

► **Microscopist Salary Survey:**

In the previous issue of this publication, we advised that we were not going to publish the result of our recent microscopist salary survey – due, primarily, to the low number (456) of respondents. However, due to the sizeable number of readers who have requested this information, and with some reluctance, the same is published on the following page.

We wish to state that we offer **NO** conclusions with this information. However, it may be that some are (and some may not be) interested in the apparent "trends" in this information.

Many might agree that, with a much wider data base, the information could be of some real value to the industry. Should you agree, and if you have not previously supplied your data, you are encouraged to do so. With a substantial amount of additional data, we will re-publish the summary at a later date.

► Princeton Gamma-Tech (PGT) has acquired the assets and resources of American Nuclear Systems (ANS) of Oak Ridge, TN. Effective December 1, 1998. The resulting company will operate as Princeton Gamma-Tech, Inc. Established in 1965, PGT is recognized as a worldwide leader in X-ray microanalysis and nuclear detector technology. William H. Hardy, Ph.D. will serve as Chief Executive Officer of PGT, and Douglas P. Skinner will continue as President of PGT, a position which he has held since March of 1998.

► Joseph I. Goldstein, Dean of the College of Engineering at the University of Massachusetts, has been named an honorary member of the Microbeam Analysis Society.

Dr. Goldstein is well known in our industry as the 'joe' at the Lehigh University series of microscopy courses.

► The 1998 MSA Undergraduate Research Scholarship awards:

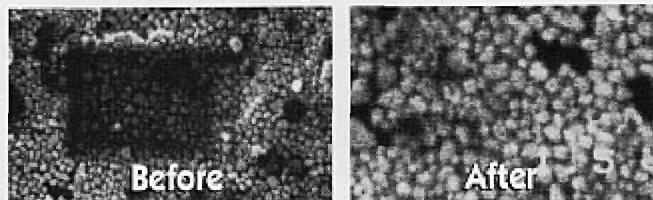
1. Jamie Fenimore: The roles of different blood cells in free radical production during encapsulation in *Manduca sexta*. (Dr. Diana Cox-Foster, Pennsylvania State University)
2. Vincenzo Lordi: Nanomechanics of Carbon Nanotubes (Dr. Nan Yao, Princeton University)
3. Sage Berg-Cross: Defining Tip Characterizations and Edge Detection (Dr. Rick Silver, NIST, Gaithersburg, MD).
4. Kelly Davidson: Characterization of mutant sperm cells of the fern *Ceratopteris richardii*: A correlated light, fluorescence and microscopy study. (Dr. Karen Renzaglia, Southern Illinois University)
5. Andrew Griffin: ASEM observation of longitudinal axis alignment of silicon carbide whiskers in an organic matrix. (Dr. Changmo Sung, University of Massachusetts – Lowell).
6. Michelle Lai: Glomerulus Development in Organotypic Cultures from Moth Olfactory Lobe. (Dr. Leslie Tolbert, University of Arizona)

The 1999 MSA Undergraduate Research Scholarship Program is currently soliciting applications from students interested in conducting a research project which involves the use of any microscopy technique. Students should be sponsored by a MSA member.

With the application deadline currently at 31 December 1998, interested parties should contact Dr. Ralph Albrecht as soon as possible: (608)263-3952, fax: (608)262-7420, eMail: [albrecht@ahabs.wisc.edu](mailto:albrecht@ahabs.wisc.edu)

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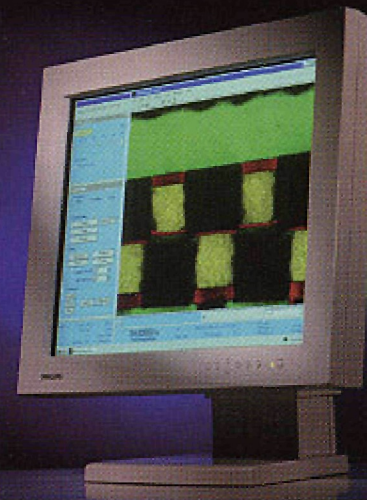
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## MICROSCOPIST SALARY SURVEY

Due to the relatively small data base, we had decided not to publish the results of the microscopist salary survey. However, due to the number of individuals that have requested the information, we have changed our mind and offer it as follows.

