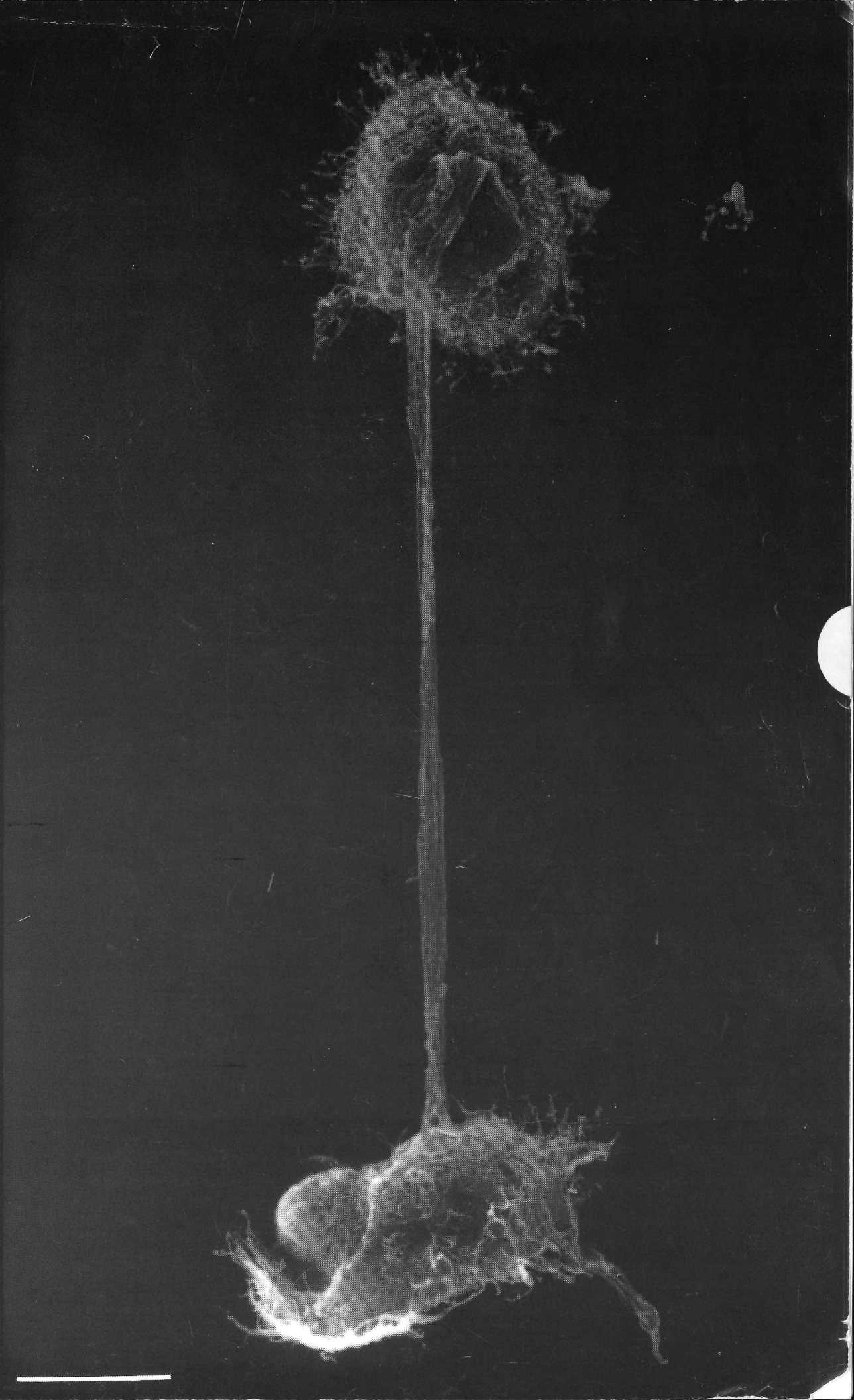
TSM

Texas Journal of Microscopy



Volume 29,
Number 2, 1998
ISSN 0196-5662

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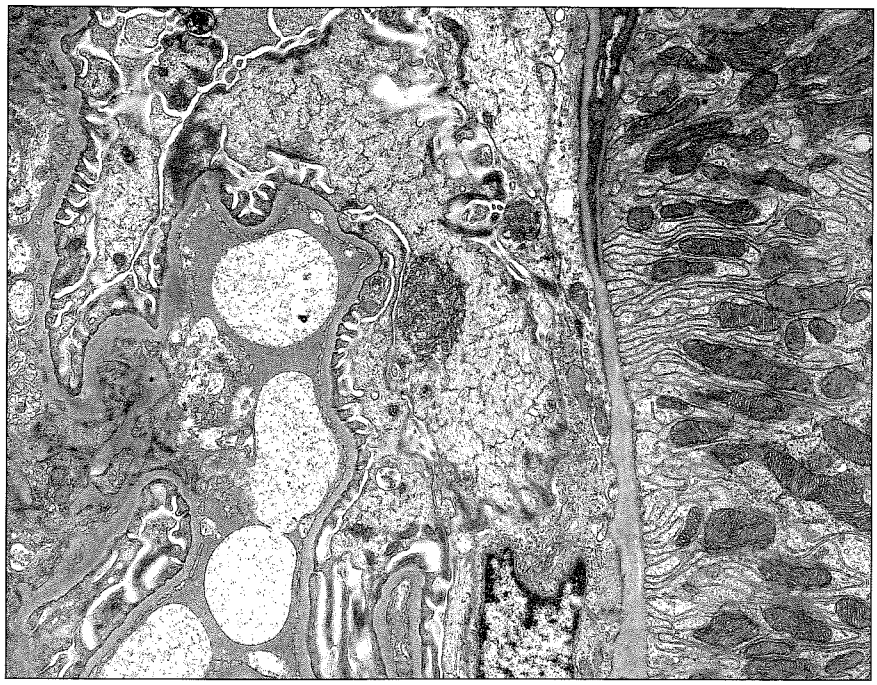

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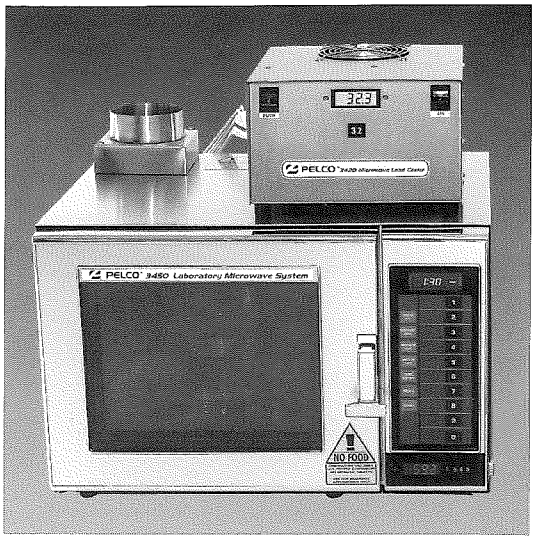

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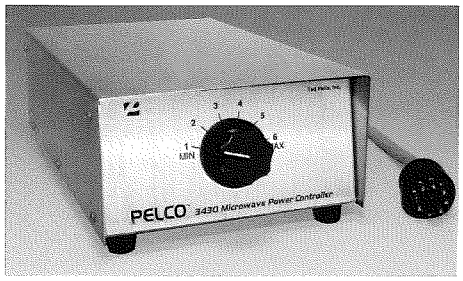

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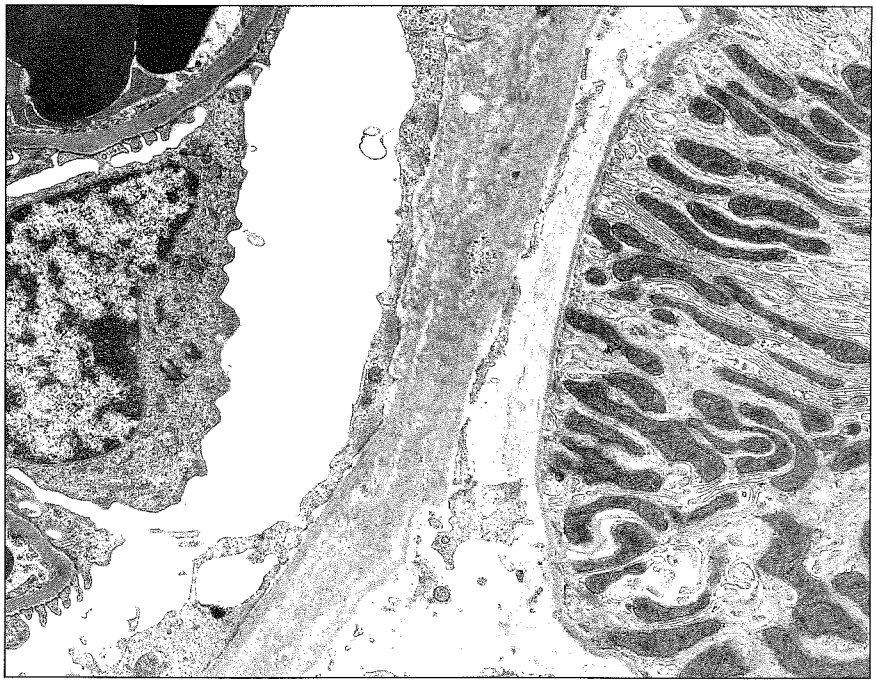

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TEXAS JOURNAL OF MICROSCOPY
VOLUME 29, NUMBER 2, 1998
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David C. Garrett, Editor
Department of Biological Sciences, University of North Texas, Denton, TX 76203

Official Journal of the Texas Society for Microscopy
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ON THE COVER

A pair of NG108-15 cells treated with thrombin (for 5 min) as seen in the Scanning Electron Microscope. Cells of NG108-15 are a neuroblastoma x glioma hybrid cell line that displays typical neuronal morphology. In culture, these cells are flattened with lamellipodia and often form axons between each other. In culture the effect of thrombin on the morphology of NG108-15 cells is to cause cytoskeleton rearrangement and cell rounding. Techniques: NG108-15 cells were grown on culture dishes, fixed with 2% para-formaldehyde/0.5% gluteraldehyde for 30 min and then in 1% osmium tetraoxide for one hour. They were run through a standard dehydration series, critical point dried, sputter coated with gold and palladium, and viewed using the JEOL 35-C. Bar=20μm. Image provided by Cindi L. Schwartz, Howard J. Arnott and M.A. Wilk-Blaszczak, The Center for Electron Microscopy and The Department of Biology, The University of Texas at Arlington and The University of Texas Southwestern Medical Center at Dallas.

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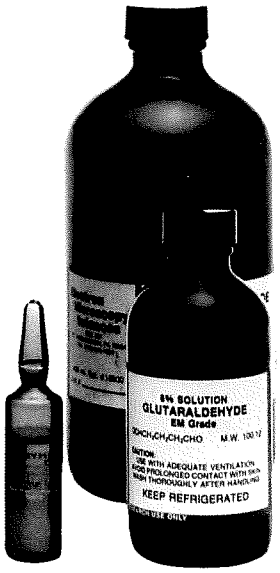

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President's Message

With the advent of our fall meeting in Bandera we usher in a new era as we hold our first meeting as the Texas Society for Microscopy (TSM). The change from TSEM to TSM was approved by the membership of the Society this past spring. Not only did our membership approve of the change but also so did the Texas Secretary of State, as we are now officially registered as TSM.

Our last meeting as TSEM, held jointly with the Oklahoma Microscopy Society, was very successful. Not only did we have contributed platform papers, posters, invited speakers, and workshops, but the MSA travelling poster exhibit as well. My thanks go out to Robert Spears and all those from OSM involved in a very successful meeting.

The success of the spring meeting may in fact point to where the future of our Society may reside, joint or concurrent meetings. This could be especially true if we do not restrict ourselves to holding meetings with just other microscopy based societies. By expanding our interaction with non-microscopy based societies within the state we may be able to entice others to join our Society as well as expand the appeal of our Society to existing members. We must remind ourselves, and others, that we are not just about electron microscopy anymore and we must actively try to solicit interactions with others that use microscopy more as a tool than as a stand alone science. We must also show that it is advantageous for them to attend our meetings and publish in our journal. Granted, some may fear that by following this course we may lose our base membership and the primary appeal that has stood our Society well all these years. However, if we are to survive as a Society I believe we must build upon the historical wide diversity of scientific interest and personal interactions showed by our membership and use this as a basis to appeal to others in various scientific fields. As we all face dwindling travel budgets and a greater institutional emphasis to present at more prestigious meetings, joint meetings may offer an effective alternative to counter these restrictions.

