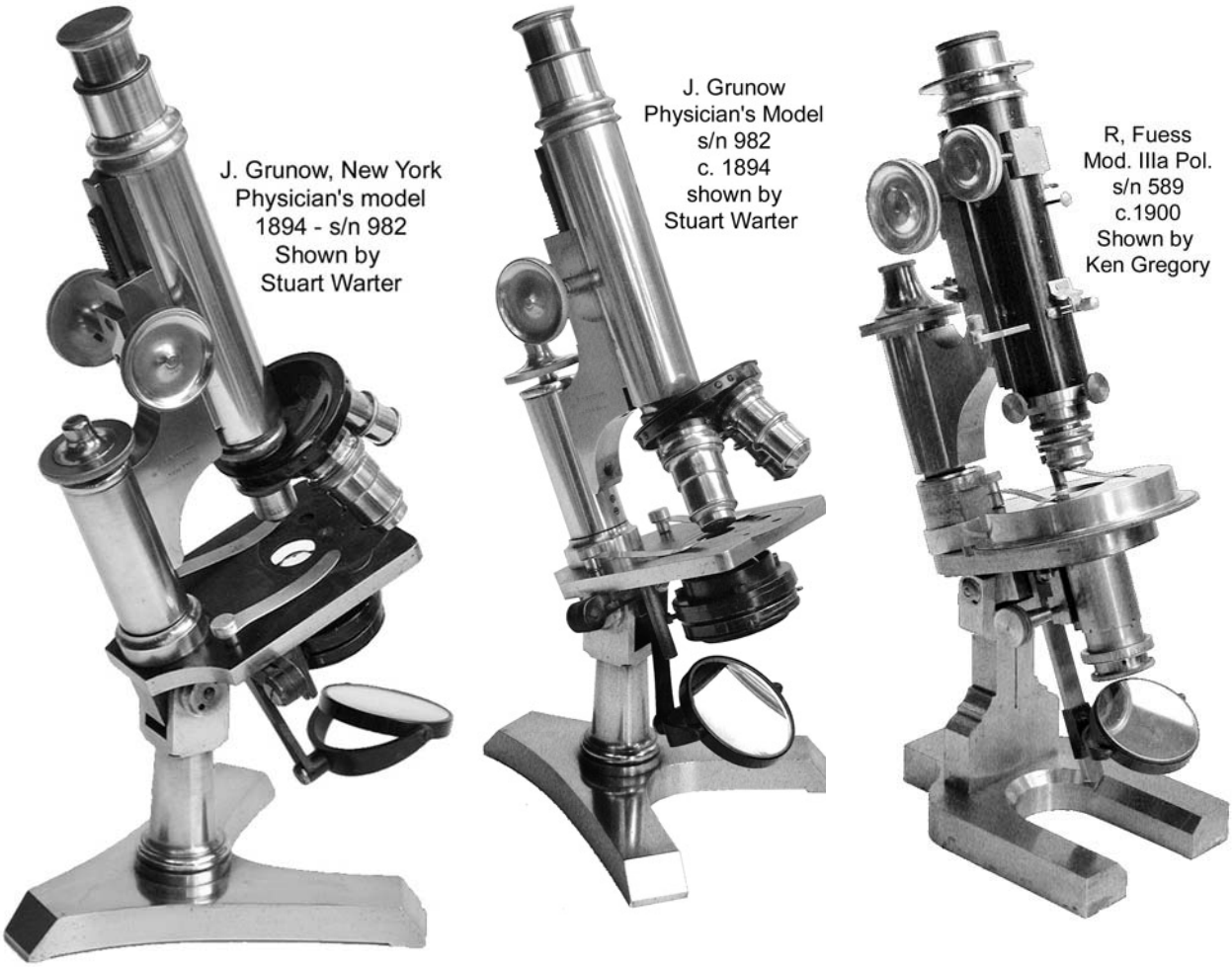
The first Grunow, no. 226, ca. 1864, was signed " Wm. Grunow"; the model is documented, but there is no record of any other microscope signed by William alone, others of that period being signed "J & W Grunow." The second was signed "J. Grunow".