Should you find the information of initial interest, subject to the size of the data base, and have not previously supplied your data, you are encouraged to do so as follows. If we receive sufficient additional data, we will republish the survey at a later date.

In the following table, under degree, the first number (\$) represents average yearly income in thousands of dollars and the second number (( )) indicates the number of entries for that category.

Years Experience	Education		
	BS, etc.	MS, etc.	Ph.D
1 - 2.9	\$29.6 (16)	\$31.3 (7)	\$44.1 (13)
3 - 5.9	\$36.1 (10)	\$42.7 (11)	\$54.6 (20)
6 - 8.9	\$47.0 (15)	\$56.7 (12)	\$59.3 (8)
9 - 11.9	\$45.7 (19)	\$50.2 (18)	\$56.2 (11)
12 - 14.9	\$48.5 (18)	\$45.9 (16)	\$57.1 (14)
15 - 17.9	\$45.0 (14)	\$52.2 (16)	\$67.9 (13)
18 - 20.9	\$48.7 (21)	\$51.6 (21)	\$71.9 (11)
21 - 23.9	\$50.4 (12)	\$54.7 (6)	\$82.3 (7)
24 - 26.9	\$43.4 (9)	\$52.9 (8)	\$75.6 (14)
27 - 29.9	\$49.8 (13)	\$48.9 (3)	\$71.7 (5)
30 PLUS	\$64.6 (9)	\$59.4 (4)	\$70.9 (3)

## Factors

We submit that there may be "factors" which influence salary levels. For example, due to the cost of living might we expect salaries to be higher in California than in, say, Florida.

With this thought in mind, we first computed the average yearly salary for all (457) microscopists - with \$51,676 as the result. Next, we computed the same for each of the following categories, and compared it to the total average for a percentage deviation.

Gender:	Male (268):	+7.7 %
	Female (189)	-10.9 %
Supervisor:	Yes (223):	+8.8 %
	No (233):	-8.4 %
Location:	Midwest (117):	-3.9 %
	Northeast (124):	+4.4 %
	Southeast (70):	-4.9 %
	South (42):	-16.1 %
	West-xCA (45):	-0.1 %
	California (52):	+20 %
	Interest	Biological (255):
	Physical (182)	+11.6 %
	Earth (20):	-15.6 %
Working In:	Industry (171):	+13.4 %
	Education (160):	-12.7 %
	Health (64):	-7.3 %
	Gov't (35):	+8.2 %
	w/GS scale	
	Gov't (27):	-3.2 %
	Research Ctr.	

**Special Note:** Due particularly to the size of the data base, we DO NOT suggest any conclusions in the above. The information is supplied only for your possible interest.

## MICROSCOPIST SALARY SURVEY

If you are interested in expanding our salary survey, and have not previously supplied your data, you are encouraged to do so. With sufficient additional data, we will republish the results. You may do so by Fax, mail or by supplying the information by eMail.

Microscopy Today  
 PO Box 620122  
 Middleton, WI 53562  
 Fax: (608)836-1989  
 email: microtoday@aol.com

### EDUCATION (DEGREE)

- None  
 AA  
 BS/BA/etc.  
 MS/etc.  
 PhD  
 MD/DVM

### LOCATION

- If in question, pick the area you feel closest to your own income location)  
 Midwest  
 Northeast  
 Southeast  
 South  
 West excluding California  
 California

### EXPERIENCE (YEARS AFTER LAST DEGREE)

### GENDER

- Male  
 Female

### PRIMARY INTEREST IN:

- Biological Science  
 Physical Science  
 Earth Science

### WORKING IN:

- Industry  
 Education  
 Hospital/Medical  
 Government (with GS-Scale)  
 Government Sponsored Research Ctrs.

