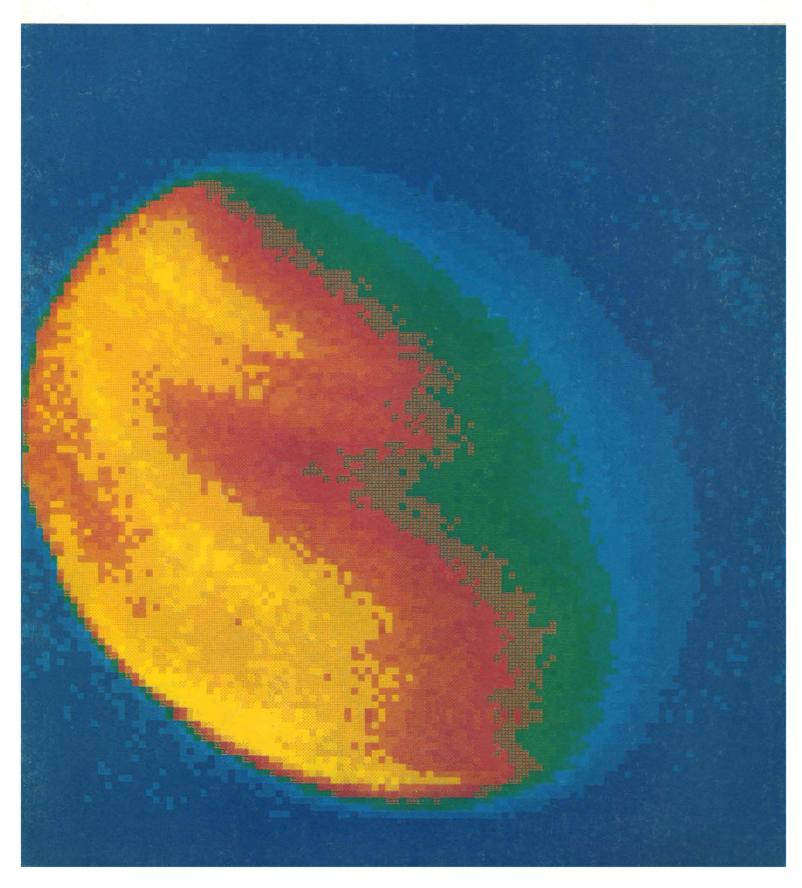
SCIENCE

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



Beckman TJ-6: Most popular centrifuge ever introduced



It's obvious why the TJ-6 table top centrifuge is so popular. It comes in refrigerated and nonrefrigerated models, holds a full liter of sample, and offers a host of innovative features that make it more useful in your lab.



The four-place horizontal rotor and brightly colored Maxi-Carrier tube racks hold large numbers of every popular-size tube. The rotor bowl lifts out for easy cleaning, stainless steel buckets hold tube racks and contain spillage in

case of tube breakage, and there is a rotor imbalance detector.

With its refrigerated option, large capacity, and speeds



to 5700 rpm, the TJ-6 can handle many separations which formerly required the expense and size of a refrigerated floor model.

Try one in your own lab free for 30 days. Just contact your local Beckman sales representative,

or write to Ray Fletcher, Beckman Instruments, Inc., Spinco Division, 1117 California Ave., Palo Alto, CA 94304.

BECKMAN

EDISON CENTENNIAL SYMPOSIUM Science, Technology and the Human Prospect

Are the critics right? Where are we headed? San Francisco, April 1-4, 1979

The Edison Centennial Symposium on Science, Technology and the Human Prospect provides a unique opportunity to review the past impact of science and technology on society and lifestyles, to assess our current condition, and to look ahead to new directions and goals

for technology, invention and innovation. Sponsored by the Electric Power Research Institute and the Thomas Alva Edison Foundation — an official event of the Centennial of Light celebration.

Sunday, April 1

6:00-8:00 PM

Reception at Exploratorium, Palace of Fine Arts

Monday, April 2

OPENING PLENARY SESSION

Chairman, International

ROBERT I. SMITH

Chairman Public Service Electric Gas Company Newark, New Jersey CHAUNCEY STARR

Symposium Chairperson

Vice Chairman Electric Power Research Institute

Energy and Civilization

Science and the Concepts of Man

PHILIP MORRISON Massachusetts Institute of Technology

LUNCHEON SPEAKER

Industry and Energy: Moral Dimensions of the Tasks

ALASDAIR MACINTYRE

GENERAL SESSION

Has the Past a Future? -Trends and Issues in the History of Electric Power

WORKSHOP SESSIONS

Medicine and Public Health

Chairperson MERRIL EISENBUD New York University Medical Center

Food and Agriculture

Chairperson RENE DUMONT

Institut Nationale Agronomique Paris, France

Urban Development

Chairperson JOHN EBERHARD Architectural Research

Associates Chairperson MICHAEL TYLER

Communications

Communications Studies and Planning, Ltd.
London, England

Energy

Chairperson WOLF HAFELE

International Institute for Applied Systems Analysis Laxenburg, Austría

Human Population and Ecology

Chairperson
F. KENNETH HARE
Institute for Environmental Studies

University of Toronto

Science, Technology, and Human Values

Chairperson NORMAN BIRNBAUM Amherst College

SPEAKERS

GEORGE BASALLA University of Delaware

CHARLES SUSSKIND University of California, Berkeley

Speaker THOMAS P. HUGHES University of Pennsylvania

Science, Technology, and Economic Growth Technology and Global Economic Development

Science, Technology, and Social Achievements

Tuesday, April 3

PLENARY SESSION **SPEAKERS**

Creativity in Applied Science

GUNNAR HAMBREAUS Royal Swedish Academy of Engineering and Sciences

Technological Innovation

Public Reactions to Science and Technology

SIMON RAMO TRW, Inc. JEAN-JAQUES SALOMON Organization for Economic Cooperation and Development

GENERAL SESSION

Resolution of Science and

Session Speaker ARTHUR KANTROWITZ AVCO Everett Research Laboratory, Inc. (Retired)

EVENING BANQUET

Science, Technology and the Human Factor

ERIC HOFFER

Wednesday, April 4

PLENARY SESSION

Session Chairman HARVEY BROOKS Harvard University EDWIN MANSFIELD University of Pennsylvania SUMITRO DJOJOHADIKUSUMO University of Indonesia PHILIP HANDLER
National Academy of Sciences

-	(Clip at	nd mai	I this	coupon	today.)

Registration fee — \$100—Includes all Symposium activities.
Further information about hotel accommodations will be
sent with acknowledgment of your registration. You may
also contact the Hilton directly at (415) 771-1400. Identify
yourself as a Symposium participant to receive the special
room rates available.

room rates available.		
☐ Enclosed is my check for \$100, payable to Government Institutes, Inc., the Symposium manager.		
Name		
Organization		
Address		
City		
·State/ZipPhone		

Return coupon to: Government Institutes, Inc. 4733 Bethesda Avenue, N.W. Washington, D.C. 20014 (301) 656-1090

ISSN 0036-8075

23 February 1979

Volume 203, No. 4382

SCIENCE

LETTERS	Air Pollution: EPA Standard: S. J. Gage; E. Marshall; Effects of Anesthesia: L. F. Walts; S. I. Miles	704
EDITORIAL	Solar Power Satellite: A Plea for Rationality: J. Grey	709
ARTICLES	Superheavy Elements: A Crossroads: G. T. Seaborg, W. Loveland, D. J. Morrissey Risk with Energy from Conventional and Nonconventional Sources: H. Inhaber	711 718
NEWS AND COMMENT	Business Booms for Caribbean Med School	724 731 732
RESEARCH NEWS	Communicating with Computers by Voice	734 737
BOOK REVIEWS	Longitudinal Research on Drug Use, reviewed by J. A. O'Donnell: Ecological and Sociological Studies of Gelada Baboons, R. M. Seyfarth: Pentachlorophenol, J. A. Moore; North American Droughts, M. Neiburger: Books Received.	739
REPORTS	Encounter with Venus: L. Colin	743 745
	Plasma Waves Near Venus: Initial Observations: F. L. Scarf, W. W. L. Taylor, I. M. Green	748 750

BOARD OF DIRECTORS	EDWARD E. DAVID, JR. Retiring President, Chairman	KENNETH E. BOULDIN President	NG FREDE Preside	RICK MOSTELLER nt-Elect	ELOISE E. MARTIN M.	CLARK CUMMINGS	RENÉE C. FOX ANNA J. HARF	
CHAIRMEN AND SECRETARIES OF AAAS SECTIONS	MATHEMATICS (A) Garrett Birkhoff Ronald Graham	PHYSICS (B) Arthur L. Schav Rolf M. Sinclair		CHEMISTRY Fred Basolo William L. Jo		Peter S	ONOMY (D) S. Conti G. Wentzel	
777	PSYCHOLOGY (J) Frances K. Graham Meredith P. Crawford	SOCIAL AND ECONOMIC David L. Sills Gillian Lindt		HISTORY AND PHILO Melvin Kranzberg Diana L. Hall	OSOPHY OF SC	Daniel C.	ERING (M) Drucker . Marlowe	
	EDUCATION (Q) Fletcher G. Watson James T. Robinson	DENTISTRY (R) Carl J. Witkop, Jr. Harold M. Fullmer	PHARMACEUTIC Samuel Elkin Robert A. Wiley	AL SCIENCES (S)	INFORMATION Mary E. Corning Madeline M. He		COMMUNICAT	ION (T)
DIVISIONS	ALA	ASKA DIVISION		PACIFIC DIVISION		SOUTHWESTERN	AND ROCKY MO	OUNTAIN DIVISIO
	Daniel B. Hawkins President	Keith B. Mather Executive Secretary	Glenn C. Lew President		Leviton tary-Treasurer	James W. O'Le President		ora M. Shields ecutive Officer

SCIENCE is published weekly on Friday, except the last week in December, by the American Association for the Advancement of Science, 1515 Massachusetts Avenue, NW, Washington, D.C. 20005. Second-class postage (publication No. 484460) paid at Washington, D.C., and at an additional entry. Now combined with The Scientific Monthly®. Copyright © 1979 by the American Association for the Advancement of Science. Domestic individual membership and subscription (51 issues) \$34. Domestic institutional subscription (51 issues) \$70. Foreign postage extra: Canada \$12, other (surface mail) \$15. air-surface via Amsterdam \$40. First class, airmail, school-year, and student rates on request. Single copies \$1.50 (\$2 by mail); back issues \$2.50 (\$3 by mail); classroom rates on request. Change of address: allow 6 weeks, giving old and new addresses and seven-digit account number. Postmaster: Send Form 3579 to Science, 1515 Massachusetts Avenue, NW, Washington, D.C. 20005. Science is indexed in the Reader's Guide to Periodical Literature and in several specialized indexes.

Ionosphere of Venus: First Observations of the Dayside Ion Composition Near Dawn and Dusk: H. A. Taylor, Jr., et al	752
Ionosphere of Venus: First Observations of the Effects of Dynamics on the Dayside Ion Composition: H. A. Taylor, Jr., et al	755
Thermal Structure and Major Ion Composition of the Venus Ionosphere: First RPA Results from Venus Orbiter: W. C. Knudsen et al	757
Electron Temperatures and Densities in the Venus Ionosphere: Pioneer Venus Orbiter Electron Temperature Probe Results: L. H. Brace et al	763
The Polar Ionosphere of Venus Near the Terminator from Early Pioneer Venus Orbiter Radio Occultations: A. J. Kliore et al	765
Venus Thermosphere: In situ Composition Measurements, the Temperature Profile, and the Homopause Altitude: <i>U. von Zahn</i> et al	768
Venus Upper Atmosphere Neutral Composition: Preliminary Results from the Pioneer Venus Orbiter: H. B. Niemann et al	770
Venus Thermosphere and Exosphere: First Satellite Drag Measurements of an Extraterrestrial Atmosphere: G. M. Keating, R. H. Tolson, E. W. Hinson	772
Venus: Density of Upper Atmosphere from Measurements of Drag on Pioneer Orbiter: I. I. Shapiro et al	775
Ultraviolet Spectroscopy of Venus: Initial Results from the Pioneer Venus Orbiter: A. I. Stewart et al	777
Infrared Remote Sounding of the Middle Atmosphere of Venus from the Pioneer Orbiter: F. W. Taylor et al	779
Orbiter Cloud Photopolarimeter Investigation: L. D. Travis et al	781
Infrared Image of Venus at the Time of Pioneer Venus Probe Encounter: J. Apt and R. Goody	785
Structure of the Atmosphere of Venus up to 110 Kilometers: Preliminary Results from the Four Pioneer Venus Entry Probes: A. Seiff et al	787
Preliminary Results of the Pioneer Venus Nephelometer Experiment: B. Ragent and J. Blamont	790
Clouds of Venus: Particle Size Distribution Measurements: R. G. Knollenberg and D. M. Hunten	792
Preliminary Results of the Solar Flux Radiometer Experiment Aboard the Pioneer Venus Multiprobe Mission: M. G. Tomasko et al	795
First Results from the Large Probe Infrared Radiometer Experiment: R. W. Boese, J. B. Pollack, P. M. Silvaggio	797
Venus Lower Atmospheric Composition: Preliminary Results from Pioneer Venus: J. H. Hoffman et al	800
Venus Lower Atmospheric Composition: Analysis by Gas Chromatography: V. I. Oyama et al	802
Wind Velocities on Venus: Vector Determination by Radio Interferometry: C. C. Counselman III et al	805
Pioneer Venus Radar Mapper Experiment: G. H. Pettengill et al	806