6. Ken Gregory showed two Fuess microscopes (two of the only four such Fuess instruments in California!), and provided the following information and the engraved illustration (Fig. 313) of the Fuess Mod. II a.

Ken presented a Fuess petrographic polarizing microscope Model 11a (s/n 1654) dating from around the 1920s. A good illustration and description of this microscope is found in Johannsen's 1914 "Manual of Petrographic Methods", page 207-8, and is below. Differences with respect to the exhibited microscope include a Leitz triple objective nosepiece with three Leitz objectives, a 6, 10 and 95X. When received, the entire microscope (except nickel-plated parts) was painted with black enamel including the fine and coarse focus knobs. According to Dan Kile, the knobs are always lacquered brass on a Fuess of this era, and they have been restored to that condition. The eyepiece is a large-diameter, slotted, Leitz 10X with crosshairs. The rotating, circular stage has an elaborate mechanical stage built-on. The Bertrand lens is equipped with a diaphragm and can be moved axially up-and-down within the body tube. The mirror can be swung aside to permit the condenser and polarizer to be racked down far enough to disengage the coupling bar allowing for independent movement of the polarizer or analyzer. Brass additions have been fitted to the sides and tail of the horseshoe base to provide for more stabilization. No other accessories were included with the microscope.

This Fuess microscope comes with a rather good provenance with respect to its last owner. It had belonged to and was probably used by Dr. Gunnar Kullerud, a member of the Department of Geochemistry at Purdue University until his death in 1989. The microscope was in the possession of Dr. Kullerud's daughter and her husband (the eBay seller).

Dr. Kullerud was of Finnish/Norwegian origin (b. 1921). He received his MA from the Technical University of Norway (1946), and his Ph.D



in 1948. From 1954-1970, he was a Staff member at the Geophysical Laboratory of the Carnegie Institution in Washington DC.

In 1964, a mineral, Kullerudite, was named for him. In 1965, he won the Andre Dumont Medal of the Belgian Geological Society for the most outstanding contribution to geosciences in 1965. From 1970 until his death in 1989 he was a Professor of Geosciences at Purdue University. (The above biographical information was from the Oct. 23, 1989, issue of the "Purdue Exponent", and was provided by the seller).

For comparison, Ken also exhibited his Fuess Model IIIa (previously described and illustrated by Allen Bishop in the April 2000 (Vol. 5, No.4) issue of our Journal.

A description of the Fuess Mod. II a, from "Manual of Petrographic Methods", by Albert Johannsen, 1st Ed. 1914, 2nd Ed, 1918 follows:

"Fuess Microscope, Model II a. The latest microscope with simultaneously rotating nicols is the Fuess, Model II a (Fig. 313). As may be seen from the illustration, a rigid bar connects hinged levers extending from polarizer to analyzer, the object of the hinges being to permit the end portions to be elevated and thus allow the nicols to be slipped in or out, or rotated independently. The amount of rotation of the nicols may be read from the graduated circle above the analyzer or from the graduations of the stage. The analyzer is a Glan - Thompson prism, the polarizer an Ahrens. If the rotating lever of the upper nicol were attached beneath the calcite prism, it would be advantageous since it would do away with the reflection of light from its upper surface. In this microscope the movable upper lenses of the con-

