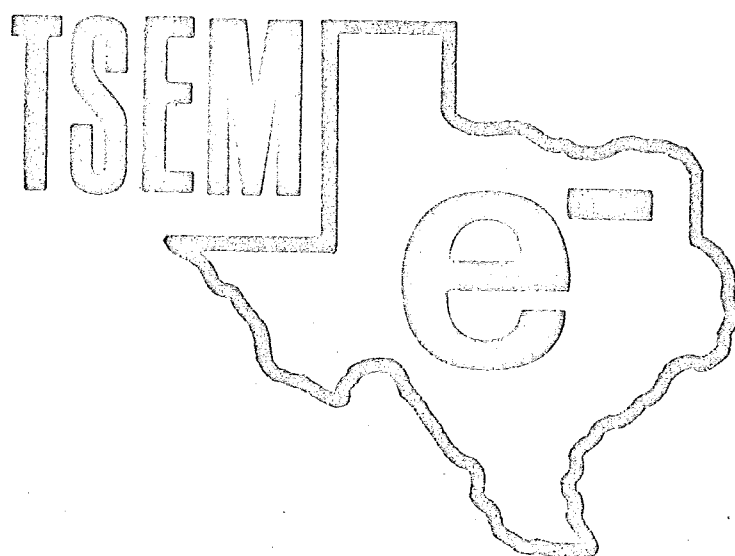




TEXAS SOCIETY FOR ELECTRON MICROSCOPY



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NEWSLETTER

Vol. 2

No. 3

Spring, 1971

Officers 1970 - 1971: Dr. Joe G. Wood, President  
Dr. Robert D. Yates, Vice President  
Robert A. Turner, Secretary  
Joyce Kephart, Treasurer  
Dr. William Winborn, Program Chairman  
Dr. C. Ward Kischer, Editor

Letters and Inquiries to:

Dr. C. Ward Kischer  
Editor, TSEM Newsletter  
Department of Anatomy  
UTMB  
Galveston, Texas 77550

## THE ACADEMIC MARKETPLACE

The number of institutions granting nonmedical doctorates has doubled during the last few years, amounting now to nearly 200 institutions, including a good number known as colleges, such as Bryn Mawr and Arizona State. However, fourteen of these have long produced more than one-half of the total. These are California, Chicago, Columbia, Cornell, Harvard, Illinois, Iowa, Michigan, Minnesota, New York, Ohio State, Wisconsin, and Yale. They accounted for 56% of the total doctorates granted during the years 1930 to 1946 and 53% of those granted from 1948 to 1955. Among them they have awarded more than 50,000 doctorates in the past generation.

W. H. Cowley  
An Appraisal of American Higher  
Education (1956)

Higher education has for some time been riding a gravy train. Up to 3 or 4 years ago, research money was rather plentiful, faculties were ever increasing, as were student bodies, and Ph. D. 's, in many areas, had their pick of positions.

Consider the date of the opening statement, 1956. In the 10 years which followed we probably unloaded another 10,000 Ph. D. s onto the academic community, to say nothing of the increase in graduate students under training.

Now, we begin to hear of troubles, job shortages, Ph. D. s picking up monthly unemployment checks. Only weeks ago one of my former supervisors said he had received several applications from Ph. D. s, who when told there were no positions open, willingly offered themselves as technicians. And I'm sure the story is around Texas by now about the 4 Ph. D. s applying for a high school teaching position in physics in a small town. I cannot vouch for the authenticity of the latter, but it is certainly consistent with other stories which are known to be true.

The question is, assuming a depressed market for new faculty at this time, do we in graduate schools have a moral or ethical obligation to accordingly reduce our intake of graduate students? On the surface that kind of question might be easily dispensed with after all, taking on a graduate student does not obligate one to find him a job. Yet, there is a sense of the profession which should compel a man to assume some concept of destiny for his student beyond the 4 years of training (sometimes whether the student likes it or not). Consequently, the question does have

reality considering the economic situation prevailing today. But what will be the situation tomorrow? Is there any evidence that funding of federal grants, for instance as one source of support, not only for faculty, but for training of graduate students, is now improving over the gloomy affair of the most recent years? Figures of 1970 for % funding of approved grants by NIH indicates a high of 77% for NINDS with a low of 20% for NIGMS. However, of 10 institutes, 5 funded better than 50% and 3 others were between 43% and 49%. For the entire NIH the % funded of approved applications were thus: 1967 - 77%; 1968 - 64%; 1969 - 66%, and 1970 - 50%. These figures do not include continuations but do include competing renewals.

Therefore, we have no encouragement from official figures such as the above. However, there is encouragement from other sources. For example, over the past two years I have published several notices in the Newsletter of grant awards to TSEM members. So, you know they can be obtained! Those who get rejected on a single try and give up do not have much confidence in their own efforts and probably do not deserve an award.

This is especially no time to be of faint heart. Persistence does pay off and not just with the individual. Some administrators and other institutional officers ought to try a little harder also for "growth" funds. True, growth in the real sense seems to be rapidly reaching a plateau. I quote from a recent by-line by Dr. Max Rafferty: "The U. S. Labor Department is currently noting the dwindling demand for teachers and is warning that many young people preparing for this demanding and sometimes eyeball to eyeball profession may well end up in unemployment lines.

Why the surplus? First, we're seeing the last wave of the great postwar baby boom cresting and inundating our colleges. The largest percentage of young people in their 20s in all history is in training for future careers. A lot of them want to be teachers. Result: more teachers and fewer kids to teach".

Perhaps that is the situation in high schools and colleges but anyone who says a ratio of 170 students to one lecturer as a teaching constant (in the medical schools, for example) is appropriate, needs his head examined. So, this is what I mean by "growth", that is, a relative improvement in the student/teacher ratio. As a matter of fact the lecture system of teaching needs a genuine overhauling - but, that is a subject for a future editorial.

The upshot of the tight Ph. D. job market is this: the squeeze will be (if not already) transferred back to the training institutions. However, rather than reduce our student intake just for the sake of reduction or on the basis of a prediction of the available job market four years hence, the advantage of the present economic condition is to enable departments to discriminate a bit more. That means the methods of selecting faculty

and graduate students will be increasingly governed by the likelihood of succeeding. Closer looks will be taken not only at the individual and the extracurricular activities of same, but also the institution from whence he came, and the kind of training or discipline he has received and/or exercised. Any Chairman or Dean who would add to his faculty headaches by employing the activist-type deserves what he gets and himself may well soon be on the block.

In other words the competition is getting thick, friends and neighbors. If you feel yourself getting pushed a bit from behind, its only those several thousand Ph.D. s who have arrived in the marketplace with nowhere to go ----- except in front of you!