MIKE MC CORMACK
RUSSELL W. PETERSON
CHEN NING YANG
Treasurer

BIOLOGICAL SCIENCES (G)
Linn Hoover
Ramon E. Bisque
MEDICAL SCIENCES (N)
Theodore Cooper
Leah M. Lowenstein
STATISTICS (U)
Richard L. Anderson
Ezra Glaser

MIKE MC CORMACK
RUSSELL W. PETERSON
CHEN NING YANG
Treasurer

WILLIAM T. GOLDEN
Executive Officer

ANTHROPOLOGY (H)
James B. Watson
Priscilla Reining
NDUSTRIAL SCIENCE (P)
Herbert I. Fusfeld
Robert L. Stern
STATISTICS (U)
Ruth B. Pitt
S. Fred Singer

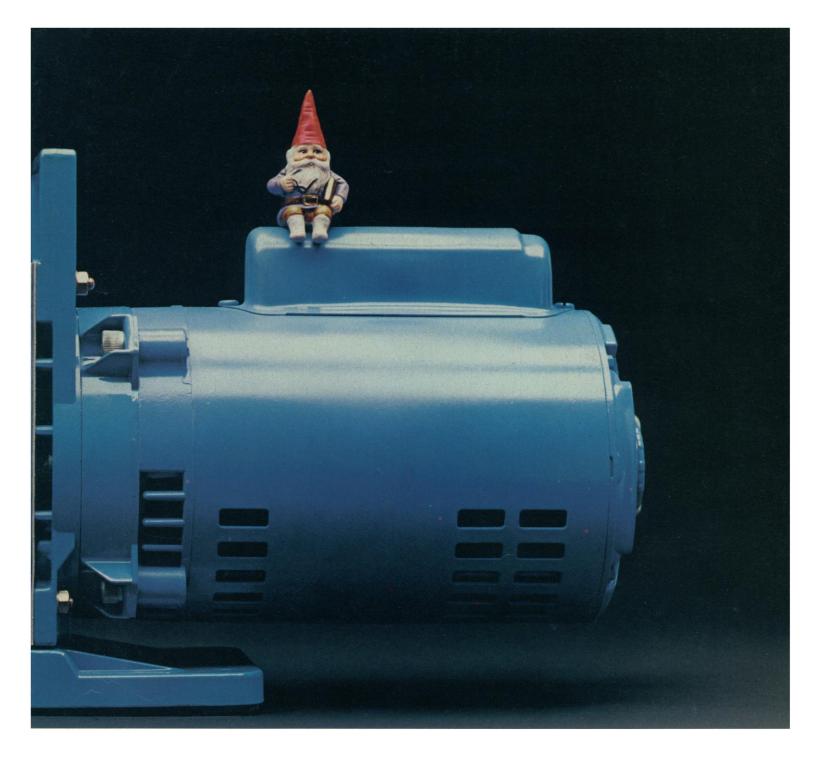
The American Association for the Advancement of Science was founded in 1848 and incorporated in 1874. Its objects are to further the work of scientists, to facilitate cooperation among them, to foster scientific freedom and responsibility, to improve the effectiveness of science in the promotion of human welfare, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.

COVER

False-color image of Venus at 2068 angstroms. Image was obtained by the University of Colorado's ultraviolet spectrometer experiment on the Pioneer Venus orbiter, 4 January 1979 (orbit 31). Yellow represents the brightest regions, blue the darkest. Venus's spin axis is tilted 30° toward the observer, with the north pole on the terminator at the top center. The markings are due to variations in the structure of Venus's cloud tops and in the distribution of sulfur dioxide in the atmosphere. See page 777.



195 l/m, 0.1 micron, 65 dB,



plus your very own gnome.

All of our new direct drive pumps have an ultimate vacuum of 0.1 micron.

To give you low pressure for a cleaner, more trouble free process chamber.

At one micron we're still pumping at 50% maximum thruput—98 I/m!

To give you this low clean working pressure as quickly as we can.

Our new direct drive pumps average 65 decibels at their lowest pressure. Up close. Where you are.

To give you relief from the irritation of noise fatigue. We worry about the quality of our pump when we build it. This lets you worry about the quality of your work when you use it.

To be precise. Pump with PRECISION.

The gnome is to remind you what our new direct drive pump is like—small, quiet, hard working, very exact, and very little bother.

Send for the new Precision direct drive brochure.



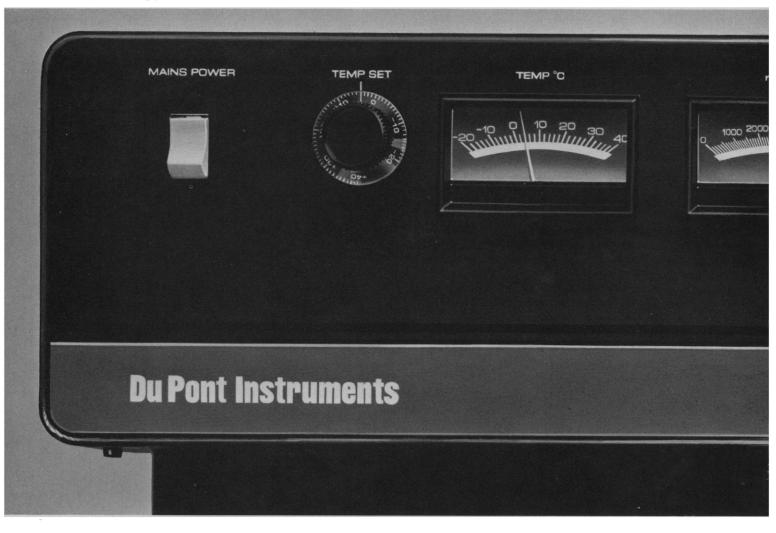
We'll include a gnome redemption card with details on how to get your very own gnome with each purchase of a Precision pump.

Write: GCA/Precision Scientific Group 3737 West Cortland Street Chicago, Illinois 60647

"From GNOMES, @ 1978 Uniboek, B.V."

PUMP WITH PRECISION.

New Sorvall® RC-3B superquietness, 6,000 rpm

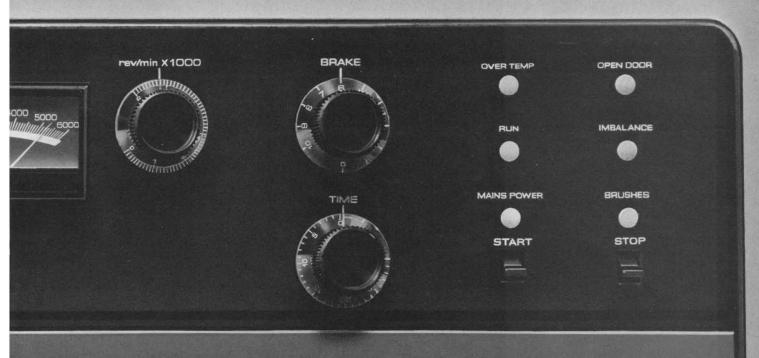


The first thing this new automatic refrigerated centrifuge offers you is the proven reliability that earned its predecessor, the Sorvall® RC-3, a reputation as the workhorse to depend on. Along with this reliability are new features that make the RC-3B the best choice for a wide range of applications in life science research, clinical laboratories, blood processing and industry.

• With its higher capacity, higher speed, and centrifugal forces to 7,120 x g, the RC-3B is unsurpassed in performance among general-purpose floor-model centrifuges.

- Its exceptional quietness lets you place it in any convenient lab area.
- Faster acceleration and deceleration save time.
- New self-aligning spindle speeds and simplifies rotor mounting.
- New malfunction indicators for rotor imbalance, over temperature and worn brushes.
- The Sorvall® Gyro-Action Drive is unmatched for start-to-stop smoothness.
- A wide selection of rotors, tubes, bottles, adapters and other accessories is available from our comprehensive line.

combines 6-liter capacity, & time-tested reliability.



Sorvall® RC-3B Refrigerated Centrifuge

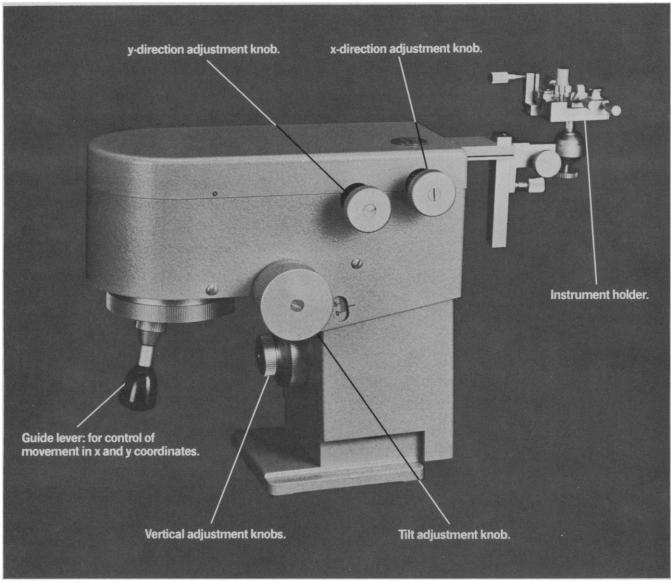


Get our new brochure.

For details on all the advantages of the new Sorvall® RC-3B centrifuge, write to DuPont Instruments, Room 36900, Wilmington, DE 19898.

Sorvall Centrifuges





3986R

Our micromanipulator: It's positively Machiavellian.

Smooth, subtle, cunningly designed, this Leitz® instrument lets you manipulate with exactness, skill, delicacy.

You can operate on the most minute specimens at highest magnifications. Because it is a mechanical, rather than pneumatic or hydraulic device, the Leitz instrument is precise, trouble-free, and has no drift.

The unique lever and sliding bar design eliminate hand vibrations, settling of instrument tips and backlash. Movements of the guide lever are immediately reproduced as instrument movements.

The guide lever actuates fine movements in the x and y coordinates. The ratio of hand-to-instrument movement is continuously variable from 1:1/16 to 1:1/800.

Precise inclinations of instruments through 15 degrees may also be made. Moreover, gross adjustments of instrument position in all three coordinates may be made with the instrument holder itself. The micro-instruments can be interchanged quickly.

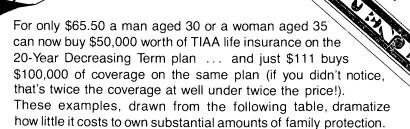
The micromanipulator reaches every point within the microscopical field of view instantly and precisely even under the highest magnification. The instrument is ruggedly built to eliminate vibrations so that you can perform exact and reliable micro-operations.

For information call (201) 767-1100 or write E. Leitz, Inc., Dept. JN5 Rockleigh, N.J. 07647.

Where most new developments start.

TIAA Cuts Life Insurance Costs Again!

Teachers Insurance and Annuity Association announces increased dividends for 1979, further reducing costs that were already well below what you'd pay for similar policies sold by commercial companies.



See What These Lower Costs Mean to Your Family

The following table illustrates yearly costs for \$50,000 and \$100,000 Decreasing Term policies at selected ages:

20-Year Decreasing Term	n Insurance	\$50	,000 Polic	/			\$100,	000 Polic	y	
Issued to a man aged	25	30	35	40	45	25	30	35	40	45
Issued to a woman aged	30	35	40	45	50	30	35	40	45	50
Annual Premium	\$ 93.50	\$117.50	\$164.00	\$243.50	\$373.50	\$187	\$235	\$328	\$487	\$747
Yearly Cash Dividend*	42.00	52.00	70.50	100.00	148.00	104	124	161	220	316
Yearly Net Cost	\$ 51.50	\$ 65.50	\$ 93.50	\$143.50	\$225.50	\$ 83	\$111	\$167	\$267	\$431

*Dividends are payable at the end of each policy year; while not guaranteed, they have been paid every year since TIAA was established in 1918.

Isn't it time you found out more about TIAA's low cost life insurance? Just think what an additional \$50,000, \$100,000 or more of solid TIAA protection would do for your family . . . and for your peace of mind.