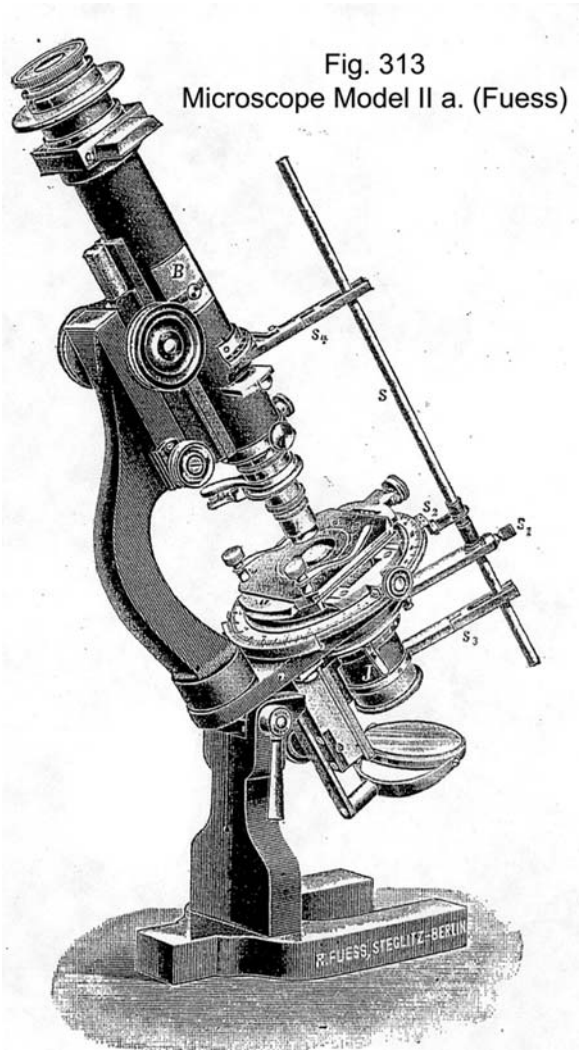


Fig. 313
Microscope Model II a. (Fuess)

densing system, used in the other Fuess microscopes, are omitted, the Abbe illuminating apparatus making these unnecessary. At the upper end of the tube is a slide - similar to the Seidentopf compensator (Fig. 469) for the insertion of accessories in the focal plane of the ocular."

7. Izzy Lieberman showed an AO/Spencer polarizing microscope Mod 37A, c.1950, which was undoubtedly the best made pol. stand in the US. This model features a helical focus adjustment of the Bertrand lens and a ball-bearing rotatable stage. Izzy described how, by a simple lathe operation, he had adapted two AO objective carriers from an AO metallograph, that he got from George Vitt, to fit the 37A.

8. Allen Bishop showed three polarizing microscopes:

a) Spencer Pol. Stand, Mod. 42AC

b) B&L Pol stand, Mod. LC, c.1935, cased. This was the 2nd largest microscope that B&L ever made. When Allen got this instrument, it was severely corroded due to the long presence of a rack of vials of immersion fluid in the case - the vapor reacting with the metal over a long period of time. Allen had most expertly restored it, having the appropriate parts re-plated at West LA Plating on Pico Blvd.

c) B&L Pol. Stand, Mod. LCH, c.1923. □

Accessories for B&L Mod.LC, shown by A. Bishop

B&L Mod. LCH Pol.
s/n 169709
1923
Shown by
A.Bishop

A-O Mod. 37A Pol.
s/n 271,861
c.1950
Shown by
I. Lieberman

Spencer A/O
Mod. 42AC Pol.
s/n 235,334
1947
Shown by A. Bishop

MSSC Monthly Meeting

Wednesday 19th February 2003
at New Roads School
reported by Leonie Fedel

Jim Solliday opened the meeting with a review of the new MSSC Officer appointments. Jim explained how Jim Clark was an expert in the use of the lathe and was offering private workshops to members, maximum of five people. The workshops would be held on a weekday at Jim Solliday's house. Anyone interested should contact Jim Solliday directly. John deHaas mentioned how he was now equipped to do nickel plating of objectives.

Jim then introduced our speaker for the night, Larry Albright. Larry's presentation was on his recent African photo Safari to Zambia and Botswana. Larry discussed how he had managed to acquire such great photographs of animals using digital equipment.

