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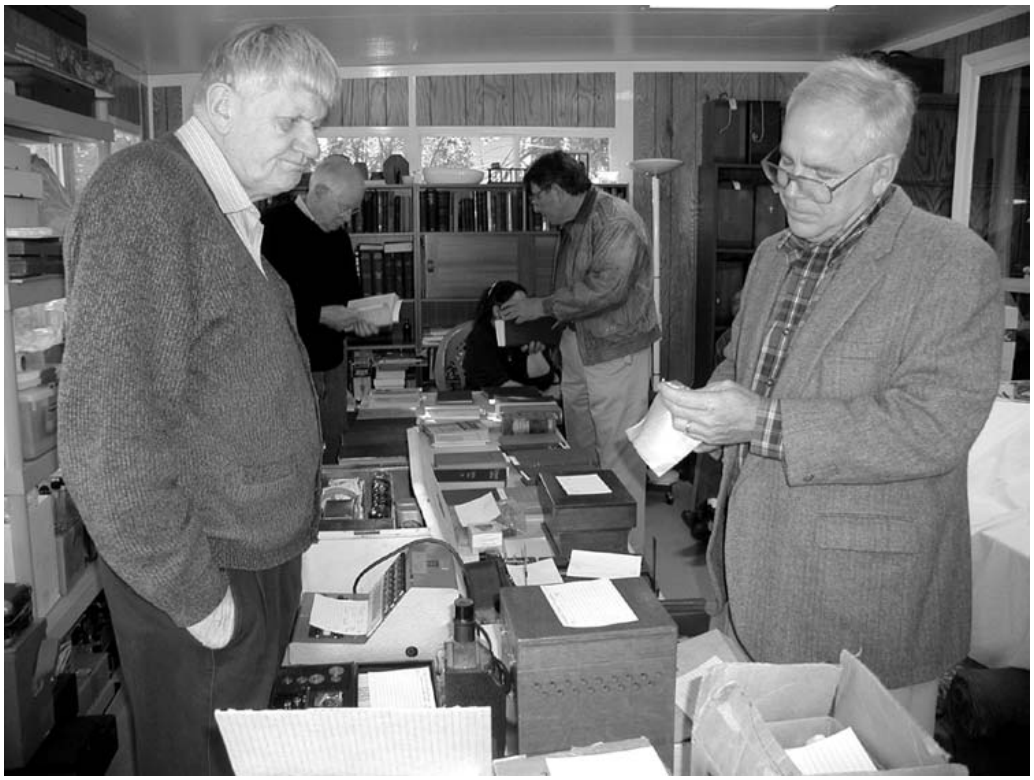
WORKSHOP OF THE MICROSCOPICAL SOCIETY OF SOUTHERN CALIFORNIA

by Jim Solliday

Date: Saturday, 7th December 2002
Location: Ken Gregory's Residence



This workshop was held at Ken Gregory's. Activities started at 9:00am. In place of our usual "Show and Tell" workshop we were pleased to dedicate the meeting to a silent auction of microscopes, accessories and numerous books from the estate of our good friend James F. Fidiam (Jim), who passed away in early November. All the sale items were carried down from Berkeley by our long-time member Dr. John Field. The proceeds were returned to Phyllis, Jim's wife of many years. A biography of Jim Fidiam, written by Jim Solliday is produced overleaf, accompanied by photographs from the estate auction. Following adjournment the group retired to Coco's for a needed lunch and ongoing conversation. Thank you to Ken Gregory for your gracious hospitality.

JAMES F. FIDIAM OBITUARY

written by Jim Solliday

Both I and Dr. Field had become very close to Jim Fidiam over the past 20 years. I became acquainted with Jim back in the early 1980's when I was making inquiries into the San Francisco Microscopical Society. He was also the gentleman responsible for introducing me to the Postal Microscopical Society. Over the years I enjoyed making at least one trip a year up to Berkeley in order to see my microscopist friend. Among his important contributions to microscopy was the fact that it was he and George Neeham who rejuvenated the San Francisco Microscopical So-

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ciety (SFMS). In 1943, Jim sent out an invitation to anyone in the San Francisco area who might be interested in participating in the Society. The invitation was prepared by Needham, who with the help of Mr. Fidiam, was able to establish a working list of possible members. As a result Jim acted as secretary for this Society for over 30 years.

In the 1970's when our very own Society became active again and began sending out a proper Bulletin, Jim was one of the first corresponding members to join. Only a few years ago I was pleased to receive from Jim a complete archive of the Bulletin of the Los Angeles Microscopical Society. Jim remained a member of our Society for almost 20 years. In memory of my good friend I would like to include a short biographical account of Jim's remarkable activities.

James F. Fidiam graduated from the San Francisco public school system in 1931. He obtained an Associate of Arts degree from the California School of Mechanical Arts, Lick-Wilmerding College, graduating in December of 1933. He was an honor student in Industrial Chemistry with minors in Geology and Photography. During the war he worked in industrial electronics and radio communications (1942-1944).

His professional affiliations included membership in the *American Institute of Mining, Metallurgical and Petroleum Engineers* as well as *the Society of Mining Engineers*. He was also registered as a professional chemical engineer (Calif. CH-912). He was elected as a Fellow of the *Royal Microscopical Society* (London) and at home was the Secretary-Treasurer of the *San Francisco Microscopical Society.*

Jim's career began in 1934 as an employee of the Shell Development Company (1934-1972). At that time he was responsible for establishing and organizing a laboratory for the investigation of the Permian Basin oil field formation. This was intended to increase secondary recovery of the product. These studies resulted in two patents on acid treatment of oil wells (Patent No. 2,124,530 and Patent No. 2,177,345, *Method of Treating Wells*). Jim was responsible for the design of specialized instruments for the oil field lab. He investigated rotary drilling fluids, studies which resulted in a number of papers on the physical chemistry of clay and its application to rotary drilling problems. He became a well-known

