

phosphorus, and potassium, which have very different geochemistries, have airborne inputs to Welsh and Pennine bogs that are of the same order of magnitude, ~1 kilogram per hectare per year. Inputs of major cations (sodium, calcium, magnesium) are an order of magnitude higher; they are also higher, by an order of magnitude, than those from continental air over Hubbard Brook, New Hampshire.

Since the peatlands of maritime Britain are nourished by a specially nutritious rain, the argument can be defended that such a characteristic bog plant as *Eriophorum* is limited by airborne supplies of potassium. The argument, which seems at first sight implausible, is justified not alone by the small inputs of potassium but by the unexpectedly high inputs of phosphorus. Unfortunately, for its generality, we do not know how far eastward the Lancashire air continues to shed kilogram quantities of nutrients. The phosphorus may all be derived from the Irish Sea, in which case the potash limitation may be strictly maritime. If more or less equally nutritious rain falls elsewhere in northern Europe (rain now dangerously enriched in sulfate falls in Sweden), we can begin to see why ombrotrophic systems are prevalent there and why they are scarce in North America west of the Maritime Provinces. (The extensive peatlands of subarctic Canada appear to be mainly rheotrophic, "nourished by the flow," and not ombrotrophic, "nourished by the sky.")

The special ecology of ombrotrophic bogs has always been appreciated by biologists, but the enormous differences in productivity, compared to rheotrophic systems on calcareous substrata, will probably surprise many ecologists. Figures for primary production, in grams of dry matter per square meter per year, range from about 100 in arctic tundra and 635 in Pennine blanket bog to 4600 in a German reed swamp, a rheotrophic "rich fen."

The classification of peatlands as rheotrophic or ombrotrophic is not new, though the terms are; it is the familiar "morphologic-climatic" dichotomy of low moor and high moor, with gratifying attention to that element of climate that is critical for morphology. Since it pays attention to growth and internal structure and their causation, the classification also seems to be genetic, as a sound geomorphic classification should be. Whether it is adequately genetic, embracing the entire

Holocene history of all peatlands, or takes into account only their most recent stages, is a different question. It seems to me that the biogeochemical approach encounters limitations when confronted by significant climatic change.

Many bogs, under similar topographic and climatic conditions, have had rather different histories. Moreover, these histories are not all of the same length. Accumulation rates of peat, as measured in dated bog sections, are of the order of a meter per millennium, rising to half a meter per century in fresh *Sphagnum* peat. Yet, apart from those on filled-in lakes, extremely few mires or blanket bogs have total depths greater than 2 to 4 meters. Within a Holocene span of ten millennia, then, either the growth of most bogs is a post-Little-Ice-Age phenomenon or episodes of bog growth have been interrupted by periods of stability, intensified decomposition, and erosion. Such nongrowth periods are well marked in many bogs, especially north of latitude 50°N in Europe and 45°N in North America, by recurrence horizons. The climatic changes they imply have correlates in the pulsed growth of glaciers, sea ice, and permafrost. The chapters on history and stratigraphy mention these points, but in perfunctory fashion. The authors virtually dismiss recurrence horizons, on evidence that they are not synchronous across one German bog, and in numerous small ways these chapters do less than justice to an enormous paleoecological literature. Testaceous rhizopods, for example, are not mentioned, and reference to pre-Iron-Age archeology is inadequate.

I have referred to a Celtic bias, but the book has a subtler bias that is philosophically more interesting. The authors are young, and it is well known that interest in history intensifies as a person lives through more of it. In a word, the bias of this book is ahistorical. Such an approach, though rarely explicit, is characteristic of the IBP effort in ecology. It is a natural one for young, chemically oriented biologists who are prepared to set aside ancient history, not as irrelevant, necessarily, but on methodologic grounds: to see how far they can get on steady-state assumptions.

One must agree that the input-output approach to modern ecosystems has taken us a long way in a short time. Steady-state assumptions, however ahistorical, have proved method-

ologically powerful in other fields as well. In anthropology the same approach is called functionalist, and geologists call it geophysics. Though an elderly historian finds it a bit surprising when applied to so richly historical a field as bog stratigraphy, he does not find an ahistorical view a serious flaw. Rather, it is a necessary but temporary stage in the development of a historical science, and has the defects of its virtues. In the next phase, after the steady-state assumptions have been explored and then relaxed to allow for known or likely perturbations of the steady state, the new methodologies bring radically new insights into the nature of historical processes. Biogeochemical climatology has not yet transformed Holocene paleoecology, but Moore and Bellamy have brought the next phase a long step closer.

EDWARD S. DEEVEY, JR.

Florida State Museum,
University of Florida, Gainesville

Books Received

Agricultural Waste Management. Problems, Processes and Approaches. Raymond C. Loehr. Academic Press, New York, 1974. xiv, 576 pp., illus. \$39. Environmental Science Series.

Allyl Compounds and Their Polymers (Including Polyolefins). Calvin E. Schildknecht. Wiley-Interscience, New York, 1973. xiv, 736 pp., illus. \$29.95. High Polymers, vol. 28.

Biology of the Reptilia. Vol. 4, Morphology D. Carl Gans and Thomas S. Parsons, Eds. Academic Press, New York, 1974. xii, 540 pp., illus. \$39.50.

Biomicroscopy of the Peripheral Fundus. An Atlas and Textbook. Georg Eisner. Drawings by Willy Hess. Springer-Verlag, New York, 1973. xii, 192 pp., illus. \$49.30.

Biostatistics. A Foundation for Analysis in the Health Sciences. Wayne W. Daniel. Wiley, New York, 1974. xvi, 448 pp., illus. \$13.95.

Blueprint for Medical Care. David D. Rutstein. MIT Press, Cambridge, Mass. 1974. xxvi, 284 pp. \$8.95.

Both Sides of the Chessboard. An Analysis of the Fischer/Spassky Chess Match. Robert Byrne and Ivo Nei. Quadrangle, New York, 1974. xiv, 212 pp., illus. + plates. \$7.95.

Canada. A Geographical Perspective. Louis-Edmond Hamelin. Translated from the French edition (Paris, 1969) by Margaret C. Storrie and C. Ian Jackson. Wiley, New York, 1974. xvi, 234 pp., illus. \$7.95.

Carbocations and Electrophilic Reactions. George A. Olah. Verlag Chemie, Weinheim, Germany, and Wiley, New York, 1974. 148 pp., illus. Paper, \$9.95. Reprinted from *Angew. Chem. Inter. Ed. Engl.* 12, 173 (1973).

(Continued on page 1072)

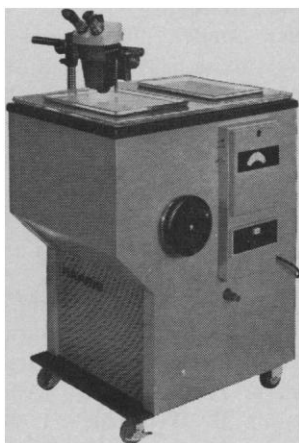
The First Wide Range Microtome-cryostat... Temperatures from —15°C to —50°C... Frozen Sections from 40 μ to 2 μ .