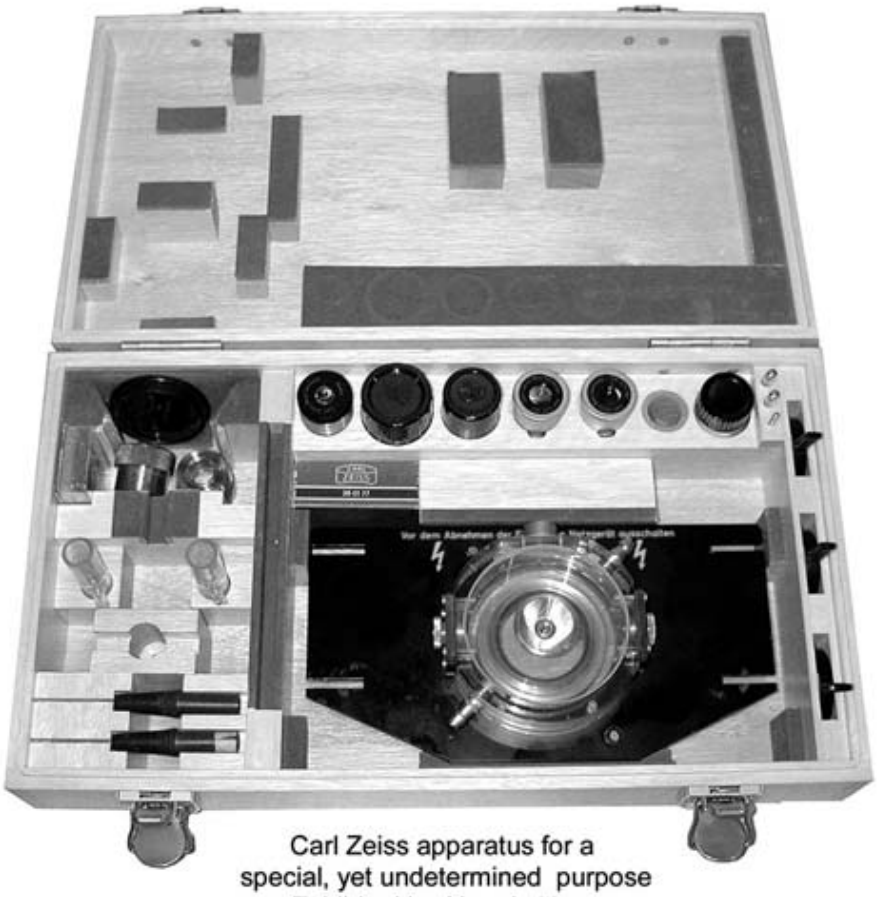
After this, Alan deHaas gave another talk in his lecture series on the use of illuminators and proper illumination. Last month Alan discussed how tungsten filaments vary greatly. As an addendum to that, Alan explained why you should always increase the lamp voltage slowly, so as to prolong the life of the bulbs.

However, the focus of tonight's lecture was on the use of filters. He explained that for photomicrography you should generally keep the exposures between 0.25 and one second. He suggested using a manual film camera as are they more reliable than automatic cameras. With a manual camera one must pay attention to knowing what voltage, aperture and other variables are neing used, and can therefore work out how much light is reaching the filmplane and hence what exposure time is required.

He described how filters help correct color temperature and because the color temperature of the bulb changes over time. Filters enable you to compensate for this. One way to ensure your prints will have white backgrounds, is to expose the first three frames on the roll using first a red filter, then a blue filter and finally a green filter. Your developer can then use these prints as a reference to color balance all the photographs on the roll.

Finally, and unrelated, Alan exhibited an intriguing piece of apparatus by Carl Zeiss. Although its purpose has not yet been determined, it is obvious that it had been designed to perform some very specialized microscopical observations and measurements involving particles, fluids, gases, and an electric field. The presence of a sensitive spirit level adds to the mystery, as does the vial of iron-free quartz particles. We should have a full report when Alan finally has it figured out. (Even the official Zeiss archivist in Germany could not identify it!)

