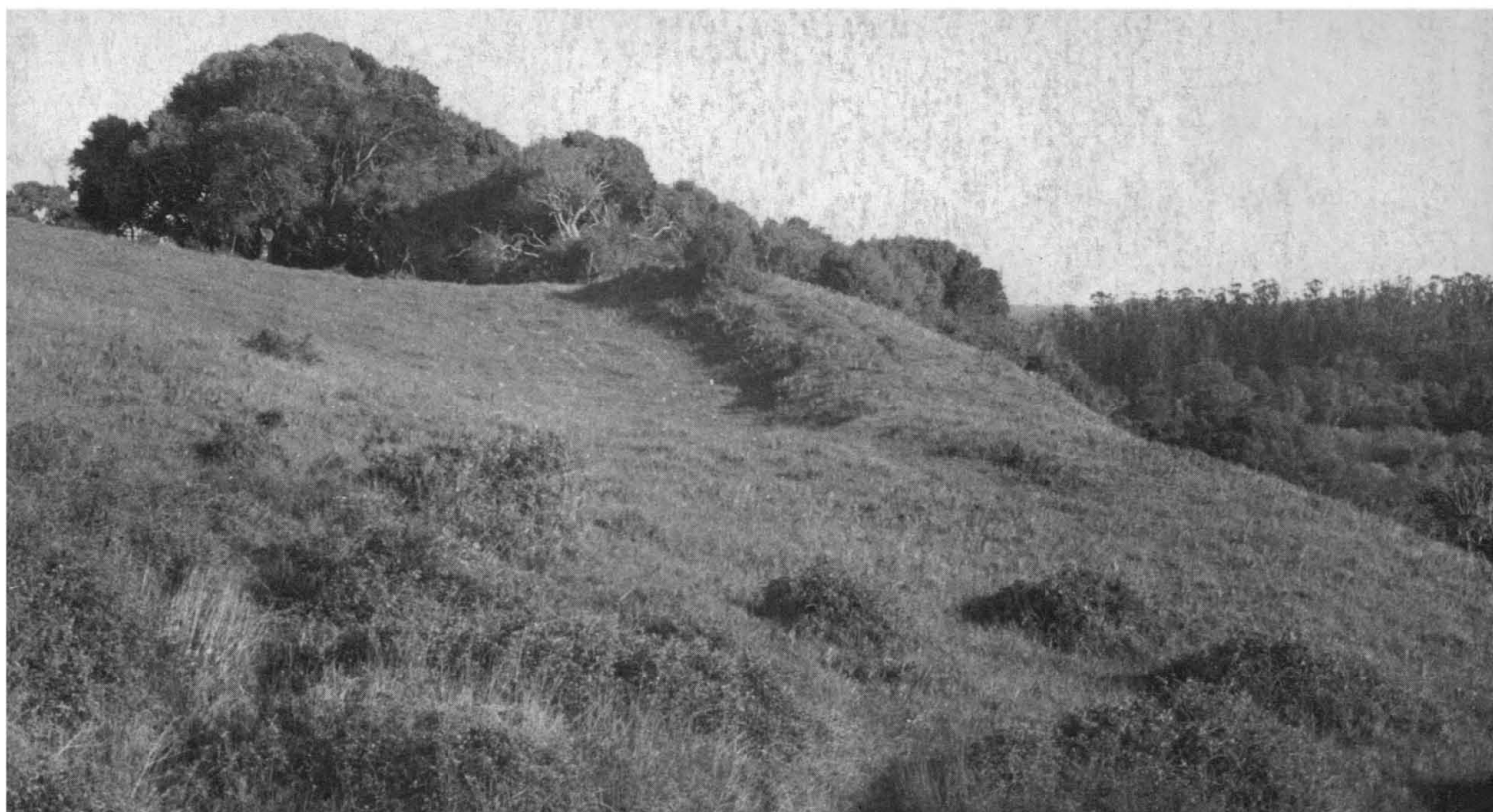


SCIENCE

21 June 1974

Vol. 184, No. 4143

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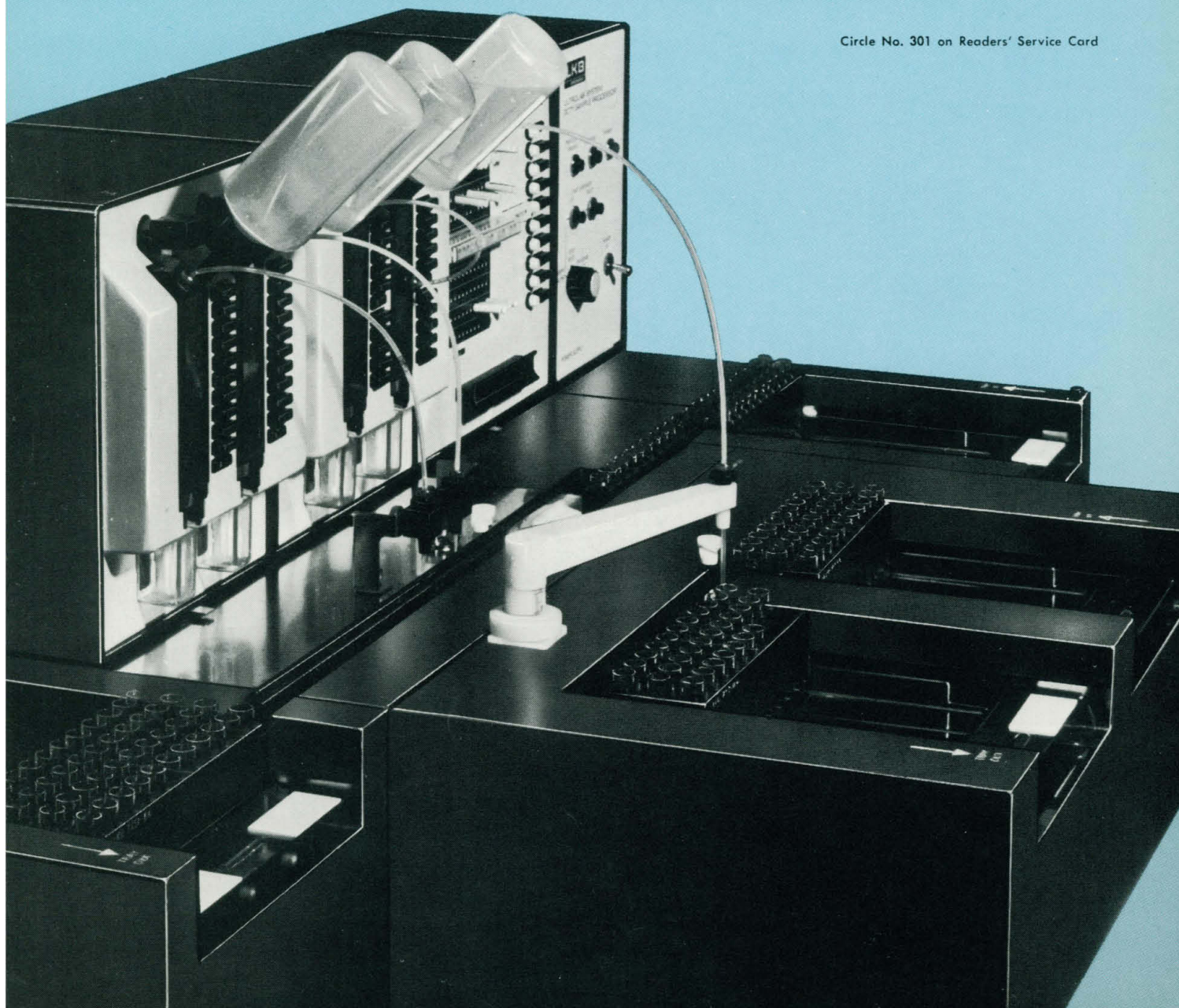
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COVER

(Above) Fault trace a mile northwest of Olema, California, 1906. Appearance of vertical displacement is largely due to combination of horizontal displacement with slope of ground. [Photograph by G. K. Gilbert, from *California Earthquake of April 18, 1906, Report of the State Earthquake Investigation Commission*, Carnegie Institution of Washington, Washington, D.C.] (Below) Fault trace photographed in April 1974. See page 1283. [Wayne Thatcher, National Center for Earthquake Research, U.S. Geological Survey, Menlo Park, California]

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the proliferation of a virus?

a forgettable lab setup?

the scene of the crime?

the eye of a green turtle?

the divisional sales chart?

chromosomal aberrations?

page 173 of Gray's Anatomy?

an electrocardiogram read-out?

a line conversion of half-tone art?

the three-millionth 8¢ Eisenhower stamp?

a hairline fracture of the fourth vertebra?

a copy of that irreplaceable 35mm slide?

your new diode, magnified 13 times?

a metallograph of vanadium steel?

reduced type for mechanicals?

an enlarged lymph node?

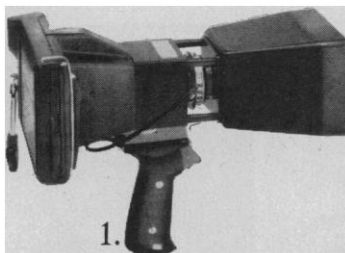
the electrophoresis results?

the world's worst malocclusion?