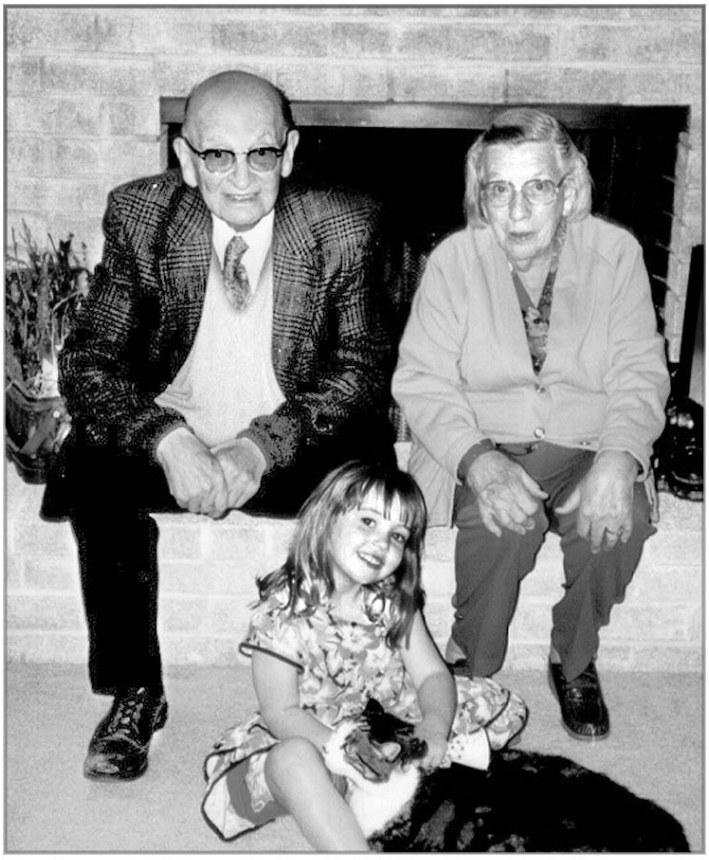
consultant to the oil industry in microscopy and photomicrography, and eventually became the supervisor of design engineering, in charge of the instrument drafting group and model shop.

In 1965, after his career with the Shell Development Company, he became a technical editor responsible for the content and publishing of instruction manuals (mostly for analytical and process instruments). He also became familiar with the offset printing process and graphic arts. Jim was the author of a number of publications primarily associated with the oil industry.

Besides microscopy, Jim had a number of other unique skills and interests. Among them were glass blowing and glassware design, industrial photography and emergency rescue training.

He was a very avid diatomist and took up botany in general in the last few years of his life. In the late 1980's he was responsible for the industrial manufacturing of Hyrax, a very important high refracting mounting media for diatoms. It was introduced at the Diatom Symposium in San Francisco in 1991. Before his death he was working on a publication on the Redwoods of California. Much of the research was done but, alas, he did not have the chance to publish the work.

Jim was well known internationally in the field of microscopy. He corresponded with so many people that it would be impossible for me to attempt an account. For at least 20 years he was the lynch pin for the American Circuit of the Postal Microscopical Society. Jim was a very active fellow and a friend who will be very much missed indeed. □



James F. Fidiam with his wife Phyllis at their 55th Wedding Anniversary, with Grand daughter Katie

Marvin Minsky, "Memoir on Inventing the Confocal Scanning Microscope,"

Reproduced courtesy of Scanning. First published in Scanning, vol.10 pp128-138, 1988

Note from MSSC Editor

We have reproduced this article (which was initially reprinted by MSSC in its Journal V4No9 September 1999) in response to growing interest among MSSC members in confocal scanning microscopes.

Editorial Note from publication in Scanning

In this issue, we carry an article which we invited Prof. Marvin Minsky to write about his invention of the confocal scanning microscope. This is not a question of recognizing priority for a scientific insight or discovery. It is much more a question of raising the problem of how it can be possible that such an immensely important idea can go unrecognized for such a very long period. It may possibly be the case that after more research we find that yet another person discovered the same idea. That does not matter. The fact is that Minsky invented such a microscope identical with the concept later developed extensively by Egger and Davidovits at Yale and by Shepherd and Wilson in Oxford and Brakenhoff and colleagues in Amsterdam etc. The circumstances are also remarkable in that Minsky only published his invention as a patent. Yet he not only built a microscope and made it work and it was the kind of prototype of which we would be proud but he showed it to a number of people who went away impressed but nevertheless failed to adopt the concept.

We have also secured a copy of Minsky's original letter to his patent agent which we reproduce verbatim to indicate the clarity with which he was able to describe the concept and the future potential. The original patent is also excellent reading, but that is quite freely available.

A. Boyde

Memoir on Inventing the Confocal Scanning Microscope Marvin Minsky

This is what I remember about inventing the confocal scanning microscope in 1955. It happened while I was making a transition between two other theoretical preoccupations and I have never thought back to that period until Alan Boyde suggested writing this memoir. When I read the following account, the plot seems more coherent now than it ever did in those times of the past. Perhaps, though, those activities which seemed to me the most spontaneous were actually those which unconsciously were managed the most methodically.

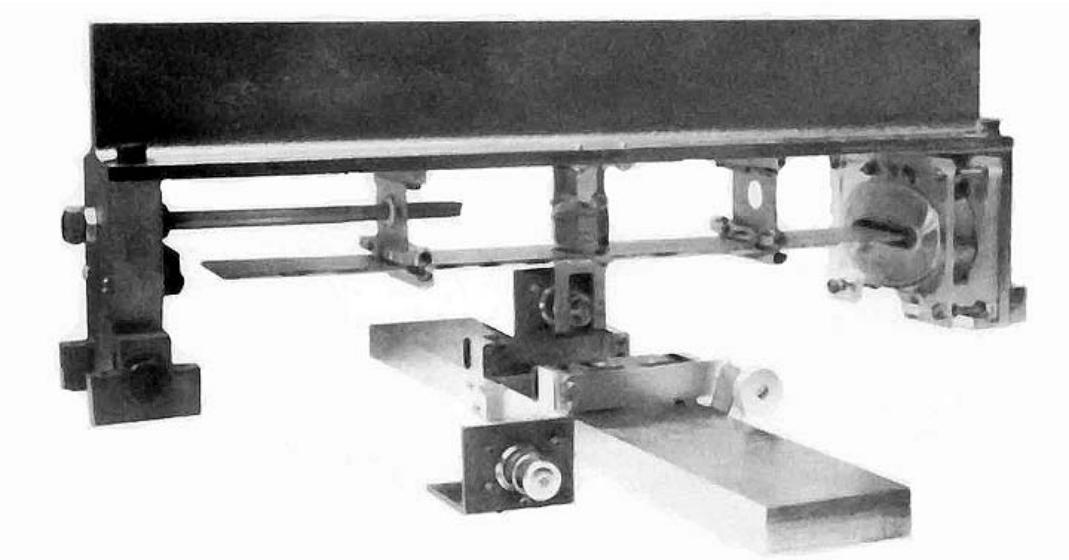
The story actually begins in childhood, for my father was an ophthalmologist and our home was simply [full] of lenses, prisms, and diaphragms. I took all his instruments apart, and he quietly put them together again. Later, when I was an undergraduate at Harvard in the class of 1950, there were new wonders every day. I studied mathematics with Andrew Gleason, neurophysiology with John Welsh, neuroanatomy with Marcus Singer, psychology with George Miller, and classical mechanics with Herbert Goldstein. But perhaps the most amazing experience of all was in a laboratory course wherein a student had to reproduce great physics experiments of the past. To ink a zone plate onto glass and see it focus on a screen; to watch a central fringe emerge as the

lengths of two paths become the same; to measure those lengths to the millionth part with nothing but mirrors and beams of light - I had never seen any things so strange.