See next page for a photograph. □



Carl Zeiss apparatus for a
special, yet undetermined purpose
Exhibited by Alan de Haas

MSSC Officer Election Results

Members of the Society voted on January 15th, 2003 as follows. Each office is filled for two years. A total of 25 ballots were cast.

President: James D. Solliday (25 votes)
Vice President: Stuart Warter (25 votes)
Treasurer: Dave L. Hirsch (25 votes)
Corresponding Secretary: George G. Vitt Jr. (25 votes)
Education Chair: Alan deHaas (25 votes)
Facilities Chair: Pete Teti (25 votes)
Webmaster: Larry Albright (25 votes)
Program Chair: Ken Gregory (23 votes)
Program Chair: Ken Miller (2 votes)
Editor (Journal): Leonie Fedel (25 votes).

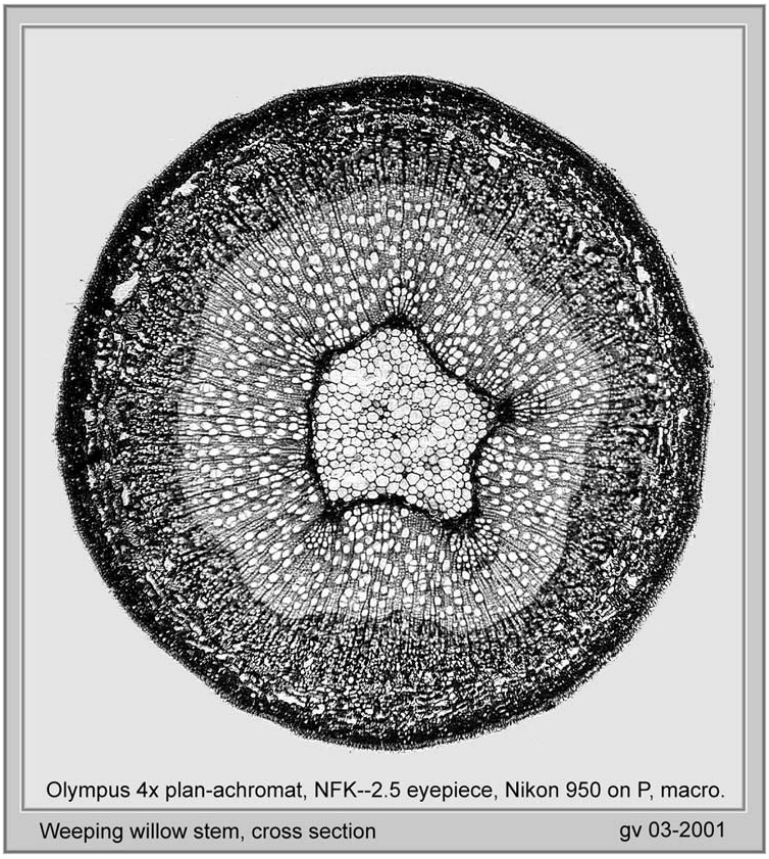
The editorial staff consists of George Vitt (graphics), Allen Bishop (associate copy editor), and Pete Teti (Journal distribution).

All positions are voluntary.

Some Thoughts on Digital Photomicrography

by George G. Vitt, Jr.

Recently, I received an email from a Geology PhD candidate in Spain who asked for advice and recommendations on digital photomicrography. My response follows.



Olympus 4x plan-achromat, NFK--2.5 eyepiece, Nikon 950 on P, macro.

Weeping willow stem, cross section gv 03-2001

There are many factors to consider in making photomicrographs digitally, but I shall attempt to give you the basic facts on the equipment I use and the procedural steps.

