Journal of
THE MICROSCOPICAL SOCIETY OF SOUTHERN CALIFORNIA
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ZENTMAYER'S ARMY HOSPITAL STAND

America's Most Copied Microscope

Stuart L. Warter

INTRODUCTION

In the early years of development of the microscope in America, the influence of the Victorian English microscope designers reigned supreme, with the earliest American microscopes being direct copies of English, and less often, French designs. As the century wore on, the fabled Yankee inventiveness reached into instrument design, with many unique developments appearing, but the old ways died hard, and for each original design there were many copies, both here and abroad. As good ideas were to be recognized wherever they appeared, American inventions made their way across the ocean to repay the debt to the older countries.

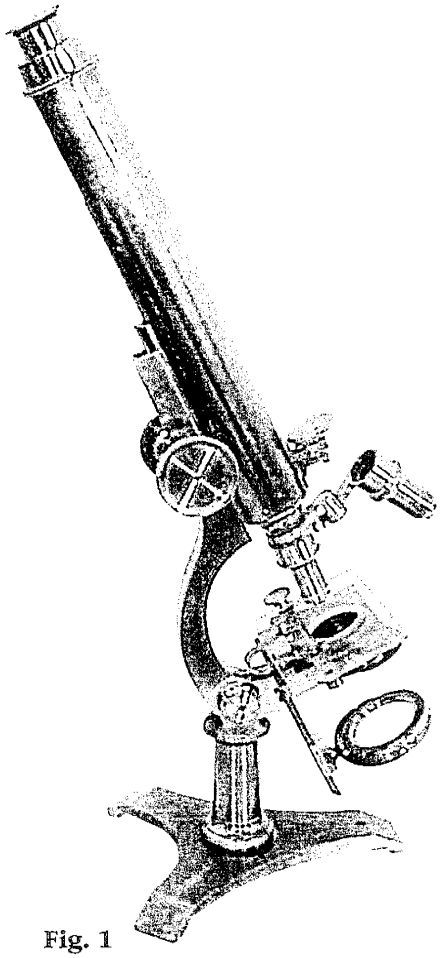

Fig. 1

Among the most influential Americans whose ideas were incorporated by the English were Wale, Bulloch and Zentmayer. Of these, probably the most important was Joseph Zentmayer, whose greatest fan was Francis Wenham. Wenham prevailed upon the Ross firm to adopt at least two of Zentmayer's inventions: (1) the swinging substage, which facilitated oblique illumination and also enabled the mirror to be brought above the stage for direct illumination, and (2) the internal long lever fine focus. These developments altered irrevocably the course of microscope development in England (and, according to Hartley, who is not a fan of Zentmayer, destroyed it); the swinging tailpiece because it brought about the demise of the inconvenient and ineffective bullseye condenser, and the internal long lever, because it freed the Lister limb from dependence on the short lever fine focus, and at the same time, also freed the designers from dependence on the bar-limb design for maintaining the preferable long lever fine focus.

Back on this side of the Atlantic, the bar-limb design had never really caught on, with the Lister limb design remaining preeminent until the advent of the all-conquering Continental pattern. Probably the most successful of the Lister limb microscopes was Zentmayer's highly regarded United States Army Hospital Stand, designed for the U.S. Army Medical Department and introduced in 1862, continuing in production, through a series of design changes, for nearly forty years (text fig. 1). It was not an inexpensive instrument, being eclipsed only by the less common Grand American and Intermediate models in Zentmayer's line, and was beyond the ability of many potential users to afford. It is possible that limited production capacity also restricted its availability, for Americans by and large were not an affluent people, and microscope use was not widespread. Until demand increased and Zentmayer finally felt the pressures of competition and brought out the smaller and more popular American Histologi-

cal stand, the way was open for imitators, and they flourished (in number, if not in volume of production). Interestingly, most of these were associated with the Philadelphia area, Zentmayer's "home turf."

JOSEPH ZENTMAYER
Philadelphia

Zentmayer's Army Hospital Stand was an all brass Lister limb microscope mounted on a cradle joint atop a single pillar which was attached to a flat, "Y"-shaped three pronged "claw" foot. It was available at first only as a monocular; a binocular was made available later on. At least five forms may be recognized (dates are based on those given in the Billings catalog, or by Padgitt, where no other information was available):

First form: c. 1862. Single coarse focusing knob, cone type fine focus, fixed mirror on flat bar. Spring holding glass stage and slide carrier attached to inside of arm above stage. Unserialized (Billings fig. 421). Plate I, fig. 1.

Second form: c. 1862 As above, adds short lever fine focus, sliding mirror. Retaining spring for slide carrier and stage a loop now attached below stage and arching above. Unserialized (Billings figs. 102, [AFIP 49108, no fig.], 421). Plate I. fig. 2.

Third form: Before 1871 - 1876. Adds double coarse focus wheels and draw tube, otherwise as above. Serial nos. 110 (private collection), 726 (Skinner catalog, lot 67), 770 (binocular, Tesseract catalog 33), 910 (private collection), 941 (binocular, Tesseract cat. 37), 1649 (private collection). Illustrations: Queen catalogs 1871, 1872; Queen ad, 1874; T. H. McAllister catalog, 1875 (Padgitt, binocular). This is the form that was "cloned" by several makers. Zentmayer numbered only his largest instruments, so the range of serial numbers in this group (if in fact sequential) would indicate that production must have begun considerably before 1871 as that many microscopes could not have been produced in a mere five years, but I have no reference before that date for this form. Text fig. 1; Plate I, fig. 3; Plate II, fig. 1.

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MICROSCOPICAL SOCIETY OF SOUTHERN CALIFORNIA

PLATE I

Zentmayer Army Hospital Stands (Monocular)

