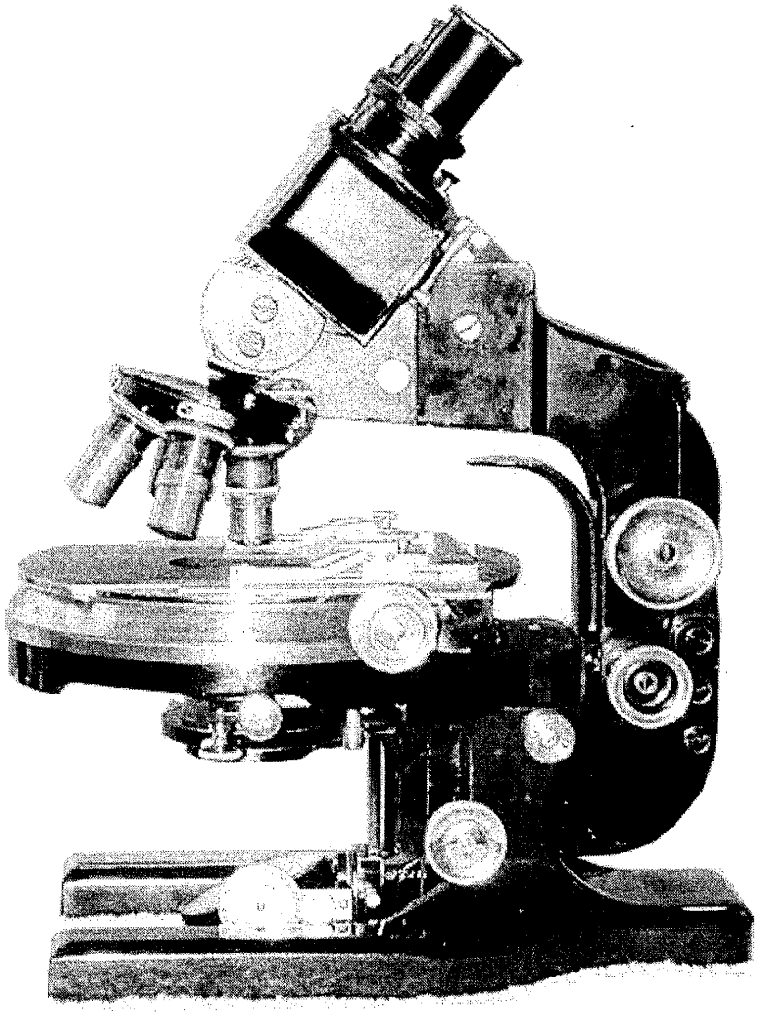
Journal of
THE MICROSCOPICAL SOCIETY OF SOUTHERN CALIFORNIA
Volume 5 Number 10 October 2000

Spencer Prototype

Allen Bishop



The profile view of the stand gives a hint of its massive construction. Note length of foot at both ends: goniometer between feet shows exact angle of mirror. Instrument shares certain components and features with Spencer's No. 8 "reverse" stand, only a handful of which are known.

At the end of the 1920's, America's two main microscope manufacturers introduced what was to become the standard configuration of the post-World War 2 microscope stand. This was the so-called "reverse" design wherein the main arm and pillar faced away from the operator, giving unrestricted access to the stage, objective nosepiece and substage. Bausch & Lomb brought out their Model DDE, which proved to be a moderately successful design. Spencer offered what they referred to as the Number 8.

The economic situation in the USA and worldwide in the 1930's precluded the widespread sales of these instruments. Not only were they unconventional in design, they were also extremely expensive. Early on into the Depression era, Spencer was in trouble; ulti-

mately they were bought out by American Optical Co. who gradually faded out the venerable Spencer name. Bausch & Lomb has survived to this day, but their microscope manufacturing facilities are long gone. In spite of this, or as a result of these circumstances, there are examples of the B&L DDE around. I have seen two, both in virtually unused condition. The Spencer No.8 however is almost extinct. Literature survives; one brochure I have seen is overstamped "Discontinued 1940.". Beyond that I have seen a photo of the specimen in the Billings collection. One or two individuals have informed me that they have seen a No.8 "somewhere" and "a long time ago". Obviously very, very few of the Spencer were manufactured.

The microscope pictured on these pages belongs to MSSC member Steve Craig. A professional documentary film maker, Steve produced films many years ago for the Moody Institute of Science. This microscope belonged to the Director of the Institute, who, according to Steve, guarded it jealously, not allowing anybody else on the staff to use it. Steve eventually talked the director out of this instrument; both men realized that it was something "special." The underside of the foot on this scope bears an oval decal indicating Moody Institute of Science ownership.

When I first saw this instrument at Steve's, I was staggered by the sheer massiveness of it - not simply huge in size, just massive.

The instrument and its cabinet were in need of cleaning, and I was allowed to undertake this by Steve. I recall clearly transporting the entire ensemble to the car - it weighs almost 50 pounds!

Upon dismantling the instrument, I was impressed by the early use of modular componentry. The first inkling I had that this microscope was genuinely unusual was the fact that it obviously shared a number of components with the legendary No.8 "reverse" stand. Most obvious is the immense circular revolving and centering stage. Fully graduated, centering is accomplished via a pair of long rocker arms actuated by thumbscrews,

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while the specimen slide carrier arms could easily guide a plate glass window! The X-Y controls are concentric in classic Turrell fashion, superbly crafted, but require careful adjustment, otherwise the two sets of controls interlock, giving only a diagonal motion to the slide carrier assembly. The stage weighs about 1 1/2 pounds and though removable, is not interchangeable with any other Spencer stage with which I am familiar.

The substage is also a complex assemblage; a true instance of trying to make one unit serve all functions. The result is an outsized piece of opto-mechanical equipment festooned with poorly interspersed control levers. The substage is difficult to access; it is completely sheltered, the stage acting like a large protective umbrella. MSSC member John deHaas has told me that this was a constant complaint about Spencer stands. It was an attempt to maintain a low center of gravity; the situation is at its worst here.

The mirror is conventional, but like the No.8, has two 360-degree goniometers which allow the user to observe the angles of side-to-side and fore-aft tilt. I have never seen anything like this. Certain elaborate English stands featured similar degree scales to indicate angle of tilt of the main tube, or on the base whereby the user could actually measure the NA of his objectives. I can offer no reasons for such an application as found on the Spencer. As someone once said about certain features of the fabulous French Bugatti automobiles: "masterpieces of misplaced ingenuity".

Two unusual facts became evident as I worked on this instrument. Firstly, there is no serial number on this microscope anywhere. In one or two hidden locations there are scratched-on digits that appear on most any early microscope; they were of relevance only to assemblers and fitters. The second anomaly I found on cleaning and reassembling the arm, fine focus control and nosepiece slider is that they are full of file marks and obviously handmade and fitted. The fine focus micrometer is a standard Spencer item, but being placed low on the arm, a "reach rod" extends up through the hollow box-section arm and hooks onto the nosepiece. This rod is a flat piece of steel that was obviously filed to shape. The arm is a U-shaped frame, open at the back and covered with a sheet metal cover held by rows of tiny screws. The holes for these screws were obviously hand-drilled and tapped - some of the screws are at angles when installed.

Aside from the lack of serial numbering, the Spencer logo appears only on the binocular head. This head is also found on the No.8. It, too, is fitted with a scale and pointer indicating angle of tilt. The optics are, of course, Spencer and appear to be conventional items from the circa-1930 era.

We must now ask the question, "What is this microscope?" To all appearances, this instrument is a partially hand-built example. Many features observed and described here would be utterly impractible to incorporate into a production path. I can locate no contemporary references to this instrument other than a photograph in R.M. Allen's book *The Microscope*. It is referred to only as "Spencer's new research stand." On the page opposite is a photo of the No.8. I have seen no other reference to this microscope in any literature, though such may well exist.

It is my assumption that the Spencer designers wanted to offer a parallel research-level microscope along with the No.8 Reverse - a more conventional and possibly more saleable pattern. Evidently this never happened, whatever the reason for the existence of this design. Is this microscope unique? Very possibly, though perhaps Spencer did construct a few test pieces or sales samples. Hopefully, some answers will be forthcoming, but we may never know. In any case, it remains a fascinating link in the history of the 20th Century microscope.

Postscript: The microscope weighs about 24 pounds set up. The coarse focusing rack and pinion show wear despite the otherwise excellent overall condition of the instrument; they are standard Spencer manufacture and too small to elevate/lower the arm without being under undue stress.

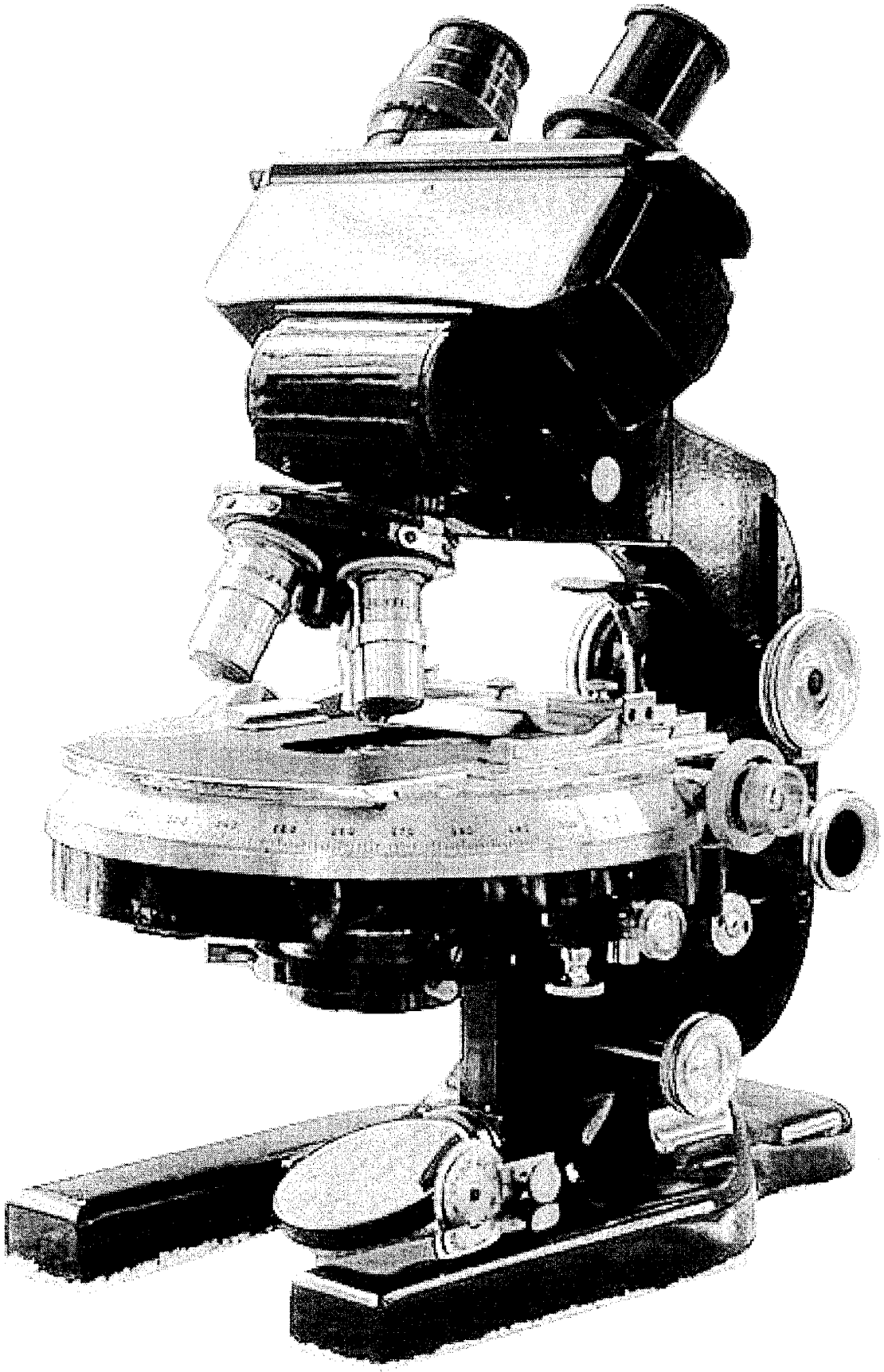
The outfit is very well equipped with accessories, presumably all supplied at the time the instrument left the Spencer factory because everything appears to be contemporary. There are two darkfield condensors, one carrier allowing the use of an objective as the condensor, monocular tube, a Silverman incident illuminator, two diffusion discs, two daylight filters, two bottles of Spencer immersion (one is synthetic "Crown" oil, and may be of more recent vintage) and a Spencer filar micrometer.

