



MicroNews

San Francisco Microscopical Society

Volume 8, #3 September 2013

The Next Issue

Volume 8 #4 is due in your mail box on November 1, 2013. To have your pictures and/or article included, please submit it to the editor no later than Monday, October 21 by e-mail to hschott@aol.com.

SFMS General Meeting: at Merritt College

7:30 PM, Wednesday, September 9, 2013

Our first meeting of the Fall Season will take place in the **D building** on the second floor, Room 245 and/or 247 nearby. Please do not disturb any class that is in session.

You will need eight (8) 25 cents coins to pay for parking.

Contribute to the meeting's activities by bringing a few interesting slides or a microscope you own, or a book that would enliven the evening. Spend part of the evening learning about the complex microscopes available and the expanding unique program

in microscopy available at Merritt College.

Your specimens, be they animal, vegetal or mineral, will find a ready audience. Come early, even before seven to have time enough to set up any interesting demonstrations.

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Participate In *Grant-Proposal* Process

At the July 27th, 2013 Board Meeting, the Board voted to provide up to \$5,000 in a single grant to an individual or organization, including our members, in the nine Bay Area counties by the end of 2014 to fund a proposal that best promotes the use or un-

derstanding of microscopy or a closely related area.

The 2014 Grant Proposal Committee will be charged with working out the detailed schedule and internal deadlines, application process and due date. They will create review teams

to evaluate the applications and recommend up to three worthy proposals that meet the stated criteria. The board will make the final decision and select one recipient, if any. During the post-award process there will be administra-

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GRANT—PROPOSALS

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tive and fiscal monitoring and reporting on compliance by the grantee to the Society. The committee will also address distribution of the materials to prospective applicants, advertising costs, and expenditures such as supplies and technical cost.

The Board remains responsible for sending out a notice of award or rejection to the applicants and communicating with any of the applicants. Ex-

penses, including travel, will be available to working committee members.

Awarding a grant is a great responsibility as well as an altruistic and beneficial act in our area of the world. It is achieved when we draw upon the experience and knowledge of SFMS members. Many of you can devote a few hours spread over several weeks to this activity.

Your Society needs your participation to organize the **2014 Call for Pro-**

posals, and advise the Board on the selection process. As a member in good standing, your input and support is essential. The Board asks that you notify the Treasurer, Myron Chan, at **myronchan@rocketmail.com** or 435 Melrose Ave, San Francisco, CA 94127 of your willingness to participate in this important and valuable outreach program. **Do it now!** HS

EINSTEIN AND HIS MICROSCOPE

Great men of science have complicated lives that sometimes mirror their thought processes. Reading about Albert Einstein in Walter Isaacson's *Einstein, His Life and Universe*, gives the reader many examples of this genius' effort to solve the riddles of the new physics. It takes some courage to tackle the 551 pages that sometimes draw you into the arguments over the theories he proposed but if you have had a reasonable education in the sciences the book is an interesting exploration and reveals much about the first half of the 20th century.

Einstein was a theorist and rather than spend time performing experiments, he spent time thinking and creating thought

experiment. What would it be like to ride an accelerating elevator out in space? What would you see if you rode alongside a light beam at the speed of light?

The book is devoid of formulas or mathematical derivations and is therefore digestible by any lay reader willing to skip some of the more complex explanations. Einstein had a profound effect on cosmology and one would wish that he would have shown as great an interest

in microscopy. At his fiftieth birthday, trying his best to avoid the spotlight, he hid in a gardener's cottage on an estate on the Havel River near Berlin. A *New York Times* reporter was the only one to find him and got an interview.

"Einstein Is Found Hiding on His Birthday" was the paper's headline. He showed the reporter a microscope he had been given as a gift, and the paper re-

ported that he was like a "delighted boy" with a new toy. (Page 358) (NYT March 15, 1929)

The 84 years that have passed make it unlikely that the instrument will have survived or that we will ever know how much use he made of this gift. There is no doubt that he had a deep curiosity directed mostly toward the invisible world of force and motion. HS.

16TH - 17TH CENTURY MICROSCOPY

Brian J. Ford's Lecture at Merritt College

Brian Ford was the featured speaker at the May 15th joint meeting of the San Francisco Microscopical Society, the Northern California Society for Microscopy and several other groups. This bright Englishman was born in Corsham, Wiltshire, in 1939. He is an independent research biologist, author and lecturer and he has been a television personality for over 40 years. The audience was treated to an eye opening presentation on the history of microscopy.