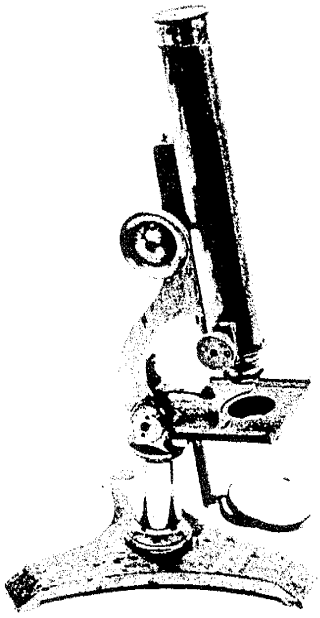


Fig. 1 First form

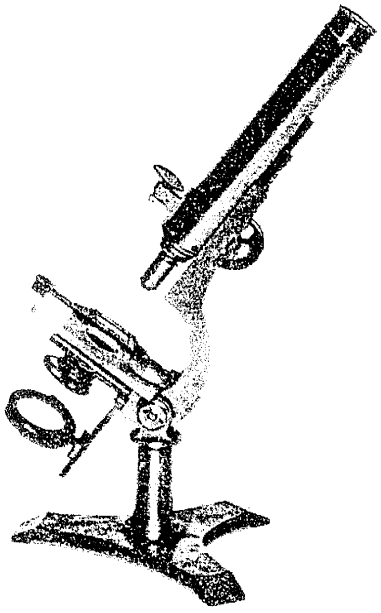


Fig. 2 Second form

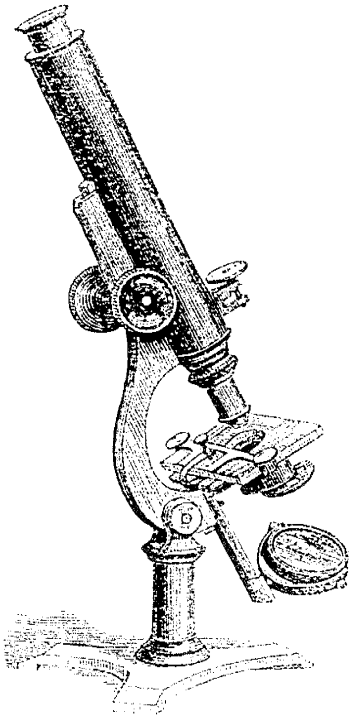


Fig. 3 Third form

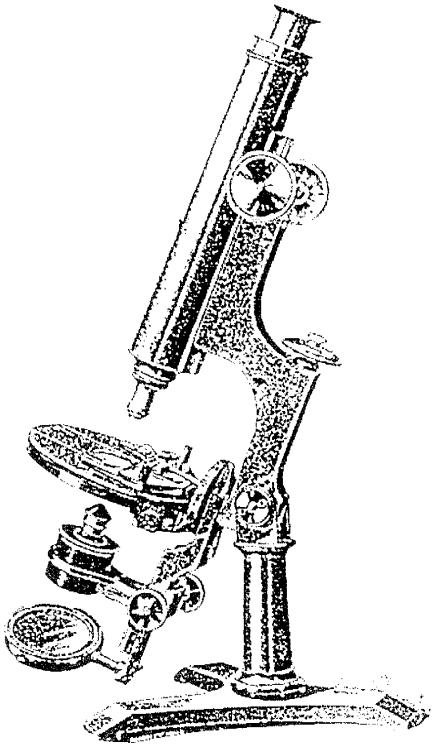
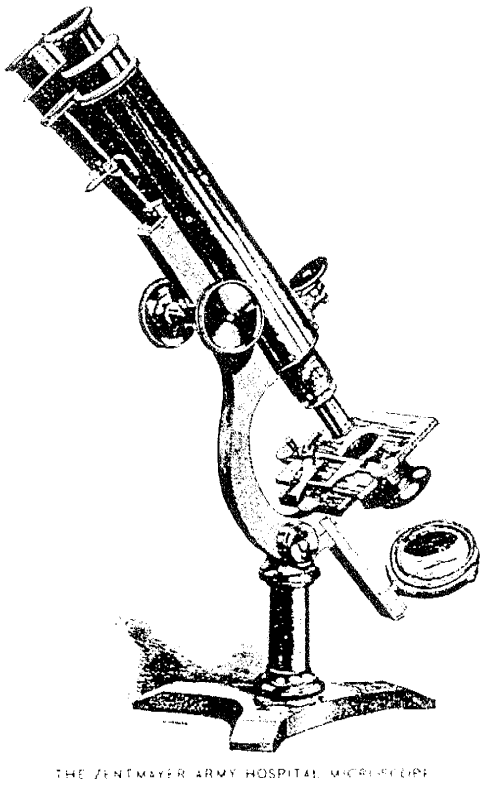


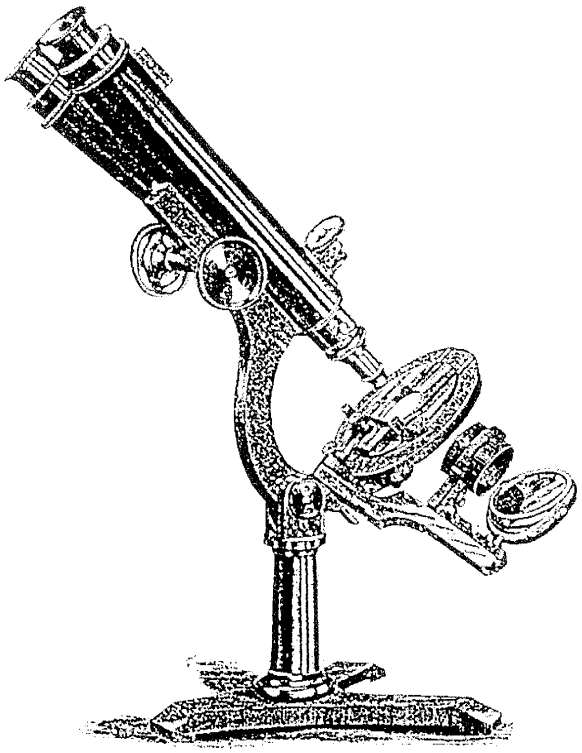
Fig. 4 fifth form

PLATE II
Zentmayer Army Hospital Stands (Binocular)



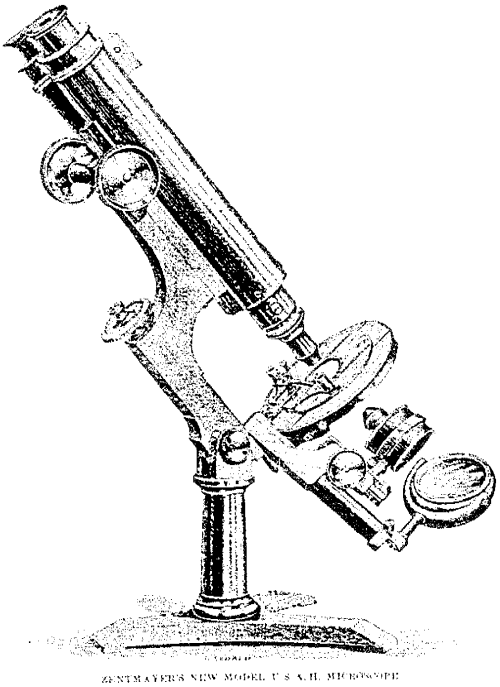
THE ZENTMAYER ARMY HOSPITAL MICROSCOPE

Fig. 1 Third form



ZENTMAYER'S UNITED STATES ARMY HOSPITAL STAND.

Fig. 2 Fourth form



ZENTMAYER'S NEW MODEL U. S. A. H. MICROSCOPE

Fig. 5 Fifth form

Fourth form: 1876 - 1879. As above, adds Zentmayer designed swinging substage, rotating stage. Last typical Lister limb form. No example located. Illustrations (binocular) Zentmayer catalog, 1879; Queen catalog, 1879. Plate II, fig. 2.

Fifth form: c.1879 - after 1895. "New Model." Adds Zentmayer designed internal long lever fine focus, rack and pinion to substage, straight limb. Coarse focus wheels elevated to top of limb for working with longer focal lengths. Later with tailpiece attached to rotating disc-like sector. Serial nos. 2032 (Billings fig. 154), 2892 (with sector, Billings fig. 169), 3038 (binocular, private collection), 3327 (binocular, private collection), 4805 (Historical Technology, 129:17, no, 97). Illustrations (binocular) Zentmayer catalog, 1879, 1895; Queen catalog 1879 (Padgitt mentions the addition of a horseshoe foot in 1885, but it is not shown in the 1895 catalog). The "New Model" appears together with the older fourth form Lister limb in Zentmayer's 1879 catalog. Plate I, fig. 4; Plate II, fig. 3.

JAMES W. QUEEN
Philadelphia

In the 1870's Queen produced a copy of the Army Hospital Microscope, similar in all respects to the third

