Journal of
THE MICROSCOPICAL SOCIETY OF SOUTHERN CALIFORNIA
Volume 7 Number 7 July, 2002

THE SWIFT "DICK MODEL" PETROGRAPHIC MICROSCOPE

By George G. Vitt, Jr.

Allen B. Dick first described his design for a polarizing microscope in the Journal of the *Royal Microscopical Society* (RMS, 1889, pp.432). In this design the stage remains fixed, while the polarizer and analyzer rotate synchronously by gearing with an angle scale readout on the stage. The microscope was manufactured and signed by J. Swift & Son of 81 Tottenham Court Rd., London (Swift Catalog, 1891). The instrument became known as the Dick Model featuring an English foot with a Traviss rolling slide holder, see figure 1. The microscope illustrated in the two photos belongs to Jim Solliday. A later, improved model, is shown in figure 3.

Figure 1

This petrological microscope differs from the usual form in that it has a fixed square stage instead of the more commonly encountered circular rotating stage. Instead of rotating the specimen, the two polarizing elements, along with the eyepiece, are made to revolve together. The crosshairs in the eyepiece turn, leaving the object stationary. This allows the tiniest specimen to be maintained in position during the entire rotation, eliminating the need for delicate centering adjustments of either the stage or the objectives. Both the polarizer and the analyzer are rotated by a set of coupled gears, with the smaller upper gear engaged to the large eyepiece assembly just above the fine adjustment. The rotation, which can be independent, is transmitted to the substage by means of a long pinion rod, which extends down from the upper gear through both the arm and stage of the microscope. Rotation is caused by the observer turning the upper gear.

Just under the stage and part of the condensing arrangement is a large disk (circle) divided into 360 degrees. The disk rotates simultaneously with the nicol polarizing prisms. A magnifying lens is

provided on the front of the bodytube for easy focus on the disk's graduations (visible at the front of the stage). A low power-condensing lens is mounted over the polarizer, with the higher power element mounted in a slide which can be pushed into place to be used with short focal length objectives for conoscopic work. The specimen is carried by a William R. Traviss type roller stage (wheels on the sides). The body-tube features two horizontal slides (inserts), which pass through the optical path. Each is furnished with a lens and an open aperture. The upper Bertrand lens yields a small conoscopic figure, the lower one produces a larger display. A rotating diaphragm with six different apertures was fitted to the upper lens in some variants. Both can be adjusted up and down in a vertical plane. The upper right side of the stage is divided into mm. in both directions, for recording the position of an object. A slot in the eyepiece tube is for insertion of a micrometer, retardation plate or quartz wedge (not present). The fine focus adjustment is a differential screw motion, with a large milled head divided into 80 parts, each division being equal to 0.01 mm., making it able to be used for finding the refractive index of a transparent mineral. A Klein quartz plate can be dropped into the open aperture of the lower slider (on the body-tube); it can also be used in a holder on the stage (not present).

If the microscope is to be used for observation in ordinary light, the analyzer is moved out of position and the substage polarizer swung to the side. The condenser is furnished with an iris diaphragm

MSSC Journal
Volume 7 Number 7 July 2002
CONTENTS

MICROSCOPICAL SOCIETY OF SOUTHERN CALIFORNIA

and two small stops (both missing). The accessories include the following: 2 Swift Universal eyepieces, 3 Huy-ghenian type eyepieces one with crosshairs (adjustable), a triple nosepiece, 5 Swift objectives all with brass storage cans, and a pinhole eyepiece cap (used for alignment) all in a fitted mahogany storage case.

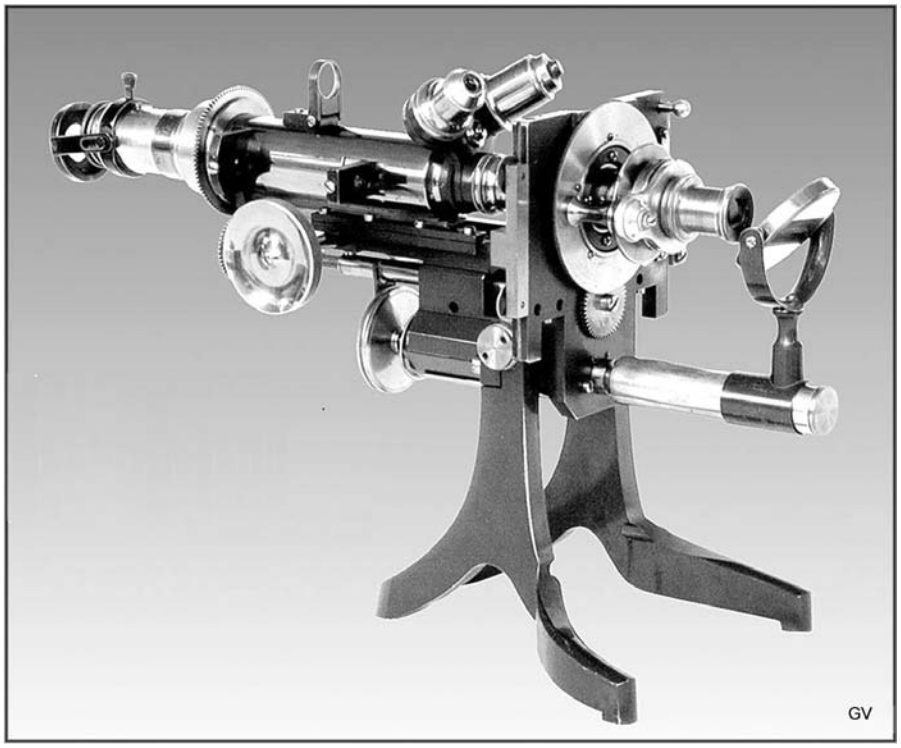


Figure 2

The 1891 Swift Catalog claims that this microscope was supplied to all the departments of the Geological Survey throughout the United Kingdom. The price at that time was listed, without lenses, at £18.00; completely equipped it was closer to £32.00.

The Swift "Improved Dick" Petrographic Microscope

Some years later, an improved model (figure 3) was introduced by Swift. The stage is fixed but, if desired, a rotating stage may be attached. The polarizer, the analyzer (in the cap), and the ocular with its crosshairs may be rotated together by means of gearing which can be clamped in any position. The rotation can be read to five minutes of arc by means of a magnifier positioned directly above the rotating graduated disk at the top of the body tube. Either nicol (polarizer) prism may be rotated independently or thrown out of the optical axis. A second analyzer is fitted in the body tube above the objectives and there are two Bertrand lenses, one above the other, for giving either large or small interference (conoscopic) figures. Below the stage is a turret carrying three different condensers and an iris diaphragm all of which can be raised and lowered by means of a rack-and-pinion. The fine focus reads in 1/1000 of a mm. of vertical movement. □

