

tities not directly measurable and, in particular, the illustrative mechanical models esteemed since the time of Descartes. Mach's most influential work, his "historico-critical" *History of Mechanics*, tries to show that our fondness for such models rests mainly on historical accident and that thereby much that is useless and even harmful has crept into science. As examples of expendables Mach pointed to the structured atom and the theory of relativity.

In the book under review Bradley gives an appropriately economical exposition of the elements of Mach's philosophy and of the chief products of his historico-criticism. Among the latter, Mach's celebrated interpretation of Newton's "laws" of motion, his analyses of inertia and of time, his electrical analogy to Carnot's engine, his temperature clock, and other ideas can still be studied with profit and even with excitement. Bradley's exposition ought to be easily intelligible to advanced undergraduates. He has simplified here, extended there, and not hesitated to criticize—with the help of Campbell, Braithwaite, Popper, *et al.*—what he finds faulty in Mach's philosophical position. One regrets that his vigilance did not extend to the historical order. Mach studied the history of science in order to prove a point; he not unnaturally exaggerated and distorted, as recent historiography amply demonstrates. Bradley ignores this literature, follows and sometimes embroilers Mach, and occasionally slips from criticism into mythology.

J. L. HEILBRON

*Department of History,
University of California, Berkeley*

American Prehistory

Archaeological Survey in the Lower Yazoo Basin, Mississippi, 1949–1955. PHILIP PHILLIPS. Peabody Museum of Archaeology and Ethnology, Cambridge, Mass., 1970. In 2 parts. xxviii, 1000 pp., illus. Paper, \$30. Papers of the Peabody Museum, vol. 60.

As archeological research in the eastern United States began to expand in the 1930's, a joint endeavor of three large universities saw the initiation of an intensive survey of the prehistoric sites of the Lower Mississippi River Valley. This impressive two-volume study is another in the series of reports that have resulted. The author, long associated with Harvard Peabody Museum,

has been actively interested in the area since before 1940, and no scholar has a greater grasp of the details of the prehistory of the Mississippi Valley from the mouth of the Ohio River to the Gulf. The Lower Yazoo Basin is a small part of the great valley and its tributaries, but it is a highly significant cultural hearth in the total prehistory of the area.

This monograph represents the accumulation of survey and field data plus laboratory analyses that were begun about 1950. Part 1 is concerned with the method and theory involved, with the description of the pottery types, and with the location and situation of the sites that are the basis for the study. Part 2 is devoted to the site excavation program and to the delineation of the various cultural periods that the author could establish on the basis of this information.

In the Mississippi River Valley, from the Great Lakes to the Gulf, the prehistoric residents evolved several great pottery traditions, and the near-imperishable fragments of these vessels constitute the tools of the archeologists who attempt to unravel the relationships or even the methodologies used. In an introductory section of part 1, Phillips briefly but masterfully treats of the problems relating to ceramic typology. He not only sets forth what has been done in the past but clearly states why he has selected some of the arbitrary types that he uses. Phillips is an advocate of a method of viewing aboriginal pottery called the "type-variety concept." He describes a basic type according to mode of manufacture and decorations, then uses all the local deviations from that type as variants or regional manifestations. These nuances of manufacture enable judgments of geographic spread of ideas about pottery making. However, Phillips is careful to state that he does not think analyses of potsherd collections from archeological sites will ever "tell us very much about cultural and social behavior." His pottery types and their recognized varieties have been selected from "an endless number of possible variations," but they are ones judged "to reveal significant relationships."

There is much written today about the "New Archeology," as though the old archeology were rather pedantic and useless. What is implied by the former is that the archeological data are directed to illumination of the total lifeway of a people. The New Archeology does not reject "data" per se, but

it exalts the statistical treatment of information in order to make possible a greater confidence in the conclusions drawn. This work represents a happy blending of the old and the new. It is in part a compilation of raw data—field results from excavations—that probably will not be surpassed and will but rarely be approached again in American archeology. The information from the 157 sites studied is a data bank usable for generations to come. Although the author denegates archeology as history and purports to be doing "science," the work is that of an artist. It is distinguished by the individualistic manner in which he handles the materials. In his particularistic style, he shares with other scientists his interpretations of the data. Happily his style is highly literate and embellished with touches of lightness that encourage the closest reading.

The detailed descriptions of the pottery types will serve as a guide and catalog for archeologists working in the Lower Mississippi Valley for many years to come. No area professional's library can be without these volumes. Students of the development of archeology in the eastern United States will read with profit the evolution of many of the ideas embodied in this study.

Even a brief perusal of the volumes gives one an indication of the tremendous amount of labor involved in their preparation. The hundreds of illustrations enhance the site reports and the beautiful plates of the pottery types make them invaluable. But ultimately the great value of this work is in the philosophical treatment of many of the fundamental ideas involved—the nature of theory in archeology, the validity of typology, and the reconstruction of regional chronologies. This publication will be the foundation and fountainhead of many future works on the archeology of the southeastern United States.

WILLIAM G. HAAG

*Museum of Geoscience,
Louisiana State University,
Baton Rouge*

Books Received

Actions Chimiques et Biologiques des Radiations (The Chemical and Biological Actions of Radiations). Quinzième série. M. Haïssinsky, Ed. Masson, Paris, 1971. 216 pp., illus. 120 F.

An Advanced Organic Laboratory Course. Melvin S. Newman. Macmillan,

(Continued on page 320)

plenum
PUBLISHING CORPORATION

BEHAVIOR OF MARINE ANIMALS

Current Perspectives in Research

Edited by **Howard E. Wimm**, *Univ. of Rhode Island, Kingston* and **Bori L. Olla**, *Sandy Hook Marine Laboratory, Highland, N. J.*

These volumes comprise a comprehensive survey whose data is based on the results of carefully defined questions designed to permit valid working hypotheses in the field of marine life research.

Volume 1: INVERTEBRATES
Approx. 244 pages April 1972 \$16.00
0-306-37571-0

Volume 2: VERTEBRATES
Approx. 248 pages April 1972 \$16.00
0-306-37572-9

WATER:

A Comprehensive Treatise*

Volume 1: The Physics and Physical Chemistry of Water

Edited by **Felix Franks**, *Unilever Research Laboratory, Sharnbrook, England*

Poses relevant questions which need to be answered for a more complete understanding of the intermolecular nature of water.