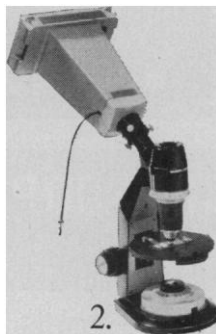
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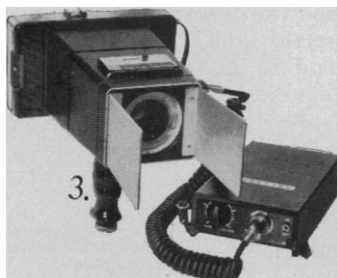
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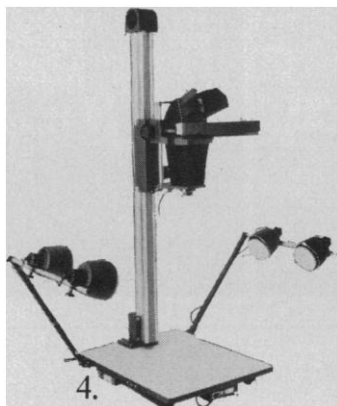
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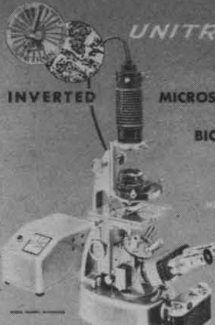
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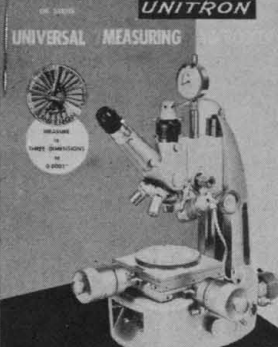
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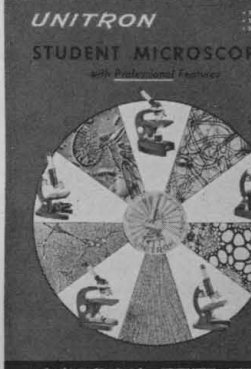
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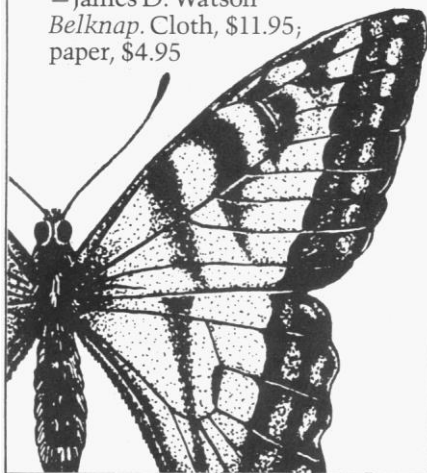
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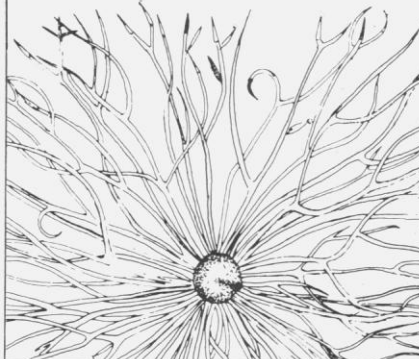
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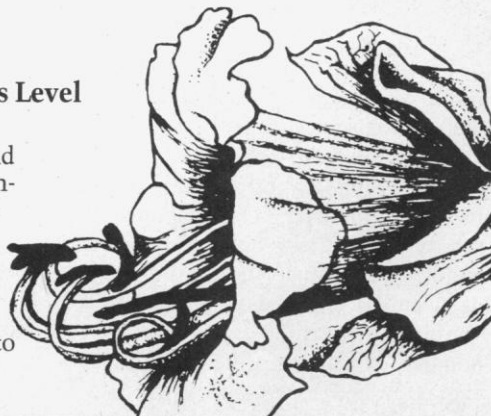
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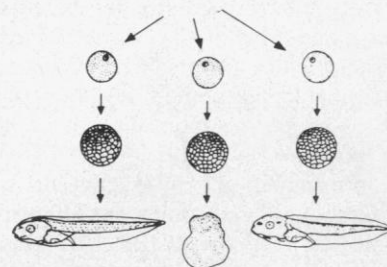
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Pseudoscience

During the last few years elements of the public and particularly of university students have turned increasingly to mysticism and to what I would call pseudoscience. The top sellers at campus bookstores have included such books as *Chariots of the Gods?*, *Gods from Outer Space*, *Limbo of the Lost*, *The Secret Life of Plants*, and others like them.

The recent pseudoscience books are in part a form of science fiction, but they have characteristics that make them different. The readers of earlier works generally understood that they were scanning fictional material, but the new books seek to create the impression of scholarship and verity. *Chariot of the Gods?* does this in several ways. It has a bibliography. In an introduction it acknowledges help from personnel of the National Aeronautics and Space Administration, including Werner von Braun. The book also contains some respectable scientific material. But the author moves quickly and without warning from fairly solid facts to unsubstantiated speculations.

Another tendency of the pseudoscience books is to evangelize in behalf of fantasies and in the process to denigrate science. For example, in the best-selling *The Secret Life of Plants*, the authors state "what makes plants live, or why, does not appear to be the purview of science." They describe botany as being "reduced to a dull taxonomy."

This is, of course, untrue. One of the great scientific frontiers today is research in plant biology.

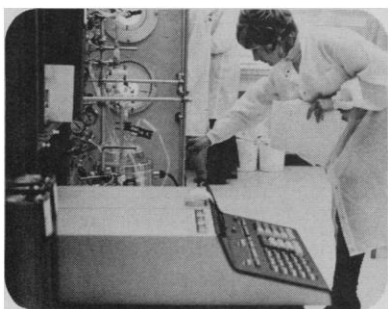
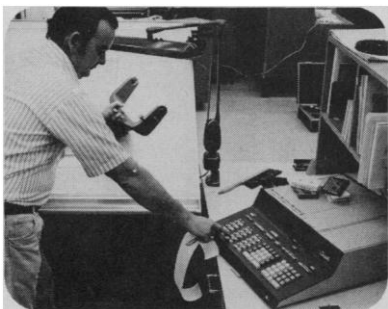
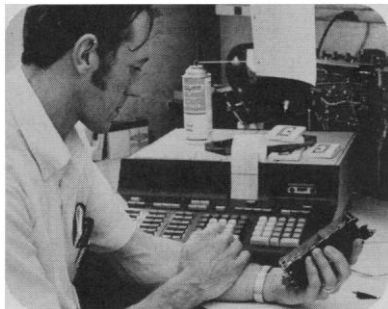
The scientists of the so-called establishment are berated because they did not accept the suggestion that plants were capable of emotions which "might originate in a supramaterial world of cosmic beings which, as fairies, elves, gnomes, sylphs, and a host of other creatures, were a matter of direct vision and experience to clairvoyants among the Celts and other sensitives."

In *Limbo of the Lost* the author devotes most of the book to an enumeration of disappearances of ships and planes in the general area of the Bermuda Triangle. In a concluding statement, the author gives his explanation for the information he has produced. He ties the disappearances to unidentified flying objects and concludes that a large ocean vessel and commercial airlines were "actually being taken away from our planet for a variety of reasons."

Much of the appeal of the new pseudoscience seems to relate to a deep-seated quirk of human nature—a predisposition to believe in the supernatural. Part of the appeal of these books is that they are entertaining, interesting, and even exciting. The danger from them is that uncritical and indiscriminating minds may accept imaginative speculation as fact. An optimist might take the view that the current craze for this new form of science fiction will go away, just as streaking departed. But already these types of books have been in demand for several years.