Ward Kischer  
Editor

## THE PRESIDENT'S MESSAGE

As outgoing President I would like to personally express my appreciation to the membership for its strong support this year of all TSEM activities, for its interest and its participation in all events. This, indeed, has been an outstanding year for TSEM. The momentum that the organization has gained over the past years was quite evident during 1970-71. All members of the executive committee have worked diligently in order to maintain the pace set in the past and, in fact, to increase the level of activity.

Special events which happened this year should be recognized to the membership. The Newsletter has indeed come into its own. It has been expanded and now has a stiff cover with a new symbol. The efforts of the editor, Ward Kischer, and his printing of plates concerned with different topics in electron microscopy have indeed been stimulating to the membership to submit portions of their work; and has created considerable interest in adding a refreshing approach to the Newsletter. Also, the Newsletter has included an element of advertising in that with the encouragement of a growing list of corporations who are active in TSEM, we have presented summaries of information forwarded to us by corporate members. Therefore, new products, ideas and concepts have been presented in the Newsletter to the membership.

This year also sees the first two meetings in which abstracts of the presentations will be published through Texas Reports on Biology

and Medicine. Again, this sets a trend and should be adhered to in the future years in that publications from at least one meeting should be published. This has increased participation at the spring meeting and, of course, now we have permanent records of our invited symposium speakers.

TSEM is also grateful this year for having had the August EMSA meeting in Houston. The presence of outstanding electron microscopists from America in Texas added to the zeal with which all of us approach our EM studies. EMSA has also been indeed generous with their support this year of our winter meeting in Galveston. Also, for the first time, after a year's intensive effort the final arrangements for a joint meeting with the LSEM have been made. Therefore, though the joint meeting will be held in 1972, the efforts of the two executive committees were conducted during this past administration. This again will represent a first for the Society and had it not been for the interest and support of the membership and the executive committee, such an endeavor could not have been attempted, much less finalized.

The solvency of TSEM is beyond question. In fact, this year also sees the year in which TSEM has applied to the Internal Revenue Service as a non-profit, tax-exempt organization. This is, indeed, a crucial step for TSEM and one of which all of us should be proud. "We have arrived" and achieved our status in the organizational world.



The programs have been outstanding. The arrangements made by the local committees and especially the program chairman have contributed immeasurably to a successful year. Support of TSEM activities by the various institutions within the state in assisting the defraying of costs of invited speakers has been of considerable help and importance to the Society.

I would personally like to thank the executive committee; namely, Ward Kischer, Newsletter Editor, for his efforts on behalf of expanding the Newsletter, developing the cover concept and the composite photographic plates which we all enjoy; Bill Winborn, Program Chairman, for his outstanding degree of organization of the meetings and of pre-registration principles which, indeed, should set precedent for future program managers and local arrangements chairmen: Bob Yates, Vice-President, who essentially was "red-shirted" this year, but who with Joe Mascorro from Galveston, served admirably as local arrangements co-chairman for the winter symposium on the Treasure Isle: Bill Brinkley, past president for, for his loyal support, comments and advice plus his assistance to TSEM through the placement service which he has so well organized; Joyce Kephart, Treasurer, who has compiled up-to-date membership lists and who has worked diligently at initiating and completing the tax-free application to the Internal Revenue Service, which was no small task and certainly is a significant step in TSEM history; and last but not most, Bob Turner, Secretary, who bore the brunt of all work and effort that was finally communicated

to the membership. Bob has served tirelessly over the past years as an officer in TSEM. He has one of the longest records of tenure in office and he, indeed, reflects credit upon the organization. He is to be admired for his willingness to serve in a capacity which is critical but often times unrecognized.

Probably a more significant event which occurred this year in TSEM is the nomination and election of new officers. Each year new officers are nominated and elected by one mechanism or another. However, it has been obvious in the past that the executive committee has been concentrated in the Gulf Coast part of the state in spite of efforts by most members of the nominating committee to disperse offices throughout the state. Speaking as a member of TSEM and an officer and not necessarily one from the Gulf Coast, it is obvious that the concentration of authority and directorship in one particular geographic area does not provide for adequate dispersal of information, ideas and assistance and can lead to stagnation. Therefore, it was the strong opinion of the nominating committee this year that new officers should definitely come from different parts of the state. We are indeed pleased to see two newly elected officers from the Dallas area. I personally hope that this trend continues and that the Gulf Coast participation in the Society will be in a proper perspective. There are outstanding active people in Central, East and West Texas and we must have them in the Society offices.

Much the same is true for physical sciences. We have a separate portion on the program in the spring for physical scientists. This was done in 1968 as well and always is an interesting and contributing experience. Therefore, speaking for the executive committee and the nominating committee of TSEM, we again invite all of you to participate as active members to carry your cause whether it be physical or biological science and to present yourself, regardless of what portion of the state, into the organization for its increasing growth.

As we look back over the accomplishments of this past year, it appears to be that we are becoming a more diversified society. The accomplishments far exceed any disparaging thoughts or events and we can truly be thankful for a great year. Possibly the only thing we could add at the present time as indicated by our Newsletter editor is that "we all pray for rain".

It has been a pleasure to serve with the organization and I send my best wishes to all of you for continued success and wish the next officers of TSEM success for the coming year. The present executive committee at their last meeting challenged the 1971-1972 officers to direct efforts toward revision of the constitution and by-laws.... soon.

I thank all of you very much for your continuous support and interest.

Sincerely yours,

Joe G. Wood

## Crystals and Crystal-Like Structures

The forty two excellent micrographs submitted by our members represent a varied and comprehensive collection of crystalline and paracrystalline structures. Micrographs 1 through 32 illustrate structures found in and about living organisms, while micrographs 33 through 42 illustrate various inorganic and organic crystallites.

Strictly speaking a crystal is an ordered three dimensional array of identical sub-units or unit cells. The structure is built up by a precise stacking of these sub-units. Generally the sub-unit will contain one or several atoms or molecules. The integrity of the individual molecules is, of course, maintained by covalent bonds, whereas the sub-units are held together by auxiliary bonding such as ionic or hydrophobic forces. Some ordered structures found in biological material can be considered to be true crystals, for example the various protein or other inclusions which are localized in a relatively pure state. However, many ordered structures should be viewed as paracrystalline (crystal-like) arrays of complex sub-units. Thus stacking may occur in only one or two dimensions rather than three, the stacking may be imprecise or varied, several different sub-units may be involved, and the bonding forces may be extremely weak or temperature labile. In general the preciseness of ordering of an array can be judged by the degree of complexity of the diffraction pattern obtained using either X-rays, electrons, or light (optical diffraction of the electron micrograph). Thus although many viruses may be said to "crystalize" and produce a relatively complex diffraction pattern, a well preserved myelinated membrane produces a very simple diffraction pattern and can at best be termed a paracrystalline structure.