Approx. 576 pages May 1972 \$37.50
0-306-37181-2 (Subscription: \$32.50)

ADVANCES IN EXPERIMENTAL MEDICINE AND BIOLOGY*

Volume 20: Drug Abuse: Non-Medical Use of Dependence-Producing Drugs

Edited by **Simon Btsh**, *Council for the International Organization of Medical Sciences, WHO, Geneva*
Approx. 289 pages April 1972 \$16.50
0-306-39020-5

*Place your continuation order today for books in this series. It will ensure the delivery of new volumes immediately upon publication; you will be billed later.

plenum press

plenum press / consultants bureau

Divisions of Plenum Publishing Corporation

NEW YORK: 227 W. 17th Street, N. Y. 10011
LONDON: Davis House, 8 Scrubs Lane, NW
10 6SE Harlesden, England

BOOKS RECEIVED

(Continued from page 272)

New York, 1972. xviii, 230 pp., illus. \$10.75. A Series of Books in Chemistry.

Agricultural and Allied Industrial Tractors. A conference, London, Oct. 1970. Institution of Mechanical Engineers, London, 1972. viii, 210 pp., illus. £7.50. Proceedings 1969-70, vol. 184, part 3Q.

American Building 2. The Environmental Forces That Shape It. James Marston Fitch. Houghton Mifflin, Boston, ed. 2, 1972. xiv, 350 pp., illus. \$15.

Amino-Acids, Peptides, and Proteins. Vol. 3. A Review of the Literature Published during 1970. G. T. Young. Chemical Society, London, 1971. xiv, 380 pp., illus. £6. A Specialist Periodical Report.

The Anatomy of the Nervous System of Octopus vulgaris. J. Z. Young. Oxford University Press, New York, 1972. xxxii, 690 pp., illus. \$35.25.

Anthropology. A Perspective on Man. Robert T. Anderson. Wadsworth, Belmont, Calif., 1972. viii, 134 pp. Paper, \$3.95.

Are Our Descendants Doomed? Technological Change and Population Growth. Harrison Brown and Edward Hutchings, Jr., Eds. Viking, New York, 1972. vi, 378 pp., illus. \$12.50.

Astronomy and Astrophysics Abstracts. Vol. 5, Literature 1971, Part 1. S. Böhme, W. Fricke, U. Güntzel-Lingner, F. Henn, D. Krahn, and G. Zech, Eds. Published for Astronomisches Rechen-Institut by Springer-Verlag, New York, 1971. x, 506 pp. \$21.90.

Atlas of Thermoanalytical Curves. (TG-, DTG-, DTA-Curves Measured Simultaneously). G. Liptay, Ed. Heyden, New York, 1971. 116 pp. In loose-leaf binder, \$28.

Atomic and Molecular Physics. National Research Council Committee on Atomic and Molecular Physics. National Academy of Sciences, Washington, D.C., 1971. viii, 136 pp., illus. Paper, \$3.25.

Basic Biology. A First Course. Stewart M. Brooks. Mosby, St. Louis, Mo., 1972. xiv, 298 pp., illus. \$8.90.

Behavioral Objectives for Psychology, the Hybrid Science. L. Wendell Rivers. Prentice-Hall, Englewood Cliffs, N.J., 1972. vi, 154 pp., illus. Paper \$2.95.

Biological Rhythms in Human and Animal Physiology. Gay Gaer Luce. Dover, New York, 1971. viii, 184 pp. Paper, \$2.50. Dover Books Explaining Science and Mathematics. Reprint of the 1970 edition.

Birch Reduction of Aromatic Compounds. A. A. Akhrem, I. G. Reshetova, and Yu. A. Titov. Translated from the Russian edition (Moscow, 1969) by B. J. Hazzard. IFI/Plenum, New York, 1972. vi, 126 pp., illus. \$15.

Broadcasting from Space. Unesco, Paris, 1970 (U.S. distributor, Unipub, New York). 68 pp. Paper, \$1.50. Reports and Papers on Mass Communication, No. 60.

Cadmium in the Environment. Lars Friberg, Magnus Piscator, and Gunnar Vordberg. CRC Press, Cleveland, Ohio, 1971. 176 pp., illus. \$25.

Carbohydrate Chemistry. Vol. 4. A Review of the Literature Published during 1970. J. S. Brimacombe, R. J. Ferrier,

R. D. Guthrie, T. D. Inch, and J. F. Kennedy. Chemical Society, London, 1971. x, 278 pp., illus. £4.

Catalog of Type Specimens of Fossils in the New York State Museum. Clinton F. Kilfoyle. New York State Museum and Science Service, Albany, 1971. vi, 306 pp., illus. Paper, \$4. Bulletin No. 413.

The Cells and Tissues of the Immune System. Structure, Functions, Interactions. Leon Weiss. Prentice-Hall, Englewood Cliffs, N.J., 1972. xvi, 252 pp., illus. Cloth, \$9.95; paper, \$6.95. Prentice-Hall Foundations of Immunology Series.

Civil Disobedience and Democracy. Elliot M. Zashin. Free Press, New York, 1972. xvi, 368 pp. \$7.95.

Clearcut. The Deforestation of America. Nancy Wood. Sierra Club, San Francisco, 1971. 156 pp. Paper, \$2.75. Sierra Club Battlebook Series, No. 3.

Clearing the Air. The Impact of the Clean Air Act on Technology. John C. Redmond, John C. Cook, and A. A. J. Hoffman, Eds. IEEE Press, New York, 1972 (distributor, Wiley, New York). viii, 160 pp., illus. Cloth. \$8.95; paper, \$4.50. IEEE Selected Reprint Series.

Comprehensive Analytical Chemistry. Vol. 2C; Electrical Methods, Physical Separation Methods. Cecil L. Wilson and David W. Wilson, Eds. Elsevier, New York, 1971. xvi, 420 pp., illus. \$31.50.

Conservation for Survival. An Ecological Strategy. Kai Curry-Lindahl. Morrow, New York, 1972. xvi, 336 pp. \$6.95.

Contemporary Topics in Immunobiology. Vol. 1. M. G. Hanna, Jr., Ed. Plenum, New York, 1972. xiv, 188 pp., illus. \$12.50.

