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America's First "Modern" Research Microscope

James D. Solliday

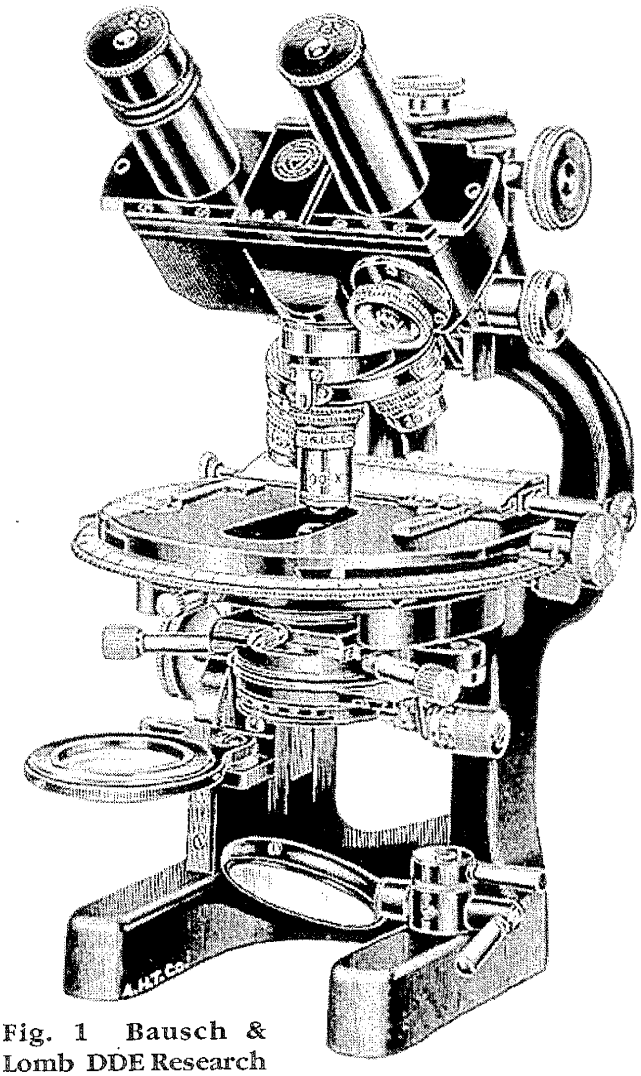

Fig. 1 Bausch & Lomb DDE Research Microscope

By 1929, the great factory, which rose from the banks of the Genesee River, represented the enormous prestige which the Bausch & Lomb Optical Company had achieved. It had been 76 years since J.J. Bausch and Capt. Lomb founded the optical industry in Rochester. By this time, the Company had established a network of service throughout the country. This service extended to the individual needs of its customers. This Company, that had now become a large enterprise, still responded to the suggestions and ideas of the end user. It was this constructive relationship that led to America's first "modern" research microscope.

The new DDE Research microscope was the result of

a conversation between a Bausch & Lomb representative and an end user. The conversation was held in 1927 with Dr. Lester W. Sharp of Cornell University. The subject turned to research microscopes and the difficulties of their manipulation. Dr. Sharp suggested the idea of a 'turned about' position of the main supporting features such as the arm and limb. This may seem like old hat today, but at the time it was quite revolutionary. This conversation continued with other workers who agreed that a new design was needed. A design that would better accommodate the long hours of use and make access to the stage and adjustments more convenient. Dr. L.F. Randolph of the U.S. Department of Agriculture agreed with Dr. Sharp and felt that the observation tube, as well as the stage, should both be facing the user. Again, the term 'turned about' position was introduced. This new arrangement would place the bulky limb and pillar opposite to the user and, therefore, out of the way.

All of these discussions lead to intensive research and experimentation on the part of the Bausch & Lomb research and development department or, what was called at the time, the B&L 'Scientific Bureau.' By 1929, their efforts resulted in the successful introduction and production of the new research model DDE (Fig.1). The first advertisement that I could find of the new DDE was in a Bausch & Lomb circular called The Educational Focus published in Sept. 1929 (fig.2).

The well-established dominance of the Continental pattern would soon begin to feel the challenge of a new and more modern design. The word 'new' is so often frivolously used to describe products which are, nothing more then, revised models. However, when used in association with the DDE microscope, the word 'new' carries its full meaning. To summarize a few of the improved features; the new turned about microscope now maintained a horizontal stage while at the same time provided comfortably inclined eyepieces. To change quickly from binocular to monocular vision and back again was a convenience. To focus the con-

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Fig. 2 Advertisement for the B& L Research Microscope DDE. From a Bausch & Lomb circular called *The Educational Focus* published in Sept. 1929

Fig. 3. B & L Microscope No. 250,000 presented to Dr. Novy (left) by Dr. Edward Bausch.

denser for high power work and leave it in position when going to low power by swinging in an auxiliary condenser was efficient. To manipulate the substage immediately in full view of the worker was an outstanding convenience. To have clear and unobstructed access to the stage was very time saving. To be able to focus the fine adjustment, which carried only the weight of the objectives, assured the finest action necessary when working at high magnification. Finally you could place the instrument on its back for convenient horizontal photomicrography, a method still popular in the 1930's and 1940's.

Many, if not all of these features were soon used or copied by other makers. Within a few years, all the major makers reversed the configuration of their large stands. Spencer soon followed with their reversed Research stand No. 8 with many of the same ideas. Later, AO adopted the independent focusing nosepiece. The basic features of the 'turned about' design can be found in such microscopes as the Ortholux and Zeiss Universal as well as just about all the mod-

ern stands of today. Ultimately, the research stands of the 20th Century have returned to the large size of the 1850's but with the new characteristics of convenience and efficiency popularized by the Bausch & Lomb DDE.

By 1936, Bausch & Lomb had manufactured their 250,000th microscope representing a quarter of a million instruments spanning more then a half a century. Of significance was the fact that the 250,000th stand was a DDE, and as it turns out, this fact was no accident. The story behind this small piece of microscope history goes as follows. When the American Association for the Advancement of Science met in Rochester in June of 1936, it was the first meeting held there since 1892. In recognition of the occasion, Bausch & Lomb offered to award its 250,000th microscope to a single member of the A.A.A.S. who had made significant contributions to human welfare by the use of the microscope. The executive committee, headed by Dr. Edwin G. Conklin, named Dr. Frederick G. Novy, a noted bacteriologist and former dean of the Medical School of the University of Michigan, to receive the honor. During his nearly 50 years of association with the University, Dr. Novy discovered and isolated the Bacillus Novyi, an agent of gas gangrene, cultured Trypanosoma Lewisi and discovered and isolated Spirochaeta Novyi, the cause of American relapsing fever. He also made notable contributions to the study of filterable viruses, the chemistry of bacteria, the causes of diphtheria, yellow fever and bubonic plague. Dr. Novy began his carrier in bacteriology and immunology as a student of Koch and Pasteur. On June 18th, a special luncheon was held by the A.A.A.S. at the Oak Hill Country Club in Rochester, at which Dr. Edward Bausch presented their 250,000th microscope to Dr. Novy (Fig.3). There were a number of speakers at the meeting including Edward Bausch himself. The speeches were later printed in *Science*, issue of August 7th 1936.

This award was no trivial acquisition because, at the time, a research DDE cost about as much as a small house. The DDE was the most innovative microscope on the market, but the timing of its production was not the most advantageous. During the depression Bausch & Lomb did not sell overwhelming numbers of high-end instruments. However, the DDE model ran from 1929 to about 1952. I do not know just how many DDEs the company manufactured but I have only been able to account for less then a dozen. No doubt, there are many more out there, but, for now, they remain in obscurity, perhaps relegated to the storage basement of the University in your own hometown. These instruments are beautifully made and should be sought out like lost pirate's treasure. If you should be lucky enough to find one, hang on to it.

