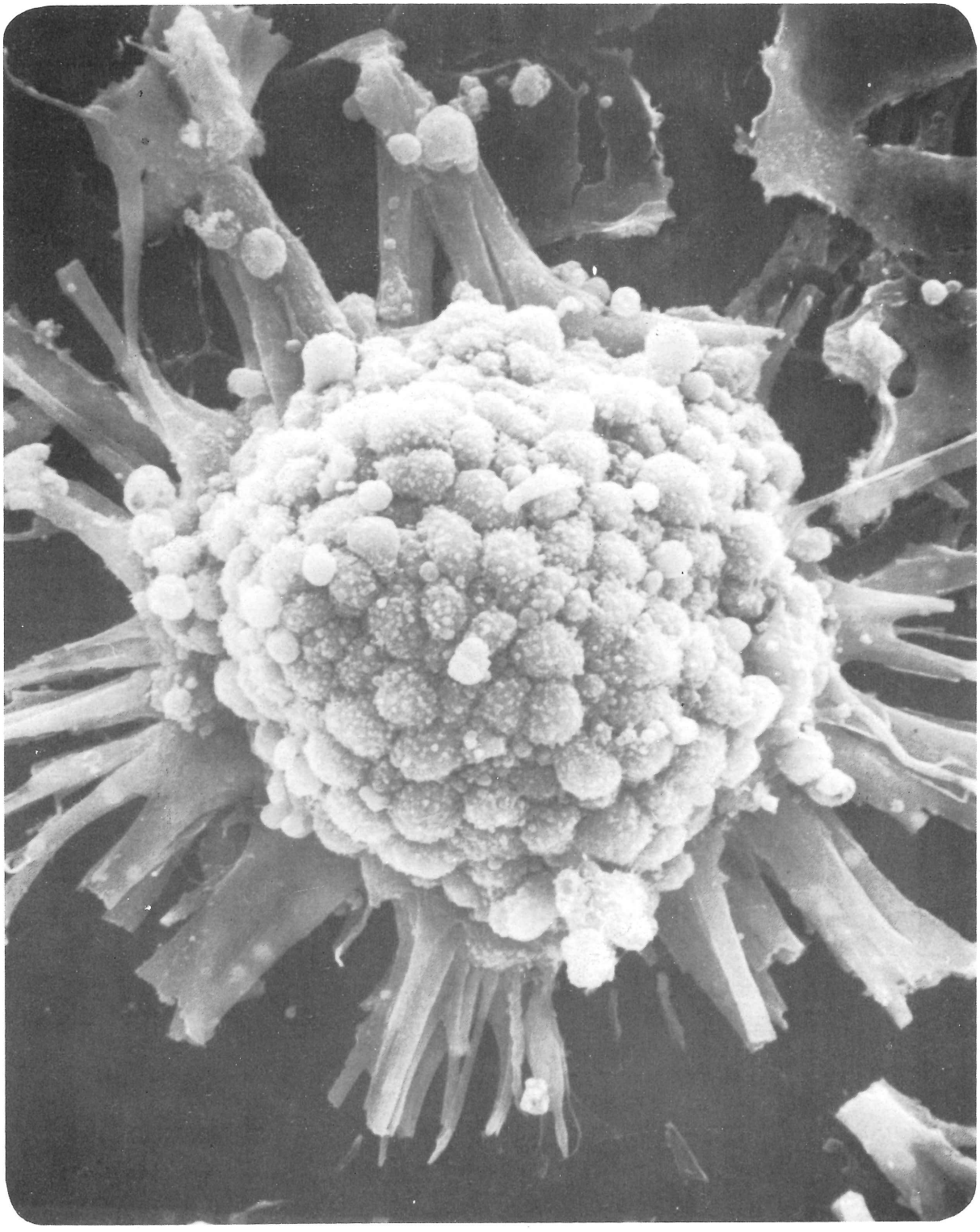
TSEM Texas Society for Electron Microscopy e⁻ NEWSLETTER

Spring 1978



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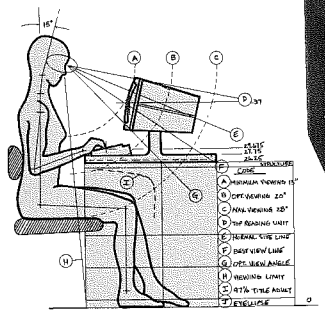
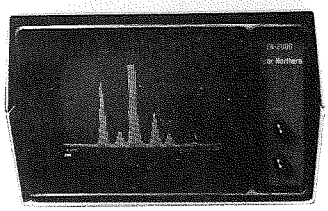


System TN-2000's superior display is controlled by its own microprocessor to provide comprehensive visual information with unparalleled clarity and versatility. Labeled keypad functions and unique OMNI control provide instant interaction with all display features.



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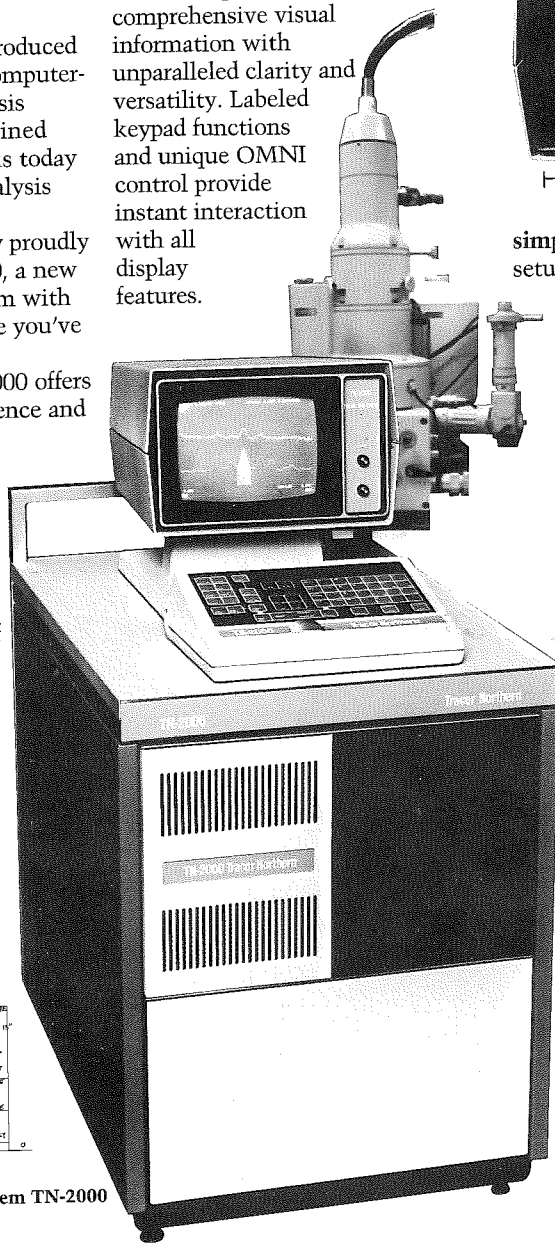

System TN-2000

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Volume 9, Number 2
Spring, 1978

Texas Society for Electron Microscopy

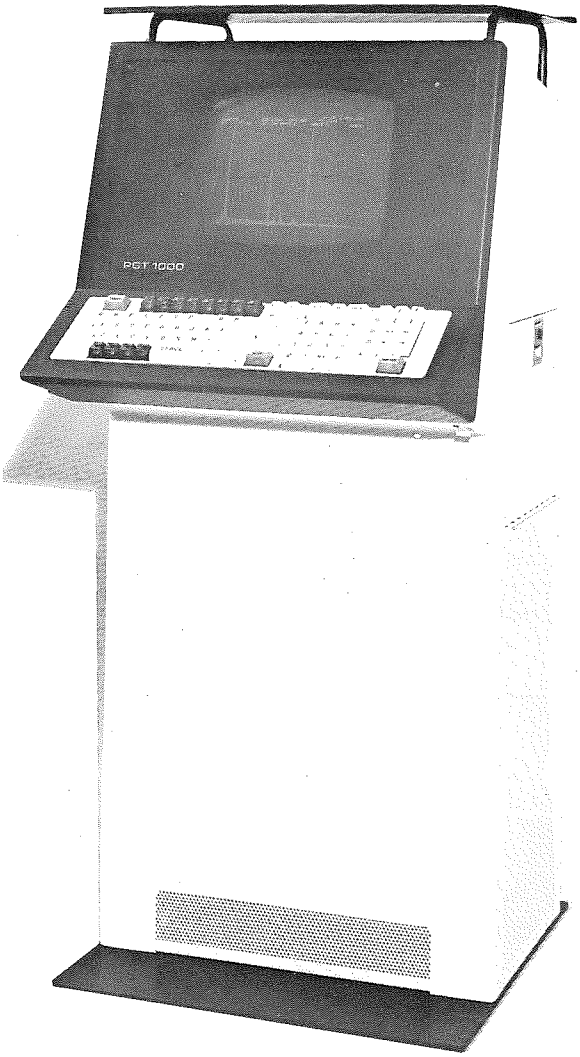
"For the purpose of dissemination of research with the electron microscope"

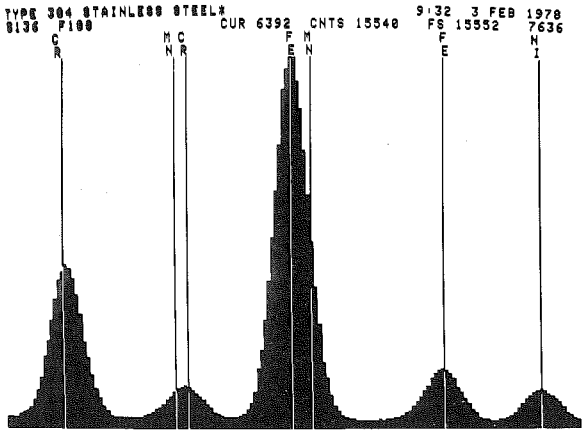
ON THE COVER

SEM of myocytes from rat embryos from Jerry Shay, University of Texas Health Science Center, Department of Cell Biology, Dallas, Texas.

For electron microscopes

...the X-ray analyzer that eXCELs





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President's Message

It is with a great deal of pleasure that I write this final message to the membership as the President of our Society. I have thoroughly enjoyed this past year and it is my opinion that the Society will be in good hands during the tenure of the next President, Ivan Cameron. My year as President was made easy by virtue of my fellow officers who really deserve the credit for the way the ship sailed on high. These individuals all performed yeoman service for us and I take this opportunity to personally thank Ivan Cameron, Paul Baur, Bill McCombs, Robert Turner, Jerry Shay, Bruce McKay, Phillip Ives, and Larry Thurston.

A year ago I had two major goals for my term in office. First, I thought the Society should ratify the revised By-Laws. The By-Laws the membership approved were in the making for over two years. On July 15, 1975, then President Ward Kischer appointed a By-Laws committee with a charge whereby "rewording of the entire By-Laws is not precluded." The committee, Ann Goldstein, Terry Hoage, Carl Tessmer, and myself, submitted its report to the Executive Committee at the February, 1976 meeting. Several drafts, two Executive Committees, one membership ratification, and one ammendment later, we have a rather conventional and functional set of By-Laws that spell out how our Society is to be operated.

The second goal was to increase the number of papers at our scientific meetings, expecially by the older members. Although more difficult to quantitate than the first goal, it is my opinion that the second goal was at least partially achieved. The San Antonio meeting saw 51 TSEM papers presented from the platform, many by senior types. Thats not bad but I think we need to constantly beat the bushes for more papers at our meetings. The real value of our Society is scientific communication and a prime form of communication is the presentation of scientific results before the group. With a membership floating around the 500 mark it is not an unreasonable goal for us to attempt to increase further the number of papers at our meetings. I would like to challenge the membership to come up with 200 papers for next years three meetings.

Additionally, we have had a good year starting with the rather innovative Stereological Symposium in Arlington followed by a very successful Joint Meeting with the Louisiana Society for Electron Microscopy in San Antonio. Needless to say, the year will be topped by the Lubbock meeting under the capable direction of Local Arrangements Chairman Randy Brackeen.

I look forward to seeing you at future meetings.

JERRY D. BERLIN
President

TSEM FINANCIAL REPORT

Period Ending December 1, 1977

Total Assets of August 1, 1977		$ 7,510.84
Certificate of Deposit (University Bank #4470)		1,252.22
Certificate of Deposit (Fannin Bank #17864)		1,000.00
Savings Account (University National Bank		4,000.00
Balance in Checking Account August 1, 1977		1,258.62
RECEIPTS		
Corporate dues	150.00	
Regular dues	245.00	
Student dues	21.50	
Corporate donations (Arlington Mtg)		
Registration Receipts (Arlington Mtg)	1,591.00	
Savings account transfer (11/29/77)	500.00	
Interest on C Dep. 17864	18.27	
Total Income	$ 2,525.77	$ 2,525.77
		$ 3,784.39
DISBURSEMENTS		
Travel (President TSEM to EMSA-Boston)	196.00	
Scott and White — Secretarial fund	1,000.00	
Treasurers Expenses (Xerox & Mailing)	156.29	
Meeting expenses (Arlington)	1,392.27	
Student travel (Arlington)	100.00	
Preliminary expenses TSEM/LSEM Meeting	300.00	
Workshop refunds (Student over charges)	57.00	
American Indemnity Co. (Treasurer's Bond)	28.00	
Camera — Society's historian	163.75	
	3,393.31	3,393.31
Balance in checking account 12/1/77		391.08
SAVINGS ACCOUNTS		
Certificate of Deposit (University Bank #4470)		$ 1,271.14
Certificate of Deposit (Fannin Bank #17864)		1,000.00
Savings Account (University National Bank #01-7420-3)		3,500.00
TOTAL ASSETS December 1, 1977		**$ 6,162.22**

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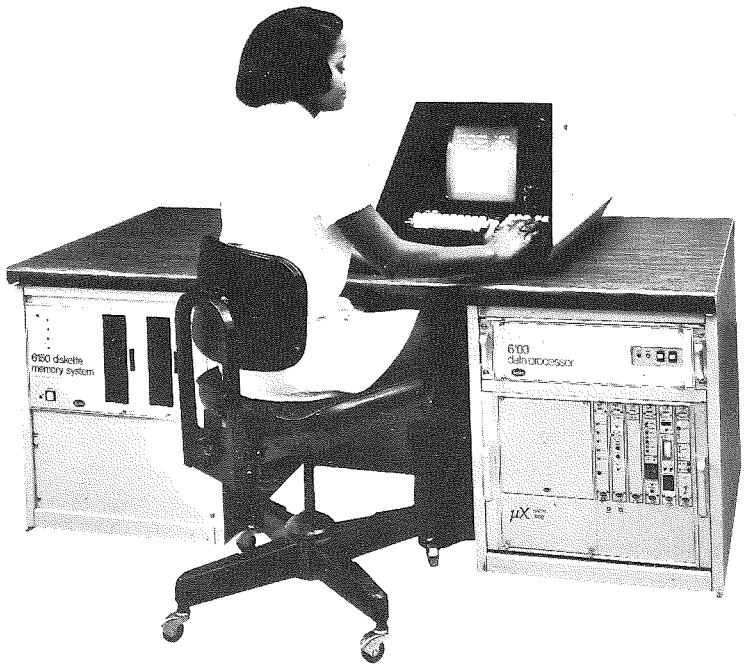
Color-coded video display, 2,048- or 4,096-word memory, printer output, and a full ASCII keyboard are included as standard features.