Camera:
The only digital cameras I know of that have the type of objective lenses (and other features) suitable for use over the eyepiece of a microscope are the Nikon 950, 990, 995 and the new 4500 (although there have been criticisms of the 4500 lens with its molded aspherics which produce certain visual artifacts.) Although the 950, 990 and 995 have been discontinued, they are still available on eBay (www.ebay.com). I use the 990. The 990 uses four "AA" size Nickel Metal Hydride 1.2volt rechargeable batteries, now available with 1.8 Ampere-Hour energy capacity. A MAHA recharger will recharge 4 such batteries simultaneously. See www.mahaenergy.com.

For extended periods of use on the microscope, the camera should be powered with an external AC power supply made for that camera (also available on eBay).

Lens on the Nikon 990 camera:
When the lens is zoomed, no external parts move, since the zoom is accomplished by the internal movement of the lens elements. This is important since the camera lens must be placed as close to the eyepiece of the microscope as possible (without touching it) to minimize vignetting. The lens diameter also closely matches that of most widefield eyepieces.

Camera memory card:
With my Nikon 990 I use the LEXAR USB-Enabled Compact Flash (CF) card (www.digitalfilm.com). 180MB storage capacity which allows taking over 140 photos at full camera resolution before download to computer is necessary. I recommend using at least 12X speed cards. These USB-enabled cards are sold with LEXAR'S "Jump-Shot" kit. This is nothing more

than a 4-foot long cable with a USB connector (to the computer) at one end and a special connector at the other end to take the CF card. Driver is supplied on a small CD, or can be downloaded from the LEXAR website see www.digitalfilm.com/support.

The card is removed from the camera, plugged into the adapter, and its icon appears on the screen - just like any hard disk icon. Download is fast: about 1.4 seconds/image. Alternatively, the camera can be directly connected to the computer USB port (cable supplied with camera) and the images similarly downloaded, but at a reduced speed of about 4.5 seconds/photo).

Microscope eyepiece:
You MUST use a widefield eyepiece with a large-diameter exit lens. I have been using the Nikon CFWN 10x20 with success.

Setup:
The microscope is adjusted for either Koehler or Critical illumination and the specimen is visually positioned and focused. The microscope stands on the base of a copy stand and the camera lens is positioned co-axially with the microscope's optic axis, as close to the eyepiece as possible, but without touching it (say a 1-mm space). The fact that the optical portion of the Nikon cameras can be swiveled allows for simple alignment with the eyepiece - whether this is on an inclined binocular microscope, or on a vertical trinocular.

Alignment is checked on the camera's LCD screen. The camera is set to MACRO MODE, delayed action, focus confirmation, matrix exposure metering (or manual area focusing/metering), maximum resolution (not TIFF), and minimum image sharpening. (Any image sharpening is done later with Photoshop). Focus is confirmed on the LCD while adjusting the microscope's fine focus around the point previously determined visually. Focus confirmation produces an easily recognizable "crispening" effect which allows you to see immediately if the camera's autofocus has acquired focus. This is further confirmed by the green LED focus indicator. This takes care of the problem of parfocality.

By moving the specimen out of the field of view, you will have a clear bright field on which you MUST perform camera White Balance. This will ensure correct color rendering with whatever might be the color temperature of your light source. After white balancing, move the specimen back into position. This white balance setting will remain in the camera's memory until you decide to change it.

The setup should be in a room with low illumination to enable a better view of the LCD and to minimize any possible light leakage at the eyepiece (I have never had this problem).

Exposure using the camera's delayed action insures that there will be no image degradation due to the camera's movement relative to the microscope. The timer can give time delays of 3 or 9 seconds.