Jim Solliday's description of the B&L DDE at the December 1999 MSSC Workshop.

See page 250

This is one of America's best research microscopes manufactured and signed by Bausch & Lomb Optical Co. USA. It was manufactured in 1948 as the DDE New Research and Photomicrographic Microscope. This magnificent instrument was first introduced in 1929 and was Bausch & Lomb's completely new research microscope design. It was adopted at the suggestion of Dr. Lester W. Sharp (cytologist) of Cornell University. Also involved in the design was his associate, Dr. L.E. Randolph of the U.S. Dept. of Agriculture. They suggested placing the arm at the front of the instrument, so as to give free access to the specimen, stage, objectives, substage and mirror. The primary aim of Bausch & Lomb was to provide "extreme rigidity" by eliminating the inclination joint and combining the arm and pillars into one cast piece. This leaves the stage in the horizontal position except when used in photomicrography. Flat contact points are provided on the back of the foot and limb for placing the entire instrument in the horizontal position. The rack & pinion are placed away from the operator and carry both the body and the independent fine adjustment. This fine movement acts only on the nosepiece and carries very little weight. Included are both a binocular and a monocular body tube which is intended for photomicrography. This stand also features a 150mm circular, revolving stage, which includes mechanical movement in two directions. It is centerable and includes a special glass slide with cross lines to aid in the centering process. The action of the rotation can be completed with the objective in focus and without any interference. The margin of the stage is graduated in degrees of rotation. The 'X' mechanical movement can be quickly removed if a large flat stage is desired. The substage is adjusted by geared rack & pinion providing a very fine action. A quick-changing dovetail slide is provided for inserting different condensers. This slider is centerable by means of two spring-loaded screws. A decenterable and rotatable diaphragm provides oblique illumination as desired. This diaphragm can also be swung to the side to attach a polarizer. A new feature of the substage is a large supplementary condenser on a swing arm (high low system). Also a one sided plano-mirror is supplied which can be set in place by a heavy clamping arrangement. Standard objectives corrected for 160mm tubelength are used along with standard Bausch & Lomb eyepieces. The objectives represent a complete set of 4 apochromat objectives. The DDE monocular body-tube features a graduated drawtube. The case has one large drawer and two sliding shelves with storage holes. Key and lock are in working order and the overall instrument is in excellent condition.

The Zeiss Cartel

Nicholas Grossman, Rockville, Maryland

This article is reprinted from the New Zeiss Historica Vol. 21, No. 1. Spring 1999
Courtesy of Allen Bishop

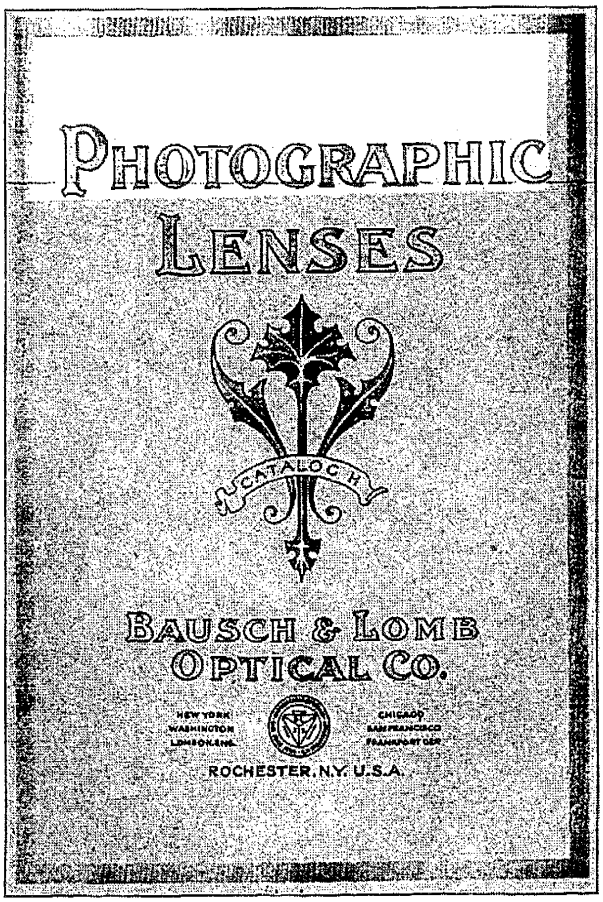
This article was prompted by the author's discovery of a book written in 1944 by Wendell Berge, the then Assistant Attorney General of the United States, on the subject of International Cartels or Monopolies that affected the contemporary war effort. Much of the material is newly discovered in that we have not considered it since that time and that the two companies involved have greatly evolved, as have their businesses. We know that Bausch & Lomb licensed many aspects of the Zeiss product lines (microscope design, photographic lenses, prism binoculars, etc.) beginning in 1892. This relationship was formalized in 1907 and broken in 1915 due to various situations having to do with World War I.

History in Retrospect

There are many aspects of the history of Zeiss that surface when we study the factors that have shaped the policy of the Carl Zeiss Stiftung (Foundation). Most of us are familiar with the goals and achievements of Carl Zeiss, Ernst Abbe and Otto Schott. These achievements have been recorded and preserved in books, technical journals, catalogs and oral presentations covering Zeiss microscopes, telescopes, binoculars, photographic lenses, planetaria and other Zeiss products. In recent times many of us have become interested in recording and preserving camera serial numbers, production figures, and plant locations. The achievements of Zeiss scientists and engineers have carved an admirable place in technical history. A lesser-known aspect of Zeiss history deals with the Foundation's top management's marketing strategy to maintain the cutting edge of technology and achieve profitability.[1] To meet these goals top management attempted at various times to monopolize the market by forming cartels! This also is history.

Expand the Market

In 1907 the Bausch and Lomb Company (B&L) of Rochester, New York entered into a commercial agreement with Carl Zeiss Stiftung. This cooperation was initiated by Bausch and Lomb to mitigate potential competition because Carl Zeiss (Schott) was planning to establish a glass manufacturing plant in the United States. The reference states that Zeiss management sent Professor Tschopski (sic) to negotiate an agreement under which B&L would use optical glass exclusively imported from Germany in the manufacture of military optical goods. The Fauth Instrument Company, of which George Saegmuller was president, was absorbed by B&L, and Saegmuller became a Vice-President of B&L. In the next step Carl Zeiss acquired one-fifth of B&L's capital stock and obtained representation on Bausch & Lomb lens catalog from the period discussed in the accompanying article. The Wording around the circular logo at the bottom reads: BAUSCH & LOMB OPTICAL CO - CARL ZEISS JENA - G.N. SAEGMULLER. In its center we see: OPTICAL TRIPLE ALLIANCE and the letters 8, 1, Z S.B&L's board of directors. in turn Zeiss abandoned its plan to establish a factory in the United States. The



Bausch & Lomb lens catalog from the period discussed in the accompanying article. The wording around the circular logo at the bottom reads: BAUSCH & LOMB OPTICAL CO. CARL ZEISS JENA - G.N. SAIGMULLER. In its center we see: OPTICAL TRIPLE ALLIANCE and the letters B,L,Z,S.

next complication surfaced in 1915 when Zeiss refused to continue to supply B&L with glass, because B&L was supplying military instruments to countries then at war with Germany. (The U.S. did not enter the war until 1917.) The book then proceeds to describe how B&L was forced to terminate the alliance and obtain the badly needed glass from other sources for the production of its optical goods.