The Harris LoTemp model WRC is two microtome-cryostats in one. A single unit that can do both routine diagnostic procedures and such sophisticated research procedures as thin section light microscopy, autoradiography, fluorescence microscopy and other histological procedures, at a cost comparable to presently available routine cryostats.

The Harris model WRC is compact... can be moved anywhere it's needed. The cold chamber has extra room for tissue handling, storage or freeze drying. Full opening top with special access ports combines the features of a totally closed system with the easy accessibility of open top models.

Available equipped with International Equipment Corp. microtomes, or cryostat only prepared for installation of your present I.E.C. microtome. Installed stereo zoom microscope also available.

For a full description of the Harris WRC and its wide range of additional features write or call...



Harris Manufacturing Co., Inc.
14 Republic Road
Treble Cove Industrial Park
North Billerica, Mass. 01862
(617) 667-5116

RESEARCH NEWS

(Continued from page 1038)

such as the speed of light, the electronic charge, Avogadro's number, and others, metrologists do not rely only on direct measurements. Rather the "best" value of each of the constants is tied to measurements of other fundamental constants via a statistical procedure called a least squares adjustment. To see the effect that a more accurate value of Avogadro's number might have on the values assigned to the other constants was a major motivation for undertaking the project at NBS. However, each of the phases of the project has also yielded important results apart from the improvement in the knowledge of fundamental constants.

For example, the SRM 990 will be the publically available (for about \$50 a wafer, according to Barnes) silicon standard with a known atomic weight. In addition, techniques akin to those used in the silicon studies are being used both for the determination of the atomic weights of other elements with several naturally occurring isotopes, and in isotopic dilution methods for the quantitative determination of trace impurities in various substances. Similarly, an immediate outcome of the density studies is that the intermediate silicon blocks are now serving as "working" standards for density measurements throughout the United States. And, in a separate experiment, Deslattes and Henins were able to accurately determine the correction factor for converting kx units to angstroms, by (in effect) reversing the usual x-ray diffraction procedure. Thus, by using silicon crystals of known lattice spacing as the diffraction medium, they measured x-ray wavelengths.

As for the possibility of redefining the kilogram, Deslattes pointed to several possible improvements (such as the use of isotopically pure silicon crystals) in the procedures necessary for finding Avogadro's number, which together hold the possibility of reducing the overall uncertainty by another factor of 100. However, because of the magnitude of the effort that would be required, such an "esthetic problem" likely would have a lower priority than other more pressing and practical problems.—ARTHUR L. ROBINSON

Additional Reading

1. R. D. Deslattes, A. Henins, H. A. Bowman, R. M. Schoonover, C. L. Carroll, I. L. Barnes, L. A. Machlan, L. J. Moore, W. R. Shields, *Phys. Rev. Lett.* 33, 463 (1974).

BOOKS RECEIVED

(Continued from page 1042)

The Chemistry of Imperfect Crystals. Vol. 1. Preparation, Purification, Crystal Growth and Phase Theory. F. A. Kroger. North-Holland, Amsterdam, and Elsevier, New York, ed. 2, 1974. xiv, 314 pp., illus. \$25.50.

Classification, Estimation and Pattern Recognition. Tzay Y. Young and Thomas W. Calvert. Elsevier, New York, 1974. xiv, 366 pp., illus. \$16.95.

Climatology. Fundamentals and Applications. John R. Mather. McGraw-Hill, New York, 1974. xiv, 412 pp., illus. \$10.95. McGraw-Hill Series in Geography.

Coastal Ecosystems. Ecological Considerations for Management of the Coastal Zone. John Clark. The Conservation Foundation, Washington, D.C., 1974. xiv, 178 pp., illus. Cloth, \$7.95; paper, \$4.

Combinatorics and Renormalization in Quantum Field Theory. E. R. Caianiello. Addison-Wesley/W. A. Benjamin, Reading, Mass., 1973. xx, 122 pp., illus. Cloth, \$16; paper, \$9.50. Frontiers in Physics.

Communications Satellite Systems. Papers from a conference, Washington, D.C., Apr. 1972. P. L. Bargellini, Ed. MIT Press, Cambridge, Mass., 1974. xvi, 482 pp., illus. \$20. Progress in Astronautics and Aeronautics, vol. 32.

Communications Satellite Technology. Papers from a conference, Washington, D.C., Apr. 1972. P. L. Bargellini, Ed. MIT Press, Cambridge, Mass., 1974. xvi, 542 pp., illus. \$20. Progress in Astronautics and Aeronautics, vol. 33.

Compaction of Argillaceous Sediments. Herman H. Rieke, III, and George V. Chilingarian. Elsevier, New York, 1974. xiv, 424 pp., illus. \$29.75. Developments in Sedimentology, vol. 16.

Comparative Psychology at Issue. Papers from a conference, Tokyo, Japan, Aug. 1972 and Honolulu, Hawaii, Sept. 1972. Ethel Tobach, Helmut E. Adler, and Leonore Loeb Adler, Eds. New York Academy of Sciences, New York, 1973. 198 pp., illus. Paper, \$18. *Annals of the New York Academy of Sciences*, vol. 223.

Complete Normed Algebras. F. F. Bonsall and J. Duncan. Springer-Verlag, New York, 1973. x, 302 pp. \$26.20. *Ergebnisse der Mathematik und ihrer Grenzgebiete*, Band 80.

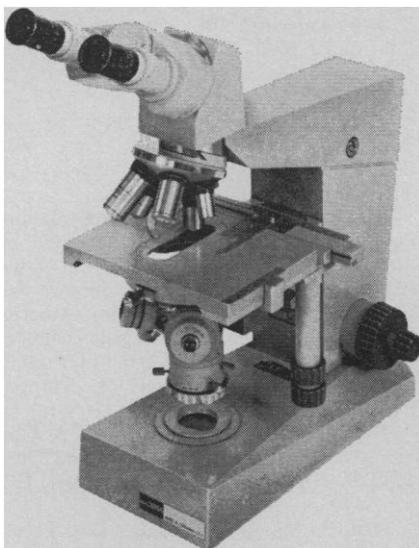
Computational Matrix Algebra. David I. Steinberg. McGraw-Hill, New York, 1974. viii, 280 pp., illus. \$11.95.

Computer-Based Chemical Information. Edward McC. Arnett and Allen Kent, Eds. Dekker, New York, 1973. xiv, 218 pp., illus. \$18.25. Books in Library and Information Science, vol. 4.

Concepts of Contemporary Astronomy. Paul W. Hodge. McGraw-Hill, New York, 1974. x, 548 pp., illus. Paper, \$9.95.