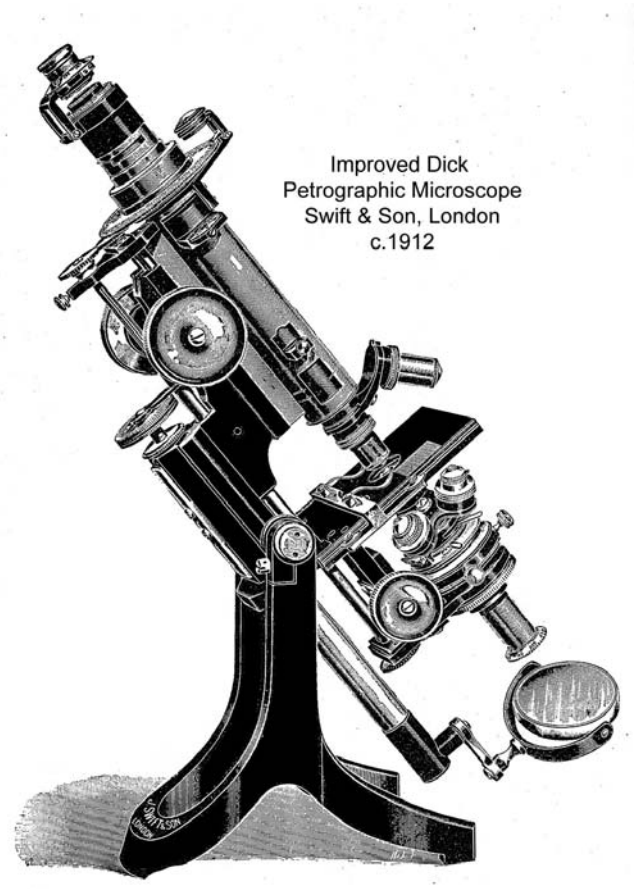


Figure 3

WORKSHOP OF THE MICROSCOPICAL SOCIETY OF SOUTHERN CALIFORNIA

by: Jim Solliday

Date: Saturday, 6th July 2002
Location: Izzy Leiberman's Residence

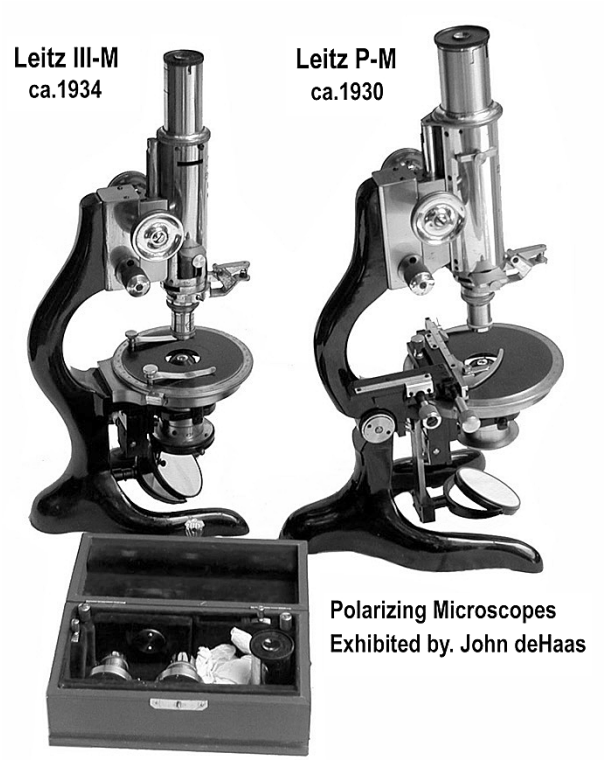
The workshop began at 9:20am and was brought to order by the President, Jim Solliday. Announcements were made concerning the upcoming Lecture meeting that will be presented by Ms. Emily Foley on the subject of DNA testing (July17th at New Roads School). This is an opportunity for the members to learn first hand the system used for testing DNA for suspect identification. DNA test gels will be used to illustrate the process and give certain members the chance to go through the procedure. Ever since the O.J. trial there have been questions associated with this form of evidence, so it will be a good chance to see the method first hand.

It was also noted how well the refreshment table has been maintained by Bill Hudson. Our continued thanks go out to his contribution. Members were also reminded that both this and the next Saturday workshops will be held at Izzy's house (July 6th and August 3rd). Jim expressed his gratitude that the exhibition table was completely filled

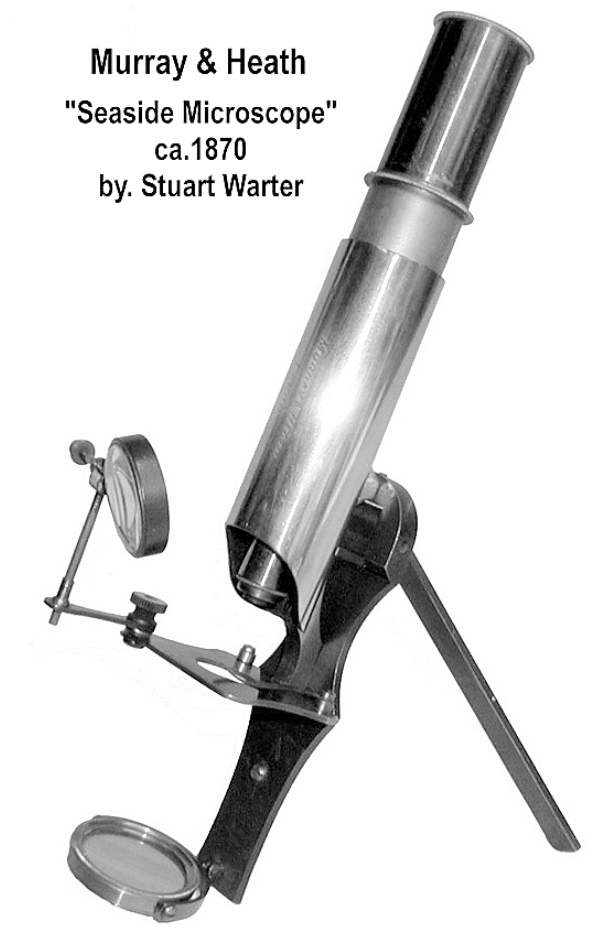
with beautiful and wonderful instruments. The more items that are brought for exhibit, the better the workshop.

Pete Teti talked about the recent Rheinberg Illumination workshop held last month on June 22nd. He mentioned how pleased he and the other attendees were with the program. The worksheet that was used at the workshop can be found in this same edition of the Journal. Pete also described the next hands-on workshop to be held in the classroom at the Newroads School on July 20th. The subject will be on Maintenance and Repair of the Microscope with the instructors being Alan deHaas and Allen Bishop. Alan stated that members should bring any tools they normally used when working on their instrument. They will be critiqued for their appropriate application to the subject. This is indeed a class you should not miss as questions related to this subject continually come up. It should be noted that our hands-on workshops are always held on the third Saturday of the month unless otherwise announced.

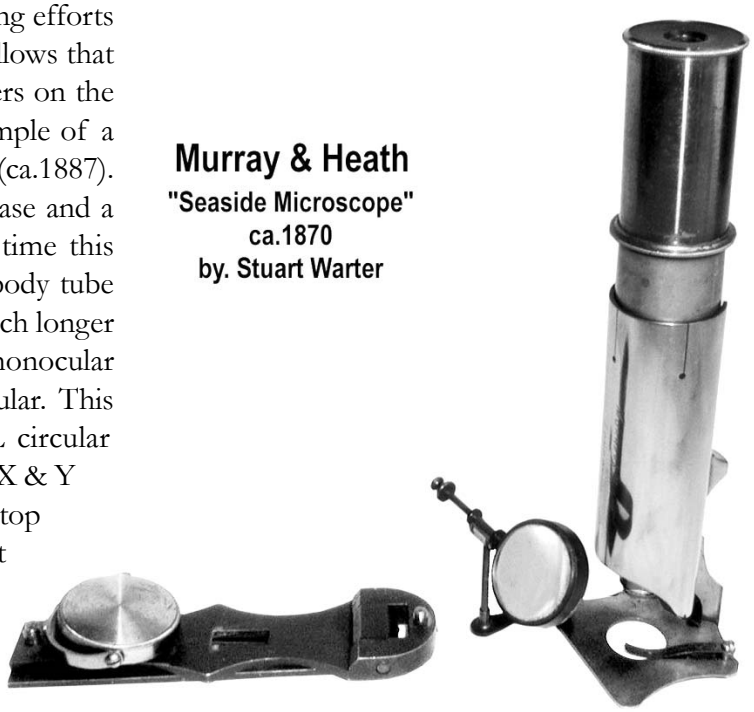
John deHaas exhibited two wonderful Leitz Polarizing microscopes. They were identified as a Leitz PM stand (ca.1930) and a Leitz IIIM stand (ca.1934). The IIIM was the smaller of the two and did not have an inclination joint. He also showed the accessories that came with the microscopes. Both stands were in rather good condition with their original lacquer. He pointed out that the single knob on the side of the limb operates a ball and ramp fine adjustment.



Stuart Warter exhibited a very rare portable Murray & Heath microscope. It was known as the Seaside Pocket Microscope and was small enough to be carried in a coat pocket. An illustration of this instrument can be found in the 1867 edition of *The Microscope* by Jabez Hogg. Stuart stated that the firm of Murray & Heath was in business from 1867 to 1883. The microscope can be disassembled when being stored in its case. It can also be separated from its feet and used as a small "Museum" type microscope resting on its own stage. The objective is a triple or as Stuart calls it a tri-visible lens with three separable optical groups . The finish was nicely re-lacquered by Ken Gregory.