Post World War I Period

The German manufacturing industry, especially the German optical industry, was suffering from the severe restrictions imposed by the Versailles Treaty. To get around these restrictions Zeiss management returned to B&L in 1921 to work out an agreement (a "secret" agreement according to Berge) to overcome some of the obstacles facing Zeiss. Zeiss would provide its "know-how" to B&L. In turn B&L would pay royalties to Zeiss as specified in the agreement. B&L denied that there was anything "secret" in this cooperative agreement, and stated that the original contract was shown to the U.S. Naval Observer stationed in Berlin. Yet the agreement stipulated that the two companies would divide the world market for military optics. Furthermore B&L would not sell military optical goods outside of the United States and Zeiss would not sell military goods in the United States. Other territories would be discussed as needed. This agreement was confirmed in a letter dated January 1927 signed by Edward Bausch and concurred by Carl Lomb. To facilitate the cooperation B&L in 1929 established under August Lomb the Bausch and Lomb GmbH in Frankfurt am Main, Germany.

Another provision of the agreement specified that Zeiss had the authority to pass on who would be chosen as directors of B&L's "Military Department." There are more detailed and specific stipulations concerning this marketing policy-and readers whose curiosity is titillated by these agreements should refer to the book. In May 1921 B&L's vice-president traveled to Germany to seal the agreement with Zeiss. One outcome of these discussions was that Zeiss and B&L set up a new corporation in Holland, called N.V. Nederlandische Instrumente Compagnie and known by its acronym "Nedinsco." The parties honored these stipulations. When the Greek Navy contacted B&L in December 1930 expressing interest in buying military instruments from B&L, the response was that B&L's priority is to provide the U.S. Government with military optics. Then it suggested that the Greek Navy could contact "our friends the Nederlandische Instrumente Compagnie, Den Haag, Holland, who has been manufacturing military optical instruments previously produced by Carl Zeiss, Germany." A similar excuse was given to the Mexican Government by B&L. Military binoculars were exempt from these cartel agreements, What did this mean? In 1931 B&L submitted a bid to the U.S. Navy for 600 binoculars, at an asking price of $39.50 each. Carl Zeiss also submitted a separate bid asking $26 for each pair of binoculars. Obviously this angered B&L management, but there was no violation of the agreement, and the information exchange continued. B&L informed Zeiss in October 1934 that it lost a bid submitted to the U.S. Government for 13 feet high military finders. The successful bidder was Keuffel and Esser (an American competitor of B&L). Based on these statements in the book, in appears that B&L scrupulously observed not only the letter but the intent of their agreement with Zeiss.

The New Era

With the formation of the Third Reich the freedom of action by Carl Zeiss Management was curtailed. Zeiss Management was reluctant to disclose these restrictions despite the agreements between the two companies In a memorandum of April 1938 Carl L. Bausch, a Vice-President of B&L, complained to Zeiss Management that despite one of the basic agreements that stipulated the sharing of the technical know-how he was denied permission to visit the Jena plant. Furthermore he complained that despite the fact that he had been sending the royalties to Zeiss, B&L was excluded from all new technical developments. It does not take too much imagination to sense B&L management's frustration. When B&L caught on to the drastically changing political environment, it was too late for corrective measures. In March 1940 Bausch & Lomb and Carl Zeiss, USA were indicted for violation of the antitrust laws. Pleas of nolo contendere were made, fines paid and thus a trial of the indictment was avoided,

Who Benefitted

This book was published in 1944 and obviously reflected the political mood and the atmosphere of that period. Did these two large and powerful firms benefit from these agreements in the long run? It is left to the reader to read the book and then decide. It certainly is in character with the mergers and acquisitions of today.

References

1. "Zeiss in the Netherlands" and "Zeiss-Bausch & Lomb Chronology," in *Zeiss Historica Journal*, 9 (1), Spring 1987.-Reprinted in the *MSSC Journal* Vol. 4, No. 11. Nov 1999.

2. Wendell Berge, Cartels: Challenge to the Free World. *Public Affairs Press*, Washington DC, 1944. See Chapter 10, "Optical Industry."

WORKSHOP of the Microscopical Society of Southern California

George G. Vitt, Jr.

Date: Saturday, 4 December 1999
Location: Ernie Meadows' residence - 21 persons attended

1. **John de Haas** suggested that the Wed meetings start on time so that we can end on time.Allen Bishop seconded this suggestion. Jim Solliday suggested that we use an alarm clock to time the sessions of the meeting.

2. **Jack Levy** informed us that Bioquip Products has an open house where they are showing their wares and serving refreshments.

3. **Ken Gregory** displayed a Zeiss-Winkel polarizing microscope, made in Feb 1936, which he had gotten on ebay. It features 4 centerable objectives, Ahrens prism polarizer and analyzer and adjustable Bertrand lens. It was the 'low end' model of the Zeiss pol. scope line at the time. See illustration on facing page.

4. **Stuart Warter** displayed three early nickel plated microscopes, which are illustrated in Billings: a) Made by Geneva Optical Co.; b) B&L first library microscope c. 1878; c) A c.1900 B&L second version of their Physician's microscope with glass stage & vulcanite mirror mount. Manufacturers started nickel plating their microscopes to gain a marketing advantage, stating that nickel maintained a more durable finish than did lacquered brass. **Alan de Haas** noted that, on modern production drawings, the thickness of nickel plating is specified, and that this thickness can he as high as 0.001 inch., although 50 microinches is adequate.

5. **Jim Solliday** discussed B&L microscope design and quality, noting that up to about 1970, B&L had continued to improve their microscopes and that subsequently, the quality deteriorated considerably and that it seems that B&L had abandoned the goal of producing quality instruments. He added that in 1960 they still made good instruments. Jim then described the B&L Mod. DDE photomicrographic microscope which was designed by professors Sharp and Randolph of Cornell University in 1928 and put on the market in 1929. It marked a radical change in the design of microscopes for several reasons: It was the first microscope in history that gave up the inclination joint; the nosepiece has a separate block which floats; it was the first microscope where the pillars and arms faced away from the operator, giving free access to the stage (and being called the "reverse" microscope for this reason). It featured a 150 mm circular centering stage and achromatic condenser. It was called a "Photomicrographic" microscope because it could be placed on its back, the axis in a horizontal position, resting on three bosses. It thus became part of an optical bench for photomicrography. Jim said that he had looked for a DDE for a long time and finally got one from Tony di Dinato. After the DDE, B&L made its last superb microscope, the Dinoptic series E, which featured apochromatic objectives and a best quality apochromatic, pancratic de-centerable condenser (with 11 optical elements), substage illuminator and an internal zoom system. Overall, this was the best condenser made for a microscope - being a Panfocal condenser, Pancratic or variable focus achromatic condenser. The condenser is on a micrometer rack, is instantly replaceable, and accurately centerable. Jim has another set of achromatic objectives and a special slide which comes with DDE and crosshair to center the stage. A monocular tube has adjustment screws to adjust it to the optic axis. See Jim's description given at the workshop on the bottom of page 241 of this Journal.

6. **Pete Teti** presented a list for people interested in having hands-on workshops of some 5-7 persons. The subjects included staining, care and cleaning, polarized crystals, stereo drawing, and micro-minerals. **Jim Solliday** suggested that we could have such a workshop as a short session before the regular meeting.

7. **John Fedel** discussed the possibility of investigating the structure of paper being produced for ink-jet printers by embedding the paper in paraffin and then cutting cross sections with a microtome for inspection under the microscope..