Congress in Action. The Environmental Education Act. Dennis W. Brezina and Allen Overmyer. Free Press (Macmillan), New York, 1974. xxii, 210 pp. \$7.95.

Control of the Onset of Puberty. Proceedings of a conference, Airlie, Va., Oct. 1972. Melvin M. Grumbach, Gilman D. Grave, and Florence E. Mayer, Eds. Wiley, New York, 1974. xxvi, 484 pp., illus. \$22.50. Clinical Pediatrics, Maternal and Child Health Series.



an instrument of
outstanding precision
aus JENA
Amplival

A universal research microscope by **aus JENA** with high optical quality and mechanical precision the modern laboratory demands. A unique feature is the condenser turret with a paracratic illumination system, which allows the microscopist to match the exact numerical aperture of the objective being used ... without loss of light. It includes a quick-change mechanism for observation in bright-field, dark-field, low power, phase contrast and polarization.

Accessories for continuous magnification (6.3 to 25X with zoom attachment), interference contrast, incident light, drawing and counting, polarization, fluorescence and microphotography are easily adaptable.

The Amplival is a modern, well-designed research microscope, readily adapted to any observation method ... an extra edge in comfort, unsurpassed by any other microscope of its class.

For free brochure and details on the complete line of aus JENA biological science instruments write or call:



International Micro-Optics

Division of Charvoz-Carsen Corp.
5 Daniel Road, Fairfield, N.J. 07006
(201) 227-6767

Exclusive U.S. Distributors for
Jenoptik Jena G.m.b.H.
GDR-69, Jena, Carl Zeiss Strasse 1

Circle No. 538 on Readers' Service Card

Electronic Circuit Analysis for Scientists. James A. McCray and Thomas A. Cahill. Wiley, New York, 1973. xii, 292 pp., illus. + charts. \$14.

Encyclopedia of the Unexplained. Magic, Occultism, and Parapsychology. Richard Cavendish, Ed. McGraw-Hill, New York, 1974. 304 pp., illus. \$17.95.

Energy. From Surplus to Scarcity? Proceedings of a meeting, Harrogate, England, June 1973. K. A. D. Inglis, Ed. Halsted (Wiley), New York, 1974. x, 242 pp., illus. \$21.95.

Environment and Man. Richard H. Wagner. Norton, New York, ed. 2, 1974. xiv, 528 pp., illus. \$7.95.

Environmental Remote Sensing. Applications and Achievements. Papers from a symposium, Bristol, England, Oct. 1972. Eric C. Barrett and Leonard F. Curtis, Eds. Edward Arnold, London, and Crane, Russak, New York, 1974. vi, 310 pp., illus. + plates. \$27.50.

The Ethics of Genetic Control. Ending Reproductive Roulette. Joseph Fletcher. Anchor/Doubleday, New York, 1974. xxii, 218 pp. Paper, \$1.95.

Evolution and Design in the Plant Kingdom. C. L. Duddington. Apollo Editions (Crowell), New York, 1974. 260 pp., illus. + plates. Paper, \$2.95. Second edition of *Evolution in Plant Design*.

Experimental Design and its Statistical Basis. D. J. Finney. University of Chicago Press, Chicago, 1974. xii, 170 pp., illus. Paper, \$2.95. The Scientists' Library. Biology and Medicine. Reprint of the 1955 edition.

Experimental Induction of Some Collagen Diseases. Kitasu Suzue. Igaku Shoin, Tokyo, Japan. 1974. vi, 58 pp., illus. Paper, \$7.

Experimental Methods in Biophysical Chemistry. Claude Nicolau, Ed. Wiley-Interscience, New York, 1973. xvi, 688 pp., illus. \$39.50.

Festveranstaltung und Internationales Kolloquium. Proceedings of a colloquium, Berlin, Germany, June 1973. Kommissionsverlag Paul Parey, Berlin, 1973. 116 pp. Paper, DM 10. Mitteilungen aus der Biologischen Bundesanstalt für Land- und Forstwirtschaft. Heft 154.

A Field Guide to the Insects of America North of Mexico. Donald J. Borror and Richard E. White. Illustrations by Richard E. White. Houghton Mifflin, Boston, 1974. xii, 404 pp., illus. + plates. Paper, \$4.95. Reprint of the 1970 edition. Peterson Field Guide Series, vol. 19.

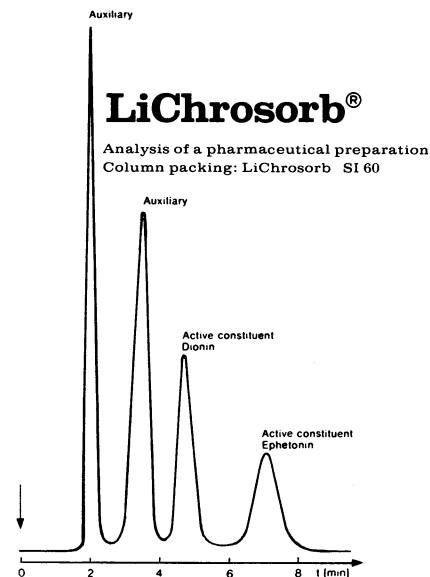
A Field Guide to Pacific Coast Shells. Including Shells of Hawaii and the Gulf of California. Percy A. Morris. Houghton Mifflin, Boston, ed. 2, 1974. xxxvi, 298 pp. + plates. Paper, \$3.95. Peterson Field Guide Series, vol. 6.

A Field Guide to Rocky Mountain Wildflowers from Northern Arizona and New Mexico to British Columbia. John J. Craighead, Frank C. Craighead, Jr., and Ray J. Davis. Drawings by Grant O. Hagen and Eduardo Salgado. Houghton Mifflin, Boston, 1974. xxxviii, 278 pp., illus. + plates. Paper, \$3.95. Reprint of the 1963 edition. Peterson Field Guide Series, vol. 14.

Freshwater Ecology. T. T. Macan. Longman Group, London, and Halsted (Wiley), New York, ed. 2, 1974. viii, 344 pp., illus. Paper, \$10.95.

EM Reagents®

Products for High Performance Liquid Chromatography



LiChrosorb®

**LiChrosorb — totally porous
HPLC column packings of
irregular shape**

LiChrosorb SI 60
LiChrosorb SI 100
LiChrosorb Alox T
LiChrosorb SI 60 silanized
mean particle sizes:
5 μ m, 10 μ m, 30 μ m

LiChrospher™

**LiChrospher — totally porous
HPLC column packings of
spherical shape**

LiChrospher SI 100
LiChrospher SI 500
LiChrospher SI 1000
mean particle size 10 μ m

EM also supplies PERISORB® a porous-layer column packing material for high speed and high resolution LC.

EM Laboratories, Inc.

associate of E. Merck, Darmstadt, Germany

500 Executive Boulevard
Elmsford, New York 10523

Phone 914/592-4660

Circle No. 535 on Readers' Service Card

Genetical Structure of Populations. Kenneth Mather. Chapman and Hall, London, 1973 (U.S. distributor, Halsted [Wiley], New York). viii, 198 pp., illus. \$12.95.