Call Collect 212 490-9000

The fastest, easiest way to get more information is to phone the TIAA Life Insurance Advisory Center and say "I'd like to talk with an insurance counselor."

Or Mail Coupon If you prefer, simply fill out and mail the coupon at right to receive personal illustrations for your age. There is no obligation, and no one will call upon you as the result of your inquiry.

Eligibility to apply for a life insurance policy from Teachers Insurance and Annuity Association is open solely to employees of institutions of higher education, private schools and certain other nonprofit educational or scientific organizations, and to the spouse of such an employee when more than half the combined earned income of husband and wife is from a qualifying institution.



Established as a nonprofit service organization by the Carnegie Foundation for the Advancement of Teaching

Life Insurance Advisory Center	
Teachers Insurance and Annuity Association 730 Third Avenue, New York, NY 10017	nc
Please send me more information about 1	

SP7902 K1

Please send me more information about TIAA's new, lower life insurance costs, including personal illustrations of TIAA policies for my age, as indicated below:

cated below:	•	, 3-,
Decreasing Term Please print	5-Year Renewable Term	Other
Name and Title		Date of Birth
Address		
City	State	Zip
Nonprofit Educational or S	Scientific Employer (college, university	; private school, etc.)
If your spouse is also provide	eligible according to the rules se	t forth at left, please
spouse's name:		
and date of birth:		

Can you pass this **Ealing BioSciences** equipment test? 1. Which of the following equipment is used in Respiratory Physiology? (a) Spirometers (b) One Way Air Valves (c) Douglas Bags (d) All of the above Ealing products 2. What type of laboratory equipment is a Pharmacologist likely to use? (a) Glass Jacketed Tissue Baths (b) Sliding Jaw Electrodes (c) Isolated Heart Apparatus (d) All of the above Ealing products 3. Which of the following is likely to be used in a Neurophysiology lab? (a) Small Animal Ventilator (b) Electrode Puller (c) Heated Operating Table (d) All of the above Ealing products 4. If you were Teaching Physiology, you might use a: (a) Student Spirometer (b) Kymograph (c) Stimulator (d) All of the above Ealing products If you answered choice (d) in questions 1-4, then you are already familiar with some of the products in the new Ealing BioSciences Catalog To find out more about these and other Ealing BioSciences products, call or write your nearest Ealing office today. Pleasant St., So. Natick, MA 01760 (617) 655-7000 · Newport Beach, CA 92660 International Offices in: Watford, England - Douai, France · Höchst, W. Germany · Novara, Italy · Montreal, Canada

LETTERS

Air Pollution: EPA Standard

An article entitled "EPA smog standard attacked by industry, science advisers" appeared in the 1 December 1978 issue of Science (News and Comment, p. 949). In that article, author Eliot Marshall, discusses the previous Environmental Protection Agency (EPA) photochemical oxidant standard of 0.08 part per million, the proposed EPA standard of 0.1 ppm ozone, and the scientific basis for these. Marshall implies that American industrial interests pressured EPA into relaxing the standard against the advice of EPA's Science Advisory Board. Unfortunately, the article is both confusing and misleading and appears to reflect a serious misunderstanding concerning the standard-setting process employed by EPA and the rationale underlying the proposed revision in the oxidant standard.

EPA's standard-setting process typically includes the following three distinct steps: (i) preparation of a criteria document representing a critical assessment of the scientific literature concerning the effects of a given agent on human health and welfare; (ii) preparation of other documents estimating the magnitude or extent of risk associated with varying exposure levels for the agent and detailing one or more rationales underlying different standard-setting options; and (iii) consideration by the Administrator of EPA of the different options before recommendation of a standard.

It is very important to note that, at each step of the above sequence, consultation and advice are sought from other government agencies and the academic community, as well as the general public and environmental and industrial interest groups. This includes aid in (i) preparation of the pertinent documents; and (ii) public external review of the documents and the proposed standard that they support. Comment on the initial document in the sequence, that is, the criteria document, has thus far been the main type of input provided by EPA's Science Advisory Board.

Nowhere in Marshall's article is there any indication that he is referring to two distinct sets of documents: (i) a criteria document entitled "Air quality criteria for ozone and other photochemical oxidants"; and (ii) other documents used in the development of the proposed oxidant standard. The criteria document was prepared under the supervision of EPA's Office of Research and Development and is a critical evaluation of the effects of

ozone and other oxidants on human health and welfare (vegetation and materials). It should be noted that this document was not the effort of EPA scientists alone: 12 scientists from the academic community who are recognized for their research in the study of photochemical oxidants reviewed and contributed to the presentation of the scientific information in the criteria document. With the aid of these scientists from various universities, EPA prepared two preliminary drafts of the criteria document, each of which was submitted for public review and consideration by a subcommittee of EPA's Science Advisory Board.

The two preliminary drafts of the criteria document were criticized by the board as being inadequate in certain areas; apparently, Marshall is referring in his article to that criticism of the preliminary drafts. Marshall, however, does not state that, in each case, revisions of the two drafts were undertaken to incorporate changes suggested by the board before a third and final preprint version of the document was prepared and resubmitted to members of the review subcommittee; nor does Marshall indicate that the final preprint version of the document received general endorsement or statements of "no major objections remaining" by the Science Advisory Board oxidant subcommittee members contacted individually by EPA. In view of the mainly minor revisions that remained to be made in the second draft of the criteria document, contact with individual subcommittee members was made by phone or mail, as they had been dissolved as a standing committee by the parent Science Advisory Board.

The criteria document mentioned above was drawn on, in part, in the preparation of further documents discussing various standard-setting options. The latter documents consist of one entitled "Control techniques for volatile organic emissions from stationary sources" and staff papers pertaining to the form of the ozone standard, risk assessment method, secondary standard, and health panel assessment. These are all listed in the Federal Register of 22 June 1978, part II, to which Marshall was referred by EPA staff members.

The final standard of 0.12 ppm ozone, which was established by EPA Administrator Douglas M. Costle on 26 January, was based entirely on the scientific record discussed above. In his announcement of the standard, Administrator Costle stated that, "In establishing a health-based ambient air quality standard, the Clean Air Act requires that the standard be set at a level that protects

the public health with an adequate margin of safety. The language of the Act and its legislative history clearly indicate that consideration of cost is not germane to a determination of the level of the standard." In describing his use of the scientific record, he stated

Our medical review of this standard has been underway for nearly two years. . . . I believe it is crucial that all air pollution standards be based on the best medical and scientific information available. The integrity of the entire environmental program depends upon standards that represent the best science available to us, and the best judgments we can make about that evidence. For those who tend to view these issues in black and white termsfor those who say never give an inch to anyone and those who say costs are more important-I reiterate my commitment to the scientific integrity of these standards.

STEPHEN J. GAGE Office of Research and Development, Environmental Protection Agency, Washington, D.C. 20460

Although I disagree with much of Gage's statement, I wish to respond only to his central assertion that the EPA secured a "general endorsement" of its criteria document for smog from the scientific advisers after "they had been dissolved as a standing committee by the parent Science Advisory Board." I have three objections. A review body which has been dissolved by definition cannot give its approval of something. The EPA cannot document the statement that the committee voted its "general endorsement" of the work in hand. The chairman of the committee, James Whittenberger, told me he did not give his approval.—ELIOT MARSHALL

Effects of Anesthesia

In Gina Bari Kolata's article regarding tetratogens acting through males (Research News, 17 Nov. 1978, p. 733), she makes the statement, "The best evidence comes from a 1974 study of operatingroom personnel exposed to anesthetic gases." She goes on to write that the wives of these men had significantly increased rates of spontaneous abortions, and their babies were more likely to have congenital defects than the offspring of unexposed men.

The American Society of Anesthesiologist's ad hoc committee report concerning occupational diseases in operating room personnel includes the finding, contrary to Kolata's statement, that the rate of spontaneous abortion among wives of anesthesiologists was lower than the rate found in a control group (wives of pediatricians) (1, p. 331). The committee did report a higher rate of congenital abnormalities among children of male anesthesiologists than was found in the control group (1, p. 332). Comments expressed in two subsequent critiques (2) raise questions as to the true significance of the latter finding.

LEONARD F. WALTS

Department of Anesthesiology, School of Medicine, University of California, Los Angeles 90024

References

- 1. Ad Hoc Committee on the Effect of Trace Anes-
- thetics on the Health of Operating Room Personnel, Anesthesiology 41, 321 (1974). L. F. Walts, A. B. Forsythe, J. G. Moore, ibid. 42, 608 (1975); L. L. Ferstandig, Anesth. Analg. (Cleveland) 57, 328 (1978).

The conclusions reached in Gina Bari Kolata's article on behavioral teratology (Research News, 17 Nov. 1978, p. 732) are not substantiated by the data she cites. The belief of a number of social scientists that the type and dosage of obstetrical medication is not related to the requirements of an individual patient does not appear to be substantiated in fact. It is true that the obstetrical medications used in various hospitals vary and that some physicians do commonly issue standing orders for anesthesia. However, many physicians do not leave such standing orders, and those who do may increase the dosage of anesthesia as indicated in the course of labor. Thus, the women who received the highest dosage of anesthesia may well be the woman who had the most difficult labor. The behavioral deficits noted in the article may, thus, not be related to the medication but, instead, to some other factor related to the difficult delivery.

SAMUEL I. MILES

Department of Psychiatry, School of Medicine, University of California, Los Angeles 90024

Erratum: In the article "Yearly report on car-Erratum: In the article "Yearly report on carcinogens could be a potent weapon in the war on cancer" (News and Comment, 9 Feb., p. 525), the second line of the second column on page 525 should read "... testing for carcinogens." The last two lines of the first column on page 526 should read "... nearly 70,000 chemicals already used commercially." The sixth line of the second column on page 527 should read "... program in viral necology."

chairman of the URA board of trustees is Milton G.
White of Princeton University. Ramsey is the

White of Princeton University. Ramsey is the president of the association.

Erratum: In "Chemical carcinogens: The scientific basis for regulation" (Research News, 29 Sept. 1978, p. 1200), a list of substances known to be human carcinogens was erroneously attributed to David P. Rall. The list was actually compiled by investigators at the International Agency for Research on Cancer [L. Tomatis et al., Cancer Res. 38, 817 (1978)].

Seek peaks at 206 nm and get up to 200x the sensitivity of monitoring at 280 nm...



Sensitivity is increased up to 200x for proteins when you monitor at 206 nm with LKB's new Uvicord® S UV-monitor. This unique instrument will detect non-aromatic peptides, polysaccharides, nucleotides, lipids and steroids as well as proteins. And, naturally, you can also monitor at 254 or 280 nm.

Enhanced versatility has required no compromise in stability. Quite the contrary. Sophisticated optics and solid state circuitry provide outstanding linearity. And you can monitor simultaneously at high and low sensitivities.

Unlike others, the new Uvicord S UV-monitor is contained in a single small case which mounts easily on a fraction collector or ring stand. And its low price matches its small size.

Contact LKB today for full details.



LKB Instruments Inc. 12221 Parklawn Drive Rockville, Maryland 20852 301: 881-2510

16 A-302

VAX Program Capacity. Ask any user.

"VAX offered us almost three times the address space of our 370/168."

Bill Miller, Senior Systems Analyst Chevron Geophysical Co., Houston, Texas



Chevron Geophysical is heavily engaged in seismic data processing involving matrix operations on large arrays

As Senior Analyst Bill Miller states the problem: "Our IBM systems, running on TSS, give 24 bits of true address space - for a maximum program size of 16 megabytes. But only 10 to 12 megabytes of this can be used by the programmer - and our application had grown to the point that TSS was simply cramping us.

"With the VAX-11/780, we know we can have application programs that use a full 32 megabytes as we're configured now - and it could be more if we wanted.'

But Chevron didn't buy their VAX without first benchmarking it against the far more ex-

Miller comments: "We developed a number of benchmarks to test specific areas of performance. On the average, the VAX CPU appears

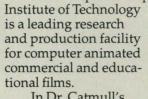
to be about a third as fast as the 168, which is really quite impressive. And it's very possible that for certain applications, we may see a negligible loss of throughput over the 168, thanks to VAX's unique page clustering scheme."

And as far as system performance to date, Miller reports: "The VAX/VMS operating system has been remarkably reliable. The people at Digital have done a phenomenal job."

"VAX's true 32-bit addressing puts its potential capacity so far out, we don't have to worry about it."

Dr. Edwin Catmull, Director, Computer Graphics Lab New York Institute of Technology, Old Westbury, New York

The Computer Graphics Lab at New York



In Dr. Catmull's words, here's what brought NYIT to the VAX-11/780: "While spending years developing our capabilities with minicomputers, we





continually ran into the problem of small address space. Our work demands the large address space we can get with a 32-bit machine. We were dealing with extremely large, randomly accessed data bases, and memory mapping is not the answer."