8. **Allen Bishop** discussed the article he is writing on the B&L DDE stand and also on material from the Zeiss Historical Society, of which he is a member.

9. **Dave Hirsch** showed a miniature cased spectrograph by Browning, London, who was the inventor of this type of instrument. Dave also showed a Baker microscope made in the second half of the 19th century.

10. **Jack Levy** told of an antique shop in Borrego Springs which has interesting items. He described a new Nikon camera lens - a 70-180mm zoom Micro-Nikkor, which focuses down to 1.5-ft giving an image-to-object ratio of 1/1.3 at 180mm. One of its elements is made of DD glass. He then described a new Nikon flash unit for macro work. It is not a ring flash, but has flash tubes to the left and right of the lens. Jack mentioned one fault of the Nikon F3 camera which relates to its TTL flash metering: the mounted flash blocks the ASA speed setting knob, noting that TTL metering is essential for the zoom lens. **Jim Solliday** mentioned that he uses the 105mm Micro-Nikor lens with extension tubes for close-up macro work, and is very satisfied with the results.

11. **Izzy Lieberman** recounted his obtaining a cased c.1927 Leitz monocular microscope from ebay in good condition. It has a rotating stage, a substage condenser assembly which can be offset for oblique illumination by rack & pinion, and which can also be rotated in the offset condition. The draw tube has a Society thread at its bottom for attachment of a low power lens that can act in place of the objective or be used as a Bertrand lens. The adjustable draw tube makes it possible to optically compensate for thickness of cover glass. There was a discussion of the cardioid cam type of fine focus on Leitz microscopes which makes it impossible to damage the fine focus mechanism. Reichert has a rotating plate which works against a roller. Izzy has a large block of paraffin that we can all have.

12. **Larry Albright** gave his results on ink-jet printing papers. New Epson paper, at 12 cents a sheet, is thin, textured, gives good blacks and 15 to 20 images per $25 ink cartridge - which represents the major cost of printing. Larry then showed a 1923 Fatima cigarette advertising poster which touted "Brain workers find in Fatimas that occasional pleasant relaxation so necessary to the best mental effort. Fatima is today the biggest selling cigarette. 20 for 15 cents." Larry also showed a June 1923 Scientific American article on the engraving of secret messages onto the heads of shoe nails with pantograph - Fahrens micro-writing machine that had been invented by the RMS.

13. **Alan de Haas** showed a display of mounted parts that make up a 100x, oil, fluorite metallurgical objective. Since this specimen had a damaged front element, Alan had no compunctions on dismantling it for such a display.

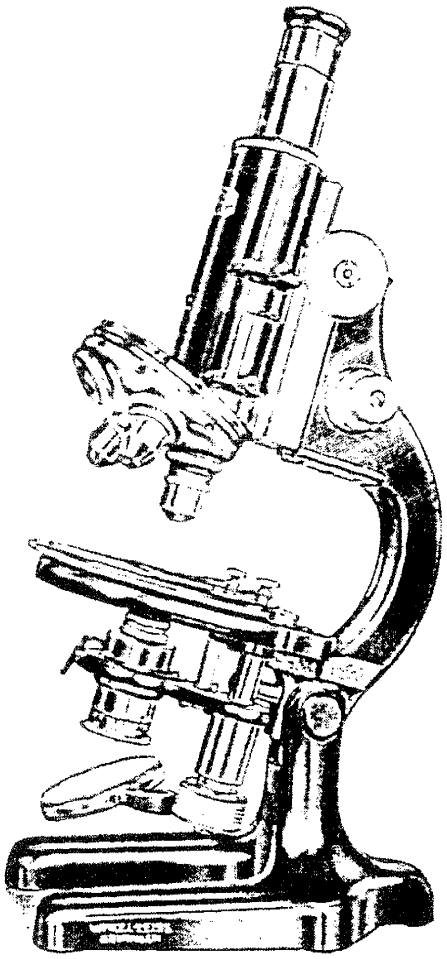
14. **Gary Legel** showed an illustration of a large Leitz photomicrographic apparatus, stating that Paul's Photo Co. in Redondo Beach has such a one for sale.

15. **George Vitt** made several announcements:
a) That **Ernie Meadows** will be giving a class dealing with the operation of machine tools, the class to begin after the workshop, convening in Ernie's superb machine shop. All those present gave Ernie their sincere thanks for this fine offer.

b) That **Alan de Haas** will start giving lectures, on the subject of optics, starting at 6pm, prior to the next meeting, and that he plans to have some 10 hours devoted to a series of such lectures.

c) That there is a shortfall of $120 on the expenses incurred in funding the recent talk given to MSSC by **Brian Ford**, and that **Larry Albright** is currently sustaining this shortfall. George urged members, who may have forgotten to contribute to that fine presentation, to reimburse Larry.

SPECIAL THANKS: We all wish to thank **Mr.& Mrs. Ernie Meadows** for the fine hospitality they are giving to the MSSC for its workshop meetings at their residence! **Ernie and Pete Teti** are also to be profusely thanked for their consistent and diligent efforts in obtaining and setting up refreshments for all to enjoy during both out Workshops and regular meetings.



MICROSCOPE, Petrological, Winkel-Zeiss,

A Lousy Tale

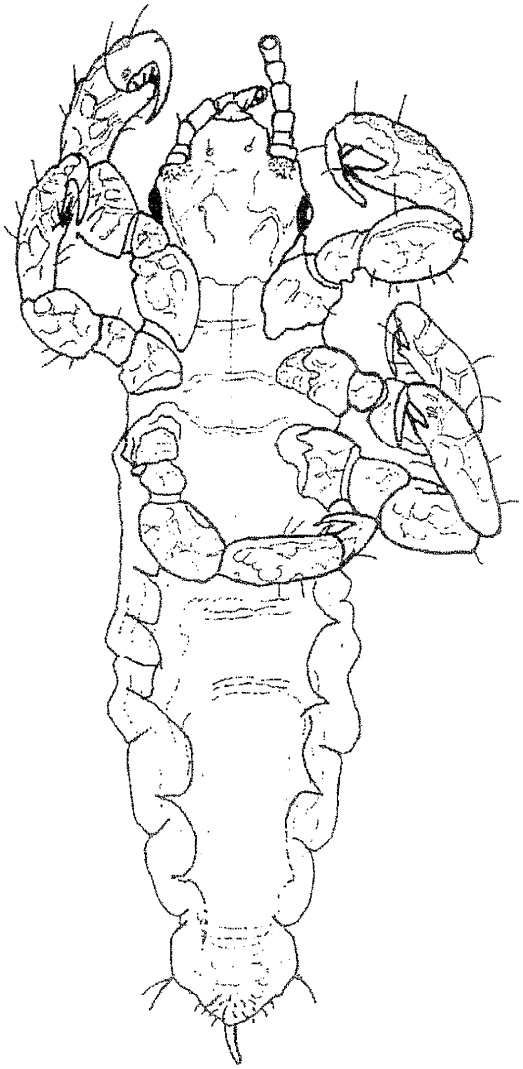
Chris Thomas

Reprinted from the Balsam Post, the Newsletter of the Postal Microscopical Society.
Issue No. 43. ISSN 0961 043X April 1999

I can vividly remember the day that my wife came to pick me up from work with the children. My sons hair looked damp and the pungent aroma of insecticide treatment wafted through the foyer.The look of shock that this innocent youth had been treated for the still present head louse must have been clearly visible on my face until my wife uttered the reassuring words "Its OK! I kept a few for you in a jar before he was treated". You can imagine my relief at finding that I had not been deprived of a good microscopical subject[

How should I deal with them? At first I observed them alive with a low power binocular microscope.The lice were helpless until presented with a few strands of hair which they gripped with alacrity and they could develop a sudden burst of speed. Indeed, removing them from the hair was difficult due to their strong hold, sliding them off a hair was the only option.The bodies are generally described as flattened front to back as compared to the fleas which are flattened side to side. However, they are more rounded than the description suggests In fact, I had some difficulty relating the specimens seen with book illustrations that showed them looking much flatter and with a very wide abdomen.