For graduate studies I moved to Princeton to study more mathematics and biology, and wrote a theoretical thesis on connectionistic learning machines - that is, on networks of devices based on what little was known about nerve cells. <As long as I can remember, I was entranced by all kinds of machinery — and, early in my college years, tried to find out how the great machines that we call brains managed to feel and learn and think.> I studied everything available about the physiology, anatomy, and embryology of the nervous system. But there simply were too many gaps; nothing was known about how brains learn. Nevertheless, it occurred to me, you might be able to figure that out - if only you knew how those brain cells were connected to each other. Then you could attempt some of what is now called "reverse engineering" - to guess what those circuit's components do from knowing both what the circuits do and how their parts are connected. But I was horrified to learn that even those connection schemes had never been properly mapped at all. To be sure, a good deal was known about the [shapes] of certain types of nerve cells, because of the miraculous way in which the Golgi treatment tends to pick out a few neurons and then stain all the fibres that extend from them. But this permits you to visualize only one cell at a time, whereas to obtain the required wiring diagram you need to make visible [all] the cells in a three dimensional region. And here was a critical obstacle: the tissue of the central nervous system is solidly packed with interwoven parts of cells. Consequently, if you succeed in staining all of them, you simply can't see anything. This is not merely a problem of opacity because, if you put enough light in, some will come out. The serious problem is scattering. Unless you can confine each view to a thin enough plane, nothing comes out but a meaningless blur. Too little signal compared to the noise: the problem kept frustrating me.

After completing that doctoral thesis, I had the great fortune to be invited to become a Junior Fellow at Harvard. That three-year membership in the Harvard Society of Fellows carries unique privileges; there is no obligation to have students, responsibilities, or supervisors, and all doors to the university are opened; one is bound only by a simple oath to seek whatever seems the truth. This freedom was just what I needed then because I was making a change in course. With the instruments of the time so weak, there seemed little chance to understand brains, at least at the microscopic level. So, during those years I began to imagine another approach. Perhaps we could work the other way; begin with the large-scale things minds do and try to break [those] processes down into smaller and smaller ingredients. Perhaps such studies could help us to guess more about the low-level processes that might be found in brains. Then, perhaps we could combine what we learned from both "top down" and "bottom up" points of view - and eventually close in on the problem from two directions.

In the course of time, that new top down approach did indeed become productive; it soon assumed the fanciful name, Artificial Intelligence. But that is a different story, and the only part that is relevant here was what happened to me in that interlude. I now felt that while it might take decades to learn enough more about the brain, Artificial Intelligence could be tackled straight away - but my ideas about doing this were not yet quite mature enough. So (it seems to me in retrospect) while those ideas were incubating I had to keep my hands busy and solving that problem of scattered light became my conscious obsession. Edward Purcell, a Senior Fellow of the Society of Fellows, obtained for me a workroom in the Lyman laboratory of Physics, with a window facing Harvard Yard and permission to use whatever shops and equipment I might need. (That room had once been Theodore Lyman's office. Under an old sheet of shelf paper I found a bit of diffraction grating that had likely been ruled, I was awed to think, by the master spectroscopist himself.) One day it occurred to me



that the way to avoid all that scattered light was to never allow any unnecessary light to enter in the first place.

An ideal microscope would examine each point of the specimen and measure the amount of light scattered or absorbed by that point. But if we try to make many such measurements at the same time then every focal image point will be clouded by aberrant rays of scattered light deflected points of the specimen that are not the point you're looking at. Most of those extra rays would be gone if we could illuminate only one specimen point at a time. There is no way to eliminate every possible such ray, because of multiple scattering, but it is easy to remove all rays not initially aimed at the focal point; just use a second microscope (instead of a condenser lens) to image a pinhole aperture on a single point of the specimen. This reduces the amount of light in the specimen by orders of magnitude without reducing the focal brightness at all. Still, some of the initially focused light will be scattered by out- of-focus specimen points onto other points in the image plane. But we can reject those rays, as well, by placing a second pinhole aperture in the image plane that lies beyond the exit side of the objective lens. We end up with an elegant, symmetrical geometry: a pinhole and an objective lens on each side of the specimen. (We could also employ a reflected light scheme by placing a single lens and pinhole on only one side of the specimen - and using a half-silvered mirror to separate the entering and exiting rays.) This brings an extra premium because the diffraction patterns of both pinhole apertures are multiplied coherently: the central peak is sharpened and the resolution is increased. (One can think of the lenses on both sides of the microscope combining, in effect, to form a single, larger lens, thus increasing the difference in light path lengths for point-pairs in the object plane.)

The price of single-point illumination is being able to measure only one point at a time. This is why a confocal microscope must scan the specimen, point by point and that can take a long time because we must add all the time intervals it takes to collect enough light to measure each image point. That amount of time could be reduced by using a brighter light - but there were no lasers in those days. I began by using a carbon arc, the brightest source available. Maintaining this was such a chore that I had to replace it by a second best source: zirconium arcs, though less intense, were a great deal more dependable. The output was measured with a low noise photomultiplier circuit that Francis Pipkin helped me design. Finally, the image was reconstructed on the screen of a military surplus long-persistence radar scope. The image remained visible for about ten seconds, which was also how long it took to make each scan.

The most serious design problem was choosing between moving the specimen or moving the beam. So far as I know, all modern confocal microscopes use moving mirrors or scanning disks. At first it seemed more elegant to deflect a weightless beam of light than to move a massive specimen. But daunted by the problem of maintaining the three-dimensional alignment of two tiny moving apertures, I decided that it would be easier to keep the optics fixed and move the stage. I also was reluctant to use the single-lens reflected light scheme because of wanting to "see" the image right away! (Not only would dark field be inherently dimmer, but there would also be the fourfold brightness loss that beam splitters always bring.) <The modern machines do use the single-objective reflected light scheme.> A more patient scientist would have accepted longer exposure times and assembled the pictures as photographs - which would have produced permanent records rather than transient subjective impressions. In retrospect it occurs to me that this concern for real-time speed may have been what delayed the use of this scheme for almost thirty years. I demonstrated the confocal microscope to many visitors, but they never seemed very much impressed with what they saw on that radar screen. Only later did I realize that it is not enough for an instrument merely to have a high resolving power; one must also make the image [look] sharp. Perhaps the human brain requires a certain degree of foveal compression in order to engage its foremost visual abilities. In any case, I should have used film - or at least have installed a smaller screen!

