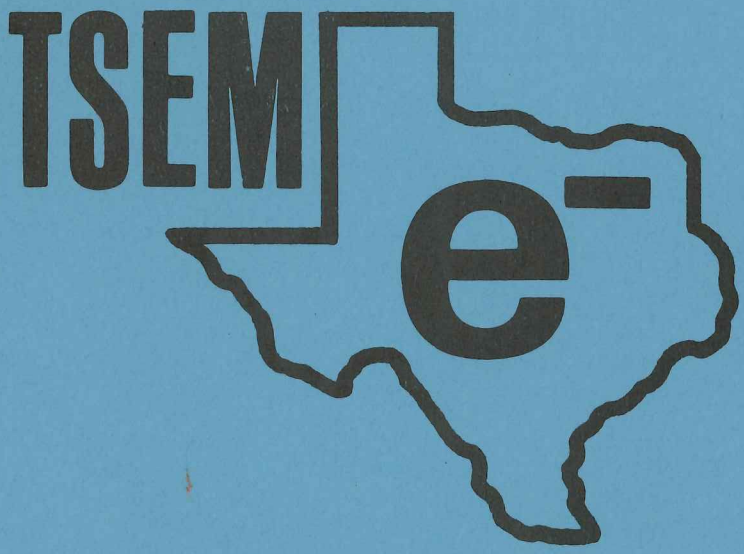

TEXAS SOCIETY FOR ELECTRON MICROSCOPY

TEXAS SOCIETY FOR ELECTRON MICROSCOPY

NEWSLETTER

Vol. 2 No. 4

Fall, 1971

Letters and Inquiries to:

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Editor, TSEM Newsletter
Department of Anatomy
UTMB
Galveston, Texas 77550

Current Membership Strength: 274 individuals
15 corporations

Editor's Note: The subject of the following editorial is hardly in keeping with the tradition of TSEM, that of promoting research through electron microscopy. But, there are just so many good things one can say about electron microscopes. At that point other subjects assume equal, if not more, importance. There are other common bonds which unite us, for example, the educational process, in which most of us are involved, and in which we all should be taking due and considered interest. So, I have decided to write about that subject hoping to strike responses from the membership, for or against. Either way I again invite you to let the Editor and Society know your views. They will be printed.

WHY THE LECTURE SYSTEM SHOULD BE ABOLISHED IN HIGHER EDUCATION

". . . There was nothing there now except a single commandment. It ran:

ALL ANIMALS ARE EQUAL
BUT SOME ANIMALS ARE MORE EQUAL THAN OTHERS

- George Orwell
Animal Farm

". . . it must be realized that the belief that some are more equal than others is completely false".

- Edward P. Morgan
Public Broadcast Laboratory 1968

When I first decided to write the following article, I thought, how am I going to impress the readers with the absurdities liable to be spawned from our present approach to teaching in the Colleges and Universities. To recount first hand knowledge of classes such as 200 in number throwing pennies and other coins at the lecturer, blowing duck calls, yelling out from the audience with spontaneous interruptions, drinking coffee, cokes, and eating during lecture, etc. might be rationalized far too easily. And then, quite fortuitously, at my school we entertained a visitor from a medical school in Venezuela. In his school they have a freshman class of approximately 600, the main body of which comprises the audience for the lectures. This past year the students have been on strike for nearly nine months, which automatically

sets them back a year academically, and thus adds that population onto an unknown number of students (there are no entrance requirements) for the new freshman class next academic year. No modifications have been made in the lecture system so that this "madness" as he called it could result in a lecture class of nearly 1200 students.

Now, with that kind of mechanics to an educational system it is time to reassess the goals of the educational process. It doesn't take 1200 students in a lecture hall, however, to prompt a reassessment of these goals. In our own country we have been moving toward a similar kind of madness, some institutions more rapidly than others, for some time.

Almost all of the so-called General courses in the biological sciences are presented in lecture to students numbering in the hundreds. And in the professional schools practically all of the basic courses are presented in lecture to entire classes. Unless one is more performer than teacher this kind of mob scene detracts from the teacher's efficiency as well as the student's learning ability.

One is no longer dealing with a class when the number mounts to three figures. And as it increases this "class" takes on more and more the characteristics of a mob. Mental discipline, often shown by attentiveness in class, breaks down amongst the students. If you doubt this, then just recall some of your own monstrous classes and a time in which you might have quipped a funny remark. I would wager more often than not, a quip shot back at you from somewhere in that murky sea of faces, and your better senses told you not to carry on a barroom repartee with that size of class.

Students are no more knowledgeable or aware (code word) today than their counterparts were decades ago; but, they are bolder, and it seems their boldness increases exponentially as they find themselves mired in greater and greater populations, especially as controls are reduced.

The college lecture, as originally conceived, had valid merit, and still does, if delivered properly. I advocate its abolition more on the basis of what college administrators have done to it. And what they have done is to pour more and more bodies into it.

The lecture is designed (or should be) to especially stimulate, to bring perspective of the subject to the student which the latter then uses to formulate continuing inquiries. It should strike at the heart of the student's enthusiasm in a personal way. This becomes far easier, if not the only way possible, when the lecturer is able to study the reaction of each individual face and to anticipate the degree and kind of receptiveness by each student. The lecture should be used sparingly and especially by guests who might be reknowned and otherwise unavailable to individual students.