In order to make permanent mounts, I dropped the specimens into isopropanol as recommended by Eric Marson. After 24 hours they were transferred into xy-



lene. After a further 24 hours they were mounted in Canada Balsam. During a later infestation I experimented with placing the lice in between cover slips which were then gently bound together with thread. This had the effect of splaying the legs on either side of the body. The sandwich was then dropped into alcohol and treated with xylene for 24 hours each before mounting and gave very good specimens.

When viewed under a compound microscope, the lice prepared in this manner were remarkably transparent. In fact, with crossed polars, the muscle structure in the thorax and limbs was beautifully revealed! The accompanying figures show the front and rear views of one of the head lice prepared in this manner. The reason for the tubular nature of the abdomen was explained under the microscope. The left and right sides of the abdomen were folded and there was little evidence of a blood meal visible in the gut. Upon feeding, the abdomen can then expand to contain a good store of food. Large spiracles were obvious on the sides of the abdomen and the tracheids linking them were visible under higher power (not shown in figures). The inability to remove the lice from hairs even in death was also explained by the large claws on each leg which could grip like a jack-knife.

The 'Collins Field Guide to the Insects of Britain and Northern Europe' (ISBN 0 00 219918 1) was my first port of call for further information. The head louse belongs to a family of over 500 species of sucking lice which on the blood of mammals. They have a small head with highly specialised mouthparts consisting of a toothed proboscis to hold onto the skin and three stylets to pierce the skin. The thorax is fused whilst the abdomen is segmented. Its relative the body louse is much rarer now but acts as a carrier of typhus.

My next reference to the louse as a microscopical object was Robert Hooke's 'Micrographia' (first published in 1665 but available in reproduction). He observed specimens feeding on his hand under the microscope after keeping them starved for a few days and his book includes a lovely illustration. This was of course in a time where 'louse coloured' was actually a description of colour for cloth!

Interest piqued, a further delve into that delightful book The Life that Lives on Man' by Michael Andrews (1 970-'s, ISBN 0 09 9165007) revealed a wealth of interesting information about these parasites., Writing in the 1970's Andrews predicted that the head louse would continue to be a problem despite efforts to eradicate it and his prediction has been borne out. Schools still regularly have to send out leaflets urging parents to check their children and I have been able to collect specimens from a further occasion. Unfortunately misconceptions and stigma prevent people accepting that they or their families may be affected and the lice themselves are continually evolving resistance to the currently available treatments. (For those too embarrassed to ask, washing the hair occasionally in water containing a few drops of tea tree oil, followed on with conditioner arid then combing with a metal toothed 'Louse buster' comb works with light infestations). Repeated treatments may be necessary as fresh offspring can emerge for up to a fortnight after treatment from the eggs or 'nits' cemented to hair).

Apathy in the face of repeated infections also affects some schools, I found sending in slides of mounted specimens to the school's Head with a friendly letter certainly reawakened interest in the matter. On a lighter note, Andrews also described how in the past, the mayor of a Swedish town was chosen annually. The bearded applicants would sit around a table with their beards touching the table surface. A louse was then dropped in the centre. The future mayor was the lucky man who's beard was chosen by the louse

There is another order of lice, that of the biting lice which primarily affects birds. The cover of this issue depicts a biting louse from a Guillemot (PMS box 97/ 23). These differ from the sucking lice in that their heads are generally larger, the thorax is segmented and the feet have two claws at their ends. The eyes am often reduced (I could not find them on this specimen) and the antennae are short and can be concealed in grooves along the side of the head,

The Bird lice feed mainly on particles of feathers though some species take blood, and have large toothed mandibles. I could not detect the latter on the depicted specimen but there is apparently a jagged hole on the underside of the head at the front. There are nearly 3000 species of biting lice known of Which circa 500 have been recorded in Britain.

The Collin's Guide goes on to describe how lice have evolved closely with their host, so much so that lice have actually aided systematicists in determining the relationships in birds. Flamingos might appear closer to storks than birds, but their lice suggest that they are more closely related to ducks!

The one thing all lice lack is the roguish glamour that has been bestowed upon the flea. Not for them the exhilaration of flea circuses, nor educated and witty references in literature and poetry and science. No, lice have a sordid image befitting their parasitic life style with the description 'lousy' 'being used for a dull coloured cloth or the lethargic depressing feeling upon illness or as a result of a hangover. Their low lustre image also means that there could well be many more species of louse to be discovered.

I leave you then, dear reader, with that slight itchiness and desire to scratch that this subject always evokes in me.

B & L DDE

Allen Bishop

By the middle 1930's the design and construction of the "Continental" style of microscope stand had reached maturity. Brass components were still used, but they were now masked behind black enamel and/or bright electroplating. Even the more conservative British makers had slowly but surely fallen into line with their designs.

The end of the 1920's however, had seen the introduction of two new and unique microscopes, both from the American makers, Spencer and Bausch & Lomb. The Spencer arrived first and was designated the No. 8, while the B&L followed that company's alpha cataloguing as the DDE. Both instruments were really the first "reverse" microscopes; that is, their pillars and arms faced away from the operator. Today, the "reverse" microscope layout is universal in all but the most inexpensive stands. But in that era, these scopes were revolutionary, though in their time, no establishment in design fell before them. These microscopes from the last and greatest American makers were large, heavy and very expensive "Research microscopes" as they were correctly termed. But they came at a time when few individuals had either the money or the inclination to invest in such instruments

In January, 1930, Bausch & Lomb published their Catalogue D-11. This splendidly done hardbound tome is well known to collectors and seems to have a high survival rate today. Page 32 illustrates what is described in the catalog's text heading as "DDE -A New Research and Photomicrographic Microscope." Page 35 lists the DDE ~ available with different optical outfits, ranging in price from $527.00 with three achromatic objectives to one with a quad nosepiece and four apos for $709.00. B&L's revised price list #D11B of December 27, 1933 reveals price increases of $10.00 to $25.00; a big "who cares" in today's world, but substantial then. I consulted with my mother, aged 93, about her earnings then. In the early 1930's armed with a Master's in Library Science, she became the librarian at Mission High School in San Francisco. Without hesitation, she recalled that she was recompensed at $1600.00 per annum to start, and was considered very fortunate. I showed her the B&L catalogue, the DDE and the prices. Turning her mind to that time, she said that such a "thing" would have been incomprehensible; furthermore, she recalled clearly that her first car, a used Buick in good shape cost $175.00. But she was quick to add that the medical school at UC Berkeley (her alma mater) would certainly have had..."such things. The University was very well endowed, even then, you know." True, the DDE was an instrument for the universities and government departments. So much for an "eyewitness"; what do contemporary accounts have to say about the No.8 and the DDE? Very little so far as my paltry "research" has uncovered. G.B. Needham in his well known text devotes a page or so to them under the subhead, "The Reverse Type of Research Microscope with Free Access to the Objectives, Stage and Substage". He states that Professors Sharp and Randolph, both of Cornell University were the motivators behind the design, which was introduced in 1929 by B&L, followed by Spencer in 1931. Needham, retrospectively, saw little advantage over the "conventional" designs in either make. He grumbles that the "mechanical movements" did not "hold" where they were adjusted to any better than a first class instrument of the usual type (why would they?). He points out the difficulty in setting up illumination. This was before the time of the built-in illuminator (the simple expedient that made the backwards microscope totally feasible). The lamp had to be placed behind the instrument with its beam projected between the legs of the stand. This, states Needham, interfered with the setting up of Kohler illumination. Precisely why escapes me, other than viewing the lamp's filament initially centered upon the mirror, and subsequently on the condensor iris would be somewhat awkward. A really bad feature, very relevant at the time was that these instruments had no inclination pivot. For projection and photomicro work on an optical bench, they had to be laid on their backs, tortoise-like in order to project a horizontal beam. Either the B&L or Spencer could be quickly fitted with a wide-body monocular tube and used in conjunction with a vertical camera.