The Dark Age of Greece. An Archaeological Survey of the Eleventh to the Eighth Centuries B.C. A. M. Snodgrass. Edinburgh University Press, Edinburgh, Scotland, 1971 (U.S. distributor, Aldine-Atherton, Chicago). xxiv, 456 pp., illus. \$27.50.

The Design of Inquiring Systems. Basic Concepts of Systems and Organization. C. West Churchman. Basic Books, New York, 1971. xii, 288 pp. \$10.

Discovering Number Theory. John E. Maxfield and Margaret W. Maxfield. Saunders, Philadelphia, 1972. x, 130 pp., illus. Paper, \$4.

Dr. Kinsey and the Institute for Sex Research. Wardell B. Pomeroy. Harper and Row, New York, 1972. xiv, 480 pp. + plates. \$10.

Drug Action and Drug Resistance in Bacteria. 1, Macrolide Antibiotics and Lincomycin. Susumu Mitsunashi, Ed. University Park Press, Baltimore, 1972. xii, 334 pp. + plates. \$17.50.

Drugs, Society, and Human Behavior. Oakley S. Ray. Mosby, St. Louis, 1972. xiv, 300 pp., illus. + unbound checklist. Paper, \$5.95.

Dynamic Mass Spectrometry. Vol. 2. D. Price, Ed. Heyden, New York, 1971. viii, 272 pp., illus. \$16.

Dynamical Aspects of Critical Phenomena. A conference, New York, June 1970. J. I. Rudnick and M. P. Kawatra, Eds. Gordon and Breach, New York, 1972. x, 628 pp., illus. \$32.

Early Warning System. The Santa Cruz Mountains Regional Pilot Study. Tito

Patri, David C. Streatfield, and Thomas J. Ingmire. University of California, Department of Landscape Architecture, Berkeley, 1970. vi, 296 pp., illus. Paper, \$5.

Electronic Processes in Non-Crystalline Materials. N. F. Mott and E. A. Davis. Oxford University Press, New York, 1971. xiv, 438 pp., illus. \$24. International Series of Monographs on Physics.

Energy. A Crisis in Power. John Holdren and Philip Herrera. Sierra Club, San Francisco, 1971. 252 pp., illus. Paper, \$2.75. Sierra Club Battlebook Series, No. 4.

Engineering Formulas. Kurt Gieck. McGraw-Hill, New York, 1972. Variously paged, illus. \$8.50.

Enzyme Kinetics. Kent M. Plowman. McGraw-Hill, New York, 1971. xvi, 172 pp., illus. \$9.95. McGraw-Hill Series in Advanced Chemistry.

Essai de Programmation de le Recherche (Département Agronomie). D. Maquart, R. Gras, J. Mamy, L. Turc, and J. P. Deffontaines. Institut National de la Recherche Agronomique, Paris, 1971. 70 pp., illus. + chart. Paper, 30 F. I.N.R.A. Publication 71-4.

Faraday as a Natural Philosopher. Joseph Agassi. University of Chicago Press, Chicago, 1972. xvi, 360 pp., illus. \$12.50.

Ferrites. Proceedings of the International Conference, Kyoto, Japan, July 1970. Yashushi Hoshino, Shuichi Iida, and Mitsuo Sugimoto, Eds. University Park Press, Baltimore, 1972. xxxvi, 672 pp., illus. \$36.

Fertility of the Sea. Vol. 1. A symposium, São Paulo, Dec. 1969. John D. Costlow, Jr., Ed. Gordon and Breach, New York, 1971. xii, 308 pp., illus. \$19.50.

Fluidization. J. F. Davidson and D. Harrison, Eds. Academic Press, New York, 1971. xiv, 848 pp., illus. \$39.

Fluorocarbon and Related Chemistry. Vol. 1. A Review of the Literature Published during 1969 and 1970. R. E. Banks and M. G. Barlow. Chemical Society, London, 1971. viii, 308 pp., illus. £7. A Specialist Periodical Report.

Fonction Gonadotrope et Rapports Hypothalamo-Hypophysaires chez les Animaux Sauvages. M. Herlant, Ed. Masson, Paris, 1971. 250 pp., illus. Paper, 94 F. 3^{es} Entretiens de Chizé, Série Physiologie, No. 2.

Foundations of the Theory of Plasticity. L. M. Kachanov. North-Holland, Amsterdam; Elsevier, New York, 1971. xiv, 482 pp., illus. \$29. North-Holland Series in Applied Mathematics and Mechanics, vol. 12.

The Fragile Blossom. Crisis and Change in Japan. Zbigniew Brzezinski. Harper and Row, New York, 1972. xiv, 154 pp. \$5.95.

General Sensitivity Theory. Rajko Tomović and Vukobratović. Elsevier, New York, 1972. x, 258 pp., illus. \$15.50. Modern Analytical and Computational Methods in Science and Mathematics, No. 35.

Germany. Ernest K. Bramsted. Prentice-Hall, Englewood Cliffs, N.J., 1972. x, 278 pp., illus. Cloth, \$6.95; paper, \$3.95. The Modern Nations in Historical Perspective.

NEW "SGA" CATALOG



1324 Pages
Size 8 3/8" x 10 3/4"



- Easy to Use
- Numbers in Sequence
- Page Headings Alphabetized
- Thousands of Illustrations
- Helpful Tables and Charts
- Cross-referenced Index

TWO CATALOGS COMBINED INTO ONE!

Over 30,000 stock items are listed in this new comprehensive laboratory supply catalog. It's simple to use, as all numbers are in sequence and all page headings are in alphabetical order. Thousands of illustrations are included, along with many helpful tables and charts.

Like our previous catalog 69, this new edition contains two separate volumes bound together for your convenience. The 976-page *General Section* lists thousands of modern scientific instruments, apparatus, appliances and general laboratory glassware and supplies. The 284-page *Inter-Joint Section* covers our entire line of interchangeable glassware. A 64-page cross-referenced index separates the two sections. General information is given in the 8-page preface.

To receive our new catalog (mailed without charge), please write to us on your official letterhead.