In any case, once I decided to move the stage, this was not hard to accomplish. The specimen was mounted between two cover slips and attached to a flexible platform that was supported by two strips of spring metal. A simple magnetic solenoid flexed the platform vertically with a 60 hertz sinusoidally waveform, while a similar device deflected the platform horizontally with a much slower, sawtooth waveform. The same electric signals (with some blanking and some corrections in phase) also scanned the image onto the screen. Thus the stage-moving system was little more complex than an orthogonal pair of tuning forks. The optical system was not hard to align and proved able to resolve points closer than a micrometer apart, using 45x objectives in air. I never got around to using oil immersion for fear that it would restrict the depth to which different focal planes could be examined, and because the viscosity might constrain the size of scan or tear apart the specimen.

There is also a theoretical advantage to moving the stage rather than the beam: the lenses of such a system need to be corrected only for the family of rays that intersect the optical axis at a single focal point. In principle, that could lead to better lens designs because such systems need no corrections at all for lateral aberrations. In practice, however, for visible light, opticians can already make wide field lenses that approach theoretical perfection. (This was another thing about optics I had always found astonishing: the mathematical way in which the radial symmetry of a lens causes odd order terms of series expansions to cancel out, so that you can obtain sixth order accuracy by making only two kinds of corrections, of second and fourth order. It almost seems too good to be true that such simple combinations of spherical surfaces - the very shapes that are the easiest to fabricate - can transform entire four dimensional families of rays in such orderly ways.) However, the advantages of combining stage scanning with paraxial optics could still turn out to be indispensable, for example, for microscopes in the X-ray domain for which refractive lenses and half-silvered mirrors may never turn out to be feasible.

In constructing the actual prototype, the electronic aspects seemed easy enough because, a few years earlier, I had already built a learning machine (to simulate those neuronal nets) - and that system contained several hundred vacuum tube circuits. But the world of machining was new to me. Constructing an optical instrument was to live in a world where the critical issue of each day was how to clamp some bar of steel to

Dec. 19, 1961 M. MINSKY 3,013,467

MICROSCOPY APPARATUS

Filed Nov. 7, 1957

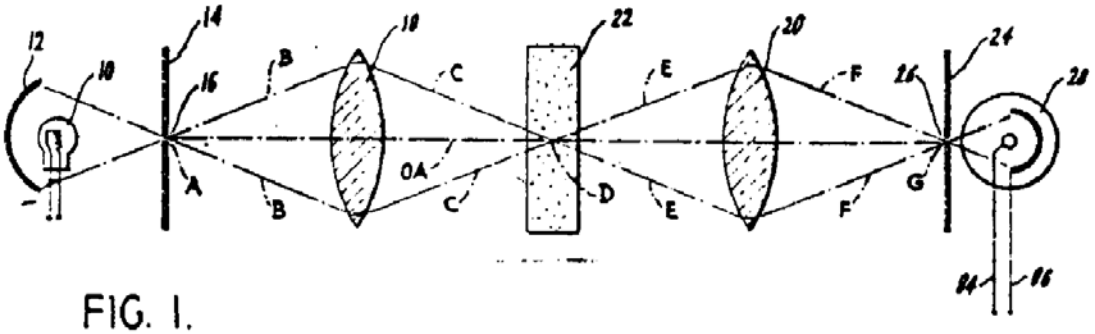


FIG. 1.

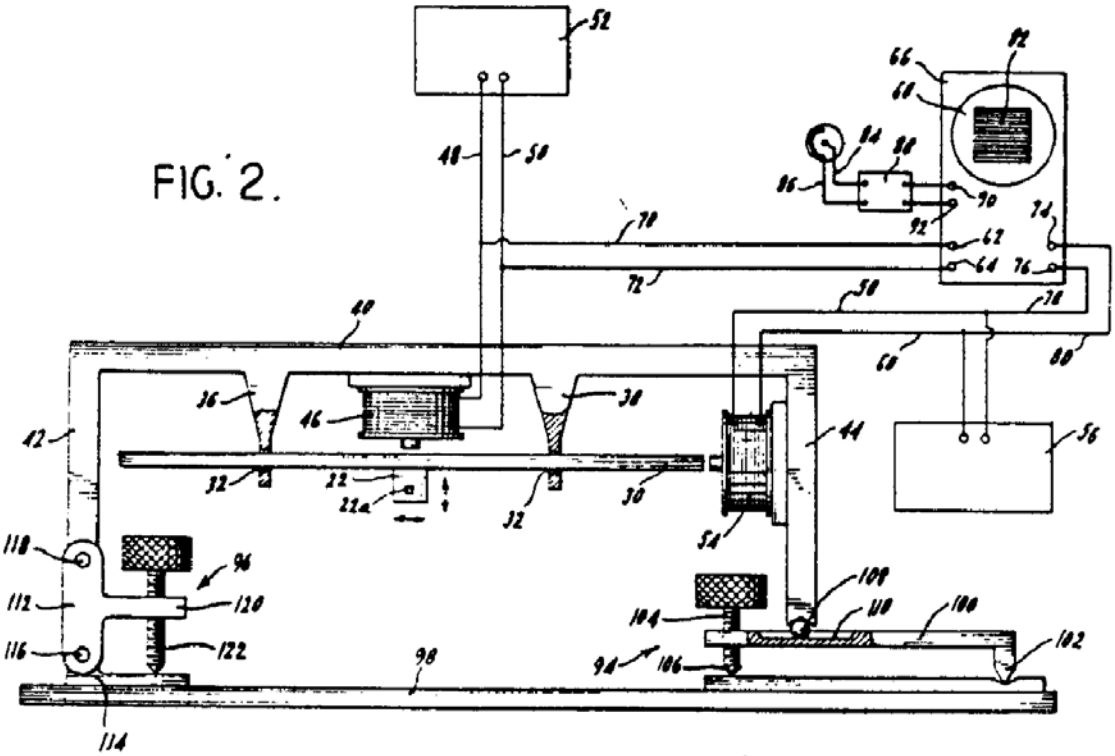


FIG. 2.