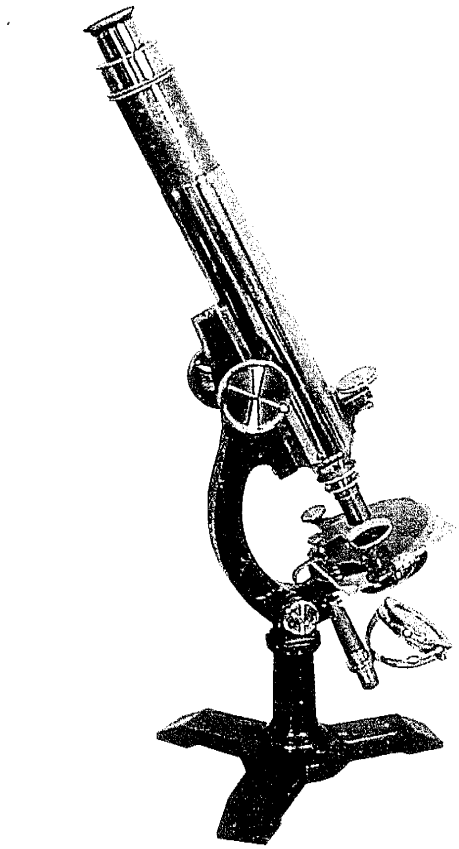


Fig. 2

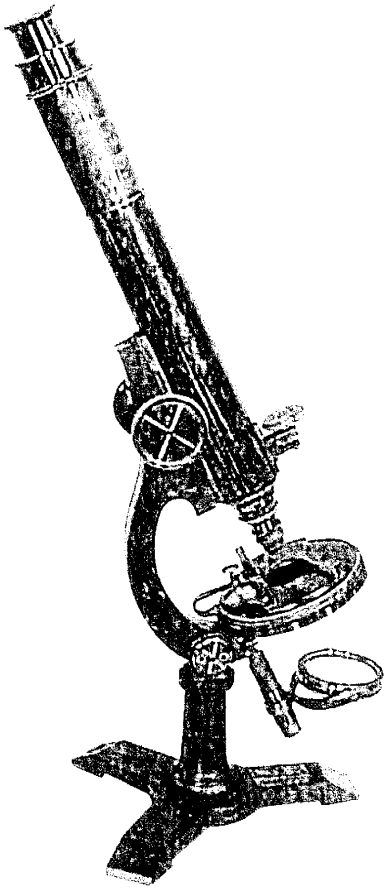


Fig. 3

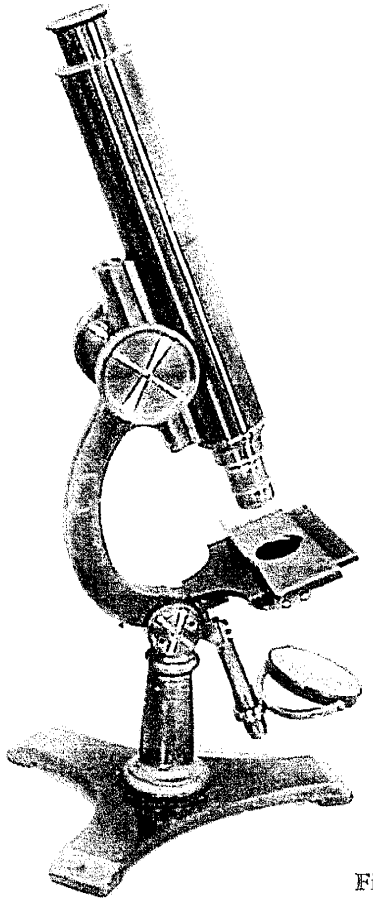


Fig. 4

PLATE III

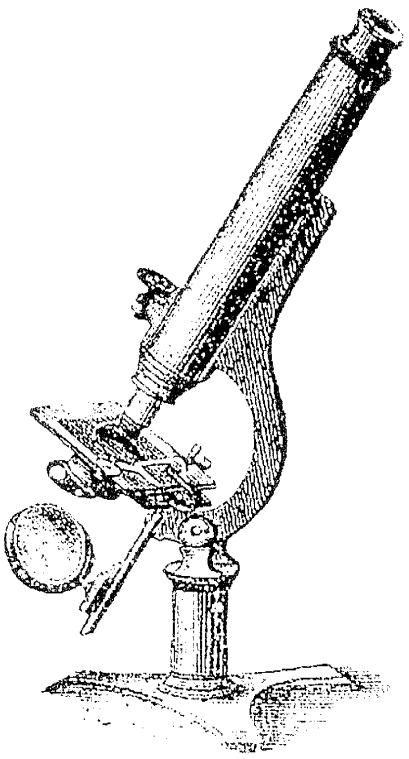


Fig. 1 Queen's Student's Microscope

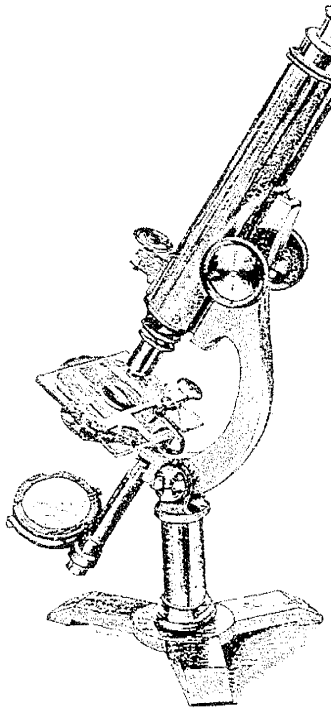


Fig. 2 Queen's Student's Microscope

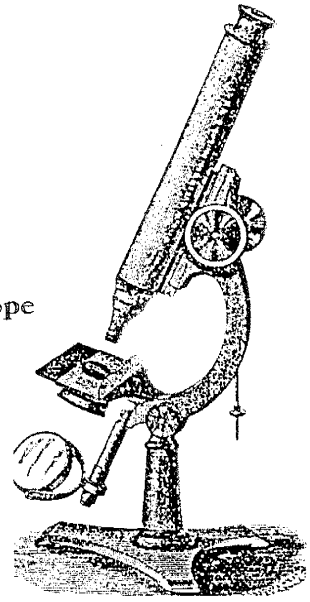


Fig. 3 Queen's Popular Microscope

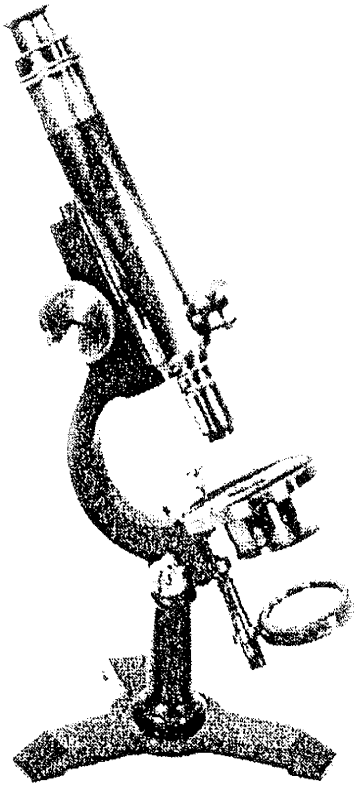


Fig. 4 W.Y. McAllister

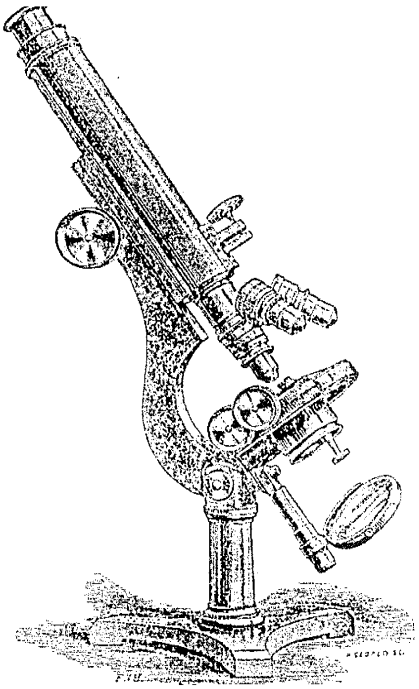


Fig. 5 The " New National Monocular" Microscope. R & J Beck.

form, except that the foot, pillar, and limb were of cast iron, painted first green, and (possibly) later black. They are difficult to distinguish in a photograph, except that, in its definitive form, the Queen model has a tubular tailpiece, rather than the flat bar of the Zentmayer, and the rack extends below the top of the arm. A similar rectangular glass stage fits over a round stage base, rather than the U-shaped support of the Zentmayer model (Text fig. 2; Plate III, fig. 2.). A rotating round stage was offered as an option (Text fig. 3). An all brass version appears in the 1897 catalog as a binocular, along with the standard iron based monocular model (Plate IV, fig. 1).

The first Army Hospital copy had appeared in the 1872 catalog as Queen's Student's Microscope (Plate III, fig. 1). It was without coarse focus knobs (slip-tube only) or drawtube, but with the short lever fine focus, U-shaped stage support and flat tailpiece of the Zentmayer model (prior to this, the 1871 catalog equivalent was Queen's Large Student's Microscope, a Lister limb instrument trunion mounted on a Ross type base). From 1872 to 1874 (fide Billings) a version was offered without the short lever fine focus, and no draw tube, as the "Popular." It was notable for having a friction coarse focus rather than rack and pinion, and the iron parts were finished in bronze paint (Text fig. 4; Plate III, fig. 3). Serial numbers located are: 101 (private collection), 106 (Skinner sale lot 145), 130 (Billings fig. 118). Student's models with rack and pinion coarse focus, short lever fine focus, and draw tube have serial nos. 218 (Billings, fig. 120, bronze paint?), 256 (green paint, private collection), 260 (green paint, private collection), 274 (black paint, Billings fig. 433, no indication whether the black paint is original; an incorrect round glass stage is mounted). Billings gives the dates of 1875 - 1879 for this model, and the sequence of serial numbers would seem to support this, except that it is in the 1874 catalog, along with the Popular; it may be, then, that these numbers are sequential only within models. This Student's Microscope was discontinued after 1879 when Queen worked out his marketing arrangement with J.W. Sidle, and adopted the Acme line of microscopes. This is also the date of the discontinuance of the Lister limb form of the Army Hospital model.