Mr. Ford began with the earliest published picture of a microscopic object dating from 1555. It shows various kinds of snow crystals. The observer was Olaus Magnus who was a Swedish priest and a naturalist born in 1490 and died in 1557. Brian Ford does not believe that a microscope was used to view the snowflakes. He believes that Olaus was a good observer of fine detail.

The investigations of Francesco Stelluti into bee and weevil organisms dating from 1625 to 1630 are some of the earliest records of microscopic observations. He showed a direct comparison between a weevil as seen by the naked eye and as seen with a microscope. An example as something that cannot be seen by the naked eye is evident in Stelluti's drawings of the eyes of the bee. The bee like all insects has compound eyes which are composed of many structural and functional units. Stelluti published these observations in 1630 in his Italian translation of the Latin Satires of Persius written in the first century A.D.

In 1644 Giovanni Battista Hodierna, a priest who was interested in astronomy and microscopy, published a collection of studies including one of the eye of a fly with illustrations. Hodierna relied on a compound microscope or

occhialino with two semispherical or convex lenses, thicker than a lentil. He also claimed that a good single lens as large as a chickpea would be suitable. The question was, "how much could they really see?" Although magnifying spectacles have been in widespread use since the 1300s, the use of lenses to see very tiny objects was a slowly-developing technology. The tinier an object is, the less light reflects off it or passes through it, and seeing anything really tiny requires a decent illumination system. Magnifying lenses used in early microscopes were made of glass that was not particularly even or clear, and tended to split light like a prism, which affected the *resolution* limits of the lenses. Resolution can be thought of as the clarity of focus; technically, it is the limit at which two close-together tiny objects stop being visibly separate.

Mr. Ford stated that

microscopy truly began in 1665. Before that time, Pierre Borel was a French savant and was a chemist, physician, and botanist who concerned himself with an eclectic range of subjects: optics, ancient history and philology. He described the discovery and construction of the telescope and the compound (multiple lenses) microscope. Borel claims that Janssen, a Dutch spectacle maker, invented the microscope sometime during the period 1590-1610. Borel presents evidence in his writings to support this claim (which is considered today to be correct) and that he had obtained this information from the Dutch Ambassador to France who had actually seen the compound microscope in 1619. Borel also reports one hundred medicophysical observations, some of them illustrated, that he made with such a microscope.

Mr. Ford then talked about Robert Hooke, an English physicist, and one of the most important scientists from the 17th century. In 1665, Hooke looked at a sliver of cork through a microscope lens and noticed some "pores" or "cells" in it. Hooke was the first person to use the word "cell" to identify microscopic structures when he was describing cork. Robert Hooke believed the cells had served as containers for the "noble juices" or "fibrous threads" of the once-living cork tree. He thought these cells existed only in plants, since he and his scientific contemporaries had observed the structures only in plant material. In

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HISTORICAL TRIVIA

Meeting Of February 2, 1900
New York Microscopical Soc.

Mr. John Aspinwall in the chair and twenty-five persons present.

Minutes of the meeting for January 19th read and approved.

The Secretary read a letter to Mr. Hyatt from Prof. Henry B. Ward in relation to the proposed meeting of the American Microscopical Society in

this city in June next, also a letter received by the Secretary from Prof. Cattell, Secretary of A.A.S.S., saying that meeting rooms could be secured at Columbia University for the use of the American Microscopical Society. On motion, the Secretary was instructed to communicate this information to Prof. Ward.

Mr. Anthony Woodward resigned.

Mr. J. D. Hyatt exhibited and described *Acarus feculae* as the

cause of the diseased condition affecting Easter Lily bulbs.

Mr. John Aspinwall then addressed the Society on the "Sexual Organs, Methods of Mating, and the Theory of Parthenogenesis, of the Honey Bee," illustrated by aid of blackboard drawings.

On motion the meeting adjourned.

Copied from the Journal of NY Microscopical Society, Vol. 15, # 2, July, 1900.

(Continued from page 3)

1667 Robert Hooke wrote *Micrographia*, the first book describing observations made through a microscope

Mr. Ford stressed that Robert Hooke did not at first use a compound microscope, instead he used a single lens microscope. Mr Ford introduced Antony van Leeuwenhoek who was born in Delft Holland on October 24, 1632. He was a tradesman and a scientist. Leeuwenhoek is commonly known as "the Father of Microbiology", and considered to be the first microbiologist. He is best known for his work on the improvement of the microscope and for his contributions towards the establishment of microbiology. By the end of the 17th century, Leeuwenhoek had a virtual monopoly on microscopic study and discovery. Leeuwenhoek was a contemporary of Robert Hooke and students of microscopy noted the disparity between the beautifully tooled design of the compound microscope that Hooke employed and the crude single lens instrument used by Leeuwenhoek. Scientists often speak of the single lens microscope as Leeuwenhoek's design. Actually, the simple microscope was one of Hooke's designs. The description was hidden within the preface to *Micrographia*.