The popularity of pseudoscience books at universities should be a source of concern to academic people, particularly scientists. The new trend comes at a time when many universities have abandoned requirements that students be exposed to as little as one science course. It is not pleasant to contemplate a situation in which our future leaders are being steeped in fantasy and are exposed to a put-down of science without effective response. The university community has a special obligation which it has not been meeting very well. It should move toward providing antidotes to the new intellectual poisons. In meeting these challenges to rationality, we should all remember that although humanity is eager to accept mysticism, it is also capable of yearning for truth.—PHILIP H. ABELSON

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Rapid processing of kidney biopsies for electron microscopy

by Jan Vincents Johannessen
The Gade Institute, Department of
Pathology and Laboratory for
Clinical Electron Microscopy,
University of Bergen,
5000 Bergen, Norway.

The widespread use of kidney biopsy has contributed to the explosive expansion of clinical nephrology in the last 20 years.¹⁻³ This is now an established procedure in the investigation and management of patients with kidney disease and the only method of making an exact and morphological evaluation of diffuse renal disease during life.⁴ Several forms of kidney disease in which the prognosis and response to therapy differ, cannot be distinguished clinically.^{5,6} Their lesions may have an almost identical appearance on light microscopy^{3,6}, although they are readily differenti-

ated by electron microscopy. Light microscopy is, therefore, not an entirely reliable means of differentiating renal lesions.^{5,7-9}

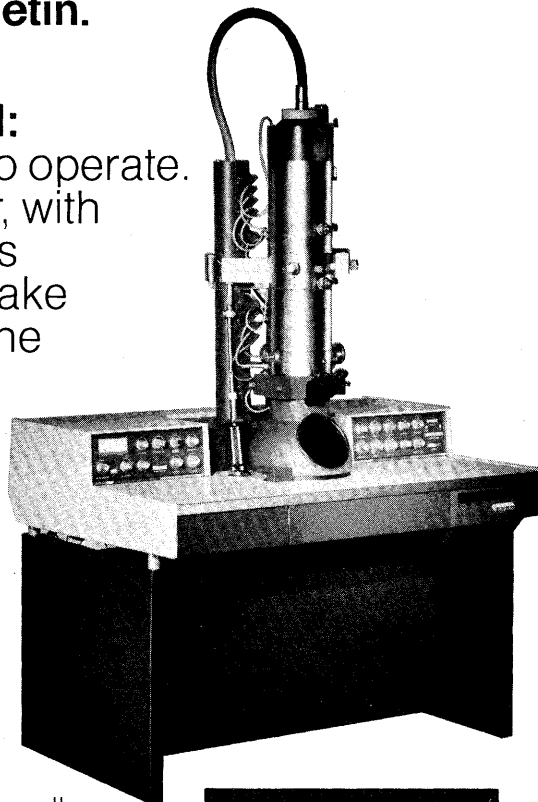
A major obstacle to the use of electron microscopy in the routine evaluation of kidney biopsies has been the long processive time that is usually employed. However, rapid methods have been successfully used in electron microscopy of normal tissues from different animal species.¹⁰⁻¹⁴ Therefore, the aim of the present study was to adapt and evaluate a rapid method of preparation of kidney biopsies for electron microscopy. The quality of the sec-