W.Y. McALLISTER
Philadelphia

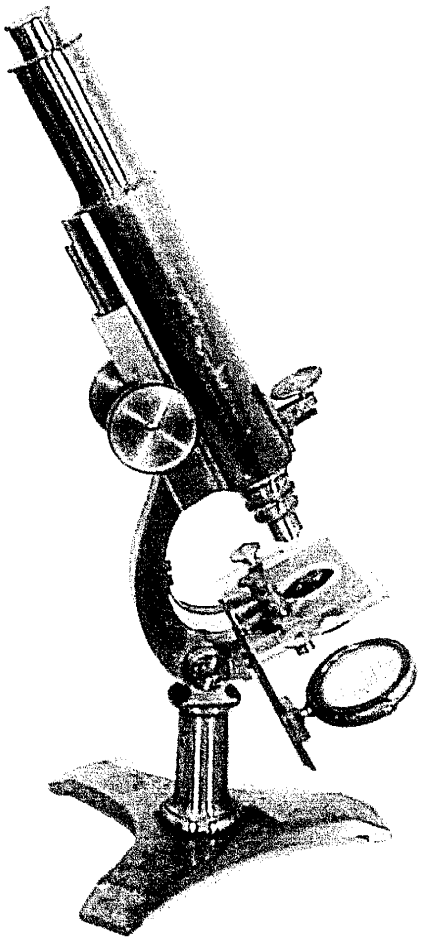


Fig. 5

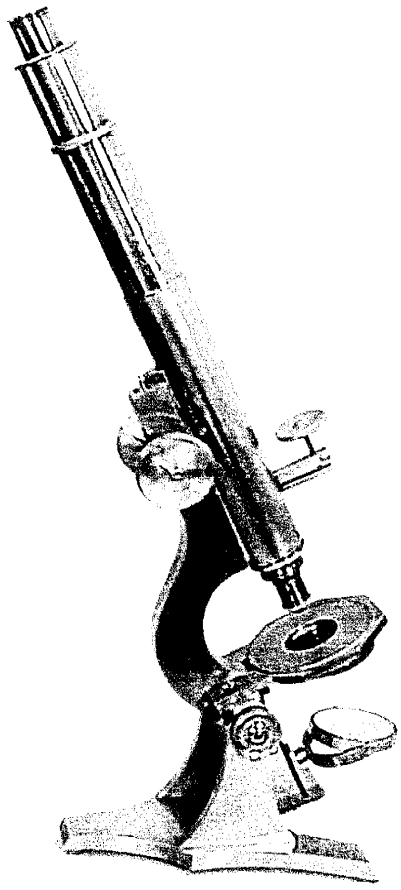


Fig. 6

PLATE IV

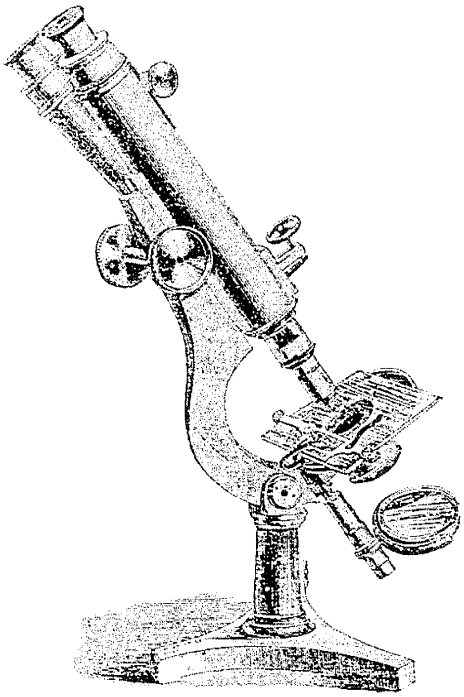


Fig. 1 Queen's student's microscope

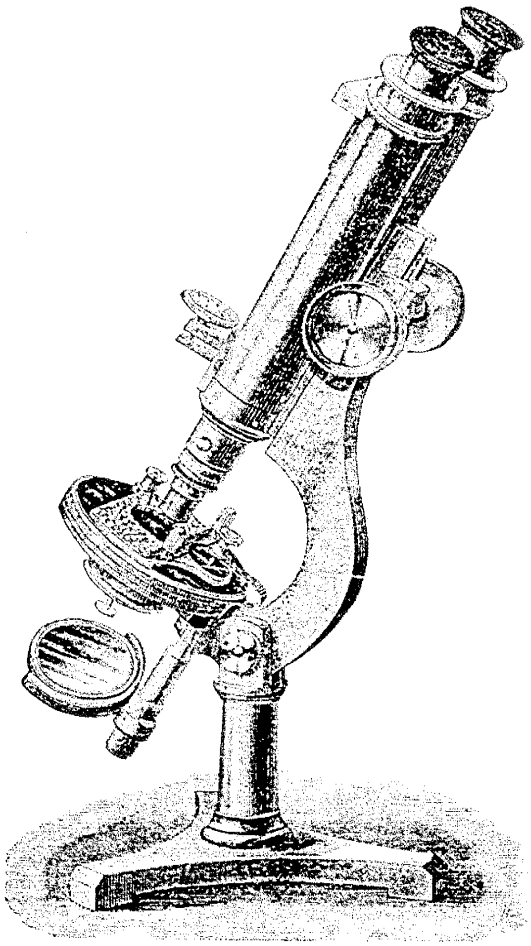


Fig. 2 R & J Beck's New National

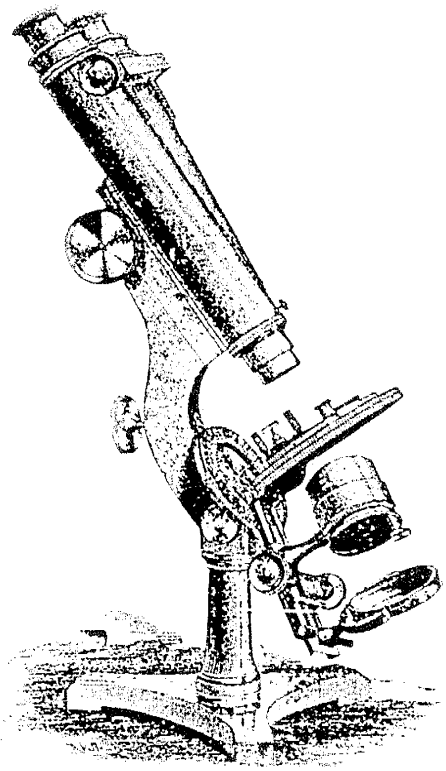


Fig. 3 R & J Beck's National

An example of a microscope very similar to Queen's Student's clone signed "W.Y. McAllister Philadelphia" appears in Historical Technology catalog 115:21, item 105. It is described as made of "blued steel" and brass, and had a friction roller coarse focus. Plate III, fig. 4.

JULIUS GRUNOW
New York

An example of this all brass Zentmayer clone, serial no. 793, is in a private collection. With the exception of the upper portion of the body tube, which has been reduced to the diameter of the standard Grunow eyepiece (there is no draw tube), the top of the limb which is wider because of a larger rack mechanism, and the focusing wheels, this is the closest copy of the third form Zentmayer instrument. The remainder of the stand is virtually identical, down to the smallest screw. The retaining spring for the glass stage resembles that on the first form Army Hospital model (Text fig. 5).

ERNEST C. FASOLDT
Albany

Although built on a Ross-type foot, this microscope by the son of Charles Fasoldt is clearly inspired by the third form Zentmayer model, with which it shares details of construction, but was probably not intended as a "clone." The Fasoldts made rulings and experimented with microscope design for their own needs, but were primarily watchmakers, and their microscope output was small. This example may be the simplest of the several types known to have been built by the Fasoldts and, therefore, perhaps the first. Two examples signed "E. C. Fasoldt Albany," both in private collections, have no serial numbers. A third, unsigned, is housed in the Union College microscope collection, is a development of the basic design, and, showing evidence of repeated modification, may have been the Fasoldts' own "shop microscope." Although Ernest did advertise as a microscope maker, no catalogs are known to have been issued by the Fasoldts, and their instruments are poorly known and largely undocumented (Text fig. 6).

R & J BECK
Philadelphia

Prior to 1877, the Becks' microscopes were distributed through the Queen company in Philadelphia. Possibly feeling that Queen was handling too many competing instruments, and desiring to increase their market presence in the United States, the Beck firm withdrew its products from Queen in 1877. They opened their own branch in Philadelphia, managed by W.H. Walmsley, whom they had hired away from Queen; they had agents in several cities. The 1879 catalog carried their "New National Microscope," another Zentmayer clone. Although it was also similar to Queen's later all brass Student's model, it differed principally in having the raised focusing wheels of the fifth form Zentmayer, and the revolving stage optional on the Queen and standard on the fourth and fifth form Zentmayer (Text fig. 7; Plate III, fig. 5; Plate IV, fig. 2). Apparently they wanted to produce, for the American market, a microscope design of proven saleability. The original illustration, unavailable for the first 1879 edition, but added to the second of the same year, differed only cosmetically from the model actually sold here, by having black recessed areas drawn from older Smith, Beck and Beck models. Ironically, in a masterpiece of poor timing, the design was introduced in the same time period in which Zentmayer redesigned his instrument, and Queen replaced its look-alike with the new Acme stands. By 1881, the Becks had redesigned their instrument, incorporating later Zentmayer like features, and redesignating it simply the "National," and, at a later time, the "Improved National" (Plate IV, fig. 3). By 1894, the Zentmayer swinging tailpiece was dropped. Serial numbers for the New National are 9669 (1880) (private collection), 9708 (1880) (Historical Technology 110:28, item no. 133), 10127 (1881) (Historical Technology 104:23, item no. 108). The National added

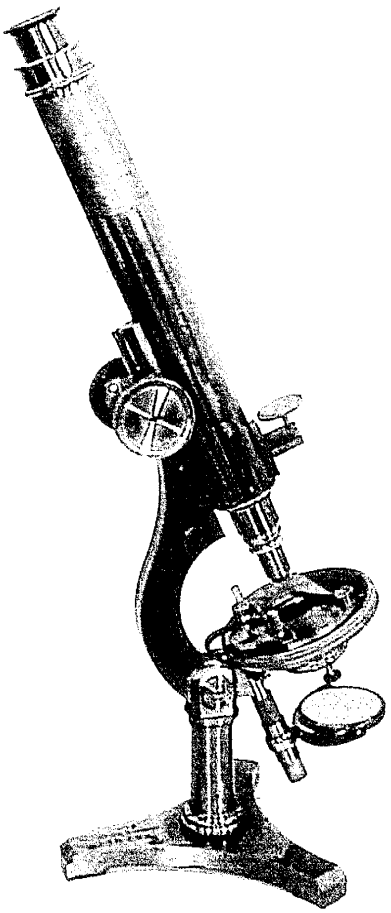


Fig 7.

an available swinging substage and an internal long lever fine focus, but retained the Lister limb. An early National number is 10698 (1881) (private collection), and is equipped with a large sector disc, apparently discontinued in later years, as it does not appear in their 1894 catalog. There is, in another private collection, a microscope designated by its owner "National," and numbered 8341 (1877). Illustrations "New National": Beck catalogs 1879, n.d. (c. 1880) (Philadelphia); "National": T.H. McAllister catalog, 1881 (with sector disc); "New National" and "Improved National": Williams, Brown and Earl catalog, 1889; "National": Beck Catalog 1894 (London, no sector disc).