"For centuries schol-

ars have described the detailed etchings in Hooke's *Micrographia* and concluded that they were based on observations made with his compound microscope. It became clear to me at the outset that this could not possibly be true. Compound microscopes of the seventeenth century were made with relatively crude



lenses, and lenses in train magnify aberrations and imperfections more than images. I have used such instruments and have always found that they could not generate images of the clarity that Hooke portrayed." See: *Celebrating Leeuwenhoek's 375th Birthday*, by Brian J. Ford.

Mr. Ford showed the drawing of the louse larvae by Robert Hooke that illustrates the fine hairs on each appendage and the details of the eye and claws. Yet these features are not resolved by the com-

pound microscope. Hooke clearly used a single-lens, simple microscope to observe these diminutive details. Such details can easily be seen if you make a simple microscope in the way he described in his preface.

Mr. Ford concluded with Antony van Leeuwenhoek's contribution to microscopy. With over 500 different microscopes to his credit, it seemed that van Leeuwenhoek made a microscope for every specimen he examined. Fewer than 10 microscopes are still intact and in museums but many more of his lenses survive to this day.

The frames for the van Leeuwenhoek microscope were made of copper, bronze, or occasionally silver. The frame was actually two plates that held the single lens between them in line with a small hole. The van Leeuwenhoek microscope and lens solved the problems of magnification and resolution, but to be useful the specimen had to be visible in the field of view. A static specimen was mounted on a pin that was mounted on a block. Two screws adjusted the distance between the specimen and the lens as well as the height of the specimen in the field of view.

The van Leeuwenhoek microscope gave scientists the first view of bacteria. In 1674 van Leeuwenhoek first described seeing red blood cells. Crystals, spermatozoa, fish ova, salt, leaf

veins, and muscle cell were seen and detailed by him.

Mr. Ford ended his lecture by stating that although the Leeuwenhoek microscope was a simple single lens device, it had greater clarity and magnification than compound microscopes of its time.

In 1980 Mr. Ford took a photo of an image in Leeuwenhoek's single lens microscope and compared it to an image in a modern microscope and both images were very similar in resolution. He emphasized that today's images are much the same as the single lens microscope in 1690.

By: Mary Ann Scott,
Recording Secretary

MICROSCOPY TODAY

is a publication of the Microscopy Society of America (MSA) published six times a year in the odd months. Readers and authors come from both the life sciences and the physical

sciences. To subscribe (free) go to the web site www.microscopy-today.com. A digital version, also free, is an exact replica of the printed edition, advertisements and all. It is a word-level search function and

variable page magnification to enlarge figures and text. Subscribe at the web site.

The editor of *Micro News* occasionally makes reference to information derived from *Microscopy*.

Records of the SFMS Meetings, 1945 — 1980's Unearthed

We will come right to the point: We have received a trove of records kept by Needham and plan to have them bound. **DO YOU HAVE ANY ANNOUNCEMENTS, PHOTOS, OR LETTERS THAT PERTAIN TO SFMS?** We do not want to deprive you of your personal collections but we do want to make copies of whatever you may have kept in order to recreate the events of the past years.

Bringing each year to life is going to be a major task. It will have to begin with your discovery of whatever you may have stored in the basement or attic, or your file cabinet that pertains to the Society. Trivial as it may

seem to you, it may be the only surviving information from that period and it may reveal some aspect of what the Society was doing at that moment.

Your computer may contain files that reflect what was happening, particularly if you were an officer. We can copy such files to a memory stick and review them for inclusion in this historic compendium.

It is up to you to let the Society know what you may have and as the instigator of this project, I hope that you will share with me that information by sending me an e-mail: hschott@aol.com

As we discover interesting items, we will publish them in the Micro News. Those snippets will only show the potential of what is likely to become a valuable resource.

The printed word remains one of the best ways of preserving information but we are also exploring how to digitize the records and bring them to you on a DVD. One obvious advantage of a digital version is the rapid way in which it can be searched for information.