The objectives with this stand are as follows:

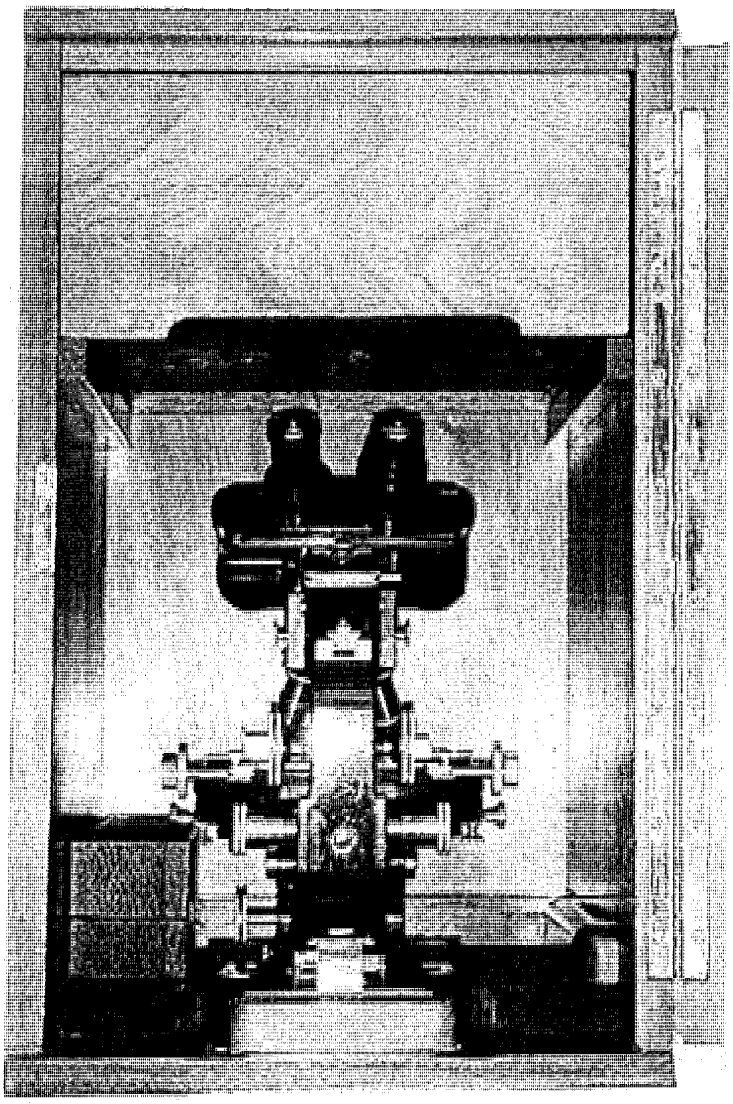
22-30mm Variable Focus #9118
10X/.30 Apo #315135
20X/.60 Apo #212788
60X/1.3 Apo #315215
90X/1.20 Apo #297123

There is also an earlier brass 4mm na .66 #22733 that is obviously not original to this outfit.

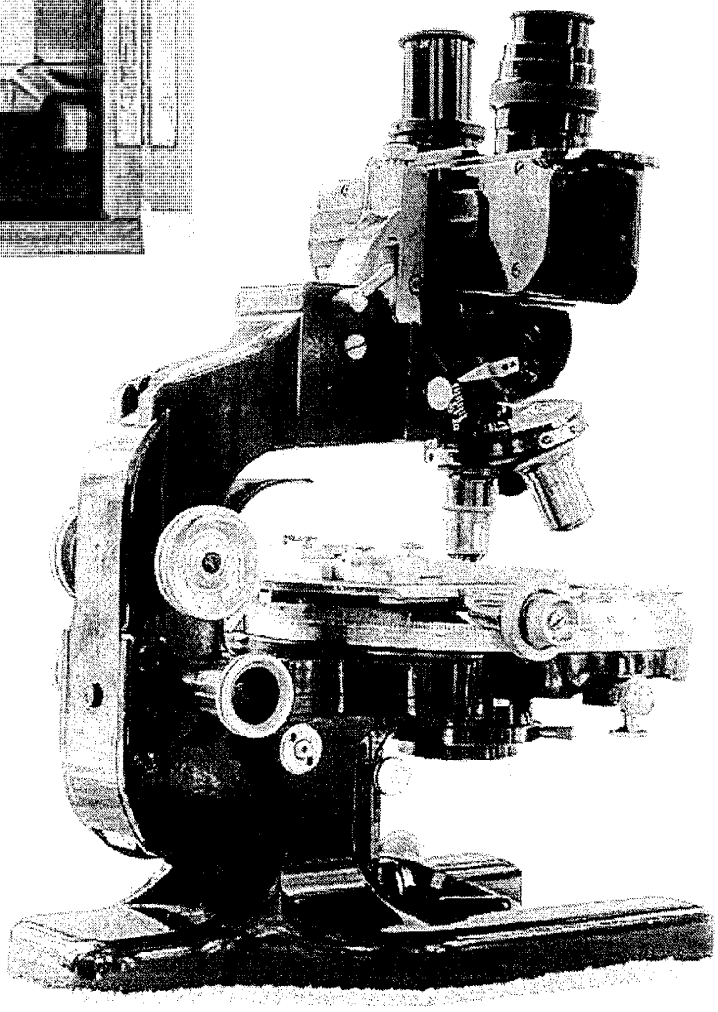
I am not aware if anyone has researched Spencer objective serial numbers, but they have been included as a reference.



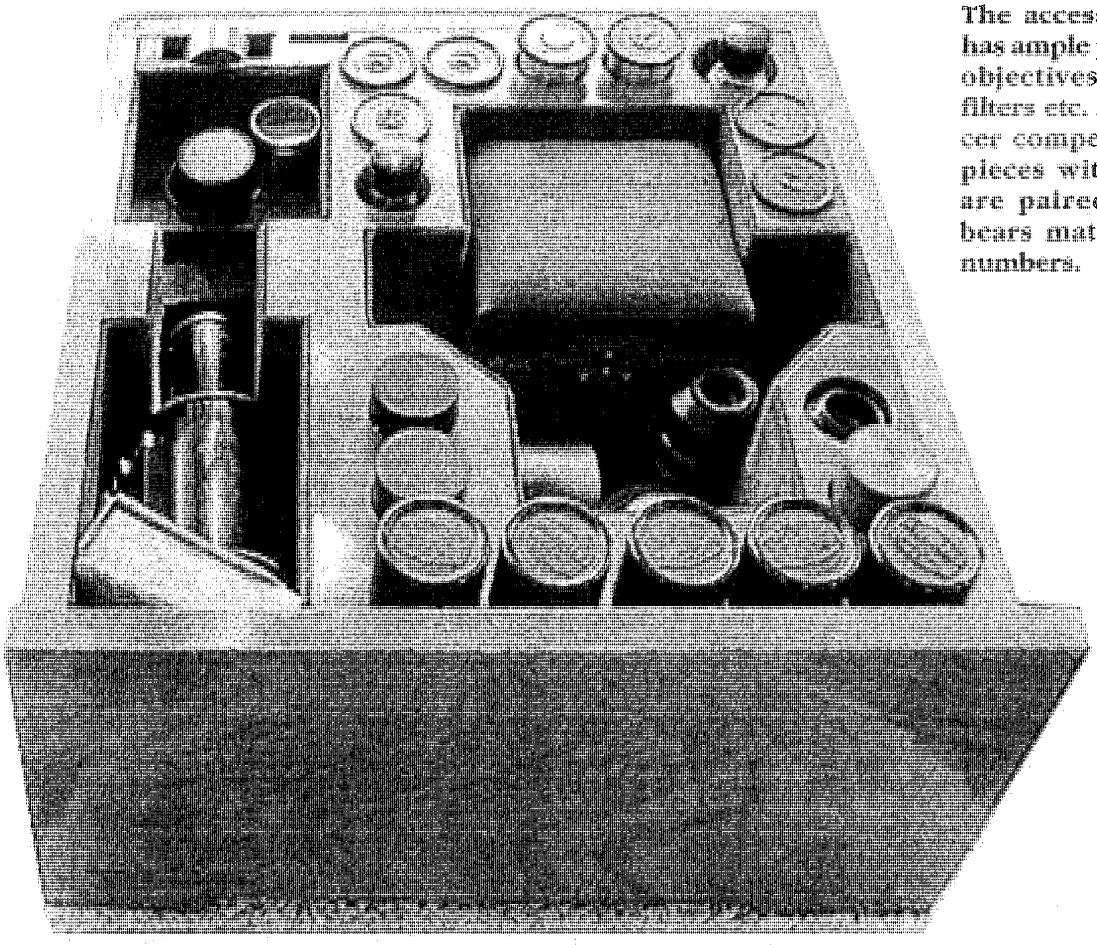
The binocular head is a standard Spencer item. It may be shifted laterally, converting it into a monocular. The Spencer Lens Co. Logo is on the face of the bino head, but no serial number appears on the instrument anywhere.



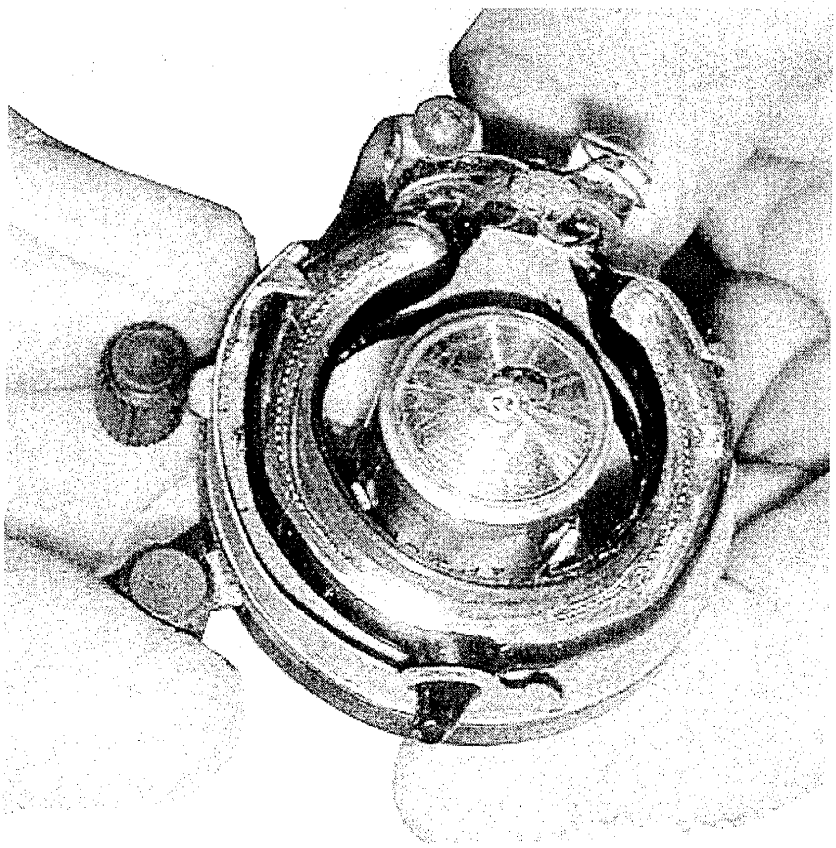
The size of the mahogany cabinet may be visualized with the stand inside. Fully loaded, the outfit weighs nearly 50 pounds. Transporting it is genuinely difficult.



