Journal of
THE MICROSCOPICAL SOCIETY OF SOUTHERN CALIFORNIA
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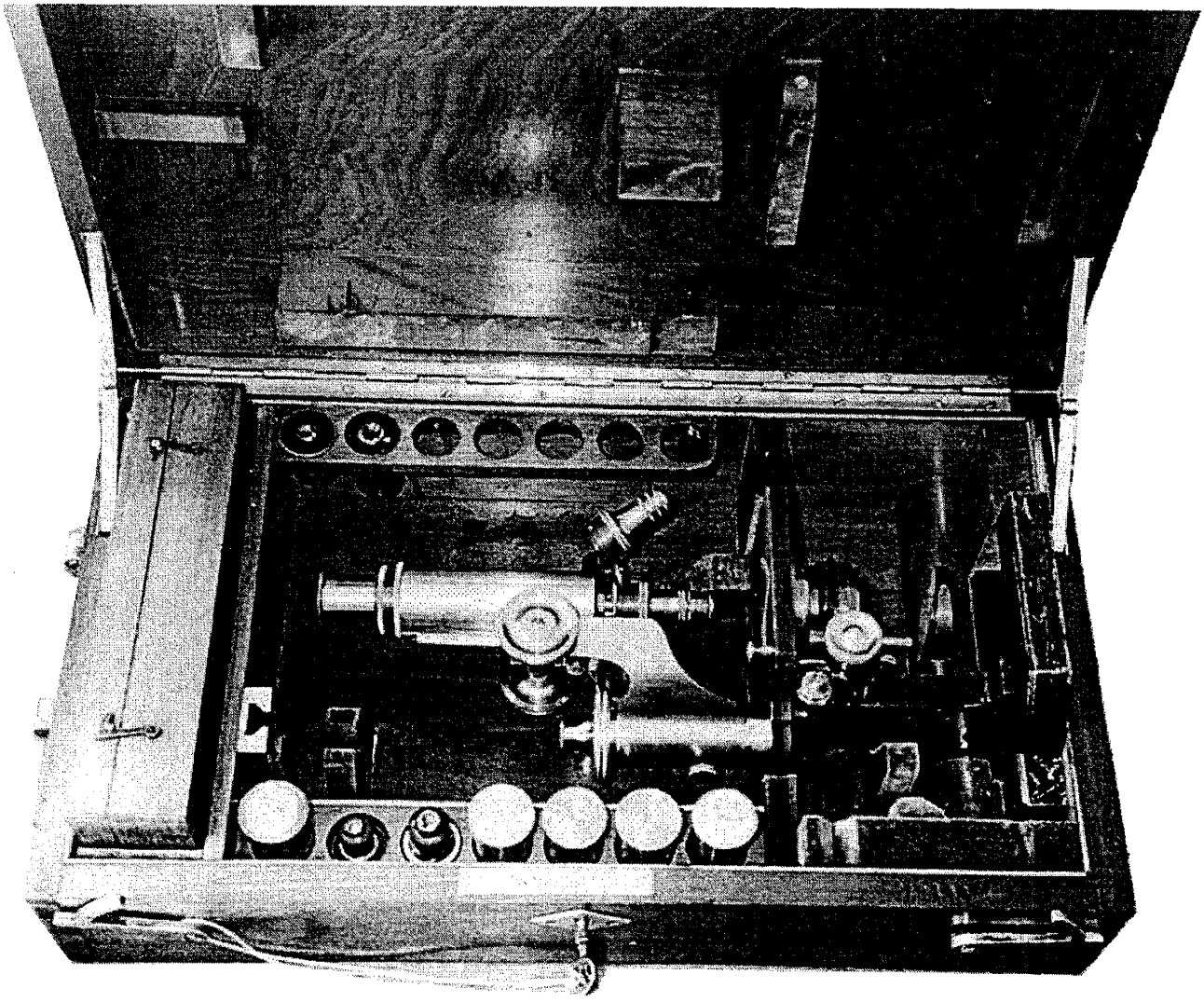
Examples of Early Zeiss Manufacture: Stands I & IV

Allen Bishop



1. "Stativ I".Nr. 10138, circa 1887. Its fitted chest is constructed of a finely figured walnut with nickel-plated brass hardware. Alone,the chest is a superb piece of antique furniture. Missing is the auxiliary mirror -used in conjunction with the pinhole substage condensor.

Illustrated are three pre-1900 Zeiss microscopes, all from private collections in Southern California. Several very obvious features differentiate these stands from later examples. Most obvious are the superb walnut cases in which the stand lies prone (this feature was not unique to Zeiss). Less obvious is the generous use of bronze in the construction of the main stand and ancillary components. These instruments were

built to last and have done so long after every element in them has been relegated to the status of museum pieces. Visually, there is nothing exciting about almost any Zeiss stand; in fact their design is purely in line with their peer group - the classic "Continental" stand as it evolved from the origins attributed to Oberhauser. All but the earliest Zeiss optical instruments are known today for their optics. They were - and are - simply the pinnacle of optical design. This excellence has in the past cost Zeiss heavily on occasion. In the 1960's Zeiss-Ikon (cameras) marketed a pair of early "zoom" lenses for their Contarex 35 mm system. At any focal length setting, these lenses were at least equal to the best equivalent fixed-focal length lenses of the era. These lenses were, however. massive in size, weight and cost. Zeiss stated that they built products to a specification, not a price, and furthermore, if these lenses were heavier than their more mediocre competition, too bad. It is not surprising that Carl Zeiss no longer makes cameras; Zeiss-Ikon is no more. Lenses, yes, but for other camera manufacturers and to those makers real-world demands. Nostalgically, tests have proven that Zeiss' Contarex lenses have indeed been equalled. They have yet to be surpassed.

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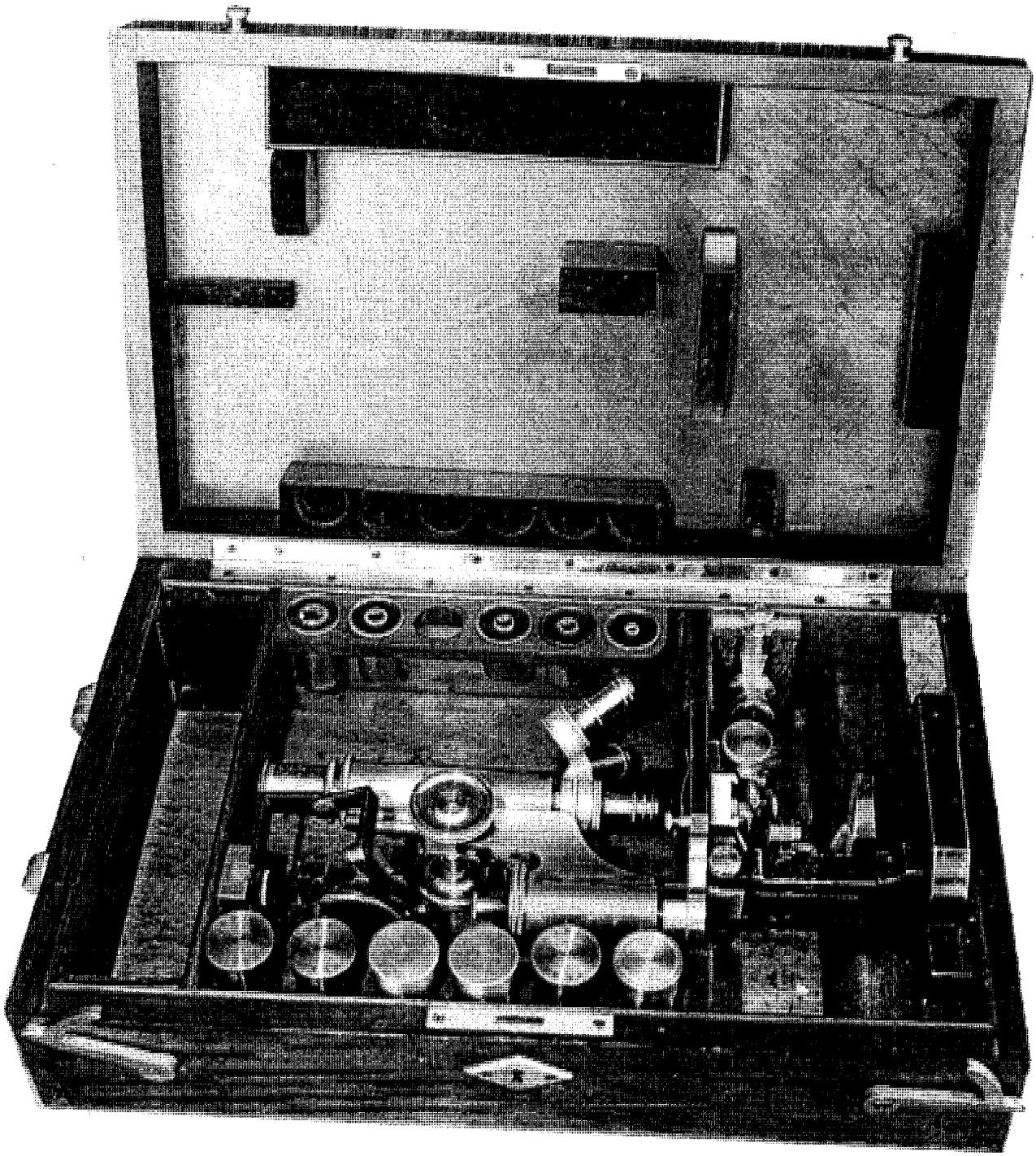
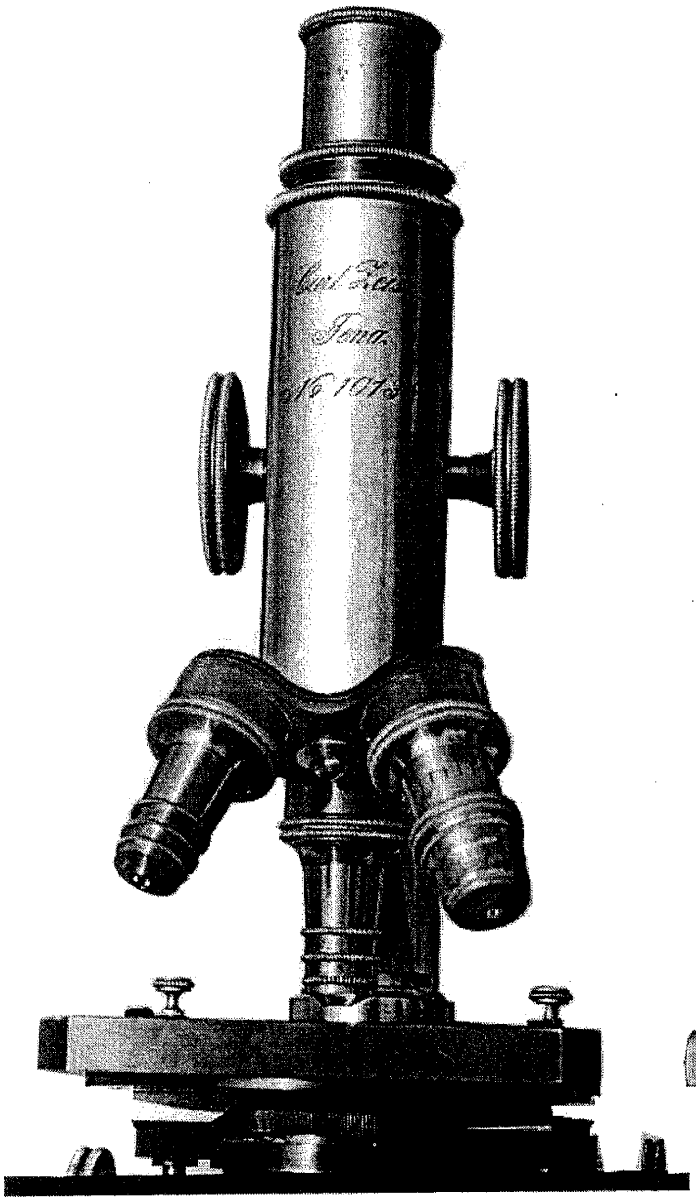
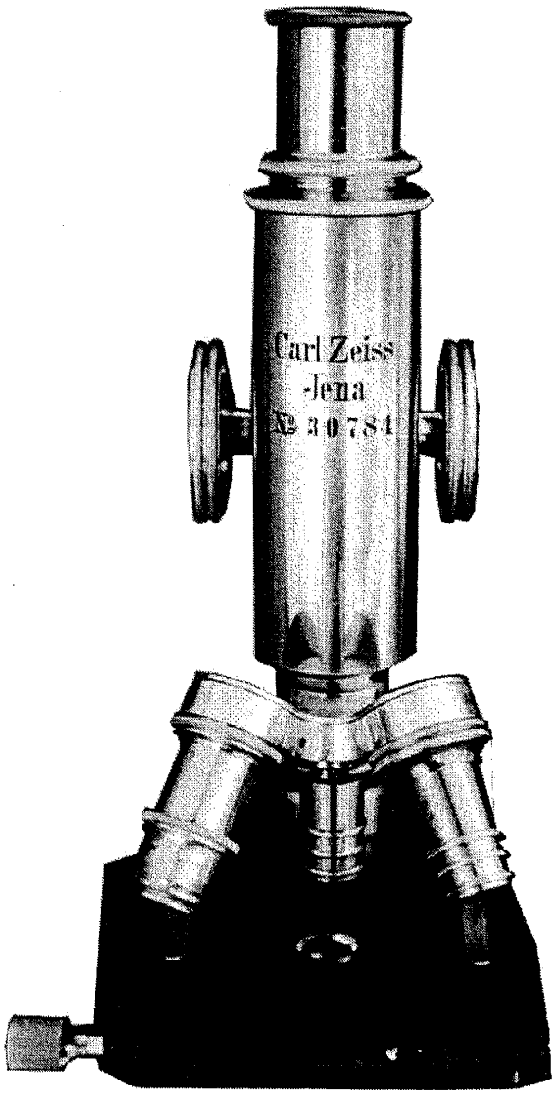