Arthur Cole  
Physics Department  
U. of Texas M. D. Anderson Hospital  
Houston, Texas

## CRYSTALS AND CRYSTALLINE - LIKE STRUCTURES

### Credits and Descriptions

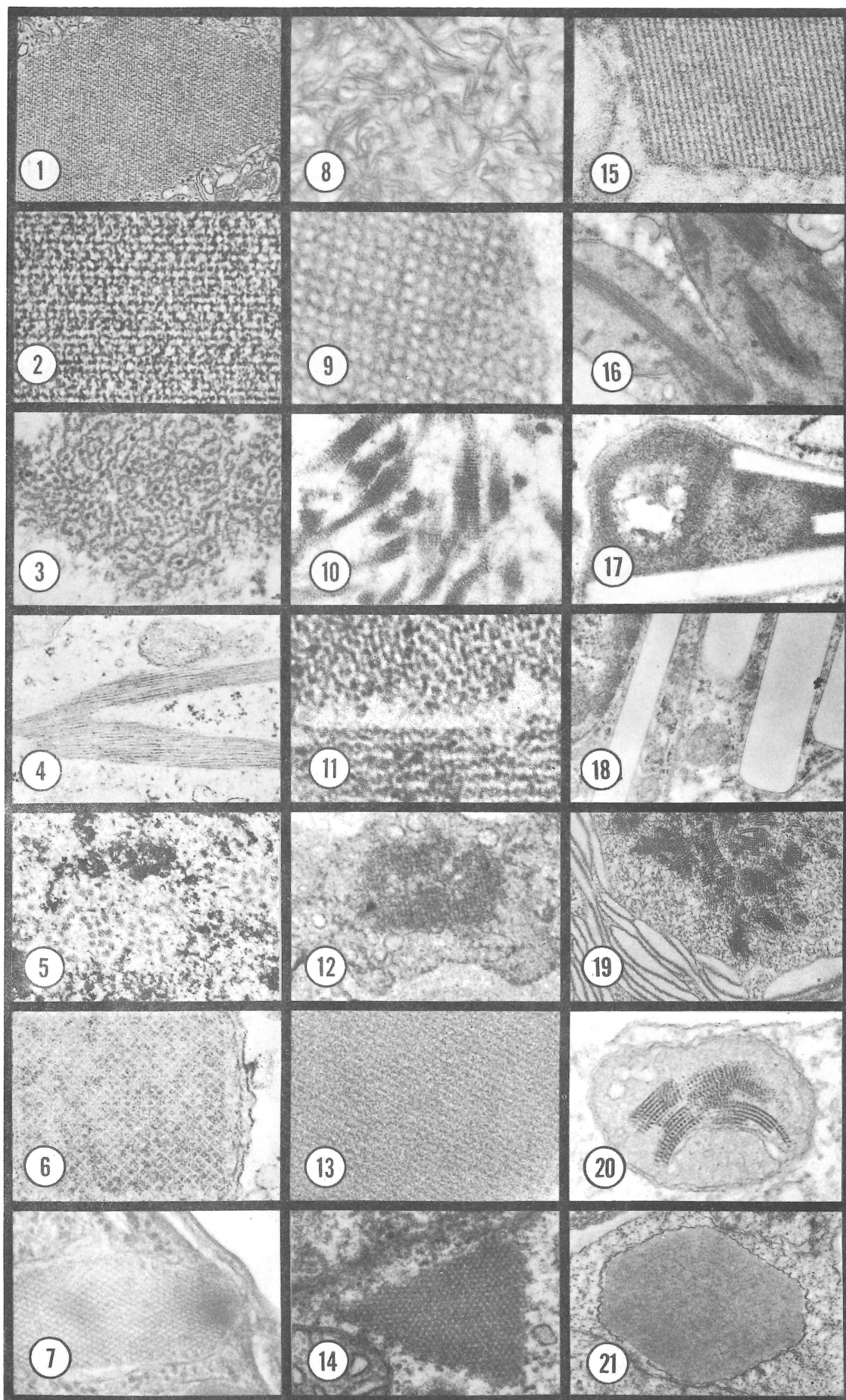
1. Leydig cell crystal of Reinke, human testis, 20,000 X. J. Berlin and R. Brackeen, Texas Tech University.
2. Leydig cell crystal of Reinke, human testis. 34,000 X. J. Berlin and R. Brackeen, Texas Tech University.
3. Cross-section of Lubarsch crystalloid in spermatogonium of human testis. 58,000 X. J. Berlin and R. Brackeen, Texas Tech University.
4. Long section of Charcot-Bottcher crystalloid in Sertoli cell of human Testis. 20,000 X. J. Berlin and R. Brackeen, Texas Tech University.
5. Intranuclear inclusions in Leydig cell of human testis. 14,000 X. J. Berlin and R. Brackeen, Texas Tech University.
6. Glyoxysome of sunflower apical meristem. 47,000 X. J. Berlin and R. Brackeen, Texas Tech University.
7. Protrichocyst in cortical region of ciliated protozoan Tetrahymena pyriformis. Upon appropriate stimulation this crystalline material is released into the environment as a mucous secretion. 40,000 X. G. Williams, University of Texas Medical School, San Antonio.
8. Birefringent crystals in alveolar space of human lung. 42,000 X. R. Turner and J. Stinson, Scott & White Hospital, Temple, Texas
9. Crystal structure from adrenal cortex of an animal treated with the cholesterol inhibitor triparanol. 160,000 X. R. Yates and J. A. Mascorro, The University of Texas Medical Branch, Galveston, Texas.
10. Crystals which occur in the nucleus of parenchyma cells of Rauwolfia serpentina, a medical plant from which reserpine was isolated. The crystal has approximately 100 Å period. They are likely to be crystals of protein accumulation in the nucleus. 41,800 X. A. J. Mia, Bishop College, Dallas, Texas.
11. Crystalline lattice in cytoplasm of human soft part sarcoma. 435,000 X. J. Chang, M. D. Anderson Hospital, Houston, Texas.
12. Crystal in endothelial cell of lung of baboon embryo. 34,000 X. W. Kischer, The University of Texas Medical Branch, Galveston, Texas.
13. Lattice of crystal from sense cell of neuromast of enlarged lateral line canal of the silverjaw minnow, Ericymba buccata. 90,000 X. Ingram, Reno, and Turner, Baylor University, Waco, and Scott-White Hospital, Temple, Texas.