Geology. Leon E. Long. McGraw-Hill, New York, 1974. xiv, 526 pp., illus. \$13.95.

Global Tectonics and Earthquake Risk. Cinna Lomnitz. Elsevier, New York, 1974. xiv, 320 pp., illus. + maps. \$29.50. Developments in Geotectonics, vol. 5.

The Grant Oneota Village. Marshall McKusick. Office of State Archaeologist, University of Iowa, Iowa City, 1973. iv, 182 pp., illus. Cloth, \$5; paper, \$3. Report No. 4.

A Guide to Medical Mathematics. D. A.

Franklin and S. B. Newman, Halsted (Wiley), New York, 1974. xii, 454 pp., illus. \$19.95.

Handbook of Vegetation Science. Part 8, Vegetation Dynamics. R. Knapp, Ed. Junk, The Hague, 1974. x, 364 pp., illus. Dfl. 80.

Heated Effluents and Effects on Aquatic Life with Emphasis on Fishes. A Bibliography. Edward C. Raney, Bruce W. Menzel, and Emily C. Weller. U.S. Atomic Energy Commission, Washington, D.C., 1974 (available as TID-3918 from National Technical Information Service, Springfield, Va.). iv, 652 pp. Paper, \$13.60. Ichthyological Associates Bulletin, No. 9.

The Hepaticae and Anthrocerotae of

North America: East of the Hundredth Meridian. Vol. 3. Rudolf M. Schuster. Columbia University Press, New York, 1974. xvi, 880 pp., illus. \$25.

Heterocycles in Organic Synthesis. A. I. Meyers. Wiley-Interscience, New York, 1974. xx, 332 pp., illus. \$19.95. General Heterocyclic Chemistry Series.

Histological Typing of Ovarian Tumors. S. F. Serov and R. E. Scully in collaboration with L. H. Sobin and ten others. World Health Organization, Geneva, Switzerland, 1973 (available from American Society of Clinical Pathologists, Chicago). 56 pp. + plates. \$16.50. International Histological Classification of Tumours, No. 9.

Histology of the Vertebrates. A Comparative Text. Warren Andrew and Cleveland P. Hickman. Mosby, St. Louis, 1974. viii, 440 pp., illus. \$16.50.

Historia de la Etnología. Los Precursores. Angel Palerm. Centro de Investigaciones Superiores, Mexico City, Mexico, 1974. 320 pp. Paper.

History of Urban Form. Prehistory to the Renaissance. A. E. J. Morris. Halsted (Wiley), New York, 1974. x, 268 pp., illus. \$19.75.

Hyperstability of Control Systems. V. M. Popov. Editura Academiei, Bucharest, Rumania, and Springer-Verlag, New York, 1973. 400 pp., illus. \$26.20. Die Grundlagen der Mathematischen Wissenschaften, Band 204.

Images, Heroes, and Self-perceptions. The Struggle for Identity from Mask-Wearing to Authenticity. Lou Benson. Photographs by Charles, Larry, and Steve Cline. Prentice-Hall, Englewood Cliffs, N.J., 1974. xiv, 434 pp. \$8.95.

Insects and Other Arthropods of Medical Importance. Kenneth G. V. Smith, Ed. British Museum of Natural History, London, 1973. xiv, 562 pp., illus. + plates. £6.50.

International Symposium on Histamine H₂-Receptor Antagonists. Proceedings of a symposium, London, Oct. 1973. Clive J. Wood and M. Alison Simkins, Eds. Research and Development Div., Smith Kline and French Laboratories, Welwyn Garden City, England, 1973. 412 pp., illus. Paper.

International Symposium on Pain. Proceedings of a symposium, Seattle, Wash., May 1973. John J. Bonica, Ed. Raven, New York, 1974. xxiv, 850 pp., illus. \$36. Advances in Neurology, vol. 4.

An Introduction to Chemical Nomenclature. R. S. Cahn. Butterworth, London, and Halsted (Wiley), New York, ed. 4, 1974. viii, 128 pp., illus. Paper, \$6.95.

Introduction to Exploration Geochemistry. A. A. Levinson. Applied Publishing, Calgary, Canada, 1974. xiv, 612 pp., illus. \$25.

Introduction to Singular Perturbations. Robert E. O'Malley, Jr. Academic Press, New York, 1974. viii, 206 pp., illus. \$16.50. Applied Mathematics and Mechanics, vol. 14.

Introductory Chemistry. A Survey of General, Organic, and Biological Chemistry. Karl F. Kumli. Prentice-Hall, Englewood Cliffs, N.J., 1974. xviii, 668 pp., illus. \$12.95.

Keller Plan for Self-Paced Study Using Masterton and Slowinski's Chemical Principles. Joseph L. Clouser. Saunders, Philadelphia, 1974. vi, 164 pp. Paper, \$4.50.

Prepare and sterilize 3 liters of agar... Automatically

Now you can prepare up to three liters of agar automatically, with the AgarMatic bench-top sterilizer. Simply add water and dehydrated medium then set it and forget it. In 45 minutes or less, sterile agar is ready for pushbutton

dispensing. The agar will automatically be held at the pre-set dispensing temperature until you are ready to use it. AgarMatic is a plug-in sterilizer that needs no external steam supply. To save sterilization time and handling, use the low-cost AgarMatic. Send for catalog AS3-S-974

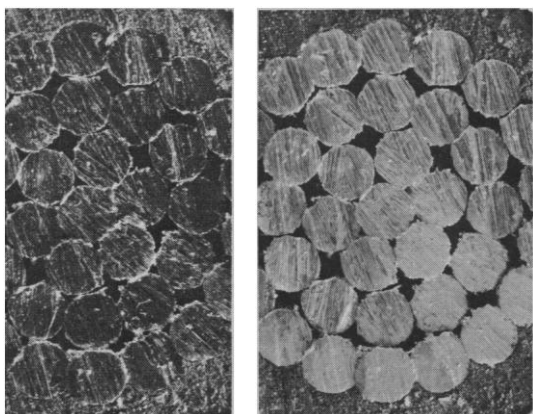
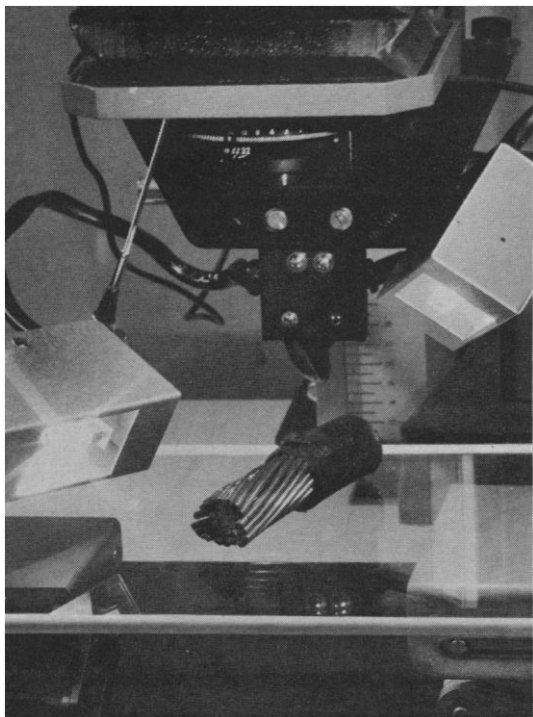


NEW BRUNSWICK SCIENTIFIC CO., INC.