### YEARLY INCOME

\$ \_\_\_\_\_

### CURRENT SUPERVISOR/MANAGER

- Yes  
 No



## COMING EVENTS

### Marine Biological Laboratory Courses, Woods Hole, MA

- May 6/14 '99: Analytical & Quantitative Light Microscopy
  - May 18/25 '99: Microinjection Techniques in Cell Biology
  - Oct 6/14 '99: Optical Microscopy & Imaging in the Biomedical Sciences
- Carol Hamel: (508)289-7401, eMail: admissions@mbi.edu

### McCrone Research Institute (Selected) Microscopy Courses, Chicago, IL

- March 1/5 '99: Conoscopic Methods
  - April 12/16 '99: An Introduction to TEM – Techniques and Applications
  - April 12/16 '99: Advanced FTIR Microscopy
  - June 21/25 '99: Electronic Image Acquisition, Processing & Analysis
- Nancy Daerr: (312)842-7100, Fax: (312)842-1078, ndaerr@mcri.org

✓ January 6/8 '99: **The 3rd Annual UC Berkeley Microwave Processing Techniques Workshop** (UC Berkeley, Ted Pella, Inc. & Leica), Berkeley, CA. Kathy Stangenberg: (800)237-3526, Fax: (530)243-3761, eMail tedpel@aol.com

✓ March 7/12 '99: **PITTCON '99**, Orlando, FL (412)825-3220, Fax: (412)825-3224, email: expo@pittcon.org

✓ March 22/25 '99: **11th International Conference on Microscopy of Semiconducting Materials**. (RMS & MRS) University of Oxford. <http://www.iop.org/Confs>

✓ April 11/14 '99: **SCANNING '99**: (FAMS, Inc.) Chicago, IL, Mary K. Sullivan: (201)818-1010, Fax: (201)818-0086, fams@holonet.net

✓ April 11/15 '99: **FOCUS ON MICROSCOPY 1999 – 12th International Conference on 3D Image Processing in Microscopy & 11th International Conference on Confocal Microscopy** (European Molecular Biology Laboratory), Heidelberg, Germany <http://www.embl-heidelberg.de/Conferences/FocusOnMicroscopy>

### ✓ LEHIGH MICROSCOPY SCHOOL, Bethlehem, PA

- June 14/18 '99: SEM and X-ray Microanalysis
  - June 13 '99: Introduction to SEM and EDS
  - June 21/25 '99: Advanced Scanning Electron Microscopy
  - June 21/25 '99: Quantitative X-ray Microanalysis
  - June 21/24 '99: Analytical Electron Microscopy
  - June 22/25 '99: Atomic Force Microscopy
  - June 21/24 '99: Microdiffraction
- Info: Ms Sharon Coe: (610)758-5133, email: slc6@lehigh.edu

✓ June 16/27 '99: **3D Microscopy of Living Cells & June 29/July 1 '99: 3D Image Processing Workshop** (Univ of British Columbia) Vancouver, BC, Canada. Prof. James Pawley: (608)263-3147, jbpawley@facstaff.wisc.edu

✓ June 21/25 '99: **15th Annual Short Course on Molecular Microspectroscopy** (Miami University) Oxford, OH (513)529-2874, fax: (513)529-7284, email: <http://www.muohio.edu/~sommeraj>

✓ June 25/July 1 '99: **INTER/MICRO '99** (McCrone Research Institute), Chicago, IL. Nancy Daerr: (312)842-7105

✓ July 9/13 '99: **IUMAS 2000: The 2000 Meeting of the International Union of Microbeam Analysis Societies**, Kailua-Kona, Hawaii

✓ Aug 1/5 '99: **MICROSCOPY & MICROANALYSIS '99** (MSA) Portland, OR

✓ Aug 27/29 '99: **First International Conference On Scanning Probe Microscopy of Polymers**. (UCSB & Digital Instruments), Santa Barbara, CA E.J. Kramer at edkramer@mrl.ucsb.ca

✓ April 11/13 '00: **MICRO 2000** (Royal Microscopical Society) London

✓ June 26/30 '00: **7th Asia-Pacific Conference on Electron Microscopy** Singapore. eMail: micngml@nus.edu.sg or medlab2@nus.edu.sg <http://www.med.nus.edu.sg/micsoc/7apem>

✓ July 9/14 '00: **12th European Congress on Electron Microscopy**, Bruno, Czech Republic. <http://www.eurem2000.isibmo.cz/>

## A Bit Of Humor

In our continued attempt to make this publication interesting to our readers, we would like to add a bit of humor in each issue. While nice if all related to some aspect of science, we will accept other topics.

To this end, we would greatly appreciate any and all contributions – material, articles, poems, cartoons, whatever!!!