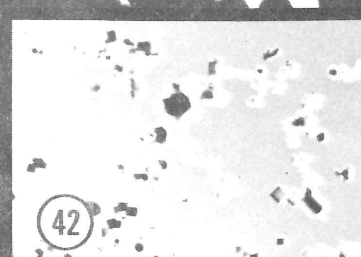
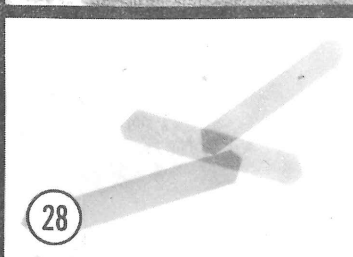
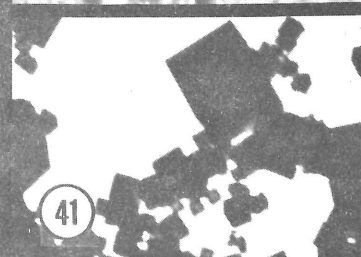
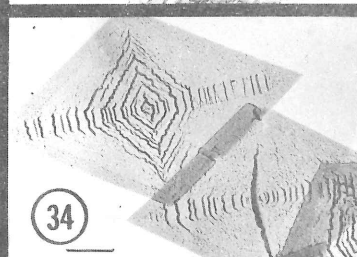
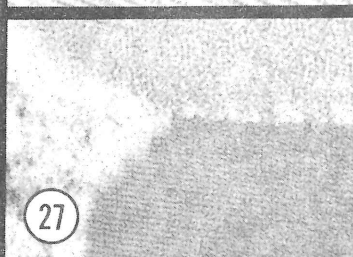
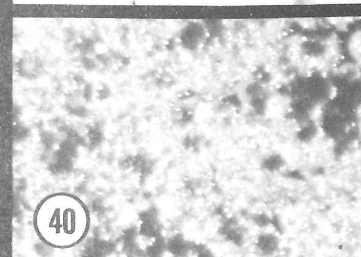
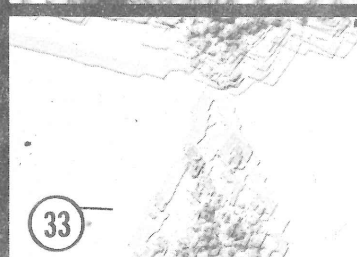
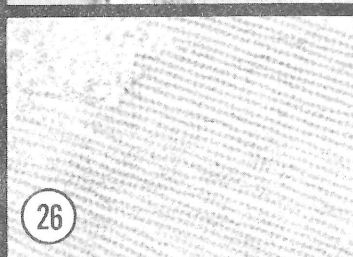
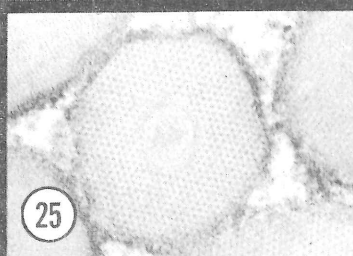
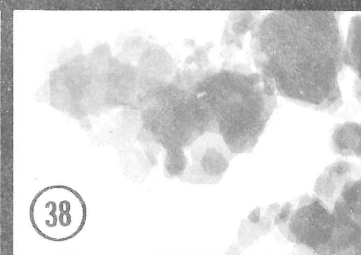
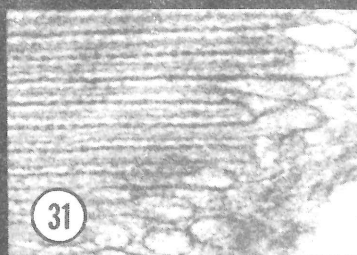
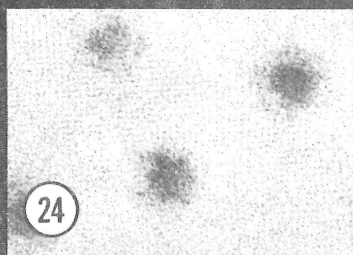
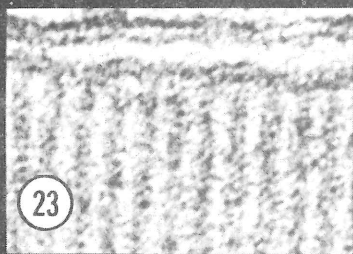
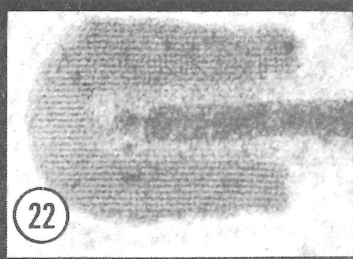
15. Crystal found in cytoplasm of cell from alveolar soft part sarcoma. Periodicity in the crystal is approximately  $100 \text{ \AA}$ . 136,800. J. Martin and J. Willis, Baylor University Medical Center, Dallas, Texas.
16. Paracrystalline tubular structures found in some liver cell mitochondria from normal humans. 20,160 X. J. Martin and J. Willis, Baylor University Medical Center, Dallas, Texas.
17. Intracellular crystalloid found in the cytoplasm of some cells of an interstitial cell tumor of the testes. 43,900 X. J. Martin and J. Willis, Baylor University Medical Center, Dallas, Texas.
18. Crystalloids from a cell surrounding the venom gland of the brown spider, Loxosceles reclusa. 11,000 X. T. Rogers, NASA - MSC, Houston, Texas.
19. Phytoferritin crystals found in the chloroplast stroma of a soybean Glycine soja (L.) Sieb and Zucc. tissue culture cell. This culture was challenged with lunar material during the Apollo 12 quarantine period. The phytoferritin was not unique to the lunar treatment. 32,500 X. P. Baur, NASA - MSC, Houston, Texas.
20. Crystalloid (possibly phytoferritin) in a chloroplast of Malpighia glabra. 55,000 X. H. Arnott, University of Texas, Austin, Texas.
21. Membrane bound crystal in vegetative hyphal cell of Coprinus stercorearius. 13,700 X. M. Rogers, University of Texas, Austin, Texas.
22. A granulosus virus of Plodia interpunctella partly encapsulated in a protein crystal. 144,000 X. H. Arnott, University of Texas, Austin, Texas.
23. Small portion of a crystalloid contained within a mitochondrion in Malpighia glabra. Note the very close relationship between the inner mitochondrial membrane and the lattice planes of the crystalloid. 500,000 X. H. Arnott, University of Texas.
24. Cytoplasmic polyhedrosis virus particles in the monarch butterfly contained within a protein crystal. 160,000 X. H. Arnott, University of Texas, Austin, Texas.
25. Mature capsule (protein crystal) surrounding the granulosus virus of Plodia interpunctella. 100,000 X. H. Arnott, University of Texas, Austin, Texas.
26. Nuclear inclusion from mesophyll cell of Pinguicula sp. leaf. 66,300 X. J. Morgan, University of Texas, Austin, Texas.
27. Nuclear inclusions of sporophyte cell of Dryopteris dentata. 46,750 X. J. Morgan, University of Texas, Austin, Texas.