Dave Hirsch talked about his continuing efforts to collect the dues and informed the fellows that we now have a total of 59 paid members on the roster. Dave exhibited a beautiful example of a Bausch & Lomb Universal microscope (ca.1887). It was accompanied by its mahogany case and a complete list of accessories. At one time this microscope had a Wenham binocular body tube as one side of the focusing pinion is much longer than the other. It now only has its monocular tube and Dave is on the alert for a binocular. This stand also features the very rare B&L circular mechanical stage. The hand controlled X & Y milled heads are both mounted on the top surface of the stage. Dave pulled out the cabinet's drawer and described all the accessories, some being for a Leitz microscope. This stand was purchased in a jeweler's shop in the city of Santa Monica. Dave recommended that collectors keep an eye out for tall mahogany boxes, as many just may contain a surprise like the one here on exhibit!



Murray & Heath
"Seaside Microscope"
ca.1870
by. Stuart Warter

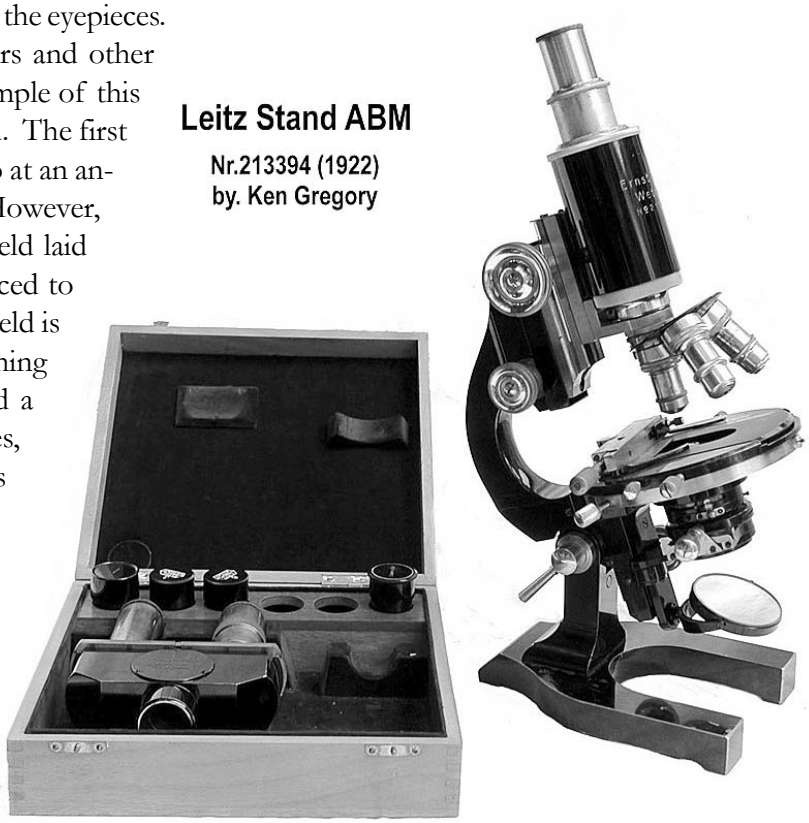
B&L "Universal"
ca.1887
by. Dave Hirsch

Larry Albright talked about his recent visit to Portobello Road in London. He obtained and now described for the group a very interesting French Thread Counter microscope. This type of instrument was also called a 'Textile' microscope. However, this example is much larger and of a very different design then most thread counters. Of interest is that the dealer who sold Larry this instrument actually told him that it was at one time used by a famous detective, allegedly the well known Sherlock Holmes! Of course Larry went for that, along with a good laugh. Larry said that collectors can almost always depend on the dealers to 'set the record' straight, again with a smile on his face. While in England, Larry also had the chance to visit our good friend Ernie Ives of Ipswich. He told the group about the amazing slide collection of insects made by Ernie himself. Ernie is also a marvelous wood worker and continues to provide the highest quality wood sections for use under the microscope. If you are interested in contacting Mr. Ives and asking about his wood sections, please see the following: Ernie

Ives, 63 Church Lane, Sproughton, Ipswich, Suffolk, U.K, IP8 3AY, Ives@marq.freeserve.co.uk .

Ken Gregory presented a large Leitz research microscope, model ABM from about 1922, serial No.213394. This stand is made of all brass with an interchangeable monocular and binocular body tubes. The monocular tube is designed for photomicrography as it is 50mm in diameter. It has a large circular and rotating stage with built-in mechanical movements. The substage condenser is moved on the usual rack & pinion. The lower diaphragm has a horizontal rack & pinion for oblique illumination, it can also be swung to the side. The condenser can be swung down and out to the side to allow the use of an upper diaphragm. The entire microscope sits on a large brass horseshoe with pillar and clamping lever for securing the joint. The numbered case is quite large with a top drawer for storage of the monocular and/or the binocular head. The drawer also holds the objectives. There are also two pullout sliders for the eyepieces. There is a sliding case for the filters and other accessories. This is the second example of this model that Ken Gregory has owned. The first was obtained a number of years ago at an antique mall in Ventura, California. However, when our good friend Dr. John Field laid eyes on it, Ken was quickly convinced to trade it away. As we all know Dr. Field is the consummate collector of anything Leitz. Eventually, Ken was to find a new, similar stand in , of all places, San Francisco, California. This is mentioned because Dr. Field is from near the San Francisco area and the two gentlemen ended up with stands from the each other's respective areas. The microscope on exhibit has been thoroughly cleaned and serviced by Ken.

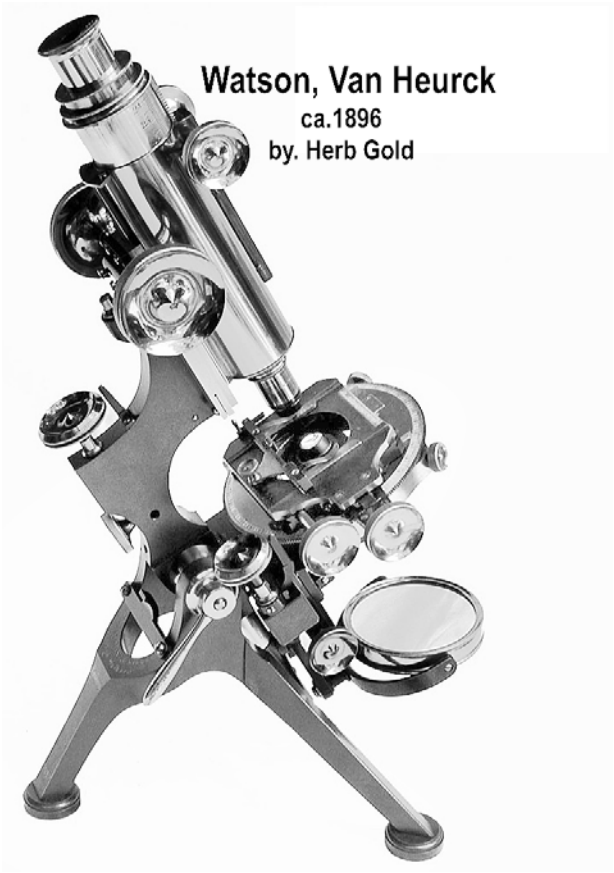
Jim Solliday set up a rare and beautiful Large R&J Beck 'Imperial' Model. The signature is *R&J. Beck, Ltd. London, 26112* and it was made in 1905. This is one of a very few examples of the Imperial and was listed in the catalogue as Model No.1104 (Continental Base). In 1905 this was Beck's top of the line first class stand and was



advertised in the *Journal of the Royal Microscopical Society*. There were two top models, which were just about the same with the exception of the base, the model on exhibit featured the Continental base, whereas model No.1101 had a large Watson-type tripod base. This new 'Imperial' Research microscope was introduced in 1902. This model represented the ultimate transition from the English style to the Continental pattern. It was designed primarily to compete with the very popular Watson 'van Heurck'. This design replaced Beck's 'International' model. In summary, it came very complete with the following important features. It consisted of a heavy coarse adjustment, two-speed fine adjustment with graduated head, large-diameter eyepiece, rack and pinion focus to the draw-tube, graduated 2nd draw-tube, large clamp for the inclination, graduated concentric rotating stage with rack and pinion movement for rotation, centering screws for the stage, graduated vertical and horizontal mechanical stage motion, coarse and fine focusing substage adjustments, centering substage adjustment and finally a swinging and sliding double-sided mirror. The optics include the following. **Eyepieces**: Beck 12x widefield, Watson Holos-orthoscopic 7x. **Objectives**: Beck 4mm–1/6th inch "A"; Beck 3mm–1/8th "A" and a Beck 2mm–1/12th "B" Oil Immersion. The microscope is stored in a fine mahogany case with lock and key. The overall condition is as new. In 1905 the firm of R&J. Beck was located at 68 Cornhill, London, E.C. Jim indicated his thanks to Herb Gold for bring in his splendid Watson van Heurck microscope for side by side comparison.