Possibly these microscopes at first may have been targeted at Queen, who had become a competitor along with Zentmayer, and who offered first their own student's microscope, and then later the Acmes, whose No. 2 and No. 3 had prominently featured the large sector disc since their introduction.

EPILOGUE

The 1870's were a decade of explosive growth in the American microscope industry, with the numbers of manufacturers virtually doubling, until a peak was reached in the early 1880's. While the number of instruments produced continued to increase, the number of manufacturers did not. As the shakeout proceeded, the designs produced converged on only a few successful types. As production capacity of the larger manufacturers increased, the smaller ones fell by the wayside, no longer able with their older methods and attitudes to compete economically. The lasting success of this Zentmayer design of the 60's and its attraction to imitators during the 70's would not be repeated in the 80's or beyond.

For nearly half of its long life, the Army Hospital model retained its clean, functional design, making it a successful and popular phenomenon, and, in its definitive third form, a model for imitation. Even as it amassed imitators, it eventually fell victim itself to the trend towards complexity that had bedeviled the English microscopes, perhaps in an attempt to set itself apart from its competitors. Losing its distinctiveness, it soldiered on in its new form until the end of the Century, but without its corps of imitators, it lost its identity, and merged, faceless, into the crowd.

ACKNOWLEDGEMENTS

Appreciation is expressed to the following individuals who contributed information, references, commentary, and/or aided in other ways: Dale Beeks, John B. Bell, Jr., Michael Benz, Paul Ferraglio, M.C. Harrold, Barry Sobel, James Solliday, Donald B. Wing.

REFERENCES

The Billings Microscope Collection of the Medical Museum. Armed Forces Institute of Pathology. Second Edition. Washington, D.C. 1974.

Bracegirdle, Brian. Notes on Modern Microscope Manufacturers. Oxford. 1996.

Frey, Heinrich (George R. Cutter, Transl. and ed.). The Microscope and Microscopical Technology. New York. 1880.

Hartley, W.G. The Light Microscope. London. 1993.

Kellert, Ellis and Leonard B. Clark. The Microscope Collection at Union College. Union College. Schenectady, N.Y.. 1967

Lankester, Edwin. Half Hours with the Microscope. New York, 1874.

Padgitt, Donald L. A Short History of the American Microscopes.

Seiler, Carl. Compendium of Microscopical Technology. Philadelphia. 1881.

Smith, J. Edwards. How to See with the Microscope. Chicago. 1885.

CATALOGUES

Beck, R. & J. London and Philaadelphia. 1879, n.d. (c.1880), 1894.

Coffeen, David. Tesseract. Nos. 33, 37. Hastings-on-Hudson, N.Y.

McAllister, T.H. New York. 1875 (partial), 1881.

Moskowitz, Saul . Historical Technology. Nos. 104, 110, 115, 129. New York.

Queen, J.W. Philadelphia. 1871, 1872, 1874 (partial), 1879.

Sidle, J.W. (Acme Optical Goods) Lancaster, PA. 1880.

Skinner, Inc. Science & Technology. Sale 1790. Bolton, MA. July 19, 1997.

Williams, Brown, and Earl. Philadelphia. 1879, 1889.

Zentmayer, J. Philadelphia. Fifth ed. (n.d., c.1879), Fifteenth ed. (1895).

Dori and Leo Milan at a recent Wednesday MSSC Meeting.

MSSC Slides Available for Check out

Leo Milan

Lee Gonzales Slides

Thanks to the efforts of Norman Blitch in cataloging them, the Lee Gonzalez sections of the MSSC slide files are now available for check out to members. There are six boxes with the following contents:

Box 1. 48 slides of histology, human and animal.

Box 2. 64 slides of animal histology and embryology.

Box 3. 35 slides. Insects.

Box 4. 56 slides. Protozoa and pond life. Bacteria, botany, pollen and miscellaneous.

Box 5. 88 Slides. Algae, botany, fungi, histology, animal, human, mammalian, pisces and reptile.

Box 6. 50 slides. Insects, protozoa, miscellaneous.

A member can check out one box at a time for a maximum of 60 days. Boxes will be issued and returned at the Crossroads school meetings.

Coal Ball Slides

Last year, member Herb Layfield kindly donated a fine collection of Flatters & Garnett coal ball fossil plant section slides. These were checked out by six members. Please bring these back to the next meeting so that they can be redistributed to other members.

Also, the Society owns a fine set of John Wells slides whose whereabouts is unknown. Please return this set also so that it can be added to the lending library.

WORKSHOP of the Microscopical Society of Southern California

George G. Vitt, Jr.
Date: Saturday, 3 July 1999
Location: Ernie Meadows' residence

1. **Jim Solliday** recapped J. Collins' talk.

2. **George Vitt** showed an example of fine leather bookbinding that had been done for him in Spain by a top rate bookbinder several years ago.

3. **Gaylord Moss** described his new capability with his PowerTowerPro Mac OS computer: a Yamaha CD-RW unit. Each CD can store 650 Mb of data at a cost of $1 each. Thus, for example, it is possible to put 10-20 issues of the MSSC Journal onto a single CD. There followed a general discussion on the relative merits of various means of archival storage of digital data.

4. **Bob Faust** brought an interesting but non-microscopical item: a crossbow of the Montagnards of Viet Nam. Besides showing it, the reason for bringing it was to determine the nature of the missing trigger mechanism. This information came from a smaller, similar crossbow which George Vitt brought.

5. **Ken Gregory** showed a B&L dissecting microscope on a wood base, c.1929, and a mint cased Camera Lucida by Spencer.

6. **Stuart Warter** showed a gilt brass monocular opera glass by "Adams, London." He then showed a free-standing Cary type botanical microscope in which the threaded main tube can be removed and attached to a base for inspecting surfaces. This microscope features button type objectives. Stuart also displayed a "Withering type" botanical" microscope contained in a small, 2.5" diameter, cylindrical case, as well as a Culpeper type microscope.

7. **Jim Solliday** talked of George Adams who lived in the mid 18th century and had one of the largest collections of microscopes of George III. Jim referred to an excellent book on this collection, *Public & Private Science*, Oxford Univ. Press. He then showed a Culpeper type microscope signed "George Adams, Sr., Fleet Street, London" cased in a wood box with drawers for all the usual accessories. There were 4 Culpepers on display - three of Jim's and one of Stuart's. Jim then displayed a telescope in a small case.

8. **Barry Sobel** showed a Benjamin Martin Culpeper type microscope of the 18th century.

9. **Jerry Bernstein** brought a large carton containing small rectangular plastic boxes as freebies.

10. **Dave Hirsch** showed an early cased Collins binocular tube microscope with an extra case for additional accessories. He then showed a W. Jones microscope with a sliding 2-objective nosepiece, Wenham prism, stage forceps, bullseye, and x-y stage, a centering R/P substage with polarizer, and no fine focus on tube. c.1850, signed "Thomas Jones."

11. **Barry Sobel** showed a Rousselet compressor and cover slip clamp, a "Butterhill" trough. He then showed "Werrington's Universal Microscope," by Salmon c.1850, which comes apart and goes into a backpack and can be configured in several ways, as described in Carpenter. A very rare microscope of which there is one example in the RMS collection.

12. **Dario Solares** showed a weighted thermometer graduated between 70-80deg.F and used in the measurement of the specific gravity of liquids. Dario noted that the thermometer had been invented by Galileo.

13. **Gaylord Moss** described some new additions to the theory of light as demonstrated by a plate perforated with many holes with a diameter smaller than the wavelength of light (say, a few nanometers). It is astounding, he noted, that this arrangement passes more light than a completely open area equal to that of the holes. He then discussed fractal antennas which have the exact property one needs for high gain (efficiency) and that this configuration is used in some cellular phones.

14. **Herb Gold** showed a superb Van Heurck microscope by Watson, s/n 2937 (1892), with a tube length range of 130 - 300mm for correcting for cover glass thickness, 270 degree rotary stage with x-y capability. In all a beautiful instrument. Herb then read from *The Microscope*, by Van Heurck. There followed a general discussion of how the names of professors and such got attached to certain models of microscopes.