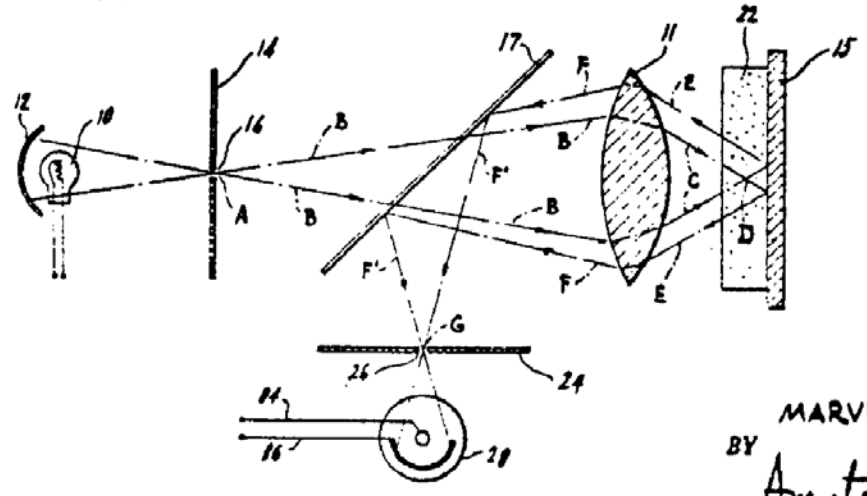


FIG. 3.

INVENTOR.
MARVIN MINSKY
BY
Ameter & Levy

the baseplate of a milling machine, what sort of cutter and speed to use, and how to keep the workpiece cool. I became obsessed with finding ways to reduce the thermal expansion under the wheel of a grinding machine; no matter how flat a surface seemed, I'd find new bumps the following day. (Perhaps I was haunted by Lyman's ghost.) By the time the prototype was complete, I understood how the principles of kinematic design had made most of that precision unnecessary. I could have saved months. Still, the machine shop experience was not wasted. A decade later, it helped me to build a singularly versatile robotic arm and hand.

Scanning is far more practical today because we can use computers to transform and enhance the images. In those days computers were just becoming available and my friend Russell Kirsch was already doing some of the first experiments on image analysis. He persuaded me to try some experiments, using the SEAC computer at the Bureau of Standards. However, that early machine's memory was too small for those images, and we did not yet have adequate devices for digitizing the signals. Subsequently years, both Kirsch and I continued to pursue those same ideas - of closing in on the vision problem by combining bottom-up concepts of feature extraction with top-down theories about the syntactic and semantic structures of images. Eventually, Kirsch applied those techniques to "parsing" pictures of actual cells, while I pursued the subject of making computers recognize more commonplace sorts of things. I should mention that I was also working with George Field (who also helped with the microscope design) on how to use computers to enhance astronomical images. Such schemes later became practical but at that time they, too, were defeated by the cost of memory. I returned to physical optics only once more, in the middle 1960s, in building computer controlled scanners for our mechanical robotics project and in studying the feasibility of using somewhat similar systems in conjunction with radiation therapy.

I also pursued another dream - of a microscope, not optical, but entirely mechanical. Perhaps there were structures that could not be seen - because they could not be selectively stained. What for example, served to hold the nucleus away from the walls of a cell? Perhaps there was a scaffolding of invisible fibres that one might recognize by plucking them - and then measure the strain, or see other things move. I examined the various micromanipulators that already existed but, finding none that seemed suitable, I designed one which I hoped to use in conjunction with my new microscope. Again the Society of Fellows came to my aid, this time in the person of Carroll Williams, who invited me to build it in his laboratory. The new micromanipulator was extremely simple: I mounted the voice coils of three loudspeakers at right angles and connected them with stiff wires to a diagonally mounted needle probe. The needle could be moved in any spatial direction, simply by changing the current in the three coils. The only hard part was replacing the coil suspensions with materials free from mechanical hysteresis. The resulting probe could be swiftly moved with precision better than 100 nanometers, over a range of more than a millimeter. (This sensitivity was at first limited by power supply noise. This was solved by using batteries.) To control the probe, my childhood classmate Edward Feder, who was now also working in Williams' laboratory, constructed a three-dimensional electrical joystick by attaching three conductive sheets to the sides of a tank of salt water. Everyone seemed to like [this] instrument, so we left it around in the laboratory, but it was never actually put to use, and I have no idea what became of it. I had planned to measure the infinitesimal forces by applying very high frequency vibrations to a microelectrode mounted on the probe and correlating the waveforms against the needle deflections as observed through the scanning microscope. I never got around to this because, by 1956, AI was already on the march.

To Morton Amster: Details of principles of operation and application.
The following further explains the mode of operation of the instrument which I have built and explained to you in previous letters and conversations.

I will first describe the ~~outer~~ details of the essential optical innovations of the system. It will be recalled that in my instrument an image of a specimen is formed by a point by point examination of the optical properties of the specimen (this point by point examination to be called "scanning") and the information thus obtained is then displayed on an oscilloscope or other appropriate image-forming device. I shall first discuss the manner in which the optical information is obtained at an individual point of the specimen;this is the "double focussing" feature of the instrument. The second basic feature,the "stage scanning" feature will be taken up later.

I.A Let me first describe the essential features of the optical path of the microscope. A source of light(1) and a pinhole aperture (1a)
(1) or equivalent are used to provide a point source of light.
(1a) Any other collimated source will work here. The power of resolution of the instrument depends on the degree to which perfect collimation can be approximated. A pinhole is merely a convenient source of collimated light.

(2) The light produced by (1) is focussed by an objective lens (2) on the specimen (3). The purpose of this lens is to produce a cone of light,at the vertex of which is the point of the specimen to be
(3) examined.

(4) A second objective lens recollimates the light that has passed through the specimen. This light is focussed on a second pinhole (5a) so that the vertex of the illumination cone is imaged on the pinhole.

(5) The light transmitted through the second pinhole (5a) is detected by a photosensitive device and its intensity measured.

~~I.B~~ Before discussing the manner in which this information about the optical properties of a point of the specimen is used to produce an image of the specimen,I will discuss the ways in which this instrument has advantages over conventional optical devices

Now the above description is that of the instrument in its simplest form. The light intensity of the light transmitted through each point of the specimen is then recorded and the resulting information is displayed to make a complete image of the specimen. How this may be done is discussed in section II below. Following this,I will discuss how,by inserting into the optical path described in section I above,certain stops,filters,etc., several new techniques of microscopy may be obtained,each of which I believe represent new innovations not to be found within the prior art.

II. In order to produce a useful image of the specimen,the information obtained by the use of the optical system of section I must be obtained in a like manner for a great many points of the specimen. Points of the specimen can be selected in some systematic manner,In particular,it was found convenient to "scan" over the specimen in the manner in which an image is generated on the screen of a television reciever;this method will here be called the "raster" scanning method. In the "stage-scanning" method described herein this scanning is done as follows:

(I wish to remark here that I regard "double focussing" and "stage scanning" as two separate innovations;it would be possible to use each independently of the other in microscopy;the fact is that when both are used we obtain a very convenient and versatile instrument.)