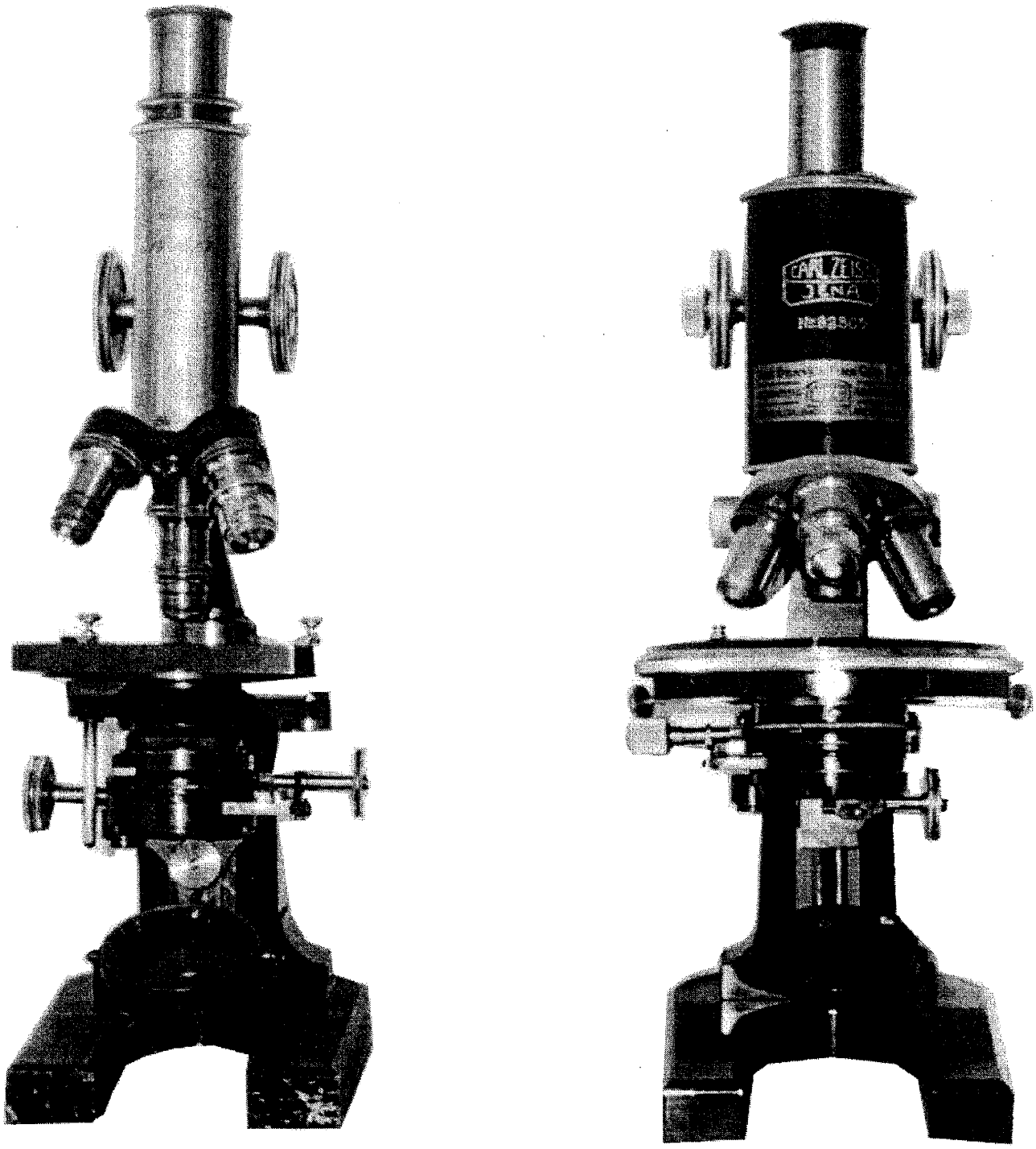
2. "Stativ IV in its chest, Nr. 9060, circa 1886. The accessory box is missing, but the articulated mirror is present. The stand's serial number is stamped on the flange of the chest, just above the right-hand hook latch; see also the Stand I. The Stand IV is smaller than the I, and its chest is proportionally reduced.



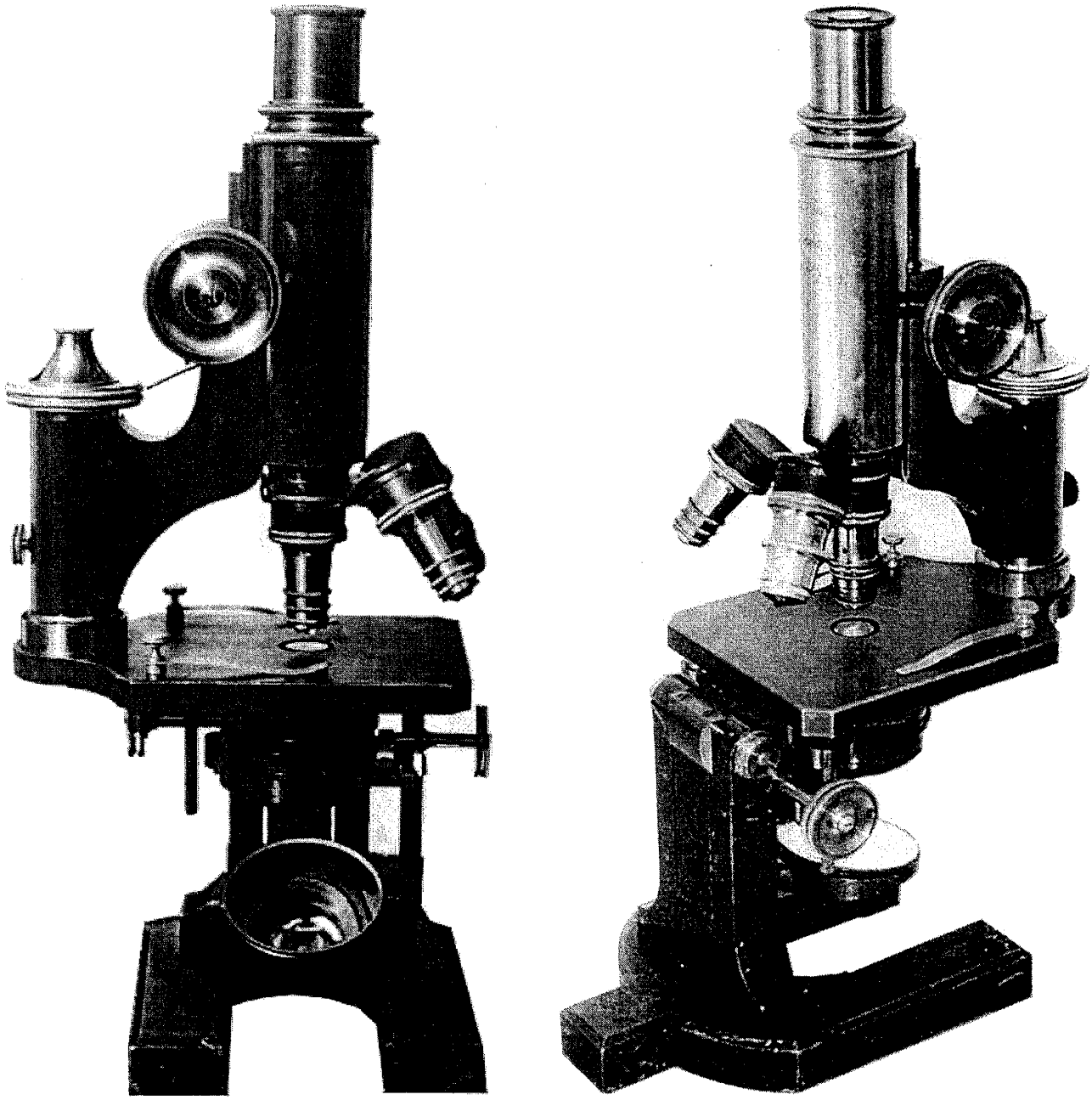


3. The script logo is superb in proportion and execution. This is the Stand I. The triple nosepiece turret is bronze - can you imagine any maker using bronze extensively today? Zeiss would if they thought they could somehow get away with it. Imagine a modern "Axiophot" with the script logo of another age - and lots of bronze. It would be delivered in a Circassian Walnut cabinet. Ten years later we hear Carl Zeiss no longer makes microscopes; Carl Zeiss is no more - but their stands and optics were unmatched.