Dr. Catmull continues, "The VAX UNIBUS lets us easily hook up a wide range of special video display equipment that had previously



"With a 22,000-point data base, we really needed VAX's huge memory capacity."

Peter Ackermans, Manager of Computer Systems Engineering CAE, St. Laurent, Quebec, Canada

CAE Electronics Ltd., currently has thirteen VAX-11/780 systems under development for both flight simulation and supervisory power control.

Here again, VAX capacity was key. Systems Manager Peter Ackermans told us: "Our SCADA systems for the power market need to handle a 22,000-point data base. VAX's large memory capacity and the VAX/VMS virtual memory operating system made it a very attractive machine."

But speed was also important. "In flight simulators," Ackermans continues, "top FORTRAN performance is essential, and on that score, VAX measures up well. Our FORTRAN programmers have also been impressed with the machine's debug facility and file handling capabilities."

Digital's VAX-11/780, with its true 32-bit address space, has set a new standard for program capacity. This means that you can run large programs easily on VAX, with a potential for growth that's unmatched in the industry.

But rather than have us tell you about it, send for our new brochure.

And listen to our customers.

☐ Please send me the brochure and deta	ailed Technical Su	
Name	Title _	
Company		
Address		
City	State	Zip
Phone		
My application is: □ □ Engineering □ G	Education Med overnment Res	ical Laboratory ale Other.
Send to: Digital Equ Communication Serv Maynard, MA 01754.	rices, 146 Main St.,	NR-2/2,

Circle No. 155 on Readers' Service Card



There are lots of good reasons to use Whatman Advanced Ion Exchange Celluloses for separations of nucleic acids, proteins, enzymes. Here are ten of them: Faster Kinetics of Exchange Whatman micrograpular

- Faster Kinetics of Exchange. Whatman microgranular AIEC's absorb 6.5 times more bovine serum albumin in 5 minutes than conventional DEAE cellulose. Desorb rapidly, thoroughly.
- Higher Polyelectrolyte Capacity. For example, Grade DE 52 absorbs approximately 500 mg of bovine serum albumin in 20 minutes.
- Greater Accessibility of Exchange Sites. With no loss of dimensional stability. Hence superior protein capacity and kinetics of adsorption.
- Greater Uniformity of Substitution. Greater than conventional ion exchange celluloses. Excellent reproducibility of results.
- Uniform Charge Density. Thus, greater protein loadings, sharper elution bonds, better selectivity.
- Easier Handling, High Dimensional Stability. Available wet (pre-swollen) or dry. Rigorous control of physical form
- Optimized Range. DEAE (anion) or CM (cation). Both wet or dry, microgranular or fibrous. Select best form for the particular application.
- Narrow Particle Size Range. For easier column packing, better packed-column reproducibility, higher packing densities, more predictable flow rates.
- Dependable Reproducibility. Whatman AIEC's are always the same, batch-to-batch, so performance is predictable, reproducible.
- Whatman Quality. Painstaking, meticulous manufacture, rigorous quality control.

Whatman Advanced Ion Exchange Celluloses. At your laboratory supply dealer or from Whatman Inc. ■ 9 Bridewell Place, Clifton, New Jersey 07014 ■ (201) 777-4825







AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

Science serves its readers as a forum for the presentation and discussion of important issues related to the advancement of science, including the presentation of minority or conflicting points of view, rather than by publishing only material on which a consensus has been insting only internal of which a consensus has been reached. Accordingly, all articles published in Science—including editorials, news and comment, and book reviews—are signed and reflect the individual views of the authors and not official points of view adopted by the AAAS or the institutions with which the authors are affiliated.

Editorial Board

LOUIDTIAL BOARD

1979: E. PETER GEIDUSCHEK, WARD GOODENOUGH,
N. BRUCE HANNAY, MARTIN J. KLEIN, FRANKLIN A.
LONG, NEAL E. MILLER, JEFFREY J. WINE
1980: RICHARD E. BALZHISER, WALLACE S. BROECKER, CLEMENT L. MARKERT, FRANK W. PUTNAM, BRYANT W. ROSSITER, VERA C. RUBIN, MAXINE F. SINGER,
PAUL E. WAGGONER, F. KARL WILLENBROCK

Publisher

WILLIAM D. CAREY

Editor

PHILIP H. ABELSON

Editorial Staff

Managing Editor ROBERT V. ORMES Assistant Managing Editor JOHN E. RINGLE

Business Manager HANS NUSSBAUM Production Editor Ellen E. Murphy

News Editor: BARBARA J. CULLITON

News and Comment: WILLIAM J. BROAD, LUTHER J. CARTER, CONSTANCE HOLDEN, ELIOT MARSHALL, DEBORAH SHAPLEY, R. JEFFREY SMITH, NICHOLAS DEBORAH SHAPLEY. ADE, JOHN WALSH. Editorial Assistant, SCHERRAINE

Research News: Beverly Karplus Hartline, Frederick F. Hartline, Richard A. Kerr, Gina BARI KOLATA, JEAN L. MARX, THOMAS H. MAUGH II, ARTHUR L. ROBINSON. *Editorial Assistant*, FANNIE GROOM

Consulting Editor: Allen L. Hammond
Associate Editors: Eleanore Butz, Mary Dorfman, Sylvia Eberhart, Judith Gottlieb, Ruth
Kulstad

Assistant Editors: Caitilin Gordon, Lois Schmitt, DIANE TURKIN

Book Reviews: KATHERINE LIVINGSTON, Editor;

LINDA HEISERMAN, JANET KEGG Letters: Christine Karlik

Letters: Christine Karlik
Copy Editor: Isabella Bouldin
Production: Nancy Hartnagel, John Baker; Ya
Li Swigart, Holly Bishop, Eleanor Warner; Jean
Rockwood, Leah Ryan, Sharon Ryan
Covers, Reprints, and Permissions: Grayce Finger,
Editor; Corrine Harris, Margaret Lloyd
Guide to Scientific Instruments: Richard Sommer
Assistant to the Editors: Pichland Semillager

Guide to Scientific Instruments: RICHARD SOMMER Assistant to the Editors: RICHARD SEMIKLOSE

Membership Recruitment: GWENDOLYN HUDDLE

Member and Subscription Records: ANN RAGLAND

EDITORIAL CORRESPONDENCE: 1515 Massachusetts Ave., NW, Washington, D.C. 20005. Area code
202. General Editorial Office, 467-4350; Book Reviews, 467-4367; Guide to Scientific Instruments, 467-4480; News and Comment, 467-4430; Reprints and Permissions, 467-4483; Research News, 467-4321. Cable: Advancesci, Washington. For "Instructions for Contributors," write the editorial office or see page xi, Science, 29 September 1978.

BUSINESS CORRESPONDENCE: Area Code 202.

BUSINESS CORRESPONDENCE: Area Code 202. Business Office, 467-4411; Circulation, 467-4417.

Advertising Representatives

Director: EARL J. SCHERAGO Production Manager: Margaret Sterling Advertising Sales Manager: Richard L. Charles Marketing Manager: Herbert L. Burklund

Marketing Manager: HERBERT L. BURKLUND
Sales: NEW YORK, N.Y. 10036: Steve Hamburger, 1515
Broadway (212-730-1050); SCOTCH PLAINS, N.J. 07076:
C. Richard Callis, 12 Unami Lane (201-889-4873); CHICAGO, ILL. 60611: Jack Ryan, Room 2107, 919 N. Michigan Ave. (312-DE-7-4973); BEVERLY HILLS. CALIF. 90211: Winn Nance, 111 N. La Cienega Blvd. (213-657-2772); DORSET, VT. 05251: Fred W. Dieffenbach, Kent Hill Rd. (802-867-5581)
ADVERTISING CORRESPONDENCE: Tenth floor, 1515 Rroadway. New York, N.Y. 10036. Phone: 212-

1515 Broadway, New York, N.Y. 10036. Phone: 212-730-1050.

Solar Power Satellite: A Plea for Rationality

The solar power satellite (SPS) is a much-talked-about means of collecting solar energy in space. It would carry photovoltaic arrays or solar thermal power plants and transmit electric power to Earth-based receivers for delivery to the utility grid.

The SPS is about to become a political football.

Three bills have been submitted and at least three more will be submitted by congressmen and senators in early 1979 proposing various SPS programs or goals. The Administration is plagued by opposing views, both internally and through external groups and Congress. Choosing up sides has already begun among environmental, industry, and consumer groups.

The SPS concept represents an orders-of-magnitude growth in space operations, which its opponents find difficult to grasp. It is controversial, however, because virtually all factions see it as either all good or all bad. For instance, it is solar (good), but it is centralized (bad). It eliminated hydrocarbon combustion products and radioactivity, but it introduces upper-atmosphere water vapor and microwaves. It eliminates second-law thermal pollution on Earth and moves the power plant thousands of miles from its nearest neighbor, but it requires large ground-based receiving antennas. The space environment provides unobstructed sun, which means no storage and hence base-load capability, and it eliminates corrosion, rain, wind, earthquakes, or gravity as factors, but space transportation and construction are

Although everyone seems to agree that the SPS is technically feasible, there are great disagreements concerning its future economic practicality, its environmental acceptability compared with other long-term alternative energy sources, and a host of political, societal, military, and international regulatory questions. The one unfortunate aspect of all the arguments is that nobody has enough sound information on which to base a rational case. The only rational questions, then, are (i) does the concept have sufficient future promise to warrant finding out whether it is practical, and (ii) if so, what type of research and how much of it should be done?

The answer to the first question seems clear. A sizable amount of federal funding is being devoted to alternative future energy sources that are faced with essentially the same questions (for example, fusion, central tower solar energy, photovoltaics, ocean thermal energy, and possibly even breeder reactors). The SPS appears to have enough potential advantages that it merits at least comparable consideration.

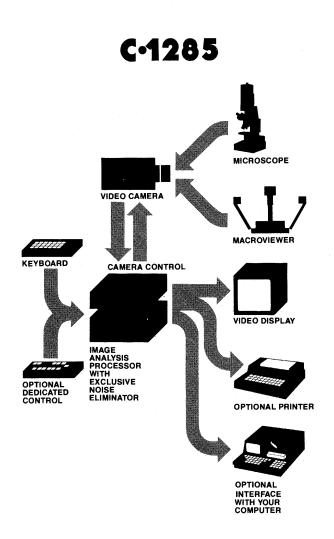
The answer to the second question is not really difficult either. Certainly a major demonstration effort, even of a prototype SPS, would be premature at this time. In fact, it is even too soon to establish a firm baseline design, as the Department of Energy seems to be doing; there are still too many promising but unexplored technical options. What is needed is an in-depth examination, not only analytical but in the laboratory, to verify and advance the technology to the point at which rational comparisons with the other longrange alternatives can be made.

Two technical committees of the American Institute of Aeronautics and Astronautics have explored the question of the level and type of support needed for SPS research (on the ground, not in space). They have concluded that a proper level of support would be on the order of \$30 million per year for about 5 years. If subsequent space experiments are called for, they can in large part be "piggybacked" on other programs that have more immediate economic returns; for instance, large orbital antenna complexes for communications.

Once we know what we are talking about, then it will be time to decide whether to proceed with development of the SPS.—JERRY GREY, American Institute of Aeronautics and Astronautics, 1290 Avenue of the Americas, New York 10019

NEW POLYPROCE/OR IMAGE ANALYSIS SYSTEM

WITH NOISE ELIMINATOR-ENHANCES DEFINITION OF LOW CONTRAST OBJECTS



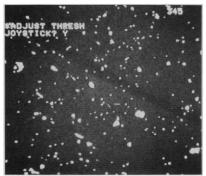
CALL OR WRITE FOR BROCHURE



Processed video image without calibrations. The field is not uniform. The image center has considerable noise, while objects at the corners are lost.



After calibration, objects in the field are uniformly extracted, but noise is still apparent. This noise tends to mask the presence of small objects.

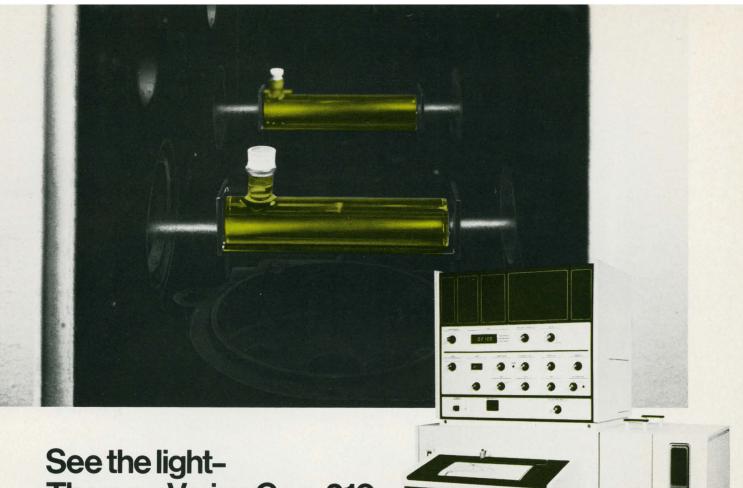


The Noise Eliminator has reduced random noise, enhancing the definition of small or low contrast objects.