1130 Somerset Street, New Brunswick, N.J. 08903 • 201/846-4600

With NBS, Advanced Technology is a Way of Life.

Circle No. 449 on Readers' Service Card



BOWENS MACRO-LITE

**is a new lower cost
high intensity
electronic flash
lighting system
for close-up and
photomacrography**

**Write for illustrated literature or
see your dealer**

BOGEN PHOTO CORP.

100 So. Van Brunt St. P.O. Box 448
Englewood, New Jersey, 07631

Circle No. 537 on Readers' Service Card

Teacher's Manual available. Saunders' Golden Series.

Laboratory Techniques for High Schools. A Work-Text for Bio-Medical Methods. Gabrielle I. Edwards and Marion Cimmino. Barron's Educational Series, Woodbury, N.Y., 1974. viii, 220 pp., illus. Paper, \$4.95.

Life on the Planet Earth. Harold J. Morowitz and Lucille S. Morowitz. Norton, New York, 1974. xviii, 380 pp., illus. \$8.95.

Linnaeus's Oland and Gotland Journey 1741. Carl Linnaeus. Translated from the Swedish edition (Stockholm, 1745) by Marie Åsberg and William T. Stearn. Published for the Linnean Society of London by Academic Press, New York, 1973. ii, 220 pp., illus. + plates. \$17.50. Reprinted from the *Biological Journal of the Linnean Society*, vol. 5 (1973).

The Liquid Metal Fast Breeder Reactor. An Environmental and Economic Critique. Thomas B. Cochran. Resources for the Future, Washington, D.C., 1974 (distributor, Johns Hopkins University Press, Baltimore). xvi, 272 pp., illus. Paper, \$6.95.

Living with Your Bronchitis and Emphysema. Theodore Berland and Gordon L. Snider. Illustrated by June Hill Pedigo. St. Martin, New York, 1974. viii, 152 pp. Paper, \$3.95. Reprint of the 1972 edition.

Living with Your Ulcer. Theodore Berland and Mitchell A. Spellberg. Illustrated by June Hill Pedigo. St. Martin, New York, 1974. xii, 178 pp. Paper, \$3.95. Reprint of the 1971 edition.

Macroscopic Thermodynamics with Engineering Applications. John S. Turton. Wiley, New York, 1973. xvi, 300 pp., illus. \$15.95.

Mathematical Foundations for Management Science and Systems Analysis. J. William Schmidt. Academic Press, New York, 1974. xiv, 582 pp., illus. \$15.95. Operations Research and Industrial Engineering Series.

Mechanisms of Body Functions. Dexter M. Easton. Prentice-Hall, Englewood Cliffs, N.J., ed. 2, 1974. xii, 500 pp., illus. \$12.95.

Medical Engineering. Charles Dean Ray, Ed. Year Book, Chicago, 1974. xxviii, 1256 pp., illus. \$90.

Methods of Media Preparation for the Biological Sciences. Joyce A. Stewart. Thomas, Springfield, Ill., 1974. viii, 100 pp., illus. \$7.50.

The Mobility and Diffusion of Ions in Gases. Earl W. McDaniel and Edward A. Mason. Wiley, New York, 1973. xii, 372 pp., illus. \$22.50. Wiley Series in Plasma Physics.

Molecular Physics. Part B. Dudley Williams, Ed. Academic Press, New York, ed. 2, 1974. xvi pp. + pp. 465-1032, illus. \$33.50. Methods of Experimental Physics, vol. 3.

La Mycologie et Ses Corollaires. Une Philosophie des Sciences Naturelles. Georges Becker. Doin, Paris, 1974. 244 pp. Paper, 54 F. Collection Recherches Interdisciplinaires.

Neurobiological Aspects of Maturation and Aging. Proceedings of a symposium, Brooklyn, N.Y., June 1972. D. H. Ford, Ed. Elsevier, New York, 1973. xii, 530 pp., illus. \$70. Progress in Brain Research, vol. 40.

Neuroleptics. Stuart Fielding and Har-

How to gain a priceless edge over your competitors: time.

Reinventing the wheel can cost you months and a small fortune during the development of a new product.

With the help of Lockheed's Dialog retrieval system, you can avoid that pitfall and use the vast knowledge of some of the world's best brains for your own technical efforts.

Dialog puts the accumulated information of thousands of technical and scientific leaders at your fingertips. In minutes you can scan the titles and summaries of their work. And a typical search can cost as little as \$10.

Dialog places you in the middle of some of the world's most important data bases, including: INSPEC (Science Abstracts); NTIS, U.S. Government Reports Announcements; COMPENDEX (Engineering Index); Chemical Market Abstracts; plus other disciplines. Almost 3,000,000 abstracts all told.

Dialog is easy to use. It only takes a terminal and a telephone. And it only takes a letter or a phone call to get more information. Contact Barbara Ellis, (415) 493-4411, Ext. 45635, Dept. 15-50, Bldg. 201, 3251 Hanover St., Palo Alto, Ca. 94304. In Washington, D.C., phone R. Caputo, (202) 872-5971; in New York, R. Donati, (212) 682-4630.

**LOCKHEED
INFORMATION
SYSTEMS**

Circle No. 266 on Readers' Service Card

bans Lal, Eds. Futura Publishing, Mount Kisco, N.Y., 1974. xxvi, 350 pp., illus. \$19.50. Industrial Pharmacology, vol. 1.

Nomenclature, Methodology and Results of Clinical Trials in Acute Leukemias. Proceedings of a workshop, Paris, June 1972. G. Mathe, P. Pouillart, and L. Schwarzenberg, Eds. Springer-Verlag, New York, 1973. x, 168 pp., illus. \$22.40. Recent Results in Cancer Research, vol. 43.

Optical Activity of Proteins and Other Macromolecules. B. Jirgensons. Springer-Verlag, New York, ed. 2, 1973. x, 200 pp., illus. \$23.10. Molecular Biology, Biochemistry and Biophysics, vol. 5, Second edition of *Optical Rotatory Dispersion of Proteins and Other Macromolecules*.

Organicum. Practical Handbook of Organic Chemistry. Heinz Becker and sixteen others. Translated from the German edition (Berlin, 1971) by B. J. Hazzard. P. A. Ongley, Ed. Addison-Wesley, Reading, Mass., 1973. xx, 748 pp., illus. \$23.50.