28. Guanine crystals from reflecting cells of the peritoneum of the guppy, Lebistes reticulatus. 4000 X. G. Brackenridge, University of Texas, Austin, Texas.
29. Trichocysts of Gyrodinium. 60,000 X. M. Watson, University of Texas, Austin, Texas.
30. Crystalline structure in cytoplasm of a hamster Purkinje cell. 43,200 X. R. Morales and D. Duncan, The University of Texas Medical Branch, Galveston, Texas.
31. Pseudocrystalline array of packed tubules from portion of synaptic sac in hamster cerebellum. Each tubule apparently contains a central helically wound filament. 63,600 X. R. Morales and D. Duncan, The University of Texas Medical Branch, Galveston, Texas.
32. Psuedocrystalline whorl pattern of smooth endoplasmic reticulum in hamster cerebellum. The containing cell is not identified. 17,500 X. R. Morales and D. Duncan, The University of Texas Medical Branch, Galveston, Texas.
33. "Skeletal" polyethylene, crystallized from xylene, 8,5000 X. D. Barr, Texas A & M University, College Station, Texas.
34. Polyethylene crystals, indicating two mechanisms of folding: parallel to sides of crystal and along the short diagonal. 5,500 X. D. Barr, Texas A & M University, College Station, Texas.
35. Crystal formation of poly-9-vinyladenine and polyuridylic acid complex prepared in 0.01 M Tris buffer, pH 7.4 and 0.1 m NaCl. Spray mounted onto a carbon support film, 1500 X. T. McKee and H. Kay, Texas A&M University, College Station, Texas.
36. Solid phase of poly-9-vinyladenine prepared in 0.01 M Tris buffer, pH 7.4 and 0.1 M NaCl. Spray mounted onto a carbon support film. 19,000 X. T. McKee and H. Kay, Texas A & M University, College Station, Texas.
37. Unique formation of mica needles, koalinitic and montmorillonitic clay minerals. 23,800 X. T. McKee, Texas A & M University, College Station, Texas.
38. Kaolinite clay platelets showing distinct and near perfect formation after extended exposure to an artificial saline environment. 33,500 X. T. McKee and U.G. Whitehouse, Texas A & M University, College Station, Texas.
39. Iron rich phase of predominantly montmorillonitic fine clay fraction from sediment of the eastern Gulf of Mexico. 12,500 X. T. McKee, Texas A & M University, College Station, Texas.

40. Dark field of Lanthanum Fluoride showing preferred orientations of many crystallites. Drop mounted in formvar. 3000 X. C. Norris and D. Barr, Texas A & M University, College Station, Texas.
41. Diffraction contrast images of magnesium oxide, not often noticed due to bright backgrounds. Realized by overdevelopment. 5000 X. C. Morris, Texas A & M University, College Station, Texas.
42. Partial dark field of magnesium oxide crystallites as indicated by the coexistence of bright and dark field images. Smoke mounted on formvar. 2000 X. C. Morris, Texas A & M University College Station, Texas.







## CHATTER

### Letter to the Editor:

First let me compliment you on the progress that has been made during the last year on the TSEM Newsletter. It is certainly a credit to the society and in its present form it should help to generate more interest in our society.

I wonder if the society would consider the possibility of sending a sample copy to groups or individuals which could be suggested as possible new members to the society?

I am enclosing a list of several books which might be of interest to those in the physical areas..... May I suggest that in addition to cataloging under Biological and Physical Sciences you consider a general or introductory section for such books as Hall, Wischnitzer, Seigel, Trillat, etc.

In reference to the micrographs in the last newsletter is not plate 3 also SEM in addition to 4 and 5 as noted? Also in reference to the micrographs I would like to make a suggestion for a future subject which would allow contributions from both biological and physical areas. It has occurred to me that we have a number of people studying algae for various reasons. I think that you could of course expect contributions from the Botanists at both UT and A&M. In addition you should receive material from Geologists, Micropaleontologists, Oceanographers, etc., who work with both fossil and living forms of diatoms, coccoliths and other forms of

algae. This should draw from our numerous oil company labs in the area as well as from the universities.

Another possibility would be special techniques which would be of interest to all specialities and disciplines.

Thomas R. McKee  
Texas A&M University

Thanks for your suggestions, Tom, we can take up the subject of the next plate at the Dallas meeting. Yes, Figure 3 in the last issue was also SEM. - Editor.

#### COMPRESSION

Treasurer-elect Joe A. Mascorro (Department of Anatomy, UTMB, Galveston) would like to remind the membership that TSEM dues in the amount of \$3.00 for the year 1971-1972 become payable by the June 1st deadline. This procedure will save our society the expenses involved in mailing individual dues reminders.

Officers for the Coming Year 1971-1972, are:

President: Dr. Robert Yates  
Department of Anatomy  
University of Texas Medical Branch  
Galveston, Texas

Vice President: Dr. Dmitri Lang  
University of Texas at Dallas  
Dallas, Texas

Secretary: Katy Jo Miller  
Department of Anatomy  
Southwestern Medical School  
Dallas, Texas

Treasurer: Joe Mascorro  
Department of Anatomy  
University of Texas Medical Branch  
Galveston, Texas

Program Chairman: Dr. Jeffry Chang  
Department of Pathology  
M. D. Anderson Hospital  
Houston, Texas

#### AREA NEWS

Houston M. D. Anderson Hospital

Dr. Ramah Weisblum La Pushin received her Ph. D. degree in basic medical sciences in the Sloan-Kettering Division of the Cornell Univ. Graduate School of Medical Sciences where she majored in cytology. The subject of her thesis was a study of gluco-corticosteroid induced pyknosis in the thymus and lymph node of the adrenalectomized rat. After a brief post-doctoral fellowship in Immunology, she came to Houston and is presently doing research in the Division of Experimental Oncology at M. D. Anderson. Her major research interests center around immuno-cytology.

#### Baylor College of Medicine

Dr. Margaret Ann Goldstein has been an instructor at Baylor College of Medicine in the Division of Myocardial Biology since Sept. 1. She is continuing her research in the ultrastructure and function of striated muscle. A scientific exhibit entitled "Striated Visceral Muscle in Drosophila Melanogaster Larvae" was displayed at the EMSA meeting in Houston in October.