Now, obviously, the lecture reaches more students at one time and avoids repetitions. But, license has been taken with this purpose and the real merits of the lecture have become compromised. The lecture system is part of almost every course in a college curriculum, and many courses are delivered through lecture alone. In many colleges, graduate students are lumped together with undergraduates taking the same course. The lecture system has been increasingly victimized by the crush of population in the nation's colleges and universities.

A recent "Report on Higher Education" released by the HEW describes our present system as "becoming increasingly homogenized and monolithic . . . The group found . . . growing bureaucracies which are standardizing education, stifling innovation and removing decision-making. . . . Comprehensive community colleges cannot remedy the situation. They are getting bigger, blander and serve a number of interests other than that of their own students. . ." Other complaints voiced in the report include the academic lockstep and the anonymity and segregation from the adult

world of students on large campuses.

I submit that one of the most profound evidences of the above criticisms can readily be found in the present-day lecture system!

The report includes the following comment: "it is important to design conditions under which people can find their own answers"!

Allan Cattrer, Chancellor of New York University, writes in The American Scientist, "many so-called malcontents are bored and frustrated with the standard college pattern; they need to learn more than we can teach them in the formal classroom setting and they need a different kind of stimulus than our college reward system provides. . ."

Now, Dr. Cattrer was not talking specifically about the lecture system, but it should be obvious that the above accurately describes an overstuffed classroom designed to satisfy the major delivery of a course.

What are some of the reasons why a situation has developed in which student populations have devitalized the lecture system? First, our post-war accelerated affluence in this country fostered the notion that every mother's son should have a college degree. Nobody was looking for a niche; they were all looking for the rainbow's end. And the path led directly through college, because no one was going to be just a mechanic, or sheet metal worker, or farmer. This idea has already given rise to other silly notions, as tornadoes spawn off of hurricanes, that the only persons not in college now are the underpriveleged or minority groups. The conclusion from that notion is that it is reason enough to shove them into a college classroom. In addition to that, another grotesque feature of this simplistic overview is that the ill-prepared should still be stuffed into college and be given remedial course work.

True, as our population has increased more capable youngsters sought higher education. As they swelled enrollments a system was devised to

equate the financial support between big and little institutions. Legislatures established financial support based on the number of students at a given level of course multiplied by the number of credit hours for that course. What is more, for graduate courses the rate of subsidy increases as the number of course level increases.

As usual, such systems eventually become compromised and this one has led to a padding of student numbers, a reduction of admission standards, lowered attrition rates, untrained and unfinished products, and a recruitment program which compliments the "college for all" idea. Administrators have taken advantage of this kind of financial dependency thereby enlarged lecture attendance without keeping building and faculty numbers apace. If, as Chancellor Cattrer states, it is "more difficult for legislatures to rationalize a 5% salary increase for teachers to meet inflation" then it must be impossible for them to support increases in budgets to reduce the student teacher:ratio. And administrators have acquiesced to this idea, most likely because they don't really believe in the effectiveness of a lowered ratio. Our immediate task, then, is to make more obvious to administrators and legislators the benefits of a lowered ratio.

Sanford's compendium, The American College, records faculty and students alike favor smaller classes.

In place of the present lecture system I propose an interaction method coupling: laboratory-lecture-discussion and conference. One of the most appalling features to the higher educational experience is lack of laboratory experience in some courses, and in those with laboratory the inclusion of surrogate instructors in the form of novice graduate students or even undergraduates.

My particular graduate curriculum included laboratory in virtually every course. And I complained about this consistently because like the

majority

majority of students I wanted something a little easier. But how I value that experience now! That is where the real learning takes place, by doing, participating, and having the lab instructor available for consultaion and discussion.

I recall that as long ago as the early '50s curricula "experts" were converting laboratory experience to demonstrations claiming the latter were as effective as the former in learning effectiveness. This might be true for a few gifted students but for the vast majority of them it is sheer nonsense.

Dr. Karl Menninger claims, "students don't have enough to do. They have run out of faith because the opportunity for physical work has been taken away from them. Physical work teaches you to appreciate life. It teaches you compassion and gives you something to love. Yet, we have built machines to do the work that people used to do. This gives young people a freedom that is constantly crippling them".

Now apply the above description to our lecture mode of education and you see why it becomes easy for 200 or more students herded into lecture halls to become restive and begin challenging the "relevancy" (code word) of their course.

One can neatly follow the evolution of our educational process from the death of McGuffey's readers, the three Rs and spelldowns, to televised lectures before hundreds of students. Coupled with this has been a decreasing student usage of the library, the one indespensable span supporting the institution as a whole.

To implement the "module system of higher education teachers must first realize that the essence of teaching is guidance, so that the student may educate himself. That is to say that the essence of education is personal experience, involvment, hard work, anything else you wish to call it. The point is the student must do it himself. An effective way to do

...

this is to involve the student with an in-class (or laboratory) production project. In other words give him an assignment which compels him to perform in class while the instructor observes, assists, discusses, or lectures upon any facet to the problem. The two important aspects to this system are 1) work actually performed by the student and 2) the availability of the instructor for immediate consultation or discussion relative to the problem. Most of the "lecture" material can be obtained by outside reading and library work by the student.

Funding for improvement of the student:teacher ratio may bring about immediate hysteria from administrators, particularly if they see fleeting from their grasp hundreds of thousands of dollars used to renovate administrative offices including the equipping of said offices with antique furniture. Legislators and administrators for the past 20 years have been pouring billions of dollars into schema (which somehow included new offices) for expected improvements in education, for example, for the non-college groups from 5.8 billion in 1950 to 32 billion in 1970. This rise has far outdistanced the rate of increase of enrollment or rise in inflation during that period. Just think of what the increase has been at the higher levels! And what have we got for it? One of the lowest hard figure illiteracy rates in the world! We also have a burgeoning marketplace full of Ph.D.s with nowhere to go, which sharply demonstrates our insistency for input with little or no planning for the finished products.