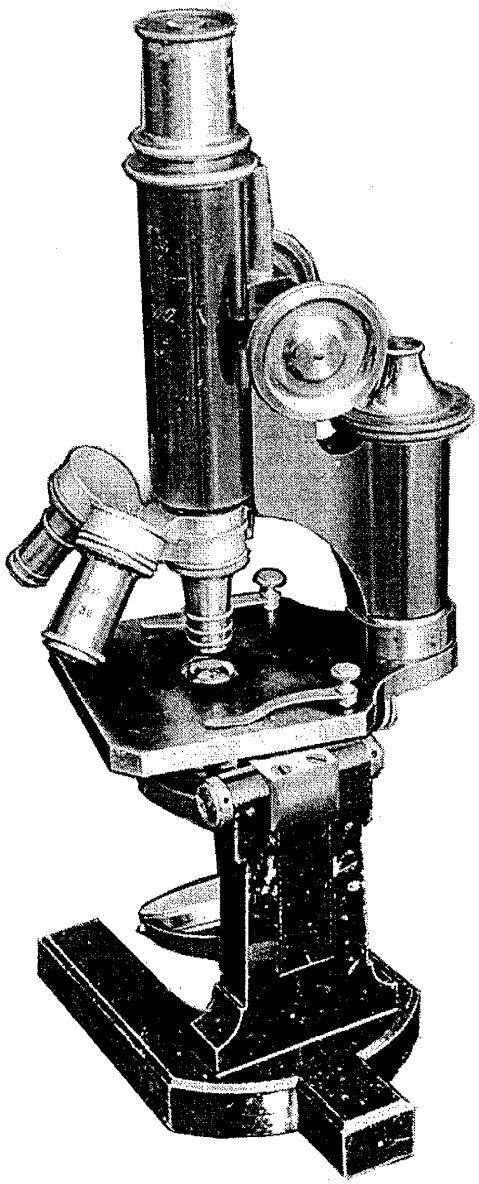
Nr. 30784's tube is stamped with much more businesslike block lettering than the earlier stands. The familiar Zeiss logo appeared in about 1904, and became one of the most famous in the world.



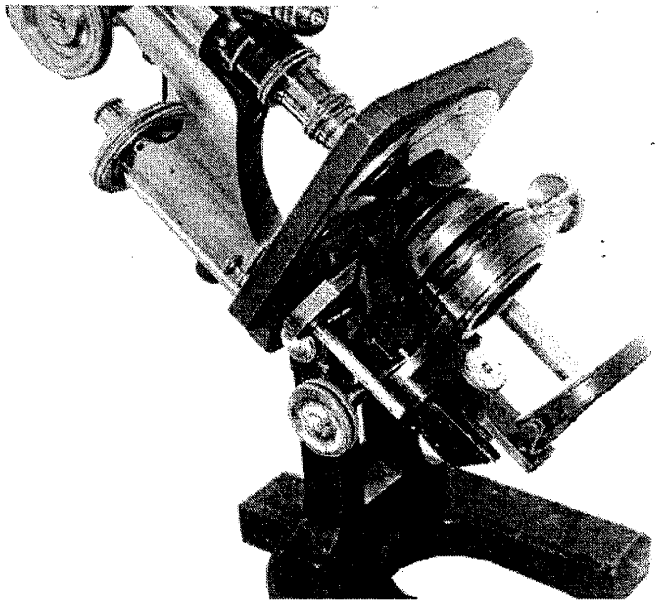
4. Two Stand I's. On the right is the often seen "jug handle" design which originated in 1898. This example, Nr. 82305 dates from 1921-22 and is one of the last built. It shows obvious lineage, even after 36 years of evolution from its forbear on the left. The later Stand I's went from a brass to an iron foot, yet both stands are almost alike in weight at about 11 1/2 pounds. The familiar Zeiss logo, "Carl Zeiss Jena" in a doublet lens outline dates from ca. 1904.



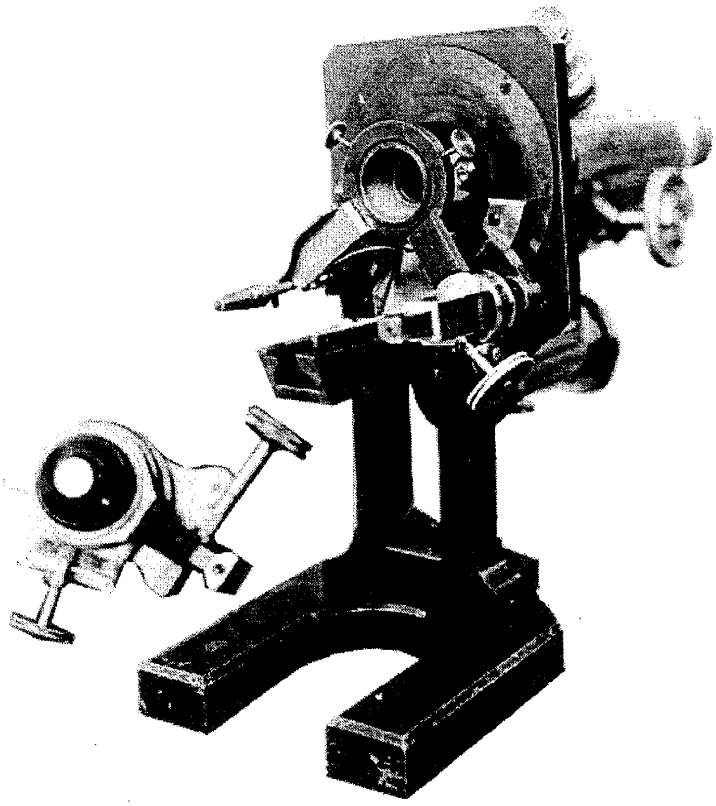
5. Nr. 10138 has a very interesting feature shown here. Stage, arm,tube and optics rotate 360 degrees about the optical axis of the stand. At the time of writing, no member of the MSSC consulted can define the real purpose of this - evidently certain French microscopes shared this feature with Zeiss, but to what purpose? One member postulated that it would have assisted when the stand was tilted horizontally and used for projection, but he later retracted this theory.



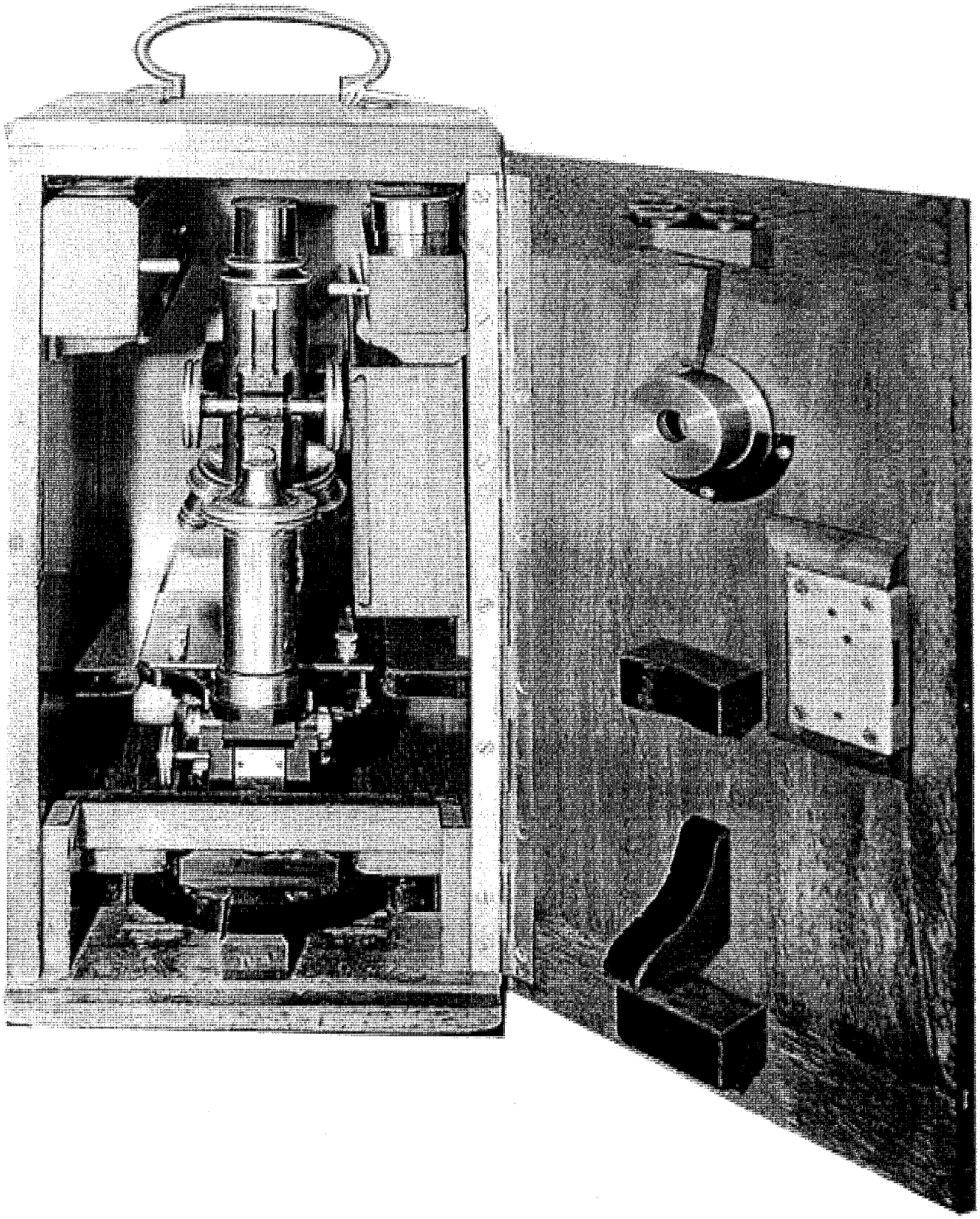
6. The early Stand IV is also a carrousel. Its pivoting hub is of a different design than the Stand I. Until the Stand I was demonstrated, the custodian of the Stand IV was unaware that his stand also had this capability; the grease in the hub was dried solid after about a century.



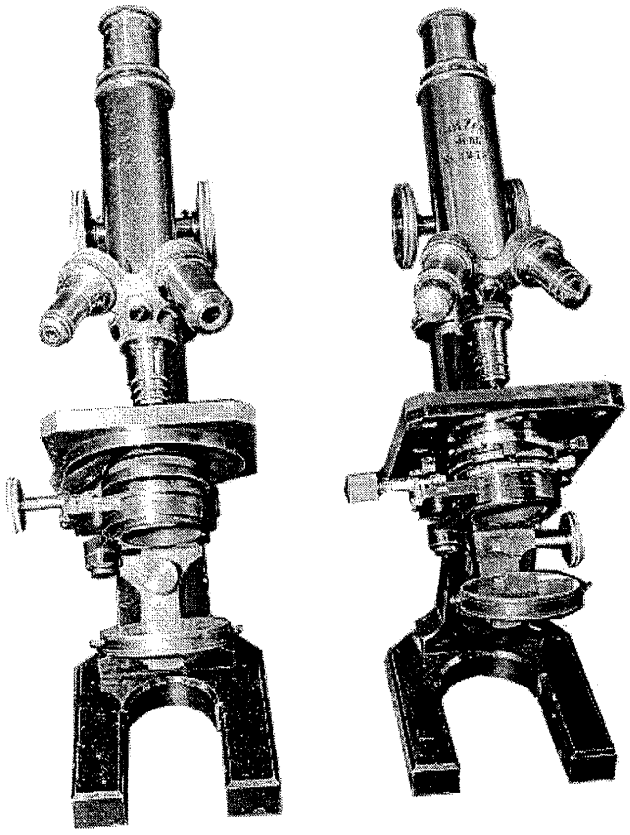
7. This is about the earliest version of Abbe substage. (Stand I shown). The Stand IV, Nr. 9060', Abbe simply slides in its dovetail. The Stand I has a narrow rack & pinion built in,to the right side of the carrier arm. The gearing was later centered and made much more Substantial. Wear was doubtless accelerated if the locking screw, seen above the mirror, was adjusted for drag. Note that the mirror moves with the condensor; later, the mirror was fixed. A Zeiss iris diaphragm has been retrofitted. The early Abbes were supplied with a set of disc stops and a darkfield stop.