.. Editor

### Single Cells

#### *Sung to the tune of Jungle Bells*

*Splashing to and fro  
Amoebas like to play*

*In a petri dish*

*Dividing one a day*

*I thought there were two*

*Nothing less or more*

*But I looked through the microscope*

*And counted up to four!*

*Oh ...*

*Single cells*

*Single cells*

*See how they divide*

*There was one on Christmas day*

*But now multiplied*

*Single cells*

*Single cells*

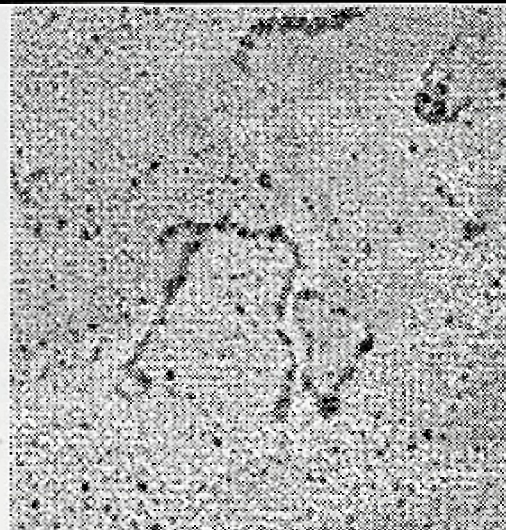
*Nothing much to do*

*But swim around a petri dish*

*Dividing into two*

*Riddle: If there is one cell on the first day of  
Christmas, how many amoebas will there be  
on the "twelfth" day of Christmas?*

The above is a contribution by Ms. Kimberly Carvalho, a student at the Punahou School in Hawaii. Ms. Carvalho is the daughter of Tina (Weatherby) Carvalho, a frequent contributor to this publication.



### Negative Stain

Contribution from Philip Oshel



## Shortcourses for Microscopists:

Short courses are opportunities that many practicing microscopists utilize to learn new techniques as well as gain deeper understanding of things they've been doing for years. Several Midwest microscopists have written brief summaries of recent short courses they have attended.

We hope to have this as a periodic forum, so if you've attended a shortcourse recently, drop us a line about it.

### Lehigh Advanced SEM Course

by Brad Huggins, Amoco Research Center, Naperville, IL 60563

This past summer I participated in the Advanced Scanning Electron Microscopy with Digital Imaging Short Course at the Lehigh University Microscopy School. This was the third such course that I have attended at Lehigh in the past 10 years, and, as always, this year's course was a very valuable experience. The 4 days were packed with information, learning and opportunity for feedback in the form of classes, lectures and labs. The instructors are world class experts/teachers in their fields, and the opportunity to interact with them throughout the entire week was unique. Instructors, participants and vendors work and live together on campus for the week.

The course material and agenda were also very good, and appropriate for this advanced section. The week started with a review on advanced electron optics, and quickly moved into High Resolution SEM and Digital Image Processing and Analysis. Environmental SEM, Low Voltage SEM, and Stereo Microscopy were also covered in detail. Crystallography in the SEM was a relatively new topic for me, and I am now looking to acquire the instrumentation to apply this technique on our SEMs.

I would rate the overall level of this course as intermediate to advanced, and highly recommend it to experienced microscopists who have a good

working knowledge of digital imaging and a strong SEM background. The instructors, staff, and organization of this Short Course are its greatest strengths. The excellent integration of the subject materials covered through the week, combined with the high caliber of instruction and access to a full range of instrumentation/vendors, make this course an opportunity that you'll not likely find elsewhere. If I were to recommend any changes to the course, it would be to make it a full week (5 days) which would enable participants to more fully pursue particular areas of interest with the experts who are assembled for the school.

### McCrone Research Institute Course Reviews:

"Microscopic Identification of Asbestos"

"Mineral Grain Identification"