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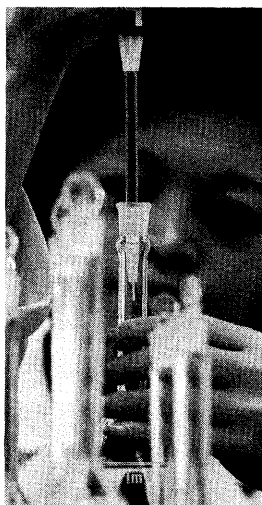
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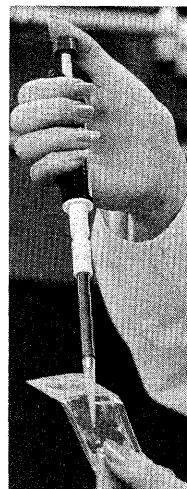
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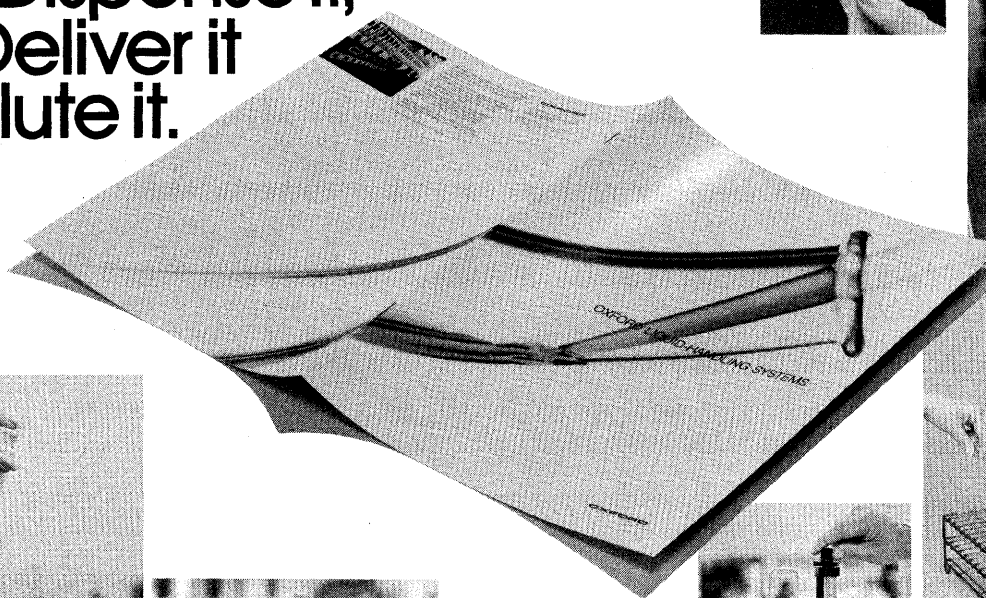
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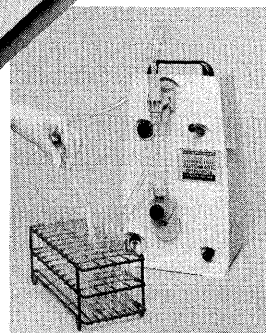
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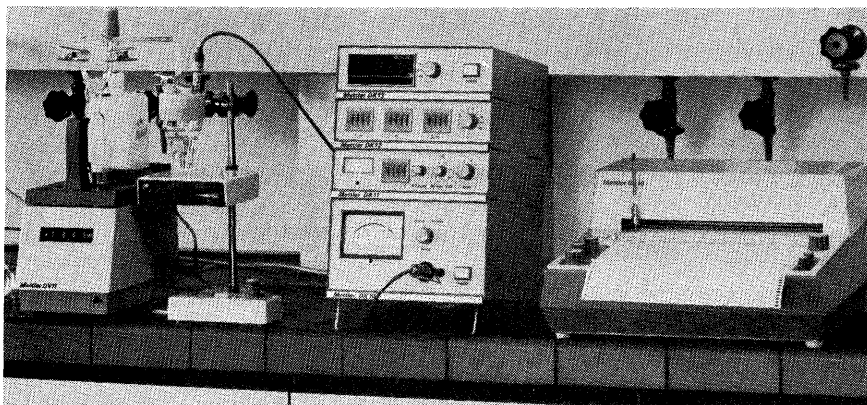
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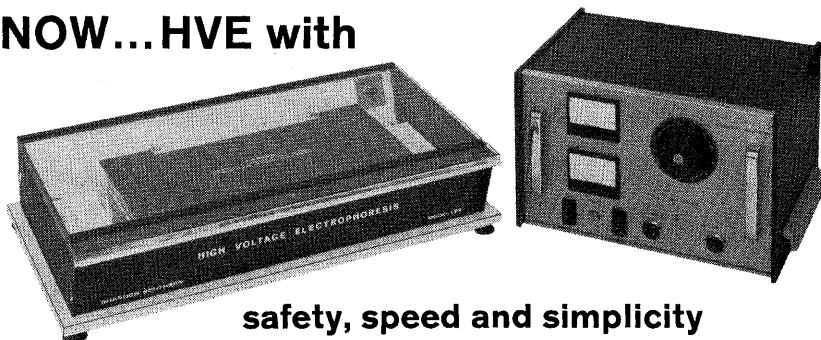
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B. No. of filtrations run simultaneously	4	4		
C. No. of runs (A ÷ B)	25	25		
D. Filtration time, minutes per batch	10	3		
E. Total filtration time, minutes	250	75		
F. Total filtration time, hours	4.17	1.25		
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H. Time Cost, total (F x G)	\$20.83	\$ 6.25		
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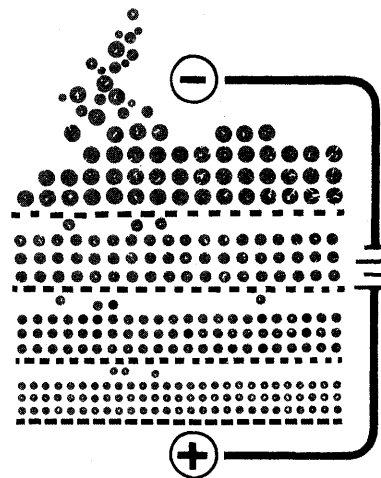
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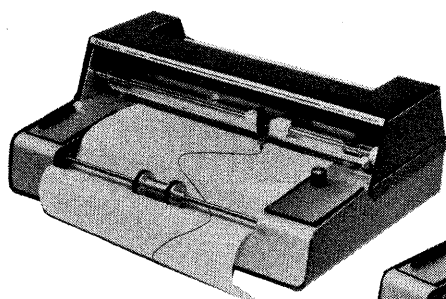
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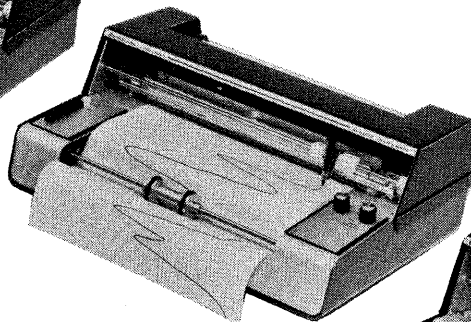
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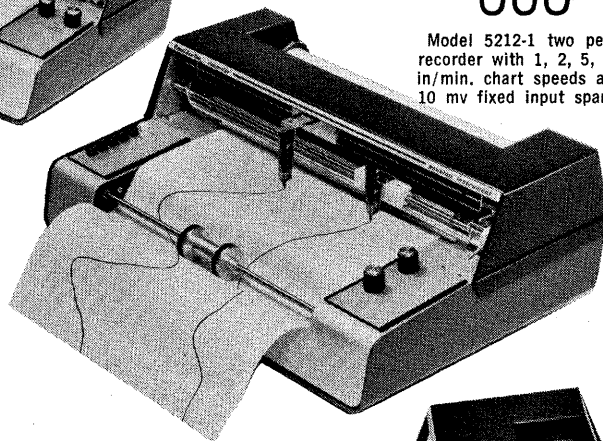