The years from the mid '80s to the present will be the most difficult to organize and make into a cohesive account. We either have no records or too much information to work with and for the

moment will try to only bring together what is available in addition to the Micro News.

Are you likely to want your own copy of this history for your library? Are you interested in working on this project by devoting some time to organizing and transcribing these records so that they will be properly formatted for reprinting? While we take the structure of a book for granted, getting the material into the proper format requires time and dedication. I know that we will need help in this interesting task.
HS

"I NEVER VOLUNTEER"

JANUARY 2014 ELECTION

Sad to say, that may be the statement we learned while serving in the armed forces. It was not observed by brave and outstanding courageous soldiers but it was the mantra of the men who did not want to "stick their necks out!"

Now we need to have new members on our board. The board is the place where decisions are made and the course of the Society is mapped. Participating as an officer spreads the effort and provides for some very interesting experiences. It may surprise you to know that all offices are open to you and that the only requirement is

that you have paid the 2014 dues or have a Life Membership. To run for an office in the January 2014 election, e-mail Myron Chan, Treasurer, (myronchan@rockermail.com) with the statement "I wish to run for the SFMS office of (*name the office*) and will attend the January 2014 General Meeting to be present at the election." You may also submit a statement of up to 100 words for inclusion in the January issue of Micro

News but this must be submitted to the editor on or before December 10, 2013.

For a description of the offices, consult the SFMS Constitution, available on-line at: www.sfmicrosoc.org or see a brief description elsewhere in this issue.

There will be vacancies on the board that must be filled. Do your part.

Stephen A. Shaffer, a long time member of the San Francisco Microscopical Society member passed away on July 23, 2013. Steve was involved in the movement in 1994 to reinvigorate the Society when its meetings could no longer be held at the California Academy of Sciences in Golden Gate Park. Steve's enthusiasm for microscopy and his vision for what the SFMS could do to enhance its visibility and encourage participation resulted in the Society's first web site. He was a frequent attendee at SFMS meetings and a presenter at some of those meetings. Professionally, Steve turned his interest in microscopy into a degree in Criminalistics from the University of California at Berkeley, and then employment by the Fresno County Sheriff's Department and the Institute of Forensic Science in Oakland.

Always one to have another idea, Steve was a founding partner in Forensic Analytical Laboratories, Inc. which is still engaged in the

Stephen A. Shaffer (1952-2013)

application of microscopy to solve environmental, industrial hygiene, and forensic science problems. Steve did



not remain long with Forensic Analytical but left to begin a new company, Microdataware, which combined his enthusiasm for microscopy with his curiosity about how computers and microscopes could come together. Combining these two fields, Steve developed a digital version of the *Particle Atlas*, which,

following his suggestion, several years later was converted from a CD version to an online version by McCrone Associates. Not satisfied with working at two forensic science jobs and founding two companies, Steve decided it was time to go back to school. He enrolled in the graduate forensic science program at the University of California at Davis where he worked on developing a computer-aided method for characterization of the surface profile of fired bullets. In spite of ill health, Steve's interest in this project continued until shortly before his death.

Steve was an inspiration to his colleagues, a mentor to his fellow students at Davis, and a valued friend by all who knew him. He is survived by his wife, Jana, his brother Doug, many nieces, nephews and cousins and an amazing family of friends!

By Peter Barnett

THE VALUE IN ADVERTISEMENTS

You will recall one or more teachers that were influential in your development. One such teacher in my development was Dr. Hensill for whom one of the science buildings is named at SF State University. He advised his students to not only read scientific articles but also the adver-

tisements that went along with them. From these advertisements, we would learn of the advances in instrumentation and also of the new application of instruments and materials to science problems. He encouraged us to subscribe to popular science magazines such as the *Scientific American* in order to get a broader perspective of the science world, and, since most of us would become teachers, to help us interpret for our students the

advances that constantly occur in the sciences.

When I saw a recent notice in **Microscopy Today**, in a section entitled Industry News, I was reminded of his advice and now bring it to your attention, (see the sidebar) particularly because it was with spherical lenses that the early microscopists were able to see so much at modest magnifications by today's standards.

HS

BARCODE READER LENSES

Who would have thought that spherical lenses would be used in barcode readers.

Sample of an informative announcement taken from page 52, *Microscopy Today*, 2013 July.