Jim Solliday took a few minutes to talk about the MSSC slide collection. Until last week, Leo Milan was the caretaker of the collection. In particular he was holding the slides that were made by John Chesluk, one of our oldest and dearest members who passed away a few years ago. The Chesluk collection consists mostly of diatom slides. This includes a card file that was prepared by John for identification of his slides. This file remains in good condition and is stored in its original wood box. This material will be added to the balance of the collection and eventually be stored

in the Society's cabinet at the Newroads school. Pete Teti will soon have a key for the cabinet and will be available to loan out boxes on a monthly basis to paid members. This service should begin after a proper inventory and log book can be prepared. For the time being the slides have been turned over to Allen Bishop for cataloging and organization.



Herb Gold brought in his magnificent Watson van Heurck microscope (ca.1896). A few words were said about van Heurck himself and his contribution to the study of the diatoms. The microscope was originally designed by Prof. Henri van Heurck of Antwerp and made by Watson specifically for use by the discriminating diatomist. The first form of the instrument constructed for van Heurck had the Continental horseshoe foot instead of the typical better balanced English foot. Watson offered either style foot, but few were sold with the Continental horseshoe base. Both the van Heurck model and the Beck Imperial have the same major features including the fine adjustment to the substage condenser. Both have the rack and pinion for the drawtube and the extra large wheels to control the coarse focus. Both have a superb rack and pinion control for rotation of the large circular stage. They are of similar size, with the Beck Imperial being quite a bit heavier. Both microscopes are in new condition and provided a wonderful display for the participants. Herb kindly brought in his van Heurck at the request of Jim Solliday to illustrate that Beck intended the Imperial to compete head to head with the van Heurck. The van Heurck remained in production for many years; the Beck was available only for a short period.

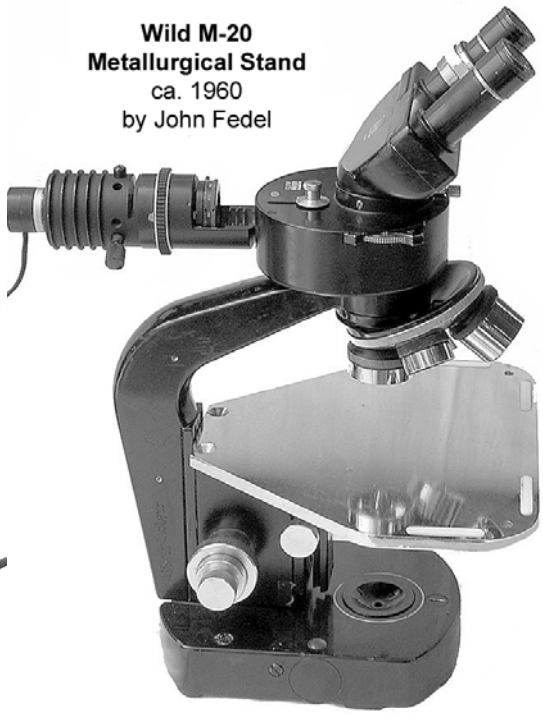
Lzzy Lieberman talked to the group about his trip to Europe and his visit to the prehistoric caves in the southern Pyrenees. The caves known as Grotte de Niaux are located in France on the banks of the Vicdessos river. The cave's paintings are thought to be about 12,000 years old. See illustration.

Victor Silvera exhibited a substage condenser for the Olympus Vanox microscope.

Leonie Fedel along with her husband John, have just returned from a belated honeymoon in Hawaii. She showed the meeting a copy of the State of Hawaii Department of Agriculture's mandatory form, a completed copy of which is required on entering the State. In addition to the usual declarations such as "Do you have any fruit or vegetables on you", the form asked if you were carrying any cultures of fungi, viruses, bacteria or even protozoa! Leonie thought it was humorous that the department had obviously not considered that all humans carry some of these organisms (many in symbiotic relationships with us) and so in essence all visitors to Hawaii should be required to tick the box and then present themselves to inspectors on arrival.

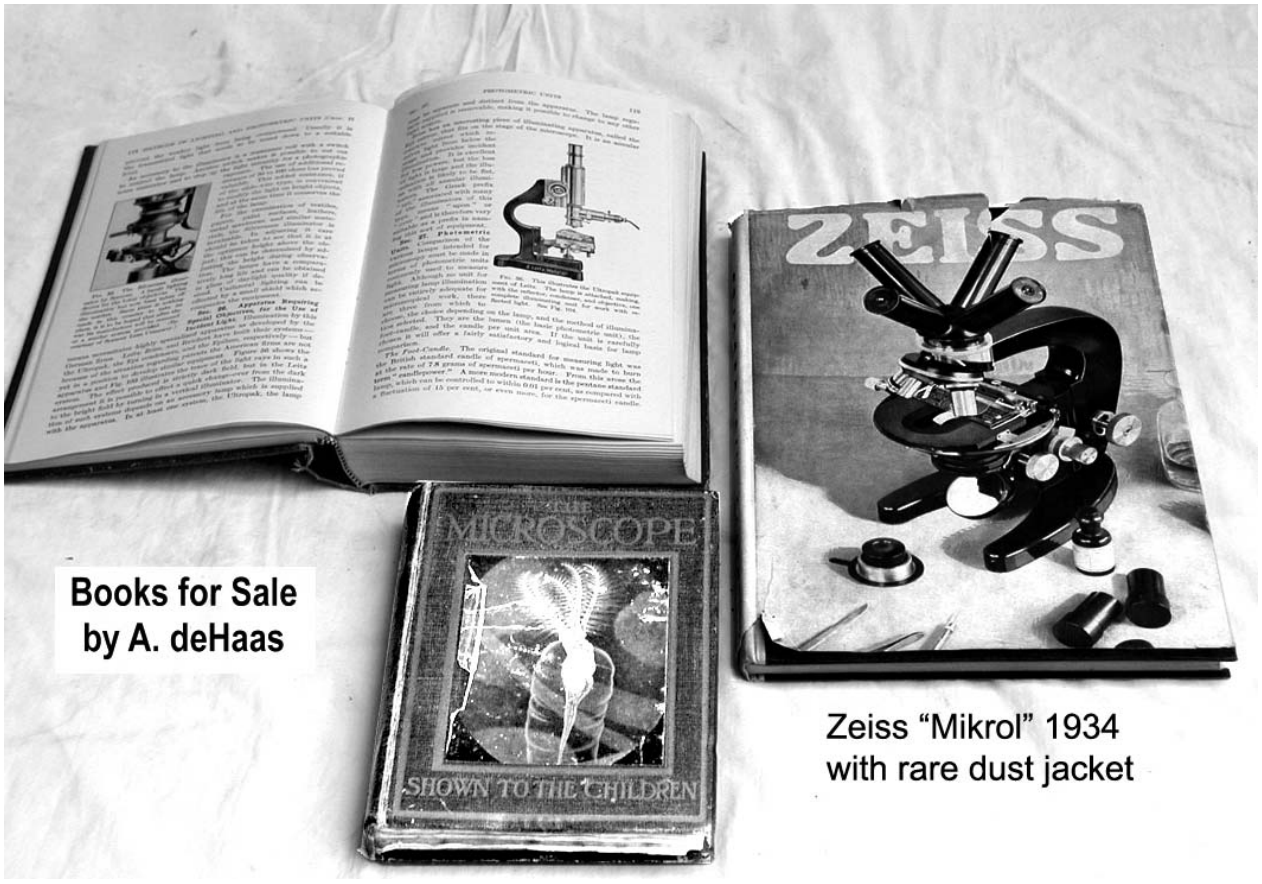
John Fedel had on display two very nice Wild M20 microscopes. One was obtained through what has become the normal method - eBay - and the other from a fellow who was a competing bidder. The first is equipped for metallurgical work, having four epi-objectives and a polarizer. The second set up for phase contrast having three objectives, the 10x, 50x and 100x. The phase microscope also features a trinocular attachment for photomicrography.