HAMAMATSU

Hamamatsu Systems, Inc., 332 Second Avenue, Waltham, Massachusetts 02154 • 617/890-3440

Circle No. 208 on Readers' Service Card



See the lightThe new Varian Cary 210
UV-Vis Spectrophotometer...
It's surprisingly affordable

For the low introductory price of \$11,995*, you can explore new avenues in UV-Vis measurements with the powerful new Varian Cary 210 Spectrophotometer.

See low level enzyme activities

The high signal-to-noise ratio, excellent photometric stability and sensitivity of the Cary 210 allow the measurement of small absorbance changes. Enzyme activity levels as low as 0.0005 Abs per minute can be monitored.

See scattering samples

Low stray light means high absorbances can be measured accurately. The versatile Cary 210 encompasses the complete range from -0.6000 to +4.0000 Abs. Scattering samples can be scanned without the use of special sampling locations or accessories. Highly turbid material need not be diluted.

See microsamples

Cary 210's high energy throughput and patented

sample space optics minimize sample volume requirement and permit efficient energy utilization. Measure samples as small as 200 µl directly, and 70 µl with beam masks.

Total sample handling capabilities

Roomy sample compartment can accommodate two five-cell turrets. You can automate measurements with our Cell Programmer and Wavelength Programmer. Monitor more than 300 samples per hour at controlled temperatures with the Routine Sampler. Scan gels up to 20 cm long...and more.

Seeing is believing

Look for the Varian Cary 210 at the upcoming FASEB Conference. See the Cary 210 and complete accessories at work.

Circle 117 for more information on the new Cary 210.

Circle 118 if you would like a representative to call.

Varian Associates, Inc., 611 Hansen Way, D-070,
Palo Alto, Ca. 94303

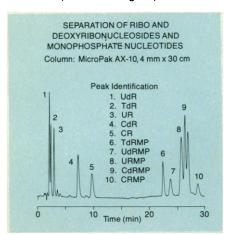
*U.S. only.



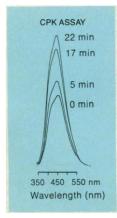
tough problems in the biological science lab

When solutions to biological problems require the latest in quality instruments, consider Varian. Here are some of the newest research and analytical instruments available. Plus some of the application areas they can help you with.

1 **Separate nucleosides**, nucleotides, PTH-amino acids and fatty acids with the new microcomputer-CRT-based **Model 5000 Liquid Chromatograph**. You can even separate nucleosides and nucleotides in the same run, (see chromatogram).



The 5000 will store nine complete separation methods in memory for instant call-up. Saves time. Makes method development easy. For details circle Reader Service No. 63.



Ex = 340 nm, slit = 10 nm Em = 465 nm, slit = 20 nm Temperature 27°C

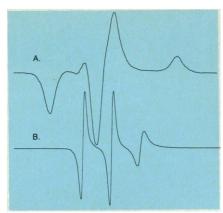
Spectrometer System.

2 Do enzyme assays on microsamples with the new SF-330 Spectrofluorometer. It gives you broad bioanalytical capability at modest cost.

The SF-330's special microflow cell also lets you measure PNAs, vitamins, drugs and amino acids after separation by liquid chromatography. For information circle Reader Service No. 64.

3 Investigate drug metabolism, study the topography of binding sites, enzymatic reactions, membrane structure, and the effects of anesthetics with the E-109E EPR

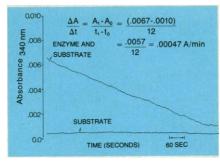
By using spin-labeled analogues or by identifying indigenous free radicals associated with cells, tissues, proteins, etc., the E-109E provides important structural and environmental information — often not obtainable by other methods. This information can be



Before (A) and after (B) administration of anesthetic.

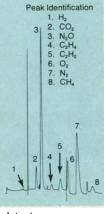
stored by the E-900 EPR data system for future comparison and manipulation. For further information, circle **Reader** Service No. 65.

4 Measure enzyme activity at 0.0005 A/min with the new Model 219 UV/Vis Spectrophotometer. You don't have to concentrate your column fractions when the activity is low and you don't have to dilute your samples when highly turbid material is present. The Model 219 will handle them all.



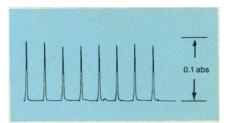
And Model 219 has routine sampling kinetics systems that will sip a 500 μ l sample and in 15 seconds measure its kinetics at 20°, 25°, 30°, 32° or 37°C. To make interpretation easy, the 219 will print all results on its microprocessor-based Smart Printer. For details circle Reader Service No. 66.

Analyze for soil gases, for haloforms in drinking water, for steroids, lipids and carbohydrates in body fluids, for drugs and drug metabolites in blood. Do it with Model 3700 Gas Chromatograph. The modular, fully automatable 3700 lets you choose exactly what you need for your application.



New element-specific detectors and a new easy-to-use capillary system give you extra capability. For details circle Reader Service No. 67. 6 Use atomic absorption to **measure electrolytes in tissues, cells, and fluids**; determine toxicity; nutrient and metabolic activities; therapeutic effects of some 67 elements. Extreme sensitivity of the AA technique enables characterization of microliter samples.

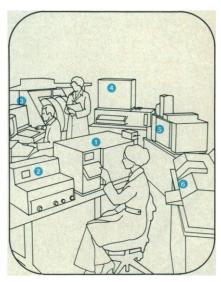
The new AA-775 Atomic Absorption Spectrophotometer's advanced microprocessor collects and computes analytical data, enhancing accuracy and precision. Calibration routines allow automatic weight compensation, calibration by standard additions, and up to 5-point curve correction. For more information circle Reader Service No. 68.



Replicate measurements of lead in blood-acid solution, using carbon rod atomizer. Sample volume 2 µl. Lead level 400 pg. Relative standard deviation 3.2%.

Varian also makes NMR Spectrometers (Reader Service No. 69) and Mass Spectrometer/Gas Chromatograph Systems (Reader Service No. 70).

To have a representative contact you about *any* Varian instrument, circle **Reader Service No. 71**.





varian/instrument division
611 hansen way, palo alto, california 94303 u.s.a.

ING BLE

Now the Alzet® minipump works up to two weeks.

The first minipump was incredible—up to one week of continuous drug or hormone delivery in the unrestrained rat or mouse.

The <u>credibility</u> of the 1701,

1 µl/hour minipump is widely recognized; it is the unique, reliable research tool that makes it easy to do the kinds of experiments one could previously only dream about.

Alza now introduces incredible two—the 1702 minipump—up to two weeks of continuous drug or hormone delivery in the unrestrained rat or mouse. Half the pumping rate—0.5 μ I/hour—but twice the duration as the credible 1701.

It is ideal for studies of centrally mediated drug or hormone action or for studies where local microperfusion of drugs or hormones can be used to test for local effects. It is also the tool to consider for steady state tracer studies.

Request technical information from Alza, Dept. Y, 3170 Porter Drive, Palo Alto, California 94304. Phone 415/494-5323.

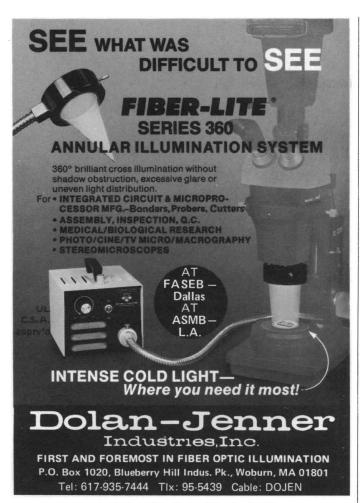
Please send me the following:

Technical information on the Alzet® osmotic minipump.

Add me to your mailing list.

dzef osmotic mnpump

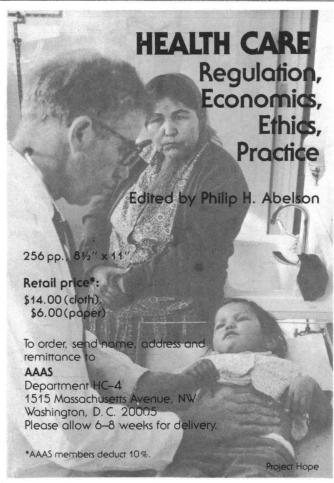
Name______Affiliation ______Address ______City _____State___Zip___







Circle No. 138 on Readers' Service Card



Mode of Action of Autonomic **Drugs**

A new, comprehensive guide

By Budh D. Bhagat, Prof., Physiology & Pharmacology, School of Medicine, St. Louis Univ., St. Louis, Mo., U.S.A.

A guide for professionals who need a ready, upto-date reference source to autonomic drugs. Dr. Bhagat brings together, in one compact volume, everything that until now has been available only from countless research sources.

PP. 170 Illustrations and Tables: 85 Hardcover edition, \$21.50 U.S. ISBN 0-932126-00-6 Paperback edition, \$17.50 U.S. ISBN 0-932126-01-4

FREE: 15 Day Examination

Examine your copy for 15 days free. If not satisfied, return it and own nothing. Otherwise, remit appropriate amount. Add \$2 for shipping.

Graceway Publishing Company

Station "C" P. O. Box 159-E Flushing, N.Y. 11367 U.S.A.

If you were designing a tissue cell counter, which features would you want to build in?

- ☐ Automatic Coincidence Correction
- □ Variable Linear Threshold
- ☐ Automatic Detergent Rinse
- \square Dynamic Size Range $20\mu^3$ -65,000 μ^3
- ☐ Non-Mercury Manometer
- ☐ Unbreakable Aperture Tubes
- ☐ Clog Alarm/Removal Device
- ☐ Lightweight & Compact
- ☐ Superb Accuracy
- ☐ Solid State Electronics
- ☐ Low Price
- ☐ All of the above

Introducing The Royco 927-TC TISSUE CELL COUNTER

(with all of the above)



Call or write for specific information:



BREAK THE GLASS HABIT



Nalgene PMP Volumetric Flasks are as transparent as glass.





Nalgene PMP Graduated Cylinders are as easy to use as glass cylinders. They're transparent and accurately calibrated. They meet the same federal specifications for accuracy established for glass.*

And because they're made of shatterproof polymethylpentene (PMP), they're safe and long lasting.

Our PMP cylinders can be used with acids, bases, and solvents. And they cost less than the leading glass cylinder.

See for yourself why so many laboratories are breaking the glass habit with long-wearing Nalgene Labware.

And unbreakable Nalgene Labware lasts longer.

*Federal Specification NNN-C-940

For a free Nalgene Cylinder, circle Reader Service Number 116 or return the coupon on the next page to Nalge.

Glass labware

0

O'

Da

Nalgene Labware





From heart disease to solar energy, from food to electronics—the American Association for the Advancement of Science publishes books which cover these topics and many more. Books that will keep you informed and abreast of important scientific advancements. Books that are designed for the researcher, scientist, engineer, student, and general public. Books that you need to read.

AAAS SCIENCE REPORT SERIES

Combating the #1 Killer: The SCIENCE Report on Heart Research, by Jean L. Marx and Gina Bari Kolata. Based on the American Heart Association's Blakeslee Award-winning articles in SCIENCE, this book presents an overview of the status of current research on all aspects of cardiovascular diseases. xi + 205 pp. \$17.00 (case); \$7.50 (paper).

Solar Energy in America, by William D. Metz and Allen L. Hammond. Chapters deal with research strategies of both government and industry: "Power Towers," photovoltaic cells and other collector strategies, fuel photosynthesis, wind and ocean thermal power, energy storage, and more. Fall 1978. \$18.00 (case); \$8.50 (paper).

Two other AAAS series, <u>Compendia</u> and <u>R&D Reports</u>, provide authoritative information on some of the principal issues that concern us all today. These publications can serve not only as valuable reference sources for scientists and researchers, but also as supplementary reading material in courses devoted to these issues.

AAAS SCIENCE COMPENDIA SERIES

ENERGY: Use, Conservation and Supply; Volume II. vi + 202 pp. \$14.00 (case); \$6.00 (paper).

ELECTRONICS: The Continuing Revolution. iv + 217 pp. \$12.00 (case); \$4.50 (paper).

MATERIALS: Renewable and Nonrenewable Resources. x + 198 pp. \$12.00 (case); \$4.50 (paper).