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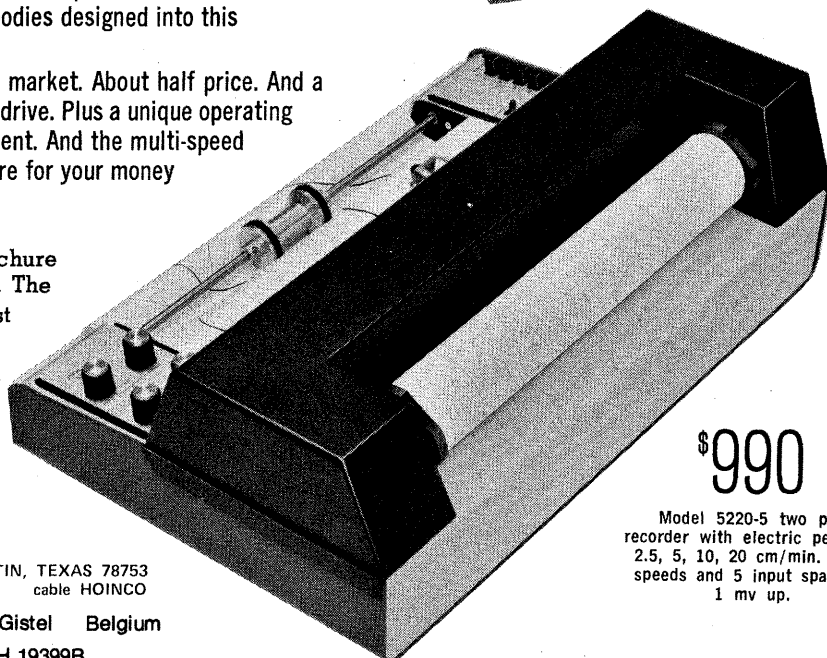
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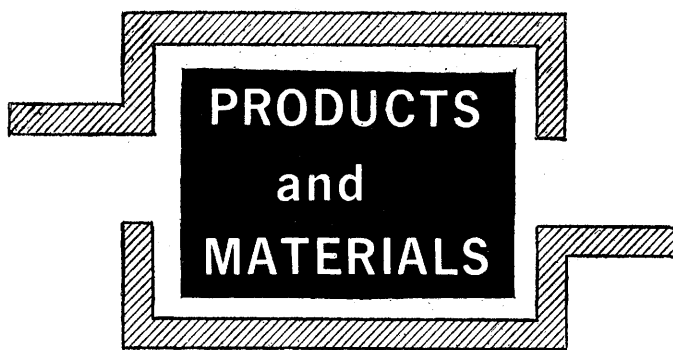
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Clinical Gas Chromatograph

The 750 series FID utilizes a flame-ionization detector and features a temperature control system with a feedback capability. Temperatures are indicated by a direct-reading dial and pyrometer readout. The 750 FID can be used for analysis of drugs and alcohols in physiological fluids for screening, stat, and therapeutic monitoring procedures. The instrument can also serve in a confirmatory procedure following thin-layer chromatographic tests for drugs of abuse. The manufacturer also offers supplies and accessories including glass columns for barbiturates, alkaloids, and alcohol separation; ferrules; rotameter assembly; syringe; septums; installation kit; chart recorder; and chart paper and standards. Gow-Mac. Circle No. 825 on Readers' Service Card.

Miniature Centrifuge

The table-top Microfuge B features a high-capacity rotor head that accommodates standard 250-microliter and 400-microliter microtubes as well as tapered-bottom 1.5-milliliter tubes. With this unit, clinical laboratory workers can spin down as many as 48 micro samples at a time, select the tapered 1.5-milliliter tubes when larger samples and ease of pipetting are important, or centrifuge mixed loads of different tube sizes at the same time. The six-place rotor head accepts a variety of perforated metal slides. The five-hole and eight-hole slides hold 30 or 48 microtubes; three-hole slides hold 18 1.5-milliliter tubes at a time. The Microfuge B offers speeds to 13,000 revolutions per minute and forces to 10,000g. Built-in automatic timer-controlled shut-off provides 0 to 5 minute settings and 10-second increments. Beckman Instruments. Circle No. 826 on Readers' Service Card.

Liquid Dispenser

This dispenser is pneumatically operated and can dispense two reagents at the same time with ratios as high as 5000 to 1. The device has two separate syringes which are operated simultaneously and deliver two liquids into one container. Each syringe can range in volume from 2 microliters to 10 milliliters. The device operates by push-button and a foot valve is optional. Hamilton Company. Circle No. 835 on Readers' Service Card.

Antibiotic Solution for Tissue Culture

Gentamicin reagent solution provides antibiotic protection for tissue culture and virology studies. The product is effective against a variety of gram positive and negative bacteria and many strains of mycoplasma. The antibiotic remains stable when autoclaved and over a wide range of pH and temperature. Gentamicin exhibits no loss of activity after addition to tissue culture media. Schering Diagnostics. Circle No. 838 on Readers' Service Card.