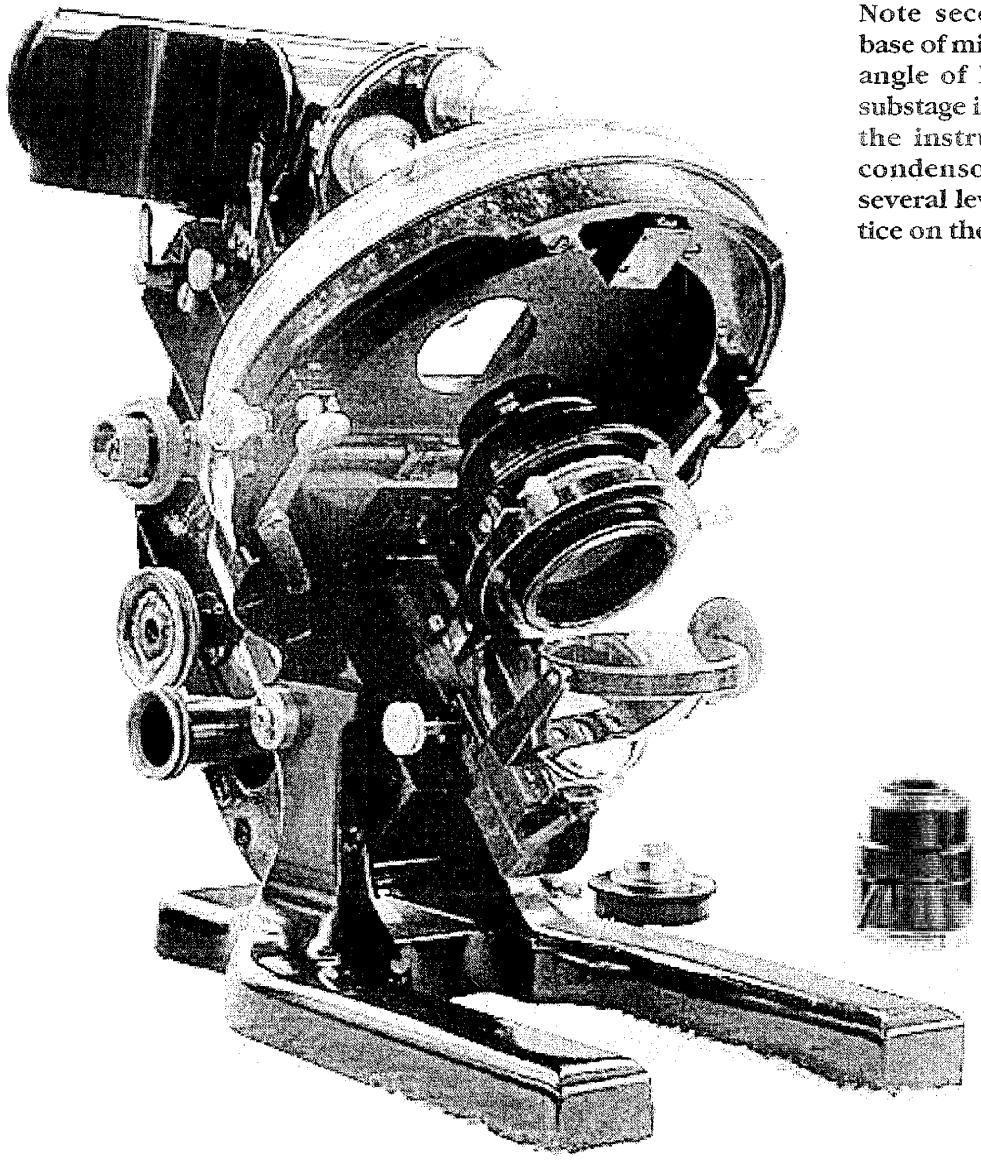
The arm appears to be mostly hand-fabricated. Inside, the extension arm or "reach rod" for the fine focus extends up through the arm and acts on the nosepiece only. The extension arm itself appears to have been handmade; it is very rough in finish and covered with file marks. The fine focus micrometer is a standard Spencer item, but its action is very slow. The motion in the nosepiece is barely visible. There is actually a slight gap between the nosepiece and the underside of the prism beneath the binocular head.



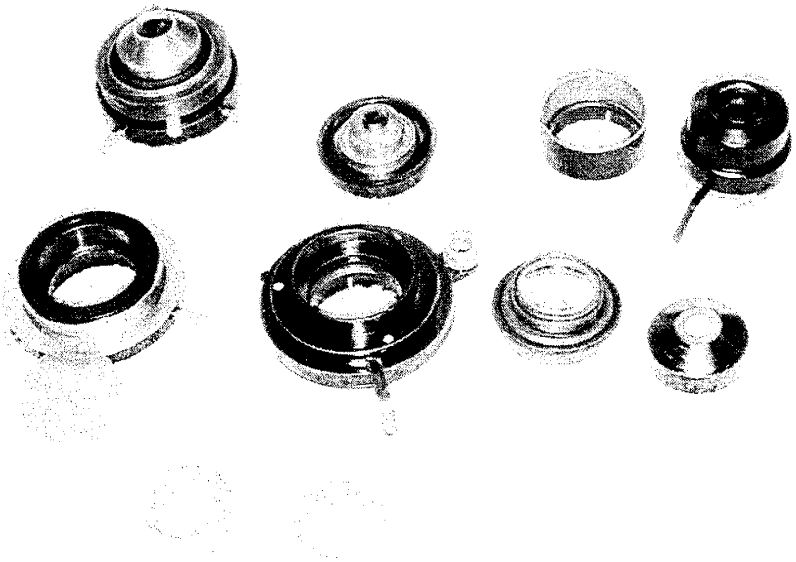
The accessory drawer has ample provision for objectives, eyepieces, filters etc. All the Spencer compensating eyepieces with the outfit are paired - each set bears matching serial numbers.



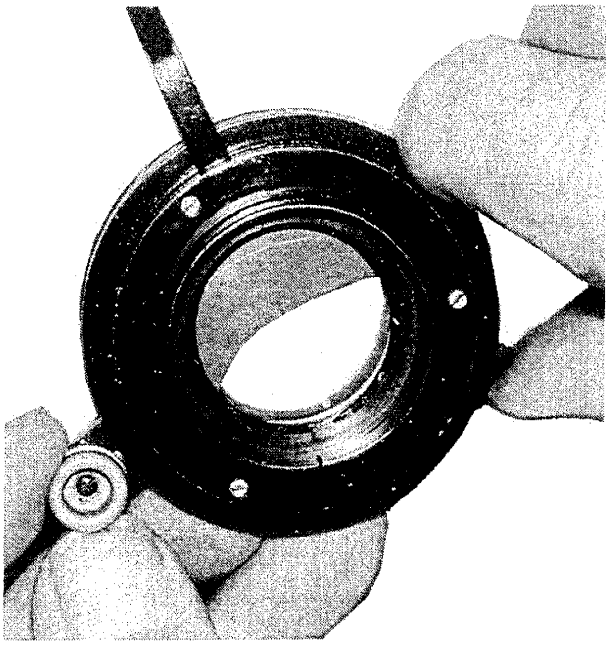
A low voltage Silverman incident illuminator in its original box is with the outfit. It clips firmly to the body of the objective in use. Photo shows the horseshoe shaped lamp of 6 volts. This unit no doubt worked well, but its delicacy is probably why they are not often seen.



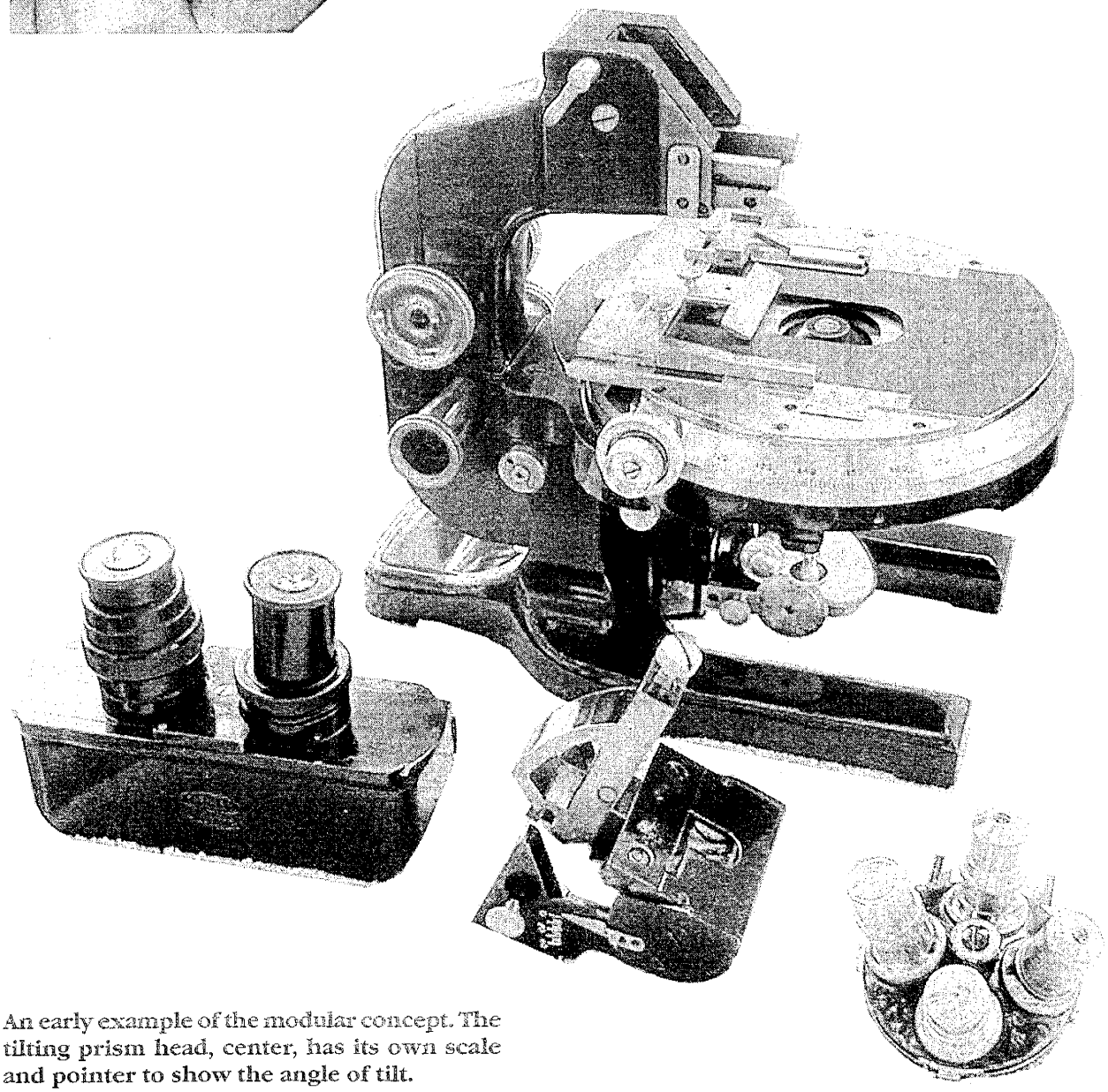
Note second goniometer on base of mirror stirrup, showing angle of lateral tilt. Access to substage is not optimum unless the instrument is tilted. The condensor/iris assembly has several levers which take practice on the part of the operator.