Alan deHaas exhibited a small microscope that was signed, *ROW-Rathenow, M 29057*. This microscope was made by the Rathenower Optical Works of East Germany, probably in the 1950's. This appears to be a portable or perhaps a field

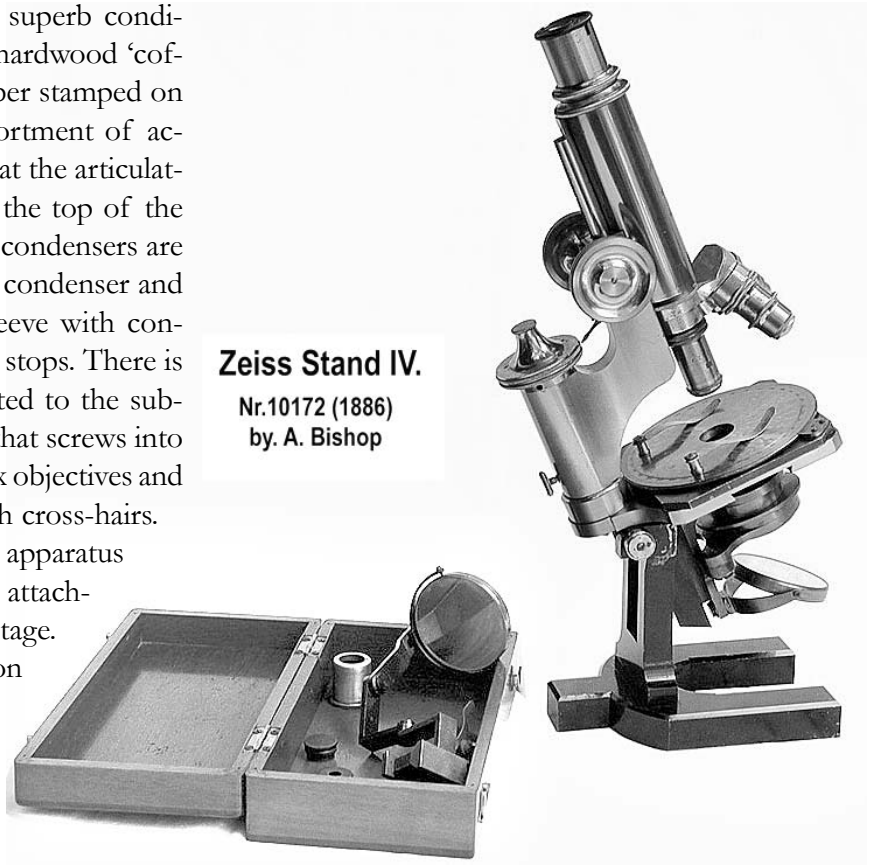


microscope. Alan assured the group that even though the body was made of plastic the image was very good indeed. As part of the focusing system there are threads on the bodytube but it is actually fitted within a cloth sleeve. The complete microscope comes stored in a nice little hardwood case with latch and hinges. Alan also offered for sale a Nikon camera that belongs to his neighbor. There were also for sale a set of 30mm f2.3 Bausch & Lomb 'Baltar' lenses used for photomicrography, and a very nice selection of microscope related books. These included, Shillaber, Photomicrography in Theory and Practice, 1944, $60.00. Also available were Corrington, Adventures with the Microscope, 1934, Munoz, F, and H. A Charipper The Microscope and Its Use, 1943, Hawks, Capt. E. The Microscope, Shown to the Children, 1919. Also offered were two Carl Zeiss Catalogues (1930's); and the most important being a scarce work by Kent, Saville, A manual of the Infusoria, in three volumes, 1880-1882. Contact Alan deHaas for questions concerning the books.

Allen Bishop exhibited two early Continental microscopes by Carl Zeiss. The first was a Zeiss stand IV, Nr.10172. On the body-tube is engraved the name of the original seller; *Agent Wm. Hume, Optician, Edinburgh*. The microscope was obtained

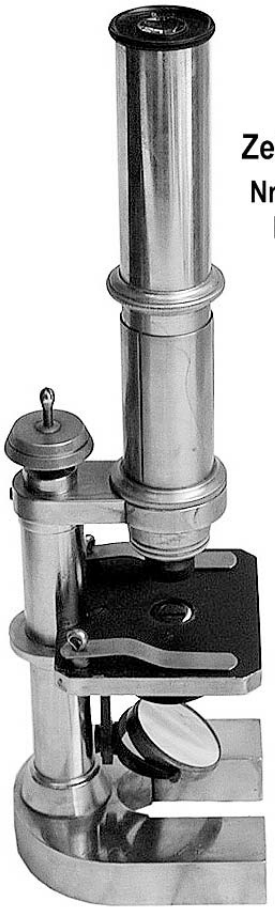


from England and remains in superb condition. It is stored in its original hardwood 'coffin' case having the serial number stamped on the rim. It includes a nice assortment of accessories. It should be noted that the articulating mirror can be swung over the top of the stage is present. Two types of condensers are present; first is the usual Abbe condenser and second is a sliding dovetail sleeve with condenser drum and exchangeable stops. There is also a polarizer that can be fitted to the substage. An analyzer is included that screws into the draw tube. Optics include six objectives and six eyepieces including one with cross-hairs. Associated with the polarizing apparatus is a rotating circular stage that is attachable to the top of the normal stage.



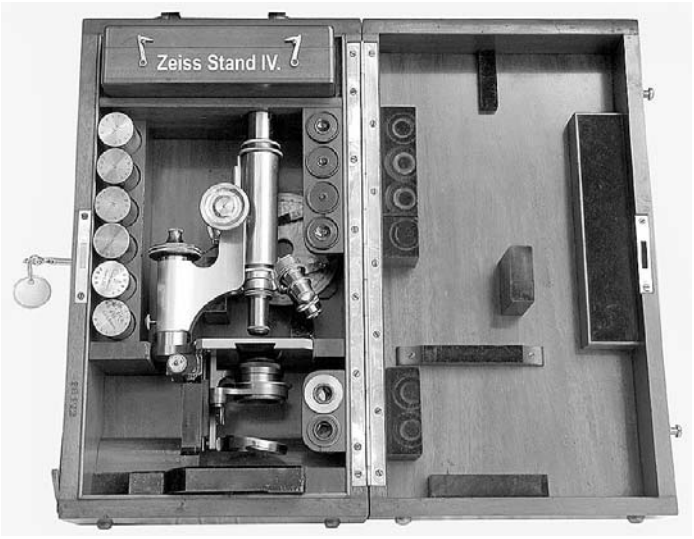
Zeiss Stand IV.
Nr.10172 (1886)
by. A. Bishop

The second Zeiss microscope on exhibit is a Stand VIII, signed Carl Zeiss, Jena, Nr.7203. This is a student's microscope made in the 1880's. This microscope was originally 'flash' nickel plated rather than lacquered. The finish was in need of serious attention and was taken to John deHaas for replating. This instrument has its original case with a number of accessories.