Where are all the qualified faculty going to come from to effectively lower the student:teacher ratio? Need one look further than the overstuffed market we have with us right now? Do we have enough in the market to go around with the proper qualifications, training and background so that student numbers may be sectioned to a level of say 25 per instructor or less? The answer is an unqualified yes. Don't forget teaching is about 90% guidance and 10% inspiration. D. B. Rinsley said it: "A good teacher,

regardless of his subject, catalyzed the student's self-discovery, and the joy of the ding an sich, -the thing in itself. The great teacher goes farther; in his unique way, he legitimizes for his gifted students the myriad awe-inspiring experiences from which new creative possibilities and combinations spring forth".

I submit that one is far more able to effect these goals in a more personal intimate interaction with the student. I further submit that unless we act soon to overhaul the present system and come to some hard decision about how the products of our educational system will affect the evolution of our society, that we may well end up on a one-way street as a course for that evolution. We are building a population of people who in their affluence fail to see the need to work. Therefore, they won't. In academia we herd the students into giant lecture halls and spoon feed them in colored chalk with exactly what they must know to get through. The personalization, the craftsmanship, if you will, the continuing aspect of their education is being lost.

In heightening the dependency so many students experience from this grotesque giant-lecture experience we may well be establishing what Buchanan has called the "Samaritan Dilemma" -modern affluent man quite willing to allow for the existence of parasites, those who feed upon him without contributing to his well-being. This is essentially what the student class has already become, and it is also what the post-student class may become during the 1970s".

Ward Kischer
Editor

PRESIDENT'S MESSAGE

The Texas Society for Electron Microscopy was founded almost a decade ago by a group of enthusiastic microscopists dedicated to promoting the results of fine structural research throughout the Southwest. Last year at the spring meeting of the Society in San Antonio certificates were awarded to that group and remarkably 90% of the persons were in attendance. This display of continued interest and participation is perhaps the major reason why our group is considered to be among the strongest state organizations in the country. For the past 3 years we have consistently attracted 100 persons to each of our triannual meetings. As your President I am dedicated to increasing the number of participants with the hope that in the future over 200 will attend.

In recent years when traveling over the country I have been impressed with the reputation of our group. I encourage each of you in your travels to promote our organization by informing individuals of our activities and purposes and then our reputation will continue to grow until we are THE strongest and largest state society in the nation.

This year for the first time we will hold a joint meeting with the Louisiana Society. Dr. Mel Hess at LSU states that 25-30 members of LSEM will attend the meeting which is to be held in Fort Worth in February. It is an ideal opportunity for us to show our Louisiana colleagues how successful our meetings can be as well as to demonstrate true TEXAS hospitality. I ask you to mark your calendars and plan to attend the Fort Worth TLSEM meeting in early February.

It is difficult to single out individuals who have contributed most significantly to the Society and so I shall limit my comments and

appreciation to persons involved in this years activities. Drs. Jeff Chang Bill Brinkley and Joe Wood who have made the Houston meeting a success-- again, we have attracted the leading microscopists in the country -; Dr. Ernest Couch who will serve as local arrangements chairman for the TLSEM meeting in Fort Worth; Dr. Ward Kischer, our Newsletter Editor; Dr. Dimitrij Lang, Vice-President; Dr. Jeff Chang, Program Chairman; Katy Jo Miller, Secretary and Joe A. Mascorro, Treasurer; I speak in behalf of the entire Society in expressing our appreciation to this outstanding executive committee.

Robert D. Yates, President
Texas Society for Electron Microscopy

A FEW WORDS ABOUT
ULTRACYTOCHEMISTRY

Ultracytochemistry is an extension of optic observation of the chemical constituents of tissues and cells to the level of electron microscopy with an ultimate goal of attaining better understanding of the dynamic organization of cells and tissues in terms of their structure, composition and function. While histological and ultrastructural preparations demonstrate the morphological characteristics, ultracytochemical procedures permit the identification and localization of specific classes of chemical substances within individual cells or cell organelles. As a result, dynamic processes and vital phenomenon may be studied and elucidated. For example, the synthesis of glycoproteins in the Golgi apparatus has been beautifully demonstrated by the use of E. M. autoradiographic techniques. Also, numerous ultracytochemical investigations have been published elucidating the dynamic processes of the synthesis, separation, transportation, packaging, storing, secretion, etc. of chemical substances in various types of cells. Therefore, ultracytochemistry contributed significantly to certain recent advances in the science of cell biology.

Ultracytochemistry is in the early stages of development. Many of the methods have not been sufficiently established for routine application. This is because only a few cytochemical techniques satisfy the rigid requirements for successful demonstration of ultracytochemical reactions. These requirements are: (1) Generating a reaction product which is specific, stable, insoluble, electron dense and of fine precipitation; (2) preservation of good cellular morphology; (3) precise localization. Feasible techniques which fulfill these requirements are difficult to devise and execute because of the complex chemical nature in any biological system. Therefore, during tissue preparation and the subsequent performance of ultracytochemical tests, errors may be introduced by diffusion, solution, absorption, adsorption, translocation, denaturation, inhibition,, nonspecific chemical reaction, etc. which produce undesirable or serious artifacts. These difficulties become greatly amplified in performing enzyme cytochemistry because of its involvement in critical balance during fixation (inhibition of enzymes) and incubation (destruction of morphology). Despite all the limitations, ultracytochemistry has made great strides in the past two decades as evidenced by numerous publications in this field and the excellent collection of micrographs in this newsletter submitted by members of TSEM. Congratulations!