In the"stage-scanning" microscope no part of the optical system need be in motion except the specimen and its immediate mounting. The specimen itself is moved in some regular pattern in such a way that the vertex of the illumination cone described in (3) above describes a raster within the specimen. This raster must of course be fine enough to reveal the details of the specimen which are being studied. The advantage of this method (of moving the specimen rather than parts of the optical system) is that once the optical system has been adjusted for one point of the specimen,no further adjustment will be required,in general, for examination of other parts. In the instrument that I have constructed, the motion of the specimen is obtained by mounting the specimen on an electrically driven tuning fork,which tuning fork in turn is mounted so as to move in a direction perpendicular to the faster vibration of the tuning fork. The result is that the specimen is moved in such a manner that the illumination point describes a"raster"within the specimen. Many other ways of moving the specimen are imaginable;the innovation is the very idea of such motion. The tuning fork method just described is particularly convenient in that the the electric signals which determine the position of the specimen can also be conveniently be used to determine a corresponding position for the beam of a cathode ray oscillograph or other two-dimensional display device,and the information used obtained by the photocell (5) can be displayed (for example,as brightness)on this two dimensional display,thus forming an image of the specimen.

A feature of this instrument which is not obtainable in conventional microscopy,is that there is no necessity that the plane of the specimen being examined need be perpendicular to the optical axis of the instrument or that of the mounting of the specimen. For the motion of scanning may be made to include a component along the optic axis,(limited only be the working "working distance" of the objectives". This feature may be of great value in microscopy.

A converse of this system would be to fix the specimen and move the entire optical system. This would in general be much less convenient,but in the case that the specimen of interest happens to be immovable,it might be useful.

A related method,which I would not consider a process converse,would be to move only the two pinholes. As will oe explained,however,such an instrument would lose the essential optical aspect of the present invention,in that all light rays of importance are in the plane of the planes containing the optic axis.

III. I will now describe certain features of the system described above,and then certain features resulting when some modifications are introduced. Each of these features results in new domains of applicability.

A. The optical system as described has the novel feature that (all light rays originate at a point of the optical axis of the instrument,and only rays which terminate at another point of the optic axis (i.e.,at 5a)are accepted by the photosensitive element. Thus only rays of direct optical the optical elements of the system deal only with what may be called "axial cones of light",i.e., families of rays which originate or terminate on a single point of the optical axis. The following are among the very important consequences of this fact

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This is what I remember now, and it may not all be accurate. I've never had much conscious sense of making careful, long range plans, but have simply worked from day to day without keeping notes or schedules, or writing down the things I did. I never published anything about that earliest learning machine, or about the micromanipulator, or even about that robot arm. In the case of the scanning microscope, it was fortunate that my brother in law, Morton Amster, not only liked the instrument but also happened to be a patent attorney. Otherwise I might have never documented it at all. The learning machine and the micromanipulator disappeared long ago but, only today, while writing this, I managed to find the microscope, encrusted with thirty years of rust. I cleaned it up, took this photograph, and started to write an appropriate caption - but then found the right thing in a carbon copy of a letter to Amster dated November 18, 1955. □

INTERNET RESOURCES

The first from the Editor, the other 2 sent in by George Vitt.

Microscopy Info: Confocal Laser Scanning Microscopy and 2 Photon

See: www.mwrn.com/guide/light_microscopy/laser.htm

This site is well worth checking out if you want to follow up on Minsky's article above. It provides numerous links to articles on the confocal scanning microscope, details of the instrumentation and techniques, and an outline of applications of the technique. It also includes a list of laser scanning confocal facilities and links to listservs and newsgroups on the subject.

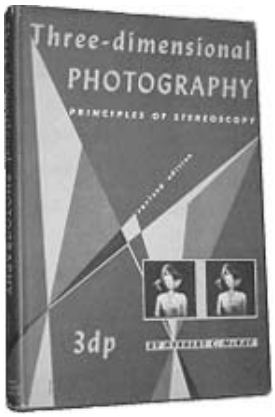
Southwest Museum of Engineering, Communications and Computation: Micro-Links

See: www.smecc.org/micro-links!.htm

This site from the Southwest Museum of Engineering, Communications and Computation provides a very useful and lengthy links pages to websites focusing on the Micro-World.

Stereoscopic Displays and Applications Virtual Library

See: www.stereoscopic.org/library/

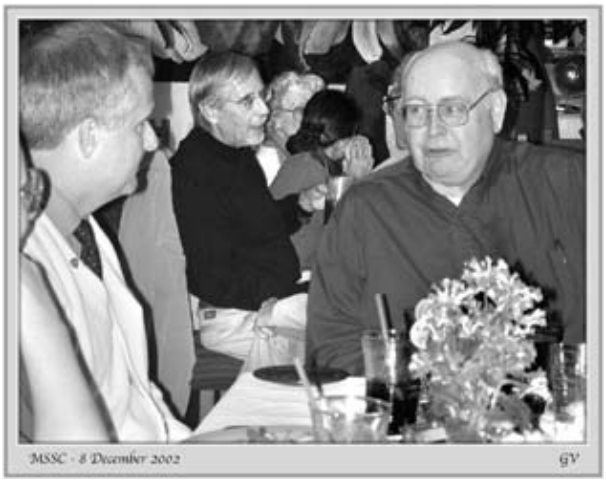


The Virtual Library is the new online repository of selected Stereoscopic Imaging publications. The site intends to convert selected publications into electronic editions which people can then download from the site. Of particular interest to members will be Herbert C. McKay's classic book on stereo photography which is now public domain and available for downloading in PDF format from the website. The original scan was at 300 l/in, to insure results of high visual quality. The file is 16.7MB - so the download time is considerable, but well worth it. The book contains 349 pages. The author is the grandfather of Maurice Greeson, our good friend and esteemed member of the Microscopical Society of Southern California (MSSC). Here is a description of this work, taken from the site. "The second title in the SD&A Virtual Library is *"Three-Dimensional Photography - Principles of Stereoscopy"* by Herbert C. McKay (b1895-d1970)."Three-Dimensional Photography" was first published in 1948 - this electronic edition is a copy of the 1953 edition (which was the second printing of the second edition). The main topic of "Three-Dimensional Photography" is stereoscopic photographic technique. Titles of chapters include: Elementary Stereography, Stereoscopic Cameras, Stereographic Technique, Flash in Stereo, Color in Stereo, Pictorial Stereography, Applied Stereoscopy, Polarized Light Applied to Stereoscopy, Close-up Stereography, Trick Work and Hyperstereo. The book also provides a review of the wide range of stereoscopic film cameras, viewers and projectors available. The book touches on a few areas of stereoscopic theory but intentionally does not go into too much detail in these areas. The book contains a glossary of stereoscopic terms and is amply illustrated. □