Circle No. 43 on Readers' Service Card

 SGA SCIENTIFIC BLOOMFIELD, N. J. 07003		 LABORATORY... ♦ APPARATUS ♦ INSTRUMENTS ♦ CHEMICALS ♦ GLASSWARE					
Branches:	Boston Mass.	Danbury Conn.	Elk Grove Village Ill.	Fullerton Calif.	Philadelphia Penna.	Silver Spring Md.	Syracuse N. Y.

Guide to the Literature of the Life Sciences. Roger C. Smith and W. Malcolm Reid. Burgess, Minneapolis, Minn., ed. 8, 1972. vi, 166 pp. Paper. \$6.50.

Hallucinogenic Drugs. F. Christine Brown. Thomas, Springfield, Ill., 1972. x, 154 pp., illus. \$10.50. American Lectures in Living Chemistry.

Harvest of Death. Chemical Warfare in Vietnam and Cambodia. J. B. Neilands, Gordon H. Orians, E. W. Pfeiffer, Alje Vennema, and Arthur H. Westing. Free Press, New York, 1972. xvi, 304 pp., illus. \$10.

Heterogeneous Processes of Geochemical Migration. V. S. Golubev and A. A. Garibyants. Translated from the Russian edition (Moscow, 1968) by J. Paul Fitz-

simmons. Consultants Bureau, New York, 1971. viii, 150 pp., illus. Paper, \$22.50.

High Resolution NMR of Macromolecules. Frank A. Bovey. Academic Press, New York, 1972. xiv, 462 pp., illus. \$19.50.

Hormones, Sex and Happiness. Elizabeth B. Connell, Joseph E. Davis, Joseph W. Goldzieher, and Eleanor Z. Wallace. Cowles, Chicago, 1972. xiv, 358 pp., illus. \$7.95.

Human Resources Research Organization Bibliography of Publications as of 30 June 1971. Human Resources Research Organization, Alexandria, Va., 1971. viii, 356 pp. Paper.

Hyperfine Interactions in Excited Nuclei. A conference, Rehovot and Jeru-

salem, Sept. 1970. Gvirol Goldring and Rafael Kalish, Eds. Gordon and Breach, New York, 1971. Vol. 2, xxviii pp. + pp. 361-732, illus. Vol. 3, xxviii pp. + pp. 733-984, illus. Vol. 4, xxviii pp. + pp. 985-1354, illus. \$27.50 each.

ISIS Cumulative Bibliography. A Bibliography of the History of Science formed from ISIS Critical Bibliographies 1-90, 1913-65. Magda Whitrow and I. Bernard Cohen, Eds. 2 vols. Vol. 1: Part 1, Personalities A-J, 1xx, 664 pp. Vol. 2: Part 1, Personalities K-Z; Part 2, Institutions. 790 pp. Mansell (in conjunction with the History of Science Society), London, 1971. The set, \$67.20.

The Identification of Organic Compounds. A Manual of Qualitative and Quantitative Methods. Stig Veibel. Gad, Copenhagen, ed. 7, 1971. xvi, 472 pp., illus. 115 DKr.

Immunogenetics of the H-2 System. A symposium, Liblice, Czechoslovakia, Sept. 1970. Alena Lengercová and Marta Vojtíšková, Eds. Karger, Basel, 1971 (U.S. distributor, Phiebig, White Plains, N.Y.). xii, 360 pp., illus. \$26.40.

Indoles. William J. Houlihan, Ed. Wiley-Interscience, New York, 1972. Part 1, xiv, 588 pp., illus. \$48. Part 2, xiv, 616 pp., illus. \$48. Chemistry of Heterocyclic Compounds, vol. 25.

Influence of Hormones on the Nervous System. A conference, Brooklyn, N.Y., June 1970. D. H. Ford, Ed. Karger, Basel, 1971 (U.S. distributor, Phiebig, White Plains, N.Y.). xx, 504 pp., illus. \$31.45.

Interface. Library Automation with Special Reference to Computing Activity. C. K. Balmforth and N. S. M. Cox, Eds. M.I.T. Press, Cambridge, Mass., 1971. x, 252 pp. \$15.

International Congress on Protection against Accelerator and Space Radiation. Geneva, Apr. 1971. CERN (European Organization for Nuclear Research), Geneva, 1971. Vol. 1, xvi pp. + pp. 1-578, illus. Vol. 2, x pp. + pp. 579-1090, illus. Paper. CERN 71-16.

International Symposium on BCG Vaccine. Frankfurt (Main), Dec. 1970. W. Hennessen, F. T. Perkins, and R. H. Regamey, Eds. Karger, Basel, 1971 (U.S. distributor, Phiebig, White Plains, N.Y.). x, 326 pp., illus. \$14.40. Symposia Series in Immunobiological Standardization, vol. 17.

Introduction to Atomic and Nuclear Physics. Henry Semat and John R. Al-bright. Holt, Rinehart and Winston, New York, ed. 5, 1972. xviii, 712 pp., illus. \$13.50.

Introduction to Electricity. L. T. Agger. Oxford University Press, New York, 1971. xii, 452 pp., illus. \$20.50.

Introduction to Molecular Energies and Spectra. Marlin D. Harmony. Holt, Rinehart and Winston, New York, 1972. xii, 564 pp., illus. \$10.

Introductory Concepts of Biology. George C. Becker. Macmillan, New York, 1972. xvi, 336 pp., illus. \$8.50.

Lasers in Medicine. Leon Goldman and R. James Rockwell, Jr. Gordon and Breach, New York, 1971. x, 386 pp., illus. \$35.

Lectures in Mathematical Physics. Vol. 2. Robert Hermann. Benjamin (Addison-

What do you want in a CO₂ Incubator?



Lab-Line has it!