Stainless Steel Filter Holder

Liquids filtered through this filter holder never contact anything except stainless steel. This material was selected for the holder because of its high resistance to corrosive materials. Designed for use with the manufacturer's membrane filters, but usable with other filters as well, the filter holder is intended for clarification of reagents and solutions in laboratory volumes. Features include stainless steel legs, splayed for greater stability. Anodized aluminum hand knobs secure the seal at the top to the bottom flanges with the membrane filter in between. Welded inlet and outlet fittings and highly polished stainless steel surfaces leave no crevices for

contaminants. Support is provided for the filter by a seamless, photo-etched screen, which is supported in turn by a perforated, textured plate. Gelman Instrument Company. Circle No. 836 on Readers' Service Card.

pH Meter

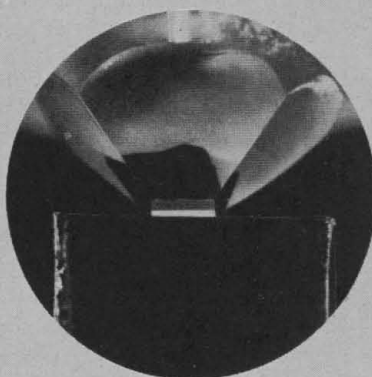
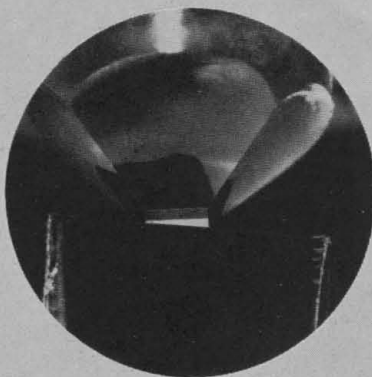
Push-button calibration is the special feature of the model 119 digital pH meter. Designed for general use, the instrument provides readout over the entire 0 to 14 pH range (± 0.01 pH unit) and millivolt readings from 0 to ± 1800 millivolts (± 1.0 millivolt). The push-button feature eliminates calibration by dial and attendant variations and errors attributable to differences in operator technique. To calibrate the unit, the operator immerses the electrodes in a pH 7 buffer at 25°C. After the readout stabilizes, pressing the calibrate button automatically calibrates the instrument to the value of the buffer. The model 119 is equipped with a recorder output jack. The device has pivotal legs that enable it to be hung from a shelf. Manual or automatic temperature compensation controls cover the range from 0° to 100°C. Corning Scientific Instruments. Circle No. 831 on Readers' Service Card.

Atomic Absorption Spectrophotometer

The model 360 atomic absorption spectrophotometer is designed to give analytical performance at relatively low cost. The instrument features a double-beam optical system that increases detection limits and precision. The instrument reads directly in concentration, absorbance, and emission. The model 360 has automatic gain control with continuous monitoring of the reference beam. An optional double-beam deuterium background corrector which eliminates warm-up delays and the need to match lamp intensities is also available. Optional interlocked gas controls with automatic switching to nitrous oxide-acetylene

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 (see pages 1238A and 1302C) and placing it in the mailbox. Postage is free.—RICHARD G. SOMMER

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and burner head safety interlock is a new feature of the model 360. The instrument's peak reader scans and displays peak height readings in concentration. A choice of continuous or integrated readings allows the user flexibility in sample analysis. Perkin-Elmer Corporation. Circle No. 837 on Readers' Service Card.

Uric Acid Determination Procedure

Consisting of phosphotungstic acid reagent, sodium carbonate reagent, and uric acid standard, this test set provides a four-step procedure for uric acid determinations. The test requires no other chemicals and requires only 0.3 milliliter of serum. Conducted at room temperature, the test gives linear results to 200 milligrams per milliliter. The test is based on the reduction of phosphotungstic acid in an alkaline solution by uric acid to form a blue complex which exhibits maximum absorption at approximately 700 nanometers. The phosphotungstic acid and sodium carbonate reagents are stable at room temperature; the uric acid standard requires refrigeration. Stanbio Laboratory. Circle No. 834 on Readers' Service Card.

Demonstration Hood for Teaching

The Demonstration Hood is designed to provide a favorable facility for safe conduct of chemical experiments while affording a clear view of experimental proceedings. The device is portable; it features transparent side walls made of quarter-inch fire-retardant Plexiglas. The heat-resistant top is removable for maintenance and the chemical-resistant work surface is made of thermoplastic resin. The unit has an eye safety shield to protect the demonstrator from spills or chemical reactions. A 115-volt exhaust blower and 100-watt vapor-proof light are included. Labconco Corporation. Circle No. 828 on Readers' Service Card.

Densitometers

The model 445-PS line of densitometers is designed for scanning serum protein, LDH isoenzyme, lipoprotein, hemoglobin and haptoglobin electrophoresis patterns as well as for scanning lecithin-sphingomyelin, amino acid, and lipid thin-layer chromatog-

raphy plates. Four different models allow the selection of instruments which scan samples from 1 to 10 centimeters or from 1 to 20 centimeters in length. All instruments provide a transmission scanning capability with wavelength selection by calibrated dial from 400 to 700 nanometers. Fluorescence and reflectance scanning capabilities can also be provided. Pattern holders are available which permit scanning of cellulose acetate, agarose, acrylamide gel, and paper electrophoresis patterns. Thin-layer plates can also be scanned with complete flexibility of plate orientation. A few basic controls permit the operator to scan samples as small as 2 centimeters in 2 seconds or a 20-centimeter sample in 20 seconds. The 445-PS densitometers are designed to be converted to scan samples automatically and feed raw signals to computers for data reduction. Clifford Instruments. Circle No. 830 on Readers' Service Card.

Semi-Automated Chemical Analyzer

The ABA-50 is a system comparable to the fully automated ABA-100. The ABA-50 can be used to perform one test at a time or multiple tests with small amounts of sample. The instrument is suitable for stat work or as a back-up to a fully automated system. Answers, in units of the operator's choice, are calculated and presented in digital readout. With automatic pipets, up to 25 different tests may be performed sequentially. For batch testing, a trigger-activated dispenser aspirates and delivers precise amounts of sample and reagent. The ABA-50 uses bichromatic photometry. It is sensitive to 0.0008 angstrom and is linear to above 2.0 angstroms and precise to within 3 percent. Abbott Laboratories. Circle No. 839 on Readers' Service Card.