Dr. Barry Van Winkle (a student of Dr. Beasley, U. of T. at Austin) is now a post-doctoral fellow in the Division of Myocardial Biology under Dr. Arnold Schwartz. He is a member of TSEM.

#### Rice University

Dr. Bill Martin, recent Ph. D. from Dr. Bill Philpott's lab. is now a post doctorate at Dr. Samuel Spicer's Lab in South Carolina.

Dr. Sue Dike recently attended the Second International Congress of Parasitology co-authoring a paper on some cytochemical and ultrastructural aspects of the tape worm Hymenolepis diminuta. She is presently investigating the ultrastructure of the surface structures of Schistosoma mansoni.

We are sorry to say that Pat Reynolds, Dr. Bill Philpotts, Research Assistant is leaving Rice to accept a position at the University of South Carolina Medical School and we would take this opportunity

to wish him well.

Denton

North Texas State University

Last winter we had the privilege of having on campus Dr. Christian de Duve of The Rockefeller University who talked with students and faculty and presented a seminar to the biology students who numbered over 200. It was indeed a pleasure to have this true gentlemen and investigator visit our campus. Mr. Joe Keeter will enter graduate work at Albert Einstein College of Medicine, Bronx, New York this fall.

Gerald Cagle, a predoctoral student in microbiology has been studying the ultrastructure of azatobacteria cells and cysts with very interesting findings, some of which have been published in the Journal of Bacteriology.

Dr. Tom Rogers and Dr. Vernon Scholes have received a renewal grant from NASA-MSC, Houston for \$25,000 for one year to study the early detection of disease. Dr. Scholes has received from NASA-MSC, Houston a \$70,000 contract for the next two years to determine the effects of lunar material on plant tissue culture cells.

Dr. Paul Bauer, Graduate of Texas A & M, is a post-doctoral investigator on the project and Mrs. Barbara Wood is the EM technician working on this project. Dr. Charles Walkenshaw of NASA-MSC is the technical monitor of the contract.

Several premasters students at NTSU are working on EM projects for their theses. These include Shirley Stanford, Martha Richardson, and Robert Pardue. Predoctoral students working on EM projects include James E. Carnes, Steve Larsen, and Jerri Lindsey. One undergraduate student, Randy Kirkland, from Dallas is learning technique and procedures preparing for graduate work in EM.

Having just received the Christiasen frozen section equipment for the ultra microtome, we anticipate subcellular enzyme localization studies in the near future.

Dr. Scholes spent last summer at NASA-MSC working on early detection of disease and plans to continue his studies again this next summer at NASA-MSC.

Dallas

The University of Texas Southwestern  
Medical School

A recent and most welcome visitor to the Anatomy Department of the University of Texas Southwestern Medical School at Dallas was Professor Rupert Everett Billingham of the Wistar Institute of Anatomy and Biology in Philadelphia. He will join the faculty of Southwestern on August 1, 1971 as Full Professor and Chairman of the Department of Cell Biology and Director of the Graduate Program in Cell Biology.

Dr. Billingham, a native of England, attended Oxford University MA 1947, Ph. D. 1950, and D. Sc. 1957. He is married and has three children.

Dr. Billingham was accompanied on his visit by Wayne Streilein, M. D. Dr. Streilein will be Full Professor and Associate Director of Cell Biology and will have a joint appointment with the Department of Internal Medicine.

Alan Beer, M. D. will also have a joint faculty appointment in Cell Biology and Obstetrics-Gynecology Departments beginning August 1.

The name change (from Anatomy to Cell Biology) has created a bit of excitement and apprehension within the department. Dr. Billingham stated in an informal luncheon with members of the department that a parochial view of the title should be taken and that emphasis will be placed on relating structure to function and interpreting the meaning of cell biology in terms of the broader aspects of the biology of Man.

Other recent visitors to our department for seminar presentations were:

1) N. A. (Tony) Moore - Anatomy Department, Galveston  
"Effects of Altered Thyroid Function on the Adrenal Cortex".

2) Dr. Ann Craig - University of Texas Medical School  
"Morphology of Human Skeletal Muscle Cells: Ultrastructural Observations which Challenge the Concept of Stability in the Definitive State of these Cells."

Fort Worth

Texas Christian University

The dedication of the Sid W. Richardson Physical Science Building and Winton-Scott Hall of Science was formally dedicated on April 14th.

Galveston

The University of Texas  
Medical Branch

Department of Anatomy

The following papers have been accepted for publication  
in the Zeit. für Zellforschung:

1. "The Effects of Clofibrate on Acetyl CoA Carboxylase Activity in Hepatocytes" by James Harkins and Robert D. Yates.
2. "An Ultrastructural Study of the Effects of Fluoroacetate on Hepatocytes" by Robert D. and Jane C. Yates.

Dr. Donald Duncan, Research Scientist Ricardo Morales, and Joe A. Mascorro Research Associate, and graduate student Ross McClung recently presented papers at the Texas Academy of Science meeting in Nacogdoches.

Dr. Robert D. Yates has received partial funding from the NIH for the purchase of an electron microscope. The remaining funds will be provided by the university.

A recent lecturer to the Medical Branch campus and visitor to the Department of Anatomy was 1970 Nobel Prize Winner Dr. U. S. von Euler. He spoke on "Prostaglandins".

Dr. Lawrence Ross recently received a 2 year renewal of the NIH grant from the Dental Research Institute for approximately \$40,000.



## THE BOOK NOOK

We will, with each issue, maintain a list of currently used and available books, monographs, texts, and manuals dealing with the subject of electron microscopy.

The list included below is undoubtedly incomplete. However, with each issue, more will be added, and we will eventually catalog our list into Biological and Physical Sciences.

However, since our Newsletter staff essentially consists of one person, said "staff" must rely on the membership to submit additions to the list (not articles, please). Also, when new publications appear, we will ask someone to review selected ones for publication in the Newsletter, unless we find such voluntarily submitted to us.

INTRODUCTION TO ELECTRON MICROSCOPY - Saul Wischnitzer 1970  
Pergamon Press

MODERN DEVELOPMENTS IN ELECTRON MICROSCOPY - Benjamin M. Siegel  
1964 Academic Press

THE WORK OF THE ELECTRON MICROSCOPE - Ralph W.G. Wyckoff 1958  
Yale University Press

TECHNIQUES FOR ELECTRON MICROSCOPY - Desmond H. Kay Ed.  
2nd Ed. 1965 Oxford Press

INTRODUCTION TO ELECTRON MICROSCOPY - C. E. Hall 1966  
McGraw-Hill

ELECTRON OPTICS - B. Paszkowski 1968 Elsevier

ELECTRON MICROSCOPY OF CELLS AND TISSUES - Fritiof S. Sjöstrand  
1967 Vol I Academic Press.