Towards the goal of expanding the scope of our Society, our upcoming meeting in Bandera will emphasize some of the latest developments in fluorescent microscopy. We will have a workshop entitled "Eavesdropping on Cells at the Micrometer Scale - Fluorescence Microscopy from Confocal to Multi-photon" conducted by Dr. Robert Burghardt of Texas A&M University and an invited talk by Dr. David Piston of Vanderbilt University on multi-photon microscopy and the use of green fluorescent proteins. Additionally, Jose Mascorro, MSA LAS chair, will host a session on revitalizing a local affiliate society, ideas from a national perspective.

Bandera meetings have always been fun in the past and a repeat is hoped for this time.

It is also my duty to inform you of the passing of Ron Davis. Not only was he a valued member of our Society, but he was also my friend. He will be missed.

Sincerely,
Robert E. Droleskey, Ph.D.
President

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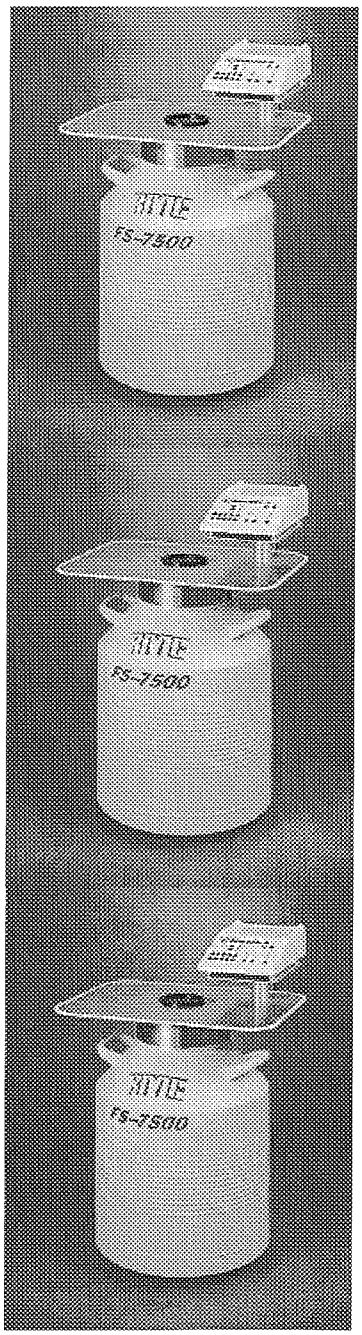

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Treasurer's Report

TEXAS SOCIETY FOR MICROSCOPY TREASURER'S REPORT

For Period Ending September 22, 1998

ASSETS AS OF JANUARY 1, 1998:

Checking Account No. 110649558		$5,258.91
Certificate of Deposit No. 1882289323		$4,079.37
TOTAL		**$9,338.28**

RECEIPTS:

Dues	$2,131.00	
Spring Meeting 1997, Lake Texoma, OK		
Meeting Registration/Banquet	$2,110.00	
Workshop	$240.00	
Exhibitors Donations/Grants	$225.00	
Journal Advertisement Revenue	$2,350.00	
Grants and Donations	$100.00	
Checking Account Interest	$46.97	
Interest on Certificate of Deposti No. 1882289323	$183.40	
TOTAL RECEIPTS		**$7,386.37**

EXPENSES:

Journal Printing	$1,712.94	
Student Travel	$841.12	
Secretary's Account/Mailout Office Expense	$1,000.00	
Spring Meeting Expenses	$2,978.22	
Fall Meeting Expenses	$100.00	
Student Awards	$100.00	
Legal Fees for name change	$375.00	
Officer Bonding	$144.59	
Past Presidents Plaque	$61.50	
Bank Chargeback fee	$3.00	
TOTAL EXPENSES		**$7,316.37**

ASSETS AS OF SEPTEMBER 22, 1998

Checking Account No. 110649558	$5,328.91	
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TOTAL		**$9,408.28**

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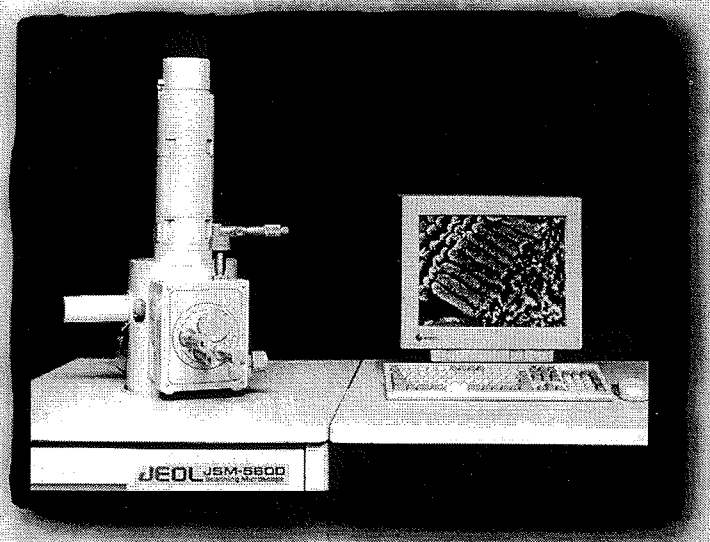

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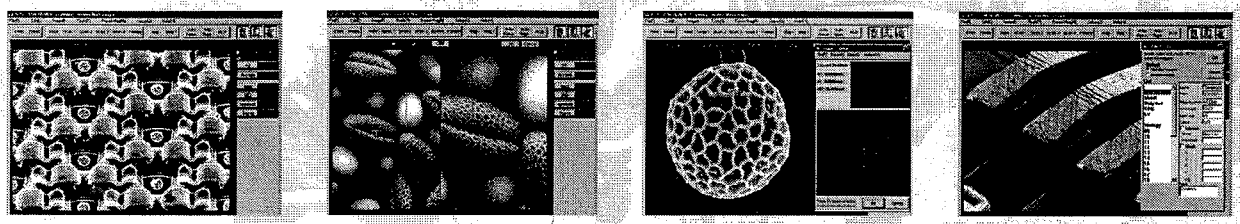

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A FUNGAL PATHOGEN OF GRASSES ASSOCIATED WITH THE ABANDONMENT OF A MIMBRES ARCHEOLOGICAL SITE

Michael W. Pendleton

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Agricultural Research Service, Food Animal Protection Research Laboratory,
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KEYWORDS: Mimbres, Paleobotany, Fungus, Tilletia muhlenbergiae

ABSTRACT

Spores of a fungal plant pathogen (*Tilletia muhlenbergiae* G.P. Clint) have been recovered from the Nan Ranch Ruin (LA 15049 or 2465) located in south-central New Mexico. This multicomponent Mimbres culture site includes rooms built during Pithouse through Late Classic cultural periods. These spores were associated with concentrations of *Acacia* pollen and were recovered within vessels which were unusually abraded perhaps due to novel activities accomplished with these vessels. Of the eleven rooms tested for pollen at the Nan Ranch Ruin, these spores were recovered only in Room 60 which was one of the last rooms occupied at the site before abandonment. Perhaps one of the last activities completed at the site before abandonment may have been associated with this spore or its host plant.

INTRODUCTION

The Nan Ranch Ruin is an archeological site located within the Mimbres Valley of southwestern New Mexico. This site was occupied from approximately 550-1150 A.D. during the Pithouse to Late Classic Mimbres cultural periods (1). Although comprehensive results of the analysis of pollen and macrobotanical materials (carbonized and uncarbonized plant remains) recovered from samples taken from eleven rooms at the Nan Ranch Ruin have been reported elsewhere (2), evidence of fungal spores recovered at the site was outside of the scope of that analysis. Fungal spores (*Tilletia muhlenbergiae* G.P. Clint) (Fig. 1) were recovered from only one of the eleven rooms tested at this site for pollen analysis. These spores were recovered from Room 60, one of the last rooms occupied at the Nan Ranch site prior to the complete abandonment of the area following a continuous site occupation of approximately 600 years. Unusually high concentrations of *Acacia* pollen associated with these spores were also recovered in Room 60 from soil samples taken near pottery vessels which were unusually scratched and abraded. One of the last activities at the site before abandonment may have been completed with these vessels and was associated with *Acacia* flowers, *T. muhlenbergiae* spores, or the host plant of this fungus.

METHODS

Pollen and fungal spore sample extraction procedures for both archeological and modern soil samples were as follows: Twenty ml. of soil were processed from each sample and exotic *Lycopodium* tablets were added to each sample prior to processing to enable pollen concentration levels to be calculated. Soil samples were placed in hydrochloric acid to remove free calcium carbonate in the sediments, rinsed, and then screened through 200 μm mesh to remove debris and rock materials. Following treatment in hydrofluoric acid and subsequent rinsing and sonication, the residues were placed in a zinc bromide solution of 2.0 absolute density and the heavy fraction containing fine-grained silicates as well as colloids was discarded. The light fraction containing pollen was then acetolysed (3) to remove cellulose materials and following rinsing in alcohol the pollen and spore residues were mounted on slides in glycerin. Counting was completed if possible to at least the 200 grain level (4).

The pollen grains observed in these samples were identified by observation with a light microscope using the reference pollen collection at the Texas A&M University Palynology Laboratory. The fungal spore *T. muhlenbergiae*

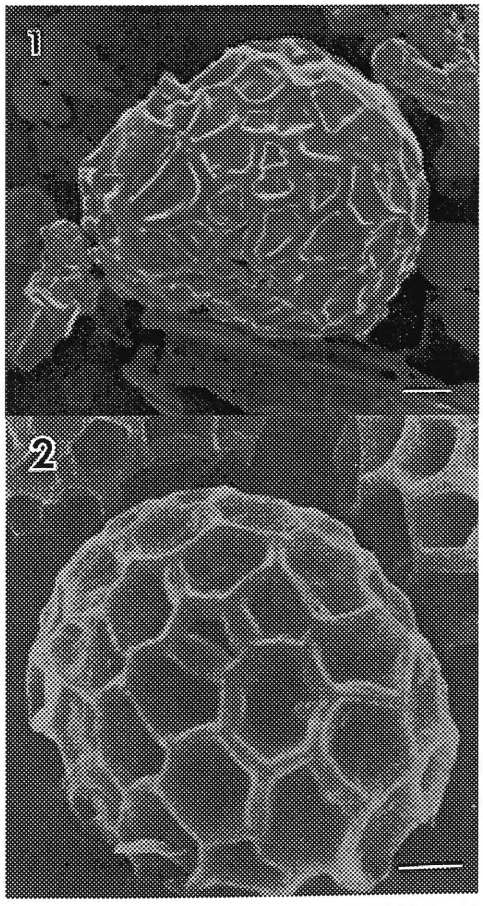

Figure 1. Tilletia muhlenbergiae fungal spore extracted from sample 12 at the Nan Ranch archeological site. Bar=5 μm

Figure 2. Tilletia muhlenbergiae G.P. Clint fungal spore (Duran 1987). Bar = 5 μm.

in these samples was identified by the observation of spores utilizing both light (using a Swift compound microscope) and scanning electron microscopy (using a JEOL JSM T330) and direct comparisons of both light and electron micrographs of present-day *T. muhlenbergiae* (Fig. 2) (5). *T. muhlenbergiae* spores can be distinguished by their large size (40 μm in diameter), absence of outer sheath, deep hexagonal reticulations, and thick walls when compared to other *Tilletia* species in North America (6).

SITE SAMPLING PROCEDURES

The Nan Ranch Ruin (LA 15049 or 2465) was occupied from approximately 550-1150 A.D. and is located in Grant County in south-central New Mexico (7). The site is a large Late Pithouse Period village overlain by a Classic Mimbres pueblo ruin of at least four room blocks each comprised of many rooms. One hundred and twenty-eight soil samples were processed for pollen from eleven rooms built during either the Pithouse or Classic cultural phases at the Nan Ranch site. Samples were taken from vessels, floors, balks, metate surfaces, or burials. Only sixty-eight of these samples had sufficient pollen grains recovered for analysis to be completed (2).

RESULTS

Of all the one hundred and twenty-eight soil samples tested at the Nan Ranch site for pollen and spores, *T. muhlenbergiae* spores were only recovered in three samples from Room 60 (Fig. 3) and from one sample taken from modern surface soil near the site. Sample 2 from soil next to a bowl in Room 60 had 3 *T. muhlenbergiae* spores out of 180 grains, sample 10 also from soil next to the same bowl in Room 60 had 4 *T. muhlenbergiae* spores out of 197 grains, sample 12 from soil under a bowl fragment near the doorway in Room 60 had 61 *T. muhlenbergiae* spores out of 258 grains, and sample 3 from the modern transect two kilometers from the site had 2 *T. muhlenbergiae* spores out of 178 grains. Hall (8) notes that southwestern pollen assemblages, both modern and fossil, are low in diversity compared with spectra from other regions so that *Pinus, Juniperus,* Gramineae, Chenopodiaceae, *Amaranthus* and Compositae may account for 90% of the pollen taxa in all samples. Except for sample 12, the pollen samples having significant quantities of pollen at the Nan Ranch site generally conform to this pattern (Fig. 4). The pollen data for all eleven rooms sampled (and the modern transect soil sample data) are described in detail elsewhere (2) and will only be summarized here as they relate to the presence of *T. muhlenbergiae* spores in each sample. Not only did sample 12 (from Room 60) have a high number of *T. muhlenbergiae* spores (61 grains) but also a very high number (135 grains) of *Acacia* pollen grains (Fig. 4).