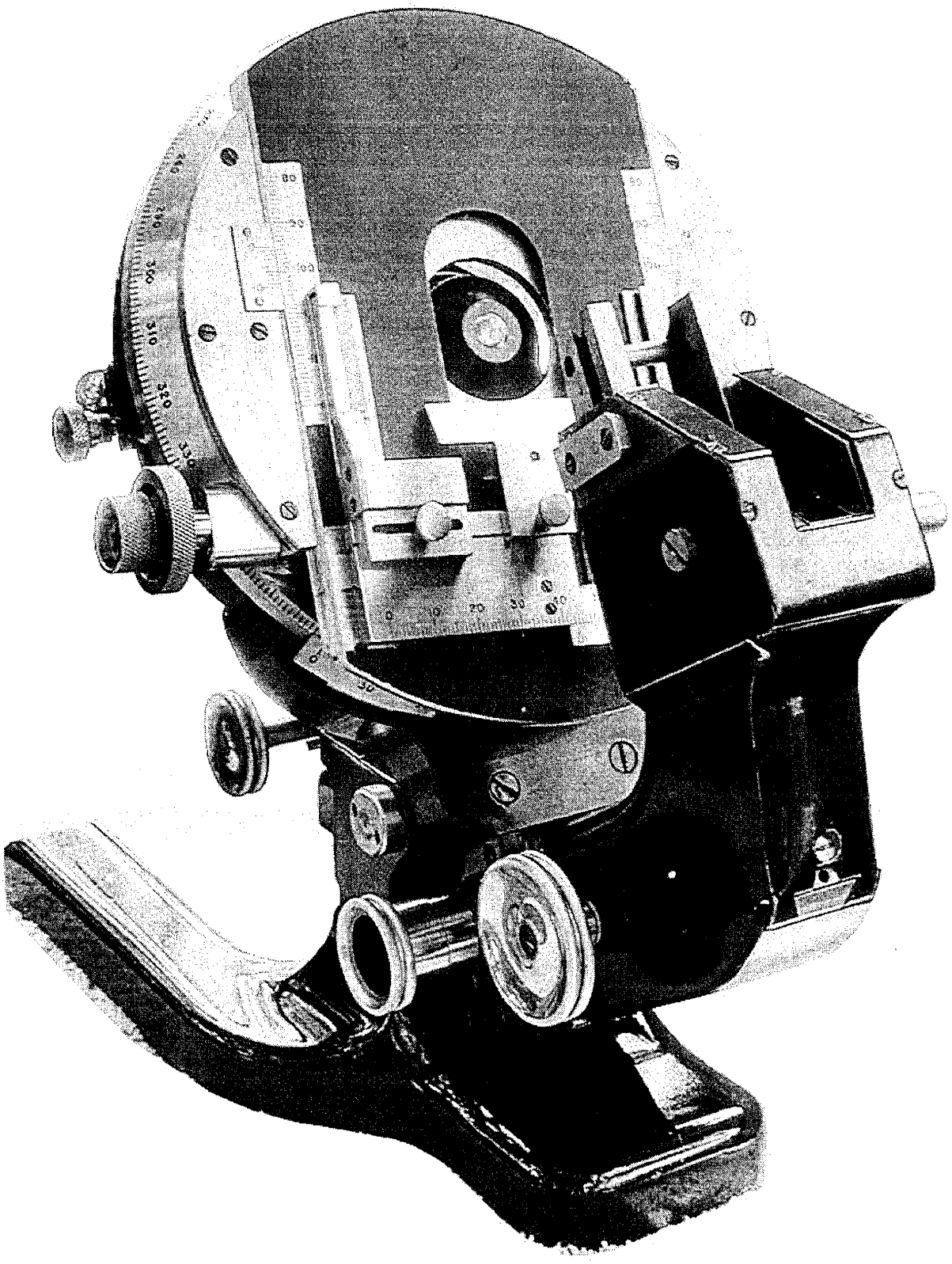
Substage components. At upper left are complete and attachable darkfield condensors. There is an upper and lower iris surrounding the na 1.4 condensor. Filters are simply dropped in above the lower iris. In the foreground are two push-on diffusion screens - we were unable to ascertain exactly to what they were intended to fit.



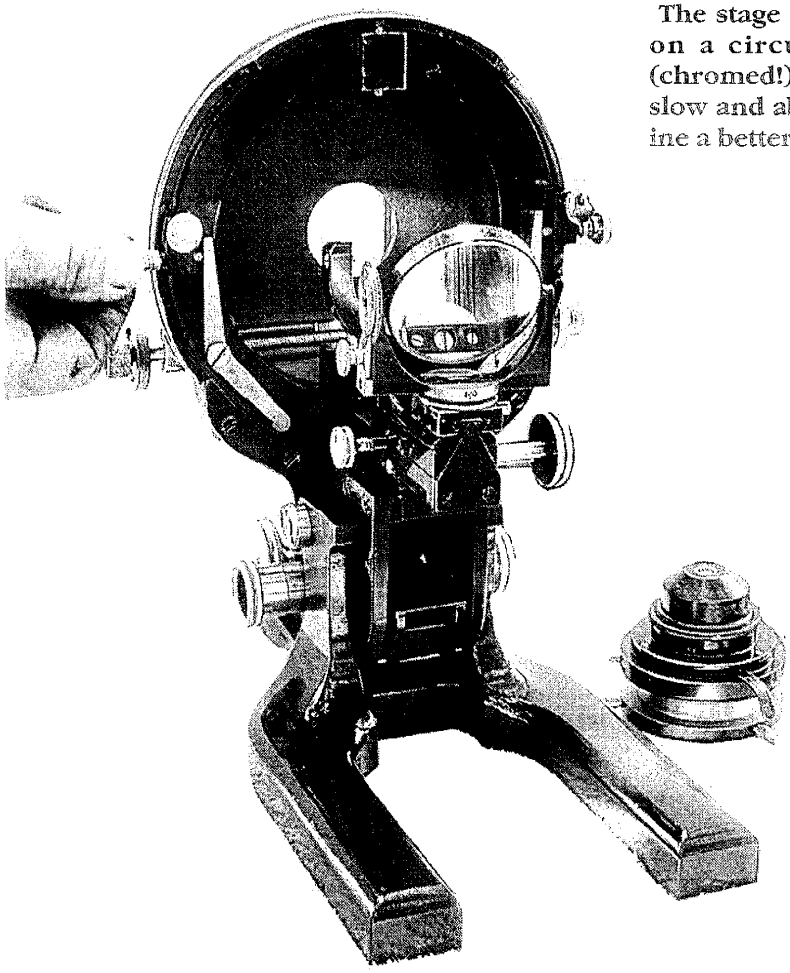
The lower substage unit contains not only a conventional iris, but also a shutter that controls oblique illumination.



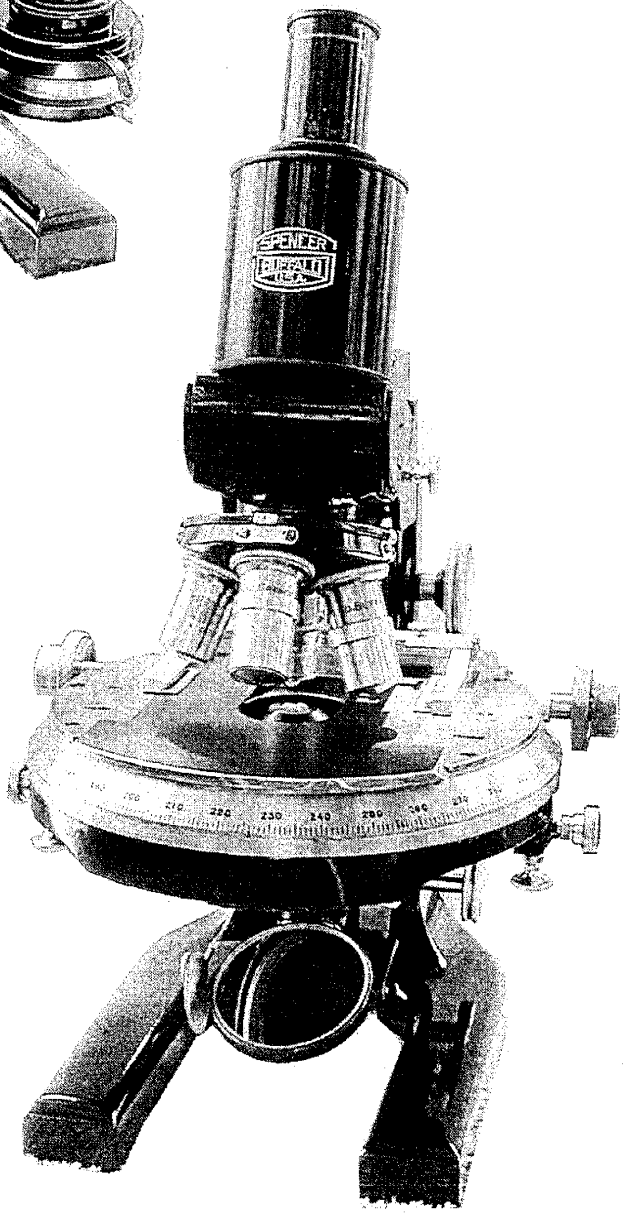
An early example of the modular concept. The tilting prism head, center, has its own scale and pointer to show the angle of tilt.



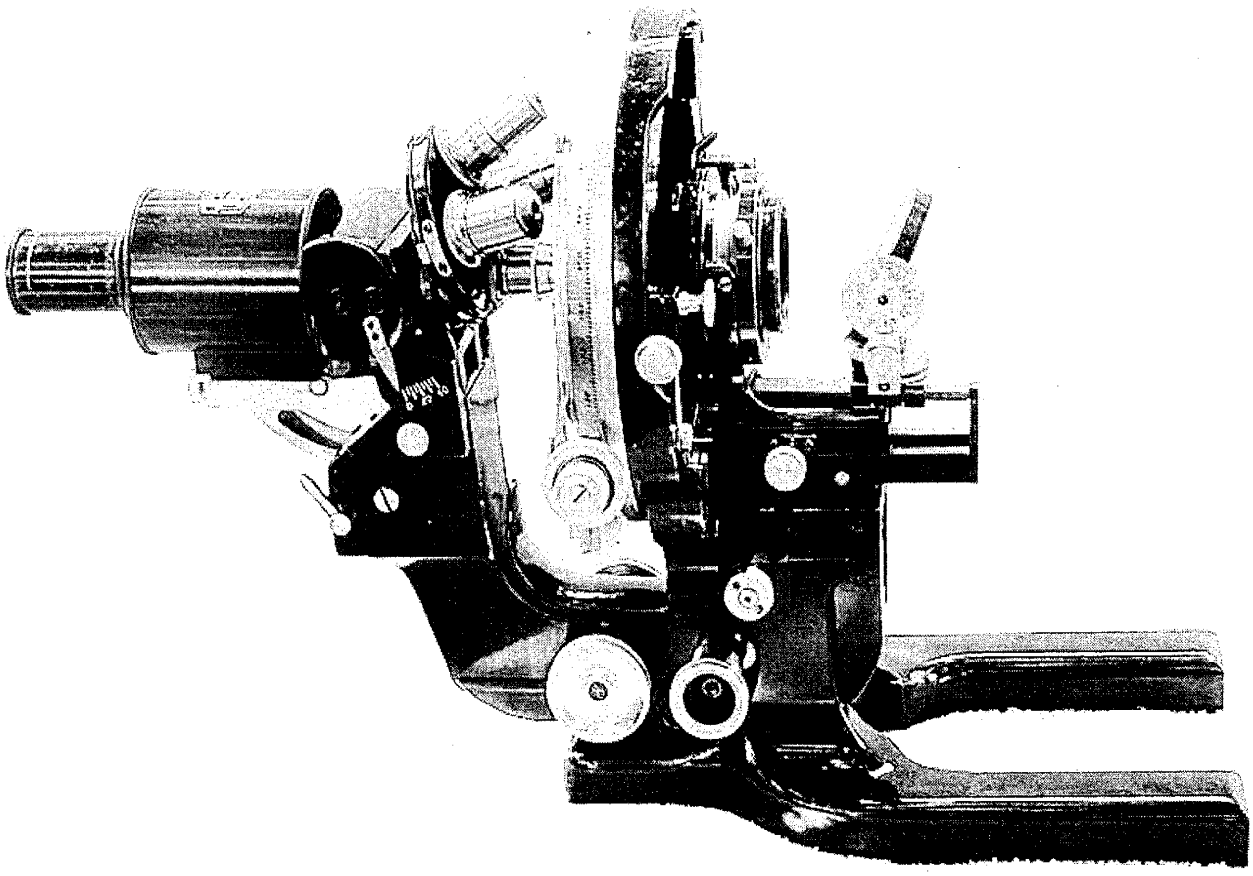
The stage is one of the most massive ever built for a "conventional" microscope. It weighs nearly two pounds and is almost totally free of deflection. Note the slide carrier assembly - what does a slide weigh - a few grams? The concentric X-Y control knobs work superbly, but require careful adjustment or they lock together, resulting in diagonal travel of the specimen slide. The main arm has several hand - made sheet metal dust covers, attached by a myriad of tiny screws. Hardly a design for series production. The stage design was carried over into Spencer/AO's later large research stands, but the shifting control knobs were made separate.