Do You Want A radiant hot-wall heated chamber? No water jacket. **Lab-Line has it!**

Do You Want A built-in automatic De-Gradientator and De-Stratifier which completely eliminates gradients and stratification of CO₂-Air mixture throughout the chamber? **Lab-Line has it!**

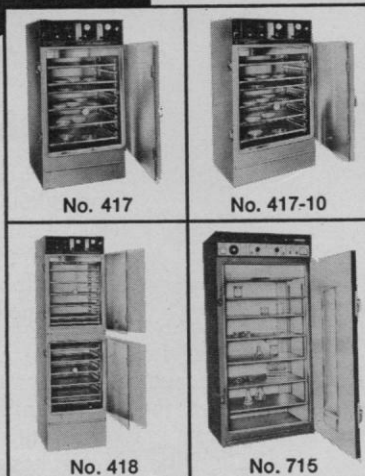
Do You Want . . . Controlled humidities from ambient to 98% RH? **Lab-Line has it!**

Do You Want . . . Dual chambers and controls that permits each chamber to operate at separate temperatures, humidities and CO₂ tensions or identical operating conditions? **Lab-Line has it!**

Do You Want . . . An automatic Kwik-Inject mechanism which injects the exact amount of CO₂ into the chamber when door is closed for speedy recovery of CO₂ Atmosphere? **Lab-Line has it!**

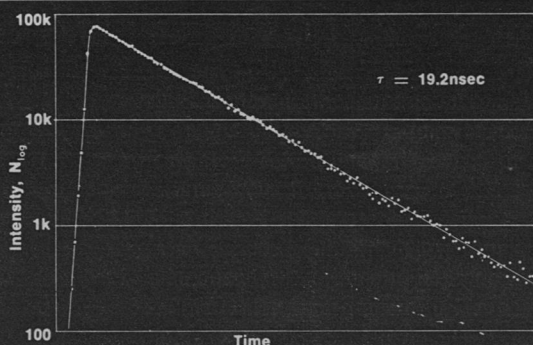
Do You Want . . . An exclusive "Window-door", for full visibility of chamber without disturbing contents or CO₂ Atmosphere? **Lab-Line has it!**

Lab-Line combines these exclusive features and more in a complete line of CO₂ Incubators, in all sizes to fit your exact requirements. Please write for additional information and specifications.



LAB-LINE INSTRUMENTS, Inc.
Designers and Manufacturers
Lab-Line Plaza
Melrose Park, Illinois 60160

**FIRST IN INSTRUMENTS
SERVING SCIENCE, INDUSTRY,
AND EDUCATION SINCE 1908**



Identification of the 19.2nsec decay component of quinine sulfate. Spectrum was produced in less than one minute. Light pulser rate: 40,000 per sec.

Fast and accurate nanosecond fluorescence lifetime spectra using the single-photon counting technique

A digital approach

Single-photon counting, a highly sensitive technique which actually samples individual quanta of light, is generally acknowledged to be the best method of measuring very low light levels. Now Ortec has applied this technique to the field of nanosecond fluorescence spectroscopy. The Ortec Model 9200 Nanosecond Fluorescence Spectrometer uses a short duration optical light pulse to excite the sample and measures the decaying fluorescence intensity as a function of time over several decades.

Our system offers sensitivity and accuracy increased by orders of magnitude compared to existing analytical techniques. This new system is already producing outstanding results in studies of chemical reaction rates, molecular structure, and molecular conformation changes.

Improved data reduction

A multichannel analyzer records each detected fluorescence photon against a time base for immediate CRT display or Teletype printout of the spectrum. Data is manipulated and stored in a digital,

computer-compatible mode. A computer interface can thus be incorporated to facilitate reduction of complex data.

The 9200 system will measure both single and multiple decay components. Multiple components are clearly represented on the spectrum and easily read. (The spectrum above shows the straight line response of a sample having a single lifetime.)

Sensitivity is better than 1 ppb quinine sulfate in sulfuric acid. Linearity is typically better than 1%.

System components

The exact system configuration will depend on the user's particular requirements, but the basic system consists of a nanosecond light pulser, sample chamber including photomultiplier, multi-channel analyzer, and associated electronics. The entire system is designed around NIM-standard modules for enhanced flexibility, reliability, and ease of servicing.

Data sheet on request

If you'd like more information on the Ortec Model 9200 Nanosecond Fluorescence Spectrometer, we'd be happy to send you a data sheet that tells all about it. Just write or call Ortec Incorporated, 110 Midland Road, Oak Ridge, Tenn. 37830. Phone: (615) 482-4411.

In Europe: Ortec Ltd., Dallow Road, Luton, Bedfordshire. Phone: LUton 27557. Ortec GmbH, 8 München 13, Frankfurter Ring 81, West Germany. Phone: (0811) 359-1001.



ORTEC®
AN EG&G COMPANY

Wesley), Reading, Mass., 1972. xviii, 750 pp. Cloth, \$12.50; paper, \$6.95. Mathematics Lecture Note Series.

Love and Hate. The Natural History of Behavior Patterns. Irenäus Eibl-Eibesfeldt. Translated from the German edition (Munich, 1970) by Geoffrey Strachan. Holt, Rinehart and Winston, New York, 1972. x, 276 pp., illus. \$7.95.

Man in Systems. A meeting, Dallas, Tex., Dec. 1968. Milton D. Rubin, Ed. Gordon and Breach, New York, 1971. xii, 496 pp., illus. \$17.50; to libraries, \$32.50.

Mathematical Statistical Mechanics. Colin J. Thompson. Macmillan, New York, 1972. x, 278 pp., illus. \$12.75. A Series of Books in Applied Mathematics.

Mathematics Made Difficult. Carl E. Linderholm. World, New York, 1972. 208 pp., illus. \$6.95.

Mechanical Properties of Materials at Low Temperatures. D. A. Wigley. Plenum, New York, 1971. xiv, 326 pp., illus. \$19.50. International Cryogenics Monograph Series.

Metabolic Effects of Nicotinic Acid and its Derivatives. A workshop, Films, Switzerland, Mar. 1970. K. F. Gey and L. A. Carlson, Eds. Huber, Bern, 1971. 1252 pp., illus. 345 Sw. Fr.

Metal Forming. Interrelation between Theory and Practice. A symposium, Cleveland, Ohio, Oct. 1970. A. L. Hoffmann, Ed. Plenum, New York, 1971. xvi, 504 pp., illus. \$26. Metallurgical Society of AIME Proceedings.

Methods in Nonlinear Plasma Theory. Ronald C. Davidson. Academic Press, New York, 1972. xviii, 356 pp., illus. \$18.50. Pure and Applied Physics, vol. 37.

Microbiology 1971. A conference, London, Jan. 1971. Peter Hepple, Ed. Institute of Petroleum, London, 1971 (distributor, Applied Science, New York). vi, 114 pp., illus. £3.60.