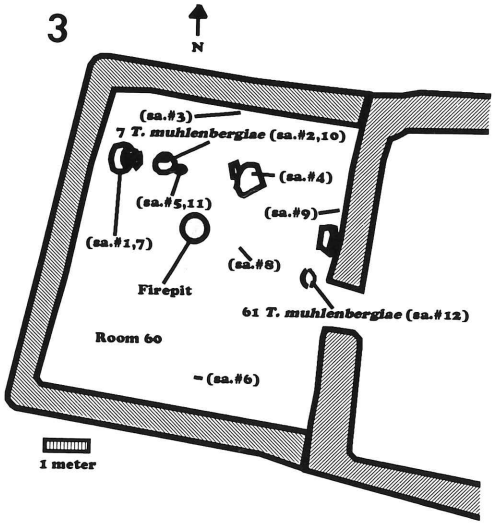

Figure 3. Floor plan of Room 60 with sample locations noted.

DISCUSSION

Room 60 was one of the last rooms constructed before abandonment of the Nan Ranch site at about 1150 A.D. (9). Room 60 is dated to approximately 1120 A.D. based on combined data from relative stratigraphy, wall-bonding patterns, and tree-ring dates (9). The Mimbres Classic black-on-white painted vessels in the latest dated room suite (Rooms 55, 56, and 60) were very unusual because the designs on the pottery were almost obliterated by wear. Visible use-wear was not uncommom on mortuary vessels of the Classic Mimbres period but the wear on these vessels is exceptional. This wear pattern is suggested by Shafer and Taylor (9) to be due to a pre-abandonment decrease in or suspension of the production of Classic Mimbres black-on-white painted and corrugated pottery or that painted vessels were being utilized for uncustomary activities. Such activities may have contibuted to the high numbers of *Acacia* pollen grains and *T. muhlenbergiae* spores in soil samples associated with these worn vessels.

The high concentration of *Acacia* pollen in sample 12 indicates the use of *Acacia* flowers. While charred *Acacia* seeds were recovered at the Janss site, a Mimbres adobe pueblo (10), and the use of *Acacia* pods for food was recorded for American Indian groups in ethnographic accounts (11, 12), there is little direct evidence of the prehistoric or ethnographic use of *Acacia* flowers.

The high concentration of *T. muhlenbergiae* spores in sample 12 (Room 60) may indicate some type of prehistoric use of the spore mass. Another fungal pathogen in the Ustilaginaceae family, the same family as *T. muhlenbergiae*, is *Ustilago maydis* (DC.) Cda, which was boiled for food by the Omaha and Pawnee Indians (13).

It is also possible that *T. muhlenbergiae* spore masses were associated with a host which may have been utilized by the inhabitants of Room 60. Holton and Heald (14) note that *T. muhlenbergiae* G.P. Clint attacks several types of grasses. Duran (5) noted that these spores were pathogens of grasses such as *Muhlenbergia depauperata* Scribn. in Mexico. Martin and Hutchins (15) noted that *M. depauperata* occures in Grant County, New Mexico on dry gravelly slopes from 5,000 to 6,500 feet in elevation. The Nan Ranch site is located in Grant County at an elevation of 5,300 feet. As previously mentioned, a few *T. muhlenbergiae* spores were recovered from a modern surface soil transect sample taken near the Nan Ranch site so the fungus may still be present and parasitizing *M. depauperata* during recent times.

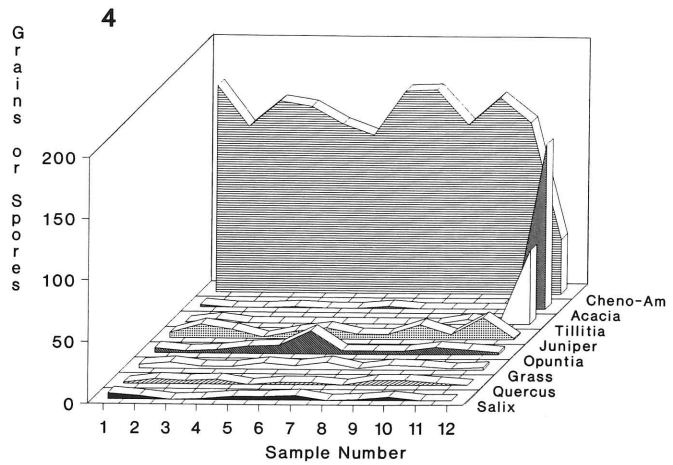

Figure 4. Graph of significant (more than approximately two percent) identified taxa taken from Room 60 soil samples.

Widespread windborne contamination of this spore from modern sources into archeological soil contexts is not likely because no other Nan Ranch site rooms and only one of twelve modern transect soil samples contained these spores. The modern transect was taken over a distance of 2.5 km east-west and about 1 km north of the Nan Ranch site. If the low numbers of spores recovered from modern surface soil samples from the modern transect are representative of modern windborne spore dissemination, then the high concentration of spores only in sample 12 from Room 60 may represent an association of spores with an unknown prehistoric activity. Stepanov (16) determined that less than ten percent of *Tilletia* spores released through gauze were recovered on the ground at twenty meters downwind compared to the quantity of spores recovered at five meters downwind, so widespread dissemination of spores onto the site floors by the wind appears unlikely.

Prehistoric evidence of grass seed processing was recorded at some sites in New Mexico. Bohrer (17) argued using pollen evidence that grasses were used for food at Salmon Ruin in northwestern New Mexico. Although grass pollen was recovered from Room 60 and from other Nan Ranch site rooms and from the modern transect samples, the grass pollen was only found in very low quantities in samples if at all (2). It is not possible to identify grass pollen less than 70 μm in diameter to a less inclusive taxonomic level than family using light microscopy (18). At the Pueblo Alto site in Chaco Canyon in New Mexico, Mathien (19) argues that grass pollen in mealing bins and a plaza suggests that grass seed was used. None of the grass pollen percentages for rooms at the Nan Ranch site was great enough to argue for grass seed utilization. Room 95, an early Three-Circle Phase sub-rectangular pithouse built long before Room 60 at the Nan Ranch ruin, contained a large grass basket along with traces of grass or yucca mats at floor level (7) but no clear evidence of the use of grass for food was discovered.

While the role of fungal spore evidence in palynological studies has been discussed elsewhere (20), this study is unusual because of the association of prehistoric activities producing bowl wear, high *Acacia* pollen and high *T. muhlenbergiae* spore concentrations. Although the response to drought-caused famine caused an increased use of wild (not cultivated) foods and the reduction of pottery production in prehistoric Saladoan culture populations in Arizona (21), the correspondence of vessel wear and unusual spore and pollen concentrations in this study could not be directly related to specific ethnographic practices of modern native peoples or to similar associations at other Mimbres archeological sites. Further study of other fungal and pollen assemblages from archeological sites may determine the possible roles played by fungal plant pathogens in prehistoric cultures.

ACKNOWLEDGEMENTS

Pollen extractions were performed in the Palynological Laboratory, Texas A&M University, College Station, Texas. Scanning electron microscopy was performed in the Electron Microscopy Center, Texas A&M University. Dr. Richard A. Frederiksen, Texas A&M University Department of Plant Pathology and Microbiology and Dr. William Elsik of The MycoStrat Connection of Houston, Texas provided valuable insights for this paper. This project was funded in part by a Texas A&M University College of Liberal Arts Dissertation Award, a Texas A&M University Academic Excellence Award, and a Texas A&M University Association of Former Students Mini-grant. Dr. R. Duran provided permission to publish his photo of *T. muhlenbergiae* G.P. Clint spores.

REFERENCES

(1) Shafer, H.J. New Dates for the Nan Ruin Chronology. (Manuscript on file, Anthropology Lab., Texas A&M Univ. College Station, Texas, 1990).
(2) Pendleton, M.W. Late Holocene Paleoenvironment and Human Ecology in Southwestern New Mexico. (Ph.D. Dissertation, Dept. of Anthropology, Texas A&M Univ. College Station, Texas, 1993).
(3) Erdtman, G. The Acetolysis Method. Svensk. Bot. Tidskr. 54 (1960) 561-564.
(4) Barkley, F.A. The Statistical Theory of Pollen Analysis. Ecology 15 (1934) 283-289.
(5) Duran, R. Ustilaginales of Mexico: Taxonomy, Symptomatology, Spore Germination, and Basidial Cytology. (Washington State Univ. Pullman, Washington, 1987).
(6) Fischer, G.W. Manual of the North American Smut Fungi. (Ronald Press. New York, 1953) 162-165.
(7) Shafer, H.J. Archaeology at the Nan Ranch Ruin: The 1987 Season. (Depart. of Anthropology, Texas A&M Univ. College Station, Texas, 1988).
(8) Hall, S.A. Quaternary Pollen Analysis and Vegetational History of the Southwest, in: Pollen Records of Late-Quaternary North American Sediments. Eds. V.M. Bryant Jr. and R.G. Holloway. (American Ass. of Stratigraphic Palynologists Foundation. Austin, Texas, 1985) 95-115.
(9) Shafer, H.J. and A.J. Taylor. Mimbres Mogollon Pueblo Dynamics and Ceramic Style Change. J. of Field Archaeology 13 (1986) 43-68.
(10) Nelson, B.A. and S.A. LeBlanc. Short-Term Sedentism in the American Southwest. (Maxwell Museum of Anthropology & Univ. of New Mexico Press. Albuquerque, New Mexico, 1986).
(11) Yanovsky, E. Food Plants of the North American Indians. (USDA Mis. Publ. No. 237. Washington, D. C., 1936).
(12) Russell, F. The Pima Indians. Bur. of Amer. Ethnology Ann. Rept. (1904-05) 26 (1908) 1-389.
(13) Gilmore, M.R. Uses of Plants by the Indians of the Missouri River Region. Bur. of Amer. Ethnology Ann. Rept. (1911-12) 33 (1919) 43-154.
(14) Holton, C.S. and F.D. Heald. Bunt or Stinking Smut of Wheat: A World Problem. (Burgess Pub. Co. Minneapolis, Minnesota, 1941).
(15) Martin, W.C. and C.R. Hutchins. A Flora of New Mexico. (Strauss and Cramer Pub. Hirschberg, Germany, 1980.).
(16) Stepanov, K.M. Dissemination of Infective Diseases of Plants by Air Currents. Bull. of Plant Protection, Ser. II, No. 8 (1935) 1-68.
(17) Bohrer, V.L. Methods of Recognizing Cultural Activity from Pollen in Archeological Sites. The Kiva 46 (1981) 135-142.
(18) Irwin, H. and E.S. Barghoorn. Identification of the Pollen of Maize, Teosinte, and *Tripsacum* by Phase Contrast Microscopy. Bot. Mus. Leaflets, Harvard Univ. 21 (1965) 37-57.
(19) Mathien, F.J. Environment and Subsistence of Chaco Canyon, New Mexico. (Pub. in Archeology 18E, Chaco Canyon Stud., Nat. Park Ser., USDA. Albuquerque, New Mexico, 1985).
(20) Graham, A. The Role of Fungal Spores in Palynology. J. Paleontol. 36 (1962) 60-68.
(21) Gerald, R.E. Drought Correlated Changes in Two Prehistoric Pueblo Communities in Southeastern Arizona. (Ph.D. Dissertation, Depart. of Anthropology, Univ. of Chicago. Chicago, Illinois, 1976).