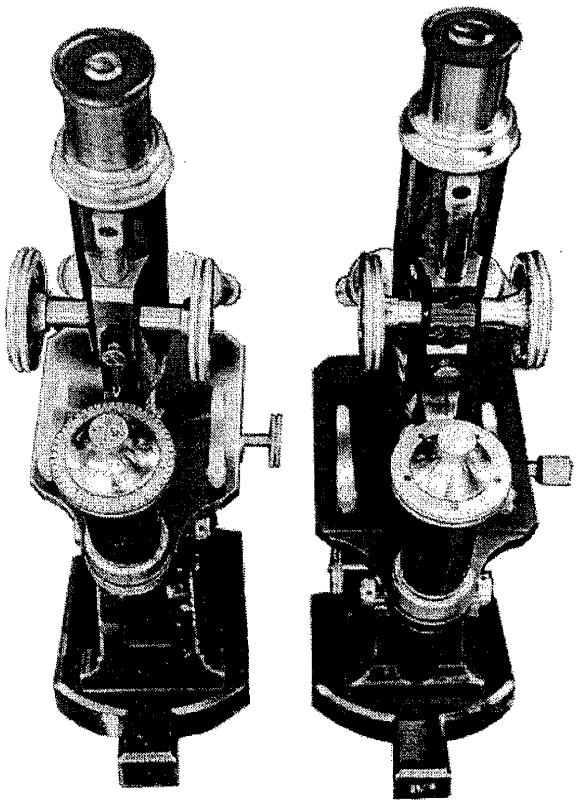
8. If the Abbe substage is removed, the pinhole substage carrier may be slid into place. It racks on one arm and is steadied on the long pin seen to the left. There are three pinhole or Waterhouse stops provided, and the carrier actually may be manually centered. The Abbe substage lacked a centering feature for many years, and the typically provided condensor is a simple two or three lens chromatic type.



9. Here is the third member of our Carl Zeiss trio. This is also a Stand IV. Nr. 30784, dating from around the turn of the century. Soon, this stand will celebrate its 100th birthday. The microscopes were now delivered in a 'vertical-position' mahogany cabinet. In the door, is the pinhole condensor with a set of three stops above it. The door lock seen originally came with a key whose handle was skeletonized with a sculpted "Z" Not a big deal really; Leitz did the same with their keys with an "L". It is very possible that cabinets and hardware were outsourced - place an early Zeiss and Leitz cabinet side by side and decide for yourself.

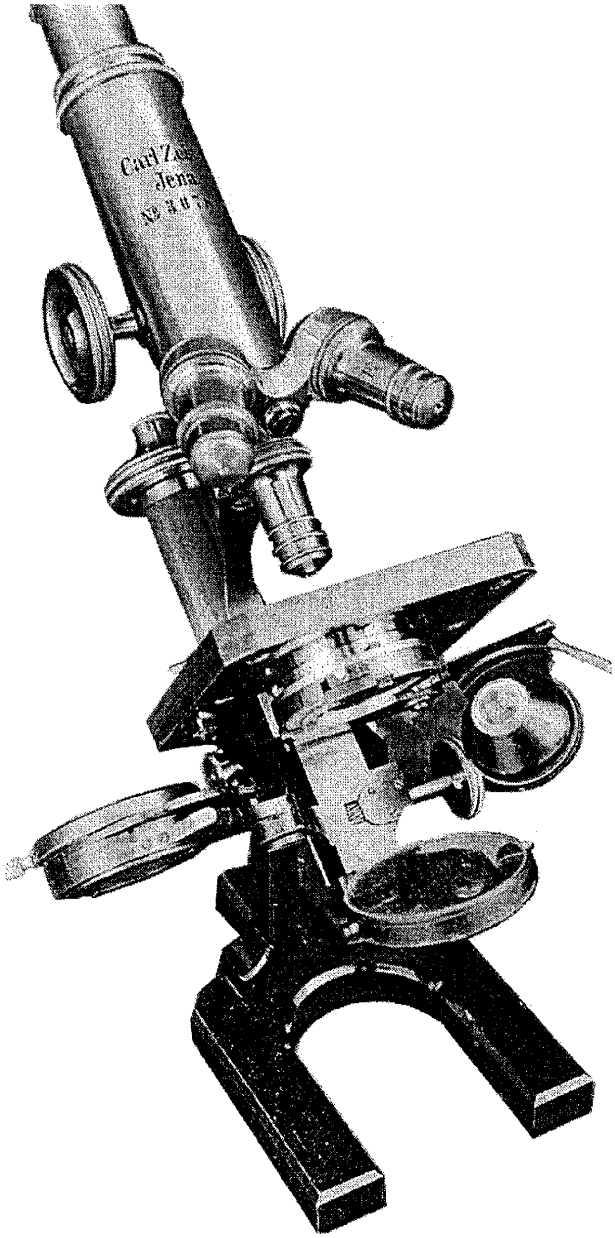


11. Nrs. 9060 & 30784 side by side. Fourteen years separate them - the design lingered on almost unchanged until 1918 or 1919. Nr.9060 has a later triple nosepiece with the familiar Zeiss logo stamped on it. Nr.30784's nosepiece is stamped with lettering identical to its tube. Note the immediate understages of both stands Nr. 30784 no longer has the carousel feature. Note also the evolution in the Abbe substage.

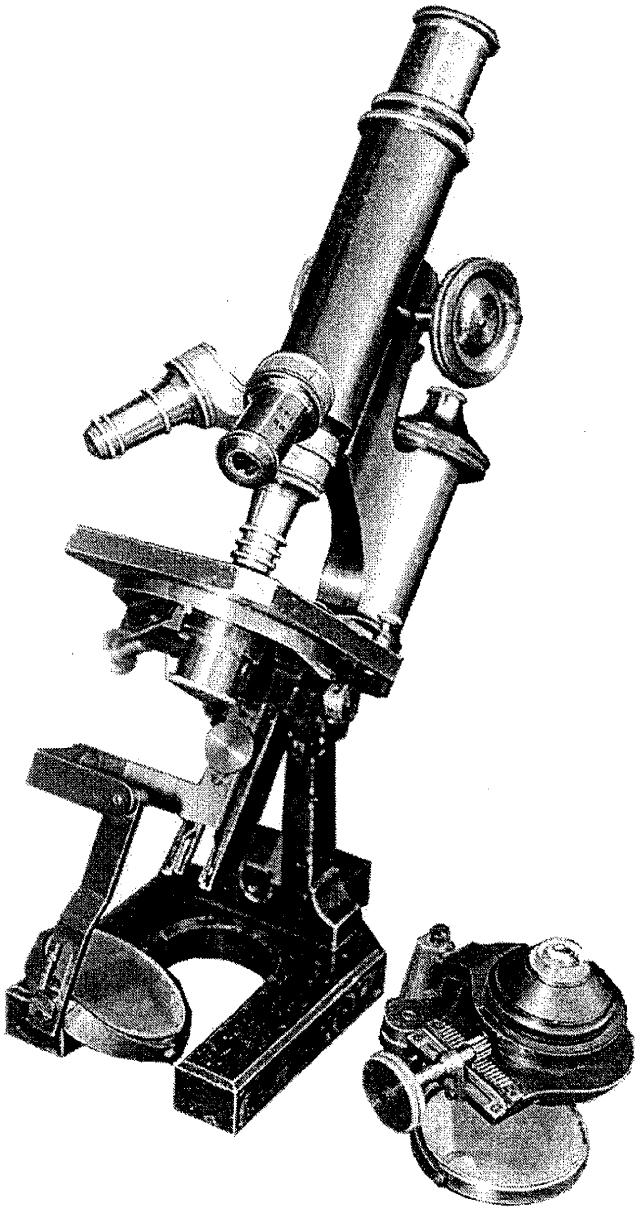


12. From the rear, note that the tail of Nr.30784's foot is engraved "IVa"; the "a" referred to the stage, in this instance, the basic design. Nr. 9060 has no provision for taking up slack in the coarse focus (left). Note minor changes in the fine-focusing wheels.

13. The substage on Nr. 9060 was built before Zeiss came up with the simple expedient of an iris diaphragm. Instead, individual stops of different hole diameters were dropped into the large hole seen here. A darkfield stop was part of the set of stops (none of the stops are pictured here). Bronze is extensively used in the construction of this early stand.



14. Nr.30784 is fitted with a later version of the Abbe substage. This shows the popular swing out condensor version. Unseen at the top of the condensor carrier is an iris. With the main iris swung out, as shown, and the optical condensor dropped out of the optical path, the upper iris controlled illumination for low-power objectives. The very conservative microscopist could resort to the pinhole condensor.Very little bronze is used in the construction of this stand.



15. With the Abbe assembly removed, Nr.9060 accepts a pinhole substage with exchangeable stops. From the right side, it slides into a dovetail milled into the underside of the stage.The auxiliary mirror on its "Rube Goldberg" articulation arms provides light. It would appear that the mirror could also be swung up and over the stage for epi illumination. All attempts to achieve this positioning of the mirror were unsuccessful. Also, note what appears to be a clamping screw on the auxiliary mirror's carrier dovetail. It serves no function whatever; it screws into a blind hole, the threaded extension of the small knob being too short to serve as a retainer for anything, let alone a clamp.

This concludes our brief excursion into the world of early Carl Zeiss design. In the future I hope to illustrate and describe other examples of Zeiss equipment. Any additions and corrections to my ramblings are welcomed. ■

Fossil Plant Slides

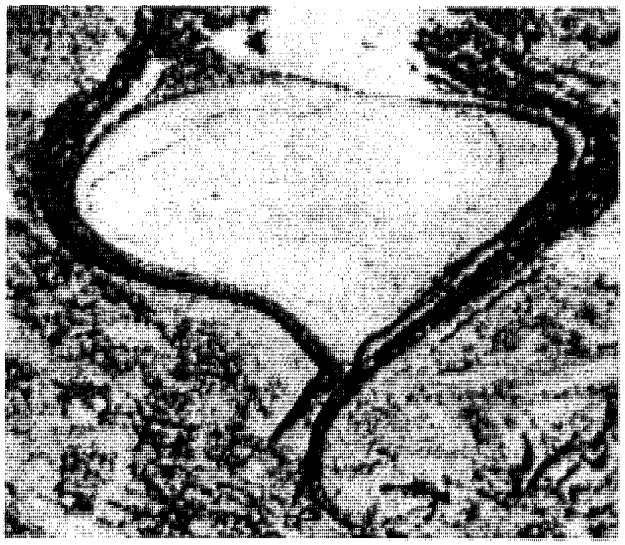
Leo J. Milan

We are indebted to member, Herbert Layfield for his donation of almost 100 fossil plant slides to the MSSC loan collection.These slides show the precursor to the modern ferns. I could not find any of the fossil genera in my botanic books.The closest relatives to the fossils are lycopodium, psilotum and equisetum.They are classified as fern allies. Lycopeodiujm has the common name of 'club moss'. These require damp and warm conditions. Psilotum is also known as 'whisk fern'.They propogate from spores.