Zeiss Stand VIII.
Nr.7203 (ca.1883)
by. A. Bishop

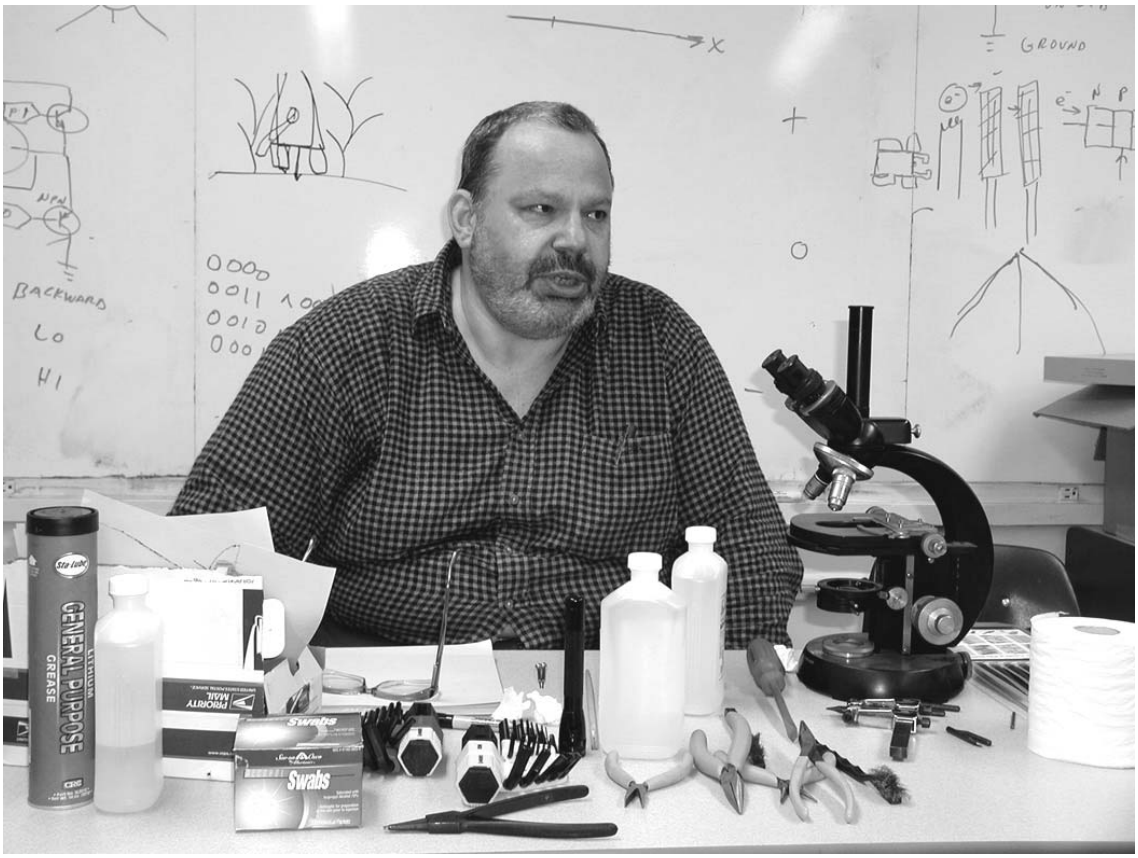
The meeting was adjourned a few minutes after 12:00 and the group moved to the local Coco's restaurant for lunch. □



MSSC Practical Workshop No. 4
Care and Maintenance of the Microscope

delivered by Alan deHaas, reported by Jim Solliday

9:00am 20th July 2002 at New Roads School



Members of the Society gathered for what proved to be a very informative workshop on the important points of care for the microscope. Alan began by talking about where one should start when it comes time to get your hands dirty. He also went over the tools and supplies one needs to properly accomplish the job. Getting to know your microscope is the beginning of good maintenance practice. Using the proper tools and supplies is also a good way to avoid problems. He also talked about the correct method of preparing your tools before starting the work. Improperly prepared tools will almost always do more damage than good. For example, a screwdriver needs to be hollow ground just below the tip so when applied it will provide maximum force at the bottom of the screw slot, especially for soft brass screws.

Alan exhibited a rather extensive array of tools, which over time he has found to be the most useful. Many fancy and expensive tools are not needed when a little experience and imagination is applied. For example, a $159.00 spanner from a well-known optical company has proven to be of little use and is better replaced by custom made tools that are precisely suited for the work. Alan provided illustrations of how one could make such tools in their own workshop.

The first topic of discussion was on proper cleaning methods. The following points were emphasized.

Cleaning:

1. Do not use facial tissue, paper towels or laboratory wipes. They may contain glass fiber for strength. It is better to use normal white toilet paper. For cleaning the surface of lenses the toilet paper should be moistened with alcohol, begin by blotting, then wipe with a fresh moistened tissue. Do not attempt to remove dirt without at least exhaling on the lens surface. There should be a liquid vehicle for the particles. Do not rub the surface, as dirt will be ground into the coating, rather apply your movements up and away. For general cleaning, such as the surface of paint and chrome it is recommended to use cotton towels. They should first be moistened with isopropyl alcohol, one variety would be the white towels you can buy from Costco at 40 towels for $12.00. For the lenses and if one can afford it you can use Type I, Class V (Fed. Spec. NNN-P-40B). Pre-packaged 'lint-free' wipes is not recommended.

2. Use ethanol for cleaning the lenses, but isopropanol will do quite well also.

3. It was recommended to keep your hands meticulously clean. Those with oily skin may need to 'de-oil' with alcohol or acetone even after using dish-washing detergent on their hands.

4. Do not use cans of compressed air, instead Alan suggested the use of empty alcohol bottles. This can be accomplished by placing a small slot about 3/16th of an inch long and 1/16th wide in the center of the cap. Then with the cap in place squeezing the bottle provides a very good stream of fast moving air. This system worked better then the expensive air bulbs I have purchased at camera shops.

5. For access to a lens surface that may be situated down a tube, Alan illustrated a very convenient approach. Using a chopstick he cut a slot at one end. The slot was about 1.25 inches in length. Taking one to three pieces of toilet paper, one end of this toilet paper was inserted into the slot of the chopstick, rolled and then turned over the end of the stick. Use whatever amount of toilet paper appropriate to the job. A little alcohol was applied to the paper and then allowed to soak over the surface of the lens. Fresh toilet paper could quickly be replaced at the end of this stick.

6. Alan provided the members with six inch cotton swabs. Cotton tips can be used for a great number of appli-

cations and were indeed recommended as one of the essential supplies. The wood handles were also of use in the removal of old dried immersion oils. Actually, any hardened medium that ended up on the surface of a lens can be removed with a wood swab. The handles for the wood cotton tips can be broken and the wedged shaped end can be used to carefully scrape off the bulk of the dried oil. With most of the residue removed you can then use xylene to finish the cleanup. Let the residue indicate the solvent.

Lubrication:

1. Never lube or apply grease to the gears of a microscope. This applies to rack and pinions as well. When it is too difficult to disassemble a lubricated area and it must be helped, a non-hardening immersion oil may be gently dripped on a way or slide to resurrect the old tube. This should be used as a temporary measure only.

2. Lubrication is needed on primarily the sliding surfaces such as dovetails and slides. Alan suggested that the best grease to use is "Sta-Lube Lithium General Purpose, heavy." This is made by CRC Industries, Inc. and can be purchased at Pep Boys.

3. Fine adjustment bearing points should never be lubricated. This is not true of screw thread driven fine adjustments which must be lubricated. Coarse focus pinion shafts need lube which must be kept off the gear.

Electronics:

1. Always use the proper bulb that is recommended by the microscope maker. Only the correct bulb will have the filament located in the proper plane and draw the appropriate current. Some 'offshore' bulbs do not conform to standard C-6 filament specifications, are too long, and hence do not provide proper illumination.

2. You will need a vom; with this you can check the lamp for continuity. The meter can be used to make sure all the contacts are in good order, transformers have good windings and that switches function.

3. Bulbs can be obtained at Stans Lighting on Pico & Fairfax and from other sources such as Bulbtronics.

General Information:

1. Do not use plastic to cover a microscope, use cloth. Plastic outgasses and will cause a deposit on lenses.

2. In your tool box you should keep a lacing cord made of nylon, this can be used to pull a heavy spring back in place rather then trying to force it with a slender tool. The cord can be cut when the job is complete.

3. Recommended was a handy tool that looked like spring-loaded pliers. These are normally used to secure C-rings in place and can be sometimes used rather than a spanner. They can be obtained in a number of convenient sizes. In Europe, these rings are called 'Seeger' rings; domestically they are referred to as 'snap' rings.

In Conclusion:

The points of interest that are mentioned above are but a few that were generously shared by our good friend Alan deHaas. After the classroom portion of the workshop was complete Alan accepted at his desk a number of instruments that were brought in by the members. He proceeded to quickly diagnose their problems and provide a remedy for their repair. The workshop was well worth the time and left the participants better prepared for the ongoing job of maintaining his precious microscope. □

MSSC Meeting

Reported by Leonie Fedel,
Meeting photos by George Vitt

7:30pm 19th July 2002 at New Roads School.

This month's meeting consisted of a presentation on DNA Fingerprinting. For years members have been asking questions about DNA analysis and in these have become particularly pertinent since the OJ Simpson trial. July's lecture and practical workshop was presented by Emily Foley, a Biology teacher who has specialized in this area. Her presentation included a brief overview of the field of DNA analysis, and how to undertake DNA fingerprinting using agarose gel electrophoresis. Throughout the presentation, members engaged in a practical exercise which included preparing a supplied DNA sample, running it through the gel electrophoresis apparatus, analyzing the DNA separation results, and ultimately identifying the suspect in the given case study. A summary of Ms. Foley's presentation is given below.