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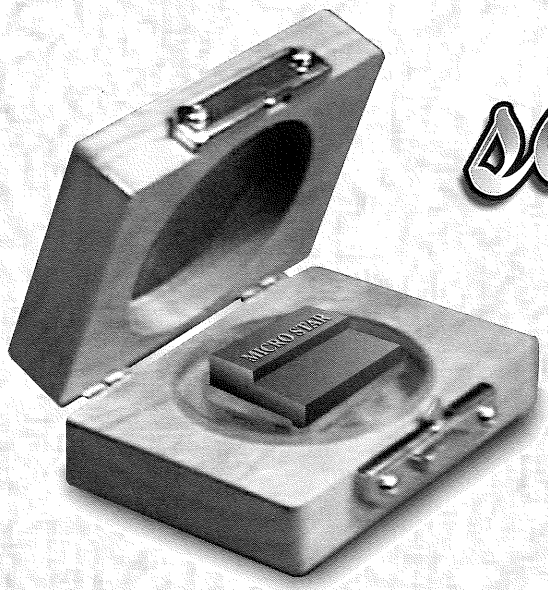

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Abstracts

BIOLOGICAL SCIENCES
PLATFORM PRESENTATION—FALL 1998

A LIGHT AND FLUORESCENCE MICROSCOPIC INVESTIGATION OF NEURONAL NITRIC OXIDE AND ITS SPATIAL LOCALIZATION DURING PERIPHERAL INFLAMMATION IN THE MAMMALIAN SPINAL CORD. MIKE DAVIS [1,2], MARY G. GARRY [2] AND HOWARD J. ARNOTT[1]. [1]The Department of Biology and The Center for Electron Microscopy, The University of Texas at Arlington, Arlington TX, 76019 and [2]The Southwestern Medical Center at Dallas, Dallas TX 75235.

Nitric Oxide (NO), a short-lived gaseous molecule, has recently been identified as an important factor in many biological mechanisms. NO is formed primarily through the degradation of L-arginine by the enzyme nitric oxide synthase (NOS). NO has been found to be important in three areas: First, the immune system, where it is used as a poison by white blood cells to kill pathogens. The second is in the vascular system, where NO is involved as a second-messenger to signal vascular relaxation in vascular endothelial cells. The third and most recently discovered area is the nervous system. NO has been defined in the nervous system as a gaseous neurotransmitter, which unlike conventional neurotransmitters is readily diffusable into any cell. It is believed that in the nervous system, NO plays a role in cell-to-cell communication and also plays roles in pain processing and neurodegenerative states. This study investigates the spatial organization of cells that produce NO in the spinal cord during peripheral inflammation. Cell groups that produce NO correspond with pathways involved in the signaling and coding of pain, and NO production corresponds with an increase in hyperalgesia (increased pain sensitivity). Conversely, administration of antagonists to NO show a decrease in hyperalgesia. This and other data support the hypothesis that NO plays a central role in the coding and amplification of pain signals at the level of the spinal cord. The aims of this study were to identify cell populations that produce NO and to visualize upregulation of NOS during peripheral inflammation.

THE ROLE OF P115 RHOGEF IN THE RHO MEDIATED EFFECTS OF LPA AND THROMBIN ON THE ACTIN CYTOSKELETON. CINDI L. SCHWARTZ[1,2], M.A. WILK-BLASZCZAK[1] AND H.J. ARNOTT[2]. [1] The Southwestern Medical Center at Dallas, Dallas TX, 75235 and [2]The Department of Biology and The Center for Electron Microscopy, The University of Texas at Arlington, Arlington TX, 76019.

In the neuronal hybrid cell line NG108-15, lysophosphatidic acid (LPA) and thrombin induce stress fiber formation and cell rounding. These effects are mediated via a heterotrimeric G-protein, G13, which in turn activates a monomeric G-protein, Rho. A recently discovered protein, p115 RhoGEF, forms the link between the (13 subunit of G13 and Rho. P115 RhoGEF has two functions. It positively regulates Rho and negatively regulates (13. The RGS (regulator of G-protein signaling) domain of p115 RhoGEF mediates the latter effect. We have tested the role of p115 RhoGEF and its RGS domain in the pathway coupling the thrombin and LPA receptors to stress fiber formation and cell rounding in NG108-15 cells. The NG108-15 cells were transfected with a mammalian expression vector with the RGS domain and green fluorescent protein (GFP) subcloned into it. The RGS domain was labeled with Glu-tag and its expression was verified by western immunoblotting with anti Glu-tag antibody. The green fluorescence was used as an indicator for the transfected cells. We have shown that the expression of RGS domain of p115 RhoGEF inhibits stress fiber formation and cell rounding induced by LPA and thrombin. This effect is due to RGS domain of p115 RhoGEF stimulating the intrinsic GTPase activity of (13 (inactivation). In controls (non-transfected cells), both LPA and thrombin produced expected cell shape changes. Our data define a role for p115 RhoGEF in the Rho mediated effects of LPA and thrombin on the actin cytoskeleton.

AN SEM STUDY OF THE CAPITATE STIGMA OF *YUCCA WHIPPLEI*. H. J. ARNOTT AND C. A. BOYLES. The Department of Biology and The Center for Electron Microscopy, The University of Texas at Arlington, Arlington, TX 76019.

Yucca whipplei Torr. is a common chaparral plant found in Southern California and Western Arizona. Individual plants flower only once; they produce a large panicle (1 to 5 m in height) with hundreds of creamy-white flowers each having a pistil whose summit ends in a large capitate stigma. The base of the stigma is a solid tissue and extending from its surface are a series of large, single cell hairs which form the length of the remaining 2/3 of the capitate stigma. Individual stigmatic hairs may reach a length of over 500 µm and a diameter of over 30 µm. Each stigma hair cell contains a single large nucleus, about 20-30 µm in diameter, usually located near the center of the cell. Previously I reported on the structure of these flowers collected in the mountains near Santa Barbara, California which were fixed in 70 % Formalin Acetic Alcohol (FAA). Materials for the current study were collected near Cajon Junction, California. They were fixed in 2% Glutaraldehyde in a sodium cacadolate buffer. After several days the tissues were washed in buffer, post fixed in OsO_4, dehydrated, critically point dried and viewed in the SEM. The new material is compared to that fixed in FAA and other materials fixed and processed in the 1950's. The stigmatic hairs are especially interesting because they arise from cells on the epidermis of the stigma whose volume is less than one hundredth of the individual hairs. A comparison of the stigmatic surface of other species of *Yucca* with that of *Y. whipplei* will be made.

CYTOLOGICAL ASSESSMENT OF CHROMOSOMAL CHANGES IN CELL CULTURE OF DALBERGIA SISSOO ROXB. - A LEGUMINOUS TREE
Nabarun Ghosh, A. Chatterjee and Don W. Smith
Department of Biological Sciences, University of North Texas, Denton, TX
CAS, Department of Botany, University of Calcutta, India

We have established a cell line of *Dalbergia sissoo Roxb.* - a leguminous tree using suspension culture technique. We used this cell line for tissue cultural and cytological study. We used modified Gamborg's medium with an addition of 6-BAP (0.5 mg/l) and NAA (0.25 mg/l). Plant cell culture is a major source of genetic variability. We analyzed the cytological status of the cultured cell line by analyzing the chromosomal changes, if any occurred, and karyotyping. We found the frequency of subculturing is a major factor controlling the genomic stability of the cultured tissue. Deviations were observed in the somatic chromosome number of *Dalbergia sisso* (2n=20). The abnormality indices increased with the age of the culture. Maximum number of polyploid cells were observed from 7 and 9 month old culture that could be re-instated by using two complex growth factors like casein hydrolysate and coconut milk.

QUANTITATIVE DIFFERENCES IN ACCESSORY PENIS MORPHOLOGY OF TEN SPECIES OF *ISCHNURA* (ODONATA:COENAGRIONIDAE). ALICE M. STACEY, H. J. ARNOTT AND J. V. ROBINSON. The Department of Biology and The Center for Electron Microscopy, The University of Texas at Arlington, Arlington, TX 76019.

Male damselflies have accessory penes which function to transfer sperm to females during copulation. Sperm is subsequently stored in two receptacles called the bursa copulatrix and the spermatheca prior to fertilization and oviposition. The accessory penes of damselflies are composed of three segments; a chitinous stem, a sclerotized body and a membranous structure known as the glans. The glans portion has distinct features which may be useful in identification of species. In ischnuran damselflies, the glans consists of paired projections called flagella. The flagella contain proximally oriented spines along their surface which have been documented to aid in removal of a rival male's sperm from the storage organs of the female (Waage, 1979). The size, shape and degree of spination of the flagella varies among species of *Ischnura*. In the present study, ten penes were dissected from male ischnuran damselflies and prepared for viewing in the scanning electron microscope. Measurements of thirteen characters from the three segments of the penes were taken using an imaging program called VitalScan.

MICROSCOPY OF THE MUNDANE. I. HOWARD J. ARNOTT. The Department of Biology and The Center for Electron Microscopy, The University of Texas at Arlington, Arlington, TX 76019.

Objects that are commonplace in everyone's daily life experiences often seem unworthy of any notice. However, they may be of extraordinary interest when viewed with a microscope. For example, what does a match look like before and after burning? What does the inside of a chocolate chip or potato chip or an apple chip or even a chocolate chip cookie look like? Can we understand what makes a cracker crack from examining it in the microscope? What characteristics make an eggshell strong enough to support the development of a chick, yet make it easily cracked when we want to cook an omelet. When viewed with a microscope the structure and morphology of common subjects often provides entertaining and enlightening answers to our questions. Many years ago, W. Gordon Whaley penned an article, entitled "Art Beyond Vision." In this he demonstrated that even such mundane items as scorpion sperm have an elegance and character that approaches great art. The current *tour de force* will look at a number of commonplace objects using light and scanning electron microscopy. Some, like the structure of money, have intrinsic interest; others may be considered "art," and finally some may be just fun. The *tour* starts by examining pencil and paper, moves on to view tea and coffee and ends with a look at salt and pepper. In between, a variety of flotsam and jetsam will appear.

STRUCTURAL CHANGES IN EGGSHELLS DUE TO TREATMENT WITH BUFFERED AQUEOUS SOLUTIONS RANGING FROM Ph 6 TO 8. SANDRA L. WESTMORELAND AND HOWARD J. ARNOTT. The Department of Biology and The Center for Electron Microscopy, The University of Texas at Arlington, Arlington, TX 76019.

Changes occur in the mammillary cones of the eggshell during incubation of fertile eggs of the domestic fowl. These changes are associated with the process that provides a portion of the calcium to the developing embryo. Calcite on the inner shell surface is believed to be dissolved by carbonic acid formed by the hydration of respiratory carbon dioxide during days13 to 21 of incubation (Burley and Vadehra, 1989). Changes in the pH of embryonic blood also occur during days 11 to 21 (Freeman and Vince, 1974). It is therefore of considerable interest to assess the *in vitro* changes that occur in the eggshell when subjected to acid solutions buffered at various pH's. In preparation for these experiments 5.25% sodium hypochlorite was used to remove both the external organic shell cuticle and the internal proteinaceous shell membranes from eggshells. In separate trials samples of the shell were then exposed to buffered acid solutions with pH 6 to 8 at 37 degrees Centigrade. Untreated samples were used as controls. After treatment, specimens were air dried, mounted, sputter coated and examined with scanning electron microscopy to determine if changes occurred in the shell structure.

BLEPHAROPLAST MORPHOLOGY OF THE MIDSTAGE SPERMATID OF THE LIVERWORT RICCIA GOUGETIANA. Ann E. Rushing and Zane B. Carothers, Department of Biology, Baylor University, Waco, TX 76798 and Department of Plant Biology, University of Illinois, Urbana, IL 61801.

The blepharoplast of the midstage spermatid of Riccia gougetiana Dur. & Mont. in Mont. is composed of a four-layered multilayered structure (MLS) and two flagellar basal bodies. The microtubular spline, the uppermost layer of the MLS, is the major cytoskeletal component of the developing spermatid. The lower three layers of the MLS form the lamellar strip. The spline comprises 24 parallel microtubules at its maximum width. A closed aperture, two microtubule-diameters wide, is located to the right of the spline's midline. The lamellar strip is longitudinally elongated and spatulate in shape with a lateral indentation in the right margin. It measures approximately 1.97 μm in length and 0.73 μm in width with no lateral extensions beyond the margins of the overlying spline. The flagellar basal bodies are dimorphic, staggered in insertion, and parallel with the spline microtubules. The anterior basal body (ABB), approximately 0.71 μm in length, is inserted about 0.22 μm from the anterior margin of the spline. The ABB is located to the right of the spline's midline, immediately above the spline aperture. The posterior basal body (PBB) measures approximately 1.19 μm in length. The PBB is found about 0.59 μm from the anterior margin of the spline and left of the spline's midline. The blepharoplast of Riccia gougetiana displays typical features of the order Marchantiales to which it belongs. The consistency of midstage spermatid structure found within the order supports a close evolutionary relationship among these thalloid liverworts.

A COMPARATIVE ANALYSIS OF THE PTEROSTIGMA OF DAMSELFLY WINGS (ODONATA: COENAGRIONIDAE). RAE OSBORN. The Department of Biology and The Center for Electron Microscopy, The University of Texas at Arlington, Arlington, TX 76019.