It has been recognized that the results of histochemical or ultracytochemical determinations tend to be descriptive and qualitative. Meaningful interpretations of these results should be supported by chemical analysis. Therefore, ultracytochemical (or histocytochemical) and biochemical determinations are complimentary. One without the other decreases the value of both.

In the future, advancement of ultracytochemistry will follow two natural courses: (1) Development of the new techniques and the improvement of the existing techniques. (2) Extension of ultracytochemistry to electron probe x-ray analysis. The latter will be of special importance because electron probe analysés will offer quantitation to ultracytochemical determinations which, in turn would extend electron probe analysis to the molécular level.

Jeffrey P. Chang, Ph.D.
M. D. Anderson Hospital

CYTOCHEMISTRY IN ELECTRON MICROSCOPY

Credits and Descriptions

1. Ruthenium Red staining of amorphous material in the T-system and in the terminal sacs of the sarcoplasmic reticulum in extraoccular muscle. 28,000 X. Ann Goldstein, Baylor College of Medicine.

2. Thorium dioxide localization in sarcoplasmic reticulum in extra-occular muscle. 28,000 X. Ann Goldstein, Baylor College of Medicine.

3. Carbonic anhydrase activity outer surface of mitochondria in parietal cell. 21,000 X. Bill Winborn, University of Texas Medical School, San Antonio.

4. Sodium ions along intracellular canalicular surface of parietal cell. 30,000 X. Bill Winborn, University of Texas Medical School, San Antonio.

5. Cationic micelles of thorium dioxide over droplets of acidic glyco-protein in mucus secreting cell. 20,000 X. C. W. Philpot, Rice University.

6. Tubular invaginations of cell surface filled with electron opaque "tracer-substance" a complex derivative of lanthanum hydroxide. Uniform array of surface-associated particles, 25 A in diameter. 210.000 X. C. W. Philpot, Rice University.

7. Surface coat of nucleated red blood cells demonstrated by prior treatment of cells with cationic ruthenium red. 18,500. C. W. Philpot, Rice University.

8. Strongly polyanionic nature of epithelial cell glycocalyx by thorium dioxide on pavement cell of teleost branchial epithelium. 25,000 X. Karl Karnaky, Jr., Rice University.

9. Silver deposits in canaliculi, lacunar spaces and in matrix of dense cortical bone. Osteocyte appears inactive in this location and this is the usual finding in the dense areas of bone. 4,600 X. R. A . Turner and J. C. Stinson, Scott-White Hospital, Temple, Texas.

10. Acid Phosphatase in cytoplasm of tumor cell, metastatic, of prostate origin. Modified Gomori technique. 7,500 X. T. H. Capers, Veterans Administration Hospital, Dallas, Texas.

11. Thorotrast localization along bile canaliculi of rat liver 3 days after administration illustrating a route of excretion. 18,000 X. Carl F. Tessmer, M. D. Anderson Hospital, Houston, Texas.

12. ATPase localization in urinary bladder of toad. 2,200 X. Robert Laird and R. D. Yates, University of Texas Medical Branch, Galveston, Texas.

13. Acetyl cholinesterase in cisternae of rough endoplasmic reticulum in motor neuron of cat. 3,000 X. R. D. and J. C. Yates, University of Texas Medical Branch, Galveston.

14. Acetyl CoA carboxylase on endoplasmic reticulum in liver parenchymal cell. 40,000 X. R. D. Yates and J. A. Mascorro, University of Texas Medical Branch, Galveston.

15. Acid phosphatase in Golgi complex of Sertoli cell of human testis 15 minutes post 200 gammas X-irradiation. 13,500 X. Steven S. Barham, Texas Tech. University, Lubbock.

16. Thiamine pyrophosphatase in Golgi complex of primary spermatocyte 24 days post exposure to 20 gammas X-irradiation in human testis. 8,500 X. Randolph Brackeen, Texas Tech. University, Lubbock.