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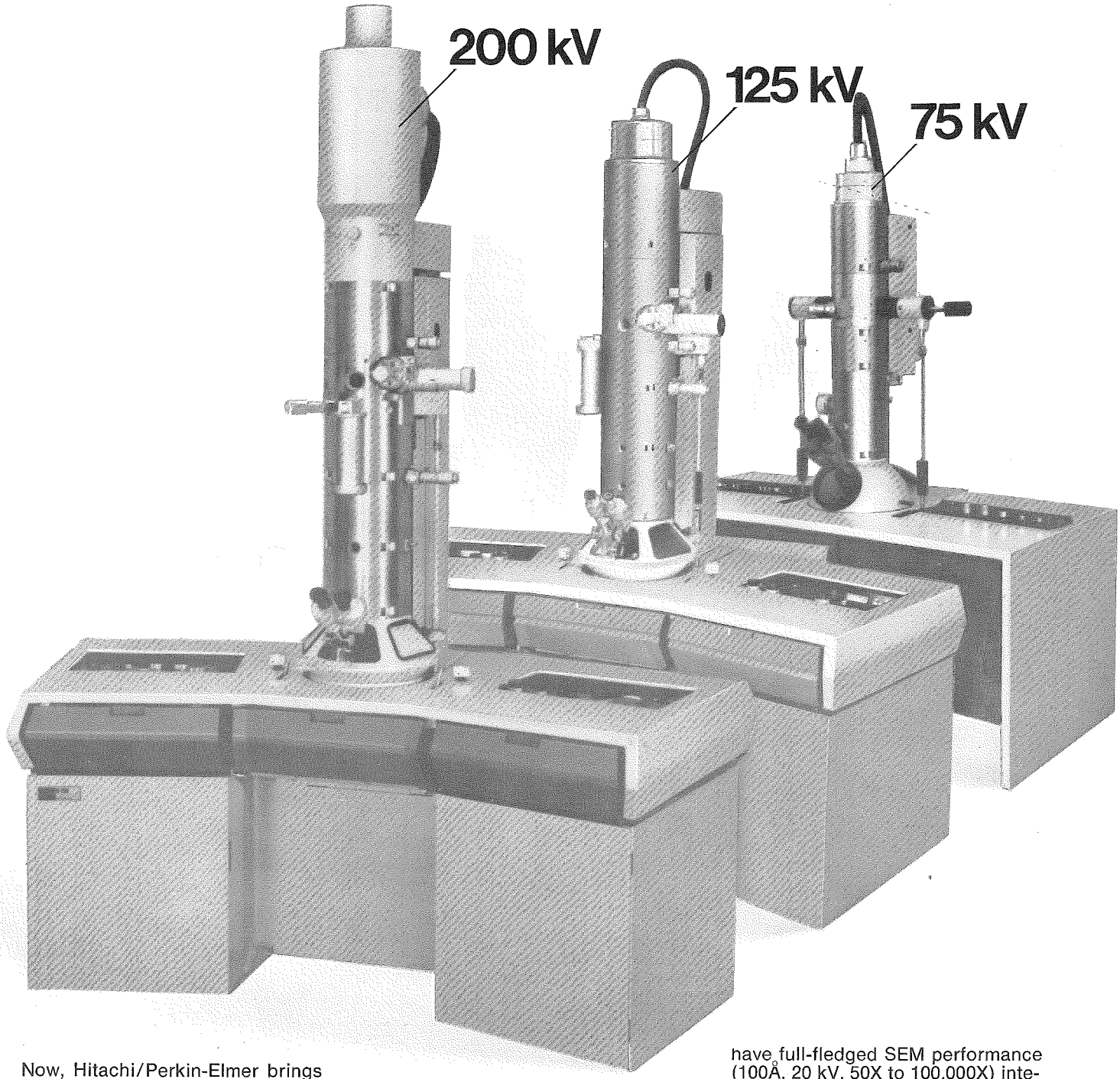

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Finally, there's our H-300, the world's first UEM (Universal Electron Microscope). As a TEM, it gives you 4.5Å, 75 kV and 250X to 100,000X. But, unlike other TEMs, it can have full-fledged SEM performance (100Å, 20 kV, 50X to 100,000X) integrated into the operating console: without compromising either mode. That's why we call it a UEM. It's also modular. Buy it as a TEM for about $35K, integrate the SEM, at any time, for around $14K.

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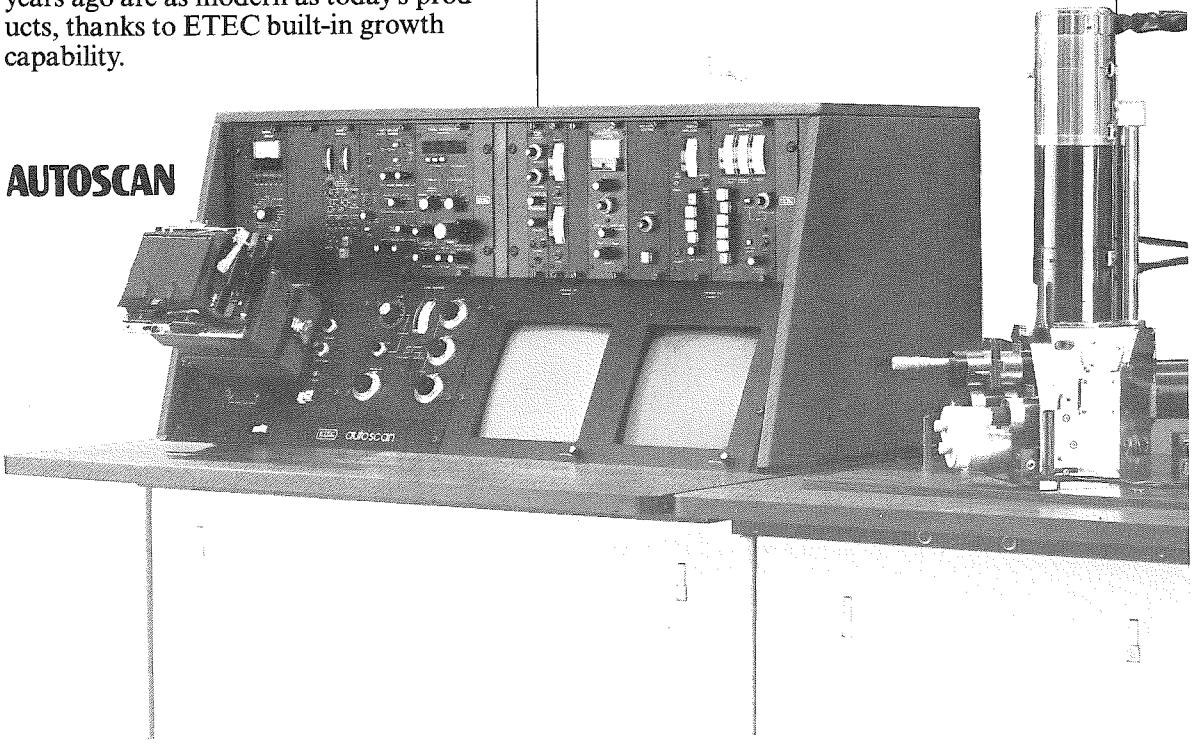

Editor's Comments

Spring has blossomed in full and oh, how sweet it is. Viewing new growth in a very proud fashion, displaying healthier attitudes refreshing to all, and looking to the future with bright anticipation.

Our society is very much in comparsion with Spring. We are in full bloom but still growing stronger and closer together. We are indeed proud of our new growth. Our newer members are being installed as our officers and leaders. We look forward to seeing what new ideas will be implemented to keep TSEM alive.

It has been stated before we have too much social fun and not enough business three times a year. Our enjoyment that many witness is a sign of satisfaction that has derived from the struggles and anxieties of getting each meeting off in such a successful manner.

I have been criticized by some for standing on my soapbox in expressing how I feel about TSEM. So for those of you that this applies to, this is my final "speech on the floor". Our society is great!

Now I feel it is time for me to step aside with my obligations and responsibilities to TSEM. I am going to move into the crowd and watch with anticipation as our new growth takes further ahead reaching out for our goal.

Compliments have been plentiful regarding the achievements of our Newsletter. I can only take a minimal amount of credit. Comendation goes to those who have contributed articles, abstracts, time, effort and money for sponsoring our TSEM Newsletter.

Since this is my last issue as editor, my contacts will be less frequent, but not forgotten. I sincerely hope you will give the same cooperation and assistance to Ann Goldstein, new editor, that you have given to me.

Thank you for making my job easier and a most pleasant experience.

Sincerely,
Bob Turner

Editorial

Recently I entertained an old college chum of mine, who is now Dean of a professional school. As has been the usual case when we get together the conversation turned toward academia: students, faculty, Deans, etc. Both of us agreed that "when we were in school" Deans were there to decide on such things as student organization sponsors for dances, and other similar mundane things. As students we were loathe to seek out a Dean for redress. In fact, the prospect of seeing a Dean usually had the connotation that you were in some sort of trouble. Today it seems quite different. Dean's offices are cluttered with students seeking respite from "unfair exams", "poor textbook choices", "irrelevant lecture topics", and other sundry crimes usually committed by faculty. At one point in the conversation my friend and I virtually chimed in unison, "students don't want to work anymore". Now, that well may be a stereotyped image, especially of a few who have a very high profile. Nevertheless, the realities of present-day students lie more in the "getting by" syndrome than with a work ethic.

One of the major activities my friend has is entertaining the polemics of the students. Most of what they proffer is gratuitous. "Perhaps", my friend said, "I'm a little bit too accessible". To that I would Add-Amen!

I believe there is a positive correlation between work load in a course and student performance. How often I have heard responses from students to inquiries about a certain course they dislike — "we don't **do** anything!" Deans do not generally hear complaints about work loads. Instead, when certain students do feel a work load crunch they usually couch their complaints in other terms. After all, few persons willingly admit to their laziness.

I remember years ago the administration at my school limited the curriculum for first-year medical students to no more than 25 contact hours per week, a result of student complaints and weak administrators. That limitation was in effect for one year only. It was the only year I witnessed first year students playing bridge in the student bookstore, **and they played it every day!**

My 6th grade son brought a notice home from his school recently announcing that several "mini-courses" would be offered for a six-week period. He had elected to take one on science fiction. Others offered were astronomy, meteorology, engineering, etc. Now, I know that the teachers at that school are not very knowledgeable or skilled in those topics. But then they don't need to be. What is important is that they give directions, and the work load is the responsibility of the student. These courses are much appreciated by the students, and the program is a success.

Wolfle writes in **Science** (24 Febr., 1978) about the equivocation facing many colleges and universities. They do not represent the pinnacles of scholarship they once did. In fact, it smacks of discrimination to require entrance examinations, and, what is worse, to even threaten failure of a course. Hence, the demand for open admissions, remedial course work and reduced standards of performance.

When I went to high school a diploma meant job security, and it was clear that those who did not obtain a diploma not only were in trouble job-wise but simply were not able or did not care to respond to a work requirement. Now, high school diplomas are given for attendance, and the onus of becoming educated, once upon the student, has been transferred to the high school, the university and finally to the professional school.

Consider the Bakke case: the 16 minority admissions scored an average 55 percentile points lower than Bakke on the admissions tests. Many arguments have been presented declaring this difference as not being significant. However, if all of the arguments, invoking on the one hand, cultural, economic and social

deprivation, and, on the other, differences in native intelligence or constitutional guarantees are sliced completely through, we come vis-a-vis with a cold inescapable fact: that performance on medical college admission tests is a reasonable measure of achievement in information and demonstration of skills relevant to professional school readiness. And, that low performance on MCATs certainly indicates a poor work level in a pre-med curriuclum and is unacceptable for candidacy. If the net effect of the Bakke ruling be that any student can be admitted to a professional school with a record of poor academic achievements, then that shall be the real tragedy. Those who work very hard, achievers, DOERS, will be disenfranchised; sloth will reign and the lazy will inherit academia. We shall witness perhaps the final blow of the vast number struck to steadily reduce the virtue of the work ethic.

"Idle fingers are the devil's workshop"

Ward Kischer
Tucson, Arizona

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James K. Butler, Bio. Dept., University of Texas at Arlinton, Arlington, TX 76019 (R)

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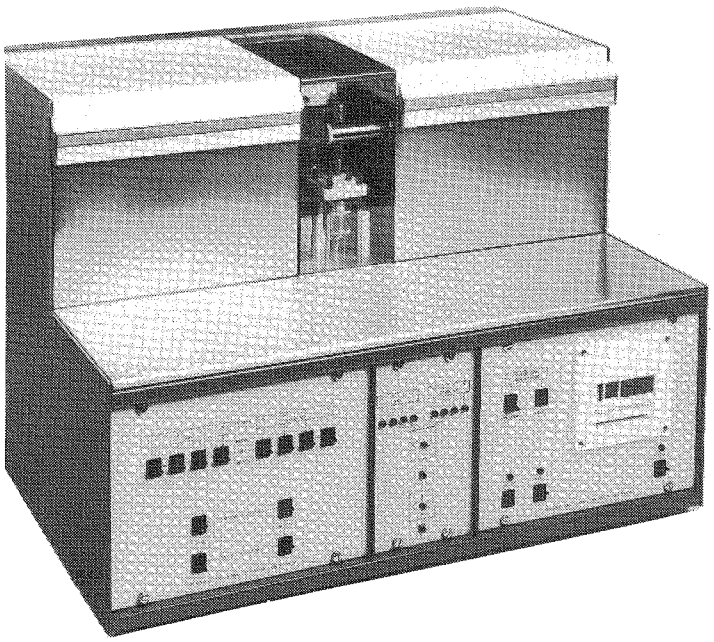

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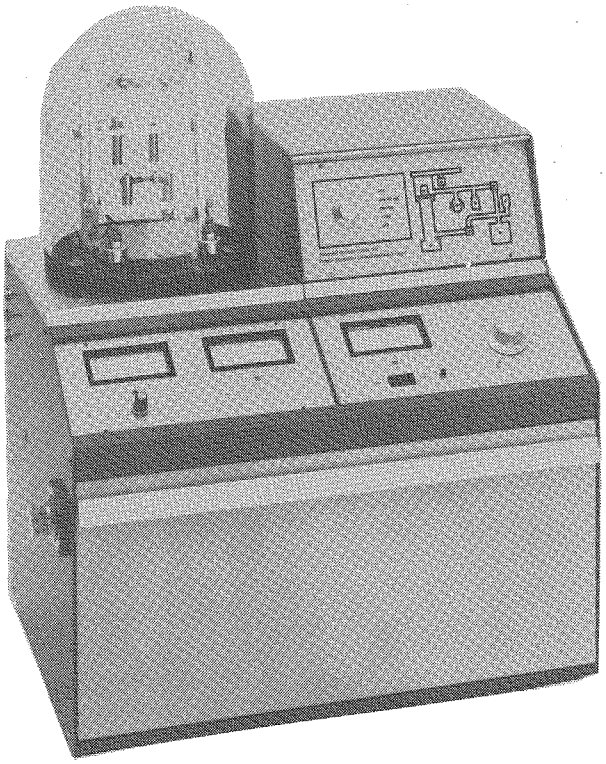