A comparative analysis was made of the pterostigma of *Enallagma basidens*, *Ischnura posita* and *Telebasis salva* using scanning electron microscopy and light microscopy. There were differences in the size and shape of the pterostigma between the forewing and hindwing of the species. This was especially so in *I. posita*. The three species had morphologically different spines on the margin of the pterostigma. The distribution of these spines varied among species, but not among forewing and hindwing or between sexes. Pores were discovered for the first time, in the costal vein of all three species. Color dimorphism was most marked in *T. salva* with the pterostigma of the male being much darker than that of the female.

BIOLOGICAL SCIENCES

POSTER PRESENTATION—FALL 1998

EVALUATION OF AN AUTOMATED IMMUNOSTAINER FOR RESEARCH APPLICATIONS. ANN S. BURKE, ROBERT A. COX, HAL K. HAWKINS, Dept. Electron Microscopy, Shriners Hospital for Children, Galveston Unit, Dept. of Pathology,UTMB, Galveston, TX 77550

Immunohistochemistry is a valuable research and diagnostic tool, however, the procedure is tedious and time-consuming. In this report we will discuss the advantages and disadvantages of using an automated immunostainer in a research laboratory with a cost comparison. Even with the standardized kits available, manually handling each slide for washing, wiping, reagent application and overnight incubation requires 2 days (7hrs. technician time) for each 20-40 slides. Our laboratory has used an automated immunostainer for the last nine months to perform antibody titrations, screen various tissues for antibody activity and identify the basement membrane components, laminin, collagens Type IV and VII in patient skin biopsies. This automated system is designed to enhance reproducibility, reliability and quality control for standardized protocols. Forty slides can be run at a time using 100ul of antibody per slide with enzyme digestion, blocking and detection typically taking less than 2 hours. The average cost per slide for supplies for the automated system is $11.50 plus $3 to $9 more for antibodies, whereas, manual procedures cost $2.25 per slide. If one takes into consideration the cost of a technician, the automated system would be $12.52/slide, compared to $4.52 for the manual method. We can reduce the supply cost for the automated system by substituting our own buffers, and manually filling reagent dispensers with our own antibody dilutions and counterstains, but the detection kit is the most expensive at $8.57/slide. We are interested in the experience of other labs using automated immunostainers for research applications.

Ultrastructure of an Acellular Nerve Graft Compared to Fresh Nerve. P.J.G. Neill, S. Fan and S. Griffey. LifeCell Corporation, The Woodlands, TX 77381.

More than one quarter million Americans suffers from debilitating spinal cord injuries and peripheral nerve damage is even more common. Current techniques for repair of nerve injury include end-to-end anastomosis of undamaged nerve ends and autologous nerve grafts. Autologous nerve grafts have been the historically preferred method of nerve repair but are fraught with donor site morbidity. Loss of function at the donor site, mismatch of nerve cable dimensions and the need for multiple surgical procedures make alternatives to these current methods desirable. An ideal nerve graft would be readily available, not require additional surgery and become fully integrated once grafted. Using LifeCell Corporation's patented processing techniques we have begun to assess a variety of decellularization protocols aimed at developing an off-the-shelf alternative to the nerve autograft for peripheral nerve repair. To replicate the beneficial effects of the nerve graft, it is essential to assess the basic structural differences between a decellularized nerve graft and the fresh nerve graft. End point analysis of these processing techniques requires TEM to evaluate the ultrastructural effects of these techniques on the structural matrix. Previous studies have shown that autologous nerve grafts go through a phase of cell clearance or remodeling prior to regeneration. Processed allogeneic grafts in which the cells have been removed will not require this initial remodeling phase and hence regeneration is enhanced. Rather than the engineered natural protein-based matrices, synthetic biomaterials and the incorporation of growth factors into synthetic neuron guidance channels, LifeCell is focusing on the use of their licensed technology to develop a decellularized nerve allograft to obtain the benefits of nerve grafts without the current inherent problems. A variety of decellularization protocols were compared by TEM to provide the basic scientific knowledge regarding the structural differences between the acellular and fresh nerve graft.

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By-Laws

ARTICLE I - NAME

The name of the Corporation shall be the Texas Society for Microscopy.

ARTICLE II - PURPOSE

This Corporation, henceforth referred to as the Society, is organized exclusively as a scientific and educational organization. The purpose of this Society shall be: (a) to increase and disseminate knowledge concerning the biological and physical applications of microscopy and related instrumentation, and (b) to promote free exchange of ideas and information among microscopists and interested participants. Notwithstanding any other provision of these articles, this Society shall not, except to an insubstantial degree, engage in any activities, or exercise any powers that are not in furtherance of the purposes of this Society. No substantial part of the activities of the Society shall be the carrying on of propaganda, or otherwise attempting to influence legislation; and the Society shall not participate in, or intervene in (including the publishing or distribution of statements) any political campaign on behalf of any candidate for public office.

ARTICLE III - MEMBERSHIP

Membership in the Society shall be open to individuals who share the stated purpose of the Society. The Society shall not discriminate among applicants for membership on the basis of race, age, gender or religious or sexual preference. All nouns and pronouns in this document are considered to be inclusive rather than gender specific. The Society shall consist of regular members, student members, corporate members, and honorary members.

An applicant, other than a corporate organization, having an interest in microscopy, may be considered for regular membership. An applicant enrolled in an undergraduate or graduate academic program and who is working toward an academic degree will be considered for student membership. Students wishing to become more involved in the Society may elect to apply for regular membership. Any applying commercial organization having an interest in microscopy shall be considered for corporate membership. A corporate membership shall entitle that corporation to designate one representative who shall receive membership benefits on behalf of the corporation. The same or other employees or representatives of the same organization may apply for regular membership. Honorary membership shall be restricted to: (a) distinguished scientists who are not members of the Society, but who have made significant contributions to this Society, and/or (b) to Society members for extended and outstanding service to this Society.

Application for regular, student, and corporate membership shall be made to the Secretary who, with the approval of the Executive Council, shall report same at the next business meeting of the Society. A two-thirds vote of the regular members present shall elect applicants to membership.

Nominations for honorary membership may be made by any member of the Society. Nominations shall be made in writing to any member of the Executive Council and must be accompanied by written evidence of the nominee's eligibility. The member of the Executive Council shall present the nomination for consideration at the next meeting of the Executive Council. The Executive Council shall act upon the nomination within one year of its presentation and shall notify the nominator of the final action taken on the nomination.

Only members shall have the right to vote and to serve on committees. The right to hold elective office is restricted to regular members. Representatives or employees of member corporations may apply for regular membership and enjoy all rights and privileges of that category. Corporate members may exhibit at the Society's meetings (additional exhibition charges may be levied by the Executive Council). An honorary member shall be exempt from dues and shall be entitled to all privileges of regular membership. All members shall receive Society mailings.

Membership dues for regular, student, and corporate members will be set by the Executive Council. Changes in dues shall be made by the Executive Council and notification of such shall be made by announcement at the fall meeting immediately prior to the year they go into effect. Dues shall become payable on January 1 of each year. Members whose dues remain unpaid may be dropped from membership in the following year.

ARTICLE IV - OFFICERS

(A) Elected Officers

The elected officers of the Society shall be the President, President-Elect, Immediate Past President, Secretary, Secretary-Elect, Treasurer, Treasurer-Elect, Program Chairman, and Program Chairman-Elect. The President-Elect shall serve one year as such, the following year as President, and the following year as Immediate Past President. The Secretary-Elect shall be elected in odd-numbered years and serve one year as such followed by a two year term as Secretary. The Secretary-Elect will serve

as a nonvoting member of the Executive Council. The Secretary will have full voting privileges on the Council. The Treasurer-Elect shall be elected in even-numbered years and serve one year as such followed by a two year term as Treasurer. The Treasurer-Elect will serve as a nonvoting member of the Executive Council. The Treasurer will have full voting privileges on the Council. The Program Chairman-Elect shall serve one year as such, followed by one year as Program Chairman. The Program Chairman-Elect will serve as a nonvoting member of the Executive Council. The Program Chairman will have full voting privileges on the Council. The installation of incoming officers shall be at the first meeting of the calendar year. All officers shall arrange for the orderly and timely transition of their offices within 30 days after the installation of officers. However, all officers shall continue until relieved by their successors. The duties of the officers shall be:

(1) PRESIDENT: shall preside at all business meetings of the Society and at meetings of the Executive Council. The President, or his designee, may represent the Society at the annual meeting of the Microscopy Society of America. The President shall conduct the business of the Society between Executive Council meetings.

(2) PRESIDENT-ELECT: shall assist the President, and substitute for him in his absence, and perform such duties as assigned by the President.

(3) IMMEDIATE PAST PRESIDENT: shall assist the President and the Executive Council, and shall keep those statistics of the Society as deemed necessary by the Executive Council.

(4) SECRETARY: shall maintain the records of the Society, other than financial, and distribute announcements to the membership.

(5) SECRETARY-ELECT: shall assist the Secretary and substitute for him in his absence. The Secretary-Elect shall achieve a working knowledge of the office of Secretary in order to effect an orderly transition when he takes over that office.

(6) TREASURER: shall be custodian of the Society funds and shall account for them in accordance with accepted business practice. The Treasurer shall be bonded, and the cost of such shall be borne by the Society. The Treasurer shall have his records examined annually by an internal audit committee chosen by the Executive Council. A written report of the internal audit shall be presented to the Executive Council at the following meeting.

(7) TREASURER-ELECT: shall assist the Treasurer and substitute for him in his absence. The Treasurer-Elect shall achieve a working knowledge of the office of Treasurer in order to effect an orderly transition when he takes over that office. The Treasurer-Elect will have no power for the disbursement of Society funds unless prior approval is granted by the Executive Council.

(8) PROGRAM CHAIRMAN: shall be responsible for organizing the various scientific activities of the Society with the advice of the President. The Program Chairman shall not commit any funds of the Society unless authorized by the Executive Council or as authorized by the President and Treasurer.

(9) PROGRAM CHAIRMAN-ELECT: shall assist the Program Chairman and substitute for him in his absence and, additionally, extend the planning of programs into his own term of office as Program Chairman.

(B) Appointed Officers

The appointed officers of the Society shall be the Journal Editor, the Student Representative, and the Corporate Representative, who shall be appointed by the Executive Council.

(1) JOURNAL EDITOR: shall publish a Journal twice a year promoting the purpose of the Society, unless otherwise ordered by the Executive Council. The term of appointment shall be for two years and may be renewed.

(2) STUDENT REPRESENTATIVE: shall represent the student membership of the Society on the Executive Council. The term of appointment shall be for one year during which he is a student member in good standing.

(3) CORPORATE REPRESENTATIVE: shall represent the corporate membership of the Society on the Executive Council. The term of appointment shall be for one year.

Additionally, the officers of the Society shall perform the duties prescribed by the bylaws and, as appropriate, by the parliamentary authority adopted by the Society. No part of the net earnings of the Society shall incur to the benefit of, or be distributed to, its members, trustees, officers, or other private persons, except that the Society shall be authorized and empowered to pay reasonable compensation for services rendered and to make payments and distributions in furtherance of the purposes set forth in Article Two hereof.

ARTICLE V - MEETINGS

There shall be two scientific meetings per year, fall and spring, unless otherwise ordered by the Executive Council. Exact times and places of these meetings shall be designated by the Executive Council. A business meeting will be held at each scientific meeting of the Society. Parliamentary procedures to be followed in the business meeting shall be those specified in the current edition of Robert's Rules of Order Newly Revised. Ten percent of the regular members, or 35 members, whichever is smaller, shall constitute a quorum at a business meeting. The Secretary shall determine if a quorum exists and inform the President at the meeting, prior to actions requiring a vote. The presence or lack of a quorum shall be noted in the minutes.

ARTICLE VI - EXECUTIVE COUNCIL

The elected and appointed officers shall constitute the Executive Council. The President and three other voting elected officers, or the President-Elect and three other voting elected officers, shall constitute a quorum.

The Executive Council shall be responsible for the scientific and administrative obligations of the Society. It shall determine policies for the good of the Society in accordance with these bylaws; it shall plan scientific and business meetings; it shall authorize the expenditure of Society funds; and it shall conduct other duties as required for the benefit of the Society. The Executive Council shall meet prior to the business meeting at each scientific meeting of the Society. Special meetings of the Executive Council can be called by the President, and shall be called upon the written request of three elected members of the Executive Council.

At a meeting each year, the Executive Council shall appoint a Student Representative and a Corporate Representative, who shall represent the student and corporate membership respectively during the following year as voting members. The Executive Council may appoint a Local Arrangements Chairman for each of the various meetings and in so doing shall duly consider the recommendations of the Program Chairman and the President. Local Arrangements Chairmen are ad hoc, nonvoting members of the Executive Council.

Any member of the Society may attend the regular meeting of the Executive Council upon prior approval of the President or presiding officer.

ARTICLE VII - FISCAL YEAR

The fiscal year of the Society shall run from January 1 to December 31 of each calendar year.