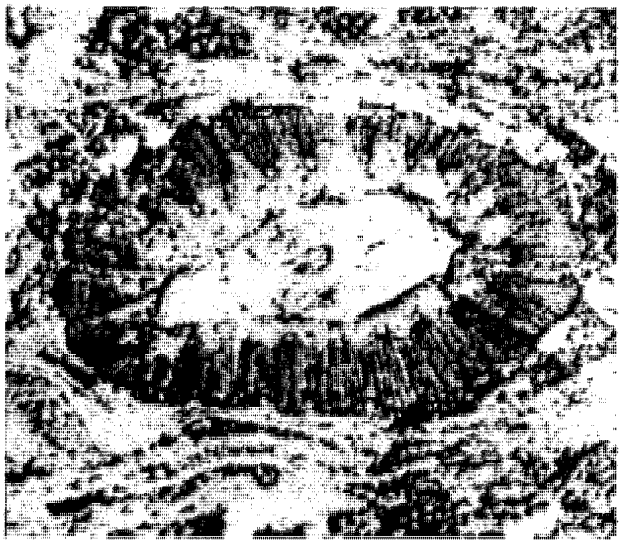
I have tried to transplant some of the offsprings that have appeared in our garden, planting them with as much stem as possible. They grew,and I have since learned that these ancient survivors have no roots, but obtain their food through their stems. Equisetums vary in size, the largest being known as horsetails. We have several sizes from the normal horsetail to smaller ones of 2" to 8". They also like moist and warm conditions.

These fossil slides may be checked out for study by MSSC members. We have a large collection of slides which are available by the box. To let members know what is available, I will provide subject information to the Journal for incremental publication.

The photographs below are illustrations of some of the fossil plant slides contributed by Herbert Layfield. They were made by Flatters & Garnet Ltd, 309 Oxford Rd., Manchester, 13 England.



Lepidocarpon lomaxi L.S.



Calamites communis T.S.

Ankyropteris corrugata T.S.

Member Profile

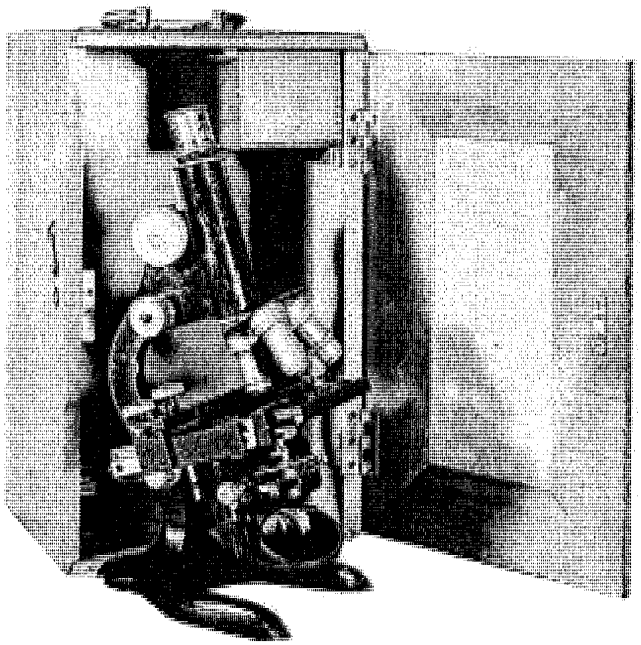
Richard M. Jefts

Title pages of six very early influential books

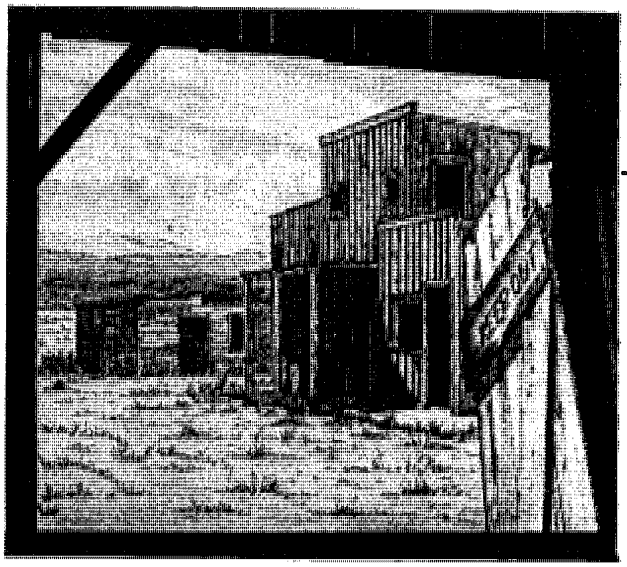
It was a dark and stormy night (actually an overcast early evening)when I first saw the light of day in the New England town of Providence, Rhode Island during the early depression years.

Those early years were both pleasant and uneventful. I did the usual things: played marbles, flattened pennies on street car tracks (much to my mother's horror), made solid balsa wood model airplanes, built an enviable collection of bubble gum baseball cards, comic books and radio program premiums (in most cases, for a cereal box top and a dime); none have survived and all would, today, be worth a small king's ransom as highly sought collectables. From an early age, I had a love for drawing. A poster I drew for the local Jr. High School Book Week Program took first place.The prize was a copy of any book in the school library. I chose *The Boy's Book of Chemistry*, by C. Ramsey Clark. Also, with a love for books and reading, this was one of six books in particular that influenced me strongly in those early days. I still have this old friend, signed by both the school Principal and Librarian. The former spoiled things slightly by signing it, in part - "Presented to Richard M. Jefts...as a reward for his prize poster for Book Book 1942." Not Book Week, but Book Book, showing that even High School principals could stand some further schooling. A second book of influence was *Amateur Telescope Making*, edited by Albert G. Ingalls.

This began a life long affair with astronomy, resulting, over the course of a few years, on my grinding, polishing and figuring the optical surfaces on seven telescope mirrors; building the mountings for each plus one small optical flat.The first mirror was a standard classic 6" f8 mirror, with a modest stove pipe tube and threaded pipe for the right ascension and declination axis. And in those days, we all silvered our own mirrors, using the potentially dangerous Brashear process. A third influential book was from my Dad, *Microbe*



My first microscope. Leitz No. 108109 with original wooden case.



Utah Ghost Town Original pen & ink

Hunters by Paul DeKruif which inspired me, first into the field of bacteriology, and then into microscopy in general.

During the summer of my second year of High School, I worked, part time, at the Chapin Memorial Hospital where I was allowed to participate in various lab procedures such as making and staining smears, mostly bacteriological, and imbedding tissues with the paraffin method and sectioning with a rotary microtome. I still have some of these early slides. My third summer was spent working at the Claflin Co. Manufacturing Chemists, through whom I purchased my first microscope, a Leitz monocular, serial No. 108109, which I also still have in its original wooden case and with the original bill of sale as an added memento. My first 'lab' was an old kitchen table, fixed up with shelves and copied, nail for nail, from the top illustration on p. 11, of the Popular Science Pub. Co. Book, *The Home Chemist*. Another book by the same publishers, *Wonders Through The Microscope*, and later, Julian D. Corrington's *Working With the Microscope* rounded out my half dozen or so working bibles.

I began making my own slides and, with an old bellows camera (no lens, and only a ground glass screen back), began taking photomicrographs. In my last year of High School, I entered the state wide Science Fair and took a first place for slide preparation and for photomicrography. The event is embalmed in cold newspaper print, courtesy of my folks, who prophesied great things to come of this. In a sense, it worked out that way, for it's been an interesting life, but Lister, Pasteur and Robert Koch are still better known than I am. Never to be one to throw anything away, I still have close to a hundred of those original B&W negatives from those early days of taking pictures through a microscope.

With High School behind me, the draft loomed ahead, and I met it obliquely by enlisting (in the Army), thereby gaining some choice of work in the Service. I had played drums in an orchestra and jazz band throughout High School, and so almost opted for Special Services, the entertainment branch, but at the last minute, swung over to the Medics. They shipped us to Bremerhaven, Germany, where we made our way south and ended up at the end of the war, in what was left of the town of Stuttgart. There, at the 387th Station Hospital, four other GI's and I with sixteen German technicians, under the charge of a medical Army Captain, ran the various laboratory departments for both routine and specialized work. It was an opportunity to hone a few more lab skills, my greatest interest being the Hematology section. I also assisted at autopsies which was academically interesting but convinced me that I would never want to spend the rest of my life as an active pathologist.

A less somber facet of life at that time was the opportunity to travel. Heidelberg, essentially untouched by the war, was my favorite place to visit. For longer trips, Bavaria was always a great pleasure, especially around Oberammergau as was the Garmisch, Garmisch-Partenkirchen area, all totally untouched by the hostilities.

Looking back, I enjoyed my time in the service, but, never having been one to thrive on regimentation, I said thanks but no thanks when my enlistment was up, even when offered another stripe to re-enlist.

Shortly thereafter, I was shipped back to the States and discharged at Fort Dix, New Jersey. After appropriate homecoming festivities, friends of our family, who had moved to San Diego, California, offered me the opportunity to travel west and spend a short

The Lab. Portion of the east wall and the south bench, Ortholux on east bench to the left. Some spare working scopes, B&L zoom stereomicroscope in center, background shelves mostly geological. West bench on the extreme right.

vacation with them including pretty much free room and board - an offer I couldn't refuse. If I remember correctly, a one way ticket on a Greyhound bus was something like $57.00, with as many stopovers on the way as you wanted. I spent a little over three weeks traveling west, making long stays at Yellowstone, Grand Canyon, Bryce, Zion, Boulder or Hoover dam and then on down to San Diego. I took one look at the crashing surf, blue skies and palm trees and was totally hooked.

My original intention was to continue schooling at Brown University in Providence, Rhode Island, but these plans obviously needed changing. Instead, I enrolled at San Diego State College, majoring in chemistry and life sciences. I was still playing the drums with small groups, which brought fun and satisfaction, but no real money. So, I hired on at San Diego's Mercy Hospital, taking nighttime emergency work during the week and longer daylight hours on the weekends. More grist for the mill with laboratory techniques, although much of the work during the night and early morning hours were routine CBCs (complete blood counts), crossmatching blood for emergency transfusions etc.

I took one summer off and worked at a horse ranch (now a major highway running east from San Diego and wall to wall with tract homes) where I learned something about horses, riding and how to make hamburger with a flour gravy that was the best I'd ever eaten. It was during my final year at State College that I made my largest telescope, an 8 inch mirror, but figured at f16 - a very long focus and a very large mounting, designed primarily for lunar and planetary work.