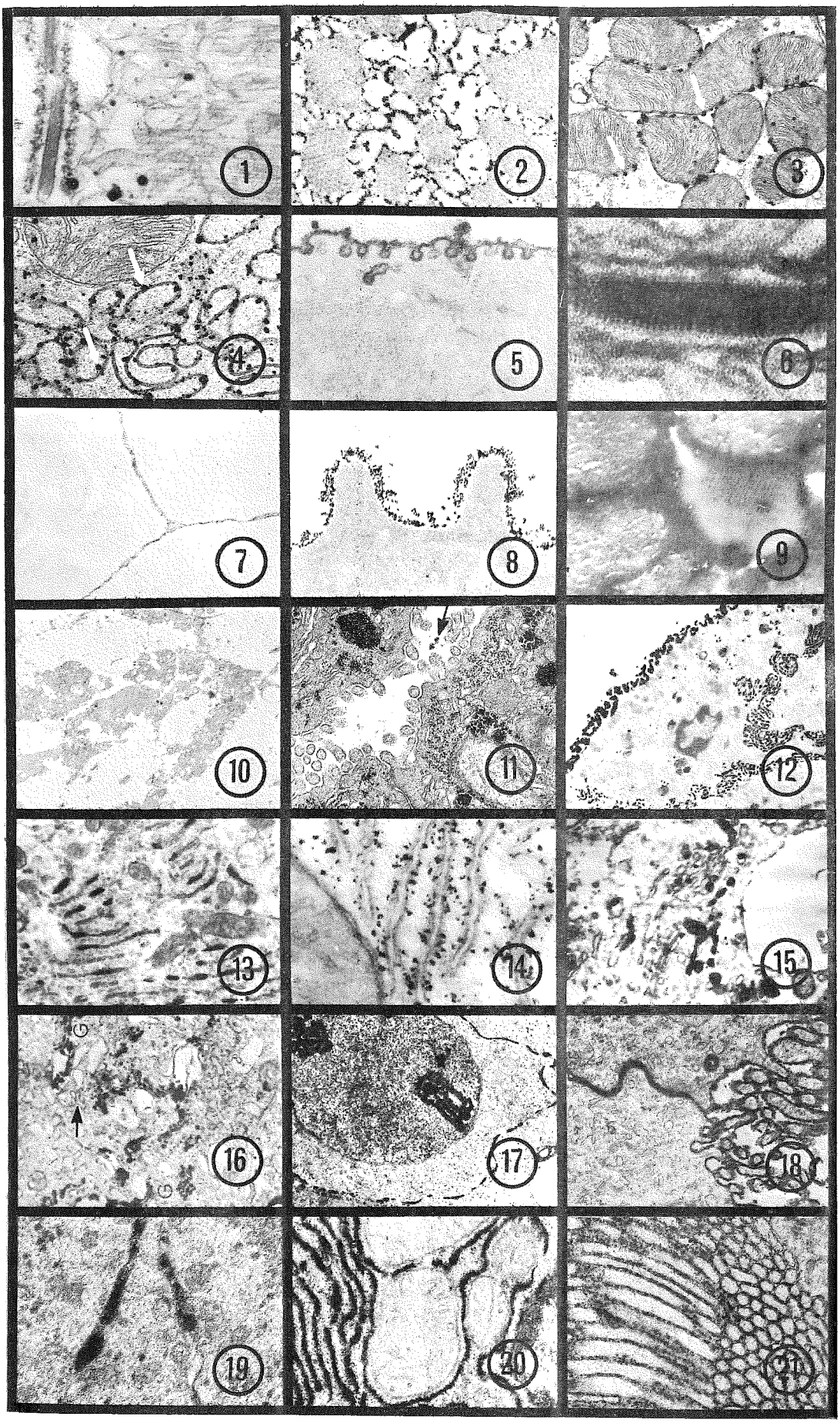
17. ATPase in plasma membrane of type A pale spermatogonium of control human testis. 2,000 X. John J. Vollet, III, Texas Tech. University, Lubbock.

18. Horseradish peroxidase on epithelial cells of epididymus in Chineese hamster. 20,000 X. M. Yokoyama and J.P. Chang, M. D. Anderson Hospital, Houston.

19. Thiamine pyrophosphatase in Golgi apparatus in a metaphase regenerating liver cell of rat. 20,000 X. T. Saito and J. P. Chang, M. D. Anderson Hospital, Houston.

20. Glucose 6-phosphatase on nuclear membrane and endoplasmic reticulum of liver. 28,000 X. J. P. Chang, M. D. Anderson, Houston.

21. Alkaline phosphatase on microvilli in kidney. 21,000 X. J. P. Chang, M. D. Anderson Hospital, Houston, Texas.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THE BOOK NOOK

INTRODUCTION TO ELECTRON MICROSCOPY - Saul Wischnitzer 1970, Pergamon Press

MODERN DEVELOPMENTS IN ELECTRON MICROSCOPY - Benjamin M. Siegal 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 Edition 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 PRAPARATIONSMETHODEN - 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
Instituto 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. Blek 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

AREA NEWS

HOUSTON

Baylor Medical School, Division of Myocardial Biology:

Dr. Ann Goldstein has received a grant from the American Heart Association in the amount of $3,500. She will study changes in Z band structure and calcium distribution in a model for aortic stenosis in rabbit hearts.

A nitrogen burst system has been installed in the laboratory darkroom.

Baylor Medical School, Department of Microbiology:

Dr. Heather D. Mayor has transferred from the Department of Virology to Microbiology where she is in charge of the Siemen's Electron Microscope. Dr. Sam Black has gone to Michigan State University. Mrs. Liane S. Jordan has also transferred to microbiology with Dr. Mayor.

University of Texas Medical School:

New member to TSEM--Robert Bruce Szamier has joined the faculty in the Program of Neurostructure and Function as Assistant Professor. He formerly was a PD Fellow under Drs. Pappas and Bennett at Albert Einstein College of Medicine.

M. D. Anderson Hospital:

Dr. Norman Granholm, post-doctoral fellow in Dr. Brinkley's laboratory, accepted a position as Research Associate in the Department of Pathology at the University of Texas Medical Branch at Galveston. He will supervise the EM laboratory in that department and continue his studies of mitosis and chromosome movement.

Recent papers published from Dr. Brinkley's laboratory:

Brinkley, B.R. and Cartwright, Joiner, Jr. Ultrastructural Analysis of Mitotic Spindle Elongation in Mammalian Cells In Vitro: Direct Microtubule Counts. The Journal of Cell Biology 50:416-431, 1971.

Rattner, J. B. and Brinkley, B. R. Ultrastructure of Mammalian Spermiogenesis. II. Elimination of the Nuclear Membrane. The Jouranl of Ultrastructure Research 36(1-2)L1-7, 1971.