Needham continues with a brief description of the Spencer, relating that the makers made "extravagant" claims of precision and "near approach to perfection" as did, supposedly, Bausch & Lomb. I have to date, never read any factory copy on the Spencer, but B&L's claims in their catalogues are not that "hyped"; they were justly proud of their achievement. Spencer was the first to let their "reverse" instrument fade out by 1940, while the B&L as we shall see, continued until sometime after World War II.

Where are they today? The answer probably lies in the fact that because of their cost and the economic straits the world was in at that time, very, VERY few of these magnificent microscopes were built to begin with.

Postwar, new developments such as the Leitz "Ortholux", Zeiss-Winkel "Standard" and East German modernization of the pre-war L-stand into the "Lumipan" would have relegated the DDE and No. 8 into obscurity, and quickly.

Recently, I was discussing all of the above with Alan deHaas. I had heard or read somewhere that the DDE was actually not a very large or imposing looking stand, to which Alan stated frankly that he could not recall when he had last seen a Spencer No. 8, but that if I would sit tight for a minute, he would show me something. "Something" was not one but two Bausch & Lomb DDE stands! The first, complete with cabinet and accessories is an early example, serial #212189, placing it in the first year of production, 1929! The second, #CD5088, dates from 1949. Thus, B&L continued to produce the DDE after World War II. I was given the opportunity to clean and photograph both.

Twenty years separate this pair, yet only minor production changes are evident. While the early stand is in superb condition, the later example is virtually unused. The 1949 DDE has a more dull black finish, while the eyepiece tubes are satin chrome instead of black. The binocular head on the 1929 stand has a thumbwheel which shifts the prisms inside, instantly converting the light path into a monocular. This feature had been dispensed with by the time #CD5088 was built.

The north-south/east-west control knobs are on one end only of the early stand, while they are symmetrically doubled on the 1949 stand. The control knobs on the 1929 stand have a much finer knurling pattern; more attractive possibly, but the late stand's knobs at least seem to give a better feel. Oddly enough, the 1929 stand reveals a few grinding marks showing slightly through the glossy black enamel. I suspect these marks have "bled" through over the years due to paint shrinkage.

Note that the mirrors on both are single-sided; there is no concave mirror, while the mirror pivot has a locking device. Note the slight changes in the clamping device between the two stands. The mirrors articulate in the fore/aft plane only.

The substages are raised and lowered by rack and pinion, but with reduction gearing. This gear train requires careful lubrication and reassembly, or the "feel" is utterly lost. When properly set up the substage can be raised and lowered with an action that no other microscope can compare to. Note the swingout magnifier beneath the condensors. This was interposed into the light path when low-power objectives were in use, obviating the need for a concave mirror as well as having to remove or disturb the Abbe condensor.

I was very impressed with the overall design and fit of the mechanical components. Modular components interchanged perfectly between the two stands. A counterbalancing coil spring runs in a pipe behind the focusing head; on both stands, this long, fairly weak spring emits a soft swishing sound as the coarse focus is operated effortlessly.

Only one stage was offered with the DDE stand. It was a rotating, centrable type. B&L noted that due to the design of the stand, the stage could be rotated 360 degrees without any of the control knobs interfering with the arms. This made the DDE useful as a simple pol stand.

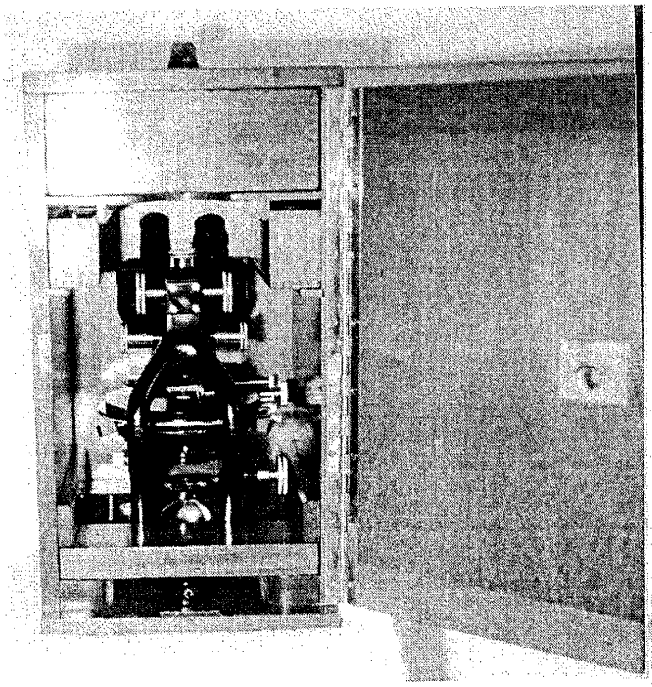
References

1. Bausch and Lomb Catalog:
Microscope and Other Scientific Instruments.
Catalog No. D-11. Jan. 1930

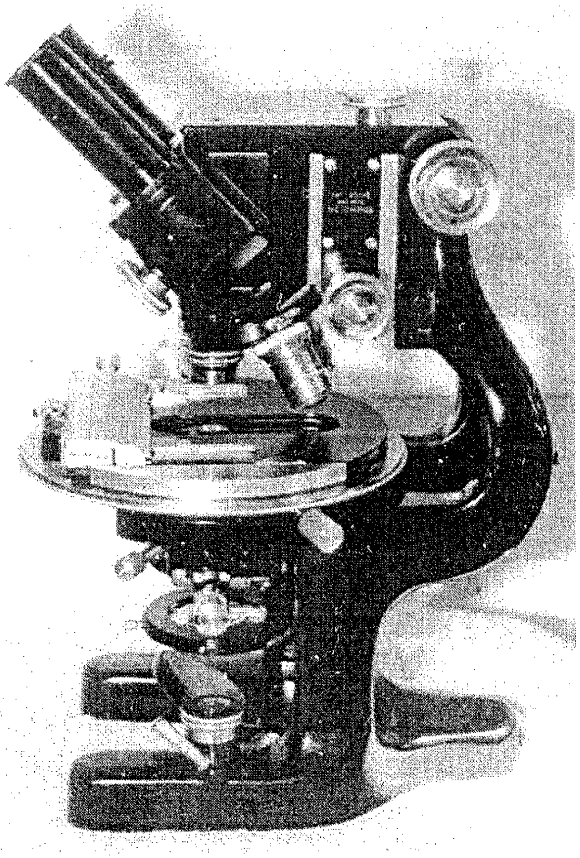
2. Bausch and Lomb *Revised Price List of Optical Instruments.* Publication No. D-11B. Dec 20, 1933.