15. **Larry McDavid** showed an Abrams Planetarium sky calendar. He then told how he was able to find a bulb for his Lensometer. He obtained it from "Bulbman," a dealer in bulbs for scientific instruments:

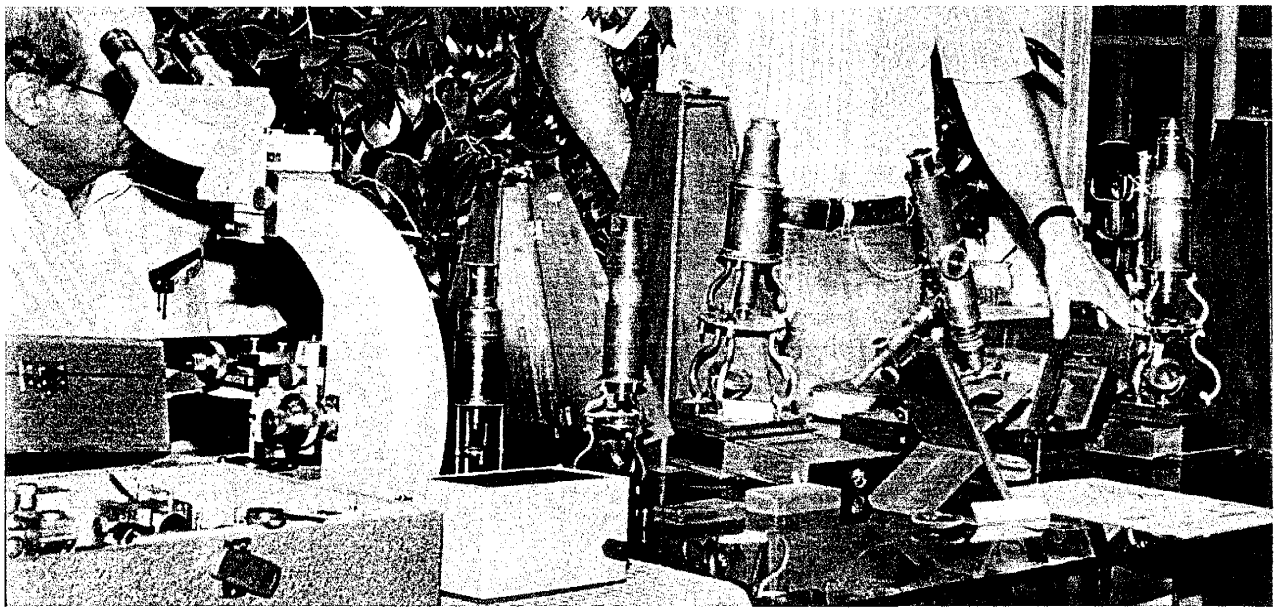
(www.bulbman.com; (800) 648-1163). He then showed an early 1900s accuracy thermometer, graduated 19-26deg.C with a resolution of 0.01deg. Larry then showed a book on Historical Meteorological Instruments and two types of "Sunshine Recorders": The first of the Campbell-Stokes type using a large solid glass ball which focuses the sun's rays onto sensitive paper placed onto a mahogany spherical shell surrounding the lower surface of the ball and closely spaced to its surface. The focused spot traces a visible path on the paper as the sun traverses its course. The second type shown was the Jordan Sunshine recorder. This is comprised of a hollow open cylinder whose axis is aligned in an equatorial mount to coincide with the

July Workshop-continued on page 151

Photos from the July Workshop

Herb Gold with his magnificent Van Heurck.

Another view of one of the display tables



Zetopan, Culpepers and Stuart Warter's Cary type botanical on an ingenious base that can be assembled in many ways for various functions.

Member Profile

Peter G. Fischer

Age 1 $^{1}/_{2}$

1999

I was born in the spring of 1933 in Zurich, Switzerland, the oldest of 4 children. My sisters and brother, all still live there. My father wanted a Peter, my mother a Gerhard. They baptized me Peter Gerhard and for the first year or so, they each called me by their preferred choice until my father gave in and I was called Gerhard for about the next 43 years, until I started in sales and was told that the name is too difficult to remember and pronounce. It would have made my father happy.

I grew up in a small village about 8 miles from the center of Zurich. At that time, about half of the families had small farms and the kids I grew up with were of rather modest means. They later sold their land and are now living very well in their large, luxurious view homes. The house I grew up in was built by my grandfather, who was a hunter and small farmer. He died before I was born. We had several small pieces of land on the side of a hill and my father later traded them for a couple of nice, flat pieces of farmland, because he thought that he might do a little farming in retirement. I inherited one of them and it is still zoned agricultural. All our former land is built over with villas because of the unobstructed mountain views. Years ago, my brother took a photograph of me standing in the middle of my land and sent it to me titled "Outstanding in his Field."

Watching the development of 9x12 photographic glass plates in my father's dark room are my earliest memories. It was magic, standing on a chair and observing the slow appearances of images (mostly of me) in the red and orange light. The period from 1939 to 1945 was the most interesting for me. In 1939 Switzerland was mobilized and had about 450,000 soldiers. In 1940, Zurich was fire bombed by the British, causing injuries and damaged buildings. More serious was the American bombing of Schaffhausen, a picturesque small town on the Rhein river, where forty people lost their lives. Nightly blackout became mandatory after that.

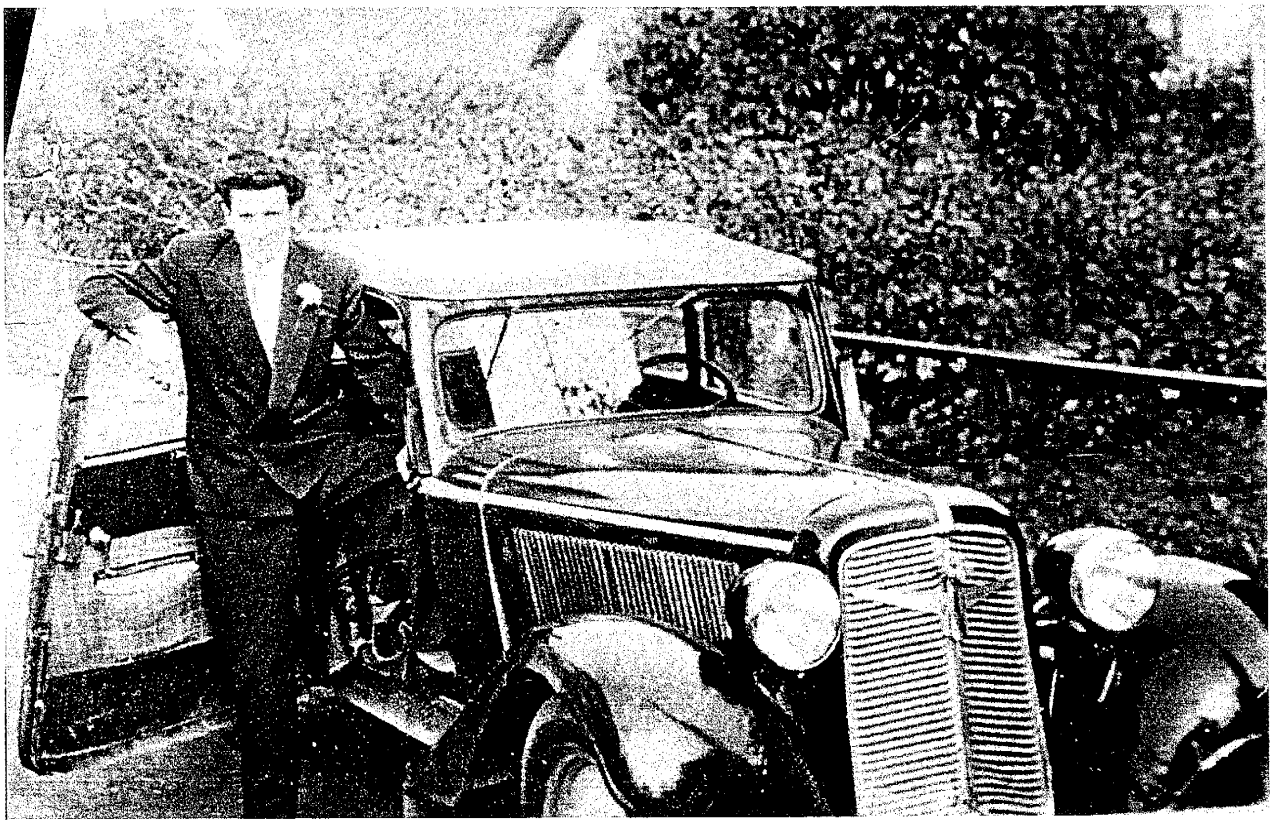
With Eleanor Roosevelt

Skiing at Zermatt 1960

My father was on active duty for much of the time. Whenever he came home, I expected and usually received a stiff spanking for all the mischief that I had gotten into during his absence. Besides soldiers, we had refugees in our town; first, Polish officers who were interned and worked on farms, later kids from France, Holland and Germany. That made school life more interesting and we learned about the war. Switzerland had close to 300,000 military and civilian refugees to a total population of about 4 million. This ratio would correspond to about 20 million for the US population of today. Food was rationed and we planted a large vegetable garden and raised a pig. It was an opportunity for me to earn money by raising rabbits and selling the meat to city people who rode out to the country on their bicycles on weekends. Gasoline was rationed and very few non military cars crowded the streets.