HISTOLOGICAL TECHNIQUES FOR ELECTRON MICROSCOPY - Daniel C.  
Pease 1964 2nd Ed. Academic Press

SOME BIOLOGICAL TECHNIQUES IN ELECTRON MICROSCOPY -  
D. F. Parsons, Ed. 1970 Roswell Park Memorial Institute,  
Buffalo, New York

AN ATLAS OF FINE STRUCTURE OF THE CELL - Don W. Fawcett 1967  
W. B. Saunders Co.

ELECTRON MICROSCOPIC ANATOMY - Stanley M. Kurtz, Ed. 1964  
Academic Press

ELEKTRONENMIKROSKOPISCHE UNTERSUCHUNGS UND PRAPARATIONS-  
METHODEN - L. Reimer 2nd Ed. 1967 Spring Verlag.

CELLS AND TISSUES BY LIGHT AND ELECTRON MICROSCOPY -  
Edmund B. Sandborn Vol. I 1970 Academic Press

CELLS AND TISSUES BY LIGHT AND ELECTRON MICROSCOPY -  
Edmund B. Sandborn Vol. II 1970 Academic Press

AN ATLAS OF ULTRASTRUCTURE - Johannes A. G. Rhodin 1963  
W. B. Saunders Co.

ELECTRON MICROGRAPHS - BIOLOGY 2, E. Yamada, K. Fukai, and  
Y. Watanabe, Eds. 1966 (This publication accompanys HITACHI  
electron microscope)

THE ELECTRON MICROSCOPE IN MOLECULAR BIOLOGY - G. H. Haggis  
1966 Longmans

ELECTRON MICROSCOPY; A Handbook for Biologists - E. H. Mercer and  
M. S. C. Birbeck 2nd Ed. Oxford Press

ATLAS OF VERTEBRATE CELLS IN TISSUE CULTURE - G. Rose 1970  
Academic Press

ADVANCES IN OPTICAL AND ELECTRON MICROSCOPY - R. Barer and  
V. E. Cosslett, Eds. 1966 Academic Press

ELECTRON MICROSCOPY OF THIN CRYSTALS - P. B. Hirsch 1965  
Butterworth

LECTURES ON ELECTRON MICROSCOPY Robert W. Horne 1965  
Istituto superiore di sanita, Rome Italy.

ATLAS OF ELECTRON MICROSCOPY OF CLAY MINERALS AND THEIR  
ADMIXTURES - H. Beutelspacher and H. W. Van der Marel 1968  
Elsevier Publishing Co.

EXPLORING THE STRUCTURE OF MATTER - Jean - Jacques Trillat  
1959 Interscience Publishers Inc.

ELECTRON MICROSCOPY AND MICROANALYSIS OF METALS - J. A. Belk  
and A. L. Davies 1968 Elsevier Publishing Co.

ELECTRON FRACTOGRAPHY - ASTM Special Technical Publication No. 436  
1968 American Society for Testing and Materials

FUNDAMENTALS OF TRANSMISSION ELECTRON MICROSCOPY -  
R. D. Heidenreich 1964 Interscience

TRANSMISSION ELECTRON MICROSCOPY OF METALS - G. Thomas  
1962 Wiley

ELECTRON MICROGRAPHS OF LIMESTONES AND THEIR NANNOFOSSILS -  
A. G. Fischer, S. Honjo, R. E. Garrison 1967 Princeton

INSTRUMENT AND CHEMICAL ANALYSIS ASPECTS OF ELECTRON  
MICROANALYSIS AND MACROANALYSIS - H. A. Elion 1966  
Pergamon Press

## CORPORATE ITEMS

### NEWS RELEASE

#### A NEW FACE FOR LOCAL FIRM

Acromatics, Inc. is the new name for an Arlington microscope specialty firm. Acromatics, formerly ActinoRex of Texas, has also added additional related product lines.

Acromatics now acts as an agent for Polaroid Corporation. Polaroid's MP-3 laboratory unit has found unlimited applications in the scientific community. Acromatics also now stocks the Science & Mechanics Supersensitive light meter which is useful in photomicrography.

At its Arlington warehouse, the company stocks a complete line of microscopes for all applications including laboratory, research, stereoscopic-dissecting, dark field-bright field units, and many others.

For further information, please contact Acromatics, Inc., P. O. Box 5331, Arlington, Texas 76011.

LKB INSTRUMENTS is loyal as always to TSEM in resuming their corporate membership. Their technical representative now for those needing information on LKB instrumentation is Jon W. Morris at 2800 Valley View Drive, Dallas, Texas 75234. An Ultratome III has recently been installed in the M. D. Anderson Cell Biology Laboratory, EM Section, of Dr. B. R. Brinkley in Houston. As usual, this instrument is receiving use by numerous people and is highly productive. Those of us who have been LKB users over the many years know the reliability of LKB Instruments and we look forward to many continued years of mutually prosperous endeavors.

BALZERS HIGH VACUUM CORPORATION has recently forwarded information regarding their Micro-BA3 High Vacuum Coating Unit. The manufacturer indicates that this unit is designed to give maximum flexibility and can be used successfully for production of carbon coated supports; for replica formation used in electron microscopy; for freeze drying and subsequent production of replicas of biological specimens; and for cathodic etching of polished metal surfaces. Also, it is equally useful in the development of phase contrast on polished metal surfaces, for use in the general research laboratory and use in the preparation of mineralogical specimens for electron-probe investigations. The unit is mounted on a portable stand, which contains a high vacuum pumping unit, vacuum measuring equipment and the vacuum chamber as well. There is a control unit on the table below the chamber. This is a portable, self-contained unit for high vacuum coating which has a high degree of flexibility and can be used in a number of different applications in different laboratories probably within the same building or on the same floor. The vacuum pump is air cooled with the pump down time between 5 to 15 minutes, depending upon vacuum with an ultimate pressure with a cold trap of  $2 \times 10^{-6}$  Torr. For further information regarding this unit, write Balzers High Vacuum Corporation, Post Office Box 10316, Santa Anna, California 92711.