3. Bausch and Lomb Catalog: *Scientific Instruments.*
Catalog No. D-111E. Jan. 1940.

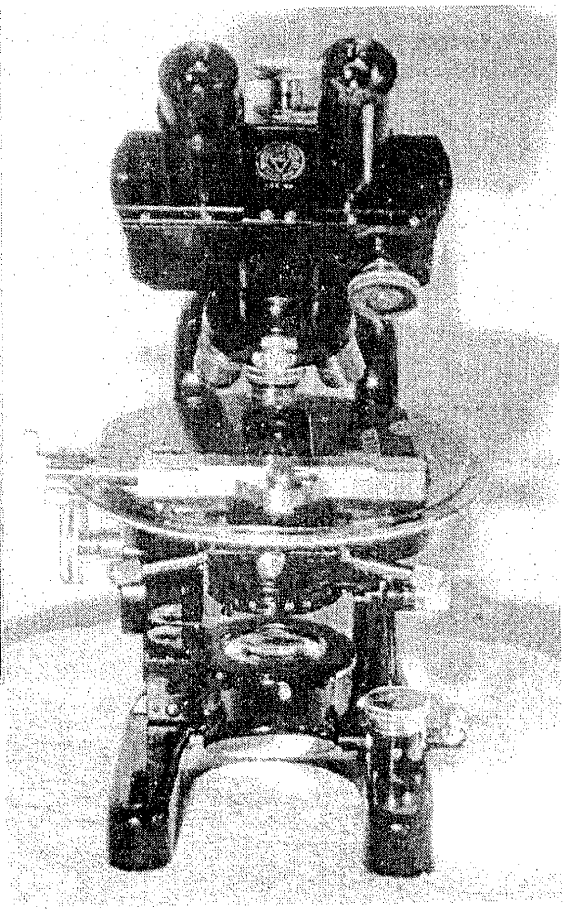
4. *The Practical Use of the Microscope.* Needham, GH.
Chas. C. Thomas, Springfield Ill. 1958.
Note-This was reprinted in 1966 and is currently available from the McCrone Institute.



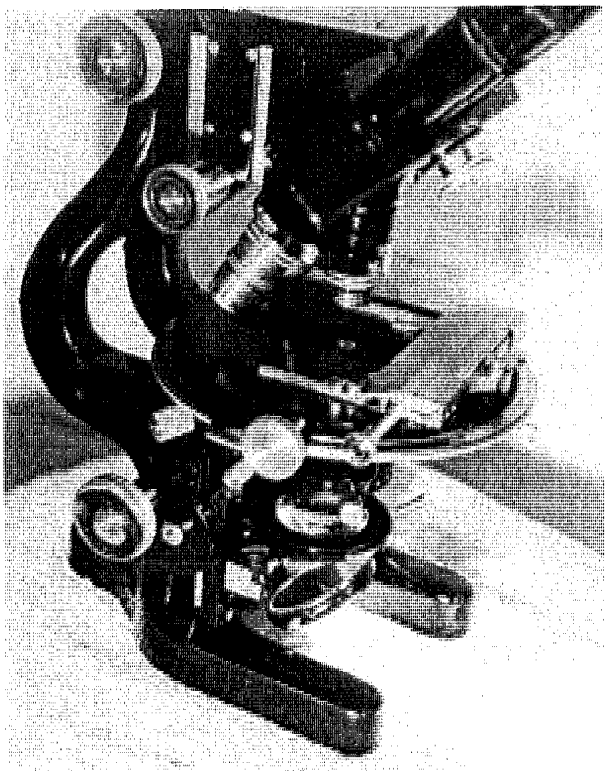
1. Early DDE stand in its cabinet. Large accessory drawer at top.



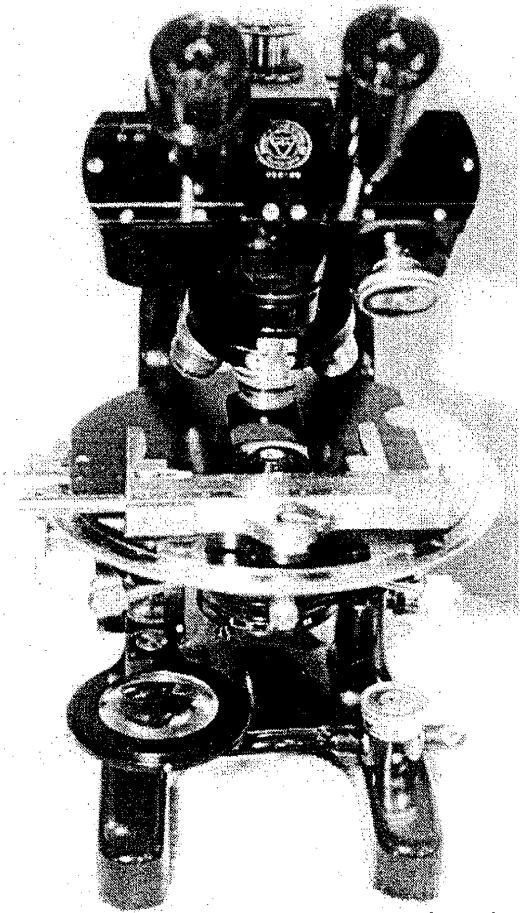
2. Side view of early stand. Note that objective turret faces top the rear, a standard today.



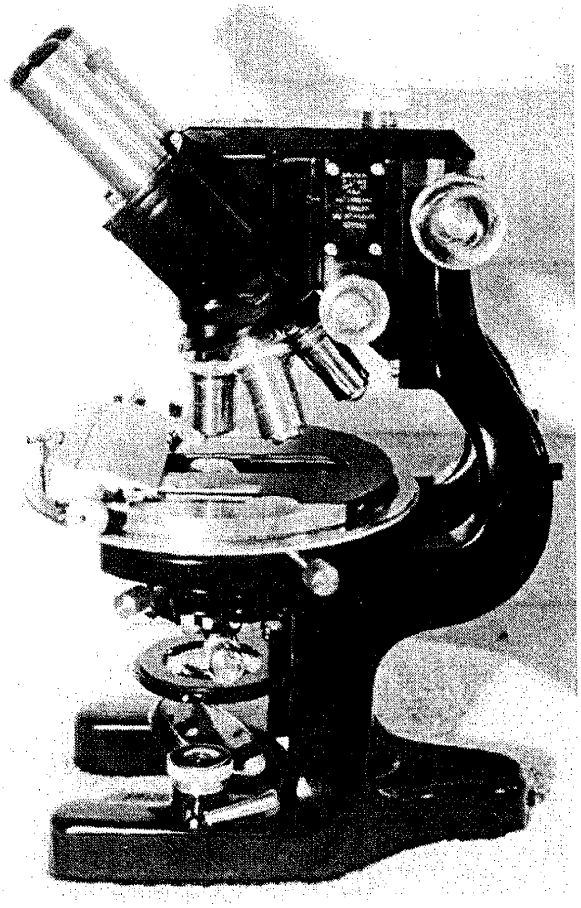
3. Early stand, "front" view. Note mono/ bino shift knob on head.