Mineral Nutrition of Plants. Principles and Perspectives. Emanuel Epstein. Wiley, New York, 1972. x, 412 pp., illus. \$10.95.

Nature Conservation. A Practical Handbook. W. M. M. Baron. Methuen, London, 1971 (U.S. distributor, Harper and Row, New York). vi, 74 pp., illus. Paper, \$3. Methuen Studies in Science.

New Techniques in Space Astronomy. A symposium, Munich, Aug. 1970. F. Labuhn and R. Lüst, Eds. Published for International Astronomical Union by Reidel, Dordrecht, The Netherlands; Springer-Verlag, New York, 1971. xvi, 420 pp., illus. \$29.80. IAU Symposium No. 41.

Oilspill. Wesley Marx. Sierra Club, San Francisco, 1971. 140 pp. Paper, \$2.75. Sierra Club Battlebook Series, No. 5.

The Optical Aurora. A. Omholt. Springer-Verlag, New York, 1971. xiv, 200 pp., illus. \$17.30. Physics and Chemistry in Space, vol. 4.

Optimization in Industry. T. A. J. Nicholson. Aldine-Atherton, Chicago, 1972. 2 vols. Vol. 1, Optimization Techniques. xiv, 222 pp., illus. Vol. 2, Industrial Applications. xiv, 252 pp., illus. The set, \$12.50. London Business School Series.

The Origin of the Domestic Animals of Africa. H. Epstein. Revised in collaboration with I. L. Mason. Africana,

New York, 1972. 2 vols. Vol. 1, xii, 574 pp., illus. Vol. 2, xii, 720 pp., illus. The set, \$85.

Parallelism in Hardware and Software. Real and Apparent Concurrency. Harold Lorin. Prentice-Hall, Englewood Cliffs, N.J., 1972. xx, 508 pp., illus. \$15. Prentice-Hall Series in Automatic Computation.

Physical Methods of Chemistry. Part 4, Determination of Mass, Transport, and Electrical-Magnetic Properties. Arnold Weissberger and Bryant W. Rossiter, Eds. Wiley-Interscience, New York, 1972. xii, 562 pp., illus. \$27. Techniques of Chemistry, vol. 1.

Physical Principles of Chemical Engineering. Peter Grassmann. H. Sawistowski, Ed. Translated from the German edition (1961) by R. Hardbottle. Pergamon, New York, 1971. xxx, 896 pp., illus. \$48. International Series of Monographs in Chemical Engineering, vol. 12.

Picture Bandwidth Compression. A symposium, Cambridge, Mass., Apr. 1969. Thomas S. Huang and Ohl J. Tretiak, Eds. Gordon and Breach, New York, 1972. xii, 734 pp., illus. \$49.

Piezoelectric Ceramics. Bernard Jaffe, William R. Cook, Jr., and Hans Jaffe. Academic Press, New York, 1971. x, 318 pp., illus. \$16. Non-Metallic Solids, vol. 3.

Plant Physiology. A Treatise. Vol. 6A, Physiology of Development: Plants and Their Reproduction. F. C. Steward, Ed. Academic Press, New York, 1971. xviii, 542 pp., illus. \$26.

Plastics and Rubbers. Edward W. Duck. Philosophical Library, New York, 1971. viii, 110 pp., illus. \$10. Chemistry in Modern Industry Series.

The Pre-Columbian Mind. A Study into the Aberrant Nature of Sexual Drives, Drugs Affecting Behaviour and the Attitude towards Life and Death, with a Survey of Psychotherapy, in pre-Columbian America. Francisco Guerra. Seminar, New York, 1971. xvi, 336 pp. + plates. \$13.50.

The Principles of Pollination Ecology. K. Faegri and L. van der Pijl. Pergamon, New York, ed. 2, 1971. xii, 292 pp., illus. \$14.

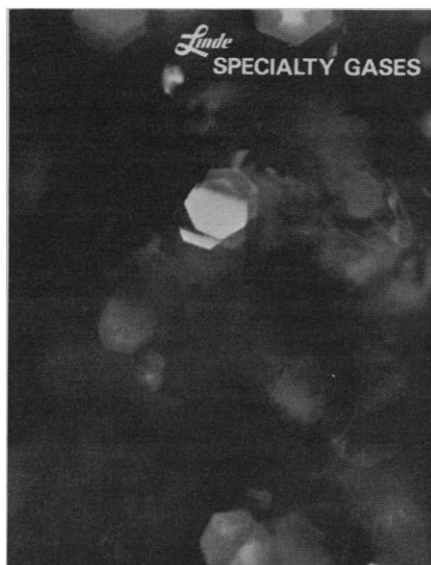
Probabilistic Programming. S. Vajda. Academic Press, New York, 1972. xii, 128 pp., illus. \$7.50. Probability and Mathematical Statistics, 9.

Proceedings of the International Conference on the Application of Vaccines against Viral, Rickettsial, and Bacterial Diseases of Man. Washington, D.C., Dec. 1970. Pan American Health Organization, Washington, D.C., 1971. xxiv, 662 pp., illus. Paper, \$7.50. Scientific Publication, No. 226.

Proceedings of the Third International Congress of Primatology, Zurich 1970. Karger, Basel, 1971 (U.S. distributor, Phiebig, White Plains, N.Y.). 3 vols. Vol. 1, Taxonomy, Anatomy, Reproduction. J. Biegert and W. Leutenegger, Eds. xvi, 278 pp., illus. \$22.80. Vol. 2, Neurobiology, Immunology, Cytology. J. Biegert and W. Leutenegger, Eds. x, 246 pp., illus. \$21.60. Vol. 3, Behavior. H. Kummer, Ed. x, 192 pp., illus. \$16.80. The set, \$55.20.

Progress in Learning Disabilities. Vol. 2. Helmer R. Myklebust, Ed. Grune and

NOW, SOMETHING EXTRA IN SPECIALTY GASES.



FREE.
Linde's new
108-page
catalog.
The most
comprehensive
in the
industry.

Oh sure, we've always made more specialty gases than anyone else.

After all, Linde is a Division of Union Carbide, a corporation that's been making industrial gases for over 50 years.

But for the first time we combined the gases and the equipment and cataloged it all for you. Color-coded the sections, so you quickly get what you want.