POPULATION: Dynamics, Ethics and Policy. viii + 184 pp. \$12.00 (case); \$4.50 (paper).

FOOD: Politics, Economics, Nutrition and Research. vi + 202 pp. \$12.00 (case); \$4.50 (paper).

ENERGY: Use, Conservation and Supply; Volume I. vi+154 pp. \$10.00 (case); \$3.50 (paper).

HEALTH CARE: Regulation, Economics, Ethics, Practice. iv + 256 pp. Fall 1978. \$14.00 (case); \$6.00 (paper).

AAAS RESEARCH & DEVELOPMENT REPORT SERIES

Research & Development: AAAS Report III. xiv + 122 pp. \$6.00 (paper).

Research & Development in the Federal Budget: FY 1978. xii + 148 pp. \$5.00 (paper).

Research & Development in the Federal Budget: FY 1977. ix + 100 pp. \$5.00 (paper).

Now . . . it's your turn to let us know how we can help you. . . .

To order your individual copies of the above titles, please send your name, address, and list of book titles (indicate case or paper) to AAAS, Department J-1, 1515 Massachusetts Avenue, NW, Washington, DC 20005. Remittance must accompany all orders under \$10.00. AAAS members deduct 10% off retail price. Please allow 6-8 weeks for delivery.

23 FEBRUARY 1979 809



Environmental and Carcinogenic Standards

Three ThetaKits are now available. Two contain 20 chemicals each; their components are pollutants for which OSHA has established limits for maximum exposure allowable in an 8-hour period. One kit contains chemicals for which limits are set below 2 parts per million. The second kit contains chemicals for which limits are between 2 and 5 parts per million. The third ThetaKit contains 20 compounds that have been designated as "category 1" carcinogens, such as polynuclear aromatics, chlorinated biphenyls, and aromatic amines. All standards have been accurately prepared at concentrations of 0.01 grams per milliliter (±1 percent) in appropriate solvents. Theta. Circle 795.

Digitizer and Digital Plotter

Hipad and Hiplot are peripherals for input and output of data with small, personal computers. Hipad converts graphic information to digital data for processing. The cursor can find individual points or can put up to 100 pairs of coordinates per second. Accuracy is to within 0.015 inch and resolution and repeatability are to within 0.005 inch. An optional digital display shows the input values. Hiplot is an incremental plotter that produces graphic information from digital data. Both axes are bidirectional, and simultaneous movement of both axes gives drawing capability in eight directions. Because of the small increment size used, the selection of moves can combine to produce curves on the chart. Houston Instrument. Circle 792.

Newly offered instrumentation, apparatus, and laboratory materials of interest to researchers in all disciplines in academic, industrial, and government organizations are featured in this space. Emphasis is given to purpose, chief characteristics, and availability of products and materials. Endorsement by Science or AAAS is not implied. Additional information may be obtained from the manufacturers or suppliers named by circling the appropriate number on the Readers' Service Card (on pages 710A and 810G) and placing it in the mailbox. Postage is free.

—RICHARD G. SOMMER

Calibration Standard for Platelet Counters

PC-Calibrator is a size standard calibration of electronic platelet counters. The upper and lower threshold calibrators define the outside limits of size of human platelets. Latex particles are suspended in a diluting solution and assayed by the manufacturer. If your counter comes within 4 percent of the assay value for each of the calibrators, the instrument is functioning properly and is counting the full range of platelets. Streck Laboratories. Circle 793.

Polarographic Analyzer

Model 384-1 is microprocessor-controlled. It has a 40-character alphanumeric display; a floppy disk for storage and recall of software, curve, and method; a touch panel for operation of controls; a static mercury drop electrode for both polarography and stripping voltammetry; and a digital plotter. The display advises the operator of instrument status in the RUN mode and echoes experimental parameters during SET-UP. The 64 buttons of the touch panel are grouped by function. The plotter provides accurate graphs of results and has a "label set-up" function to provide headers with all pertinent experimental parameters recorded. Up to nine peaks may be accommodated per scan. EG & G Princeton Applied Research. Circle

Laboratory Demonstration Shield

The Demonstration Labshield provides four-sided protection from flying particles, hazardous chemicals, hot liquids, and so forth, yet it affords a clear view of a classroom demonstration. It is constructed of unbreakable polycarbonate. There is a portal on one panel for access to apparatus by the demonstrator and a small opening at the base for utility connectors. The device is 18 inches high

and provides a square foot of space within. The base and hardware are resistant to corrosion. Science Related Materials. Circle 794.

Blood Chemistry Analyzer

The AutoPacer is a programmable analyzer with a 60-sample capacity. Components include an automated diluter/ dispenser, a 60-position sample processor, a computer module, and a spectrophotometer. The diluter/dispenser picks up and delivers a precise amount of serum and reagent into the reaction cup at the selected mix station. An isolated pump meters the ratio of reagent to sample per operator instruction. Visual display and tape readout of results are available. There are 37 programs for 26 of the most commonly preferred chemistries. The operator can change test parameters or create new programs on the entry keyboard. Ames Division, Miles Laboratories. Circle 798.

Literature

Sample Injection Valves features the Series 210 four-port design for HPLC. Altex Scientific. Circle 799.

BioSciences is a catalog of equipment, instruments, and supplies for studies of animal physiology with a new line for pharmacologic and respiratory investigations. Ealing. Circle 800.

Organic Chemicals lists a line of products for chemical analyses including reagent-, practical-, and technical-grade formulations. Eastman Organic Chemicals. Circle 801.

New for the Laboratory presents a variety of apparatus from a broad range of manufacturers. SGA. Circle 802.

Labware is devoted to plastic products and includes eight new items. Nalge. Circle 803.

Microscopes and Accessories are topics of a Scientific Buyers' Guide. Nikon, Instrument Division. Circle 804.

Bench Metallographs describes the ICM 405 and IM 35, which are inverted camera microscope systems for metallography and materials science. Carl Zeiss. Circle 805.

Photoionization Detector Applications in Gas Chromatography are listed and categorized in this 12-page brochure. HNu Systems. Circle 786.

Chromatography for Protease-Free Immunoglobulin G is a one-step procedure with DEAE Affi-Gel Blue. Bulletin 1062 gives the details. Bio-Rad Laboratories. Circle 787.

A page of information on flow cytometry from Ortho.

State-of-the-art cell sorting and analysis

Ortho announces the most powerful, precise, and versatile instrument for cell sorting and analysis ever available commercially: the Ortho Cytofluorograf™ System 50. It combines a rapid cell sorter (based on the electrostatic droplet deflection principle) with a flexible, wide-ranging analysis package in a single versatile unit.

Ortho System 50 for analysis.

Its dual-laser excitation system provides three modes

of excitation. There are two single individual-excitation sources for different purposes: a .8 milliwatt helium-neon laser for ultra-high-precision scatter measurements, and a 4-watt argon laser for fluorescence measurements.

There are four detectors: two are photomultiplier tubes for broad visible-range response, two are solid-state photo sensors for axial light loss and narrow forward-



with the Cytofluorograf System 50

angle scatter. A photomultiplier tube provides for measuring wide-angle scatter.

12 measurement parameters.

The System 50 Cyto-fluorograf permits for the first time the yielding of morphological information by a flow cytometric instrument. Because pulse height analysis, pulse area analysis, and pulse width analysis can be selected for every detector output, a total of 12 distinct measurement parameters is available with the

System 50. Other features of the system include two bidimensional regions of interest, dual histogram multichannel analyzer with cytogram mode, ultra-sensitive optics, and easy sample entry.

Complete details of System 50 are available in a new brochure available from your Ortho Instruments representative or direct from Ortho Instruments.

Protocols No. 25 describes discrimination of mitotic phases by cytofluorographic analysis.

We would like to bring your attention to an application note: Discrimination of G_0 , G_1 , S, G_2 and M phases by Cytofluorographic Analysis contributed by Z. Darzynkiewicz, Ph.D. of Memorial Sloan Kettering Cancer Center, New York, No. 25 in the Ortho Protocols series.

It includes some interesting computer-drawn histograms in its description of how to distinguish mitotic cells from cells in interphase based on differences in chromatin structure. Methods and results are described, with discussion and references.

For a copy of Protocols No. 25, write or call Ortho Instruments

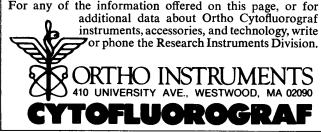
New brochure available on Ortho CytofluorografTM systems for flow cytometry.

Complete details are given on Ortho Cytofluorograf systems in a new brochure. It lists and describes the different combinations of Cytofluorograf modules that permit

you to build a flow cytometry system that precisely meets your present needs and can be modified to suit any future requirements.

With both mercury-arc and dual-laser illumination measurement modules, the new Ortho Cytofluorograf systems offer resolution, sensitivity and versatility unmatched by any other commercially available flow cytometric equipment.

For a copy of this new brochure, phone or write Ortho Instruments.



Forma CO₂ Incubators will duplicate any in vivo environment.

Exactly.

CH/P™ System for total temperature accuracy. Stable top-to-bottom temperature uniformity to within .25°C. Control from above ambient to +60°C. 29 cu.ft. with 110 sq.ft. available shelf space. Audible and visible overtemperature warning system. And a lot more features you should know about. Write us.



3916 Reach-In Forced Draft Incubator (recorder optional)



Accurate CH/P System controls temperature to within 0.1°C, RH and CO₂ to within 0.1%. Safety features include warnings for CO₂ deviation, overtemperature and door ajar. A capacity of 10 cu.ft. takes up only 7.2 sq.ft. We'd like to show you more. Write us.

Solid-state CH/P minicomputer controls CO₂ accuracy to within 0.1% over the full 0-20% range. CH/P sensors circulate chamber atmosphere to reduce CO₂ consumption, eliminating stratification and improving temperature/humidity uniformity. Capacity is 5.6 cu.ft. Takes up only 4.1 sq.ft. There's more you should know, and we'd like to send it to you. Write us.



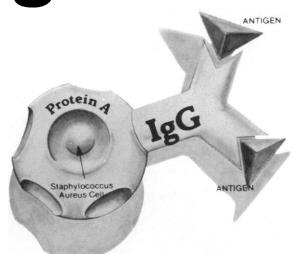
3157 Single Chamber Water Jacket Incubator



Where technology begins with imagination

Circle No. 92 on Readers' Service Card

IgGSORB



The New IgG Adsorbing Agent

- 10 minute incubation
- separates antibody-antigen complex from free antigen
- eliminates double antibody
- highly specific for IgG
- separates IgG from crude mixture
- lyophilized
- long term storage life

IgGsorb, The new IgG Adsorbing Agent from the enzyme center inc., simplifies the separation of antibody complexed antigen from free antigen — eliminates double antibody procedures and reduces incubation time from several hours to minutes. IgGsorb is Protein A, fixed to the wall of inactivated, lyophilized staphylococcus aureus cells. It specifically binds the FC portion of IgG antibody, separating it from the solution and eliminating long incubations where double antibody processes are usually required.

IgGsorb is particularly useful in performing IgG purification and separation of antibody complexes from uncomplexed antigen. IgGsorb binds rapidly in about ten minutes and separates easily by centrifugation or filtration. With a long storage life, IgGsorb has almost universal use, and in some cases can replace charcoal and other cumbersome separation methods.

ORDER DIRECT

Order Code: IGSL

(reconstitutes to a 10% cell suspension)

100ml vial \$ 80.00 Ten—10ml vials \$115.00 One—10ml vial \$ 19.00



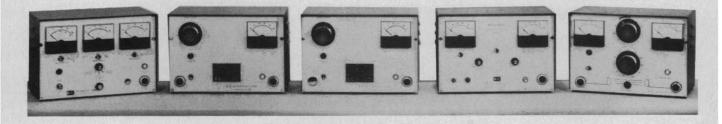
the enzyme center inc.

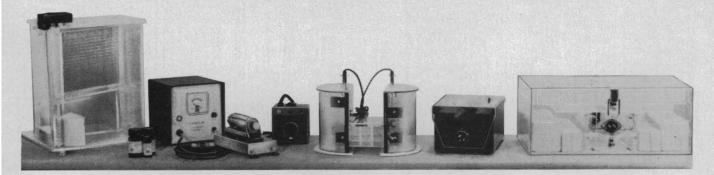
33 Harrison Avenue•Boston, MA 02111 Tel. (617) 482-7123

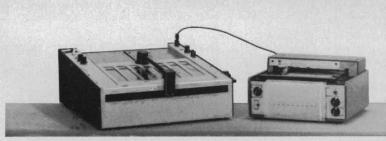
Gel Electrophoresis Systems

The Most Complete Line









You don't have to create your own gel electrophoresis system. E-C can supply from stock the proper system for your procedures. For more information, call Technical Service collect at (813)-344-1644 or write:



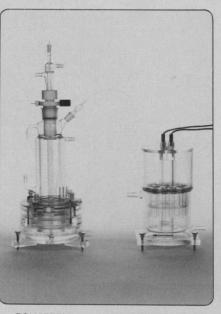
E-C Apparatus Corporation 3831 Tyrone Blvd. N. St. Petersburg, Florida 33709



If you're not using our **CONSTANT POWER SUPPLY** there may be a 'short' in your electrophoresis system

The acclaim given to our digital display Constant Power Supply suggests that this unit could become the standard for electrophoresis work. The Constant Power Supply belongs to a group of electrophoresis apparatus that has earned the respect of knowledgeable researchers everywhere. These instruments include the Poly-Prep® 200, a continuous elution unit for rapid preparative separations and the Polyanalyst, which permits both separation and destaining under temperatureregulated conditions.