ARTICLE VIII - COMMITTEES

Standing or special committees shall be appointed by the President as directed by these bylaws, or as the Society, or the Executive Council, shall from time to time deem necessary to carry on the work of the Society. The President may appoint advisory committees at any time without prior consultation with the Executive Council. The President shall be an ex-officio member of committees except the Nominating Committee.

ARTICLE IX - ELECTIONS AND INTERIM VACANCIES

Prior to a meeting each year the Executive Council shall appoint three regular members to serve on the Nominating Committee with the newly elected President-Elect and the Secretary. The Secretary shall serve as chairman of the Nominating Committee. The Nominating Committee shall nominate one or more candidates for each elected officer position becoming vacant that year. In preparing the slate of nominees, due consideration shall be given to the geographical area and fields of interest represented by the membership of the Society and to the nominee's previous membership of the Society and to the nominee's previous participation in the Society's affairs. The Nominating Committee shall also ascertain the willingness of each nominee to serve if elected. The report of the Nominating Committee shall be announced to the Executive Council at a meeting of the Executive Council and then to the membership with the first announcement and call for abstracts for the first meeting in a calendar year.

Additional nominations may be initiated by the membership by a petition to the Secretary, signed by a minimum of ten members. Such petitions must be received by the Secretary by eleven weeks prior to the first meeting in a calendar year.

Ballots shall be mailed to members at least seven weeks prior to the first meeting in a calendar year, and completed ballots shall be accepted by the President until 21 days prior to the same meeting. The Secretary and President shall independently count the ballots prior to the Executive Council Meeting, announce the results at the Executive Council Meeting, and at the business meeting, and in the next general mailing to the membership. The results of the election shall be released to the Journal Editor immediately after they are known so they may be published as part of the list of officers as soon as possible. Any member may examine the ballots at the first business meeting in a calendar year.

The candidate receiving the largest number of votes shall be the winner. In the event of a tie vote, the Executive Council shall decide the winner. The ballots may be examined by the Executive Council.

A two-thirds vote of the entire membership of the Executive Council shall remove any officer or appointee derelict in their duties or considered incapable of properly carrying out the duties of office for any reason. The Executive Council shall accept resignations in good faith.

An interim vacancy in the presidency shall be filled by advancement of the President-Elect, who will go on to serve his anticipated terms as President and Immediate Past President. In the event there is no President-Elect to advance, the Executive Council shall elect one of its members as acting President to serve until the completion of the next regular election. An interim vacancy in the office of Program Chairman shall be filled by the Program Chairman-Elect, who will go on to serve his anticipated term as Program Chairman. If there is no Program Chairman-Elect to advance, the Executive Council shall appoint a Program Chairman to serve until the completion of the next regular election. Interim vacancies in the offices of Secretary or Treasurer shall be filled by the

Secretary-Elect or the Treasurer-Elect, respectively, who will go on to serve his anticipated term as Secretary or Treasurer. If there is no Secretary-Elect or Treasurer-Elect to advance, the Executive Council shall appoint a Secretary or Treasurer to serve until the completion of the next regular election. Interim vacancies in the offices of Journal Editor, Student Representative, or Corporate Representative shall be filled by appointment by the Executive Council.

ARTICLE X - DISSOLUTION

Upon the dissolution of the Society, the Executive Council shall, after paying or making provision for payment of all the liabilities of the Society, dispose of all the assets of the Society to an organization exempt from taxes under Internal Revenue Code Section 501(c)(3) to be used exclusively for the purposes of the Society in such manner, or to the Microscopy Society of America. Any such assets, not so disposed, shall be disposed of by the Court of Common Pleas of the county in which the principal office of the Society is then located, exclusively for such purposes, or to such organization, as said court shall determine, which are organized and operated for such purposes.

ARTICLE XI - INDEMNIFICATION BY THE SOCIETY

The Society shall indemnify each member of the Executive Council, director, officer, person who is serving or has served at its request as a director, officer, or employee of another corporation or organization, against expenses, in connection with the defense of any pending or threatened action, suit, proceeding, criminal or civil, to which he is or may be made a party by reason of being or having been such a member of the Executive Council, director, officer, or employee, providing that a determination is made: (a) that he was not and has not been adjudicated to have been negligent or guilty of misconduct in the performance of his duty to the Society of which he is or was a member of the Executive Council, director, officer or employee; (b) that he acted in good faith in what he reasonably believed to be in the best interest of the Society; and (c) that, in any matter the subject of criminal action, suit or proceeding, he had no reasonable cause to believe that his conduct was unlawful.

The determination as to the foregoing matters with respect to each action, suit or proceeding shall be made: (i) by a majority of the Executive Council of the Society acting at a meeting at which a quorum consisting of officers who are not parties to or threatened with such action, such officers vote; or (ii) by independent legal counsel in written opinion, if such quorum cannot be obtained to vote on such indemnification, or even if obtainable, the officers qualified to vote so direct.

The termination of any action, suit or proceeding upon a plea of nolo contendere or its legal equivalent, shall not, of itself, create a presumption that any member of the Executive Council, director, officer or employee did not act in good faith in what he reasonably believed to be the best interest of the Society or had reasonable cause to believe that his conduct was unlawful. Expenses incurred by any person in defending any action, suit or proceeding may be paid by the Society in advance of the final disposition of such action, suit or proceeding as authorized by the Executive Council in the specific case upon receipt of an undertaking by or on behalf of such person to repay such amount unless it shall ultimately be determined that he is entitled to be indemnified by the Society. The indemnification provided in this Article shall not be deemed exclusive of any rights to which those seeking indemnification may be entitled under any regulation, bylaw, agreement, insurance policy purchased by the Society, vote of the members or otherwise, or of any other indemnification which may be granted to any person who has ceased to be a member of the Executive Council, director, officer or employee of the Society, and shall insure to the benefit of the heirs, executors, successors and administrators of such a person.

ARTICLE XII - AMENDMENTS AND PERIODIC REVIEW

Amendments to these bylaws may be initiated by individual members of the Executive Council, or by petition to the Secretary, signed by ten regular members of the Society. Amendments must be approved by a two-thirds majority of the Executive Council. The secretary shall then promptly, by mail, submit the proposed changes in the Bylaws to the membership for approval, with statements of support and/or opposition by the Executive Council. The ballots shall be accepted by the Executive Council for one month after the date of mailing. The Executive Council shall count the ballots; the amendment(s) shall be ratified if it (they) received a favorable two-thirds majority of the votes cast. Any member may, if he so desires, be present at the counting of the ballots.

These bylaws shall be reviewed for amendment at regular intervals, not to exceed three years, by a committee of voting members of the Executive Council appointed by the President. The date of the latest review and/or amendment shall be stated in the last paragraph.

These bylaws were last reviewed by the Executive Council and/or amended by vote of the general membership on April 2, 1998.

IN MEMORIAM

RON DAVIS

1944-1998

Ron was a respected and valued member of our Society for many years, joining in 1983. From 1983 until 1997 Ron was a Research Associate at the Texas A&M University College of Medicine and managed their central electron microscopy facility. Over the years he served the Society as President from 1990-91, Program Chairman from 1987-88, and as Editor of the Texas Society for Electron Microscopy Journal from 1986-90. Ron was associated, in one way or another, with many of the Societies most successful meetings in the late 80's and early 90's. Ron contributed numerous articles, cover micrographs, and "what is it" micrographs to the journal. He always tried to help anyone who had problems with microscopy and worked hard to expose others to the microscopic world around them. Ron will be remembered for his sense of humor, his ability to ask pointed questions and his contributions to the Society.

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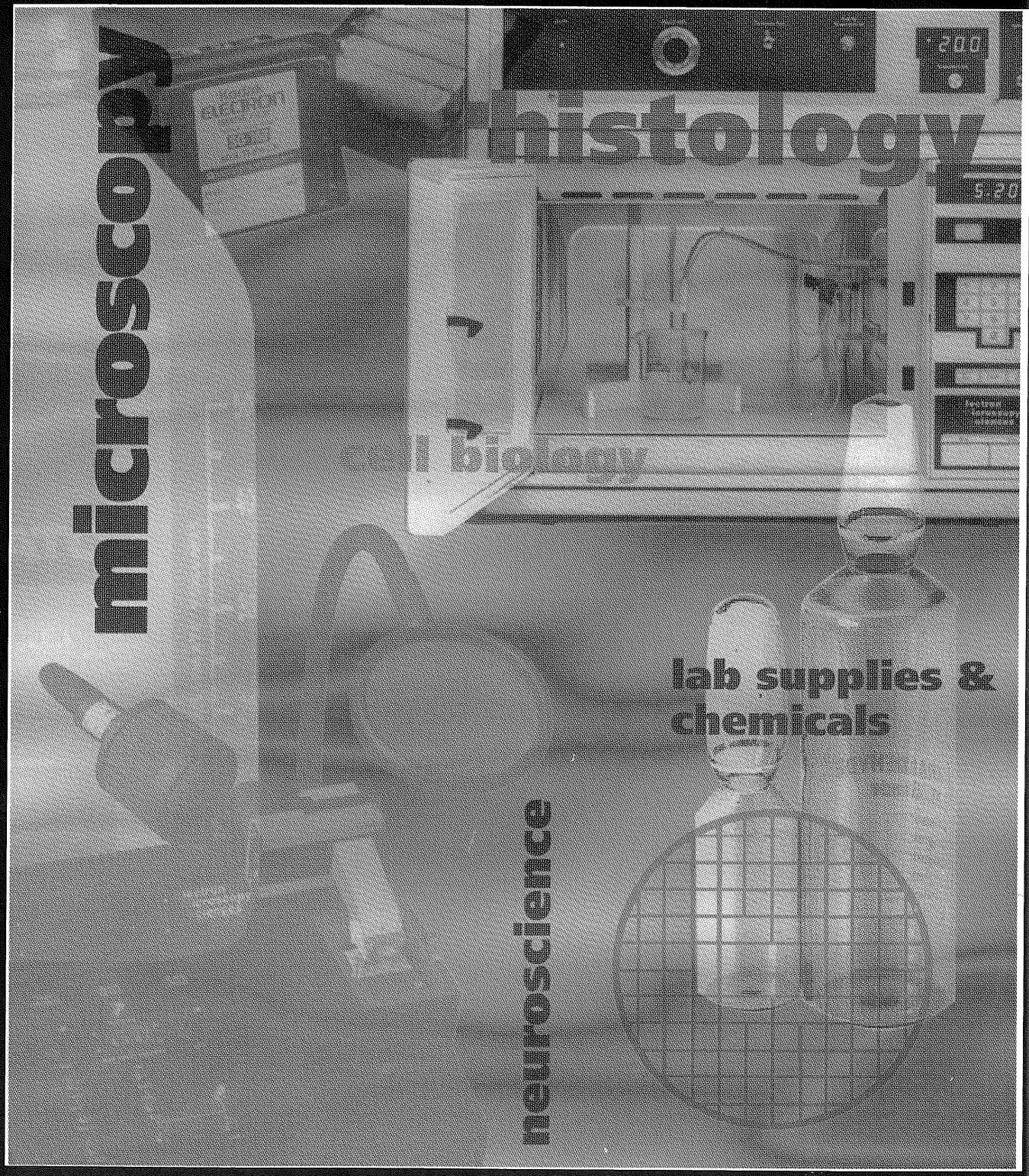

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1978
Introduction of PV9100.

1979
Introduction of the PV9500.

1983
Introduction of the ECON III. (patents 5,274,237 & 5,235, 817)

1985
Introduction of PV9900.

1987
Introduction of PV9800.

1992
Introduction of the DX-4, the world's first and most popular Windows® based microanalysis system and the Compact Detecting Unit. (patents 5,302,831 & 5,275,677

1993
ISO 9001 certification.

1994
Introduction of PowerMX™ Series. Introduction of the Retractable TEM detector. (patent 5,569,925 & 8,259,947)

1995
Introduction of the DX^{PRIME} Series of fully integrated, PC Windows® 95 based workstations for x-ray microanalysis. Introduction of the LN free detector. (patent 5,552,608)

1996
Introduction of the Sapphire detectors with the best standard performance of any EDS detector (patent pending) and introduction of the Phoenix Windows NT based EDS system.

1997
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MICROGRAPHS AND COVER PHOTOS

Micrographs submitted for cover photos should be marked as such. The choice of photographs will be made by the Editor. Photograph receipt and/or dispensation will not be acknowledged. Photographs will not be returned. Electron micrographs to be used for cover photos and text fillers are welcome and should be selected with some attention to aesthetic appeal as well as excellence both in technique and in scientific information content.

EMPLOYMENT OPPORTUNITIES

The JOB OPPORTUNITIES section will be comprised of a "Jobs Available" and a "Jobs Wanted" sub-section. Anonymity of individuals listing in the Jobs Wanted or Jobs Available subsections may be maintained by correspondence routed through the News Editor's office.