The Origins and International Economics of Space Exploration. Bernard Lovell. Halsted (Wiley), New York, 1974. viii, 104 pp., illus. \$4.50.

The Origins of Digital Computers. Selected Papers. Brian Randell, Ed. Springer-Verlag, New York, 1973. xvi, 464 pp., illus. \$21.60.

Our Wildlife Legacy. Durward L. Allen. Funk and Wagnalls, New York, ed. 2, 1974. x, 422 pp. + plates. Paper, \$3.95.

The Outer Lands. A Natural History Guide to Cape Cod, Martha's Vineyard, Nantucket Block Island and Long Island. Dorothy Sterling. Illustrated by Winifred Lubell. Anchor/Doubleday, New York, 1974. 192 pp. Paper, \$3.50.

Pharmacological Models in Contraceptive Development. Animal Toxicity and Side-Effects in Man. Proceedings of a meeting, Geneva, Switzerland, Sept. 1973. M. H. Briggs, E. Diczfalussy, and A. Diczfalussy, Eds. World Health Organization Research and Training Centre on Human Reproduction, Stockholm, Sweden, 1974. 494 pp., illus. Reprinted from *Acta Endocrinologica*, Supplementum No. 185.

Physical Anthropology. Philip L. Stein and Bruce M. Rowe. McGraw-Hill, New York, 1974. xiv, 424 pp., illus. Cloth, \$9.95; paper, \$7.95.

Physical Chemistry for the Life Sciences. Gordon M. Barrow. McGraw-Hill, New York, 1974. x, 406 pp., illus. \$12.50.

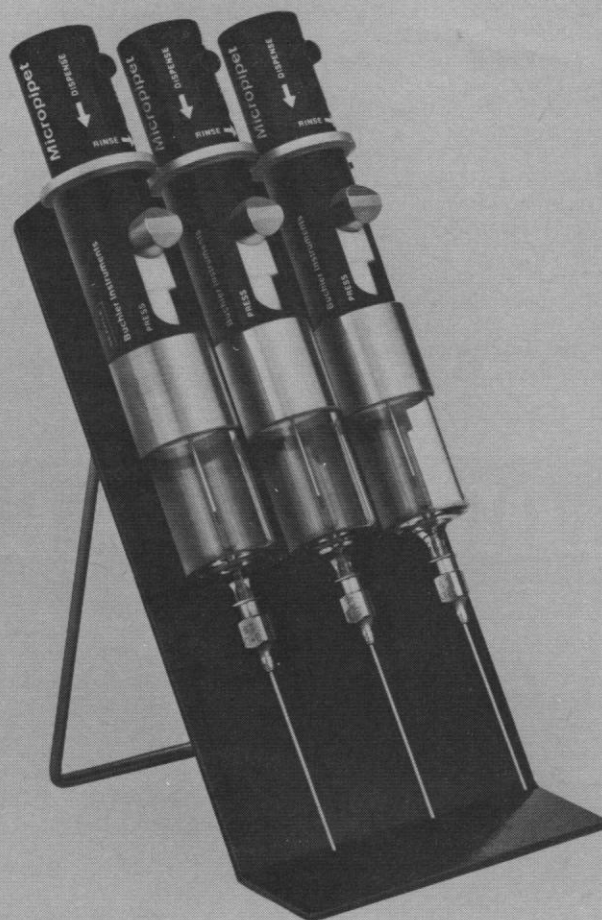
Physical Models for Semiconductor Devices. John E. Carroll. Arnold, London, and Crane, Russak, New York, 1974. xiv, 254 pp., illus. Paper, \$11.95.

Physiology of Autonomic Ganglia. Vladimir I. Skok. Igaku Shoin, Tokyo, 1973. viii, 198 pp., illus. \$25.

Plant Viruses. Kenneth M. Smith. Chapman and Hall, London, ed. 5, 1974 (U.S. distributor, Halsted [Wiley], New York). x, 212 pp., illus. + plates. Cloth, \$10; paper, \$5.95.

Population, Contact, and Climate in the New Mexican Pueblos. Ezra B. W. Zubrow. University of Arizona Press, Tucson, 1974. viii, 88 pp., illus. Paper, \$4.95. Anthropological Papers of the University of Arizona, No. 24.

Precalculus Mathematics. An Elementary Functions Approach. David A. Sprecher. Harper and Row, New York, 1974. xii, 364 pp., illus. \$10.95.



Working in the Microliter Range? **Buchler Micropipet** for fixed or variable volume. Pat. Pend.

To suit your individual requirements, you can now obtain the Buchler Micropipet in a variable volume model from 2 to 10 ul . . . or in fixed volumes of 2, 3, 4, 5, 6, 7, 8, 9, 10, 20 and 50 ul.

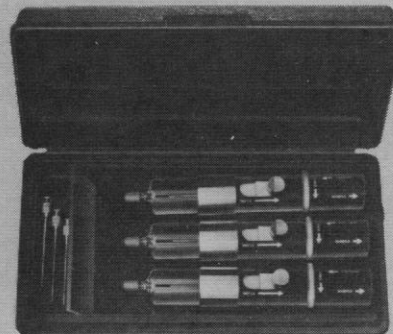
- Suitable for titration, blood cell counting, flame photometry or RIA.
- Flow-thru diluent wash eliminates sample carryover and delivery errors.
- Reproducibility to a $\pm 0.3\%$ coefficient of variation.

Individual pipets available in variable or fixed volume. Set of 3 fixed volumes specified by you, including rack and case, package-priced at only \$295.

SEARLE

Buchler Instruments

Division of Searle Analytic Inc.
1327 Sixteenth Street
Fort Lee, New Jersey 07024



Circle No. 465 on Readers' Service Card

Prehistory of North America. Jesse D. Jennings. McGraw-Hill, New York, ed. 2, 1974. xii, 436 pp., illus. \$12.95.

Principles and Applications of Electrochemistry. D. R. Crow. Chapman and Hall, London, 1974 (U.S. distributor, Halsted [Wiley], New York). viii, 228 pp., illus. Paper, \$7.75. Chapman and Hall Chemistry Textbook Series.

Principles of Quantum Mechanics. The Non-relativistic Theory with Some Illustrative Applications. W. V. Houston and G. C. Phillips. North-Holland, Amsterdam, 1973 (U.S. distributor, Elsevier, New York). xii, 376 pp., illus. \$39.50.

Proceedings of the International Conference on Nuclear Physics. Munich, Ger-

many, Aug. 1973. J. de Boer and H. J. Mang, Eds. North-Holland, Amsterdam, and Elsevier, New York, 1973. 2 vols., illus. Vol. 1, Contributed Papers. lxvi, 740 pp. Vol. 2, Invited Papers. xii, 838 pp. \$78.