So don't stand short; write for our free literature describing the Buchler line of electrophoresis products.



POLY PREP 200

POLYANALYST

Buchler Instruments, Inc. 1327 Sixteenth St., Fort Lee, N.J. 07024 U.S.A. (201) 224-3333

Circle No. 202 on Readers' Service Card

Do the better labs use the OSMETTE,



Results from national proficiency tests show that laboratories using the OSMETTE consistently get better precision on more of the specimens than all the other instruments combined. A recently published study¹ shows the OSMETTE laboratories had the best S.D. on 10 of 12 specimens, and best C.V. on 11 of 12 (one other instrument had equal C.V. on 3 specimens). Such remarkable inter-lab precision must reflect OSMETTE's inherent characteristics including precision, long term stability, and ease of calibration.

We urge you to check the survey results yourself. Then if you note that a freezing point measurement, as made by the OS-METTE, is the only way to avoid missing the effect of alcohol and other volatiles on concentration2 3, we think you will agreethe OSMETTE is the right osmometer for your laboratory.

Write today for full details, or to arrange a demonstration--you will be pleased to find the OSMETTE is the fastest, simplest, most dependable, and most economical osmometer available.

PRECISION SYSTEMS, INC.

60 Union Avenue, Sudbury, Mass. 01776 Telephone: 617-443-8912

Juel, R., Serum Osmolality, AJCP July 1977 (165-169). ² Rocco, R.M., Letter, Clin Chem 22: No. 3, 1976, p. 399.

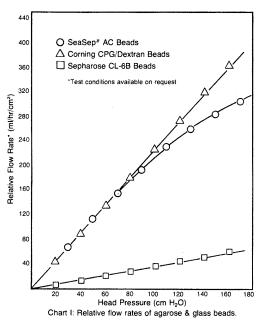
³ Champion, H.R. et al., Alcohol Intoxication and Serum Osmolality, The Lancet June 28, 1975 (1402-1404).

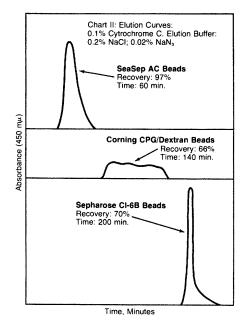
Circle No. 236 on Readers' Service Card

Marine Colloids Announces New Agarose Bead Media For

AFFINITY CHROMATOGRAPHY

Flow Rates comparable to glass beads; Performance superior to any other media; Cost competitive with other agarose affinity media at less than 1/20th the cost of glass beads!





Marine Colloids, Inc., the world leader in agarose production announces, with pride, SeaSep® AC Agarose Beads for affinity chromatography.

The new medium offers:

1. High flow rates

SeaSep AC Beads offer flow rates comparable with glass beads and 3-5 times greater than those of other agarose beads. (See Chart #I above.)

2. High coupling capacity

Because of the unique SeaSep AC bead design, these beads exhibit coupling capacities greater than other agarose beads and almost twice that of commercially available derivatized glass beads.

3. Non-specific protein binding

Agarose exhibits substantially less non-specific protein binding than glass. (See Chart #II above.) Only the highest quality SeaKem agarose is used to prepare SeaSep AC bead media.

4. Maximum versatility

Since the SeaSep AC beads are not derivatized, proteins may be coupled directly or separated from the agarose matrix with "Spacer Arms."

Call or write for our complete catalog and price list or a free copy of our agarose monograph.

To order product, dial 24 hr. toll-free: 1-800-341-1574 (Continental USA, except Maine).



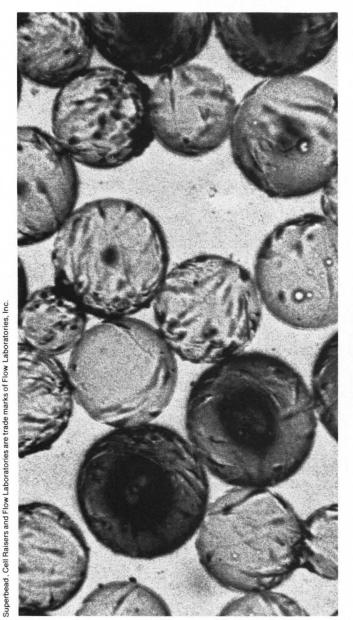
FMC Corporation
Marine Colloids Division

Bio Products Rockland, Maine USA 04841 (207) 594-4436

Circle No. 174 on Readers' Service Card

For culture of anchorage-dependent cells

Sterile, Ready-to-use Superbead Microcarriers...



NOW! Available from the Cell Raisers at Flow Laboratories a NEW product for growing anchoragedependent cells.

- sterile, ready-to-use hydrated beads in phosphate buffered saline without Ca or Mg
- provides LARGE surface area in relatively small
- composed of diethylaminoethyl (DEAE) anion exchange groups bound to a dextran matrix as described by Levine et. al.1
- reduces media/sera requirements
- reduces incubator space needed
- developed at Massachusetts Institute of Technology (patent pending)
- Potential use in the production of ...

viruses2 viral vaccine3,4 hormones3,4 interferon3,4 biological pesticides3,4



- 1. Levine, D. W.; Wong, J. S.; Wang, D. I. C.; and Thilly, W. G., (1977) Somatic Cell Genetics, 3:149-155.
- Giard, D. J.; Thilly, W. G.; Wang, D. I. C.; and Levine, D. W., (1977) Appl. Environ. Microbiol., 34:668-672
- ASM News (1977) 43:524. Chemical Week (August 10, 1977)
- pp. 34-35.



For technical data and pricing information contact:

Flow Laboratories, Inc. Subsidiary of Flow General Inc.

7655 Old Springhouse Road McLean, Virginia 22102 (703) 893-5925

If it doesn't say Flow Laboratories, it's not a Cell Raisers product.

Circle No. 84 on Readers' Service Card

AN AUDIOVISUAL

GUIDE TO SEARCHING THE BIOLOGICAL LITERATURE

Michael M. King, Ph.D. Linda S. King, M.L.S.

Five important references are discussed: EXCERPTA MEDICA INDEX MEDICUS BIOLOGICAL ABSTRACTS (including BIO RESEARCH INDEX) CHEMICAL ABSTRACTS SCIENCE CITATION INDEX

The structure of each tool is skillfully examined with the aid of a common search topic. This not only enhances comprehension by emphasizing the practical aspects of literature searching but serves to highlight relative strengths as well. The program was developed for students and practicing professionals in the life sciences, biology, medicine and related fields and is suitable for both group presentation and auto-tutorial study.

The program has been evaluated by the National Library of Medicine and selected for inclusion in AVLINE.

Materials consist of a set of 78 visuals in 35 mm slide format, 2 audio cassettes, approximately 90 minutes in total length, and text. Price: \$165.00.

Orders may be placed directly with Science Media, P.O. Box 910G, Boca Raton, FL 33432 USA. (Outside USA add \$15.00 to your order for air mail postage and handling. Remittance must accompany your order. Return privileges honored)

Circle No. 237 on Readers' Service Card



Each lot is pre-tested for biological activity in a cell-free translation system, and the incorporation curve is provided with the shipment.

Increased **Protein** Labeling **Capacity**

Paired with our translation grade Methionine, L-[35S] at >500Ci/mmol (NEG-009T), the new Cysteine is useful in producing even hotter proteins.

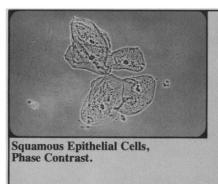


549 Albany Street, Boston, Mass. 02118

Call toll-free: 800-225-1572 (In Massachusetts and International: 617-482-9595)

NEN Chemicals GmbH, Dreieich, W. Germany; NEN Canada Ltd., Lachine, Quebec

Circle No. 228 on Readers' Service Card



This is the first precision tissue culture microscope system, with upright image, to take full advantage of the inverted microscope design. The unobstructed stage surface allows easy access to the specimen, at all times.

Long working distance objectives, including 2mm W.D. Plan Achromat 40x, and two long working distance phase contrast condensers (20mm and 50mm W.D., respectively), permit use of all standard tissue culture vessels and flasks.

A full range of techniques is possible, including brightfield and phase contrast, utilizing the standard set of objectives, as well as polarizing and fluorescence microscopy.

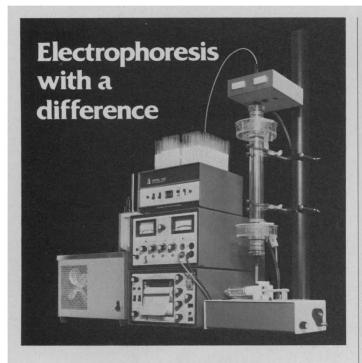
The standard trinocular observation tube is inclined 30°, interchangeable, and fully rotatable on a 360° dovetail. High transmission optics increase image brightness by a 2x factor over competitive microscopes.

For complete details on this highest quality Olympus optical achievement, write: Olympus Corporation of America. 4 Nevada Drive, New Hyde Park, New York 11040.

The Olympus IM1.

The high performance inverted microscope system with unprecedented versatility.

OLYMPUS In Canada: W. Carsen Co., Ltd., Ontario.



Whether you're involved in special procedures or routine analyses, we can help with our innovative instruments for research electrophoresis.

Power supplies. ISCO precision power supplies deliver reliable constant power, current, or voltage to your electrophoretic system. Results: shorter separation time and sharper zones.

Analytical tube gel apparatus. Convenient in-line configuration eliminates need to remove or empty tanks to change tubes. A rapid destainer is also available.

Gel scanner. Get high-resolution scanning at UV or visible wavelengths. Dual beam scanning of isoelectrically focused gels eliminates background absorbance.

Density gradient/isoelectric focusing column. Put an end to blind electrophoresis: only an ISCO column lets you record UV absorbance at any time during separation.

For more information on our instruments for electrophoresis, send for your free catalog today. Or dial direct, toll free (800) 228-4250 (continental U.S.A. except Nebraska). Instrumentation Specialties Company, P.O. Box 5347, Lincoln, Nebraska 68505.



Instruments with a difference

- · From stock
- Tested for binding and displacement in a specific RIA
- · Purified by high pressure liquid chromatography

Vasopressin, 8-arginine, [125]]-

1100-1300μCi/μg 0.05M Sodium phosphate buffer (pH 7.4) containing a stabilizer and proteolytic enzyme inhibitor, in dry ice.

ΝΕΧ-128 10μCi 2x10μCi 50μCi 2x50μCi

Not for use in humans or clinical diagnosis

IEN New England Nuclear

549 Albany Street, Boston, Mass. 02118 Call toll-free: 800-225-1572 (In Massachusetts and International: 617-482-9595)

NEN Chemicals GmbH, Dreieich, W. Germany; NEN Canada Ltd., Lachine, Quebec Circle No. 206 on Readers' Service Card

Unitron's **Polarizer**

Certain types of transparent specimens have structural detail only visible when viewed by polarized light. For these applications, the Unitron MPS-3 has all the necessary features of a true polarizing microscope Bertrand lens for observing interference figures, analyzer and polarizer, compensators, strain-free objectives, and more. Ask for free literature describing Unitron's MPS-3 polarizing microscope. Or ask us to arrange a no-obligation demonstration by a nearby dealer.

Unitron Instruments, Inc. 101 Crossways Park West Woodbury, NY 11797, U.S.A. Phone (516) 364-8046



LNTRON The value line

Subsidiary of Ehrenreich Photo-Optical Industries, Inc.

(Continued from page 742)

Prentice-Hall Foundations of Developmental Biology Series.

Cancer Therapy by Hyperthermia and Radiation. Proceedings of a symposium, Essen, Germany, June 1977. Christian Streffer and seven others, Eds. Urban & Schwarzenberg, Baltimore, 1978. xviii, 344 pp., illus. \$39.50.

Cardiac Rehabilitation. Papers from a congress, Hamburg, Sept. 1977. K. König and H. Denolin, Eds. Karger, Basel, 1978. vi, 202 pp., illus. \$53.50. Advances in Cardiology, vol. 24.