American bombers could often be seen in the sky. They were sometimes damaged and their occupants could be seen parachuting prior to crashing. At the end of the war, there were over 150 US bombers and 1100 US flyers interned in Switzerland. The most memorable was a flying fortress which the pilot ditched into the lake of Zurich. I saw the drenched pilot who was picked up by a small boat and brought ashore. Newspapers reported that he was 21 years old but he looked more like 15. I could not comprehend that someone so young would be given so much responsibility. That evening I dreamt that one day I would be a military pilot and visit America. Only part of the dream materialized, since I failed the physical to become part of the Swiss Air Force.

My father had two hobbies, guns and making gun sights. He had boxes full of surplus lenses, prisms and magnifiers. While he was away in the military, they were all mine. At home, we had many rifles, pistols and boxes of ammunition around. An open field behind our house served as our rifle range with targets from 25 to 100 meters. I received training with 22 caliber pistols and rifles, but was not allowed to use the larger caliber guns. When my father was away, the temptation was irresistible. I barely escaped a potentially serious accident when I forced into a pistol a bullet that was a little too large. I will never forget the puff of warm air and smoke that escaped from a 2 cm crack in the barrel and hit my eyes when I fired. The only injury received was from the strongest spanking of my life. It left large blue welts on my behind, but probably did not constitute child abuse in those days. The "gun room" remained locked until the end of the war. I, however, still had all the lenses and magnifiers. I built myself a stereo microscope consisting of eyepieces and objectives mounted in a wooden body. The image was re-



My cousin with my first car, a 1934 Adler.

versed, but that did not bother me, as I looked mostly at plants and insects. It was fascinating. Perhaps this accounts for my life-long love of stereo observation. I did not look through a compound microscope until about age 16. My father also had several telescopes. Helped by the blackout and clean air, nights were ideal during the war for observing the starry sky. One night, as we looked at the moon, I predicted that one day people would land there. My sister who is two years younger started crying and hitting me and wanted assurance from my father that this was not true. Somewhere, I had read about rockets but had not seriously thought about space exploration. Reading was my obsession and I became the school librarian.. I was interested in things mechanical and, much later, electronics. Playing with the Erector set and a small steam engine and building small sailplanes were my early hobbies. At age 16, I purchased my first automobile, a 1934 Adler. Since I had to be 18 before I could legally drive, I had time to explore it, rebuilding the engine and painting the body. I painted a license plate and, when my parents were not around, took the car for drives. Many other old cars followed this one and, even today, I have a 1950 convertible Mercedes built in pre-war body style sitting in my garage awaiting restoration.

My father wanted me to do an apprenticeship first and start college later. And so I did, in electro mechanics and later went to night school to study Engineering. By this time, my interest shifted to electronics. While going to school and after graduation in 1956 I worked in a small research organization in Zurich with many interesting projects like building a model of an automatic parking garage where the size of the car was automatically measured and the car then moved to a space just fitting its size. It was a dream job. Another interesting project was the development of germanium point contact diodes. It reminded me of the lead crystal detectors I built and sold to my buddies in grade school.

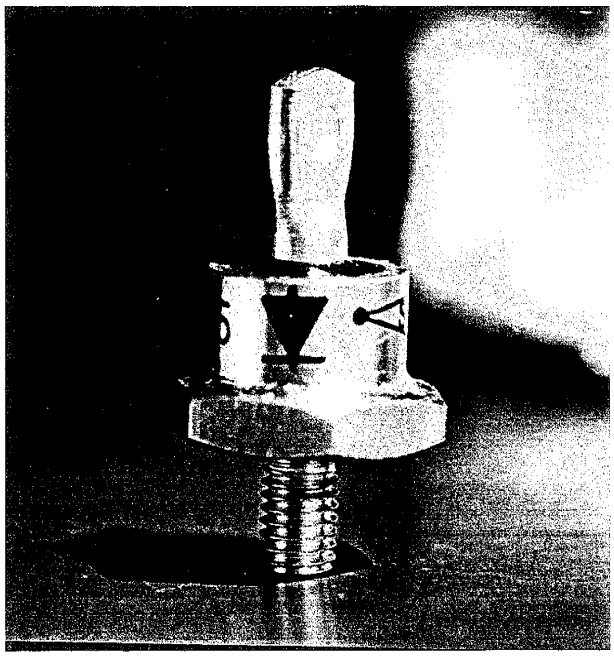
In 1957, I participated in an international graduate study program in the USA to study the inner workings of American Industry. I planned to follow that with a 3 month trip across the country. Sorensen was the first company to which I was assigned. They had a research laboratory in Stamford, Connecticut producing Silicon Rectifiers. I requested a transfer to the laboratory and found the work fascinating. My first job was the construction of a crystal growing apparatus. Eventually, with the firm's help, I was permitted to remain there until the end of the program. Coincidentally, Sorensen had a Swiss branch and they planned to make rectifiers in Switzerland. They made me an incredible offer, "spend 6 more months here, go to Switzerland and set up the operation and we will get you an immigration visa so you can come back and work for another year, take your trip and then return to Switzerland"

Christmas in Cancun with my family. l to r. Son Marc, daughter Rita, wife Cora and me.

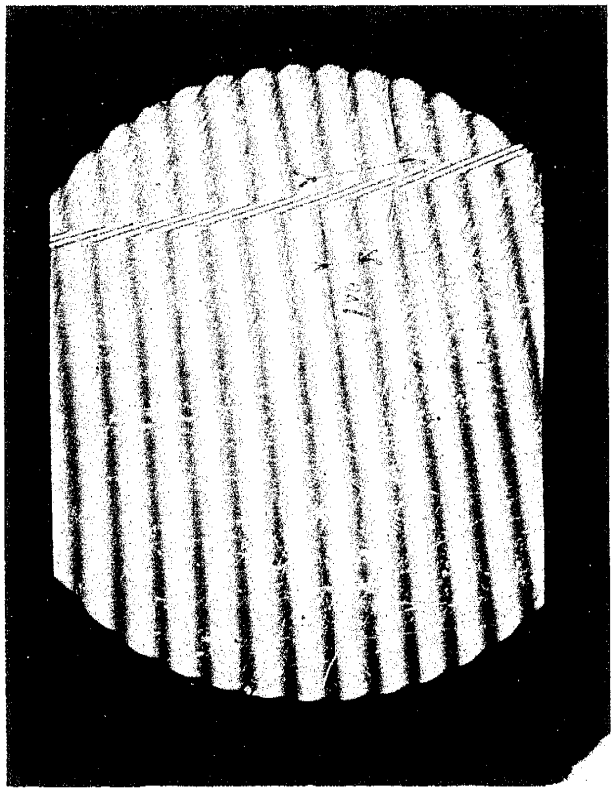
How could I refuse this? It worked like clockwork. I was very lucky. The operation progressed without a hitch. I produced the first silicon rectifier made in Switzerland, 3 months ahead of schedule. That earned me a one month bonus vacation. Meanwhile, the first preference immigration visa arrived. I flew from my vacation in Spain to New York in the fall of 1959, just in time to witness the closure of the laboratory. Raytheon had purchased Sorensen and since they had their own semiconductor manufacturing in Massachusets, they did not need this operation. I was offered a job there or a return ticket to Switzerland. Neither sounded enticing. Since I had no money, travel was out too. I started looking for a job in Connecticut where I had made a number of friends. While visiting one of them, Ms. Marion Dickerman, Director of the Mystic Sea Port, my hostess received a phone call from Mrs. Eleanor Roosevelt, a long time friend. Mrs. Roosevelt invited her to lunch at her Hyde Park residence to tell her all about the visit of Nikita Krushchev a few days earlier. I was invited to drive Ms. Dickerman and enjoyed a very pleasant lunch with the most charming former First Lady and also got to sign the guest book just below Krushchev.

Sperry Rand hired me. They had a semiconductor operation in Norwalk, Connecticut and a secret project developing monolithic Integrated Circuits (ICs). The methods were very primitive then. To produce a photo mask for example, one would photograph a pattern using a Graflex camera, move the camera until the pattern had the right size as measured with a vernier caliper, then insert a photographic glass plate and snap the picture. Developing reminded me of my fathers dark room of 25 years ago. The semiconductor industry was in its infancy. People were moving to new firms every week. In 1961, I was offered the job of Director of R&D in a small firm in New York. My salary was $11,000 per year and stock options of 50,000 shares at $0.75 a share. Fairchild had just come out with the FD100 switching diode that was to be used in computers. I had previously copied it at Sperry and was now going to produce it. After a hyped up announcement in the press by a market maker, the shares zoomed to $ 6. That put me on cloud 9 and I started believing the stories I often heard as a child of someone going to America and becoming a millionaire. At an exchange rate of 4.3 Swiss franc to the dollar, I now was a millionaire in Swiss Francs on paper. The company was to go public in 1962. In the spring of 62 the market dropped. Our stock was quoted at 50 cents and I was poor again and all my dreams flew out the window.

That was enough adventure for me. I decided to quit, do my traveling and return to Switzerland. First, I sailed for a month along the coast of New England, trying out a salt water still I had invented. I then sold the boat, bought a tent and cookware and took off by car, driving south on the old Post Road all the way to Key West, then along the gulf to Texas and down to



The first siliconrectifier made in Switzerland. (1958)



Interferometric measurement of oxide layer.