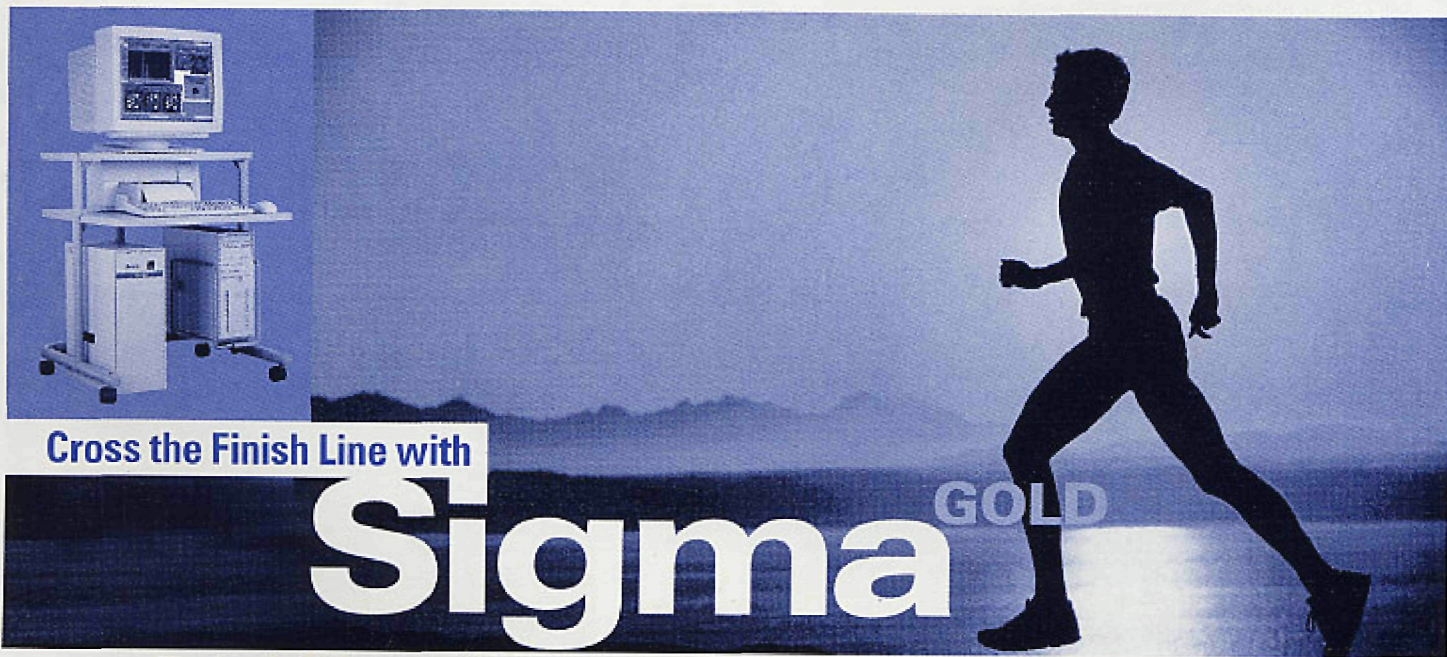
"Hotstage Microscopy and Polymorphism"

"Advanced Pollen and Spore Identification"

by Tony Havics, pH2 Environmental, Inc.

The McCrone Research Institute (MCRi) offers a variety of microscopy courses. I have attended four. They are offered at their South Michigan Ave facility in Chicago with good access to both the interstate and airport. The geographic location leaves something to be desired and it results in the Institute bringing in lunch daily (which they pay for, and if they didn't, it's so good that I'd pay for it myself).

The MCRi facility is outfitted with more light microscopes and accessories than could ever be needed - most of an older variety of Nikon. Founded on Walter McCrone's philosophy that the polarized light microscope (PLM) is the best tool for investigatory and R&D work, few other scopes are noticeable, but they're still present. The asbestos analysis was taught by Peter Cooke, mineral grain identification course instructor was John Delly, hotstage and polymorphism course was hosted by Dr. McCrone himself, and Dr. John Shane guided us through the pollen and spore identification course. Each instructor was well



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suited for his respective course considering their backgrounds and teaching styles. The asbestos analysis course using the PLM required a strong foundation in optics that became tedious at times. The classroom instruction was not as in-depth as that of an optical mineralogy course due to the need to practice techniques and conduct real world sample work, but could have been enough to overwhelm a novice without the proper instructor. This is where Peter Cooke entered. *A patient teacher who is fundamentally sound in his theory, he was capable of seeing the glazing over of a student's eyes . . . and quickly responded with a different perspective to aid in grasping multiple theories.* The course, while not particularly pleasant due to the extended lecturing, was well worth the enhancement of basic optical mineralogy application and fiber identification.