And we *supply* what you want quickly too. Five hundred Linde Distributor locations nationwide provide fast service, but we mean really *fast* service. Cost-cutting FOB delivery too, because we have 5 plants across the country.

Linde's product know-how can even help you pinpoint your needs. Not just in specialty gases and types of containers, but in control equipment too.

They're all there in our new catalog. Our little something extra to help make your job easier. Send for your free copy today.



**GAS
PRODUCTS**

Linde is a registered trademark of Union Carbide Corporation

UNION CARBIDE CORPORATION
LINDE DIVISION, Dept. LB—S

270 Park Avenue
New York, New York 10017

Gentlemen:

Please send me "the something extra" in specialty gases.

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

Desalt!

95% salt free in 20 minutes with new Hollow Fiber Devices.

Proteins, viruses, enzymes and other biomolecules can now be desalted (also concentrated or fractionated) quickly with Hollow Fiber Devices. Using the latest in membrane technology, these unique devices are self-con-



tained and compatible with existing lab equipment.

They're reusable, too, after a simple wash.

Operation is as simple as it is rapid. Forget about pouring columns and fussing with dialysis bags. Price? You can have a complete setup for under \$30.

Send for literature that's loaded with practical applications (and prices).

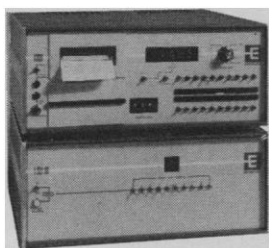


Laboratories

32nd & Griffin Avenue/Richmond, CA 94804
(415) 234-4130

Circle No. 64 on Readers' Service Card

El Cheapo: programmable data acquisition system



Analog data. 5 to 200 channels. Switch programmed. Digital output prints out or is formatted for computer input. Designed for laboratory, pilot plant, industry or field. That's El Cheapo: the tight-belt computer feeder.

And price, operating cost and programming expense are the only things cheap about it. Ask for a demonstration—we'll prove the point. Write or call for a catalog. Box 24000, Indianapolis, Indiana 46224. (317) 244-7611.



ESTERLINE ANGUS

Division of Esterline Corporation

Data Recording Instruments

Circle No. 108 on Readers' Service Card

OSMOMETER for \$795.—

New revolutionary design utilizing solid state technology.

Unique in nondestructive determination of osmolarity of any aqueous system at ambient temperatures from 0° to 100°C.

Ideal for blood, urine, buffers, bacteriologic media, water pollution work, molecular weight determination, etc.

Simple, rapid, rugged, accurate better than ± 1 milliosmole.

For Industry, Clinic, Research, Classroom, Government.

Send order to

ACTIVITY METERS, INC.

P.O. Box 304, Menlo Park, CA 94025

Ask for free booklet on Osmometry

Inquiries invited for activity determination of dissolved molecules in solvents other than H₂O i.e. alcohol in expired air (drunkometer) etc.

Circle No. 107 on Readers' Service Card

Stratton, New York, 1971. x, 404 pp., illus. \$13.75.

Progress in Physical Organic Chemistry. Vol. 9. Andrew Streitwieser, Jr. and Robert W. Taft, Eds. Wiley-Interscience, New York, 1972. viii, 354 pp., illus. \$22.50.

Public Health and the State. Changing Views in Massachusetts, 1842-1936. Barbara Gutmann Rosenkrantz. Harvard University Press, Cambridge, Mass., 1972. xii, 260 pp. \$9.

The Queen Mary. Her Inception and History. Neil Potter and Jack Frost. San Francisco Press, San Francisco, ed. 2, 1971. 160 pp. + plates. \$3.95.

Reaction Mechanisms in Sulphuric Acid and Other Strong Acid Solutions. M. Liler. Academic Press, New York, 1971. xiv, 350 pp., illus. \$17.50. Organic Chemistry, vol. 23.

Recognition of Air Pollution Injury to Vegetation. A Pictorial Atlas. Jay S. Jacobson and A. Clyde Hill, Eds. Air Pollution Control Association, Pittsburgh, 1970. Various pages. Paper, \$15; to members, \$10. TR-7 Agricultural Committee Informative Report No. 1.

Research Techniques in Biochemistry and Molecular Biology. Robert E. Thach and Mary R. Newburger. Benjamin, Menlo Park, Calif., 1972. xxiv, 182 pp., illus. Spiral bound, \$7.50.

Science and Politics in Canada. G. Bruce Doern. McGill-Queen's University \$C12.50.

The Science of Genetics. An Introduction to Heredity. George W. Burns. Macmillan, New York, ed. 2, 1972. viii, 470 pp., illus. \$9.95. Macmillan Biology Series.

A Science Policy for Canada. Report of the Senate Special Committee on Science Policy. Vol. 2, Targets and Strategies for the Seventies. Maurice Lamontagne, chairman. Information Canada, Ottawa, 1972. vi + pp. 329-608, illus. Paper, \$3.

Les Sciences de la Terre à l'Heure des Satellites (Télédétection). Jean Pouquet. Presses Universitaires de France, Paris 1971. 260 pp., illus. Collection SUP, section Le Physicien, 5.

The Scientific Management of Animal and Plant Communities for Conservation. A symposium, Norwich, England, July 1970. E. Duffey and A. S. Watt, Eds. Blackwell, Oxford, England, 1971 (U.S. distributor, Davis, Philadelphia). xvi, 652 pp. + plates. \$30.

Ship's Doctor. Stephen Kerry. Taplinger, New York, 1972. 182 pp. \$6.50.

Society and Environment. The Coming Collision. Rex. R. Campbell and Jerry L. Wade, Eds. Allyn and Bacon, Boston, 1972. viii, 376 pp., illus. \$10.95.

Sociology in Medicine. M. W. Susser and W. Watson. Oxford University Press, New York, ed. 2, 1971. xii, 468 pp., illus. \$11.50. Oxford Medical Publications.

Spectroscopic Properties of Inorganic and Organometallic Compounds. Vol. 4. A Review of the Literature Published during 1970. N. N. Greenwood and seven others. Chemical Society, London, 1971. xviii, 604 pp., illus. £10. A Specialist Periodical Report.

Spectroscopie Atomique et Moléculaire.

SCIENCE, VOL. 176

Tome 2, Spectroscopie Moléculaire. P. Barchewitz. Masson, Paris, 1971. vi, 306 pp., illus. Paper, 80 F.