TECHNICAL SECTION

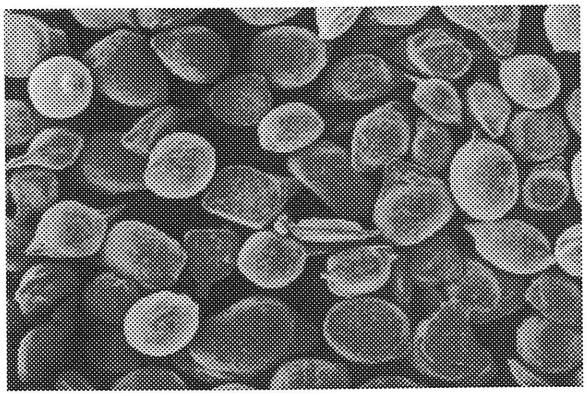
The Technical Section will publish TECHNIQUES PAPERS, and HELPFUL HINTS. The TECHNIQUE PAPERS will describe new or improved methods for existing techniques and give examples of the results obtained with methods. The format of the Technique Papers will be the same as that used for regular research reports. HELPFUL HINTS will be in the form of a brief report with an accompanying illustration, if required for clarity. Helpful Hints should embody techniques which will improve or expedite processes and/or procedures used in EM.

PUBLICATION PRIVILEGES

The right to publish Abstracts in the TEXAS JOURNAL OF MICROSCOPY is restricted to TSM members or to those whose membership is pending. A membership application form can usually be found in each issue of the TEXAS JOURNAL OF MICROSCOPY. Membership dues are as follows: student $2.00; regular members $15.00; Corporate members $75.00. Research articles are accepted from both members and non-members. Individuals who belong to TSM by virtue of a corporate membership are invited to participate in Journal submissions as are our regular or student members. However, papers of a commercial nature, either stated or implied, will not be accepted for publication as a Research Report or Techniques Paper. Such papers may be acceptable as advertising copy.

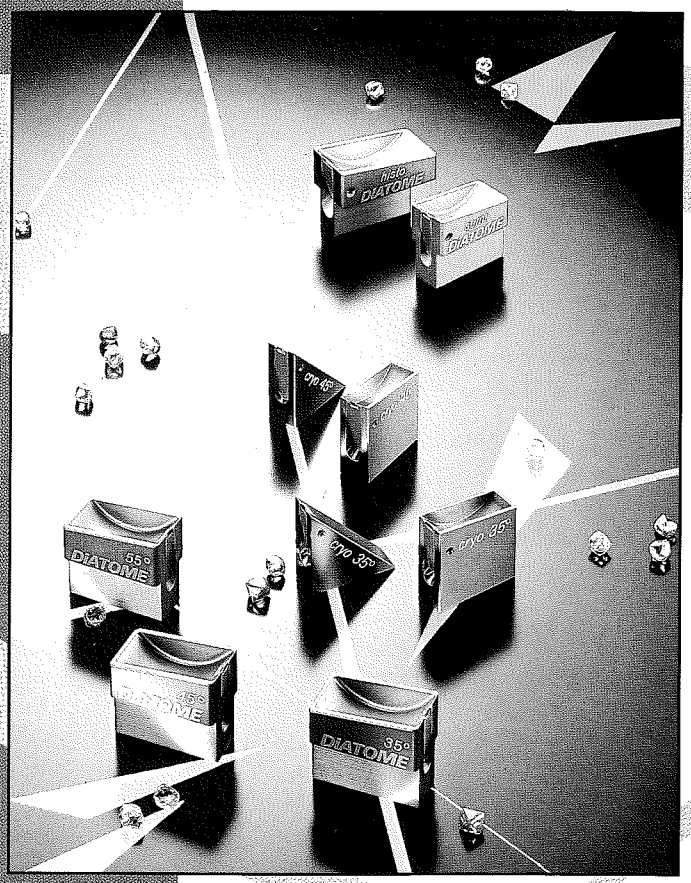
ANSWER TO "WHAT IS IT"

from Texas Journal of Microscopy 29:1



The micrograph on the back cover of Volume 29, Number 1, p. 32, 1998, is a scanning electron micrograph of the contents of a single controlled release potassium chloride (KCL) capsule called Micro-K Extencap® (8 mEq) manufactured by A.H. Robins, Inc. Each crystal of KCL is microencapsulated with an insoluble polymeric coating which functions as a semipermiable membrane allowing for the controlled release of potassium and chloride ions over an eight-hour period. According to the manufacturer, two advantages of this delayed release process include enhanced absorption of KCL and minimizationi of gastrointestional irritation. This medication is used as a dietary supplement in patients whom may be at risk for electrolyte depletion caused by the concominant administration of diuretics. The specimen was made by emptying the contents of the capsule on a stub and coating it with gold and palladium before viewing in the SEM. This micrograph was part of a study concerning characteristics of surface morphology of selected pharmaceutical dosage forms.

Alice M. Stacey. The Department of Biology and The Center for Electron Microscopy, The University of Texas at Arlington, Arlington, TX 76019.



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GUIDELINES: Manuscripts written in English will be considered for publication in the form of original articles, historical and current reviews, case reports and descriptions of new and innovative techniques. It is understood that the submitted papers will not have been previously published. Accepted manuscripts become property of the TEXAS JOURNAL OF MICROSCOPY and may not be published elsewhere without written consent of the Editor. The author should retain one complete copy of the manuscript. The JOURNAL is not responsible for manuscripts lost in the mail.

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(1) A. Glauert, Practical Methods in Electron Microscopy. Vol. 2 (North-Holland. Amsterdam, 1974) 82-88.
(2) P.S. Baur, Jr., G.F. Barratt, G.M. Brown and D.H. Parks. Ultrastructural Evidence for the Presence of "Fibroclasts" and myofibroclasts" in Wound Healing Tissues. J. of Trauma. 19 (1979) 774-756.
(3) D. Gabor. Information Theory in Electron Microscopy, in: Quantitative Electron Microscopy. Eds. G.F. Bahr and E. Zeitler (Williams and Wilkins, Baltimore, 1956) 63-68.

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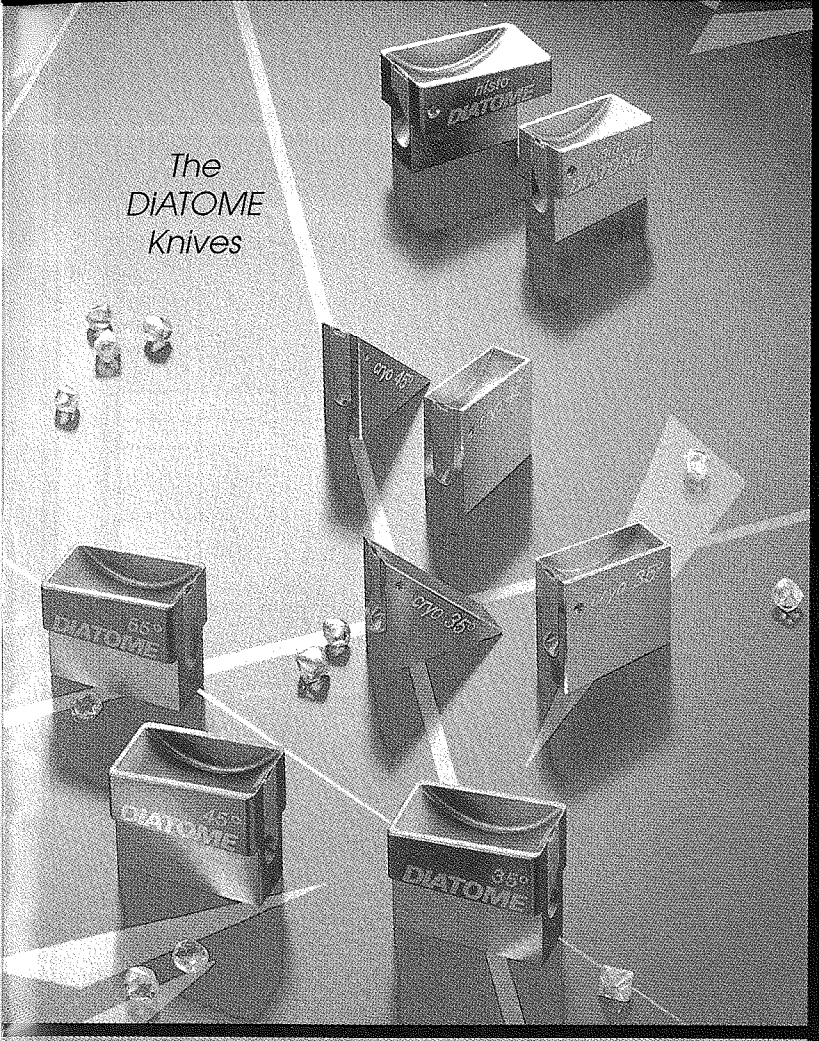

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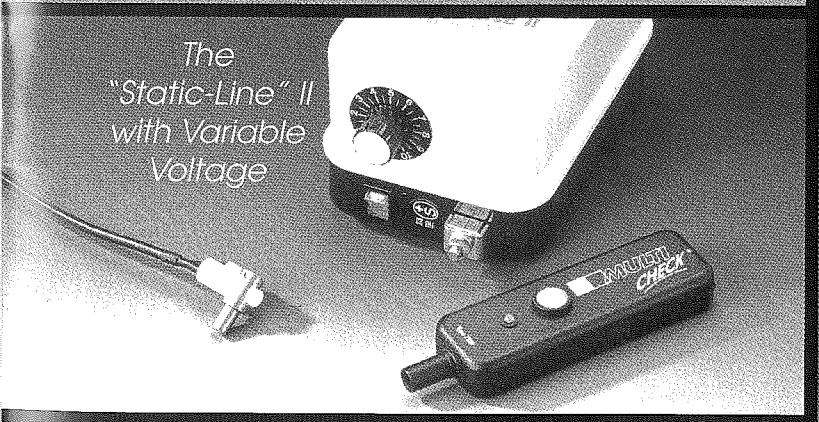

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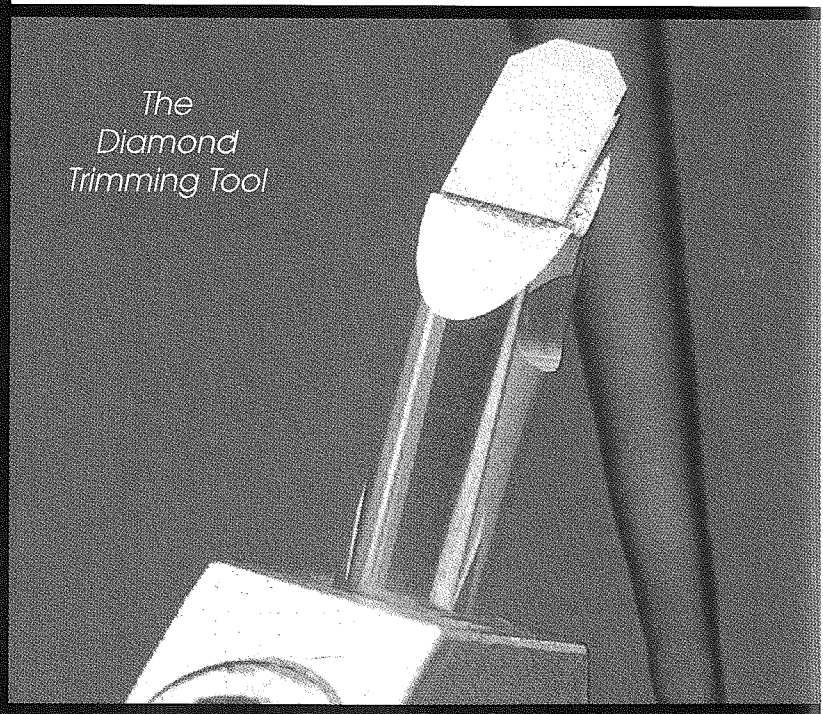

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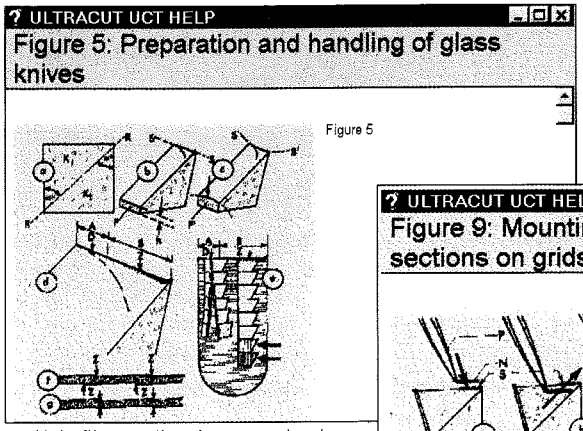