Society's Annual Holiday Banquet

Sunday 8th December 2002 at Sabors Restaurant

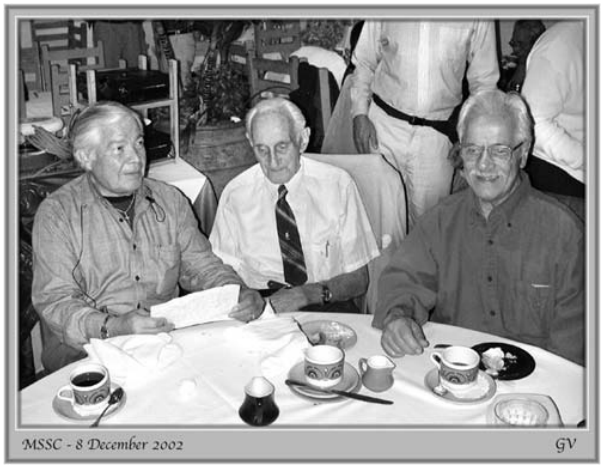
This was the annual gathering of the Society for its holiday banquet at Sabors Restaurant in Santa Monica. We are very grateful to Pete Teti for making the arrangements on behalf of the Society.



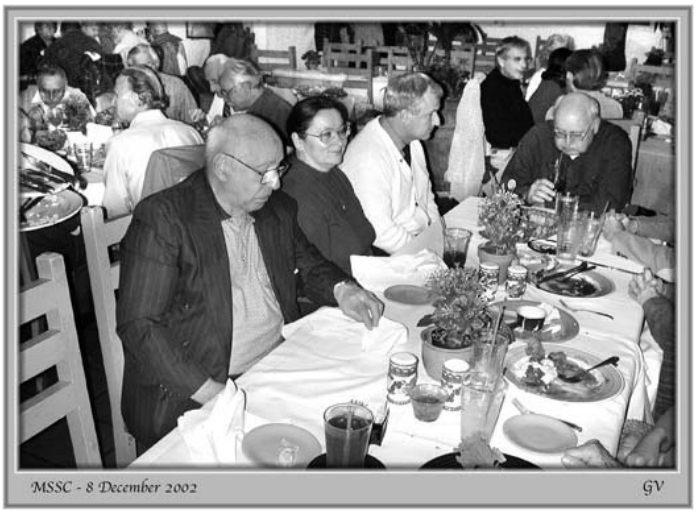
After the meal Jim Solliday gave a slide show presentation entitled "Exploring a Microscopic Universe". The presentation consists of slides by John Chesluk & Jim Solliday. The presentation lasted $21^1/_2$ minutes and a program is given below:

Scenes from an Old Planet (time: 7:44)
Music: Medelssohn: "*Hebrides*" Overture, Op 26, Symphony No.3

Exotic Plant Life (time: 5:16)
Music: Johann Pachelbel, *Canon and Fugue*
The Surface Cools and Crystals Grow (time: 5:30)
Music: Windham Hill, Sample 84, (*Shadowdance*), plus short by John Williams
Some Paintings by Nature (time: 2:12)
Music: William Acherman, Passage, song: *Passage*

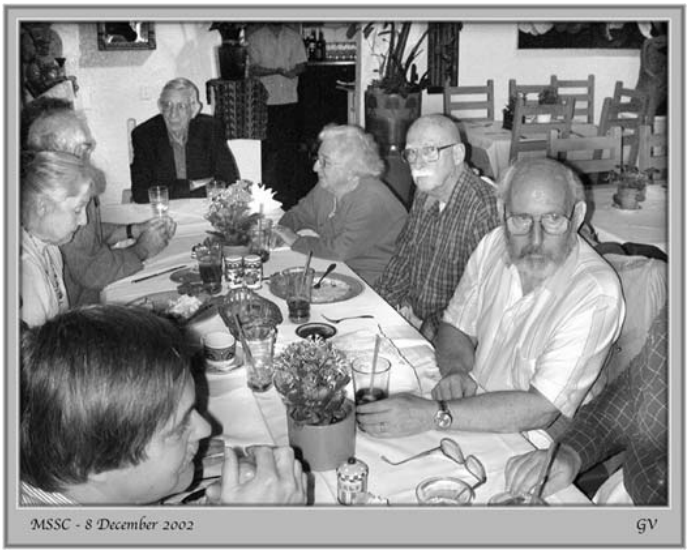


MSSC - 8 December 2002



MSSC - 8 December 2002 GV

Larry McDavid



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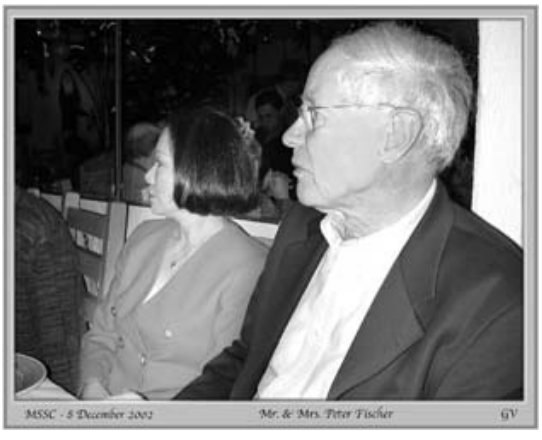