Hsu, T. C., Cooper, J.E.K., Mace, M. L., Jr., and Brinkley, B. R. Arrangement of Centromeres in Mouse Cells. Chromosoma 34:73-81, 1971.

Texas Children's Hospital, Department of Pathology:

The Department of Pathology is now operating a Zeiss 9S2 electron microscope in the completed electron microscopy laboratory. Mr. C.W. Lewis assumed the duties as Chief Electron Microscopist in January, and worked toward the completion of the laboratory with the assistance of Miss Kay Nevels.

Two medical students from Baylor College of Medicine are receiving training in electron microscopic technics in the laboratory.

The laboratory will facilitate the investigations and diagnosis of liver and kidney lesions in childhood. Metabolic, pulmonary, gastrointestinal, and neoplastic diseases of infants and children are also under study.

St. Luke's Episcopal Hospital, Department of Pathology:

The electron microscope laboratory of Dr. Carl J. Lind, Jr. in the Department of Pathology at St. Luke's Episcopal Hospital is nearing completion. A Siemen's electron microscope 101 is being installed and the department is looking forward to using it for implementing patient diagnosis and for resea rch projects.

Rice University, Department of Biology:

Dr. Charles W. Philpott recently gave a paper for the SATELLITE SYMPOSIUM, of the International Endocrinology Meetings, Studies on Na^{+}-K^{+} ATPase. It was held at the University of British Columbia, Vancouver, B.C., June 10, 1971. It was "Comparative cytological studies on transport epithelia". It involved research done by Dr. C.W. Philpott, Dr. S. Ernst, Dr. Paul Quinton, Dr. K. Karnaky, Dr. L. Dendy, and Dr. B. Martin.

Students awarded Ph.D. degrees in May, 1971: Drs. Peter C. Moller, and Paul M. Quinton. Dr. Paul M. Quinton will do a Postdoctoral fellowship with Dr. John M. Tormey, Department of Physiology, Medical Center U.C.L.A., Los Angeles, California.

Lectures Given: Dr. Peter C. Moller presented "The Pharyneal Circulatory system of Amphioxus: Fine Structure and Cytochemistry of the vascular system in a Cephalochordate. This paper was presented at: Division of Biological and Medical Sciences, Brown University, Providence, R.I., and Department of Pathology, Medical University of South Carolina, Charleston, S.C.

Dr. Pete Moller moved to Providence, Rhode Island at the end of the summer. He will begin a postdoctoral fellowship with Dr. Richard Ellis in the Division of Biological and Medical Sciences, Brown University. Karl Karnaky, Jr. recently gave an Anatomy Seminar at the Medical University of South Carolina, Charleston, South Carolina. Mr. Karnaky was the guest of Dr. Bill J. Martin, a recent graduate of Dr. Philpott's laboratory. Dr. Martin begins his second year as Research Associate in Experimental Pa thology at the Medical University. He is presently a member of Dr. Sam Spicer's research group. Dr. Stephen Ernst, former Research Associate in Dr Philpott's laboratory, begins his first year as Assistant Professor in the Department of A natomy, Temple University School of Medicine, Philadelphia, Penn. Dr. Ernst recently had two papers accepted for publication by J. Histochem. and Cytochem. Titles: Transport ATPase Cytochemistry: Part I. Biochemical characterization of a cytochemical medium for the ultrastructural localization of ouabain-sensitive, potassium-dependent, phosphatase activity in the avian salt gland. Part II. Cytochemical localization of ouabain-sensitive, potassium-dependent, phosphatase activity in the secretory epithelium of the avian salt gland.

SAN ANTONIO

University of Texas Medical School, Department of Anatomy:

Dr. Vick Williams has just received a 3 year grant from NINDS for studies on "Ultrastructural Aspects of Injured Cerebral Cortex".

The department entertained this past summer Prof. Dr. Saburo Tayama, President of Miyazaki University, Miyazaki City, Japan.

An Advanced osmometer has recently been installed in the EM laboratory.

Papers accepted for publication:

Singer, E. L., L.L. Seelig, Jr., and E. G. Rennels, "Effects of Dehydroepiandrasterone and Cyanoketone on Ovarian Weight, Cholesterol Content and Ultrastructure in PMS-HCG Treated, Immature Rats", accepted for Endocrinology.

Shiiho, M., M.G. Williams and E. G. Rennels, "Ultrastructural Observation of Pituitary Release of Prolactin in the Rat by Suckling Stimulus", accepted for Endocrinology.

DENTON

North Texas State University, Department of Biology:

Two demonstrations will be presented at the upcoming meeting in New Orleans of the American Society for Cell Biology:

Quantitative Distribution of Nucleoprotein of Dividing Cells as Revealed by Ultraviolet Microspectrophotometry, T.D. Rogers, S. L. Kimzey, and V.E. Scholes.

Synthesis of Ergastic Material in Pine Tissue Cultures, P.S. Baur, C.H. Walkinshaw, V.E. Scholes, and S. Venketesweren.

Two post doctoral students, Dr. Paul S. Baur and Dr. Tom Croley are presently working on a NASA contract examining the effect of Lunar material on plants. Dr. Scholes is the contractor with Dr. Charles Walkinshaw contract monitor.

DALLAS

University of Texas:

Dr. Dimitrij Lang has received a 5 year continuation of his Research Career Development award from NIH. He also has just received a 2 year research grant from the NSF.

Baylor Dental School, Department of Anatomy:

Dr. Les Matthews reports that his and Dr. Jim Martin's (Dept. of Pathology) book, "Atlas of Human Histology and Ultrastructure", Lea and Feberger, is out.