The stage centering screws do not act directly on a circular flange, rather via a pair of (chromed!) rocker bars. The resulting action is slow and absolutely smooth, but can one imagine a better example of misplaced ingenuity?



The monocular tube is usable for visual work, but was primarily for photomicrography. Note the superbly wrought 360 degree scale on the main stage. It would be difficult to adapt this stand to polarization use, nor was that ever the intent of Spencer.



The instrument is absolutely stable tilted back for projection or use with a horizontal camera. This instrument was, no doubt, built as a possible companion to the No. 8 reverse. The only place we have seen it heretofore is in "The Microscope" by R.M. Allen. It is shown on page opposite to an illustration ot the No. 8. It is referred to only as "Spencer's new research microscope" implying that the author had practically no information. Spencer had to join forces with American Optical during the Great Depression or die. Today, A-O itself is primarily just a name.

WORKSHOP of the Microscopical Society of Southern California

George G. Vitt, Jr.

Date: Saturday, 6 October 2000
Location: Izzy Lieberman's residence

Since a picture is worth a thousand words, we will make every effort to photograph the instruments brought to our Workshops for publication in the MSSC Journal. To this end, George Vitt asked that instruments not be put away directly after the end of the Workshop, to enable their being photographed. With the able assistance of Jim Solliday (who set up each mic. and held the background) and Ken Gregory (who wrote the ID of each piece being photographed) a number of photos were taken and are shown in this issue. We solicit your suggestions.

1. Dave Hirsch gave a report on the membership status of MSSC.

2. There were several announcements:

a) Jim Solliday announced that the subject of the next meeting will be "The Microscope and the Computer";

b) There will be a special meeting on 28 October on the occasion of Mike Dingley's visit. Mike will video tape the meeting and will present a slide show of portable and pocket microscopes. Members are urged to bring examples of such microscopes which will be photographed by Dingley and Vitt;

c) Jim again asked us to look for the missing microslides that had been prepared by John Welles;

d) Alan de Haas announced that Chris Brunt will give a lecture on 25/26 October on how to place items on the ebay auction. This lecture will take place at the NT Audio, Inc. facility which is on the west side of Centinela Avenue, just north of Olympic Blvd.;

e) Jim Solliday reported on the improved condition of our Honorary Life Member, Norm Blitch, who will be moving to Portland OR at the end of November. Jim urged that we give Norm a call.

3. Barry Sobel showed a small, plastic pocket mic. made in China (See Photo). It is distributed by DaMert Co., Berkeley, CA. He also brought a number of mics. for sale which were presented by Jim Solliday.

4. Jim Solliday showed a D-Handle Continental Microscope, s/n 31208, by C. Reichert, Vienna, c.1905. (See photo). It features a bright lacquered brass finish, and a black enameled foot. The serial number seen on the microscope is also stamped on the door of the case. A patent number of D.R.G.M, No. 246019 is also engraved on the foot. The primary signature is in capital letters and found on the body-tube. This microscope is supported by the usual horseshoe foot and has a pillar of rectangular cross section which supports a cradle joint that is locked by a levered clutch. The two-sided mirror is mounted to a pivoting stem located under the stage. The, substage sleeve is controlled by a helical screw that can lower or raise the Abbe condenser equipped with iris and filter holder. The substage also accepts a plain cylindrical condenser with three caps or aperture stops. The stage is covered with a vulcanite type surface and has two clips. The fine focus adjustment is by micrometer screw located at the top of the limb and the coarse movement is by rack/pinion. The body-tube has a graduated drawtube and holds a three-place nosepiece. The microscope comes with five Reichert objectives, all in their storage cans, and three eyepieces, one being signed by Leitz. The microscope stands 12 5/8" high. The drawtube, along with the mirror, stem, nosepiece, clutch and iris are all nickel plated. The mahogany case retains its original lock and key and has a sliding shelf which holds the accessories. This mic. is very close to equivalent models of Leitz of the times.

5. Jim then showed Barry Sobel's c.1870-80 Watson double pillar mic. which is probably one of a kind, made to order. Its sector limb allows it to be tilted while maintaining stability by keeping the center of gravity in the proper location (See Photo). It has in-line lever fine focus, a spring-held glass 'floating stage', and a glass surfaced stage. The Watson model "H" stand was also shown (See Photo). Its new owner is Larry Albright.

6. Jim then discussed the various means that have been used for cleaning optical glass surfaces, and there was a general discussion. Methods recommended by various members were: a) 1 pt. ether, 7 pts alcohol, the ratio being somewhat critical; b) A water-based detergent, such as yellow Ajax, diluted in water for cleaning O.I. objectives; c) For wiping, use a clean (often laundered) linen or cotton handkerchief or unscented toilet paper, but do not use Q-Tips or the tissue supplied with lens cleaning kits; d) Kodak lens cleaning solution is OK; e) An air syringe and brush, or feather, should first be used to remove surface particulate matter. Jim recommended most highly the 'Rexton Optyl #7' cleaning solution, obtainable from Rexton Photographic, Box 412, Collingswood, NJ 08108; (609) 663-4040.

7. Ken Gregory brought an interesting B&L Stereo tester, with several stereo test photos, used by ophthalmologists (See Photo).

8. Jack Levy announced that he is moving to Pasadena and is looking for a heavy table or a good lab bench.

9. Larry Albright said that he will pick up Mike Dingley at the airport. There was a discussion as to the logistics of Mike's visit.

10. Gaylord Moss said that he needs material for the Journal. There was a long discussion on this subject with George Vitt stressing that the members become more active in their submission of articles and other material. John de Haas suggested that we have a slide making demonstration which could then be written up, or tape recordings could be made and then transcribed. The question was: who would do the recording and transcription?

11. Gary Legel had for sale a Japanese made extension eyepiece for use by two observers; a c.1900 French style school mic. with bullseye on adjustable arm (See Photo); two Spencer mics. c.1905, one with 'D' handle and one without (See Photo).

12. Dave Hirsch described a special type of binoculars he had which were made of two telescopes, appropriately connected and made in Australia. He had put the piece on ebay, and it now resides in a prominent Australian museum!

13. Izzy Lieberman, our workshop host, showed a c.1935 Dietzgen tripod mounted surveyor's level obtained on ebay. The unit is on a 4-screw tribrach and the scope provides an erect image.

14. Herb Gold read to us the prices being charged for 'used equipment' microscopes in England during the depression (c.1929). For instance: an extralarge metallurgical Van Heurck with 2 bodies went for £152 (about $5 per £ at the time); A #1 Powell & Leland with all the best accessories, c.1870, went for £50 in 1930!!

15. Alan de Haas showed a small, cased students' mic. by Emile Busch, unsigned, not tiltable, with its foot and other features being 'almost Leitz" (See Photo). Alan then recalled what he had read in an edition of Brewster Fegruson's lectures: that, in Victorian England, the normal reading distance was considered to be 6-7" - which means that, at that time, the average English person was quite nearsighted by today's standards. Alan also brought a highly specialized Nikon objective (See Photo) used mostly in the industry for inspecting silicon wafers and CDs. Its specifications are: 40X, NA= 0.5, working distance= 1 cm. Quite a remarkable lens!

16. Larry McDavid described his attendance in San Francisco of the national meeting of the American Sundial Society, noting that every issue of their Journal is now available on CD-ROM. There was a bus tour to many major sundial sites in the SF area including a solar simulator facility where the shadowing effects on modeled architectural structures could be simulated for any time of day and recorded on video tape for later analysis and used as an aid to architects and for city planning.

17. Allen Bishop described the book, "Light & Electron Microscopy" by Slater, Cambridge Univ.Press., as being very readable and interesting.

18. Barry Sobel showed the following mics., which were for sale (See Photos).

a) Benjamin Martin "Universal Mic." on tripod foot, c.1780, which incorporates a 'between lens', positioned between the objective and eyepiece, to increase the field of view. The unit comes with bone sliders, fish plate, plano-convex mirror, 3 original objectives.

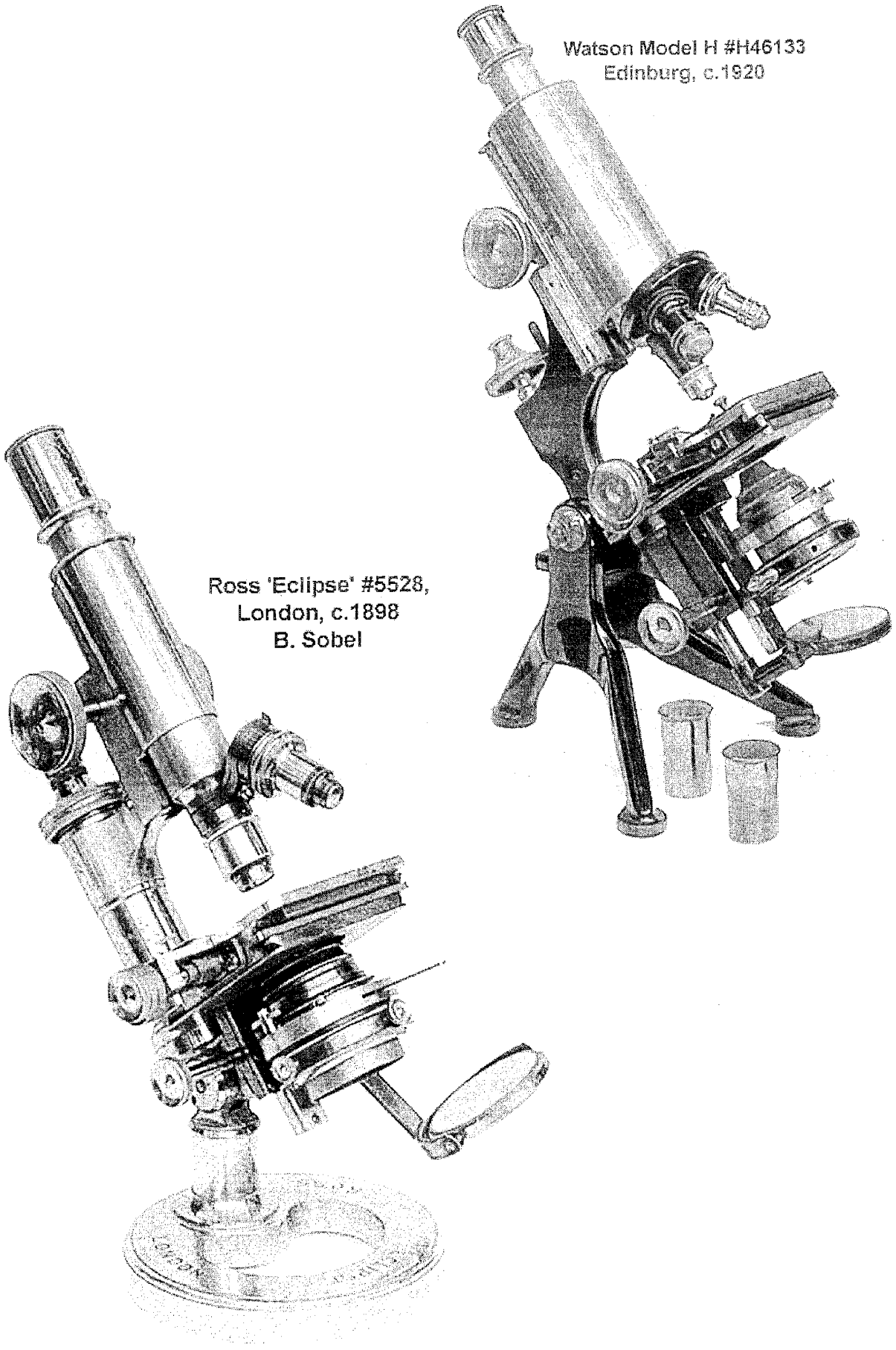
b) Society of Arts prize microscope (See Photo). This was the actual piece that won the prize c.1860.