Progress in Molecular and Subcellular Biology. Vol. 3. A. S. Braverman and 11 others. viii, 252 pp., illus. \$25.50.

Psychological Aspects of a First Pregnancy and Early Postnatal Adaptation. Pauline M. Shereshefsky and Leon J. Yarrow, Eds. Raven Press, New York, 1973. xviii, 374 pp. \$12.50. A Monograph of the National Institute of Child Health and Human Development.

Quantitative Analysis. R. A. Day, Jr.,

and A. L. Underwood. Prentice-Hall, Englewood Cliffs, N.J., ed. 3, 1974. x, 534 pp., illus. \$13.95.

Radiative Transfer and Interactions with Conduction and Convection. M. Necati Özisik. Wiley-Interscience, New York, 1973. xvi, 576 pp., illus. \$18.95.

Recent Earth History. Claudio Vita-Finzi. Halsted (Wiley), New York, 1973. xii, 138 pp., illus. \$7.95.

Regional Growth and Water Resource Investment. W. Cris Lewis, Jay C. Andersen, Herbert H. Fullerton, and B. Delworth Gardner. Lexington (Heath), Lexington, Mass., 1973. xii, 172 pp., illus. \$14.50.

Resource Recovery from Municipal Solid Waste. A State-of-the-Art Study. National Center for Resource Recovery. Lexington (Heath), Lexington, Mass., 1974. xvi, 182 pp., illus. \$13.

The Revolution in Medical Technology Education. Robienetta Driver and Mary A. Feeley. Thomas, Springfield, Ill., 1974. viii, 60 pp. \$7.95.

Schistosomiasis. The Evolution of a Medical Literature. Selected Abstracts and Citations, 1852-1972. Kenneth S. Warren. MIT Press, Cambridge, Mass., 1974. xl, 1308 pp., illus. \$35.

Science as a Career Choice. Theoretical and Empirical Studies. Bernice T. Eiduson and Linda Beckman, Eds. Russell Sage Foundation, New York, 1973. xvi, 736 pp. \$25.

Science Observed. Science as a Social and Intellectual Activity. F. R. Jevons. Allen and Unwin, London, 1973 (U.S. distributor, Crane, Russak, New York). 186 pp., illus. \$11.95.

Science, Technology and Freedom. Willis H. Truitt and T. W. Graham Solomons, Eds., with the collaboration of Anne J. Truitt. Houghton Mifflin, Boston, 1974. xiv, 272 pp., illus. Paper, \$4.50.

Selected Organic Syntheses. A Guidebook for Organic Chemists. Ian Fleming. Wiley-Interscience, New York, 1973. viii, 228 pp., illus. Paper, \$10.50.

Should Trees Have Standing? Toward Legal Rights for Natural Objects. Christopher D. Stone. Kaufmann, Los Altos, Calif., 1974. xviii, 102 pp. Cloth, \$6.95; paper, \$2.95.

Simplified Design of Structural Steel. Harry Parker. Harold D. Hauf, Ed. Wiley-Interscience, New York, ed. 4, 1974. xvi, 326 pp., illus. \$12.50.

The Singing Land. 22 Natural Environments of Australia from Surging Ocean to Arid Desert. Vincent Serventy. Scribner, New York, 1974. 96 pp., illus. \$6.95.

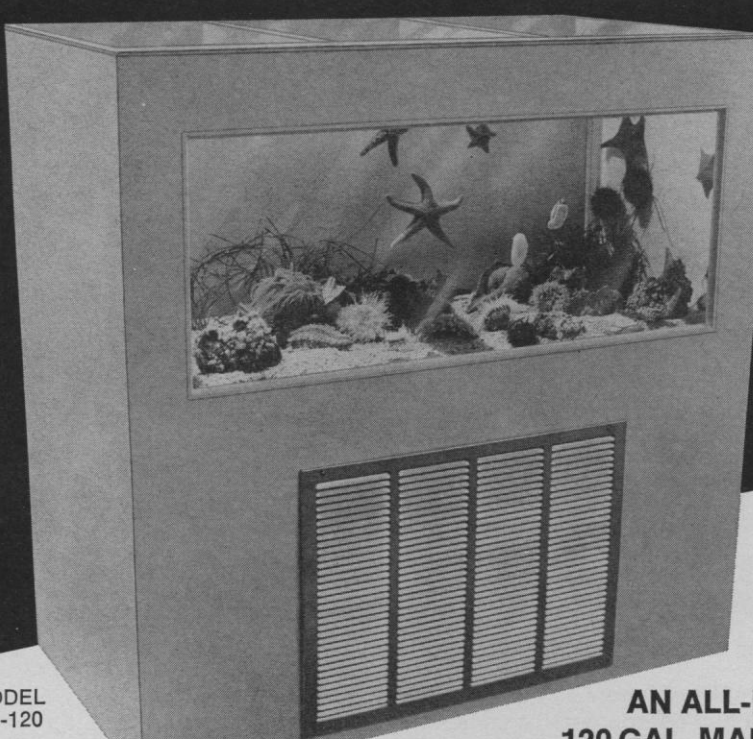
Snoring. New Answers to an Old Problem. Marcus H. Boulware. American Faculty Press, Rockaway, N.J., 1974. 204 pp., illus. \$6.95.

Social Psychology. Jonathan L. Freedman, J. Merrill Carlsmith, and David O. Sears. Prentice-Hall, Englewood Cliffs, N.J., ed. 2, 1974. xiv, 526 pp., illus. \$19.95.

Socio-Economic and Ethical Implications of Enzyme Engineering. Carl-Göran Heden. International Federation of Institutes for Advanced Study, Stockholm, Sweden, 1974. xii, 122 pp., illus. + indexes. Paper, Sw.Cr. 15. IFIAS Study No. 1.

Statistical Methods in Nuclear Control. John L. Jaech. U.S. Atomic Energy Com-

EXPLORE OUR OCEAN



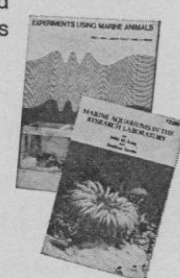
MODEL
CS-120

AN ALL-NEW 120 GAL. MARINE CULTURE SYSTEM OF ADVANCED DESIGN FOR LABORATORY, CLASSROOM OR DISPLAY

This handsome multi-view marine culture system is practical for every use . . . and, completely reliable with its built in water management system that holds 3°C to ambient temperatures. The patented filtering system with circular current provides an ideal life-supporting environment for marine invertebrates and fishes. Just fill with tap water, add INSTANT OCEAN® Synthetic Sea Salts, plug in and add the animals. It's that easy. INSTANT OCEAN® Culture Systems are available in many sizes and styles.

WRITE FOR DETAILS TODAY!

Free with each INSTANT OCEAN® Culture System—EXPERIMENTS USING MARINE ANIMALS, by Dr. F. A. Diehl, et. al. and MARINE AQUARIUMS IN THE RESEARCH LABORATORY by J. King and S. Spotte.