With San Diego State behind me, I looked forward to a quiet summer in a small rented trailer, on Mission Beach, when by a fluke, and a coincidence that no writer of novels would dare to use, I was offered a chance to join, on a temporary basis, a small field laboratory, being set up in the Downey, California area, by the U.S. Public Health Service, which had their main labs in Hamilton, Montana. The field work was to further explore the less understood disease called Q-Fever, then very prevalent in that Southern California area. The small group of four consisted of a doctor in charge, a secretary, myself and an animal caretaker, the latter as we worked almost wholly with hamsters. The work was fascinating, for not too much was known of the Q-Fever disease, an upper respiratory ailment, greatly resembling pneumonia in many respects, which affected bovine animals, and sometimes man. Except for size, the causative agent was not too dissimilar from the pneumococcus of human pneumonia - an encapsulated diplococci. In the case of Q-Fever, however, the organism was a true Rickettsia, about midway in size between a bacterium and a virus, and was almost at the resolution limit of the very best of our optical microscopes. All electron micrography was done at the Rocky Mountain labs in Montana. It was interesting and very challenging work, and the days spun out to weeks and then months until some two years passed. We were successful in accomplishing the original goals of the field lab, learned much of the etiology of the disease, and even developed a capillary tube agglutination test for the detection of Q-Fever antibodies (developing a suitable stain was one of the main problems, for the gelatinous-like sheath surrounding the organism made staining difficult), but time was running out. The field lab was disbanded and I passed up the kind offer to move back with the

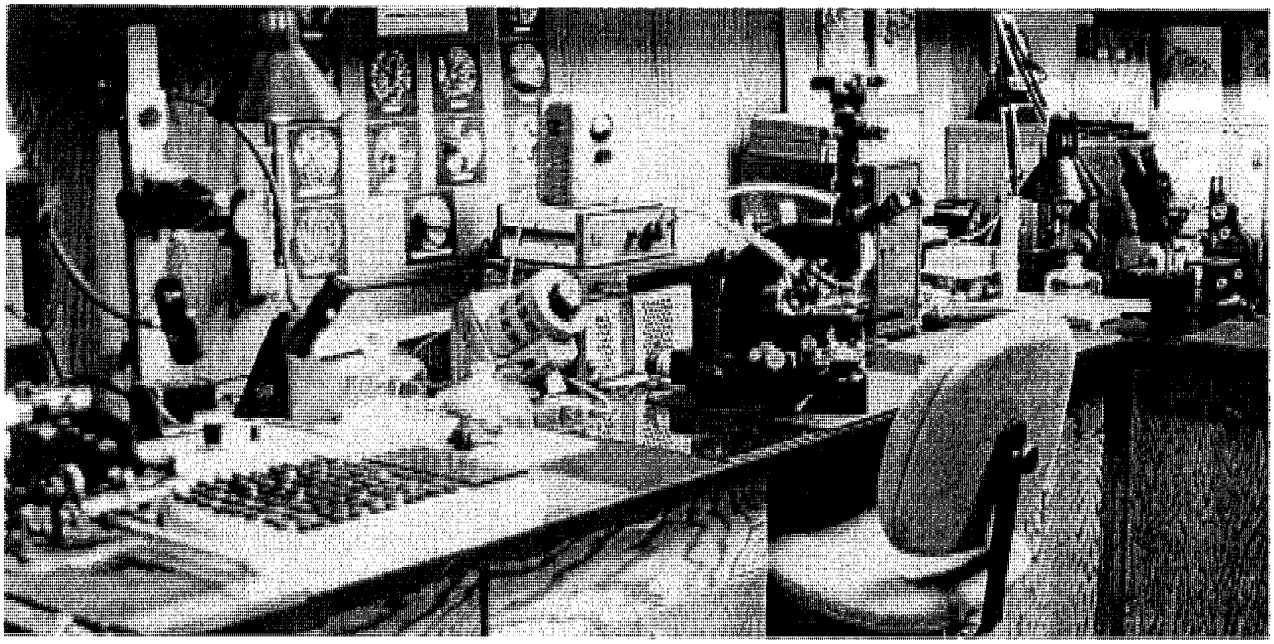
The Lab. Portion of the west wall and the west bench. From left to right: microprojector, scope set up for polarized lighting, scope set up for darkfield, background shelves with biological stains, electronic balance, triple beam balance, centrifuge and sink. Not seen are shelves of chemicals and the north wall with bookshelves, photo-enlarger and door to closet with other equipment, materials and supplies.

group to the Rocky Mt. lab. I had long experienced New England's cold, could imagine Montana's snow and ice and had grown to know southern California's sun and surf, mountains, deserts and generally ideal weather.

In the meantime, I had married and started a family and so the first order of business was another job. Any post graduate work receded into the background and I joined the Union Oil Research Laboratories, in Brea, California. This was a very fine organization, with nice people, excellent facilities and a restful view to the east that took in low hills where fossil sea shells, laid down in the geologic past when the area was a shallow inland sea, could be had for the scraping of the surface.

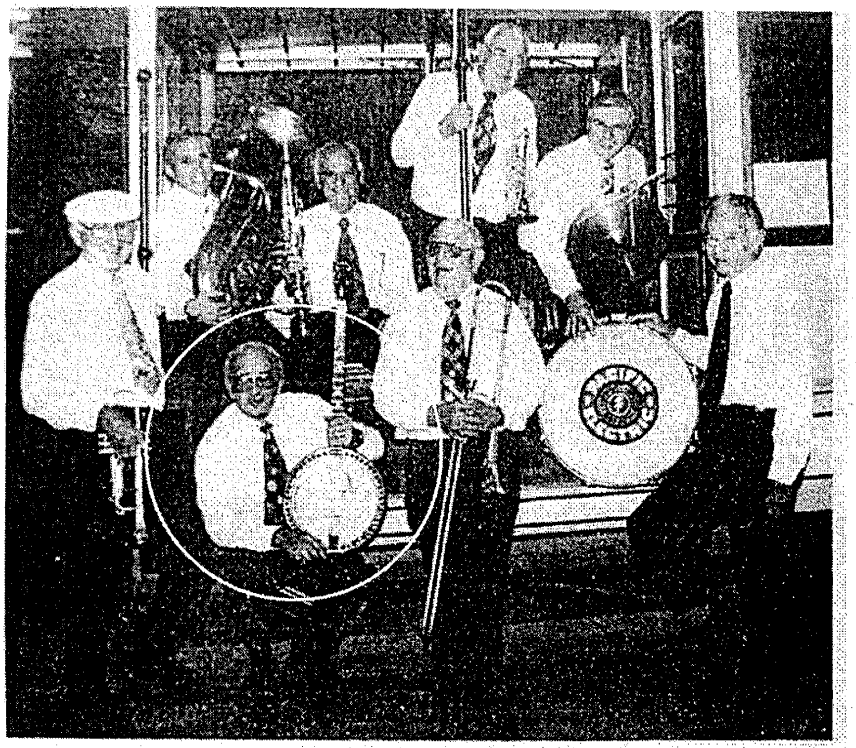
Here, I met three gentlemen who were to influence my next few years. The first was an older man who worked in the machine shops at the lab; he was a former miner among other skills and occupations. When he learned of my growing interest in rocks and minerals, we combined both forces and resources (his truck, my jeep, his portable black light, my scintillation counter), and we spent countless hours, weekend after weekend, cutting systematic swaths, using geological topographical maps, through some 70 square miles of high desert, primarily in the county of San Bernardino which, interestingly enough, is not only the largest county in California, with an area of approximately 20,000 square miles, but is also some sixteen and one half times larger than the whole area of my home state of Rhode Island! In the course of putting together a fine collection of indigenous rocks and minerals, and learning much of the lure and pleasure of exploring many very remote desert areas, we prospected for radioactive minerals by day (this was at the height of the uranium exploration boom), and for tungsten minerals by night - primarily Scheelite, as it glows or will fluoresce a bluish-white under short ultraviolet wavelengths. We also learned that scorpions, hidden in the daytime in rocky cracks and crevices, will fluoresce at night with a handsome but ominous cold and greenish glow. Ultimately, moderately high radioactive readings justified locating two lode claims, which we developed, doing all the necessary discovery and assessment work. A memorable moment in my life was the first time I punched a deep, slotted hole in a stick of dynamite so as to introduce the necessary wires and blasting caps. Our claims, however, contained mostly thorium with very little uranium and only traces of rare earths. The bottom fell out shortly thereafter for many of us small time miners, when a vast deposit of easily mined rare earths and radioactive minerals was discovered at Mountain Pass, some 95 miles to the north east. We halted operations and the claims subsequently reverted back to the land, but it had been great fun and a great learning experience.

The second friend that influenced me during that time was one that shared my interest in the somewhat off-trail sport of fencing and also in motion picture photography. We started formal training with foil, epee and saber and reached levels to compete with other fencing clubs in the southern California area. My favorite weapon was the French foil with a Belgian grip. We also joined a club of amateur motion picture photographers, in Long Beach, California, and began making short 8mm color films. Of the many that I made



The Lab. Portion of the east wall and the east bench. From left to right: Controls and stand for macro and microphotography, variac to control reflected lighting, controls for fiber optic incident lighting for the ortholux (right of center), slide cabinets, spare working microscopes, etc.

at that time, one was a sword-play epic, using much of what we had learned in competition fencing (Errol Flynn and Basil Rathbone did it better), and another was a western, shot primarily in and around the desert ghost town of Calico and titled Double Cross. Both were well received, and I ventured off in another direction.This time it was a science fiction effort based on a long admired short story by the famous and very wonderful writer, Mr. Ray Bradbury, called "Kaleidoscope" (a strictly amateur and non-profit production, I might add). It too was graciously received. About this time I began a life long interest in collecting science fiction and fantasy material, and became so enthused that I sat down and wrote a science fiction short story which fell flat on its face but served shortly after as an idea for a slightly more ambitious amateur film. I wrote the script, did the special effects (mostly table top photography) shot, on location partly in town but mostly in the Mohave desert, in 8mm color, and used a system that utilized a tape recorder specifically designed to drive an 8mm projector.This allowed not only background music, but sound effects and tight lip-synchronization. The film was titled "From the Void", ran close to 40 minutes and ultimately took a number of awards, including "Ten Best of the West" and later, the amateurs version of the golden Oscar. It was screened at many other film societies, traveling as far east as New York and Florida. One of the many people who saw the film, was a very gracious person who suggested that I might enjoy taking a crack at making educational films and who lined me up with the proper department in the Los Angeles school system. I was from there directed to an independent film production company on Melrose Avenue, in Los Angeles. (Hollywood sounds better but actually its all Los Angeles.) I approached these folks, showed them some of my work, and in subsequent talks, my interests in astronomy and microscopy were discussed. This resulted in their suggesting a film on microbes or germs as a possibility, so I wrote another script, this one fact, not fiction. It posed a special challenge, as it would be slanted for youngsters of roughly seven to ten years of age. Facts and concepts had to be developed but always, at least, back then, in a bright, cheerful, pastel-colored manner. One of the concepts I was especially asked to bring out was the roll that bacteria play in breaking down dead organic matter and, in essence, returning nutrients back into the earth, to allow other life to grow and thus cycle. This was only one segment of the whole film, and was somewhat crucial, but it was also fraught with the possible macabre overtones of death, decay, etc. I suggested using a tree as a living entity, and follow its 'death' and (bacterial) dissolution, (ignoring insects and other helping hands), and this was hailed as a great idea. So I began as an independent producer, writing, filming and editing my first educational film, with the provisional title of "Meet the Microbe." It went well. I used school children, home interiors and, using rented camera equipment, even shot a time lapse sequence, of growing hyphae, the filamentous mycelium of Penicillium notatum. I have to tell you of the filming of the 'tree' sequence. Permission was obtained to film a logging crew in north-central California, as they went about felling many large trees. I filmed a number of them, choosing one in particular as 'my' tree. I then spent the bulk of my time photographing already downed trees, each of a more or less similar shape and size as 'mine,' further



ELECTRIC PERFORMANCE — The Pacific Electric Jazz Band joins the fun in Pismo Beach this weekend. Don't miss their performance.

Pacific Plays Two-Coronet Style Of Jazz

PISMO BEACH — Pacific Electric is a newly organized group of southland musicians playing in the two-cornet style of the Lu Waters Jazz Band.