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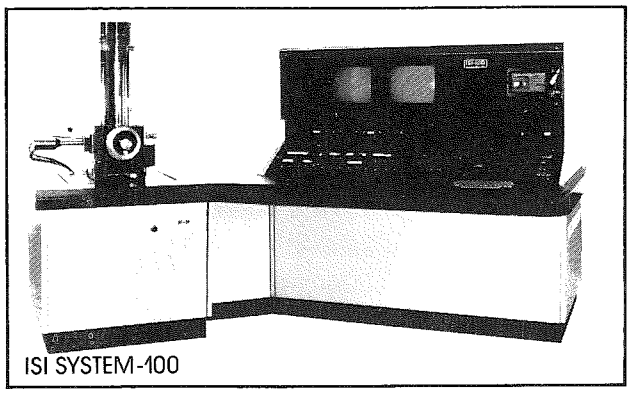

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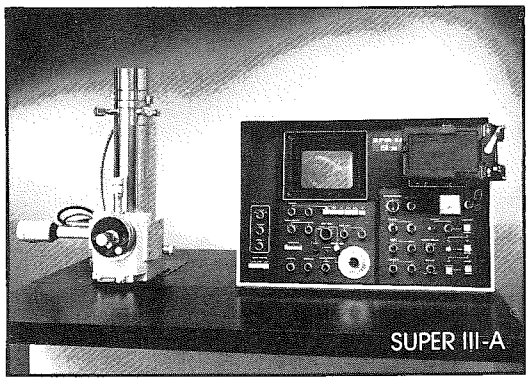

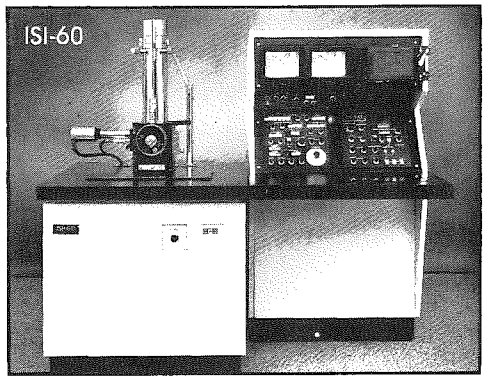

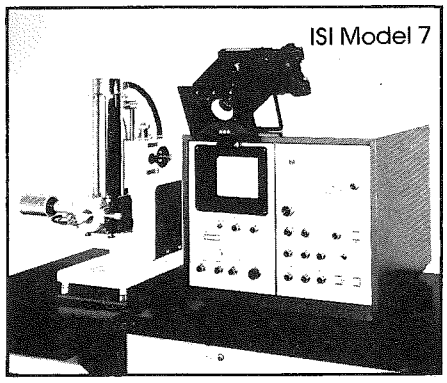

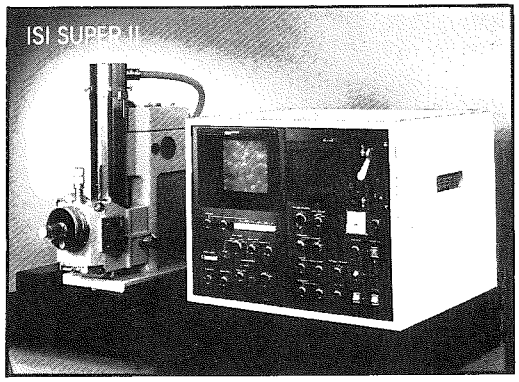

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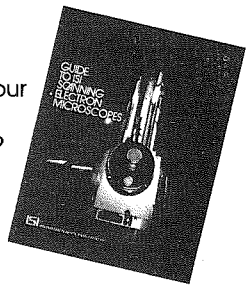

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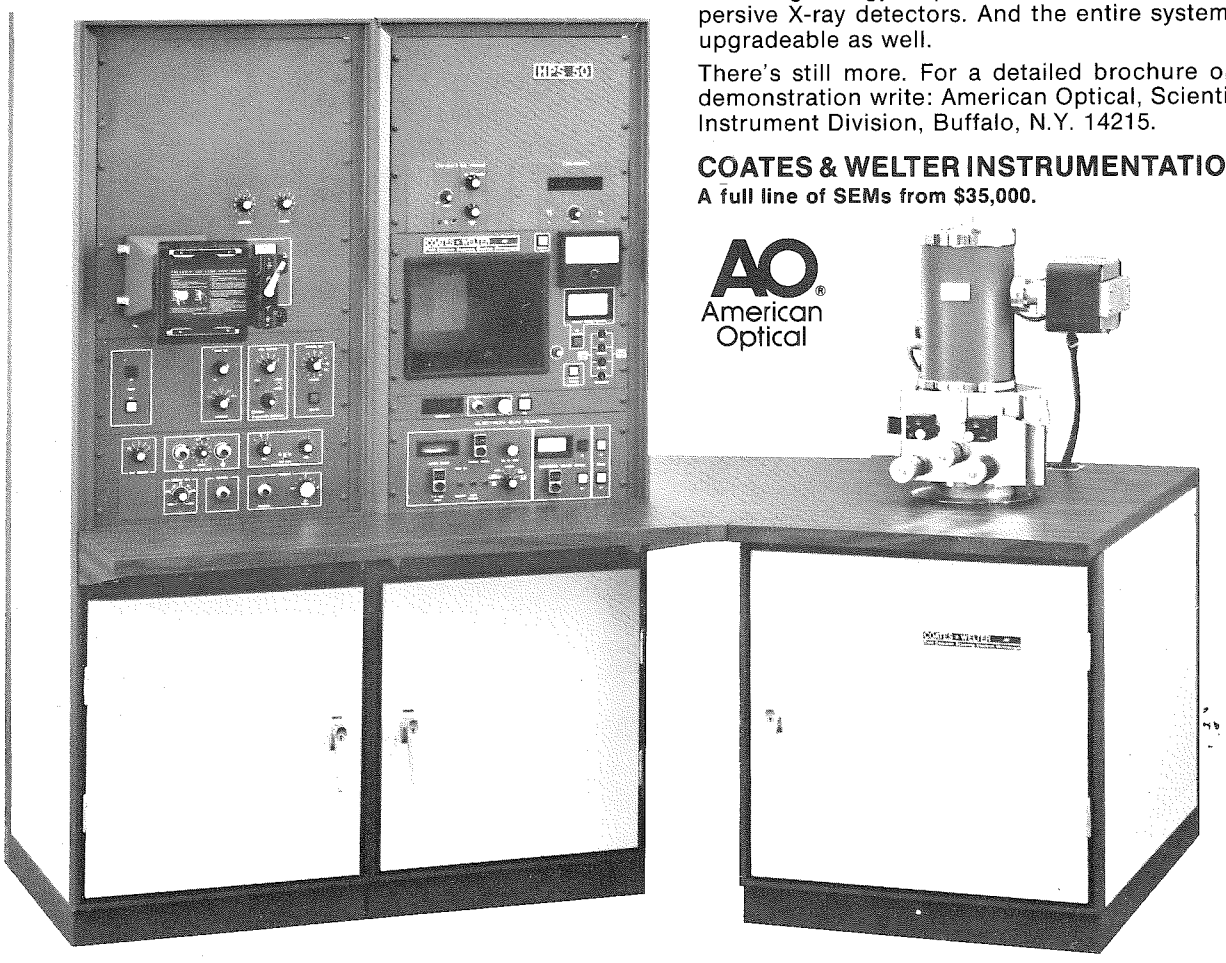

Job Opportunities

Situation Wanted — Elsie M. B. Sorensen, Ph.D. 1974 (Zoology). Currently post-doctoral appointee with Div. Biol. and Med. Res. Argonne Nat'l Lab., Argonne, Ill. 60439. (312) 739-7711 (Ext. 5418). Primary research interest: toxicity, accumulation, and subcellular transport and localization of heavy metals; experience in therapeutic decorportation of metals from mammals. Analytical techniques used: neutron activation analysis and radioisotopic labeling. Experience in TEM, SEM, and XES, as well as audioradiography, semiquantitative ultrastructural analysis, contact radiography, histology, and histochemistry. Desires position in research and/or teaching. Reference and curriculum vita are available.

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Situation Wanted — Raul Joseph Alvarado, 5300 Tropicana, El Paso, TX 79924. (915) 751-0691. Single, 5-10, 180 lbs, born July 24, 1951. Wants career in medical field as a Laboratory Technician. Majored in Microbiology at El Paso Community College, GPA 3.6 on a 4.0 scale. Presently employed as Bio-Lab aide, electron microscopy, Dept. of Pathology, William Beaumont Army Medical Center, El Paso, Texas. Has been recommended by Bernhard E.F. Reimann, Dr., rer. nat., Chief, at William Beaumont Army Medical Center. Dr. Reimann is in the process of training Mr. Alvarado and will be available for full-time job on Jan. 21, 1977. Other references and a complete resume are available.

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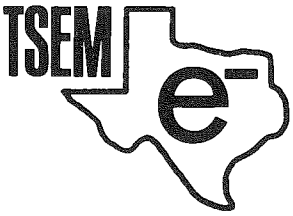

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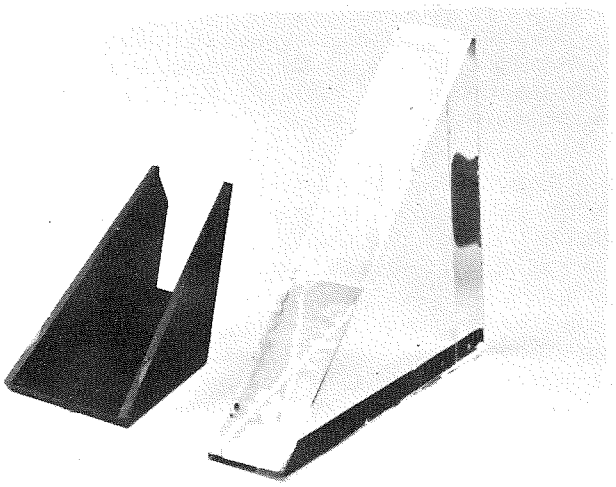

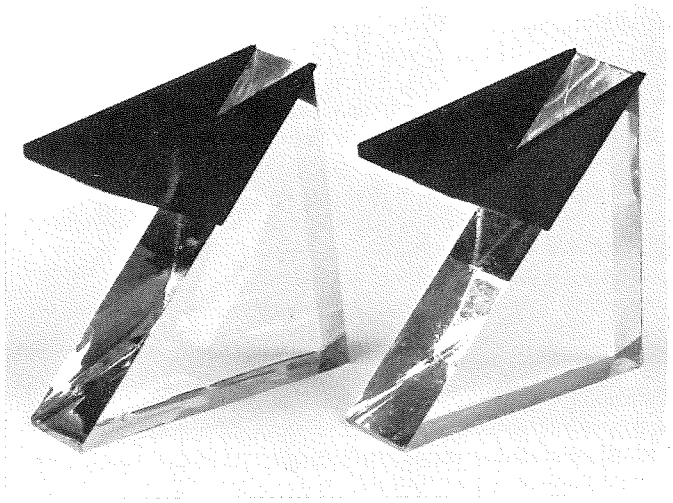

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Health and Safety Hazards in the SEM Laboratory

E. Laurence Thurston
Electron Microscopy Center
Department of Biology
Texas A&M University
College Station, Texas 77343

INTRODUCTION

Health and safety is of universal concern to everyone. A review of the health and safety hazards in the SEM laboratory provides insight into potential dangers specifically associated with electron microscopy. A number of topics included in the manuscript fall into broad safety areas which are applicable to all labs, i.e., electrical, overcrowding, compressed gas cylinder; whereas, other topics are more germane to electron microscopy laboratories, i.e., vacuum evaporators, cryogens, critical point drying devices.

FIRES

Fire in the electron microscopy laboratory is a potential danger due to the combustible chemicals employed and the nature of the equipment. A number of fire extinguishers are available for handling limited outbreaks of fire or to help contain fire until help arrives. Few individuals are aware of how fires are classified and which extinguisher to use to extinguish it. This became apparent in our laboratory when a graduate student attempted to extinguish a "fire" associated with a SEM using a H_20 extinguisher. The "fire" in actuality was oil vapors being generated from a faulty vacuum pump. Obviously, I was relieved when the student was foiled in his attempt to extinguish the "fire." However, this lesson prompted me to instruct students and laboratory personnel in proper fire control.

Portable fire extinguishers are classified as to the type, size and intensity of fire they can extinguish. The National Fire Prevention Association (NFPA) has classified four types of fires based according to the burning media:[2]

Class A: Fires involving ordinary combustible materials (such as wood, cloth, paper, rubber, and many plastics) requiring the cooling effects of water, water solutions, or the coating effects of certain dry chemicals which retard combustion.

Class B: Fires involving flammable or combustible liquids, flammable gases, greases, and similar materials where extinguishment is most readily accomplished by excluding oxygen, inhibiting the release of combustible vapors, or interrupting the combustion chain reaction.

Extinguishing Agents: dry chemical, carbon dioxide, foam, halogenated hydrocarbons (Halon)', water (under certain circumstances by using a spray fog).

Class C: Fires involving live electrical equipment where safety to the operator requires the use of electrically nonconductive extinguishing agents.

Extinguishing Agents: dry chemical, carbon dioxide, halogenated hydrocarbons (Halon).

Class D: Fires involving certain combustible metals (such as magnesium, titanium, zirconium, sodium, potassium, etc.) requiring a heat-absorbing extinguishing medium not reactive with the burning metals.

Extinguishing Agents: powdered graphite, dolomite, sand, etc.

Some portable fire extinguishers are of primary value on only one class of fire; some are suitable on two or three classes; none are suitable for all four classes of fire.

Numerals are used with identifying letters for extinguishers labeled for Class A and Class B fires to indicate the relative extinguishing effectiveness of the device. The numeral that precedes the letter "A" (example 2-A) indi-

cates the size of standard test fires the device is able to extinguish successfully under reproducible laboratory conditions. The rating numeral that precedes the letter "B" (example 10-B) gives a proportionate to what indication of the maximum (sq. ft.) area of a flammable liquid fire of appreciable depth (1/4 inch) which can be protected. Rating numerals are not used for Class C or Class D fires. Since electrical equipment has either Class A or Class B combustibles, or both, as part of its construction, the type of Class C rated extinguisher selected should be based on the construction features of the electrical equipment and the nature and amount of combustibles in the immediate vicinity. The effectiveness of each listed Class D extinguisher on specific combustible metals is detailed on the nameplate of the device. Extinguishers that are effective on more than one class of fire have multiple "letter" and "numeral-letter" classifications and ratings (example: 4A, 20 B:C).