APPLIED IMAGE ANNOUNCES

Their New
Ball Lens Technology

Applied Image announces its newest manufacturing technology. Precision Glass Ball Lenses. Ball lenses are ideally suited in applications such as fiber optical couplers; laser focus lens devices; collectors in LED lighting; microscopy; and endoscopy; or sensors, to name a few. Ball lenses can focus or collimate light and are mechanically simpler to incorporate into complex optical systems such as endoscopes and barcode scanners or can be used as a condenser lens.

www.appliedimage.com

Louis Agassiz

Louis Agassiz, Creator of American Science, by Christoph Irmscher, 2013, describes the life of America's greatest naturalist and Harvard professor who died at the age of 66 on December 6, 1873. He had spent part of the day in his beloved Museum of Comparative Zoology when he suddenly broke out in a sweat and was carried home to rest and sleep, never to awake.

The following comes from page 33: "Agassiz had spent a lifetime extolling the virtues of microscopy; now he himself – or parts of him – were about to end up under the lens. The slides, if any were made, are lost. But the authoritative language of the report [by his colleague] Morrill Wyman released in January 1874, ... did show signs of disease [in the brain], but what emerged as the more immediate cause of Agassiz dying was the circulation at the base of the brain. Obstruction in the left vertebral artery had gradually destroyed the left basilar artery and thus affected the brain as well."

The clots that they found in the arteries of the brain also were present in the heart and damage to the lungs was also noted in the autopsy report. He had died of a stroke.

WHAT THE SOCIETY'S OFFICERS DO?

There are moments when everyone is asked to pitch in and solve a problem such as who will be our speaker at the next meeting but most of the time we know what the job of each officer encompasses. Some jobs are described in the Society's constitution but jobs evolve with the times. From observing over the years, here is my description.

The President is the spokesman for the Society. He/she calls the meetings of the board and organizes the agenda with input from all the board members. He/she also conducts the General Meetings of the membership.

The Vice President is also the Program Director.

The VP is responsible for planning meetings and finding speakers. When the VP runs out of ideas, all the board members pitch in to help with the planning. Our VP also sends out the internet notices about upcoming board meetings and the regular general meetings. Before the advent of Micro News, the VP mailed regular announcements of upcoming meetings.

The Treasurer collects the dues, maintains the membership list and pays the bills that have been authorized by the board. The treasurer also reports to the board the expenditures and the income, files papers with the IRS and makes a fiscal year-end report.

The Recording Secretary, (RS) records the minutes of the Board Meetings, writes an overview of the general membership meeting, (see the excellent and extensive report on the Brian J. Ford Lecture in this issue) and assists the President with some research if necessary.

The Communications Secretary writes letters, prepares documents, and currently publishes the Micro News which is not the actual task of a board member but is that of an editor. In the past, this office would have published reports and papers generated by the membership. Our membership does not do any research so there are no reports to publish.

Henry Schott

DUES ARE DUE

MAKE A DIFFERENCE

It is true that due to a generous legacy SFMS does not depend upon dues for survival. This is why you are asked for only \$12.– a year. Do the math, and that works out to 3.285420 cents a day. It is money well spent.

So why collect dues at all? *It is a matter of commitment*. Your willingness to send in your dues is a clear signal that you are interested and supportive, and still a voting member of the Society. We need to know of your commitment and we need your participation in electing officers in January 2014.

MEMBERSHIP INFORMATION

To join the Society,:

Print application form available at:

www.sfmicrosoc.org

Mail it to :

SFMS Treasurer
435 Melrose Ave
San Francisco, CA 94127

Make check out to SFMS.

Dues are \$12.– /calendar year.

Pay now for 2014

Life membership is \$144.00

Stamp



Volume 8, #3 September 2013

FROM:

Micro News

San Francisco Microscopical Society
20 Drake Lane
Oakland, CA 94611-2613

TO:

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COMMUNICATION

May 21, 2013

Brian [Ford] wanted me to thank each of you for the opportunity to address the microscopical and forensic audiences in the Bay Area. He was pleased with both audiences, with meeting the various people that he had a chance to speak with at both of his presentations, and he was especially gratified by the response of both audiences to his presentations.

And for myself, thank you for your participation in making his visit to the Bay Area enjoyable for all of our colleagues. I am sure that those of us at the luncheon at DOJ will not soon forget eating our sandwiches while the slide show of

spontaneous human combustion was playing on the screen, and while two people who have studied that phenomenon were present in the room. And for those few of us in the audience at the trace evidence section where John DeHaan gave his talk it was a rare experience to hear two papers about human combustion, spontaneous and accelerated, on the same day. Only forensic scientists would enjoy such a day!!

Thanks again for all of your help.

Pete Barnett