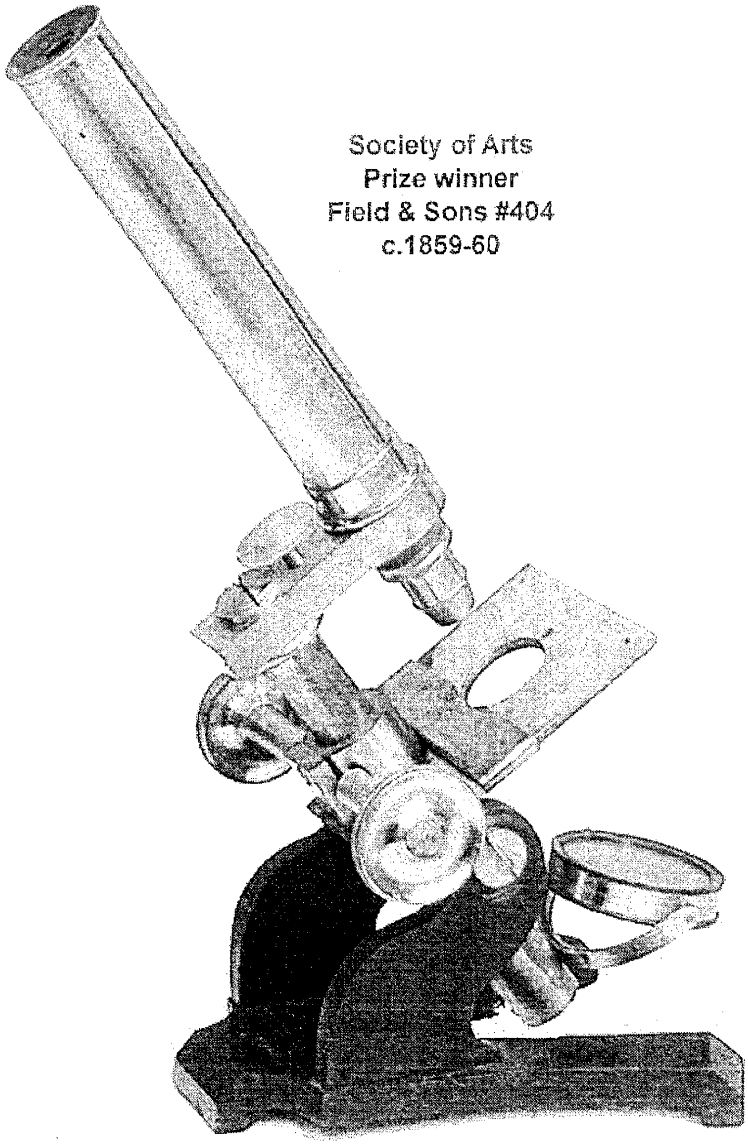
c) A Ross "Standard", early 20th century. This was the last model that Ross made because European microscope competition was intense and Ross decided to concentrate on making camera objectives. Unfortunately, this mic. was put away before a photo could be taken.

d) A Ross "Eclipse" mic. with round foot, c.1900. (See Photo). Now the property of Larry Albright!

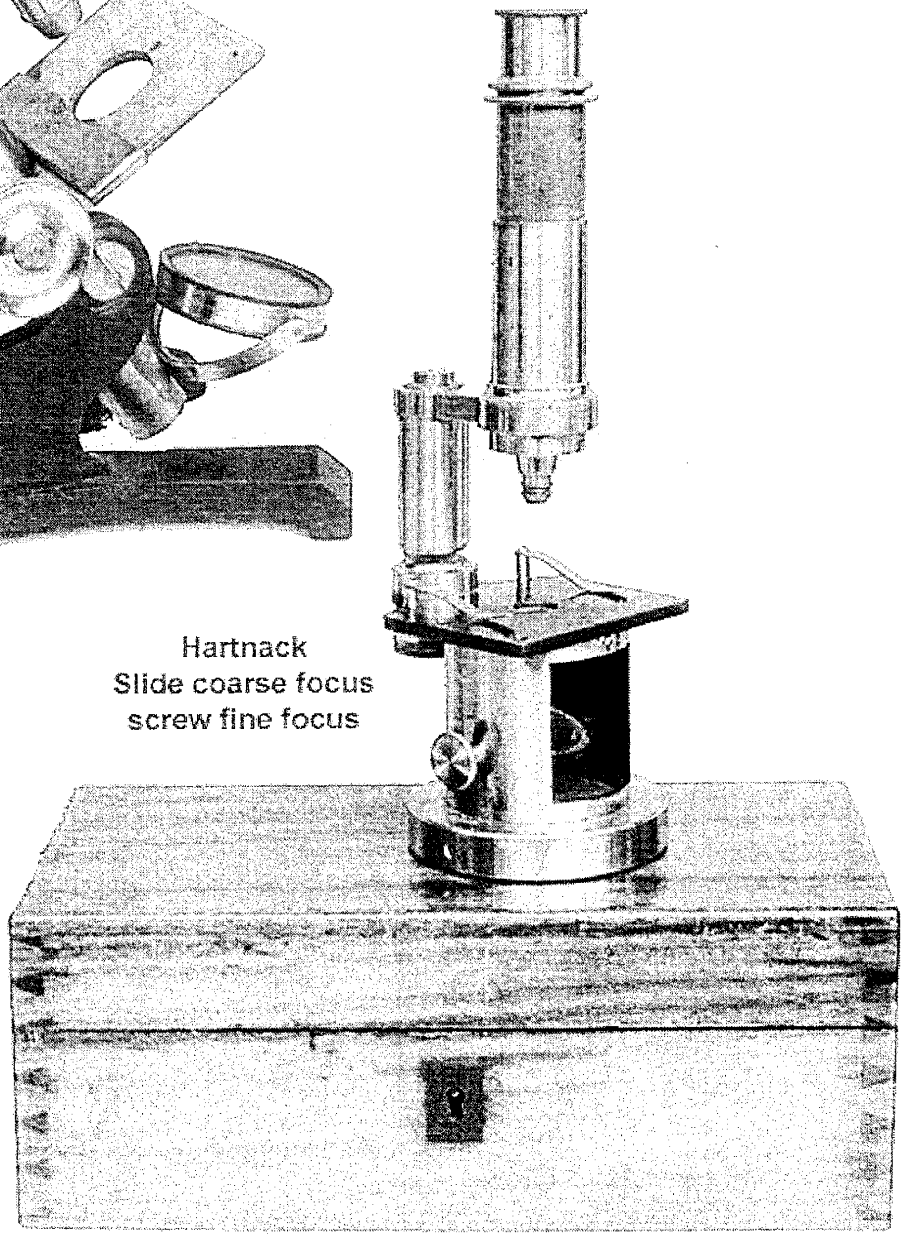
e) A drum type mic. by Hartnack, Paris, signed, cased c.1860-70. (See Photo).

f) Dissecting microscope by Zentmayer (See Photo).

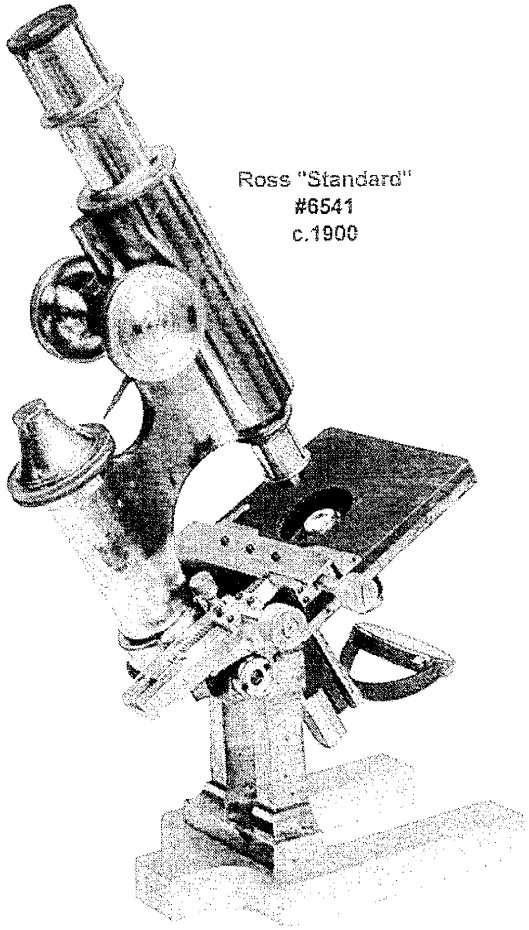

Watson Model H #H46133
Edinburg, c.1920
Ross 'Eclipse' #5528,
London, c.1898
B. Sobel



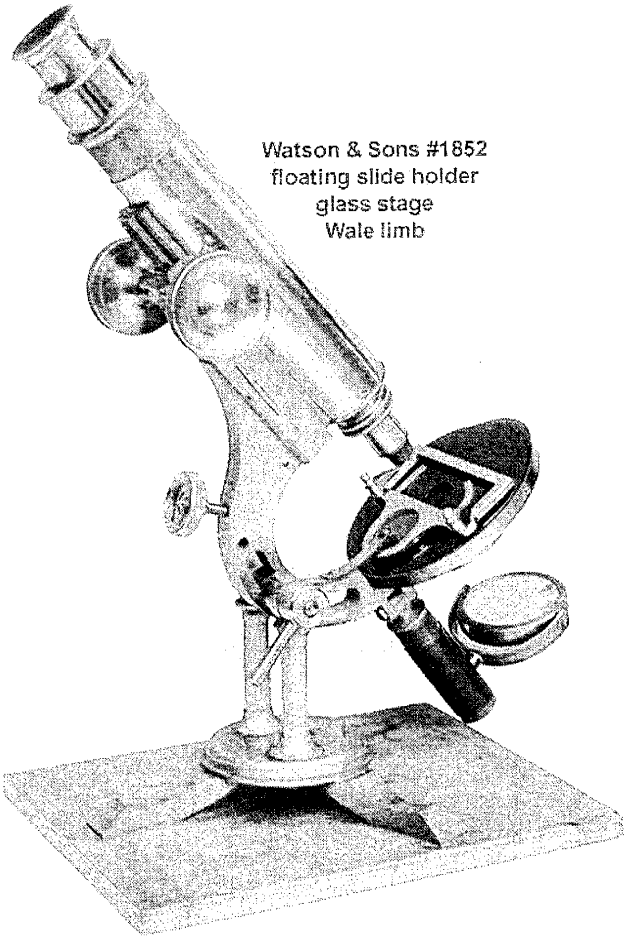
Society of Arts
Prize winner
Field & Sons #404
c.1859-60



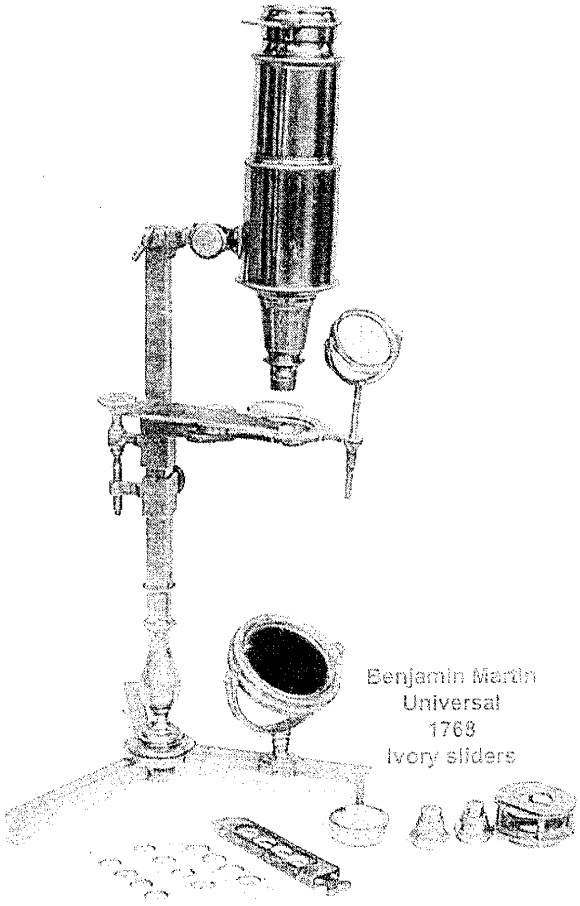
Hartnack
Slide coarse focus
screw fine focus