JEOLCO, a long and loyal corporate member of TSEM announces their JSM-S1 Scanning Microscope. This is a compact scanning microscope which is designed to bridge the gap between the optical microscope and the conventional electron microscope. It permits direct and stereoscopic observation of solid specimens. It now includes a wide range of useful magnification and a depth of field allowing the formation of in-focus images of very rough surfaces. The resolving power is a guaranteed  $250 \text{ \AA}$ . The magnification range is from  $\times 19$  -  $\times 100,000$ . Very low accelerating voltages, ie 4kV and 10kV are described as being advantageous. The instrument itself is small, easily located within a laboratory and the alignment is relatively simple. There is a built-in exposure meter and an automatic camera, plus automatic vacuum control. Jeolco also offers a larger JSM-U3 Scanning Electron Microscope, which can be equipped optionally with an X-ray spectrometer. This instrument has increased capabilities and contains many of the features described for the JSM-S1. For further information on these two exciting instruments, please contact JEOL.

Suite 1115, 1001 International Blvd., Atlanta, Georgia 30354.

CARL ZEISS Electron Microscope installations have been proceeding well in the Dallas-Arlington area. The laboratory of Jim Butler had a Zeiss EM-9 installed in January. This is in a new laboratory which utilizes the Porter Blum EM-2B microtome and Varian VE-10 vacuum evaporator. The EM-9 is intended for biological ultra-structural studies to support the graduate program at The University of Texas at Arlington and for faculty development in the department of biology. The laboratory consists of a five room suite centered around the Zeiss EM-9 and most of the work is being done on invertebrates. Jim describes the microscope as a "jewel".

Also, Zeiss has recently installed another EM-9 in the anatomy department at The University of Texas Southwestern Medical School under the directorship of Dr. Kastritsis. The microscope is performing well and currently is being used by Mrs. Mary Jo Harrod in her pre-doctoral work. This instrument was also installed in January. Congratulations to the two new Zeiss oriented laboratories.

#### NEW COMPACT

Kent-Cambridge Sci.

Scanning Electron Microscope: The Stereoscan 600 is a completely new scanning electron microscope. The compact all solid state design features accelerating voltages from 1.5 KV to 25 KV, guaranteed resolution of 250A, and unusual sampling versatility.

Operation is extremely simple with a fully automatic vacuum system, prealigned electron optics, and built-in TV display of images. The standard stage accepts large specimens of 50mm diameter. The range of accessories includes energy dispersive x-ray analysis.

The Stereoscan 600 is the first SEM to bring the full impact of good SEM performance within range of all budgets. Price - \$35,800. For further information contact Michael J. Orvis.

Brinkmann Instruments: Please ask for a copy of The Brinkman Notebook; a quarterly discussion for the biochemical analytical and clinical laboratory. Many accessories are available for an electron microscopy laboratory including Zeiss light microscopes. Contact Helmut Schares, Manager, Brinkmann Instruments, 3100 West Alabama, Houston, Texas.

AEI Sceintific Apparatus Inc. announce their new high performance compact microscope CORINTH 275. This is the first really new instrument for many years and was designed specifically to meet all the needs of the cell biologist in the best possible way. It is exceptionally easy to use, and is designed for a high throughput of work. The multiple specimen holder and 50 exposure camera are included to this end. The specimen tilt facilities operate at a better resolution than some much bigger instruments. The Corinth 275 has a full complement of lenses including full double condenser system so that the specimen is protected from damage. The very large viewing screen makes this instrument extremely comfortable for one operator and uniquely suitable for demonstration and training sessions. For more information write to: J. Leta, AEI



Scientific Apparatus Inc. , 647 S. Kingery Highway, Route 83,  
Elmhurst, Illinois 60126.

1970-1971 Corporate Membership:

Balzers High Vacuum Corporation

Jeolco

Harper & Row, Publishers

Brinkmann Instruments, Inc.

Polysciences, Inc.

Kent Cambridge Scientific, Inc.

Ivan Sorvall, Inc.

Carl Zeiss, Inc.

Ladd Research Industries, Inc.

Perkin-Elmer

LKB Instruments, Inc.

Aromatic, Inc.

## PLACEMENT SERVICE

### Positions Wanted

Electron microscope technician: medical technologist, 5 yrs. experience in all aspects of electron microscopy, female, German, permanent U.S. resident (Immigrant Visa), desires position in or near Houston. Available immediately. Reference #30.

Electron microscope technician: M.A., experienced female, U.S. citizen, Available immediately. Reference #32.

Electron microscope technician: B.S., experienced in histological preparation, thin sectioning, darkroom work, registered medical technologist, U.S. citizen. Available immediately. Reference #33.

Electron microscope technician: B.A., three years experience in electron microscopy of cells and tissues, female, U.S. citizen. Available June, 1971. Reference #34.

Electron microscope technician: Medical technologist, six years of experience in virology, neuropathology, enzyme histochemistry, supervision of electron microscope service lab, female, British subject, Canadian citizen, wishes to relocate in Houston-Gulf Coast area. Available immediately. Reference #37.

Research Associate or Assistant Professor: Ph.D. Rice University, 1971, Cell Biology - Electron Microscopy, excellent qualifications, U.S. citizen. Available immediately, Reference #31.

### Positions Available

Experienced E.M. technician: Experienced electron microscopist to maintain two Hitachi microscopes and do routine and specialized EM techniques. Must be expert with Ultramicrotome and darkroom procedures. Contact Dr. B. R. Brinkley, Section of Cell Biology, The University of Texas M.D. Anderson Hospital and Tumor Institute, Houston, Texas 77025, Phone 526-5411, Ext. 284.

E.M. Technician: Must have previous experience in electron microscopy, ultramicrotomy, tissue processing and embedding, but not necessarily in the operation of the electron microscope. Will train on the latter. Will take charge of a scanning electron microscope and learn the technique. Experience in darkroom technique helpful, but not necessary, Primary work will be on human scar tissue. Opportunity learn organ culture and associated techniques. Degree is not essential, Contact: Dr. C. Ward Kischer, Department of Anatomy, UTMB Galveston, Texas 77550 Phone 713-765-1809.

Technician: Some previous experience in electron microscopy helpful. Primary responsibilities are tissue processing, organ culture, and laboratory management. Experience in histological techniques a must. References are required. Contact: Dr. C. Ward Kischer, Department of Anatomy, U. T. M. B., Galveston, Texas 77550. Phone 713-765-1809.

Undergraduate Students - ATTENTION - SUMMER EMPLOYMENT!  
I have one and probably two positions open for undergraduate students during the summer. Must be reliable and desire to learn. Biology majors. Chemistry very helpful. Any previous experience in electron microscopy will be helpful. Opportunity to learn many new techniques, including tissue and organ culture, transmission electron microscopy and scanning electron microscopy. Will maintain animal colony and assist others in experiments. Apply: Dr. C. Ward Kischer, Department of Anatomy, U. T. M. B., Galveston, Texas 77550. Phone 765-1809.