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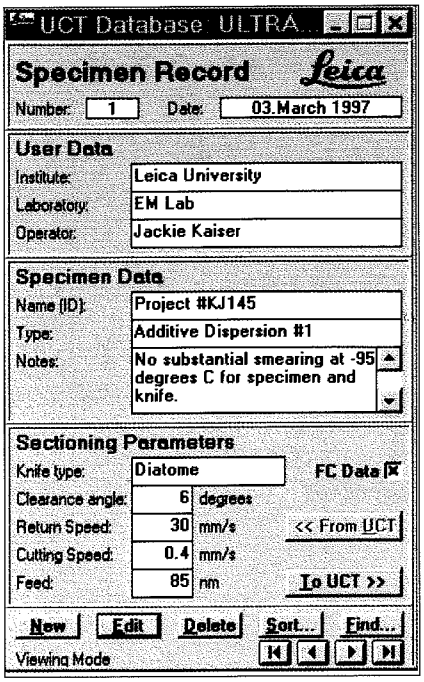
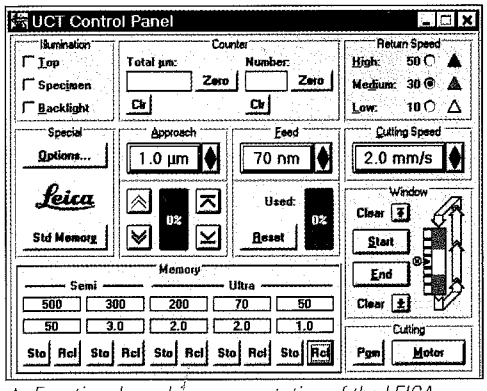
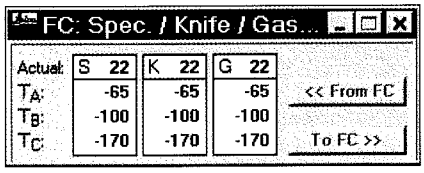
▲ *Illustration of section collection techniques.*



▲ *Software database stores reference information and notes on cut specimens. Transmit data to and from the LEICA Ultracut UCT.*



▲ *Functional graphic representation of the LEICA Ultracut UCT control panel.*



▲ *Database also supports cryosectioning.*

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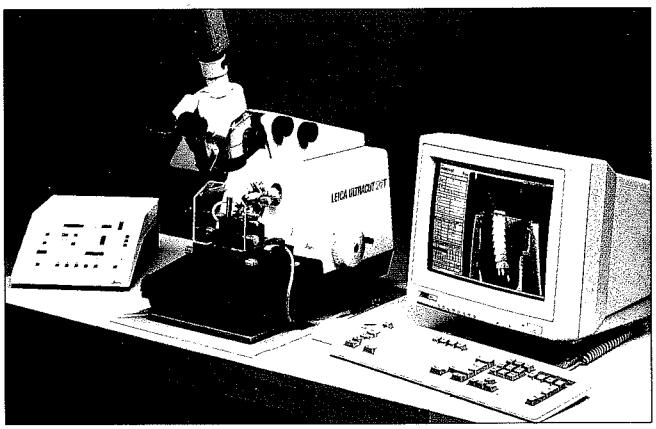

▲ *The LEICA Ultracut UCT with computer*

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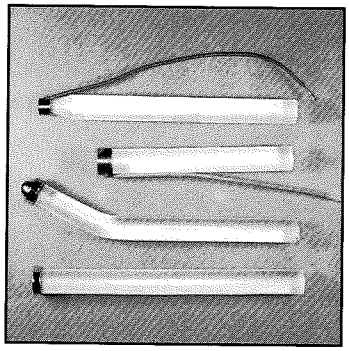
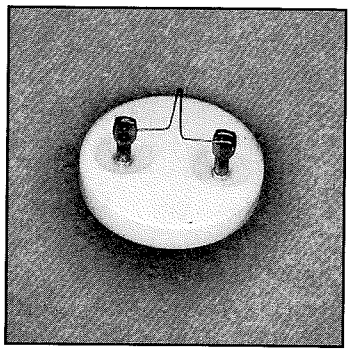
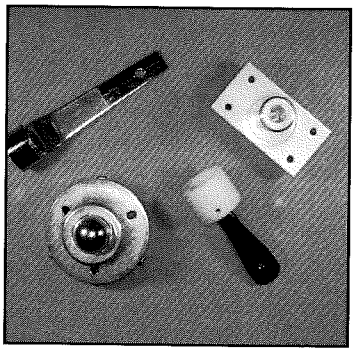


Light Pipe Scintillators are available in quartz and acrylic as well as custom work.



Precision Tungsten **Filaments** are new, not rebuilt. Meet or exceed original manufacturer's specifications.



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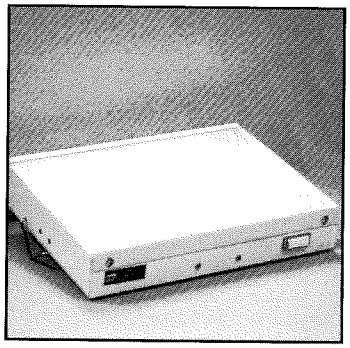

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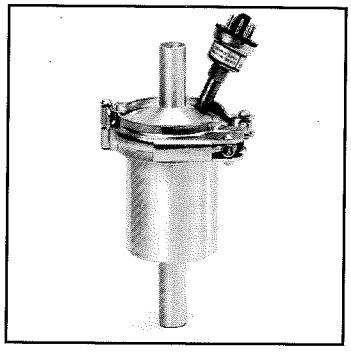

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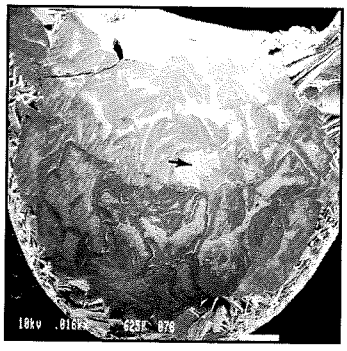

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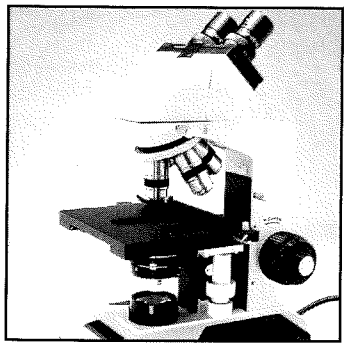

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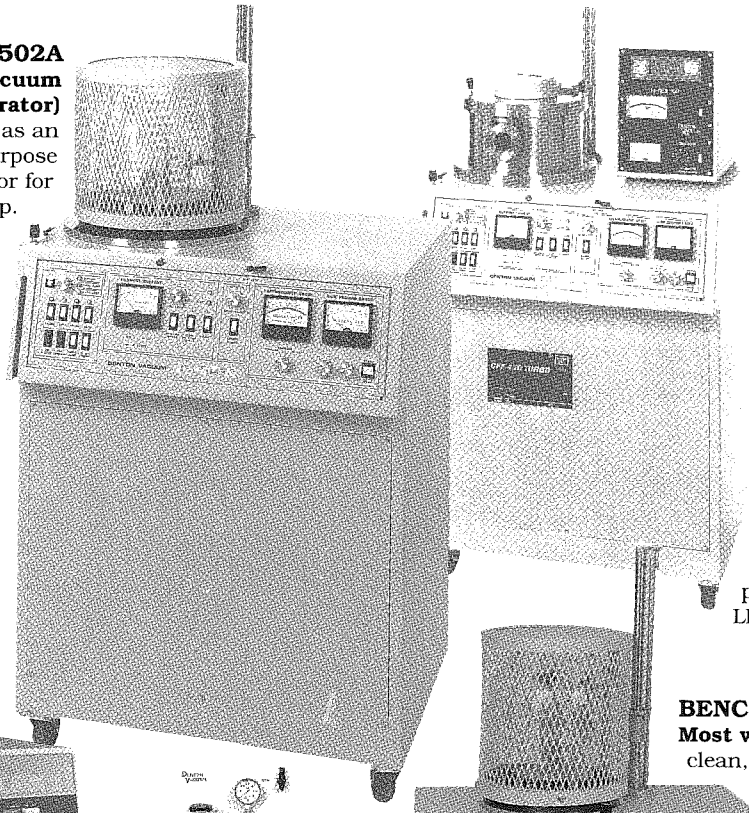

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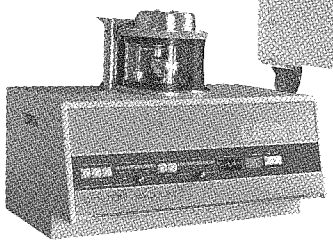

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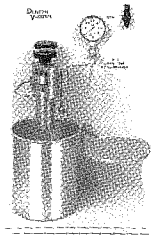

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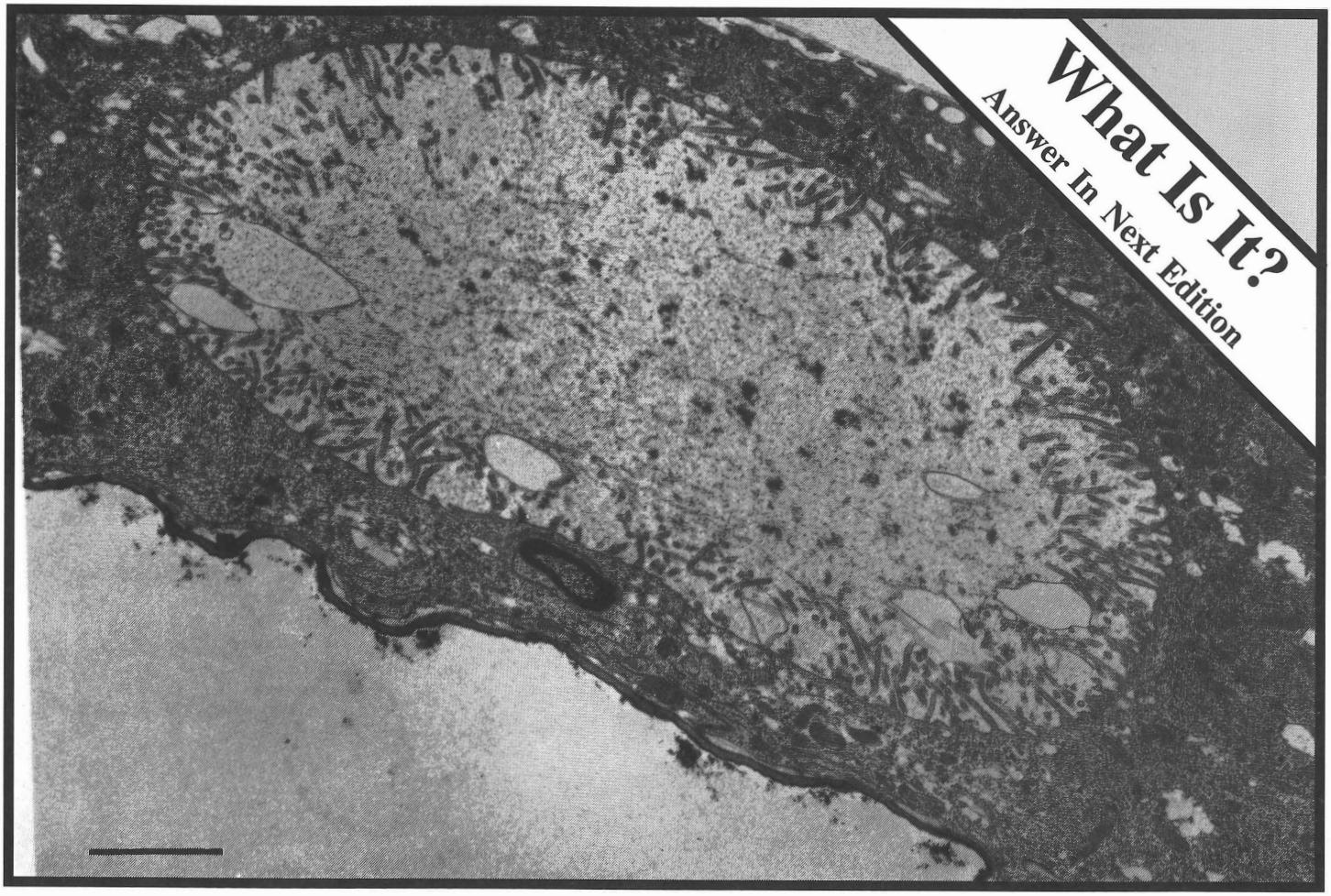

Micrograph by Nan Pryor. FAPRL, USDA. Rt. 5, Box 810, College Station, TX 77840. Bar=1μm.