In 1969, the manufacture of all inverting type extinguishers (soda-acid, foam, and cartridge-operated loaded stream) was discontinued in the United States. These extinguishers are no longer listed or approved by testing laboratories, and it is recommended they be phased out in lieu of the safer, more effective stored pressure extinguishers.

Laboratory personnel should familiarize themselves with the location and various types of extinguishers within the laboratory. If possible, training films or practice sessions should be made available. Further information concerning numerous facets of fire extinguishers can be obtained from numerous sources.[2,3]

Flammable and Combustible Materials

The classification of flammable and combustible liquids is listed below:[4]

		Flashpoint (a)	Boiling Point
Flammable liquids (b)			
Class I	A.	<73°F	<100°F
	B.	<73°F	≧100°F
	C.	73°F-99°F	—
Combustible liquids (c)			
Class II	A.	100°F-139°F	—
Class III	A.	140°F-199°F	—
	B.	≧200°F	

Examples of some flammable and combustible liquids commonly used in electron microscopy laboratories are listed in Table 1.

Flammable, Combustible Liquid	FP[1] °F	BP[2] °F	Classification
Ethyl Ether	-49	94	I(A)
Methyl Chloride	32	-10.8	I (A)
Propylene Oxide	-35	93	I (A)
Benzene (Benzol)	12	176.2	I (B)
Acetone	0	133	I (B)
Hexane	-22	154	I (B)
Toluene	40	231	I (B)
Methanol	52	149	I (B)
Amyl Acetate	89	248	I (C)
Acetic Acid	103	244.6	II
Formaldehyde	122	—	II
Phenol	174	356	III (A)
Aniline	158	364	III (A)

[1]Flashpoint
[2]Boiling point

Poor storage of flammable and combustible materials serves as a potential fire hazard. Consult the "Accident Prevention Manual!"[5] for more complete information concerning the proper storage of such materials. The NFPA codes[2] should also be consulted as to the limitations placed on container size and quantity of flammable and combustible liquids stored in laboratories.

(a)Flashpoint — the minimum temperature at which a liquid gives off vapor in sufficient concentration to form an ignitable mixture with air near the surface of the liquid.

(b)Flammable Liquid — any liquid having a flashpoint below 100°F, except any mixture having components with flashpoints of 100°F or higher, the total of which make up 99% or more of the total volume of the mixture.

(c)Combustible Liquid — any liquid having a flashpoint at or above 100°F.

THRESHOLD LIMIT VALUES

Threshold limit values (TLV's) refer to airborne concentrations of substances and represents conditions under which it is believed that nearly all individuals who are repeatedly exposed, day after day, could suffer adverse effects. Individuals interested in learning more concerning the established standards, and under which conditions, should refer to "Threshold Limit Values for Chemical Substances in the Workroom Environment".[6] Examples of TLV's of some chemicals commonly associated with electron microscopy laboratories are listed:

	ppm(a)	mg/m^3(b)
Acetic Acid	10	25
Acetone	1,000	2,400
Acrolein	0.1	0.25
Amyl Acetate	100	525
Bromine	0.1	0.7
Benzene	10	30
Formaldehyde	2	3
Glutaraldehyde	2	8
Heptane	400	1,600
Hydrogen peroxide	1	1.4
Nitric Acid	2	5
Osmium tetroxide	0.0002	0.002
Phosphoric acid	—	1
Propylene Oxide	100	240
Sodium Hydroxide	—	2.0
Sulfuric acid	—	1

(a) Parts of vapor or gas per million parts of contaminated air by volume at 25°C and 760 Hg pressure.

(b) Approximate milligrams of substance per cubic meter of air.

FUME HOOD

The fume hood is often thought of as a multipurpose exhaust fan. The function of the fume hood is to capture contaminations generated within its enclosure and not to capture contaminants generated at other locations in the laboratory, nor is it generally designed to withstand explosions.

Adequate face velocity or the velocity of air entering a hood is a basic requirement to determine if it is safe for its intended use. Face velocity limits (Table 2) are dependent upon factors related to the hood design and location.[6,7]

The location of the hood in the laboratory plays a major role in optimizing its performance. The face of the hood should be free of external sources of air disturbances at its face or opening. Disturbances can be created by such things as open windows, air supply inlets, etc. Pedestrian traffic can create a disturbance of 260 feet per minute (fpm) when walking past the hood face at 3 miles/hour. A disturbance of 30 fpm is sufficient to cause face velocity interference.

CHEMICAL HAZARDS

The American Conference on Governmental Industrial Hygienists (ACGIH) recognized a number of substances used in the laboratory that have been proven to be carciongenic to man or have induced cancer in animals under defined experimental conditions. A complete list of these compounds can be obtained from — "Threshold Limit Values List for 1974," American Conference of Industrial Hygienists, P.O. Box 1937, Cincinnati, Ohio 45201.

Bis-chloromethyl ether

A recognized human carcinogen that can be found in a SEM laboratory is bis-chloromethyl ether ($ClCH_2)_20$ formed from the exposure of formaldehyde vapor with hydrochloric acid vapor in humid air.[8] The TLV assigned to this compound is 1 ppb. It is recommended that formaldehyde should not be used near hydrochloric acid and that, if the compounds are used together, the fume hood should be capable of maintaining a face velocity of 100 fpm.[7]

Uranyl acetate

Uranyl acetate, $[UO_2(CH_2COO)_2]$ is a dual laboratory hazard as discussed in a recent review.[9] The chemical toxicity of uranyl acetate poses a far greater hazard than does its radiological toxicity. The maximum daily intake of uranium has been established at less than 2μg, and 50 mg is considered a lethal dose. The maximum allowable concentration in the air is 0.5 mg for arsenic, and only 0.05 mg for soluble uranium compounds per cubic meter of air.[9] The inhalation of powdered uranyl compounds is dangerous to human health and precautions should be taken to avoid inhalation and ingestion.

The measured radioactivity of uranyl acetate approximates theoretical figures for natural uranium[9] and an analysis of uranyl acetate taken from our laboratory produced 2.522×10^{-1} μCi/g beta and 5.279×10^{-3} μCi/g alpha radiation. The amount of alpha radiation is low and not dangerous, however, precautions should be exercised when handling any radioactive compounds.

Sodium Cacodylate

A recent article[10] deals with the dangers of the commonly employed electron microscopy buffer sodium cacodylate, $[(CH_3)_2AsO_2Nu]$, and discusses the lack of knowledge concerning this compound. The LD_{50} is reported to be 1250 mg/kg for rats when orally administered.[11] Precaution should be exercised when using sodium cacodylate and other toxic compounds e.g., lead citrate, osmium tetroxide.

DISPOSAL

Diposal of hazardous compounds should be carried out according to recommended guidelines. The "Laboratory Waste Disposal Manual", 1974, Manufacturing Chemicists, 1825 Conn. Ave. N.W., Washington, D.C. 20008, should be consulted when there is doubt concerning hazardous compounds. Better yet, contact your institutional safety officer.

Numerous injuries have occurred to laboratory and custodial personnel from improper handling and disposing of waste materials. All chemicals, glass, razor blades, needles, etc. are considered to be potentially dangerous. Separate disposal containers for such items should be maintained. Laboratory personnel should be solely responsible to see that such hazardous materials are disposed of properly.

X-RAYS

The hazards of high energy radiation is well documented, and it is suggested you consult the literature for specific details concerning the safety and dangers of electron beam and x-ray analytical instrumentation.[12,13,14]

Table 2. Recommended Fume Hood Face Velocity and Toxicity

NATURE OF MATERIAL HANDLED	THRESHOLD LIMIT VALUE	SUITABILITY	MINIMUM FACE FELOCITY OF FULLY OPEN HOOD (fpm)	
			AVERAGE	AT ANY POINT
Highly Toxic	Less than 10 ppm Less than 0.1 mg/m^3	For radioactive (low MPC) materials, metal carbonyls, beryllium compounds, volatile carcinogens, benzene, tetraethyllead and other materials of extreme toxicity or hazard. (For very high toxicity materials and pathogenic microorganisms, use a glove box).	150	125
Moderately Toxic	10 to 100 ppm 0.1 to 15 mg/m^3 50 5 mppcf	For any operation except those offering severe potential hazards. For moderate to highly toxic materials. For tracer quantities of radioisotopes. Recommended generally for all laboratories and minimum recommended for **research** laboratories.	100	80
Relatively Low Toxicity	Above 100 ppm Above 15 mg/m^3 Above 5 mppcf	Only for operations where hazard is relatively low. For materials of low to moderate toxicity such as acetone, ethanol, nuisance dusts and nuisance fumes.	80	60

A film, "The Double Edged Sword", dealing with the hazards of x-ray diffraction and x-ray analytical equipment is available free for distribution, from Association Sterling Films, 600 Grant Avenue, Ridgefield, N.J. 07657.

Critical Point Drying

Cohen, Humphreys and Speizer et al., discuss the dangers and safety precautions in using a critical point drying (CPD) apparatus. A recent communication concerning an accidental explosion of a CPD apparatus provides some additional insight as to its proper use. The "Protective shield", constructed from plastic or lucite, designed to protect the operator from a window explosion, proved more injurious upon explosion than the shattered window.

CONCLUSION

I did not attempt to cover the entire spectrum of health hazards present within the SEM laboratory, but I did intend to provide the reader with the stimulus to seriously question the safety of the equipment and chemicals associated with electron microscopy. References are included for individuals seeking further information concerning safety. Contact your institutional safety officer for a complete list of available references. Supervisory personnel should spend more time instructing laboratory personnel and students in health safety.

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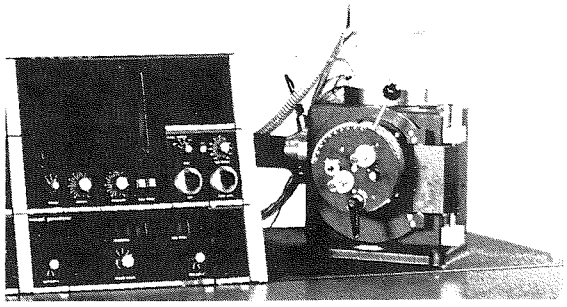

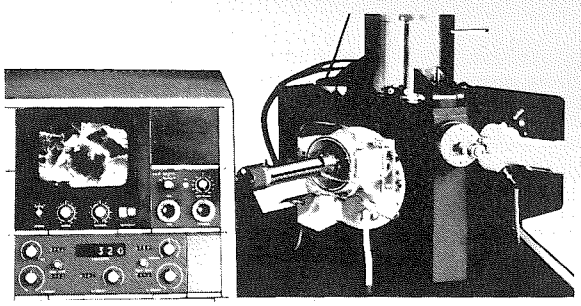

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Abstracts

OOGONIAL DEVELOPMENT IN ACHLYA RECURVA. Huizar, Elaine and Joanne T. Ellzey, Ultrastructure Laboratory, Biological Sciences, The University of Texas at El Paso.

Achlya recurva Cornu **sinsu** Latham, a water mold, consists of coenocytic hyphae which produce oogonia and antheridida during sexual reproduction. As oogonia develop they cleave into oospheres which may mature into oospores. Some oospores can germinate within three days. Electron microscopic observations have revealed nuclear and cytoplasmic changes occurring in developing oogonia and germinating oospores. Numerous meiotic nuclei exist in precleavage oogonia. Oospheres are uninucleate. Some of the major cytoplasmic changes include lipid distribution, storage body configuration, and number of organelles such as mitochondria present.

THE PRICE OF OIL AND GAS — A VIEW FROM THE SEM CONSOLE. David K. Davies, Department of Geosciences, Texas Tech University, Lubbock, Texas 79409.

SEM analysis is becoming an important tool in attempts to increase worldwide oil and gas reserves. The SEM is used to study the fine-grained ($<4\mu$) clay minerals which can block interconnections (throats) between adjacent oil and gas-filled pores. Before hydrocarbons can be economically exploited in many reservoirs, the clay minerals must be removed from the pore-throats. The method selected depends on the specific chemical composition of the clay mineral in the throats. Identification of the offending minerals is undertaken using an SEM with an attached energy dispersive x-ray system. Chemical removal of the clays is carried out through dissolution by using various concentrations of different acids (HCl, HF) either singly or in combination.

The cost of "stimulating" oil and gas production by this technique can be expensive ($100,000± per well in some areas of Texas). Much of our domestic hydrocarbon resources are locked by clay minerals in deep rock formations. To improve rates of domestic hydrocarbon production it is becoming necessary to use expensive stimulation treatments on increasing numbers of wells. This is resulting in dramatic cost increases. Increased prices for oil and gas are necessary to cover these costs. The inevitable OPEC-inspired increases in oil prices which lie ahead will enable the geologist to produce hydrocarbons from formations with clay problems. In so doing, the use of the SEM will become commonplace in our search for increased hydrocarbon reserves.

ANATOMY OF AN INSECT EQUILBRIUM RECEPTOR. Lisa P. Bennett and H. Bernard Hartman. Department of Biological Sciences, Texas Tech University, Lubbock, Texas.

Insects are thought to lack a mechanism for directly perceiving spatial orientation. Instead, light cues, proprioceptors, and differential limb loading provides them with an indirect means for deriving positional information. However, such clues are not available to burrowing insects. Recently, two rows of pendulous sensilla found on the ventral surface of each cercus of the desert burrowing cockroach, **Arenivaga,** have been shown by physiological methods to provide equilibrium information. In this communication, we report the anatomical studies of these receptor organs.

The plumb bob-like structure of the modified sensilla, tricholiths, is ideally suited for position reception. Tricholiths are composed of a large dense sphere located distally on a slender shaft. The sensilla, keeping a constant relationship with the gravitation force vector, are deflected upon the insect's movement away from its primary orientation. Each tricholith inserts into an innervated socket, and movement of the sensilla elicits a neural response in the receptor cell. The ellipitcal point of insertion allows only uniplanar movement perpendicular to the long axis of the cercus. Direction of movement is further restricted by the eccentric placement of the hair in its cuticular socket. Sensitivity of the receptor cells and resultant CNS interneuron response is then predicted by the anatomy. Four interneurons are responsive to positional information, each interneuron of the interneuronal responses mimic the quadrants of movement for the rows of tricholiths.

Supported by grants from the National Science Foundation and the National Aeronautics and Space Administration.

ELEMENT CONCENTRATION CHANGES DURING THE CELL CYCLE OF ESTRADIOL STIMULATED VAGINAL EPITHELIUM. Ivan L. Cameron, Thomas B. Pool and Nancy R. Smith, Department of Anatomy, The University of Texas Health Science Center at San Antonio, Texas 78284.