Statement on Race. An Annotated Elaboration and Exposition of the Four Statements on Race Issued by the United Nations Educational, Scientific, and Cultural Organization. Ashley Montagu. Oxford University Press, New York, ed. 3, 1972. xiv, 278 pp. Cloth, \$7.95; paper, \$2.50.

The Structure and Relationships of the Primitive Devonian Lungfish—Dipno-rhynchus sussmilchi (Etheridge). Keith Stewart Thomson and K. S. W. Campbell. Yale University Peabody Museum of Natural History, New Haven, Conn., 1971. vi, 110 pp. + figures. Peabody Museum Bulletin 38. Paper, \$4.60.

Studies in Constructive Mathematics and Mathematical Logic. Part 3. A. O. Slisenko, Ed. Translated from the Russian edition (Leningrad, 1969) by J. S. Wood. Consultants Bureau, New York, 1971. viii, 98 pp., illus. Paper, \$15. Seminars in Mathematics, vol. 16.

Studies in Tropical American Mollusks. Frederick M. Bayer and Gilbert L. Voss, Eds. University of Miami Press, Coral Gables, Fla., 1971. vi, 236 pp., illus. \$12.50.

Study on Communicating Science Information to a Lay Audience, Phase II. G. Ray Funkhouser and Nathan Mac-coby. Stanford University Institute for Communication Research, Stanford, Calif., 1971. Variously paged. Paper, \$2.50.

Survey of Compounds Which Have Been Tested for Carcinogenic Activity. 1968-1969 Volume. Prepared for the National Cancer Institute by Thompson, Rockville, Md., 1971 (available from the Superintendent of Documents, Washington, D.C.). vi, 654 pp., illus., + errata. \$7. Department of Health, Education, and Welfare Publication No. (NIH)72-35. Public Health Service Publication No. 149.

Survey on the Scientific and Technical Potential of the Countries of Africa. Enquête sur le Potentiel Scientifique et Technique des Pays d'Afrique. Unesco, Paris; Unesco Field Science Office for Africa, Nairobi, Kenya, 1970 (U.S. distributor, Unesco Publications Center, New York). 296 pp. Paper, \$6.

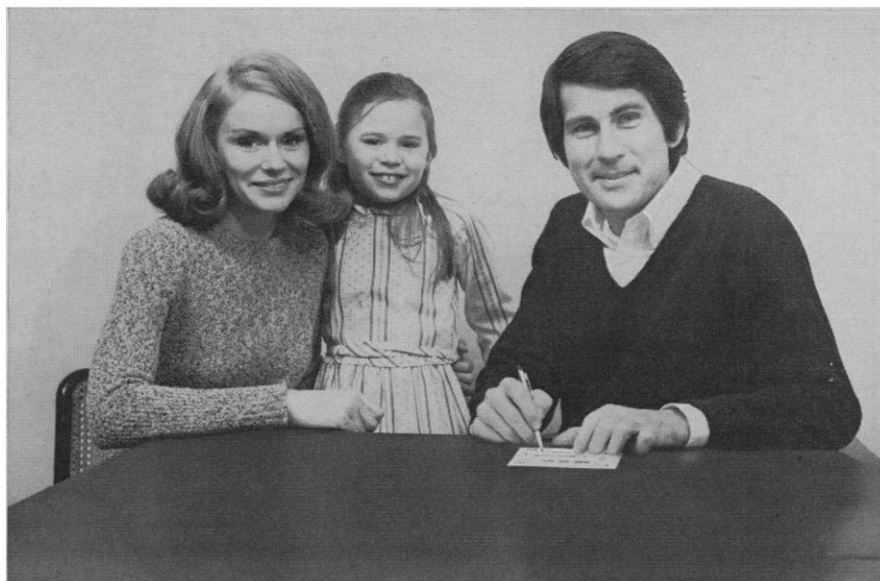
Synoptic Plates of Higher Marine Fungi. An Identification Guide for the Marine Environment. Jan and Erika Kohlmeyer. Cramer, Lehre, Germany, ed. 3, 1971 (U.S. distributor, Stechert-Hafner, New York). 88 pp., illus. Paper, \$7.70.

Systematic Introduction to the Psychology of Thinking. Donald M. Johnson. Harper and Row, New York, 1972. xii, 498 pp., illus. \$10.95.

Theory of Fully Ionized Plasmas. Günter Ecker. Academic Press, New York, 1972. xvi, 344 pp., illus. \$19.50.

Three Styles in the Study of Kinship. J. A. Barnes. University of California Press, Berkeley, 1972. xxiv, 318 pp., illus. \$8.75.

The Year of the Seal. Victor B. Scheffer. Illustrations by Leonard Everett Fisher. Scribner, New York, 1972. xiii, 208 pp. Paper, \$2.45. Reprint of the 1970 edition.



YOU MEAN I CAN GET \$50,000 OF TIAA LIFE INSURANCE FOR LESS THAN \$100?

That's what an Assistant Professor asked us when he heard about TIAA's low life insurance costs.

It's true. At his age 30 the annual premium for a 20-Year Home Protection policy providing \$50,000 initial amount of insurance is \$159.00. The first-year dividend, based on our current dividend scale, is \$61.50, making a net payment of \$97.50. Dividends, of course, are not guaranteed.

The Home Protection plan is level premium Term insurance providing its largest amount of protection initially, reducing by schedule each year to recognize decreasing insurance needs. This is just one example of the many low-cost TIAA plans available. If you need more protection for your family, ask us to mail you a personal illustration with figures for a policy issued at your age. We'll also send the Life Insurance Guide describing other TIAA policies.

ELIGIBILITY

Eligibility to apply for this or other TIAA life insurance is limited to persons employed at the time of application by a college, university, private school, or other nonprofit educational or scientific institution that qualifies for TIAA eligibility.

TEACHERS INSURANCE AND ANNUITY ASSOCIATION
730 Third Avenue, New York, N. Y. 10017



pi

Please mail the new Life Insurance Guide and a personal illustration.

Name _____ Your Date of Birth _____

Address _____ Street _____

City _____ State _____ ZIP _____

Dependents' Ages _____

Nonprofit Employer _____ college, university, or other educational or scientific institution