BORGER

J. M. Huber Corporation:

Dr. Peter Marsh attended the recent EMSA meeting in Boston where he presented a paper on "Recent Studies of the Fine Structure of Carbon Blacks".

Another paper by Dr. Marsh has been accepted by the 'Carbon' journal, "Quantitative Micrography of Carbon Black Microstructure".

TEMPLE

Scott and White Clinic, Pathology:

Welcome to new member Lonnie Shephard. Bob Turner reports that the EM lab is currently handling 6 to 8 biopsies per week and offers a 25-36 hour service from patient to prints. Oh well! There's no rest for the wicked! eh Bob?

GALVESTON

University of Texas Medical Branch, Department of Anatomy:

Dr. Robert Yates is expecting delivery in his laboratory, at any time of a Phillip's EM-300, which will be used in his research.

Dr. Richard Peterson, who recently joined Dr. Joe Wood's section of Neurobiology in Houston, presented a seminar on Electron Microscopy of Myelin.

On 22nd November Prof. Dr. Edwardo DeRobertis, Buenos Aires, Argentina will lecture to the cell biology class on synaptic membranes.

Dr. Richard Coggesball joined the Department of Anatomy and Marine Biomedical Institute this past summer. His chief research interest involves ultrastructural studies of ganglia in aplysia. He also expects delivery soon of a new Phillip's EM-300.

Dr. Ward Kischer has been appointed Director of The Electron Microscope Laboratory, Shriner's Burns Institute and has just installed a Kent-Cambridge Stereoscan 600. It will be used for studies of hypertrophic scarring in burned patients.

Working with Dr. Kischer this past summer was Franklin Bailey, who now is on leave in the Army, but will rejoin the laboratory this spring. Also new in the laboratory is Joyce Talas, recent Master's graduate from Dr. Hoage's lab at Sam Houston State University, and Carol Jeffries who was previously at Penn State University.

LUBBOCK

Texas Tech University, Department of Biology:

Steven S. Barham has just become a member of TSEM.

Atlanta, Georgia

Emory University, Dept. of Anatomy:

Dr. Claudia Crow, previously with Baylor Medical in Houston, Myocardial Biology, has moved to this institution. She has acquired a fully equipped E.M. laboratory with an RCA EMU 3D.

The Academic Marketplace Revisited

Last issue's editorial was written prior to the appearance of 3 timely articles which appeared in Science (9 April, 172:132-140; 30 July, 173:399-405; 27 August, 173:784-793). I don't claim to be prophetic, but that the Ph. D. manpower situation is a contemporary problem which needs a planned for equitable solution. The upshot of these three articles is that the current oversupply is not, repeat NOT, a transient thing. Therefore, as Terman (30 July) points out, "This is not a time to complain about present difficulties; it is, rather the time to seek out new opportunities and to make the most of them".

I am suggesting that we alter our approach to educating the student which will recover many of the excess doctorates. It is High Time the Professional members of TSEM take an active interest in this problem. I expect your views to appear in the next issue!

Stock Replenisher

TSEM welcomes the following new members for 1971-1972:

Ronald D. Arneson - Texas A & M
Janet Aune - Texas Woman's University
Dennis Balsam - Southwestern Medical School
Steven S. Barham - Texas Tech
Thomas J. Baum - 125 W. Main St., Humble, Texas 77338
George E. Bridges - Tarrant County Junior College
Clinton L. Burns - SMU
Linda Burns - NASA
Sonya Cardenas - Univ. of Tex. Med. Branch at Galveston
James Carnes - North Texas State
Janice Carnes - L. D. Bell High School, Hurst, Texas
Hou-Chi Dung - Univ of Texas Medical School at San Antonio
C. A. Gleiser - Texas A &M University
Norman Granholm - Univ. of Texas Medical Branch at Galveston
Henry T. Grinvalsky - U.S. Air Force - San Antonio, Texas (Wilford Hall Hosp.)
Stevonne Gully - Southwestern Medical School
Noel M. Hall, Jr. - SMU
John E. Harris - Texas A&M University
Katherine K. Ingram - Baylor University
William N. Jacobs - 1605 Glenville Dr., Garland, Texas
Allen L. Kasten - 909 W. Virginia St., McKinney, Texas
Lyle C. Kuhnley - Texas Tech
Poon-Ming Lam - TCU
Albert Leibovitz - Scott & White Clinic, Temple, Texas
Benjamin Lichtiger - M. D. Anderson Hospital
Bill McCombs - Texas Tech University
A.J. Mia - Bishop College
Madison Reed - ANDRECO CORP., Houston, Texas
Harley W. Reno - Baylor University
Martha Richardson - North Texas State University
Gabriel Seman - M.D. Anderson Hospital
Theodore E. Staley - Oklahoma State University
John E. Ubelaker - SMU
U. Grant Whitehouse - Texas A&M University
Neil W. Williams - M. D. Anderson Hospital
Jay M. Willis -
S. Venketeswaren - University of Houston
Robert B. Szamier - University of Texas Medical School at Houston

Technique Hints For Investigators

-----From Bob Turner and J. C. Stinson at Scott-White Clinic in Temple comes the following:

> When one has a large piece of tissue with few and scattered abnormal areas that would be interesting for electron microscopy, isolating this location is difficult. In this laboratory frozen sections (about 15 - 20 microns) are stained and the area of interest is dissected out. The tissue is kept wet and a dissection is performed with needles on the slide under the low power of the microscope. The desired specimen is sucked into a capillary pipette and from this point is processed as any other tissue for electron microscopy. This section of tissue usually sinks during polymerization in the plastic and can then be thin sectioned in the usual manner.