Acapulco, Mexico. After a month of exploring Maya ruins and pyramids, silver mines and old towns, it was back to the National Parks and the familiar USA. I camped out most of the time until eventually the rain forced me down from Washington all the way to sunny Southern California, where I arrived in November 1962, bearded and broke. I checked into a (sleazy) hotel in Hollywood. The occupants were mostly movie actors between jobs. Since I did not have the funds to buy the return ticket, I once again decided to look for work and to return to Switzerland in the spring. Well, spring never came and I am still here.

Even with a beard, which was quite rare for an engineer at the time, I managed to promptly find employment at Hoffman Electronics in El Monte. They had started development of integrated circuits and I joined their R&D department. By this time, photomasks were made by the step and repeat process. Technology had taken a quantum leap. They also manufactured solar cells for space application, a technology in which I was interested. In 1966, I moved to the beach area so I could be closer to sailing. International Rectifier in El Segundo was my next employer and I remained there for 11 years. Again, I started in R&D in a management position and later moved into manufacturing as Operations Manager. I had my first experience with setting up a manufacturing operation in Tijuana, Mexico. By now I was 38 years old, still single and considered by many to be a "confirmed" bachelor (I never understood exactly what that meant). I had my sail boat, was flying airplanes and living in a bachelor pad on the Esplanade in Redondo Beach. Life was almost perfect. Then, at a wedding reception I met Cora, my wife, and probably the best thing that ever happened to me. She was assigned to Los Angeles by the Philippine Government and had one of those diplomatic identity cards you could put on the dash of your car and be immunized from parking tickets. We were married in 1971 in the Philippines and, after a trip around the world, settled in Palos Verdes. In 1972, our daughter Rita was born. She is currently living in the Bay Area and works as Global Product Manager for Guidant, a manufacturer of surgical catheters, stents, pacemakers and various other items used in cardiology. Marc, our son, was born in 1977. He lives in Washington State where he operates his printing business, tours the country with his band and produces graphic arts for the music industry.

I was now a BUM (Business Unit Manager) and became a casualty of one of the frequent re-organizations that occurred with every down turn of the ever volatile semiconductor industry. It was time to try something new. I enjoyed microscopy and was considered the expert in the field wherever I worked. Although much of the physics in semiconductors happens inside the material, tell-tail signs of most problems are visible on the surface. William Shockley, who received the Nobel prize for his invention of the transistor, called it "the physics of dirt." I found the Reichert Zetopan DIC to be superior to anything on the market and it helped me numerous times in diagnosing a problem. Wild Heerbrugg was looking for a technical person as liaison between the semiconductor and electronics in-

dustry and development at the factory in Switzerland. I fit the requirements and started traveling among the industry here and the factory in Switzerland. At that time, Wild purchased the controlling interest in Leitz. Since Leitz had a considerable effort and program for instruments for the semiconductor industry, development at Wild was reduced to work on stereo and macroscopes. The last Wild design of a compound instrument was the Dialux 20 which then was produced by Leitz. The merger did not go smoothly. Some of the old Leitz people had not the highest opinion of the small Heerbrugg group. After all, Wetzlar had been at it for over 100 years and Wild only started to work on microscopes around 1943 when they were sure Germany would lose the war and there would be a need for new instruments once the war was over.

I became the US sales rep for the electronics industry and also had to train dealer personnel. In 1980, the Wild and Leitz sales organizations in the US joined and my territory was reduced to the west coast, but my product mix increased to most of the Leitz products including at one time Histology and most of the former AO, Cambridge and B&L line. I was also the specialist on the acoustical microscope.

In 1988 a Swiss conglomerate approached me to set up and manage a US sales and service organization. They manufactured electro plating equipment, mainly used for plating precious metal. I became president of the US operation and after about 6 months the president of the parent conglomerate was fired and that part of the business sold to a company that already had a presence in the USA. I had a 10 year contract and probably could have retired and collected my pay. Instead, I started a new business, manufacturing a gift item in Mexico, a miniature brief case that was the idea of my partner. I invested my money, developed and manufactured the product. Unfortunately the business failed.

By this time the big merger between Wild, Leitz and Cambridge Instrument took place and they asked me back. So, I was in microscopes again until 1994, when as part of yet another management change and a decline of industrial sales in Southern California, I was let go. Shortly thereafter I started at Philips Lighting in Torrance as Purchasing Manager. My buyers were at the factories in Taiwan, China and Mexico and at Corporate in Torrance. That required frequent travel to Asia. In 1997, corporate headquarters moved to Chicago, but they wanted to keep me on as consultant working out of my house. Just as I was to retire in March 1998, the plant manager in Mexico quit on short notice and I was asked to manage the Tijuana factory. This was my third Mexico venture. It was a challenge because Philips had just closed a factory in Taiwan, and Tijuana had to double production and increase employment to 1,600 people. It was hard work but an exciting challenge.

I did "retire" as of April 1 this year and started a business representing Taiwan and China based suppliers. Next time when I retire, I will start fixing up my Mercedes and hope do some serious work in microscopy, especially polarized light, using my Orthoplan Pol.

In 1992, at the TRW swap meet I met George Vitt and he invited me to join the former LAMS and I am glad I did. I enjoy the programs and the many interesting and knowledgeable members. I have several relatively modern instruments, a few common brass types and photographic equipment which is very under utilized in spite of me being turned on by some of the presentations shown at our meetings. Thanks to all of you for your contributions.

July Workshop-continued from page 145

latitude of the place, and which has a hole in the middle of its upper surface. Blueprint paper is placed inside the cylinder and the sun's light exposes it through the hole, tracing a path which is then read to determine the sunshine time.

16. Alan de Haas showed a rare Cooke, Troughton & Simms interference microscope (which was used before the introduction of phase contrast). He then described a Beck UV microscope with Cassegrain reflective Beck objectives (172X, NA=0.9), used at a wavelength of about 250nm. It has compound leverage fine focus. Alan then showed an excellent late Reichert Zetopan microscope with interference and incident Nomarski attachments, a large assortment of epi and transmitted light objectives and various accessories. (Gaylord Moss is now the proud owner of this fine instrument).

17. John de Haas showed a beautifully restored objective as an example of his recent efforts at nickel plating. He stressed that of prime importance on the appearance of the finished job was the polish and cleaning given the brass prior to plating. John said that he could supply the necessary solutions to those interested in doing the same. Thanks, John!

18. Barry Sobel showed a microscope by R. Wasserlein, Berlin, c.1850 which had been handed down in the family of the original owner. He said that Klaus Kemp will research Wasserlein in Germany when he visits there.

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

NORMAL AND ABNORMAL HISTOLOGY
The Aging Prostate Gland

Walter Coulson M.D.

Dr.Coulson will illustrate the normal appearance of epitheluim and its mesen channel supporting tissuem the correlation of micro-and macro-anatomy using the prostate gland as a model.He will describe the gross and microscopic changes tht overtake the gland with age, inducing the development of malignancy.

Dr. Coulson has an M.D. From Edinburgh, Scotland and trained as a histopathologist.He came to the United States in 1960, and for the last thirty years has held an appointment at UCLA in the Division of Surgical Pathology.

MSSC 1999 Speaker's Calender

Oct. 20,1999 Moon Rocks under the Microscope. Prof. Jones.

Nov 17,1999 Member Exhibition Meeting.

Dec. 1999 Christmas Party-Date to be decided.

If you would like to make a presentation or can recomend a speaker, please contact Larry Albright at albright@plasma-art.com.

Saturday Workshop - October 2 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).

**CORRIGENDA to **
ZENTMAYER'S ARMY HOSPITAL STAND
America's Most Copied Microscope
(July, 1999)

Page 133. Text Fig.1. Add caption: Army Hospital Stand (third form) Ser. No. 910.

Page 134. Column 2, Paragraph 2. Third form microscope No. 110 is actually 410. It is transitional between the second and third forms in that it lacks a draw tube, and its two wheels are shaped (as is the single wheel of the second form) rather than having the flat surfaced wheels of the later third and all subsequent forms.

Page 135. Plate I, Fig.2, Note that the stage is mounted sideways in this photograph taken from Billings.

Page 136. Plate II, Fig. 5 (fifth form) is Fig. 3. there is no fig. 5 in this plate.

Page 137. Add captions to text figures, as follows:

Fig. 2. Queen Student's Microscope, sliding stage. Serial No 260.
Note that the left side of the glass stage has been omitted.
Fig. 3. Queen's Student's Microscope, rotating stage, Serial No. 256.
Fig. 4. Queen's Popular Microscope, Serial No. 101.

Page 138. Plate III. Add title: Other Monocular Stands

Page 139. Add captions to text figures, as follows:

Fig. 5. J. Grunow, Ser. No. 793.
Fig. 6. E. C. Fasoldt. Unnumbered

Page 140. Plate IV. Add title: Other Binocular Stands

Page 141. Add caption to text figure:

Fig. 7. R & J Beck's New National, Ser. No. 9669.

Page 142. Acknowledgements. Add name of John de Haas.