The mineral grain identification course presented less of lecturing style instruction and more of hands-on learning under the scope, looking at morphology and inclusions, performing conoscopic observations, learning about source identification by characteristics. When the class seemed to be dragging, John Delly would reveal a novel or interesting application of the microscope – or the specimen for that matter. There seemed to be too little time, but the course was enjoyable and I walked away with plenty of new skills and a greater understanding of the subject matter. The hotstage and polymorph course was history incarnate. Little time was spent on the theory of the microscope, but through the week Walter McCrone lead the class through a personal tour of the development of hotstage (and coldstage) work, from his own work in explosives, circa the 1940's (which mysteriously became declassified during the course), the liquid crystalline form of Intal, DDT, hydrates and various other fusion preparations. This course was not one for the novice. Given Dr. McCrone's vast experience and a prerequisite course in PLM, it was presumed that the students understood the basics and more (including phase diagrams). No time was wasted on formalities - one immediately dug into previous and current applications as if they were a daily routine. Without my formal education including chemistry, materials science, phase diagrams, and heat transfer, I would have been a little frustrated.

The last course I attended was on pollen and spore identification, and like the other courses, the instructor's enthusiasm in this field was only equaled by his skill. The course itself included collecting samples and preparing reference slides to take back to the office, which took away from the time that might have been better spent on more instruction via slides and the monitor linked to the instructor's scope. Like the rest of the courses, the applications of the field (R&D, forensics, drug source locating, geologic dating, indoor air quality) were well presented and discussed by the instructor. I acquired a sense of security in my skills, along with an appreciation of my (and any microscopist's) limitations after this course.

As these courses are both for, and attended by, professionals in the workplace, their focus is application. This is not to say that the philosophy and theories are abandoned. The instructors gently probe the students (anywhere from 4-16 in number) the first day and a half to gauge their level of understanding, and from then on quickly fill the voids where necessary. Given that many of the courses were originally 2-weeks each, this is understandable. This is also a disadvantage in that each time I discovered there was far too much material to learn in the allotted time.

An oftentimes overlooked benefit of these courses is the other students. At MCRI I've met and learned from other microscopists: a DNA expert, a Ph.D chemist, military lab scientists, and even a visiting artist. In addition, the instructors welcomed, appreciated, and at times solicited questions and practical advice from the students. Three times I have taken problems to these courses and had them solved. One solution I used in a court case as part of the identification of soil, and a second I used in an air quality investigation at a hospital.

In addition to the camaraderie of the students (and instructors), I was pleased with the reference materials (a thick binder) acquired from these courses, which I have used many times during my work. The fact that I'm planning to attend two more of McCrone's courses within the next year is the best indicator of my overall satisfaction.

### John Mackenzie's Digital Imaging Course at North Carolina State University

by John Fournelle, UW-Madison Geology, Electron Microprobe Lab

John Mackenzie runs a 5 day summer school course in Raleigh NC, officially listed as BIT697V. I participated in the class this past July. There were 20-25 students, mostly graduate students from NCSU, with a few outsiders like myself. It is essentially a practical guide to collection, storage and elementary processing of (microscopic) images. He focuses on the nitty gritty of topics such as resolution of printers (including tricks to yield higher quality output on some HP laser printers), scanners, cameras, data storage, image formats.

A significant aspect of the course revolves around usage of Adobe Photoshop, and some essential/simple (but not widely known) features it has to help improve the grayscale presentation of images. Mackenzie is great lecturer, is very knowledgeable and has an easygoing manner. He evangelizes his message to "Kick the brightness/contrast habit" and to utilize the gamma function in Photoshop as a better way to bring out the features in ones images.

The class day was divided into 3 hour morning lectures and then 3 hour afternoon computer labs with Photoshop exercises.

Mackenzie is Coordinator of the Electron Microscopy Center at NCSU. He also runs a highly compressed version of this course at various microscopic meetings, and is scheduled to do so at the upcoming Scanning 99 meeting in Chicago.

NCSU also hosts a distinct (and highly praised, I am told) Image Processing shortcourse taught by John C. Russ, author of the CRC Image Processing Handbook – cost: \$750 with economical dorm accommodations available. ■

*The above reprinted from the Newsletter and Journal of the Midwest Microscopy and Microanalysis Society, Volume 26, Number 1, November 1998*

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