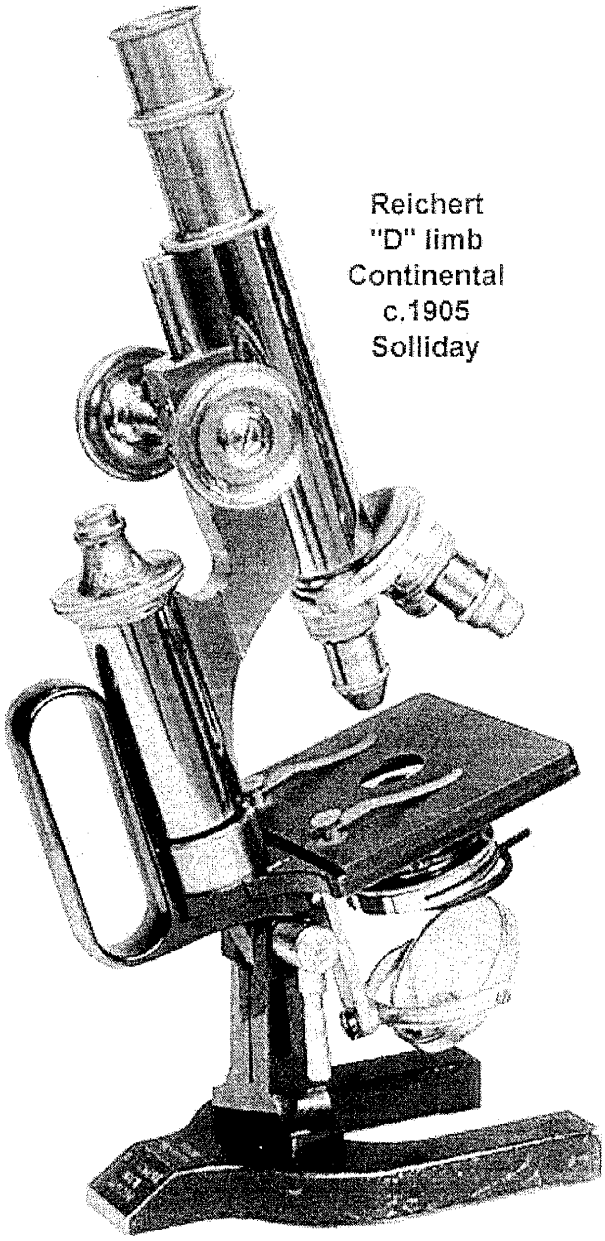
Ross "Standard"
#6541
c.1900



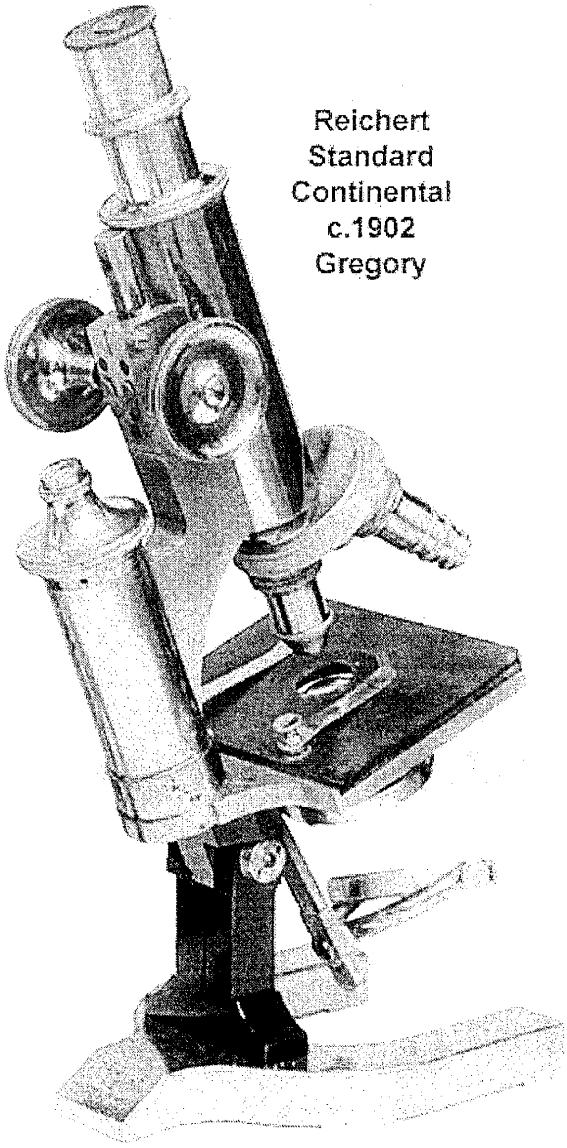
Watson & Sons #1852
floating slide holder
glass stage
Wale limb



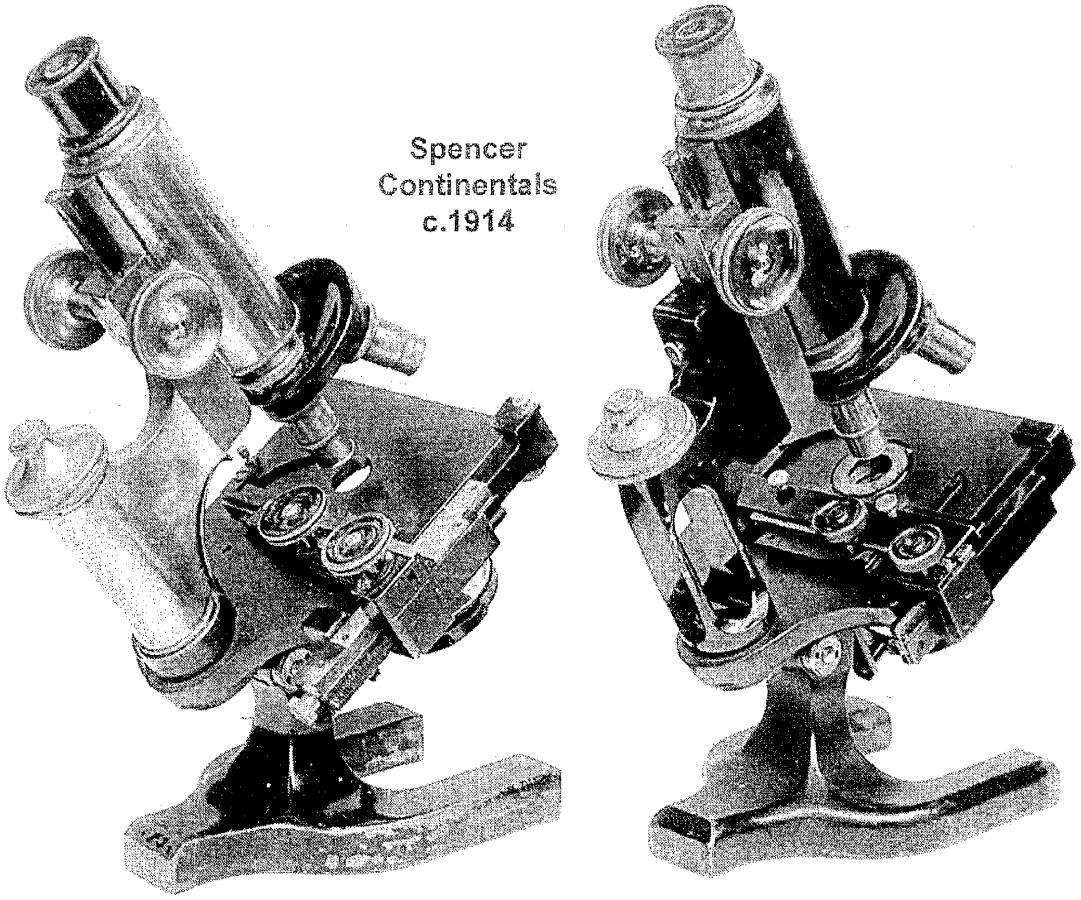
Benjamin Martin
Universal
1768
Ivory sliders



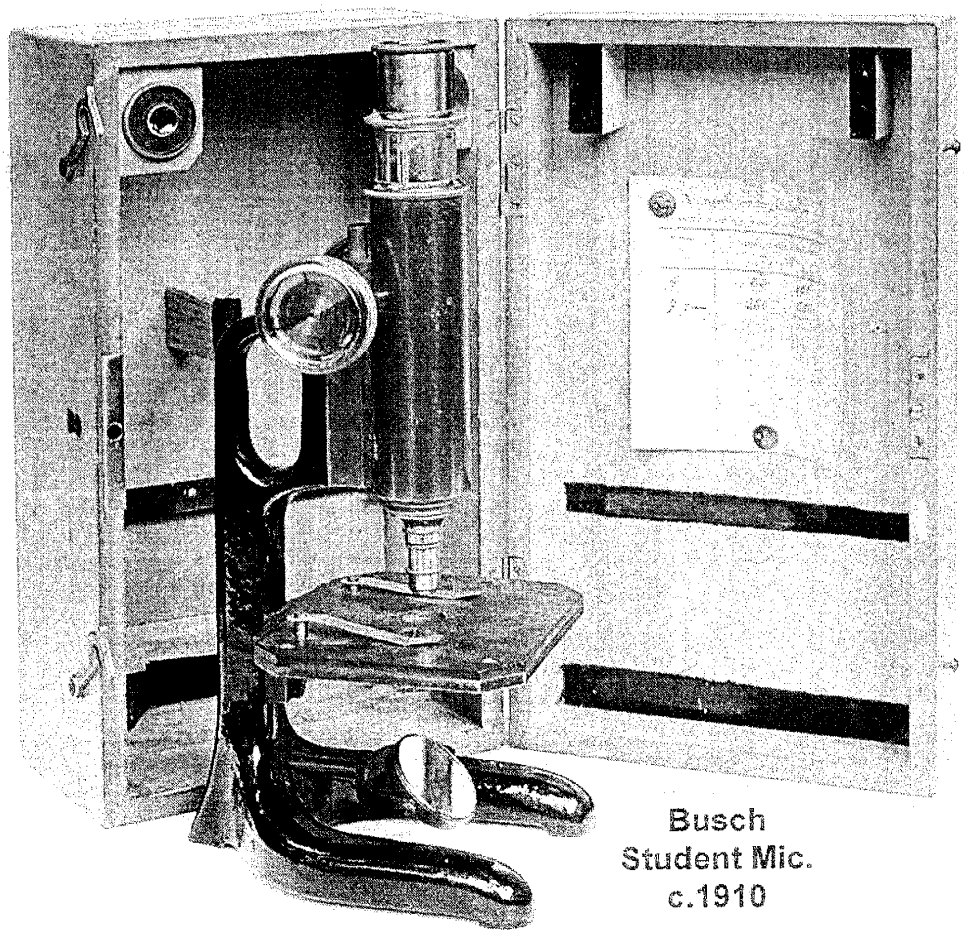
Reichert
"D" limb
Continental
c.1905
Solliday