They do a variety of rags, stomps, and traditional two-beat jazz tunes from the late teens and twenties.

They especially enjoy playing for dancers. Their West-Coast Revival style should bring some happy faces and tapping feet.

Musicians include John McCormick, leader/cornet; Dick Randolph, cornet; Don Cox, trombone; Larry Wright, reeds; Kenny Sands, piano, Chuck Rimmer, tuba; Dick Jefts, banjo; and Frank Sano, drums.

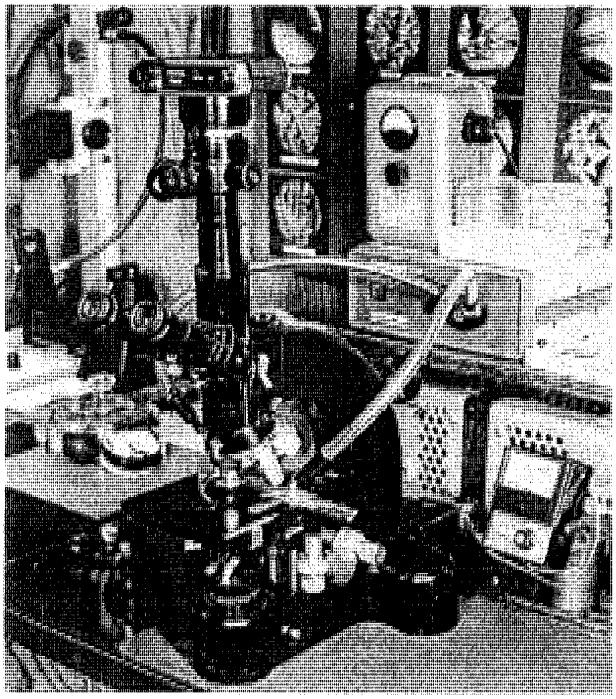
The band hopes their trolley will take you back for a nostalgic jazz ride into the 1920s.

Dixieland Jazz Band - One of a number over the years.

photographing each from the same camera angle, but with each in a state of more and more advanced decomposition. The sequence, when it was properly edited, turned out nicely .... we see a stately tree (a living entity); dark clouds of an approaching storm, (sickness/old age); the tree topples and crashes to the earth (death); then, moving in, and with a series of slow lap dissolves, the now dead tree slowly disintegrates and becomes a low, elongated mound of fine light colored material and dust, where a small green shoot (a little filmic license here - we planted it!) is seen, thrusting up in full vigor - a new growth, rising from the remains of once living matter. A dramatic sequence, but there was only one problem. Because the film would have nation-wide distribution (and possibly overseas also) it was felt that a less indigenous, a more ubiquitous, a more readily recognized and universally easy to identify type of tree would be better. I had shot the whole thing using Redwoods. I had to re-shoot the whole thing - using Pine trees!

My interest in astronomy served well for my second film, provisionally entitled "Fourth From the Sun." It used the planet Mars, and what we knew of it at that time, as a springboard to present the various types of telescopes used by professional astronomers and the auxiliary devices and equipment that extended their range and usefulness. Permission was secured to photograph the 100 inch Hooker telescope on Mount Wilson, overlooking Los Angeles, but it proved too massive and lighting it was a problem. Instead, I filmed the smaller 60 inch reflector, and then some of the smaller refractors, the sun telescopes, etc. It was a culminating thrill to actually sit on one of the massive black cross beams of the great 100 inch, to come in intimate contact with the legendary 60 inch and to see the sun's 17 inch diameter image formed by the 150 foot tower telescope. Upon completing this film, I began a script for a third production on geology - rocks, minerals and gems, but time, or lack of it was becoming a problem. For during all this time, I was holding down my regular full time job, with the scripts and filming being done on evenings, weekends and vacation time. Another factor that complicated matters was the change to a new job. The folks and facilities at Union Oil were the very finest, but the work was proving to be overly routine.

The third fellow to prove a positive influence on me had just recently relocated from Union Oil to the U.S. Borax Research Laboratories in, at that time, Anaheim, California. I followed suit, applied at the Borax lab and was hired. And so began a love affair that lasted till my retirement 30 years later. No greater group of nice people, company policies or challenging projects is imaginable, and at the risk of waxing maudlin, let me say that if you had to work five days a week for a living, this was the organization with which to do it. The world famous washing powders, etc, were mined, processed and shipped out at other company facilities; the research lab itself was engaged in pure research, both in boron chemistry and boron related projects. My very first group project was under Government contract and explored the feasibility of using elemental



The Lab. Leitz Ortholux with Olympus PM-6 camera, Olympus fiber optic "Highlight 2000" for incident lighting.

boron fibers as windings for ablative rocket reentry nose cones. The last project I worked on, thirty years later, was the environmental impact of certain mining processes on commercial fishing in selected Alaskan waters. I truly loved my job, but have learned that retirement definitely has its advantages and has allowed for activities shortchanged or shelved in times past.

My best friend, Billie, who is also my wife and who is a (retired) Research Librarian, and I have shot competitive archery and we built, owned and operated for a number of years, our own out-of-print and rare bookshop. I am proud of her skills in pastel artwork; whereas, I've kept my interests up over the years with Prismacolor pencil, black and white line drawings and occasional acrylic painting.

To partly round out the picture, and for anyone with similar interests (who I would be pleased to hear from), I am a collector of things by nature, and have put together such collections as coins(early Mexico), stamps (United Nations), old style glass pharmaceutical graduates and long bladed Bowie style knives. But I am, at heart, a collector and lover of books. I collect H.P. Lovecraft material and am a completist with Arkham House, publishers. I am also into Western Cowboy shooting with single action revolver, lever action carbine and 12 gauge shotgun, with the recorded alias of 'Raven.'

Many years ago, I switched from the drums to guitar, and then to the four string plectrum banjo. With the latter, I've played professionally for over thirty years, with a number of Dixieland Jazz bands, at clubs, jazz societies and at the annual jazz festivals in Los Angeles and at Avalon on Catalina Island. I have also done much solo work, playing at hospitals, retirement and rest homes.

Astronomy is still a hobby, but I now use a commercially made Schmidt-Cassegrain telescope, rather than one of my own making. Interestingly enough, I've found that many of the problems that can plague the taking of astrophotographs is very similar, in many ways, to those that can haunt the taking of photomicrographs - from the macro to the micro- literally worlds apart, but basically not really all that different.

I've hiked the John Muir trail in the California High Sierras and most of the eastern laterals and, over a period of many years, have climbed most of the major peaks. With a long time friend and fellow outdoor and fresh air enthusiast, I have paddled a kayak, (actually a 17 foot Folbot), from Green River, Utah, down the Green River to the junction of the Colorado and then south to the lower end of Lake Martinez, a few miles north of the Mexican border, excepting only the Black and Cataract Canyon stretches of the Colorado River. This also spread out over many trips during a number of years. Shooting carp with a bow and arrow helps keep up the interest in archery and is an added extra in the back waters and sloughs of the Lake Martinez area. And in a similar vein, rocks and minerals (pun not only intended but labored for) are still a hobby, being an active member of the local Gem and Mineral Society.

Right up there at the top of the list, however, is also my love for microscopy - primarily old and new microscopical techniques, such as staining and mounting procedures and the challenge of high power, high resolution photomicrography. I find diatoms probably the single most intriguing subject material. The former Los Angeles Microscopical Society and the subsequently reformed Microscopical Society of Southern California has been a very special pleasure, affording contact with fellow members with a similar love for microscopes, both vintage and modern, related accessory items and equipment and the history and practice of techniques in the many various and related microscopical sciences. The very excellent Postal Microscopical Society of England offers another, almost unlimited, outlet for both learning and for contribution to the hobby.

Life has indeed been good. As for the future, there is an old Indian saying that "No man has seen tomorrow's sun," but with a lovely and supportive wife, and children who are no longer children but good friends, I would like to believe Robert Browning when he wrote that "The best is yet to be...." ■

Workshop of the MSSC

George G. Vitt, Jr.

Date: 6 March 1999
Place: Ernie Meadows' residence
32 persons attended

Regretfully, and with apologies, these notes do not cover the entire proceedings of this Workshop because your humble chronicler arrived more than an hour late. His lame excuse was that Photoshop had kept him up most of the night and that he had slept right through the alarm clock! He may not have showed up at all had not **Ernie Meadows** given him a phone call! Thanks, Ernie.

1. **Stuart Warter** exhibited two microscopes made by the McIntosh Battery & Optical Co. The first was the "New Clinical Microscope No.2", c.1885; black & brass. The other was the "Scientific Microscope No.1, c.1885, all brass. Stuart then presented the following summary of the business activities of Dr. McIntosh:

1863: Dr. Lyman D. McIntosh received his medical degree from Caledonia Medical College in Vermont. He served in the Union Army as a surgeon and began his own practice in Sheboygan, Wisconsin. He moved to Chicago in 1871: (FI/223), he was first listed in the Chicago City Directory in 1872 (HAM/75).

1871: Dr. Lyman D. McIntosh established himself in Chicago, in addition to his medical practice his first business was the McIntosh N.U. (Natural Uterine) Supporter Company (also known as Surgical Instruments), located at 296 West Lake St., in 1875 a Cat. was issued from this West Lake address (FI/223). This first business is said to have operated out of his medical office (HAM/75). By 1879 to 1881, there were at least three businesses associated with the McIntosh name. In 1879 he established the McIntosh Electrical Corporation, and in c.1881 a catalogue was issued under this company name. In 1880 he formed a third company called "McIntosh Galvanic & Faradic Battery Co.". An 1881 catalogue locates it at 300 & 302 Dearborn St. (this branch was also known as the "McIntosh Galvanic Belt & Battery Company"). An 1881 advertisement placed the McIntosh Galvanic Belt & Battery Co., at 192 Jackson St., Chicago. The ad featured his Solar Microscope & Stereopticon Combination. This apparatus could also be broken down into a normal compound microscope. Stands that could be broken down and used with his projection apparatus were covered by a McIntosh patent of 1883. A Catalogue issued by the McIntosh Battery & Optical Co., stated it was "Successor to McIntosh Electrical Corporation, established in 1879" (FI/221). The first address associated with this new name was: 521-531 Wabash Ave., Chicago (FI/221). Padgitt believes this business was established around 1889 (HAM/79). By October of 1889, the McIntosh Battery and Optical Co., was located at; 141-143 Wabash Ave. (TM,Oct,1889/ad/7).

There are at least seven different addresses associated with the various McIntosh Catalogues. He was listed in the Chicago Directory under Opticians and at one time as an electrician (1890). McIntosh did not make his own objectives and supplied lenses from William Wales of New York. Catalogues under the name of McIntosh Battery and Optical Co. continued to be issued until at least 1929. The last known Cat. was issued in 1929 from; 223-233 No. California Ave. Chicago (FI/221).
Lyman McIntosh died in Florida while on a speaking trip in March of 1892. See 1879.

1879: Establishment of McIntosh Electrical Corporation., Chicago. See 1871 & 1889.

1885: New Orleans Exposition, two microscope makers attended, B&L and McIntosh.

1889: Establishment of McIntosh Battery & Optical Co., at 521 -531 Wabash Ave. Chicago. See 1871

2. **Jim Clark** displayed his very first microscope: a small French student's microscope which his father had rescued from the basement store-room of the San Diego High School when Jim was a wee tyke. This, c.1875, double pillar microscope has a lyre shaped slide holder, a substage disk with apertures, a separable lens objective, and a bullseye condenser - all packed in a compact mahogany case. Jim noted that the first double pillar microscope was made by Hartnach, which the French copied.