Different lines of evidence suggest that modulation of intracellular ions or elements plays a regulatory role in the control of cell proliferation. For example, we have recently shown that populations of rapidly proliferating cells have high Na and Cl concentrations, whereas cells which are not actively proliferating have low Na and Cl concentrations. We have used electron probe microanalysis to measure element concentration in the basal layer of vaginal epithelial cells of ovariectomized rats before estradiol administration and at 2 hrs (early Gl phase), 17 hrs (mid-S phase), and 24 hrs (G2-M phase) after estradiol administration. Significant differences were seen in the concentration of all elements measured. A similar pattern of concentration change was seen for Na, P, S, and Cl; all of which decrease in early Gl and S phase and return to near the non-stimulated concentration at the G2-M phase. Both Mg and K show an early and continued increase after estradiol stimulation. Based on our previous findings it appears that the non-stimulated vaginal epithelial cells are like rapidly proliferative cells in terms of their higher Na and Cl levels, and that they lack only the specific mitogenic trigger, estradiol to begin cell proliferation. The increase in Mg and K concentration suggests that these elements are involved in the events leading to the initiation of RNA, protein, DNA synthesis and to mitosis.

THE MORPHOLOGIC NATURE OF PERIODONTAL LIGAMENT CELLS FOLLOWING STIMULATION OF OSTEOGENESIS. John A. Yee, Department of Anatomy, Texas Tech University, School of Medicine, Lubbock, Texas.

The nature of the morphologic response of rat periodontal ligament (PDL) cells in areas of tension created by orthodontic force was assessed by light and transmission electron microscopy. Young adult male rats were sacrificed at 24, 48, 72, and 96 and 120 hrs. following orthodontic stimulation. PDL cells were examined in two locations in the ligament: 1) in an osteogenic region adjacent to the alveolar bone surface and 2) in

the central region of the ligament. The earliest detectable response was the appearance of increased numbers of mitotic figures in the PDL at 24 hrs. post-stimulation. The most significant ultrastructural feature of these cells was the presence of intracellular membrane-bound vesicles which contained cross-banded collagen microfibrils. These vesicles were indentical to similar profiles observed in functional interphase PDL fibroblasts. Between 48 and 120 hrs. the alveolar region of the ligament was characterized by the presence of newely generated osteoblasts. The ultrastructure of these cells and their association with new bone matrix confirmed these cells to be osteoblasts. At no time were intracellular collagen profiles observed in osteoblasts. Cells in the central portion of the PDL maintained their fibroblastic morphology throughout the duration of the study. The presence of intracellular collagen in mitotic figures suggests that a portion of the proliferating PDL cells belonged to the population of functional PDL fibroblasts. Absence of similar profiles in newly generated osteoblasts does not allow speculation about the nature of their progenitors of their relationship to the mitotic figures observed. Supported by National Institute of Dental Research DEO4371.

THE INTERACTION OF PRESUMPTIVE OSTEOCLASTIC PRECURSOSRS WITH MINERALIZED BONE MATRIX IN VITRO. Ronald L. Shew and John A. Yee, Dept. of Anatomy, Texas Tech University School of Medicine, Lubbock, Texas.

In order to investigate the possibility that macrophagic-monocytic cells may be progenitors of osteoclasts, paritoneal macrophages from young rats were harvested and cultured for 2, 8, 24, 48 and 72 hours with treated calvaria or collagen gels. Glass coverslips served as the control substrate. Matrices were combined to study preferential cell-matrix interaction. Cultures were examined using phase contrast and brightfield light microscopy and scanning and transmission electron microscopy. The morphology of peritoneal macrophages cultured on glass has been described by numerous investigators. With phase contrast microscopy and scanning electron microscopy these cells demonstrated a variety of shapes and sizes at all incubation periods. Their surfaces were covered with microvilli and ruffles. Lamellapodia were observed at the edges of cells. Cells cultured with collagen gels were round and lacked both cytoplasmic processes and microvilli. There were fewer cells in collagen cultures than in cultures where treated bone served as the substrate. In cultures containing bone the morphology of peritoneal macrophages did not differ significantly from those observed on glass cover slips. With light and transmission electron microscopy the cells appeared macrophagic-like. These cells attached to the mineralized bone matrix. These results indicate that peritoneal macrophages interact with mineralized matrix in culture. However, under these culture conditions after 72 hours, cells lacked morphological evidence of differenation into osteoclasts.

This research funded in part by a grant from National Institute of Dental Research, grant number DEO4371.

A RADIOLOGIC STUDY OF THE GASTROINTESTINAL TRACT AND AN ULTRASTRUCTURAL STUDY OF THE SYMPATHETIC TRUNK OF THE KETOTIC DIABETIC CHINESE HAMSTER. Michael E. Yates, Arthur R. Diani, and Donald L. Risinger, Department of Biology, Baylor University and Hillcrest Hospital, Waco, Texas.

Radiologic analysis of the gastrointestinal tract of six matched pairs of Chinese hamsters was carried out to determine types and incidence of abnormalities in the barium x-ray pattern of ketotic diabetic animals. The animals were tube-fed 1.5 cc of barium sulfate and restrained in a radiolucent tube to minimize movement artifact and eliminate the necessity of anasthetic. X-ray exposures were made at intervals from initial administration of barium (time O) through 24 hours. The ketotic animals displayed marked dilatation of the stomach and intestinal loops. Hypomotility was characterized by flocculation and segmentation of barium in the small and large intestine, and by a significant delay in emptying of the stomach and large intestine. The ketotic animals also displayed abnormal stools as well as delayed formation and passage.

Ultrastructural analysis of the abdominal sympathetic trunk of 8 pairs of Chinese hamsters was also carried out to determine the types and incidence of pathologies. Some of the Schwann cells of ketotic animals displayed accumulation of Pi granules of Reich, myelin digestion figures and cytoplasmic vacuolization. Unraveling and vesiculation of the myelin sheath were also observed in some of the myelinated nerve fibers. These ultrastructural data provide the first structural evidence of autonomic neuropathy in the Chinese hamster, and seem to support the hypothesis that autonomic neuropathy may be the primary factor associated with gastrointestinal hypomotility. (Supported in part by an Upjohn Company Grant and Baylor University Research Grants 002-76/7-BU-303 and 022-76/7-BU-303).

ULTRASTRUCTURE OF AECIOSPORE FORMATION IN THE DEWBERRY RUST FUNGUS GYMNOCONIA PECKIANA. Charles W. Mims, Department of Biology, Stephen F. Austin State University, Nacogdoches, Texas 75962.

The rust fungus **Gymnoconia peckiana** infects leaves of the common dewberry **Rubus trivialis.** The lower epidermis of the leaf is eventually ruptured by the fungus revealing a mass of bright yellow to orange aeciospores. These spores arise from a layer of tightly packed sporogenous cells. Sprogenous cells give rise to binucleate aeciospore initials basipetally. Each initial is produced from the open end of a sporogenous cell and delimited by a centripetally developing septum. The nuclei within the aeciospore initial then divide mitotically and an unequal cell division results in the formation of a small binucleate disjunctor cell and a larger aeciospore proper. The disjunctor cell dies while the aeciospore continues to develop. The cytoplasm of the spore becomes dense and large numbers of lipid droplets appear. Small electron-transparent deposits appear on the outer surface of the plasma membrane of the aeciospore beneath the primary spore wall. These deposits develop into spines and are pushed to the surface of the spore wall as a result of the deposition of wall material beneath them. At maturity the surface of the spore is covered with these spines.

ULTRASTRUCTURE OF SPERM STORAGE ORGANS IN MALE MYOTIS VELIFER (ALLEN) Mary Doerfler and T.R. Hoage Dept. of Life Sciences, SHSU

Mammalian males store sperm in the cauda epididymidis for an average of 23 days, however, extended sperm maintenance occurs in male **Myotis velifer** (Allen) and other Chiropterans. Previous studies have described sperm storage in bats but ultrastructural studies of **M. velifer** are lacking. Male **M. velifer** were collected seasonally from May to March and the testis, epididymidis, ampulla and seminal vesicles excised. These were fixed in modified Brightman's paraformaldehyde-gluteraldehyde, buffered with Sorenson's phosphate buffer at pH 7.3 and subsequently embedded in Epon 812. One μ and silver to gold sections were treated with stains and emzymes and analyzed by electron microscopy. Epithelia of **M. velifer** cauda epididymidis showed cuboidal cells with sterocilia and basal cells similar to those seen in other studies. A comparison of winter bats (September-March) to summer bats (May-August) shows the epithelial cells of the winter bat to have a greater volume, an increase in secretory material, RER, golgi, vesicles, and a larger number of sperm concentrated in the epididymal

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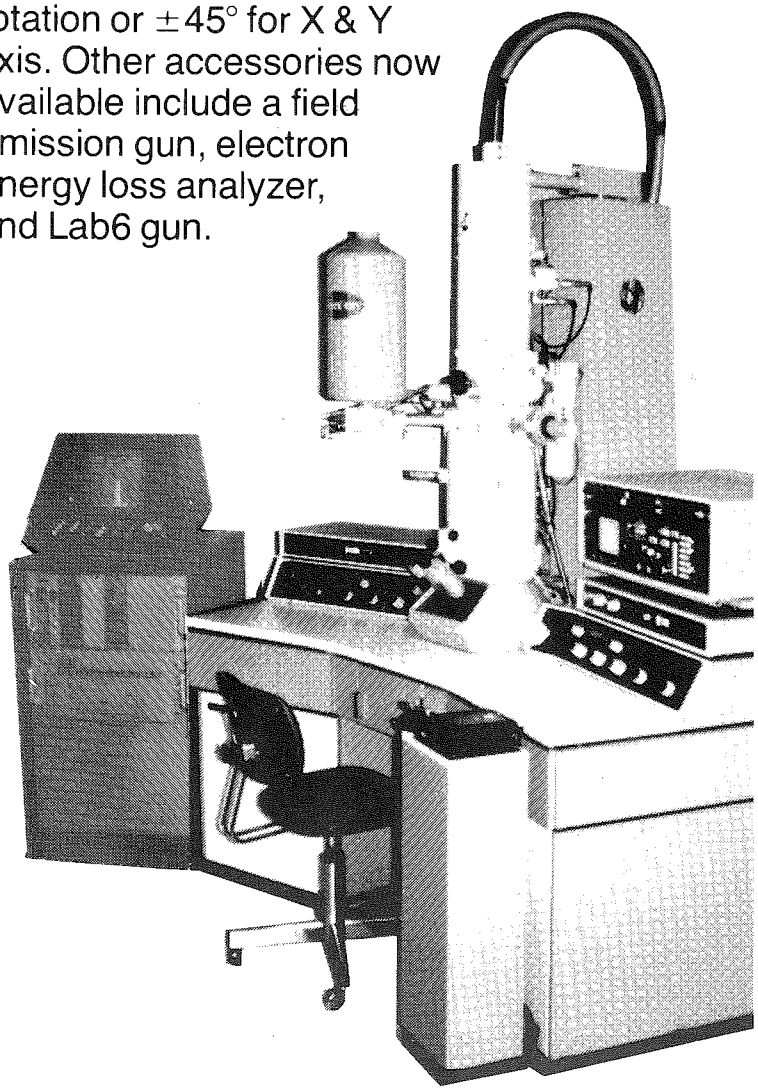

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lumen. During the same time interval, the ampullae of the winter bats show increased secretory activity with an abundance of RER, golgi, vesicles, and fewer mitochondria. Summer bats show a greater concentration of microvilli, fewer RER and golgi in the ampullar epithelium. The seminal vesicles of the winter bats had a cuboidal epithelium with sparse microvilli, while summer bats had more columnar cells with some RER and golgi. Few secretions were noted although abundance of RER and golgi were present in winter bats. These studies extend the reported time of active sperm maintenance from September through March in winter bats and show an increase in secretory organelles and secretory granules. Cellular activities and secretions are described through cytological tests.

STEREOLOGICAL ANALYSIS OF MITOCHONDRIAL DEVELOPMENT IN GERMINATING PHASEOLUS VULGARIS L. AXIS. Betty Hamilton and Glenn Todd, School of Biological Sciences. Oklahoma State University, Stillwater, Oklahoma 74074.

The early stages of speed germination are marked by rapid initiation of various metabolic systems as the tissue undergoes the transition from dormancy to active development. Respiratory uptake of O_2 is one of the first measurable metabolic activities, and is crucial to the initiation and continued function of mother metabolic systems. Early respiratory activity parrallels increased fresh weight of the tissue. Hydration occurs rapidly, within two hours in excised **Phaseolus vulgaris** L. axis, and is followed by a plateau phase in which neither fresh weight nor respiratory activity change rapidly. The plateau phase is terminated by steadily increasing respiratory rate and fresh weight. Once this transition occurs, the tissue is committed to the sequence of activities leading to development of the embryo into a mature plant.

The object of this study is to establish the relationship between changes in respiratory activity and changes in mitochondrial structure during the early stages of germination. Using the excised axis of **P. vulgaris** as a model system, the stereological parameters V_V, S_V, S/V, and n have been calculated for mitochondria at three points in the previously described sequence: the end of rapid hydration (two hours), the end of the end of the plateau phase (six hours) and the period of increasing respiratory activity (sixteen hours). The data provides insight into developmental processes occuring during the earliest stages of germination.

CAPILLARY BASEMENT MEMBRANE THICKENING IN THE SMALL INTESTINE OF THE KETOTIC DIABETIC CHINESE HAMSTER. E.A. Weaver and A.R. Diani, Baylor University, Waco, Texas.

Capillary basement membranes from the small intestine of four ketotic diabetic Chinese hamsters, matched with non-diabetic controls, were examined in this pilot study. Intestinal tissue was initially fixed in Karnovsky's medium and followed by post-fixation in osmium. The tissue was embedded in Epon-Araldite and uniform thin sections (silver) were obtained. All sections were stained in uranyl acetate and lead citrate and examined until ten measurable capillaries from the intestine of ketotic and control animals were found. The electron microscope was calibrated daily to insure accurate magnification and measurement of capillary basement membranes. The basement membranes from each animal were measured in the short axis of the capillary. Capillaries which were juxtaposed to pericytes were rejected from the study. The two measurements for each basement membrane were averaged, and the mean for ten basement membrane measurements was calculated. A parametric t-test for paired means was utilized to analyze the data.

The basement membrane data indicated significant thickening in the capillaries of ketotic animals compared with controls. The degree of capillary basement membrane thickening was not correlated with duration of ketosis due to the limited number of animals involved in this investigation.

This work was supported by a grant from the Upjohn Company, Kalamazoo, Michigan, and by Baylor University grants 002-76/7-BU-303 and 022-76/7-BU-303.

ULTRASTRUCTURAL FEATURES OF SOFT TISSUE TUMORS. Bruce Mackay, M.D. Anderson Hospital and Tumor Institute.

The identification and classification of soft tissue tumors, particularly the sarcomas, is frequently a problem by routine light microscopy. At the present time, approximately 20% remain unclassified despite careful study of light microscopic sections and the use of histochemical procedures. Ultra-structural studies have demonstrated that when electron microscopy is correlated with the light microscopic histology, the pathologist has a significantly better opportunity to identify the cell type and classify the tumor. In addition, a better understanding of the histogenesis and interrelationships of the soft tissue tumors is emerging, and new variants are being characterized. Precision in classification increases the accuracy of studies on biologic behavior and response to therapy, and hopefully will contribute to more selective approaches to therapy.

GRANULAR CELL TUMOR (GRANULAR CELL MYOBLASTOMA) - SCHWANN CELL ORIGIN. Mattie I. Bossart — St. Luke's Pathology — St. Luke's Episcopal Hospital, Houston Texas.