DNA is an abbreviation for the term *DeoxyriboNucleic Acid*. It is responsible for building life and physical characteristics, susceptibility to certain diseases as well as some behavior characteristics which are passed from generation to generation through DNA. It is a molecule made up of smaller units called *bases*. There are four different bases found in deoxyribonucleic acid which connect into a long chain of bases to form the DNA molecule. These bases are adenine, cytosine, guanine, and thymine, abbreviated to A, C, G, and T respectively.

DNA consists of two such long chains of bases which link to one another through base pairs to form a double-helix structure. A base pair is simply a pair of bases which form bonds with each other. There are only two base

pairs found in DNA: adenine and thymine form one base pair, and cytosine and guanine form the other.

Every strand of DNA has pieces that contain genetic information allowing an organism's development (exons, approximately 99% of all DNA and the same from human to human) and pieces that, apparently, supply no relevant genetic information at all (introns). Although the introns may seem useless, it has been found that they contain repeated sequences of base pairs. These sequences, called *Variable Number Tandem Repeats (VNTRs)*, can contain anywhere from twenty to one hundred base pairs. Because VNTR patterns are inherited genetically, a given person's VNTR pattern is more or less unique. The more VNTR probes used to analyze a person's VNTR pattern, the more distinctive and individualized that pattern, or DNA fingerprint, will be.

Once DNA has been extracted from cells it can be operated upon by *restriction enzymes* (ECO R1). These enzymes are used to "cut" the DNA at a specific point chosen to isolate a specific VNTR sequence. This produces a *restriction fragment length polymorphism or RFLP*.

Once the DNA has been 'cut' (ie: the RFLPs have been isolated), it is injected into channels within the gel using a micro-pipette. The gel is then set

VNTR EXAMPLE

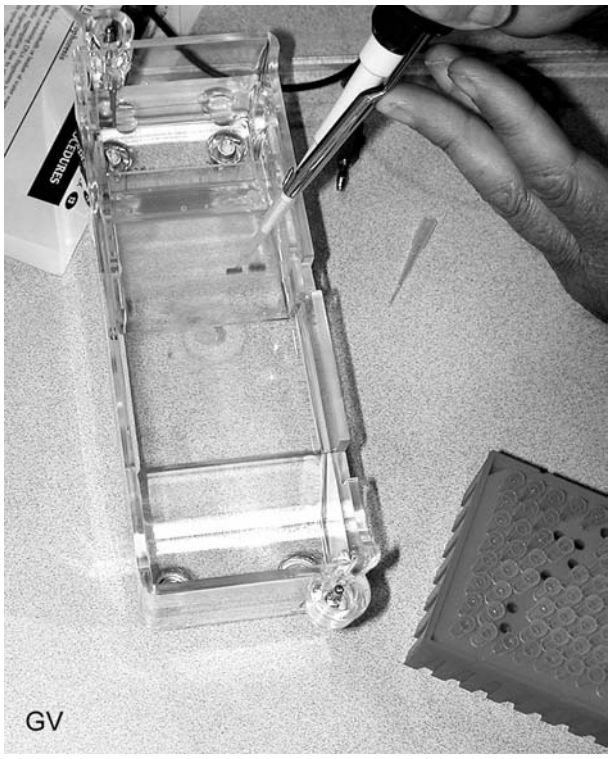
A DNA exon sequence (useful DNA) is AGTGAC and represented by ☐.
A DNA intron (useless DNA) sequence might be TGTTCA represented by ●

Person A's DNA portion = ☐ ● ● ● ☐

Person B's = ☐ ● ● ● ● ● ● ● ☐

The repeat of ●s is the person's VNTR. ie: person A has a VNTR of 3●s and person B a VNTR of 7●s.

After DNA "digestion" or "cutting" between the exon and intron, person A has a short RFLP (length 4) and person B has a long RFLP (length 7).



within the electrophoresis apparatus, electricity applied and the sample left for 30-45mins.

As DNA is negatively charged, it migrates towards the cathode. Longer fragments travel slower and therefore do not migrate as far from the start as shorter fragments do. This results in bands ap-

Staining/ De- staining / Viewing:

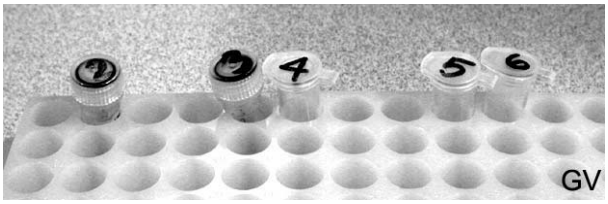
1. Remove Gel from electrophoresis chamber. (after power source is off)
2. Place gel on plastic wrap
3. Put a few drops of buffer over gel
4. Place insta - stain sheet on top of gel.
5. Rub over the top of sheet with fingers several times
6. Place gel casting tray and small beaker on top.
7. Wait 15 minutes
8. Place in plastic dish with DI water - 10 minutes.
9. Replace water and soak for 10 more minutes - slightly agitate.
10. Place Gel on light box and view DNA bands

pearing in the gel. The gel is then stained blue to increase the visibility of the banding and help with analysis (see description of staining process).

As each person's VNTR pattern is unique, you get different banding for different people - *a DNA fingerprint*. Comparing the banding across samples of DNA taken at a crime scene and those from suspects can lead to positive evidence of a person being present at the crime scene.

Usually there is too much DNA in the human genome to view the banding clearly, rather a smear is seen. To overcome this problem, the DNA is denatured or dropped to one strand of the double-helix. A replica is then made of this strand, and this is treated with a radioactive DNA probe which is complimentary to the bases in the original. After rinsing the membrane is then placed on x-ray film and the resulting banding analyzed.

The case study that MSSC members worked on was as follows, Johnny Montana is a movie star. He is found dead by his housekeeper and presumed murdered, but by whom? Some blood is found at the crime scene which turns out not to be Johnny's. There are two main suspects, Johnny's ex-wife and Gloria Starlight who is Johnny's current girlfriend and has been badgering Johnny to marry her. Samples of their blood is taken, along with the sample found at the crime scene. The DNA from each sample is extracted and two different VNTR samples prepared for each of the two suspects and for Johnny, ready for agarose gel electrophoresis. The prepared DNA is placed in marked containers 1&2 sample from crime scene, 3&4 sample from ex-wife, and 5&6 sample from Gloria (see photo).



The samples were injected into the gel, and the gel placed in the electrophoresis chamber. The power was turned on. After 30 minutes the samples were ready for staining. Of the six columns, a match was found between samples 1&2 and 5&6. It was therefore determined that it was Gloria's blood which was found at the crime scene, and hence she became the number one suspect in Johnny's murder.

The meeting closed at 10.30pm. □

Member Biography: Ken Miller

I am probably the least experienced amateur in the MSSC. Although I always loved biology, my fate was sealed when I decided on law school instead of medical school. From time to time I bring my microscope into my wife's primary school classroom. She has always taught children who come primarily from non-English speaking homes and I love their reaction to their first microscope experience.

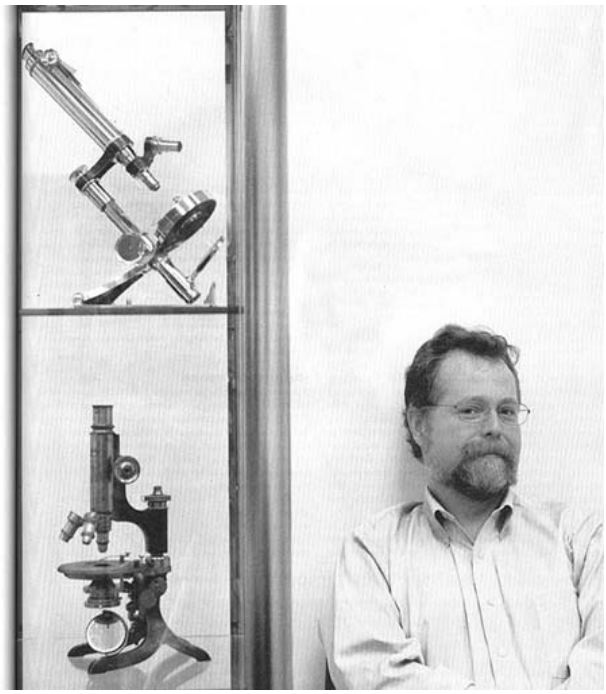
Sometimes it is a bit intimidating to be surrounded by so many knowledgeable MSSC members. My career background is different from the other members. I closed my law practice several years ago after 22 years in business and real estate litigation. I remain active as a mediator and legal consultant, specializing in real estate and business disputes and I have served for the past 3 years as a volunteer on the Los Angeles County Superior Court mediation panel. I am licensed as an attorney in California and Hawaii. I am also a Licensed California Real Estate Broker

Last, but not least, I also work in the investment and insurance field, with John Hancock Financial Services. I am an NASD Series 7 licensed Registered (Securities) Representative and California licensed Life Insurance agent. □

A Very Very Wealthy Person

by George G. Vitt, Jr.