3. **Ken Gregory** displayed an excellent cased Koristka microscope c.1909, s/n 16,803

4. **Izzy Lieberman** displayed his very first microscope, a Koristka, made in Italy in 1924, which his mother had bought on her honeymoon in Italy that very year. Izzy first looked through this microscope at four years of age. This well designed and constructed instrument features four objectives and a swing-out sub-stage condenser with a very convenient form of side adjustment.

5. **Walter Coulson** described his activities in collecting commemorative stamps that bear an image of a microscope.

6. **Alan de Haas** showed a marvelous book, *Classification of Sponges and Molluscs* by Lamoreau, 1821, and showed several extremely fine engravings which illustrated the book. Alan remarked on the meticulous detail of such engravings which makes them so valuable as a source of information to this day.

7. **Larry McDavid** showed a Geissler tube that is powered by a high voltage induction coil. He then showed a small hand-held Tesla coil of the type used to check for leaks in vacuum systems. There was a brief discussion of Tesla coils and their ability to produce ozone which, when inhaled at close range, can cause severe respiratory incapatitation. Larry then showed a German made glass technometer which is a precision made glass-stoppered vial (Labeled,"25 grammes") used for determining the specific gravity of liquids.

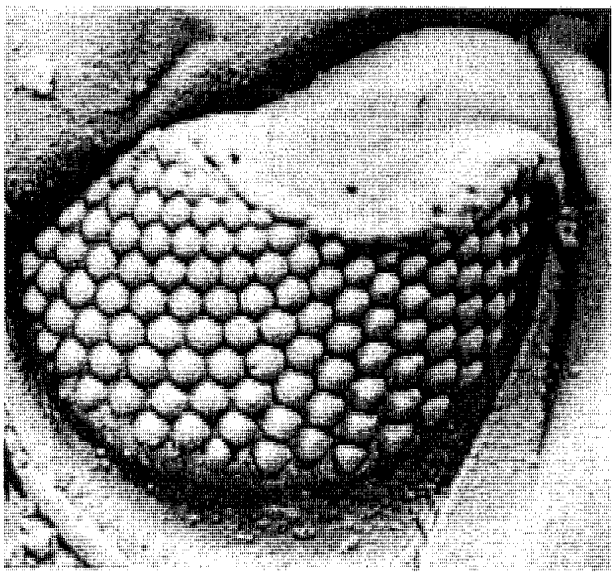
8. **Pete Teti** told about a good source of protozoans and 'pond life' that he discovered recently - a stagnant pool near the Hollywood reservoir. Pete expressed his desire to have more hands-on workshops. At this point, **Jim Solliday** reminded us that the May meeting will be devoted to observation of pond life, as it was last year, and that **Colin Lamb** of the British Postal Microscopical Society (PMS) may well be a visitor at that meeting.

9. **Gaylord Moss** told us about the doublet lenses in the eyes of trilobites of the Cambrian period. The outer lens of the doublet is formed of calcite with the optical axis of this bi-refringent crystal lens in line with the line of sight and hence appearing isotropic so that double vision is avoided. An inner and outer lens with a curved intermediate surface corrects for spherical aberration. The eye arrangement is similar to that of some modern insects. There was a discussion as to how the trilobites processed this information.

10. **Dave Hirsch** displayed two microscopes which he had found in a shop in Edinburgh: A French drum microscope by Oberhauser with a coarse focus knob, a substage mirror rotating on a single axis, with dissecting instruments, two objectives, a live box and forceps all packed in a compact rosewood case. Dave's other microscope was a fine Reichert, c.1900, with 3 Reichert objectives, a substage fitting for stops, and an Abbe condenser which moves up and down on a dovetail and is held by friction only. An unusual feature of this microscope is its unusual and very distinctive and handsome mahogany case which is bound and reenforced by inset brass bands, and has a very sturdy recessed brass handle. Most probably, this was a specially made case designed to stand the rigors of an expedition. ■

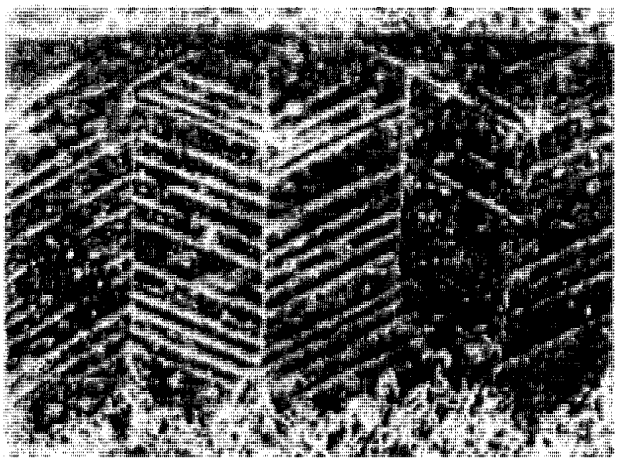
The Trilobite Doublet Eye,
from *Trilobites* by Riccardo Levi-Setti

In the second edition of the book Trilobites, published by The University of Chicago Press, Levi-Setti describes and illustrates with many photographs the eye structures of these early Cambrian creatures. Their doublet eye structures and use of a curved surface to correct for spherical aberration is a remarkable example of the complexity of nature's optical designs in such early creatures. A comparison is made with the designs worked out by Descartes and Huygens who came up millions of years later with the same surface shape to correct aberrations. For those who are interested in other details about these early creatures, Levi-Setti's book contains a wealth of other information. There are also a number of trilobite sites on the Web, including one at http://www.trilobites.com which has many photographs of various types including some with stalked complex eyes that seem closely akin to those of insects. Ed.



Eye of one of the earliest phacopid trilobites,. The lenses are closely packed and almost hexagonal.

All illustrations from *Trilobites* by Riccardo Levi-Seti



Magnified detail of the calcite structure of an Asaphus eye section in darkfield illumination.

Minutes for the MSSC Meeting of 17 March, 1999.

David L. Hirsch

What better way is there to finish off the St. Patrick's Day festivities, than by holding a MSSC swap meet as part of this evenings program? Fifty MSSC members and their guests spent a very pleasant and rewarding evening browsing, salivating over, and buying the intriguing items offered for sale.

The high point of the meeting dealt not with material things, but with people. Our dear friend and long time active member, STEVE CRAIG, was in attendance along with his wife, Mildred. With a loving family, sincere friends and help from Above, Steve is on the road to recovery. Please help Steve along by sending him a word of encouragement. He can be reached by phone at: (310)397-8245 or by e-mail at:scraig@leonardo.net.

We offered a hardy welcome back to another long time member, RON MORRIS.

KEN GREGORY, looking dashing and debonair in his red derby, had several interesting items to sell, such as a vintage toy microscope. Also offered, were a variety of books and sets of unusual bookends. JERRY BERNSTEIN had a number of oculars, objectives, blank slides, slide covers and a Russian binocular microscope. LEO MILAN offered photographs and selected prints of diatom arrangements. ALLAN deHAAS featured a collection of microscope and camera items. His sales included a pristine Bolex Paillard 16mm movie camera loaded with a wealth of lenses and accessories.

LARRY ALBRIGHT offered a variety of vintage microscope parts, including a Bausch and Lomb polarizer set and a very old case which contained slide making chemicals and solutions. BILL DAVIES brought in a collection of book reprints dealing with telescope making, eacs experi electricity for boys, etc.

JIM CLARK set up two SHERLINE lathes. Later in the evening, BARRY SOBEL demonstrated the capability if these lathes by turning a knurled knob out of brass. Barry also showed several instruments including a Bullock microscope which he is restoring, and a miniature planetarium.

STU WARTER set up a Society of Arts microscope for display He offered a fine 4-draw Harris Day or Night marine telescope, with a mahogany outer case. Perhaps, the fastest sale of the evening involved a pristine Leitz dissecting microscope offered by ZANE PRICE.

ALLAN BISHOP offered a highly detailed Nikon illumination system.

DAVE HIRSCH showed a Zeiss-Winkel monocular microscope, an 1857 edition of Carpenter, and gold plated lapel pins featuring a highly detailed replica of a vintage Bausch & Lomb microscope with the MSSC letters inscribed thereon. Lack of space (and a failing memory) keeps me from mentioning all of the member-vendors. My apologies to you-all who were not included. Catch you later.

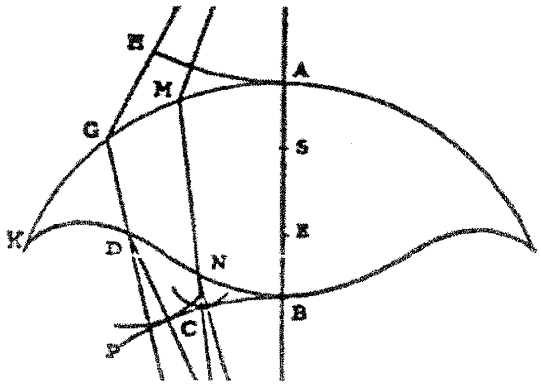
To all MSSC members with access to the Internet, I call your attention to Member RICK BLANKENHORN'S Gemmary web site. In addition to his extensive inventory of books, instruments and conservator supplies, check out the Gemmary Forum. It is a sort of chat room and an information exchange for people having an affinity and inclination toward the scientific milieu; anything from identifying stuff, to cleaning up mercury spills. Look for the names of MSSC members who occasionally add their voices to the Forum.

Two new members have joined the crew of the Good Ship MSSC. Added to our cosmopolitan roster are: Frederick C. Skvara, M.D., Bridgewater, New Jersey. From across the Pond, Peter J. Bruce, from Leicestershire, England has joined our merry band.

■

Trilobites-continued

Thin section of a specimen of the Silurian Dalmanites eye showing the calcite lens.



Construction of a lens free of spherical aberration: from C. Huygens *Traite' de la Lumiere.*

■

MSSC April Meeting

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

Seeing Difficult Objects

Alan deHaas

In preparation for the Pond Life session next month, Alan deHaas will share his expertise and experience in explaining the various techniques for enhancing difficult-to-see objects. He will describe a method for using Schlieren illumination to achieve results remarkably like those of some commercial phase contrast systems. He will also discuss methods to push the practical limits of resolution.

Alan's exceptional ability to coax information out of "impossible" viewing situations and ability to teach and explain makes this an instructional evening that you will not want to miss. Be ready to try these techniques next month with your own microscope when Alan will be available to help with practical setup and adjustment.

Saturday Workshop - April 3 9AM

At the home of Marj and Ernie Meadows
707 Greentree Rd. Pacific Palisades, CA 90292
310-459-4788

Directions-Take Brooktree off of Sunset Blvd (Brooktree is the first turnoff east of Chataqua).Then the first right off of Brooktree is Greentree. Go to end of Greentree main road, park and walk up wooded lane to Meadows' (first house on the right up the lane).

Preview Notice - May 19
Spring Pond Life Meeting

Bring your microscope and a jar of pond water! At this exciting MSSC event last year, there were over 40 microscopes set up with all sorts of pond life to look at. Compare your lenses and equipment, get expert help in setting up for optimum viewing and in identifying what you see.A fun evening also for family members.

Preview Notice - June 16

Pigment Identification, Metallography, Restoration and Authentication
Narayan Khandekar - Getty Center