Granular cell tumors are usually solitary lesions which arise in the dermis, subcutaneous, and submucosal tissues. The histogenesis of the tumor remains unclear. Electron microscope data supports peripheral nerve as the origin of this tumor which replaces the original concept of a striated muscular derivation.

This is an ultrastructural study of eight cases which show a cellular arrangement reminiscent of the pattern seen in small peripheral nerves. There is a spectrum of cells resembling Schwann cells containing few lysosomal granules and adjacent profiles of membrane bound axon-like structures to rounded cells in which the cytoplasm is engorged with lysosomes.

The low incidence of malignancy, ultrastructural resemblance to peripheral nerve, and anatomical universality of the site of origin of these tumors lend support to the conclusion that these lesions are of Schwann cell origin.

UTERINE ULTRASTRUCTURE AND SPERM MAINTENANCE IN MYOTIS VELIFER (ALLEN). Judy Brown and T. R. Hoage Life Sciences Dept. SHSU

Female mammalian sperm storage for up to 5 or 6 months has been shown in various Chiropteran species. This study approaches the problem of sperm association with the uterine lining of the cave bat, **Myotis velifer.** Female bats were collected March through December, and the reproductive tract immediately fixed in modified Brightman's paraformaldehyde-glutaraldehyde fixative, pH 7.3, for 2 hours, postifxed in 1% OsO_4 in phosphate buffer, pH 7.3 and subsequently embedded in Epon 812. One μ and silver to gold sections were treated with various stains and enzymes, followed by light and electron microscopic analysis. Tissue ultrasturcture from winter (September-March) and summer (May-August) bats was compared in terms of spermatozoan presence and showed that a glandular area possessing numerous ciliated cells existed near the oviductal junction. During the summer, spithelial cell nuclear density indicated reduced activity while the cytoplasm and abundant lysosomes, a small amount of Golgi uterine lumen in winter

bats, but are much more concentrated in the glandular area or "seminal receptacle." The sperm are often aligned parallel to the epithelial cells or embedded in crypts between cells, and membrane-membrane contact exists between the sperm and the plasma membrane, cilia, and microvilli of the epithelial cells. Epithelial cells exhibited a 3 fold increase in size and contained an increased concentration of glycogen, Golgi, ER, and mitochondria. Sperm are stored in the uterus of **Myotis velifer** females from late September to early March and an obvious increase in specific cellular activity for sperm maintenance can be detected within the uterine horns at this time.

CELL-MEDIATED REORDERING OF EXTRACELLULAR MACROMOLECULES IN ATRIOVENTRICULAR (AV) MORPHOGENESIS. Markwald, Roger R., David H. Bernanke and Jayne M. Krook. Department of Anatomy, Texas Tech University School of Medicine, Lubbock, Texas.

Reordering (restructuring) of the extracellular macromolecular cytology accompanies **in vivo** migration of the cells (cushion mesenchyme) destined to become AV valvular & septal primordia. Reordering involves 1) the coalescence of randomly arranged microfibrils into focalized matrical "tracks" coincident with the formation of motility appendages; and 2) degradation of the polyanionic matrical continuum termed "CPCL-dependent" matrix consisting of hyaluronate, glycoprotein and chondroitin sulfate-protein (visualized respectively as 3nm filaments, electron-dense amorphous material and 30nm granules). To determine whether such changes represent matrix "maturation" or cell-mediated events, migrating chick cushion cells were 1) treated with cytochalasin B (5μg/O.1cc injected at 55 hrs and collected at 85 hrs) to block formation of locomotive appendages; and 2) exposed to horseradish peroxidase (HRP) lysozyme (vital stain for polyanions) or matrix pre-labeled (i.e., before migration) with ^{3}H-glucosamine (GSA) or $Na^{35}SO_4$ (1. OμCi injected at hour O and collected at 85 hrs) to test the capacity for cushion cell endocytosis of glycosaminoglycans (GAG). Results indicate that 1) blocking the formation of motility appendages with cytochalasin B prevented formation of both microfibrillar tracks and the corresponding plasmalemmal modifications accompanying normal sites of "trackpseudopodial" interractions; and 2) migrating cushion cells readily incorporate HRP and lysozyme into endocytic vesicles which similarly blind dialyzed iron at pH 2.5 (visual probe for carboxyl groups) and preferentially incorporate GAG labeled with GSA rather than sulfate. These findings tentatively suggest that matrix modification or conditioning accompanies **in vivo** cell movement and moreover, appears to be the direct consquence of cell: matrix interractions. Supported by NIH grants HL 19136 and K01-HL-0228.

A SCREENING STUDY FOR VIRUSLIKE INCLUSIONS IN BLOOD CELLS OF PATIENTS WITH ACUTE LEUKEMIA. G. Seman and Robert Matthews, Department of Molecular Carcinogenesis and Virology, The University of Texas System Cancer Center, M. D. Anderson Hospital and Tumor Institute, Houston, Texas 77030.

In a collaborative morphological and biochemical study with the National Cancer Institute, leukapheresis specimens of 12 patients with leukemia in acute phase (6 acute myeloblastic and 2 acute lymphoblastic leukemias, 1 hairy cell leukemia, 1 undifferentiated leukemia, and 2 chronic myelogenous leukemias in blastic crisis) were examined in thin sections for the presence of cytoplasmic inclusions of possible viral origin. Inclusions were found in 5 of the cases (3 AML, 1 undifferentiated leukemia, 1 CML in blastic crisis). Similar inclusions have already been observed by us and by others in France, England and Turkey. However, several points concerning their fine structure remained unclear, and their relationship to the biochemical expression of oncornavirus activity in leukemic cells was unknown. In the present study, inclusions in the form of 100-150 nm particles and of filamentous networks were observed in poorly differentiated, large cells of probable reticuloendothelial origin. These inclusions were contained in smooth endoplasmic channels connected to the perinuclear space and to dilated rough endoplasmic sacs. Sacs and perinuclear space were filled with a loosely organized granulo-filamentous substance. The viruslike particles apparently are formed not by a mechanism of budding but by condensation of subunits in a finely granular intracavitary matrix. There was no correlation between the presence of inclusions and biochemicals expression of type C viruses as determined in "core" preparations of patients' peripheral blood cells.

IDENTIFICATION OF A VIRAL AGENT CAUSING TRAVELERS' DIARRHEA BY ELECTRON MICROSCOPY. John J. Vollet. The University of Texas Medical School at Houston, TX.

The human rotavirus is an important cause of diarrhea worldwide in infants and young children (0.5-3 yrs.). The basic technique for identifying the virus in diarrheic stools is electron microscopy for direct visualization of viral particles. Stool preparation was done by the pseudoreplica technique in which fecal samples (1 gm) are homogenized with 0.2 M phosphate buffer and trichlorotrifluoroethane, centrifuged (4,000 xg, 30 min.) and the resulting supernatant collected. One drop of stool supernatant is allowed to diffuse and dry on 1 cm agar squares followed by adding 0.25% Formvar. The Formvar membrane is then floated off the agar into 3% PTA and picked up on a 200 mesh grid. Examination of the grid for viral particles was done on a JEOL 100-B electron microscope.

Using this technique, the role of rotavirus in travelers' diarrhea has recently been evaluated in an adult population of 300 U.S. students (mean age 31; range 15-68 yrs.) attending a Mexican university for summer school. Rotavirus was found in a significantly ($p<0.020$) greater number of adults who were ill with diarrhea (36.4%) when compared to age-matched controls without diarrhea (13.4%). All stools were simultaneously checked for bacterial and parasitic pathogens. A relationship is now indicated between travelers' diarrhea in adults and the human rotavirus which heretofore has been thought to be restricted to infants. In addition, rotaviruses must now be considered as an additional agent of any adult diarrhea.

STRUCTURE ANALYSIS OF EXTRACELLULAR MATRIX WITHIN THE CELL-FREE SPACE (CFS) TRAVERSED BY MIGRATING CEPHALIC NEURAL CREST CELLS. Bolender, D. L. and W. G. Seliger, Dept. of Anatomy, Texas Tech Univ. School of Medicine, Lubbock, Tex.

Neural crest cells destined to "seed" craniofacial premordia migrate in a CFS between the surface ectoderm and underlying mesoderm containing an abundant extracellular matrix (ECM). The purpose of the present study was to characterize the ECM by polyanionic histochemical techniques (Alcian Blue pH 1.0 and 2.5) and by scanning electron microscopy (SEM interfaced to an X-ray energy dispersive analysis system). Chick embryos 24-30 hours of age (stage 7-8) were fixed in either 10% buffered formalin solution of 3% glutaraldehyde containing cetylpyridinium chloride (CPCL) and processed for light or electron microscopy. Alcianophilic material spanned the CFS coating the mesoderm, exterior of the neural tube and basal surface of the ectoderm. Alcianophilia was diminished after treatment with **Streptomyces** hyaluronidase and removed with testicular hyaluronidase treatment. Buffer controls were similar to untreated sections. Similar staining patterns were observed in

sections treated **en bloc** with colloidal iron. Staining was abolished after acid methylation at 60°C. Removing the ectoderm revealed by SEM that the CFS consisted of a microfibrillar network and a continuum of pleomorphic strands whose retention depended on adding CPCL to the fixative. Spot mode X-ray analysis of the CPCL-dependent matrix indicated strong sulfur K_a emission. Microfibrils of the CFS in close proximity to the mesoderm were uniquely studded with a granular matrical component. Treatment with T-hyaluronidase disrupted the stroma. Data suggest that CFS is rich in both sulfated and non-sulfated glycosaminoglycans which are contained in pleomorphic strands and granules associated with microfibrils.

THE EFFECT OF CASTRATION AND ANDROGEN REPLACEMENT THERAPY ON THE SURFACE MORPHOLOGY OF GUINEA PIG SEMINAL VESICLE AS STUDIED WITH THE SCANNING ELECTRON MICROSCOPE. S.C. Robinson, J.M. Burns, and J.F. Bailey. Department of Biological Sciences, Texas Tech University, Lubbock, Texas 79409.

The effect of bilateral orchiectomy on guinea pig seminal vesicle can be observed by changes in surface morphology. Within days of castration, it is known that this homogenous columnar tissue deteriorates, losing cell-to-cell adhesion and ability to produce specific proteins, thus illustrating the androgen-dependence of seminal vesicle in order to maintain uniformity in structure and protein synthesis. This scanning electron microscope study is designed to demonstrate the rapid degeneration of this tissue during the two week period following castration. Experiments in androgen supplementation have succeeded in restoring cellular cohesiveness and protein synthesis. Treatments of 3-α-androstanediol and testerone proprionate suggest a differential hormone replacement effect upon the lumenal surface of the seminal vesicles. An attempt to determine these effects is presented.

AN ULTRASTRUCTURAL STUDY OF THE SMALL BOWEL OF THE KETOTIC DIABETIC CHINESE HAMSTER. David M. Grogan and Arthur R. Diani, Department of Biology, Baylor University, Waco, Texas

An ultrastructural analysis of the small bowel of ten ketotic diabetic Chinese hamsters, matched with controls, was performed to describe the types and incidence of pathologies. The apical cytoplasm of some epithelial cells in ketotic animals displayed dense residual bodies and myelin figures. Some of the Paneth cells in ketotics contained dense residual bodies, myelin figures, and granular degeneration. Extensive vacuolization of Paneth cell cytoplasm, juxtaposed to degenerating granules, was observed in a majority of the ketotic animals. All ketotics possessed some swollen or hypertrophic axons in the myenteric plexus of Auerbach. Glycogen deposition and myelin figures were observed in these enlarged axons.

The aberrations in the epithelial and Paneth cells may be associated with absorptive and digestive dys function. The ultrastructural pathologies in the Auerbach's plexuses provide the first morphological evidence of autonomic neuropathy in the Chinese hamster. These neuronal lesions may be the primary factor underlying gastrointestinal hypomotility in the Chinese hamster.

Supported in part by an Upjohn Company Grant and Baylor University Research Grants 002-76/7-BU-303 and 022-76/7-BU-303

EXOCRINE AND ENDOCRINE PANCREAS IN HUMAN JUVENILE PANCREATITIS. K. Porter, A.R. El-Din and W.A. Shannon, Jr., Veterans Administration Hospital and Department of Cell Biology, Southwestern Medical School, Dallas, Texas.

Electron microscopy revealed atrophic areas of exocrine and endocrine pancreas along with areas of relatively normal cellular organization. Within the affected exocrine areas, the normally tightly organized acinar cells appeared loosely arranged with marked dilation of the acinar lumina in some areas. Within the dilated lumina, amorphous material of different densities was observed, with that on the periphery being fibrous and probably corresponding to previously reported protein precipitates. The number of mature zymogen granules appeared deficient. Mitochondria in affected cells were swollen with severely reduced numbers of cristae and loss of normal matrix density. The rough ER, normally compact and with flattened cisternae, appeared dilated, often taking on a spherical shape. Many acinar duct cells appeared necrotic with a loss of cytoplasmic organelles and containing finely granular irregular shaped electron dense material similar to that in the acinar lumina. Nuclei in the duct cells exhibited heavy peripheral distribution of chromatin. Electron dense, usually elongated and often spindled bodies sometimes associated with lipid droplets appeared in some acinar cells.

Endocrine cells also exhibited loosely organized cytoplasm with swollen mitochondria, dilated ER cisternae and vacuoles. The proportion of A, B and F cells appeared to be normal by initial immunofluorescence and histological studies. However, a reduction in the number of D-cells was indicated. The B cells appeared to have more numerous granules than normal while the A cells often exhibited abnormal granules. Tubular arrayed structures, possibly derived from ER were also seen and may correspond to previously reported "annular images".

THE ULTRASTRUCTURE OF RENAL BIOPSIES FROM PEDIATRIC PATIENTS WITH HEMATURIA. Hillman, J.R. and R.B. Brackeen, Department of Pediatrics, University of Colorado Medical Center, Denver, Colorado and Department of Anatomy, Texas Tech University School of Medicine, Lubbock Texas.

Hematuria in children has multiple causes and often the diagnosis can be readily determined. The percutaneous renal biopsy has become the final step in the diagnosis of hematuria in cases where the cause is intrarenal. The purpose of this presentation is to describe the ultrastructure of renal biopsies from two distinct conditions cuasing hermaturia in children: immunoglobulin A glomerulonephritis is common in childhood. It is characterized clinically by hematuria, frequent upper respiratory infections and mild proteinuria. Ultrastructural features include mesangial proliferation with associated electron dense deposits consisting of IgA, IgG and C_3. Capillary loops are involved with focal areas of thinning of the basal laminia and less consistent findings of endothelial hypertrophy, feet process fusion and occasional electron dense deposits on epithelial or endothelial surfaces of basal laminae.

Familial benign essential hematuria is characterized by persistent microscopic or gross hematuria with biopsy findings of marked thinning of glomerular basal laminae that consist of irregular narrowing of the lamina densa. This may be associated with focal fusion of foot processes and no other abnormal features.

Areas of basal lamina thinning are present in both of the above conditions. This is an unusual feature and may be associated with the hermaturia.