-----Ann Goldstein at Baylor Medical reports that the hot uranyl acetate staining (Journal of Cell Biology, Vol. 50:557-561, 1971) works!! If you have not yet read this exciting article, do so. It is contamination free.

Miscellaneous For Sale

J. B. Ruffin has recently come across a customer, Dr. W. H. Zucker, Department of Pathology, University of North Carolina, Chapel Hill, North Carolina (Telephone 919/966-4510), who is interested in selling for a nominal price an RCA 3F Electron Microscope. Actually, the microscope is a 3B, which has been updated to the 3F version. This microscope is approximately 10 years old and Dr. Zucker is interested in selling it for a price which is probably somewhere under $4000 to $5000.

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Ernest F. Fullam Inc. is a supplier of a wide range of laboratory tested accessories and supplies for electron microscopy. All EFFA* designated products have been designed for use in their own consulting laboratory which encompasses Transmission Electron Microscopy, Scanning Electron Microscopy, Light Microscopy, Electron Probe, X-ray Diffraction and Spectroscopy. Some of these innovative accessories include a line of centrifuge cells where the suspensions may be deposited directly onto a carbon coated grid or into BEEM type capsules. Special substages for scanning electron microscopes are custom designed for specific purposes with a wide line of these holders offered as stock items. Ernest F. Fullam, Inc. features a custom drilling service for apertures and do fluorescent screen recoating.

Carl Zeiss, Inc.

Carl Zeiss, Inc. has just opened a branch office at 3131 West Alabama in Houston. Although we have had sales representatives in Houston and Dallas for several years, with the addition of the branch office and service representatives, we will now be able to provide local service.

Polysciences, Inc.

Data sheets have been issued for the following items: 1) Ion Exchange Membranes, manufactured by Ionac Chemical Company, specific for either cations or anions; 2) X-TRACT A-100, a new ion exchange resin for the removal of inhibitors from acrylic monomers; 3) Rapid/Mount, a new acrylic embedding medium for metallographic work; 4) Tetrazolium Salts which have numerous uses in the fields of histology, electron microscopy, pathology, biochemistry, microbiology and many others; and 5) Quinacrine Mustard, recently shown to be a very effective fluorescent labeling agent for chromosomal DNA. For further information, please write Polysciences, Inc., Paul Valley Industrial Park, Warrington, Pa. 18976.

* Trade Mark

Ladd Research Industries, Inc.

We offer a complete line of filaments for electron microscopic work. Our filaments are made with tight control over the height so that very little adjustment of the Wehnelt cap is required. Our re-designed filaments are fired under high vacuum to relieve stresses so that once aligned the filament will not shift. Long life is normal.

Our pointed filaments of crystal oriented tungsten wire are micro-welded under an inert gas and are then fired under vacuum to eliminate stresses. This permits the microscopist to center the filament point in the electron microscope gun with assurance, knowing it will not shift when heated.

PLACEMENT SERVICE

Positions Wanted:

Beginning EM Technician with brief training in all techniques of EM. B.S. degree from Rice University. Desires employment in the Austin area. Available immediately. Reference # 20.

Electrical Engineer with EM experience. B. S. degree in Electrical Engineering from Texas A&M. Desires position in EM laboratory with medical environment. Phone 866-3562, College Station, Texas. Reference #21.

Technician. Truett King, 6801 Poppy Road, Little Rock, Ark. LO 2-6032 has 3 years experience in all phases of EM, 3 years of college in Biology. Salary $10,500 up.

EM Trainee. Ann Whiting, 2722 Knight St. Apt. 212-1 Dallas, Tex. 75207 wants a trainee position in electron microscopy, has one year of college, knows darkroom work, presently employed in photography lab. Tel. 521-7119 home, 747-1894 work.

Positions Available:

Experienced EM technician: Male; Should have training and experience in tissue processing, darkroom procedures, microtomy and microscopy. Contact Mr. Bob Turner, Dept. of Pathology, Scott & White Clinic, Temple, Texas, Phone: (817) 778-4451.

ADDENDUM

Vol. 2 No. 3

Supplement 1

Current Electron Microscope Installations in Texas

TRANSMISSION

SAN ANTONIO

US ARMY INSTITUTE OF SURGICAL RESEARCH, Ft. Sam Houston Experimental Studies Branch	RCA	EMU 4A
BROOKE GENERAL HOSPITAL, Ft. Sam Houston Dept. of Pathology	RCA	EMU 4A
5th US ARMY AREA MEDICAL LAB, Ft. Sam Houston Dept of Pathology	RCA	EMU 4B

HOUSTON

BAYLOR UNIVERSITY COLLEGE OF MEDICINE Department of Pathology	Siemens	Elmiskop 1A
UNIVERSITY OF TEXAS, M. D. ANDERSON HOSPITAL Department of Clinical Pathology	Siemens	Elmiskop 1A
ST. LUKE'S EPISCOPAL HOSPITAL Department of Pathology	Siemens	Elmiskop 101
NASA	Siemens	Elmiskop 1A
TEXAS INSTRUMENTS, INC.	Siemens	Elmiskop 1A

AUSTIN

UNIVERSITY OF TEXAS Department of Zoology	Siemens	Elmiskop 1 Elmiskop 1A

EL PASO

W. BEAUMONT HOSPITAL Electron Microscope Lab	Siemens	Elmiskop 101