Cell Receptor Disorders. Papers from a workshop, La Jolla, Calif., Mar. 1977. Theodore Melnechuk. Western Behavioral Sciences Institute, La Jolla, Calif., 1978. viii, 216 pp., illus. Paper, \$10.

Cell, Tissue, and Organ Cultures in Neurobiology. Proceedings of a workshop, Saskatoon, Canada, Mar. 1977. S. Fedoroff and L. Hertz, Eds. Academic Press, New York, 1977. xiv, 694 pp., illus. \$29.

Cellular Degradative Processes. R. T. Dean. Chapman and Hall, London, and Halsted (Wiley), New York, 1978. 80 pp., illus. Paper, \$3.95. Outline Studies in Biology.

The Changing American Diet. Letitia Brewster and Michael F. Jacobson. Center for Science in the Public Interest, Washington, D.C., 1978. iv, 80 pp., illus. Paper, \$2.50.

Chemical Problem Solving Using Dimensional Analysis. Robert Nakon. Prentice-Hall, Englewood Cliffs, N.J., 1978. xii, 288 pp. Paper, \$6.95.

Development Issues. U.S. Actions Affecting the Development of Low-Income Countries. The Third Annual Report of the President Transmitted to the Congress, April 1978. Agency for International Development, Washington, D.C., 1978. iv, 130 pp. Paper.

A Dictionary of Geography. Definitions and Explanations of Terms Used in Physical Geography. W. G. Moore. Barnes and Noble (Harper and Row), New York, ed. 2, 1978. x, 260 pp., illus. + plates. \$16.

Directory of Computer Education and Research. International Edition. T. C. Hsiao, Ed. Science and Technology Press, Washington, D.C., 1978. Two volumes. xxxviii, 1760 pp. \$150.

Disciplined Creativity for Engineers. Robert L. Bailey. Ann Arbor Science, Ann Arbor, Mich., 1978. xviii, 614 pp., illus. \$20.

Diseases of Shade Trees. Terry A. Tattar. Academic Press, New York, 1978. xviii, 362 pp., illus. \$22.

Diseases, Pests and Weeds in Tropical Crops. Jürgen Kranz, Heinz Schmutterer, and Werner Koch, Eds. Wiley, New York, 1978. xvi. 668 pp., illus. + plates. \$61.

Distributed Processing and Data Communications. Daniel R. McGlynn. Wiley-Interscience, New York, 1978. xiv, 306 pp., illus. \$20.75.

Diversity and Periodicity. An Inorganic Chemistry Module. James Huheey. Harper and Row, New York, ed. 2, 1978. vi, 106 pp., illus. Paper, \$2.49. Interdisciplinary Approaches to Chemistry.

Doenças do Trigo e Seu Controle. Yeshwant Ramchandra Mehta. Editora Agronômica Ceres Ltda. Summa Phytopathologica, São Paulo, Brazil, 1978. 190 pp., illus. \$25.

The Dynamics of Science and Technology. Social Values, Technical Norms and Scientific Criteria in the Development of Knowledge. Wolfgang Krohn, Edwin T. Layton, Jr.,

and Peter Weingart, Eds. Reidel, Boston, 1978. xii, 294 pp. Cloth, \$29.50; paper, \$14.95. Sociology of the Sciences, vol. 2.

The Earth's Dynamic Systems. A Textbook in Physical Geology. W. Kenneth Hamblin. Illustrated by William L. Chesser and Dennis Tasa. Burgess, Minneapolis, ed. 2, 1978. viii, 470 pp., illus. \$16.95.

Econometric Models, Techniques, and Applications. Michael D. Intriligator. Prentice-Hall, Englewood Cliffs, N.J., 1978. xvi, 638 pp., illus. \$17.95.

The Geomagnetic Field and Life. Geomagnetobiology. A. P. Dubrov. Translated from the Russian edition (Leningrad, 1974) by Frank L. Sinclair. Frank A. Brown, Jr., Transl. Ed. Plenum, New York, 1978. xviii, 318 pp., illus. \$25.

GLC and HPLC Determination of Therapeutic Agents. Part 1. Kiyoshi Tsuji and Walter Morozowich, Eds. Dekker, New York, 1978. xviii, 416 pp., illus. \$37.50. Chromatographic Science, vol. 9.

Gray Corrugated Pottery from Awatovi and Other Jeddito Sites in Northeastern Arizona. James C. Gifford and Watson Smith with the assistance of Carol A. Gifford, Muriel Kirkpatrick, and Robert O'Haire. Peabody Museum of Archaeology and Ethnology, Harvard University, Cambridge, Mass., 1978. xiv, 156 pp., illus. Paper, \$15. Papers of the Peabody Museum of Archaeology and Ethnology, vol. 69. Reports of the Awatovi Expedition, Report No. 10.

Handbook of Semantic Word Norms. Michael P. Toglia and William F. Battig with Kay Barrow and five others. Erlbaum, Hillsdale, N.J., 1978 (distributor, Halsted [Wiley], New York). viii, 152 pp. \$14.95.

Hawthorne's Mad Scientists. Pseudoscience and Social Science in Nineteenth-Century Life and Letters. Taylor Stoehr. Archon Books (Shoe String Press), Hamden, Conn., 1978. 314 pp. \$19.50.

Healing Massage Techniques. A Study of Eastern and Western Methods. Frances M. Tappan. Reston (Prentice-Hall), Reston, Va., 1978. xii, 260 pp., illus. \$15.95.

The Healing Sea. A Voyage into the Alien World Offshore. George D. Ruggieri and Norman David Rosenberg. Dodd, Mead, New York, 1978. viii, 168 pp., illus. \$7.95.

Health Effects of Environmental Pollutants. George L. Waldbott. Mosby, St. Louis, ed. 2, 1978. x, 350 pp., illus. Paper, \$13.50.

Health Insurance Bargaining. Foreign Lessons for Americans. William A. Glaser. Gardner Press, New York, 1978 (distributor, Halsted [Wiley], New York). xviii, 266 pp. \$18.

Heraclitean Fire. Sketches from a Life before Nature. Erwin Chargaff. Rockefeller University Press, New York, 1978. viii, 252 pp. \$13.

Heterostructure Lasers. Part B, Materials and Operating Characteristics. H. C. Casey, Jr., and M. B. Panish. Academic Press, New York, 1978. xiv, 330 pp., illus. \$29. Quantum Electronics.

Hilbert's Third Problem. Vladimir G. Boltianskii. Translated from the Russian edition by Richard A. Silverman. Winston, Washington, D.C., and Halsted (Wiley), New York, 1978. x, 228 pp., illus. \$19.95. Scripta Series in Mathematics.

Holmes Principles of Physical Geology. Arthur Holmes. Revised by Doris L. Holmes. Halsted (Wiley), New York, ed. 3, 1978. xvi, 730 pp., illus. \$24.95.

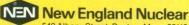
Marine Evaporites. Walter E. Dean and B. Charlotte Schreiber, Eds. Society of Economic Paleontologists and Mineralogists, Tulsa,



Counting a gel is like choosing a wine

You may not get a satisfactory result unless you know your polymers as well as your vine-yards. Yet the number of different gels used for electrophoresis in biomedical research is almost infinite. So to avoid gel counting errors before they happen, call or write our LSC Applications Laboratory, where helping with counting problems is the staff's principal activity.

Meanwhile consider eluting the radioactivity from the gel as an alternative to solubilization. We have developed a procedure using our PROTOSOL® and ECONOFLUOR™ which is very simple and avoids problems that sometimes arise in preparing homogeneous samples. Ask us to send you LSC Application Note #22, by Dr. Yutaka Kobayashi.



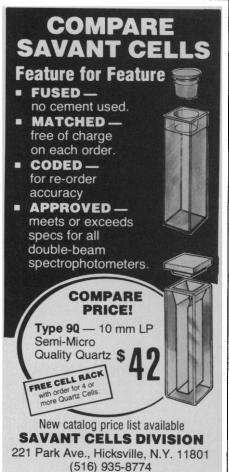
549 Albany Street, Boston, Mass. 02118 Call toll-free: 800-225-1572 (In Massachusetts and International: 617-482-9595)

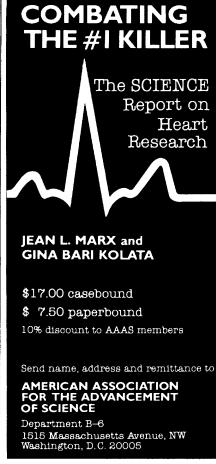
NEN Chemicals GmbH: D-6072 Dreieich, W. Germany, Daimlerstrasse 23, Postfach 401240, Telephone: (06103) 85034, Telex: 4-17993 NEN D

NEN Canada Ltd., 2453 46th Avenue, Lachine, Que. H8T 3C9, Telephone: 514-636-4971, Telex: 05-821808



Circle No. 141 on Readers' Service Card





Okla., 1978. iv, 188 pp., illus. Paper, \$6. SEPM Short Course No. 4.

Marine Natural Products. Chemical and Biological Perspectives. Vol. 1. Paul J. Scheuer, Ed. Academic Press, New York, 1978. x, 308 pp., illus. \$29.50.

Materials Behaviour in Low Gravity Conditions. Papers from a meeting, Dec. 1976. The Royal Society, London, 1978. pp. 129-264, illus. + plates. Paper, £5.55. Proceedings of the Royal Society, Series A, Vol. 261, No. 1705.

Mathematics for Technical Occupations. Dennis Bila, Ralph Bottorff, Paul Merritt, and Donald Ross. Winthrop (Prentice-Hall), Cambridge, Mass., 1978. xviii, 606 pp., illus. Paper, \$14.95.

Mathematics of Manpower Planning. S. Vajda. Wiley-Interscience, New York, 1978. x, 206 pp. \$29.

New Directions in Attribution Research. Vol. 2. John H. Harvey, William Ickes, and Robert F. Kidd, Eds. Erlbaum, Hillsdale, N.J., 1978 (distributor, Halsted [Wiley], New York). xiv, 402 pp. \$19.95.

New Medical Schools at Home and Abroad. Papers from a conference, Oct. 1977. John Z. Bowers and Elizabeth F. Purcell, Eds. Josiah Macy, Jr. Foundation, New York, 1978 (distributor, Independent Publishers Group, Port Washington, N.Y.). viii, 552 pp. Paper, \$10.

New Worlds in Chemistry. Martin Sherwood. Basic, New York, 1978. 234 pp., illus. \$10.95. Second edition of *The New Chemistry*.

Nonlinear Equations in Abstract Spaces. Proceedings of a symposium, Arlington, Tex., June 1977. V. Lakshimikantham, Ed. Academic Press, New York, 1978. viii, 484 pp. \$24

North American Forest Lands at Latitudes North of 60 Degrees. Proceedings of a symposium, Fairbanks, Alaska, Sept. 1977. University of Alaska School of Agriculture and Land Resources Management, Fairbanks, 1978. iv, 332 pp., illus. Paper.

Nuclear Power and Nuclear Weapons Proliferation. Report of the Atlantic Council's Nuclear Fuels Policy Working Group. Atlantic Council of the United States, Washington, D.C., 1978 (distributor, Westview Press, Boulder, Colo.). Two volumes. 140 pp., and 84 pp. Paper. Each volume, \$6. Atlantic Council of the United States Policy Papers. Energy Series.

Numbering the People. The Eighteenth-Century Population Controversy and the Development of Census and Vital Statistics in Britain. D. V. Glass. Gordon and Cremonesi, London, 1978 (U.S. distributor, Atheneum, New York). 206 pp., illus. Paper, \$7.95.

Occurrence, Diagnosis, and Sources of Hospital-Associated Infections. Willson J. Fahlberg and Dieter Gröschel, Eds. Dekker, New York, 1978. x, 138 pp. \$16.75. Handbook on Hospital-Associated Infections, 1.

On Human Nature. Edward O. Wilson. Harvard University Press, Cambridge, Mass., 1978. xii, 260 pp. \$12.50.

Ophthalmic Microsurgery. Papers from a workshop, Singapore, May 1977. S. S. Ratnam and five others, Eds. Karger, Basel, 1978. viii, 228 pp., illus. \$64.25. Advances in Ophthalmology, vol. 37.

Paleoneurology. Veronika I. Kochetkova. Translated from the Russian edition. Harry J. Jerison and Irene Jerison, Eds. Winston, Washington, D.C., and Halsted (Wiley), New York, 1978. viii, 340 pp., illus. \$24.95. Scripta Series in Biobehavioral Sciences.

Parasitic Protozoa. Vol. 2, Intestinal Flagel-

Parasitic Protozoa. Vol. 2, Intestinal Flagellates, Histomonads, Trichomonads, Amoeba,