HETEROCHROMATIN AND ITS RELATIONSHIP TO HISTONE PHOSPHORYLATION. S.S. Barham, R.A. Walters, L.L. Deaven, and L.R. Gurley, Department of Pathology and Anatomy, Mayo Clinic, Rochester, Minnesota 55901 and Cellular and Molecular Biology Group, Los Alamos Scientific Laboratory, Los Alamos, New Mexico 87545.

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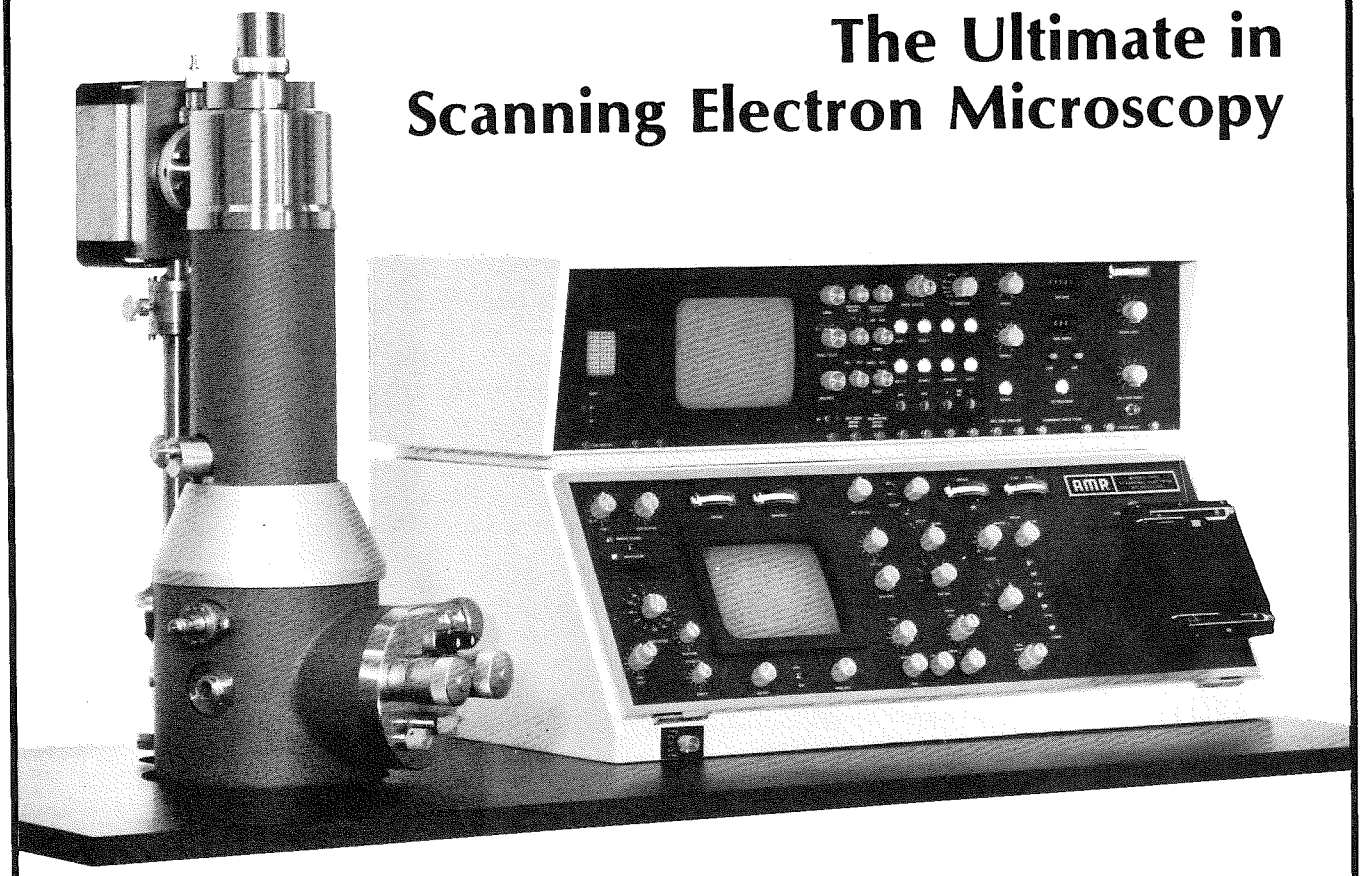

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Regional News

HOUSTON: The University of Texas Health Science Center at Houston.

Department of Infectious Diseases and Clinical Microbiology

The Program in Infectious Diseases and Clinical Microbiology contains a JEOL 100B microscope under the supervision of Dr. Jay Vollet. The major work is for the identification of viral agents from human samples. The research thrust is directed at identifying those viral agents that cause diarrhea. To this end the Program was recently awarded a 3-year contract of 837,000 dollars from the National Institute of Allergy and Infectious Disease to establish the nation's first Infectious Enteric Disease Study Center. Intensive data gathering on the incidence of diarrhea in the Houston area will be conducted to determine the pathogens involved. Direct and immune electron microscopy is now being used to identify rotaviruses and parvovirus-like agents as the viruses involved in pediatric and adult diarrhea. In addition, the pathogenesis of viral diarrhea is being investigated. Dr. Jay Vollet was also a recent recipient of a matching 2,000 dollar grant from The National Foundation for Infectious Diseases to study "Antigenic Variation Among Human Rotaviruses that Induce Gastroenteritis".

HOUSTON: University of Texas Medical Science Center at Houston.

Department of Neurobiology & Anatomy

The Department of Neurobiology & Anatomy has had the following visitors, either as candidates or visitors, visit with our department and present seminars:

W. J. McBride, Ph.D., Associate Professor, Indiana University School of Medicine, "Amino Acids Transmitters in the Cerebellum".

Jack C. Waymire, Ph.D., Assistant Professor, University of California, Irvine, Department of Psychobiology & Developmental Cell Biology, "The Roles of Cyclic AMP — Regulating the Synthesis and Secretion of Catecholamines-cultured Adrenergic Cells".

Gary D. Gray, Ph.D., Staff Fellow, Stanford University, Department of Physiology, "Gonadotrophin Changes — Middle Age Female Rats".

David W. McCandless, Ph.D., Staff Fellow, National Institute of Health, Bethesda, "Thiamin Deficiency and Regional Cerebral Energy Metabolism".

John A. Robson, Ph.D., Postdoctoral Fellow —NIH, Department of Pharmacological and Physiological Sciences, University of Chicago, "Morphology of Retino-geniculate Axons as Revealed by Diffuse with Horseradish Peroxidase".

Charles Murrin, Ph.D., Postdoctoral Fellow, Department of Pharmacology & Experimental Therapeutics, John Hopkins University, "Activation of High Affinity Choline Up-take **in vitro** and the Formation of Releasable Acetylcholine".

William T. Chance, Ph.D., Postdoctoral Fellow, Department of Pharmacology, Medical College of Virginia, Richmond, "Centrifugal Control of Pain: Autoanalgesia Mechanism".

Lindsey Grandison, Ph.D., Staff Fellow, National Institute of Mental Health, Washington D.C., "The Involvement of Opiates — Prolactin Secretion".

Janet Blanks, Ph.D., Research Fellow, Department of Neuroscience, Harvard Medical School, "Retinal Degeneration in Mice".

Robert Blanks, Ph.D., Associate Professor, Department of Anatomy, Harvard Medical School, "Cerebellar Control of the Vestibulo-ocular Mechanism: Anatomical and Physiological Studies".

Gayle Hostetter, Ph.D., Assistant Professor, Department of Anatomy, Colorado State University, "Vasopressin: Anatomical and Behavioral Correlates".

Gerald P. Kozlowski, Ph.D., Professor, Department of Anatomy, Colorado State University, "Brain Pathways Which Secrete Hormones".

Zehava Gottesfeld, Ph.D., Visiting Scientist, National Institute of Mental Health, Bethesda, Neurochemistry and Histopharmacology Section, "In Search of Neurotransmitters — Specific Pathways in the Brain".

Stephen C. Bondy, Ph.D., Associate Professor, Department of Neurology & Pharmacology, University of Colorado Medical Center, "The Axonplasmic Transport of Micromolecules".

Rex Y. Wang, Ph.D., Assistant Professor, Department of Psychiatry, Yale University School of Medicine, "Anatomical and Physiological Evidence for Collateral Inhibition of Serotonergic Neurons in the Rat Dorsal Raphe".

Michael Sheridan, Ph.D., Professor, Department of Anatomy, University of Rochester, School of Medicine & Dentistry, "The Pineal Gland: Morphology & Function".

Rebekah Loy, Ph.D., Postdoctoral Fellow, Department of Neuroscience, University of California, San Diego, "Development of Regeneration in the Hippocampus".

Jack C. Waymire, Ph.D., University of California, Irvine, Zehava Gottesfeld, Ph.D., National Institute of Mental Health, David W. McCandless, Ph.D., NIH, and Gerald P. Kozlowski, Ph.D., Colorado State University have accepted faculty positions within our department.

Marilyn Munkres, M.S., previously employed at Yale University, has recently joined our department as a Teaching Associate. Ms. Munkres is the Director of the electron microscope facilities which include the recently purchased JEOL 100CX analytical electron microscope with KEVEX X-ray detector. Her main interests are the development of techniques for the AEM and ammuno cytochemistry.

Barbara Block, who has been with us for the past 2 years and who has been instrumental in the development of our cadaver program, will be leaving the department at the end of March. She and her husband are moving to Des Moines, Iowa to venture into the business world on their own. Good luck to both of them!

Pat Caver, formerly with the Department of Reproductive Medicine and Biology, has recently joined our department. Ms. Caver will be replacing Barbara Block on the cadaver program and will be working very closely with the State Anatomical Board of Texas. Welcome Pat!

The faculty of the Department of Neurobiology & Anatomy has been very active since the beginning of the new year. The following are presentations and meetings various members of the department have engaged in and/or will be engaging in:

Leonard D. Aldes, Instructor, Feb., traveled to Colorado State University to conduct experiments with fellow colleagues and bring back experimental data to use in research laboratories in Houston. April 1-6, Dr. Aldes will attend and present a paper titled "Tongue Representation in the Cerebellar Nuclei of the

Macacas Rhesus" at the 91st Annual Meeting of the American Association of Anatomists in Vancouver, British Columbia.

Dr. Jon DeFrance, Associate Professor, Feb., presented seminars titled "Mechanisms of Post-tetanic Potentiation" and consulted with colleagues at Wayne State, Detroit, University of Michigan, Ann Arbor and University of South Alabama, Mobile.

Dr. S. J. Enna, Associate Professor, Departments of Pharmacology and Neurobiology & Anatomy, traveled to Denver, Colorado to present a paper at the 11th Annual Winter Conference on Brain Research. April 6 & 7, Dr. Enna traveled to Washington, D.C. to hold a consultation with colleagues on similar research and presented a paper titled "Molecular Biology of Huntington's Disease" at a seminar titled " Autosomal Dominant Neurological Disorders" sponsored by NINCDS. March 29, he gave a lecture titled "Neurotransmitter receptors and neurologic disorders" to Neurology residents at the University of Texas Medical Branch in Galveston. March 17, Dr. Enna presented a talk on "Current Concepts in the Therapy of Parkinson's Disease" to the Houston Area Parkinson's Society. During the month of May, Dr. Enna has been asked to present a talk at the Alfred Benzon Symposium in Copenhagen, Denmark on GABA Neurotransmitters. During July and August, he will be attending and presenting a paper at the Symposium GABA-Biochemistry and CNS Function in Strasbourge, France. He will also be consulting with members of the Hoffman-LaRoche Company on joint research projects in Basal, Switzerland.

Gregory Fuller, graduate student, traveled to Washington D.C. in March to attend the American Society for Neurochemists.

Dr. JoAnn McConnell, Instructor, during the first 3 weeks in March, traveled to Dr. John Sladek's laboratory in Rochester, New York to learn special laboratory techniques on special equipment available only in Dr. Sladek's laboratory. These techniques were applied upon her return to Houston. Dr. McConnell also attended (Feb.) a symposium in Lubbock, Texas on "Aging and Neuroendocrinology". April 1-6, she will attend the 29th Annual Histochemistry Society meeting and present a paper titled "Distribution of Autonomic Fibers to Pelvic/Perineal Viscera of the Human Male" at the 91st Annual Meeting of the American Association of Anatomists in Vancouver, British Columbia.

Dr. Michael Oberdorfer, Assistant Professor, April, will attend the Annual Meeting of the American Association of Anatomists in Vancouver, British Columbia, and will consult with fellow colleagues on mutual research interests.

James Stanley, Ph.D., Feb., traveled to Detroit, Michigan and Ann Arbor, Michigan to present seminars and consult with colleagues on research.

Dr. Richard Wiggins, Assistant Professor, traveled to Washington D.C. on March 10th to chair a session titled "Myelin: Metabolism and Enzymology" and present a peper on "Measuring Myelin Synthesis by Double Isotope Methods" at the American Society for Neurochemistry. Margaret Bell, graduate student and co-author of the above mentioned paper was also present at this meeting.

Joe G. Wood, Professor and Chairman, April 1-6, will attend the 91st Annual Meeting of the American Association of Anatomists in Vancouver, British Columbia and will attend the Annual Meeting of the Histochemistry Society in Vancouver and present a paper on "Histochemical and Cytochemical Identification of Autonomic Nerve Fibers to Pelvic/Perineal Viscera of the Human Male".

Yvonne C. Clement-Cormier, Ph.D., Assistant Professor, has received the Pharmaceutical Manufacturer's Faculty Career Development Award. This award will pay Dr. Cormier's salary for 2 years plus indirect costs and allow her to devote more time to her research.

Dr. S. J. Enna, Associate Professor, received a Research Career Development Award from the National Institute of Neurological and Communicative Disorders and Stroke (NINCDS). This award will provide Dr. Enna's full salary or up to $30,000 for 5 years and allow him to be relieved of some of his teaching duties and devote more time to his research.

The Department of Neurobiology and Anatomy would like to announce the arrival of our new JEOL 100CX electron microscope with KEVEX dispersive X-ray analysis. Also, we would like to thank JEOL for the nice "open house" provided in honor of this receipt.

SAN ANTONIO: The University of Texas Health Science Center

Departmentof Anatomy

Publications: Gravis, C.J., 1978. A scanning electron microscopic study of the Sertoli cell and spermiation in the Syrian hamster. Am. J. Anat. 151:21-28.

Gravis, C.J., 1978. Testicular involution after optic enucleation: Ultra-structure and alkaline phosphatase cytochemistry of the peritubular tissue. Am. J. Anat. 151: 213-226.

Gravis, C.J., 1978. Interrelationships between Sertoli cells and germ cells in the Syrian hamster. Z. mikros.-anat. Forsch. (In Press).

Herbert, D.C., H. Ishikawa, M. Shino and E.G. Rennels, 1978. Prolactin secretion from clonal pituitary cells following incubation with estradiol, progesterone, thyrotrophin releasing hormone and dopamine. Proc. Soc. Exp. Biol. Med. (In Press).