Aquarium Systems inc.

AQ-3392 33208 Lakeland Blvd. • Eastlake, Ohio 44094 • Phone: 216-946-9180
Circle No. 357 on Readers' Service Card

1974 TEN YEARS
SPRINGER-VERLAG
NEW YORK

Temperature Adaptation

Temperature and Life

By **H. Precht, J. Christophersen, H. Hensel, and W. Larcher**

Contributions from authors representing a wide range of fields—microbiology, botany, zoology, biochemistry, and physiology—provide a comprehensive study of the way in which living organisms, including plants, adapt to temperature and climate.

The text of the 1955 German edition by Precht, Christophersen, and Hensel has been completely revised and substantially enlarged for this first English edition.

1973. xx, 779p. 263 illus. cloth/\$54.70
ISBN 0-387-06441-9

Effects of Temperature on Ectothermic Organisms

Ecological Implications and Mechanisms of Compensation

Edited by **W. Wieser**

The study of thermoregulation in ectothermic organisms continues to produce insights into a number of general biological problems, in particular that of metabolic regulation. Ectotherms, in adapting to a thermally unstable environment, exhibit a wide range of subtle molecular and organismic mechanisms. Thus, the experimenter using temperature change as a tool is well-equipped to analyze temperature-induced adaptation.

1973. xi, 298p. 126 illus. cloth/\$28.10
ISBN 0-387-06420-6

Temperature Regulation

By **S. A. Richards and P. S. Fielden**

This book deals with the responses of all types of vertebrates, especially man, with particular emphasis on physiologic mechanisms. Invertebrates are also considered where relevant. Written primarily for the undergraduate student, it is intended as an introduction to the field of thermoregulatory physiology and as a framework for more advanced studies.

Wykeham Science Series, Volume 27
1973. xi, 212p. illus.
ISBN 0-387-91110-3 paper/\$6.00
ISBN 0-387-91114-6 cloth/\$8.30

To order books or obtain further information, write to:



**Springer-Verlag
New York Inc.**

175 Fifth Avenue
New York, NY 10010

mission, Oak Ridge, Tenn., 1973 (available as TID-26298 from National Technical Information Service, Springfield, Va.). x, 402 pp., illus. Paper, \$10.60.

Stonework of the Maya. Edward Ranney. University of New Mexico Press, Albuquerque, 1974. xvi, 120 pp., illus. Paper, \$9.95.

Strange Artifacts. A Sourcebook on Ancient Man. Vol. M-1. William R. Corliss. Published by the author, Box 311, Manor Road, Glen Arm, Md., 1974. vi, 262 pp., illus. In looseleaf binder, \$6.95.

Strategy for the West. American-Allied Relations in Transition. Richard B. Foster, Andre Beaufre, and Wynfred Joshua, Eds. Crane, Russak, New York, 1974. xii, 258 pp. \$11. Strategic Studies Center series.

Structural Mechanics. The Behavior of Plates and Shells. Jack R. Vinson. Wiley-Interscience, New York, 1974. xviii, 174 pp., illus. \$12.95.

Structure and Bonding. Vol. 17. J. D. Dunitz, P. Hemmerich, J. A. Ibers, C. K. Jorgensen, J. B. Neilands, D. Reinen, and R. J. P. Williams, Eds. Springer-Verlag, New York, 1973. vi, 268 pp., illus. \$27.80.

The Structure of Scientific Inference. Mary Hesse. University of California Press, Berkeley, 1974. viii, 310 pp. \$15.

Studies in Personnel and Industrial Psychology. Edwin A. Fleishman and Alan R. Bass, Eds. Dorsey Press, Homewood, Ill., ed. 3, 1974. xiv, 624 pp., illus. Paper, \$8.50. The Dorsey Series in Psychology.

Submicroscopic Cytochemistry. Vol. 2, Membranes, Mitochondria, and Connective Tissues. Isidore Gersh, Ed. Academic Press, New York, 1973. xviii, 246 pp., illus. \$22.

Systems Physiology. Samuel Armstrong Talbot and Urs Gessner. Wiley-Interscience, New York, 1973. xvi, 512 pp., illus. \$24.95. Wiley-Interscience Series on Biomedical Engineering.

T and B Lymphocytes. Origins, Properties, and Roles in Immune Responses. Melvyn F. Greaves, John J. T. Owen, and Martin C. Raff. Excerpta Medica, Amsterdam, and Elsevier, New York, 1973. viii, 316 pp., illus. \$32.

Thesaurus Phytomedizin. Pflanzenkrankheiten und Pflanzenschutz. Dedo Blumenbach. Kommissionsverlag Paul Parey, Berlin, 1973. x, 146 pp. Paper, DM 14.50. Mitteilungen aus der Biologischen Bundesanstalt für Land- und Forstwirtschaft, Heft 155.

Time on the Cross. Robert William Fogel and Stanley L. Engerman. Little, Brown, Boston, 1974. 2 vols., illus. Vol. 1, The Economics of American Negro Slavery. xviii, 286 pp. \$8.95. Vol. 2, Evidence and Methods. xii, 268 pp. \$12.50.

Topologie et Perception. Tome 1, Bases Philosophiques et Mathématiques. Claude Paul Bruter. Doin, Paris, 1974. ii, 254 pp., illus. Paper, 64 F. Collection Recherches Interdisciplinaires.

Tropical Pathology. Herbert Spencer and eight others. Springer-Verlag, New York, 1973. xiv, 766 pp., illus. \$88.60. Special edition of *Spezielle pathologische Anatomie*, Band 8.

Understanding Crime and Delinquency. A Sociological Introduction. Michael Philipson. Aldine, Chicago, 1974. xviii, 210 pp. Cloth, \$7.50; paper, \$2.95. Second edition of *Sociological Aspects of Crime and Delinquency*.

Frozen Sections in Seconds The CRYO-HISTOMAT®

Microtome freezing attachment quickly provides frozen sections with any standard microtome.



- Fast freezing preserves cell details
- Section at temperatures to minus 40°C
- Positive thaw control for quick specimen change
- "Solid State" "Peltier Effect"
- No circulating refrigerants or cumbersome CO₂ cylinders
- Noiseless - vibration-free
- Compact, conveniently portable
- Most economic - only \$835.00
F.O.B. Fairfield



HACKER INSTRUMENTS, INC.
Box 646, Fairfield, New Jersey 07006 • (201) 226-8450

Circle No. 545 on Readers' Service Card

FREE!

Savant

HVE ELECTROPHORESIS GUIDE

A comprehensive 24 page Guide describing the use of Dye Markers, Separation of Peptides and Amino Acids as well as Bibliography, available upon request.



**Savant
Instruments, Inc.**

221 Park Ave. / Hicksville, N.Y. 11801

Circle No. 267 on Readers' Service Card

Circle No. 543 on Readers' Service Card