Computer and software for Images:
Once the images are downloaded from the camera into the computer, it is **mandatory** that they be adjusted for best image quality by using either Adobe Photoshop software (around $600) or Adobe Photoshop Elements (around $100). Apple computers are universally acknowledged as being best suited for image work, as opposed to PCs using the Microsoft OS (operating system). My recommendation here is to use either the Mac G4 desktop or the new eMac ($1,000 new) which has a built-in 17-inch flat screen CRT monitor and which has been given excellent reviews in the literature. It is important to have as much RAM as the computer can accommodate. RAM is cheap these days. A CD-RW is needed for archiving many finished images.

If the computer requires an external monitor, CRT monitors have a greater color gamut than do the LCD monitors. □

MSSC Monthly Saturday Workshop Announcements

The MSSC holds a workshop from:

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

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

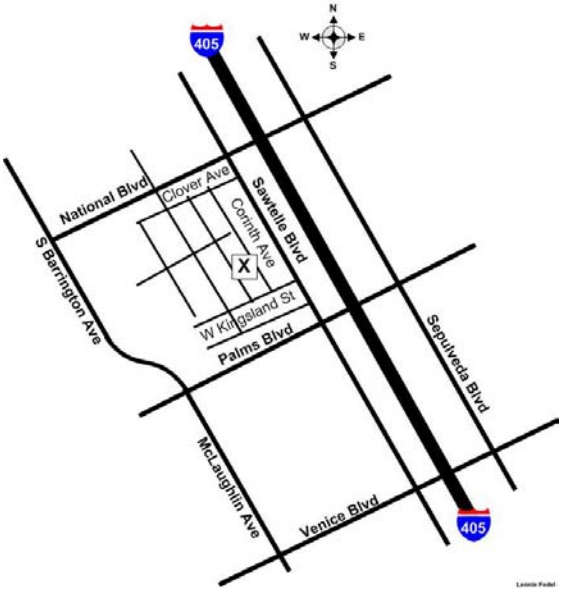
The workshops provide a chance for fellow microscopists to talk about our favorite subject. You are invited to bring any manner of items related to microscopy to share it with the fellowship. If you have something you would like to sell, please feel free to bring it and set it up at the sales table.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

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

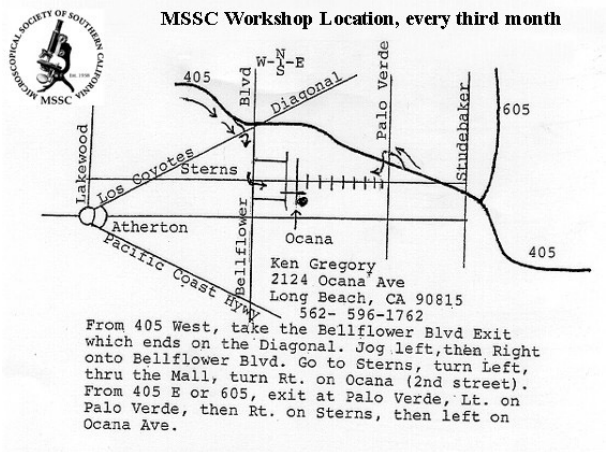
The schedule for 2003 is as follows:
Jan. 4, 2003 at Izzy Lieberman's residence
Feb. 1, 2003 at Izzy Lieberman's residence
Mar. 1, 2003 at Ken Gregory's residence
Apr. 5, 2003 at Izzy Lieberman's residence
May 3, 2003 at Izzy Lieberman's residence
Jun. 7, 2003 at Ken Gregory's residence
Jul. 5, 2003 at Izzy Lieberman's residence
Aug. 2, 2003 at Izzy Lieberman's residence
Sept. 6, 2003 at Ken Gregory's residence
Oct. 4, 2003 at Izzy Lieberman's residence
Nov. 1, 2003 at Izzy Lieberman's residence
Dec. 6, 2003 at Ken Gregory's residence

There will also be a field trip to collect specimens from Madrona Marsh, Torrance California on Saturday, April 26, 2003 at 9.00am.