McGill, J., D.C. Herbert and T. Hayishida, 1978. Immunocytochemical identification of rat growth hormone cells utilizing antisera to submandibular growth hormones. Gen. Comp. Endocrinol. (In Press).

Herbert, D.C., 1978. Identification of the LH and TSH-secreting cells in the Rhesus monkey pituitary gland. Cell Tiss. Res. (In Press).

Berry, V.K., L.E. Murr and B.E.F. Reimann, 1978. An SEM study of morphological and leaching characteristics of thermophilic microorganisms isolated from an experimental ore body. SEM/1978 (In Press)

Mehta, A., A.E. Torma, L.E. Murr and V.K. Berry, 1978. An SEM characterization of biodegradation of aluminum-bearing rocks by fungi. SEM/1978 (In Press)

Adrian, E.K., M.G. Williams and F.C. George, 1978. Fine structure of reactive cells in injured nervous tissue labeled with ^{3}H-thymidine injected before injury. J. Comp. Neurol. (In Press)

Shino, M.I. Ishikawa and E.G. Rennels, 1978. Accumulation of secretory granules in pituitary clonal cells derived from the epithelium of Rathke's pouch. Cell Tiss. Res. 186: 53-61.

Ishikawa, H.M. Shino and E.G. Rennels, 1978. Subclones of normal clonal prolactin cells of the rat. In Vitro (In Press)

Shino, M.H. Ishikawa and E.G. Rennels, 1978. Specific subclones derived from a multipotential clone of rat anterior pituitary cells. Am. J. Anat. (In Press)

Smith, N.R., R.L. Sparks T. Pool and I.L. Cameron, 1978. Differences in the intracellular concentration of elements in normal and cancerus liver cells as determined by X-ray microanalysis. Cancer Res. (In Press).

Ishikawa, H., M. Shino and E.G. Rennels, 1978. Separation and maturation of gonadotrophs from 2A8 clonal cells **in vitro.** Cell Tiss. Res. (In Press)

Morgan, W. W. and J. T. Hansen, 1978. Time course of the disappearance of pineal noradrenal in following superior cervical ganglionectomy. Exp. Brain Res. (In Press)

Hansen, J. T., 1978. Development of the rabbit subclavian glomera (aortic bodies). A light, fluorescence and electron microscopic study. Am. J. Anat. (In Press).

News Briefs: Members of the Department of Anatomy submitted 27 abstracts for presentation at the recent American Association of Anatomists meeting in Vancouver, British Columbia.

Recent seminars in the department were given by Dr. Robert Klein from the University of Kansas, and by Dr. Dorothy Burk from the University of Virginia.

Dr. Rennels was the guest of the Department of Anatomy, Tulane University, and presented a lecture on clones from the anterior pituitary as a participant in the Distinguished Scientist series.

Two Japanese researchers joined the department as postdoctoral fellows in the labs or Drs. Shino and Rennels. Dr. Takeo Maruyama came from Tohoku University School of Medicine, Sendai, Japan. He is a specialist in electro-physiology. Dr. Tadao Tanaka came from Tokyo Jikei University School of Medicine, Tokyo, Japan. Both researchers will be working in the area of tissue culture.

Dr. Hiroshi Ishikawa will be leaving San Antonio on April 28, 1978, to return to his position in Tohoku University School of Medicine. Dr. Ishikawa was extremely productive during his stay in San Antonio and created a lot of interest in tissue culture techniques. He will be greatly missed.

Dr. Robert Gulley will be joining our faculty in June, 1978, as an Assistant Professor. Dr. Gulley comes to us from Case Western Reserve University and brings with him an extensive background in freeze-etch techniques and interpretation. Dr. Gulley did a Postdoctoral study under Dr. T.S. Reese.

Grants were recently awarded to the following: Dr. Shino, "Studies on functional clonal gonadotrophs of the rat," NIH (3 years); and Dr. Rennels, "Studies on a new clone of rat prolactin cells," NIAMDG (3 years).

LUBBOCK: Texas Tech
Department of Anatomy

The Department of Anatomy is pleased to announce that Dr. Penelope Coates will join the faculty this fall. Dr. Coates is currently a member of the Dpeartment of Biological Structure at the University of Washington. She received her Ph.D. from Southwestern and completed a 2-year postdoctoral fellowship at UCLA. She is a trained Neuroanatomist with research interests in the study of the supraependymal cells in the floor of the third ventricle.

Dr. William Seliger was recently awarded a grant from the National Institute of Health. His grant was entitled "Matrix Mediated Expression in Cranio-Facial Development" and will run for three years. The amount of the award was $85,000.00.

Dr. Roger Markwald was invited to present a seminar entitled "Role of the Extracellular Matrix in Cardiac Valvular Development.", at the University of South Carolina at Columbia. Dr. Markwald also presented seminars at the Medical University of South Carolina in Charleston. They were entitled, "Deciduate Cell Response to Alkaline Phosphatase and Thymidine-^{3}H upstake," and "Cell Matrix Interaction: A Study of In vivo and In vitro in Atrio entricular Cushion Tissue Formation."

Several members of the Department of Anatomy presented papers at the 91st session of the American Association of Anatomists held April 2-6 in Vancouver, British Columbia. Those who presented papers were:

Dr. Robert L. Casady, G.T. Kitten, and Dr. P.R. Sterrett, 1978. Cerebrovasculature permeability in selected brain areas following experimental cerebral angiography. Anat. Rec. 190:359.

Dr. David L. Bolender, 1978. Structure analysis of extracellular matrix within the cell free space (CFS) traversed by migrating cephalic neural crest cells. Anat. Rec. 190:343.

Mr. David H. Bernanke, Dr. R.R. Markwald and Ms. J.M. Krook, 1978. Extracellular matrix reorganization during cell-matrix interaction in cardiac cushion: in vivo and in vitro studies. Anat. Rec. 190:338-339.

Drs. Bernell K. Dalley and William G. Seliger, 1978. Characterization of the vas deferens as a myocardial homograft. Anat. Rec. 190:375.

GALVESTON: University of Texas Medical Branch
Department of Cell Biology:

Paul Baur will be moving into a new laboratory at the Shriners Burns Institute this summer and will also be getting a new JEOLCO E.M. complete with all accessories.

Recent Publications Baur, **et al.,** Wound Contracture, Scar Contraction and myofibroblasts: a classical study, J. Trauma, **18**,8:22 (1978).

Department of Anatomy:

Department members planning to attend the American Association of Anatomy meeting in Vancouver include Andrew Payer (Payer, A., Meyer, W., Walker, P.A., Correlations of Human Leydig Cell Ultrastructure with Serum Testosterone levels), Gerald Callas (Pressure volume changes in lungs from thyroid treated rats) and Donald Duncan.

Dr. Duncan was recently invited to present the Distinguished Scientist Lecture in the Department of Anatomy at Tulane University School of Medicine. The title of Dr. Duncan's lecture was "Fine Structure of the Substantia Gelatinosa".

NEW ORLEANS: Tulane University
Department of Anatomy

Distinguished Scientist Lecturers. Dr. Donald Duncan, University of Texas Medical Branch "Studies on the fine structure of the substantia gelatinosa of the cat"

Dr. Thomas Reese, National Institutes of Health "Recycling of synaptic vesicle membrane at neuromuscular junction during synaptic vesicle release"

Dr. G. C. Mueller, McCardle Laboratory, University of Wisconsin "Molecular mechanism in the replication and differentiation of animal cells"

Publications: Klara, P.M., Brizzee, K.R., Chen, I-Li and Yates, R.D. Ultrastructural localization of ATPase activity in the dog area postrema. Brian Research, In press.

Klara, P.M. and Brizzee, K.R. Tanycytic ependyma in the mammalian IV ventricle. Anat. Rec. 187: 626, 1977 (abstract).

Klara, P.M. and Brizzee, K.R. Area Postrema Ependyma: Modified structure and functional implications. TSEM Newsletter, 8: 36-37, 1977. (abstract).

Klara, P.M., Kawamura, H., Knox, C. and Frohlich, E. Brain stem lesions in the spontaneously hypertensive rat. TSEM Newsletter, 9: 40, 1978 (abstract).

Mascorro, J.A. and Yates, R.D. The anatomical distribution and morphology of extraadrenal chromaffin tissue in the dog. Tissue & Cell, 9: 447-460, 1977.

Mascorro, J.A. and Yates, R.D. The abdominal chromaffin paraganglia: A vast and persisting endoctrine system in young thru adult age dogs. Anat. Rec., 187:646, 1977 (abstract).

Mascorro, J.A., Klara, P.M. and Yates, R.D. Morphological characteristics of abdominal paraganglia (extraadrenal chromaffin tissue) in Rhesus monkeys. EMSA Proceedings, 35: 642-643, 1977 (abstract).

Knox, C.A., Klara, P.M., Yates, R.D. and Frohlich, E. Adenosine triphosphatase and alkaline phosphatase localization in the cerebral vasculature of spontaneously hypertensive rats. TSEM Newsletter, 9: 41, 1978 (abstract).

Mascorro, J.A., Armstead, J.W. and Yates, R.D. Ultrastructure of extraadrenal chromaffin cells following insulin injection. TSEM Newsletter, 9: 34, 1978 (abstract).

Yates, R.D. and Chen, I-li. An electron microscopic study of the baroreceptor nerve endings in the internal carotid artery of the rat. TSEM Newsletter, 9: 29, 1978 (abstract).

Area News: The following researchers represented Tulane Anatomy at the annual meeting of the American Association of Anatomy: Robert Yates, Leon Walker, Robert Vaupel, Gerald Kirby, Dean Yamaguchi and Lorraine Fitzpatrick.

Dr. Robert D. Yates, Professor and Chairman of Anatomy, recently was named to the post of Secretary-Treasurer of the Association of Anatomy Chairmen. Dr. Yates also has been named an Associate Editor to the American Journal of Anatomy.

Dr. Petter M. Klara, Research Fellow in Anatomy and third year medical student, will soon trade his lab coat for military garb. Pete will become Capt. Peter M. Klara, U.S. Army, and will report to Hawaii where he will spend the summer practicing medicine — on the beaches!!

Abstracts (Continued from Page 30)

Nuclear structure and histone phosphorylation have been compared in cultured cell lines of two closely related species of deer mice, **Peromyscus crinitus** and **Peromyscus eremicus.** The two species possess essentially the same euchromatin content but differ greatly in their heterochromatin content. Flow microfluorometry measurements indicated that **P. eremicus** contained 36% more DNA than did **P. crinitus,** and C-band chromosome staining indicated that the extra DNA of **P. eremicus** existed as constitutive heterochromatin. Electron microscopy revealed two striking differences in nuclear ultrastructure. **P. crinitus** nuclei contained small clumps of heterochromatin and a loose, amorphous nucleolus, whole **P. eremicus** nuclei contained large, dense clumps of heterochromatin and a densely structured nucleolus with a well defined nucleolonema. Incorporation of $^{32}PO^{4}$ into histones indicated that the steady-state phosphorylation of Hl was identical in **P. crinitus** and **P. eremicus** cells. In contrast, the phosphorylation rate of H2a was 58% greater in the highly heterochromatic chromatin of **P. eremicus** cells than in the lesser heterochromatic chromatin of **P. crinitus** cells, suggesting an involvement of H2a phosphorylation in heterochromatin structures. It is suggested that the degree of phosphorylation of histone H2a is associated with the level of chromatin organization found in heterochromatin.

(This work was performed under the auspices of the U.S. Energy Research and Development Administration.)

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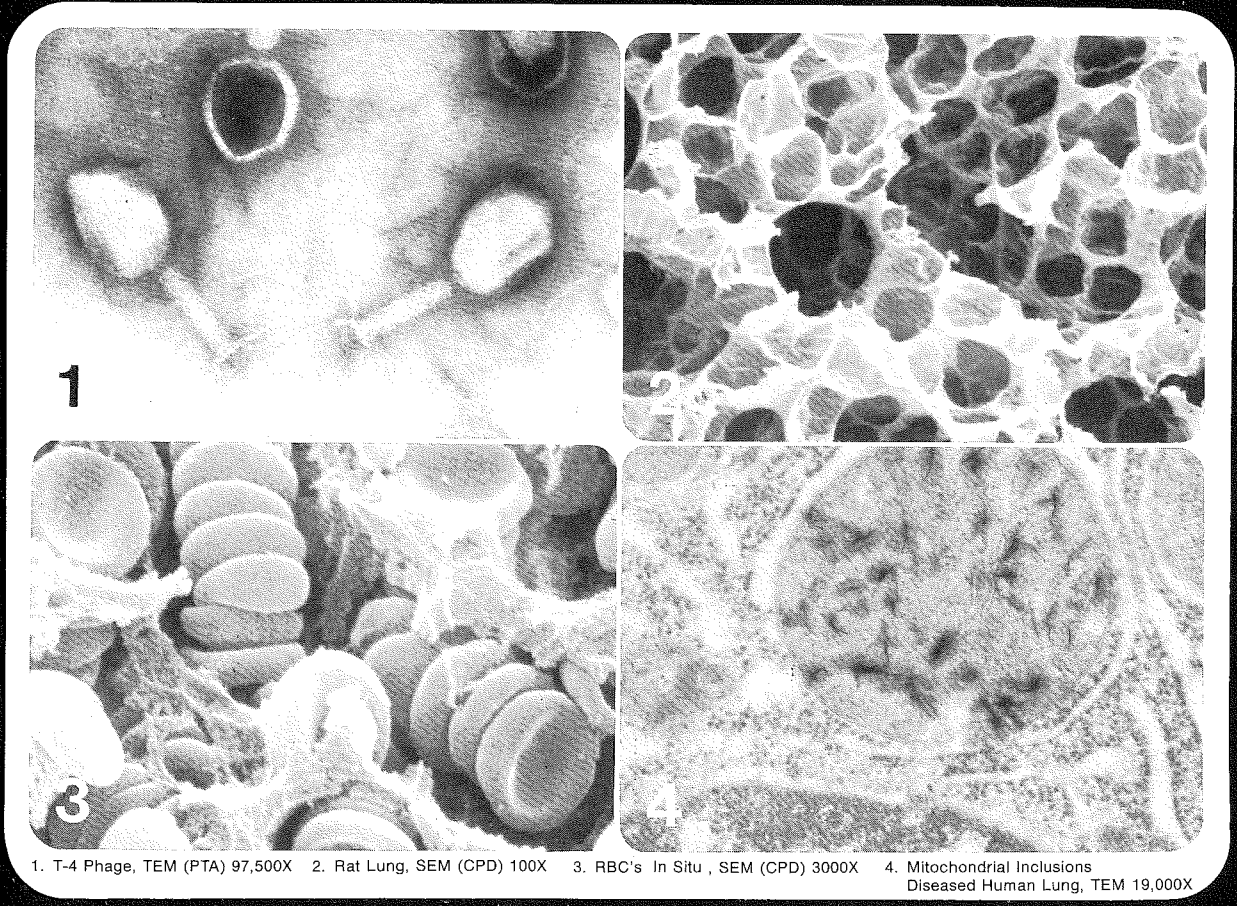

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