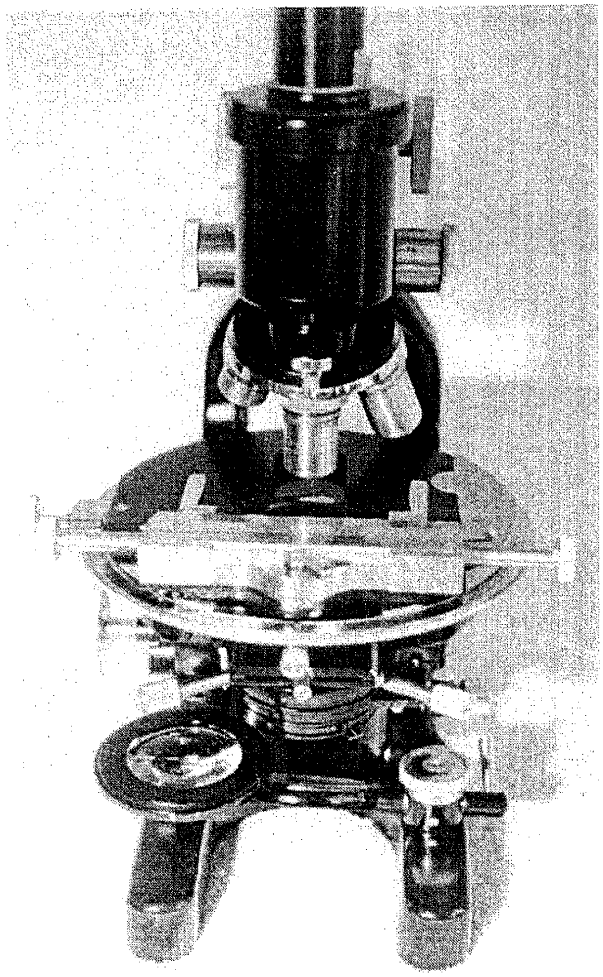
4. Stage controls were on "left" only on older DDE. Controls have very fine knurling.



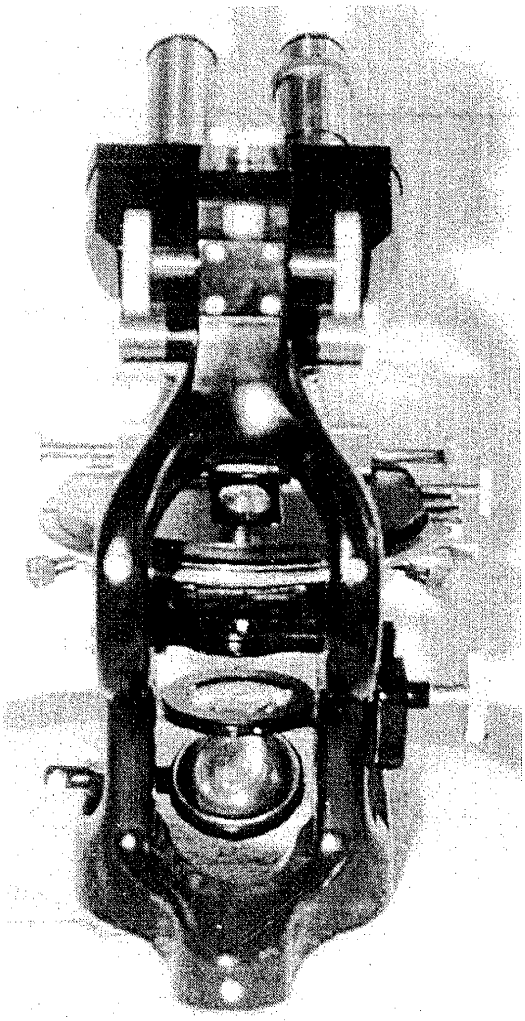
5. On the 1929 vintage DDE, the B&L logo is on the focusing head, along with serial number. If the two became permanently separated, all info was lost.



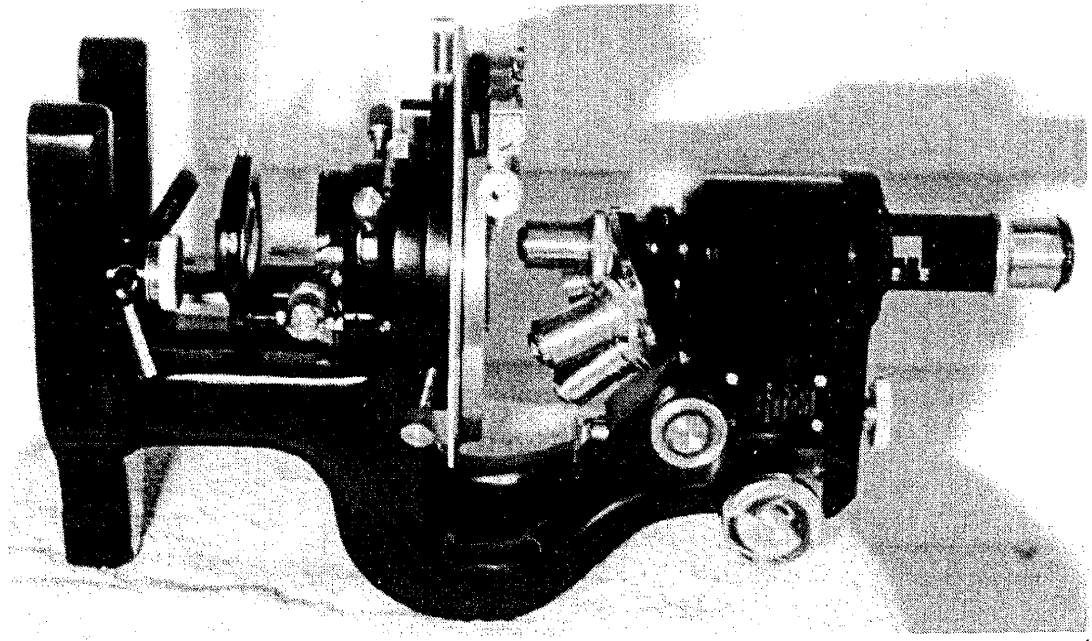
6. Vintage 1949 DDE stand. Note serial number and maker's name now on cover plate of fine focus mechanism.



7. Stage controls "doubled" on later stand. The "goggle" magnifier is swung out; this allowed use of low power without removing main 1.4 achromatic condensor. Mono tube installed.



B. "Rear" view of the DDE stand. Now you can see the mirror, and the way in which the foot is "tunneled" to give unrestricted illuminator path. Note the three polished chrome bosses on the tail of foot and arms.



9. Lacking an inclination joint, entire stand had to be laid on its "back" for projection and photo work with a horizontal camera. Mono head fitted. B&L said the mono tube was for projection and photo work only. A strange, unique piece of design, utterly obsolete today.

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Advertisement from J. of Applied Microscopy October, 1901. Courtesy of Richard M. Jefts.

MSSC April Meeting

Wednesday, April 19 at 7 PM.
Crossroads School, 1714 21st Street
Santa Monica, CA.

Viewing Brownian Motion.

Bill Davies

Bill Davies will demonstrate some of the classic methods for viewing Brownian Motion and then he will show some of his own mechanisms for doing the same in smoke and other suspended particles. Some of these devices are simple enough to be built by anyone, although anyone who has seen other examples of Bill's ingenuity may suspect that some may be more difficult. This will make a fine follow- on to the fascinating talk which Brian Ford gave of the discovery of the particle motion by Brown and his remarkable scientific reserve in checking carefully before jumping to the conclusion that he had found the source of life. In all Bill's demonstrations, it will be interesting to see what the temptation must have been, particularly in seeing the motion in pollen grains with their connection to new growth.

April Workshop

Saturday, April 1, 9:00 AM
The Meadows Residence
707 Greentree Road
Pacific Palisades, CA 90292
310-459-4788

And Now for Something Completely Different!

The line above from Monty Python describes the departure in one article of this issue from our usual fare of elegant collectables. We are indebted once again to our friends in the Postal Microscopical Society for permission to reprint, on page 247, Chris Thomas's 'Lousy Tale'. It is a good humored reminder of the connection between the splendid 'brass and glass' and the, sometimes not so genteel, real world.

Gaylord Moss. Ed.