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



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



MSSC Monthly Meeting Announcements

7:00pm January 15th, 2003

Mr. Arnie Rosner (member of the Orange County Astronomers Association) has set up a system of internet access to a remote observatory, which he will demonstrate at this meeting. The telescopes are located in Arizona and provide the best possible access to the heavens. Mr. Rosner will link up with the observatory and guide the telescopes to locations in the sky as suggested by members. Photographs will be taken using a mounted CCD camera and the images transmitted back to the class room and projected on a screen for the members to study. He is also offering a prize draw of two hours of free access to one lucky member. After this, Alan deHaas will give another talk in his lecture series on the use of illuminators and proper illumination.

7:00pm February 19th, 2003

At this meeting, Larry Albright will give a presentation on a recent African photo Safari to Zambia and Botswana. He will present images of animals taken during the trip and will describe how one can acquire such images of animals using digital equipment. If you ever had doubts about the digital camera, this program should relieve your worries. Digital imaging has indeed arrived. After this, Alan deHaas will give another talk in his lecture series on illumination systems.

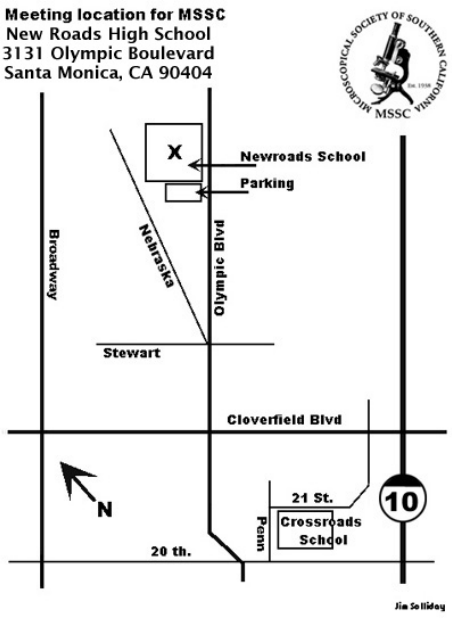
7:00pm March 19th, 2003

This month we are expanding on the topic of illumination. Mr. Gregg Kleinberg from the Tamar Technology Co. will give a presentation on the EtherGlow illumination system which was designed for the Olympus BHS. Mr Kleinberg will introduce the technology, explain how it works and highlight its unique advantages. In addition Mr Kleinberg will be accompanied by a colleague, David Marx Ph.D. (optics). Dr. Marx was the Chief Optical Engineer of Sight Systems, which ultimately became Tamar Technology. For the presentation they will set up an Olympus BHS microscope (donated for the evening by John Fedel, MSSC member) with the EtherGlow illuminator. Following this presentation, Jim Solliday (MSSC President) will show some results that can be gained using the EtherGlow filter.

7:00pm April 16th, 2003

This month, Dr. Ken Gregory (MSSC member and longtime teacher of Anatomy and Physiology) will give a talk on The Functional and Histological Anatomy of the Human Gastro-Intestinal Tract. His talk will be accompanied by slides illustrating peptic ulcerations of the esophagus, stomach, duodenum and pathophysiology of the colon. The second half of the meeting will provide an opportunity for members to share what they have been working on.

All meetings are held at **New Roads School**:



Optional dinner beforehand at Coco's restaurant at 5:30pm (near Ocean Park and Bundy, Santa Monica). □

Editor's Note

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

Leonie Fedel
10945 Rose Avenue #209
Los Angeles CA 90034
(310) 839-9881,
email:
mssceditor@attbi.com

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

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

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

Renewal of Membership Dues

Membership dues for fiscal year 2003 are due and payable. The dues structure remains as before:

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

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

Payment accepted in the form of cash or checks in US funds made out to Dave Hirsch (NOT to MSSC).

Please remit dues to:

David L. Hirsch/MSSC
11815 Indianapolis Street
Los Angeles, CA 90066-2046
(320) 397-8357
Email: dave.hirsch@verizon.net □