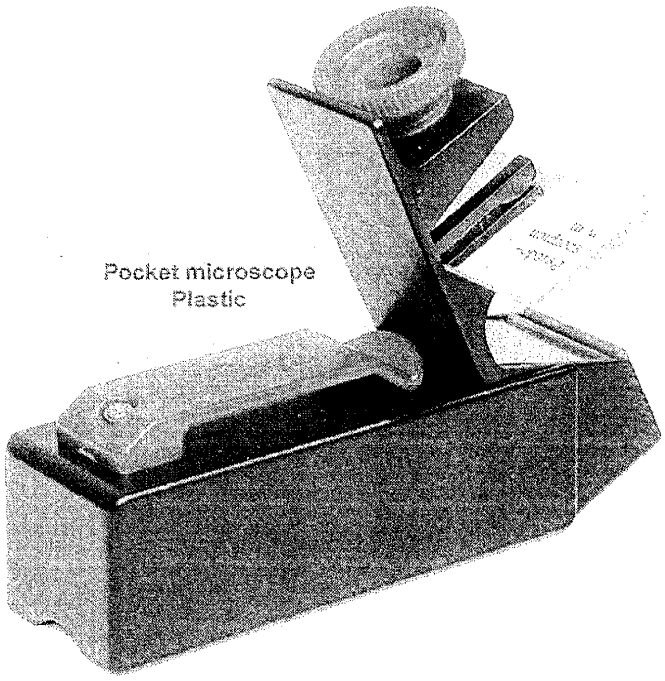
Reichert
Standard
Continental
c.1902
Gregory



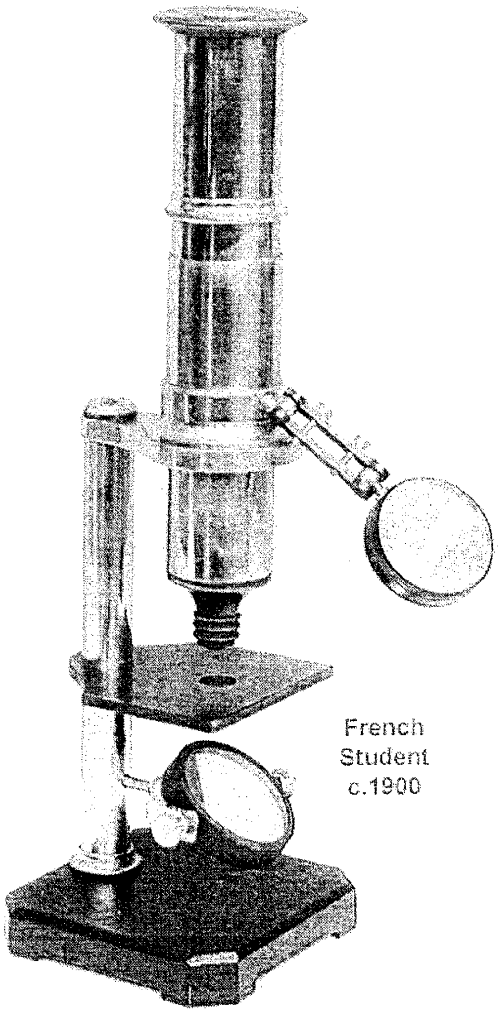
Spencer
Continentals
c.1914



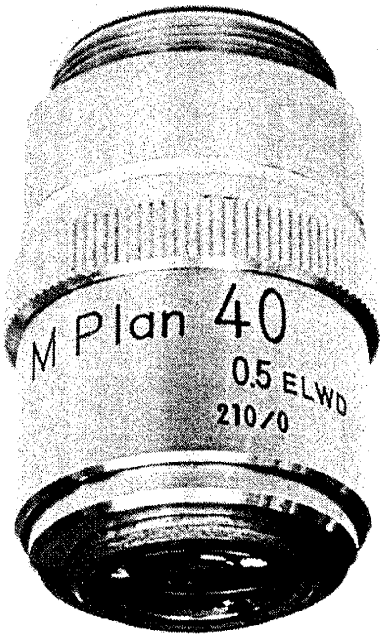
Busch
Student Mic.
c.1910



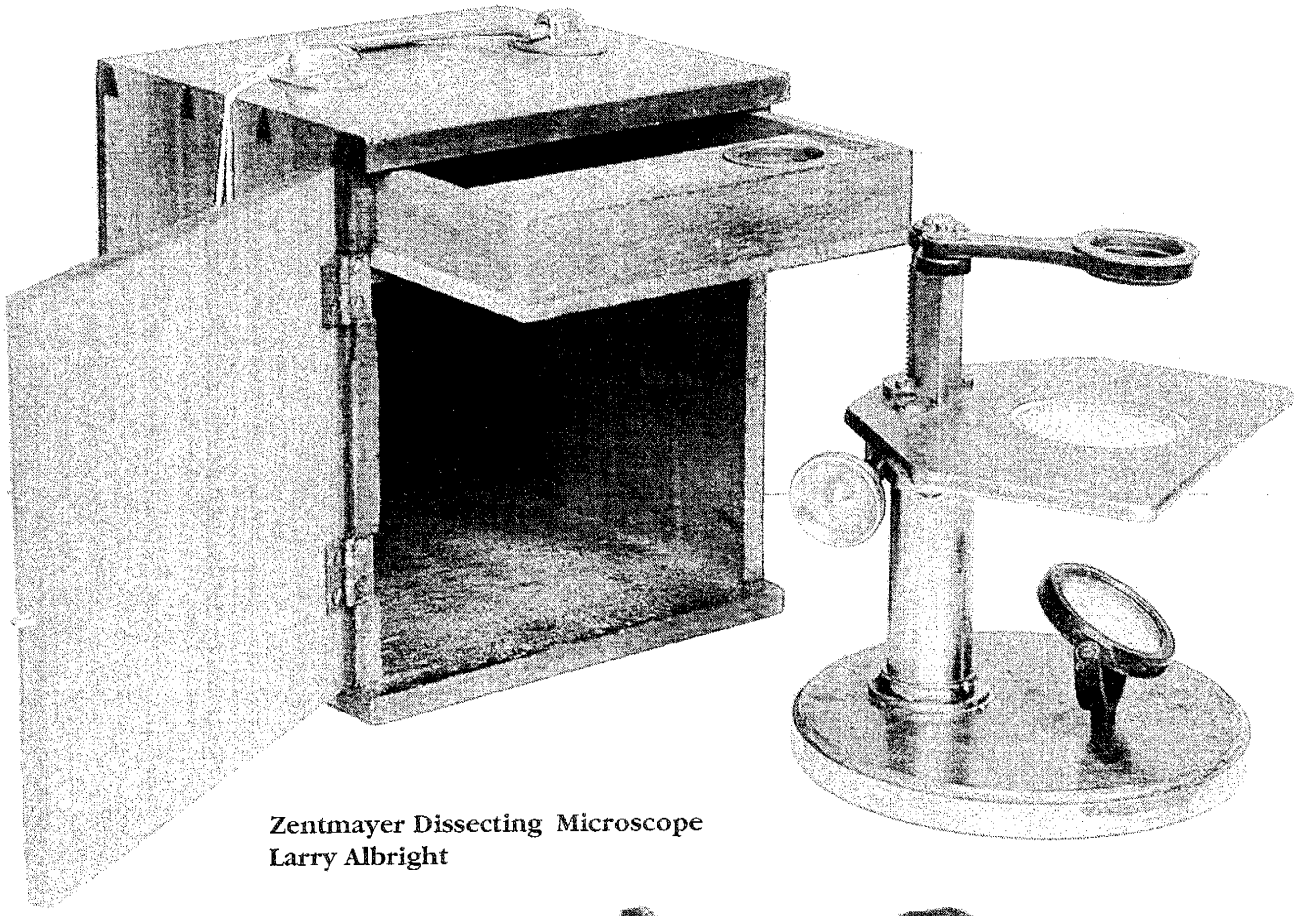
Pocket microscope
Plastic



French
Student
c.1900



Nikon M, 40x
NA = 0.5
WD = 1 cm
A.de Haas



Zentmayer Dissecting Microscope
Larry Albright

B&L
Stereo tester
c.1930
K. Gregory

MSSC October Meeting Notes
Wednesday , October 18
The Microscope and the Computer
James D. Solliday

Jim Solliday showed his usual superb level of technical excellence, preperation and presentation skills in an entirely new area enthralling and instructing the group in the use of the computer with the microscope.

Jim began with a detailed overview of the equipment needed and selection criteria for taking photographs, scanning them into the computer and manipulating them afterward. He also discussed the changing presentation methods using Microsoft Power Point software and a digital projector to replace a slide projector for the actual show.

After the initial overview, Jim demonstrated the full procedure of setting up and giving a presentation with the computer.

Starting with slides of microorganisms scanned into his laptop computer, he showed how to use Photoshop to select various areas of the slide and to change them by dimming them or coloring them to accentuate given parts. It was like being able to stain slides with the software. Jim showed how one could put various parts of the slide on different transparent layers and change the contrast or color of each part individually.

He showed how to put notation or arrows on the slide that could be controlled in an explanation sequence.

After preparing the slides that would be shown, Jim proceeded to put them into a slide program to be projected. He showed how Power Point allows one to select a slide format, background color and added graphics. Jim then set up a sequence of slides in the order they would be presented.

He showed the way in which each slide could be cued manually or set to run with a preset interval between and even the times at which graphics such as arrows would appear on a slide.

With added niceties such as various fades or transitions that could also be programmed, the power of the whole process was astonishing.

By demonstrating the complete process from enhancing the basic slide to putting together the whole slide presentation, Jim demystified the process and proved that he could with the computer put together in a few minutes what would have taken many hours in the past.

It was a revelation. Perhaps we can publish some of his information, however, the impact was in seeing it happen.

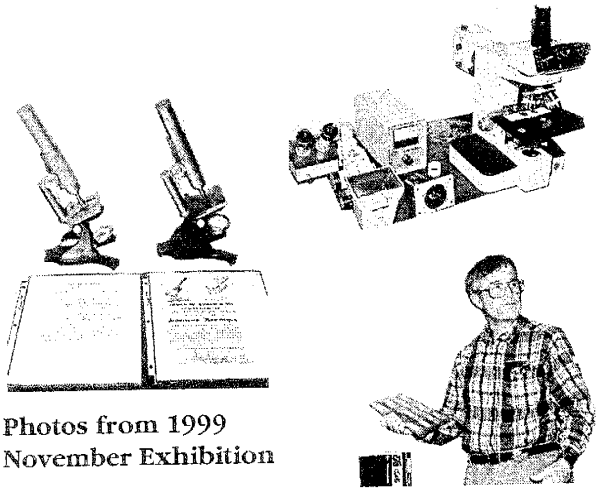
Jim also showed the working of the Intel/Mattel toy microscope which has a built-in video camera and which is available now on e-bay for around $50, or new for around $70.

e-bay Seminar
Chris Brunt

On October 26, 2000, we had a wonderful and most instructive seminar on the process of uploading an item for sale on ebay. Chris Brunt gave a very comprehensive step bystep session on the process. It was of great value and the attending members were quite satisfied. We did have a rather large group including John Field from up north. Seems there were at least 12 or13 of our members in attendance. Before the class we all met at the Cocos restaurant for the usual fellowship and meal. The dinner was a very happy event with the addition of Mr. Mike Dingley from Australia being introduced to the entire group. The event was held at Tom McCormick's movie sound recording facility in Santa Monica. This was very convenient giving us all the chance to take a wonderful tour of the various sound labs. We would all like to thank Tom and Chris for their kind hospitality and preparation for this event.

MSSC Meeting
Wednesday, November 15 at 7 PM.
Crossroads School, 1714 21st Street
Santa Monica, CA.

Annual Member Exhibition Meeting



Photos from 1999 November Exhibition

This is one of the most exciting and fun meetings of the year in which each member has a chance to show a project in which he is interested.

Past projects have included demonstrations of a favorite microscope or other piece of equipment, recreations of historical experiments such as looking at the circulation in a fish, photomicrographs, the equipment to take microphotographs, demonstrations of phase and other contrast systems, the use of the microtome, the observation of microbes in the gut of termites.

What has made these exhibition evenings so memorable in the past has been that so many members have brought exhibits making for a full evening just trying to see it all. There will be a prize for the most interesting exhibit by popular vote.

Let's all bring something to make this another great evening.

If you do not have time to do anything else, just bring a favorite microscope or slide for the rest of us to see.

There will be plenty of table space, however, it might be well to bring a spare extension cord and multiple plug block to tap into the wall circuits around the room.