Nathan Myrhvold was the founder and the head of Microsoft's "Microsoft Research" and was described by the New Yorker magazine as, "the man Bill Gates put in charge of the future". This gentleman left Microsoft not too long ago with a personal wealth estimated at hundreds of millions of dollars. With this and his great track record at Microsoft, he started a Company named "Intellectual Ventures". He plans to assemble the best inventive brains in the country and start crafting both significant innovations and methods to broaden their impact on the market. Contrary to practice in most corporations, these inventors will share the royalties with the company. He calls this enterprise "The Invention Factory" and states that he is interested in how amazing new ideas are generated, and what it takes to bootstrap those ideas and grow them afterwards.

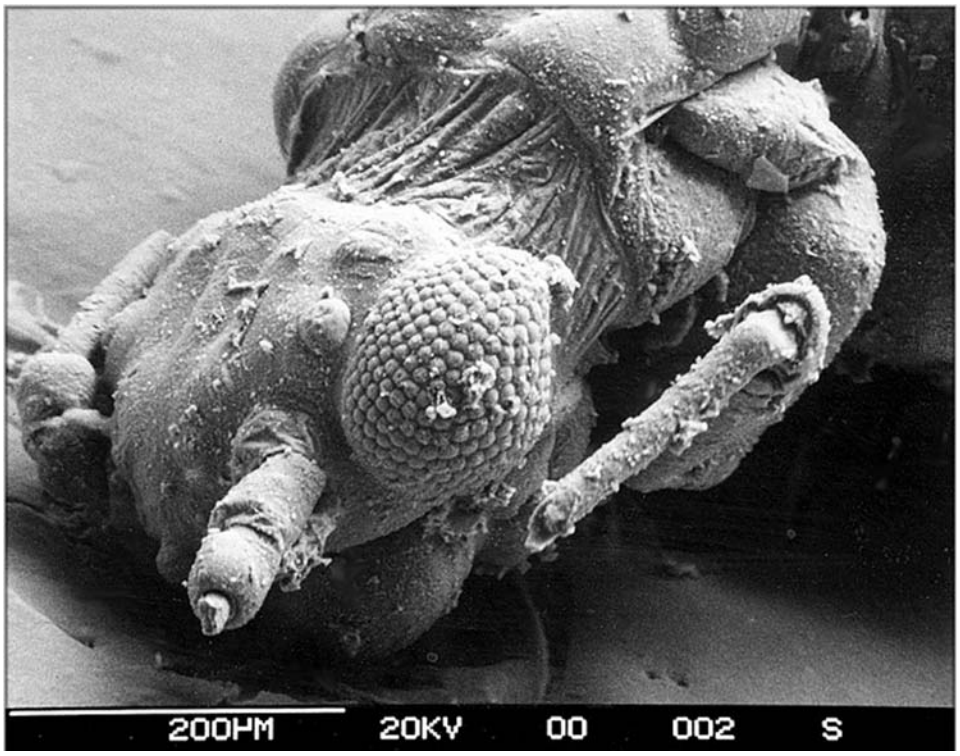


In his spare time, he collects antique goodies like the two illustrated here. Who knows, we may well have a ready market for some of our surplus! □

TIDBITS

Ed Jones and his hair sectioning apparatus.

This is an SEM image done during a memorable field trip of the Microscopical Society of Southern California on 21st August 1982 to the Hughes Research Labs in Malibu, California (which, in the 'old days', was home to MSSC members Gaylord Moss and George Vitt). The image shows a microfossil specimen, 60 million years old, which was provided by MSSC member Fred Hantsch. The field trip was organized by George Vitt and John Myer with Marynell Colborn (in charge of the SEM Lab) as our host.
Ah! Nostalgia ain't what it used to be. (Sent in by George Vitt)

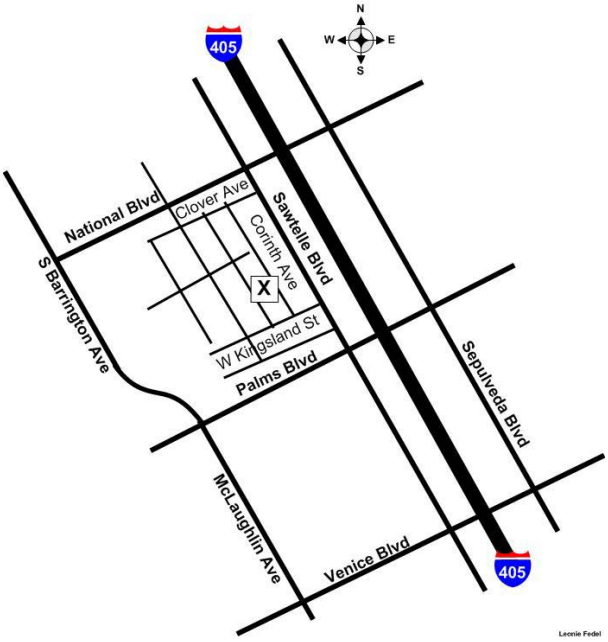


Saturday Workshop Announcement

9:00am 3rd August 2002

At the home of Izzy Lieberman

3300 Corinth Avenue
Los Angeles CA 90066
310-391-6076



This workshop will be held at Izzy Leiberman's. Activities will start at 9:00am. As usual this is a chance for good friends and fellow microscopists to talk about our favorite subject. You are invited to bring any manner of items related to microscopy to share it with the fellowship. If you have something you would like to sell, please feel free to bring it and set it up at the sales table. All are encouraged to participate and join in the fun.

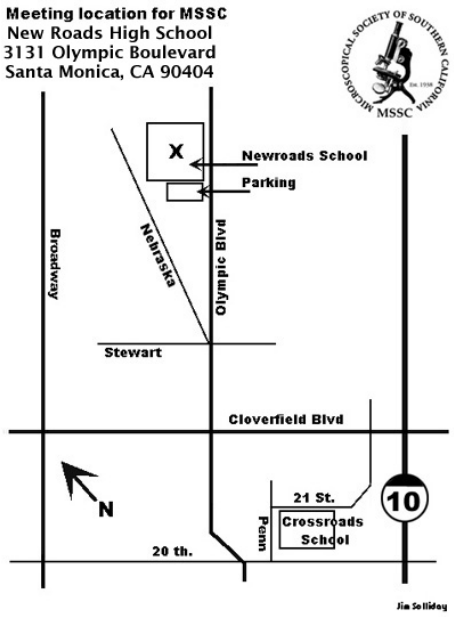
Lunch after the workshop will be at the local Coco's. If you have any questions please send me a message. I look forward to seeing all of you at the workshop...

Jim Solliday (MSSC President).

MSSC Meeting Announcement

7:30pm 21st August 2002

at New Roads School



Edward Tarvyd will be giving a presentation on Charles Darwin at this August lecture. His presentation will include an overview of Darwin's personal history and how he came to ultimately produce his new evolutionary view of the world. Darwin's book "The Origin of the Species: through means of natural selection" was written in 1859 and was a major challenge to contemporary beliefs of the time.

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

EDITOR'S NOTE

A big thank you to Ken Miller for submitting a member profile for the Journal this month. Perhaps his contribution will encourage other members to submit their biographies? Thank you also to George Vitt our Image Editor for his work on the graphics for the Journal, they look fantastic again this month.

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

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

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

Leonie Fedel (Editor)

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

Jim Solliday (President)
Dave Hirsch (Treasurer, Printing & Distribution)
Alan deHass (Education Chair)
Leonie Fedel (Layout Editor)
George Vitt (Image Editor)
Allen Bishop (Copy Editor)

Want to advertise in the Journal?

We are also happy to include advertisements within the Journal either from individual members wanting to sell an item to other members, or from companies wishing to promote their products and services to the MSSC membership. If you wish to place such an advert, please contact our Treasurer, Dave Hirsch for further details and charges.

Dave Hirsch
11815 Indianapolis St.
Los Angeles, CA 90066
(310) 397-8357 email: dave.hirsch@verizon.net