MSSC - 8 December 2002 Mr. & Mrs. Peter Fischer GV

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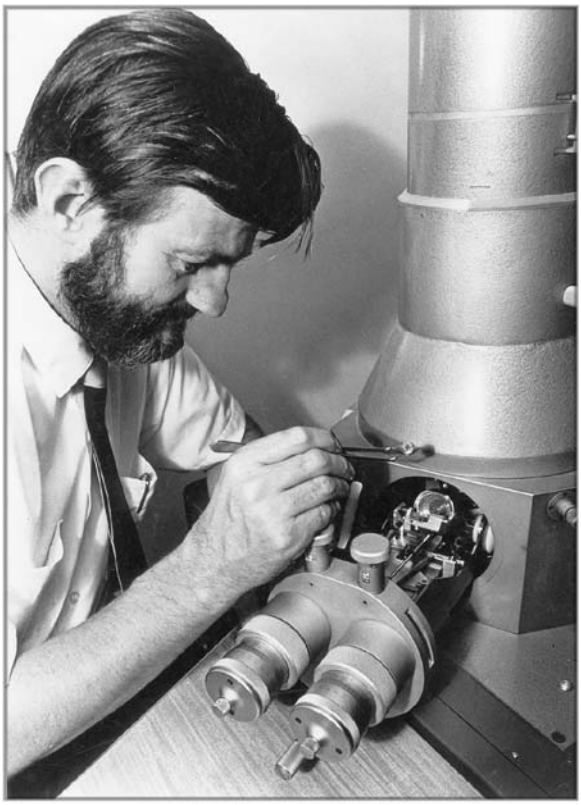
Obituary: Dr. Norman M. Hodgkin

by Joan Hodgkin

Dr. Norman M. Hodgkin, PhD, age 77, a five year resident of Alameda, California passed away on December 15, 2002 from a heart attack. Dr. Hodgkin was born in Los Angeles and was raised in Palo Alto, California. He joined the Navy in 1944 and spent his naval career in Alameda.



Dr. Norman Hodgkin

After World War ll he went back to school, graduating in Business Administration from the University of Colorado. He returned to school again in the late 1950's graduating in 1961 with a MA in zoology from the University of California at Berkeley. He received his doctorate from the University of Arizona in 1969.

Dr. Hodgkin started Micrographics in Newport Beach, California becoming one of the first in the nation to use the Scanning. Electron Microscope as a research tool. He was a long time member of the Microscopical Society of Southern California. □

FORTHCOMING BI-ANNUAL MSSC OFFICER ELECTIONS

15th January 2003 at New Roads School

As announced at the Christmas Banquet, it will soon be time to conduct our bi-annual elections. In January 2001 the membership voted to have the election of the Societies officers every two years and to conduct the election in January of the appropriate year. In order to accommodate this effort I will need all nominations for office to be sent to me no later than 4th January 2003.

Any member can be nominated as long as he or she consents to serve. Please make your desire to serve as an officer known to me or a friend who can then send in a nomination. We welcome the participation of all members.

Certain positions are very important and will be primarily be put forward for confirmation votes. This includes the Treasurer (Dave Hirsch) who maintains the check account, Larry Albright who maintains our website (unless there is someone else who is willing to take on that commitment), and Leonie Fedel who edits the Journal.

If no nominations are received for any position the officer that currently occupies that office will be up for a confirmation vote. Please seriously consider who might best serve our Society.

From the nominations, a ballot will be produced for the January business meeting on Wednesday 15th January 2003. It is very important that you as a member participate in this voting process. The officers need your confidence and the members need to be able to rely on their elected officers.

The following list is our current line up of Officers. Please let me know if you are interested in serving and/or if you want to submit a nomination for a particular office. Thanks for your consideration, Sincerely, Jim Solliday, President MSSC.

Send nominations to
Jim Solliday: jlsolliday@adelphia.net
or (714) 775-1575

Officers of the Microscopical Society of Southern California, Election Results (2001) Effective for two years:

President: James D. Solliday
Vice President: Dr. Ken Gregory
Treasurer: Dave Hirsch (confirmation)
Corresponding Secretary: George Vitt
Education Chair: Alan deHaas
Facilities Chair & workshops: Pete Teti
Webmaster: Larry Albright (confirmation)
Program Chair: Larry Albright
Program Committee: Ken Gregory, Ed Jones
Editor (Journal): Leonie Fedel (confirmation vote).

The editorial staff consists of George Vitt (graphics), Allen Bishop (associate copy editor), and Pete Teti (Journal distribution).

All positions are voluntary. □

Saturday Workshop Announcement

9:00am 4th January 2003
At the home of Izzie Lieberman

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

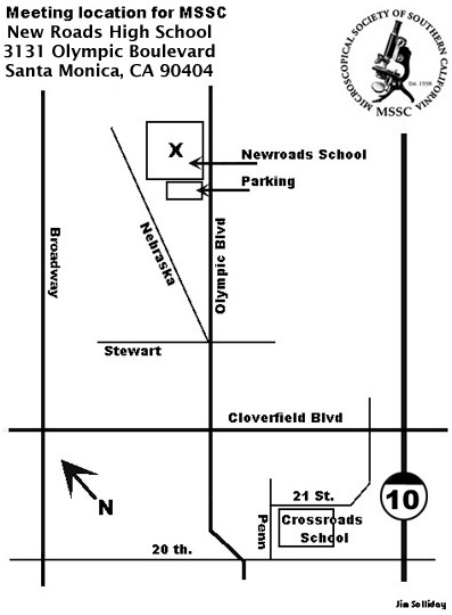
This workshop will be held at Izzie Lieberman's. Activities will start at 9:00am. As usual, this is a chance for good friends and fellow microscopists to talk about our favorite subject. You are invited to bring any manner of items related to microscopy to share it with the fellowship. If you have something 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

7:00pm 15th January 2003
at New Roads School



Mr. Arnie Rosner, an astronomer, will be giving an interactive presentation on astronomy to the membership. Using the internet he will direct a large telescope at specific points in the night sky. Photographs will be taken using a mounted CCD camera and the images transmitted back to our class room. The telescopic images will be projected on the screen for the members to study.

After this, Alan deHaas will give another talk in his lecture series on the technology of the microscope.

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

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Register by April 7, 2003 for pre-registration rates. Reserve hotel by April 10, 2003. CALL 1-800-443-0263 for further information or visit our website at www.scanning.org.

RENEWAL OF MSSC MEMBERSHIP DUES

Membership dues for fiscal year 2003 are due and payable. The dues structure remains as before:

$50.^{00}$ for Regular Members for the year. Regular Members are geographically located so they can attend meetings and workshops.

$40.^{00}$ for Corresponding Members for the year. Corresponding members reside in geographically remote areas and are not able to attend meetings. Corresponding members may also include disabled persons who reside geographically close but are unable to attend meetings and workshops.

Payment accepted in the form of cash or checks in US funds made out to Dave Hirsch (not to MSSC). Please remit dues to:

David L. Hirsch/MSSC, 11815 Indianapolis Street,
Los Angeles, CA 90066-2046
(320) 397-8357, Email: dave.hirsch@verizon.net

EDITOR'S NOTE

Please send any articles, photos, member profiles, notifications of forthcoming events and website summaries for inclusion in 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.

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

Jim Solliday (President)
Pete Teti (Printing & Distribution)
Alan deHass (Education Chair)
Leonie Fedel (Layout Editor)
George Vitt (Image Editor)
Allen Bishop (Copy Editor) □