Bath-Circulator

The FrigidFlow model RF10 is a compact, continuous flow chiller with a 10.5-liter circulating bath that accommodates various laboratory containers for rapid cooling. This self-contained table-top chiller combines the advantages of a recirculating coolant transfer system with the precision of a general-purpose cold bath. It may also be employed as a chilling station for external circulation of coolant to a water bath, reaction vessel, or fer-

mentor. An immersion "cold finger" or cooling coil accessory facilitates rapid and efficient cooling. Temperature of the circulating bath can be maintained in range from -20°C to ambient with an accuracy of $\pm 0.5^{\circ}\text{C}$. Cool down to 0°C (without heat load) is accomplished in less than 15 minutes. New Brunswick Scientific Company. Circle No. 833 on Readers' Service Card.

Liquid Monitor

The Saf-T-Monitor protects against dangerous boil-over of reactions by controlling temperature, pressure, reflux, liquid levels, flow rates, and other parameters in laboratory operations. The Saf-T-Monitor allows equipment to cycle "on" and "off" at a control point or alternately will turn equipment off and activate an alarm, recorder, and so forth as the control point is passed. The sensing probe detects the rise of mercury or other liquid in a thermometer or manometer and signals the solid-state amplifier to turn one outlet "on" and the other "off." After cycling, the outlets reverse themselves. The unit is constructed of aluminum. Fuses are provided to protect all equipment being controlled. The unit operates by reacting to the slight changes in capacitance as liquid rises inside a tube. Lab-Line Instruments, Incorporated. Circle No. 829 on Readers' Service Card.

Literature

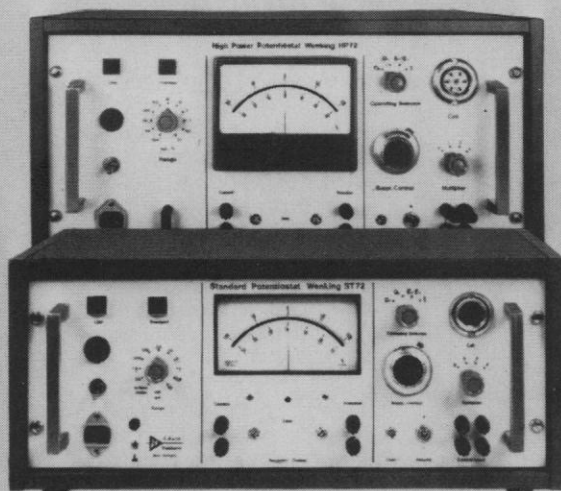
Drug Abuse Detection Using Pre-Coated TLC Plates is divided into two sections totaling 37 pages devoted to methods and techniques for using thin-layer chromatography to detect drugs of abuse. EM Laboratories, Incorporated. Circle No. 840 on Readers' Service Card.

Kontes Anaerobile describes a complete portable laboratory for the collection, culturing, and incubation of aerobic and anaerobic bacteria. Kontes Glass. Circle No. 841 on Readers' Service Card.

Respiratory Gases Bulletin describes and illustrates products for measuring and monitoring medical and respiratory gases. Applications include diagnosis of emphysema and related respiratory disorders, and measuring alveolar concentration of anaesthetic gases. Beckman Instruments. Circle No. 842 on Readers' Service Card.

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ADVANCES IN RADIATION BIOLOGY Volume 4

edited by JOHN T. LETT, HOWARD ADLER, and MAX ZELLE

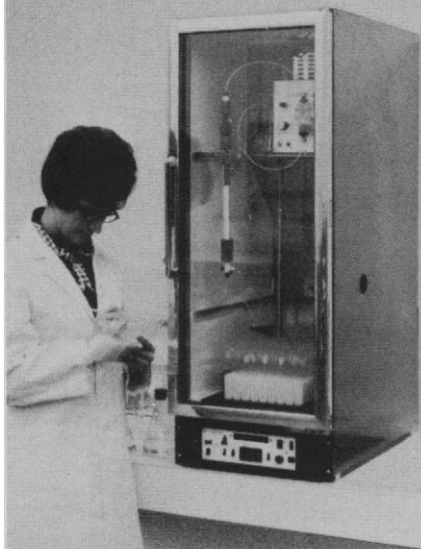
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BOOKS RECEIVED

(Continued from page 1278)

Gerard, Verviers, Belgium, 1973 (U.S. distributor, A.D.P., Montreal, Canada). 184 pp., illus. Paper, \$2.60.

Computed Electron Micrographs and Defect Identification. A. K. Head, P. Humble, L. M. Clarebrough, A. J. Morton, and C. T. Forwood. North-Holland, Amsterdam, and Elsevier, New York, 1973. x, 400 pp., illus. \$38. Defects in Crystalline Solids Series, vol. 7.

The Dynamics of Atoms in Crystals. W. Cochran. Crane, Russak, New York, 1974. viii, 146 pp., illus. Cloth, \$13.95; paper, \$6.95. The Structures and Properties of Solids, No. 3.

East from the Andes. Pioneer Settlements in the South American Heartland. Raymond E. Crist and Charles M. Nissly. University of Florida Press, Gainesville, 1973. x, 168 pp., illus. Paper, \$4. Social Sciences Monographs, No. 50.

Elastic Solutions for Soil and Rock Mechanics. H. G. Poulos and E. H. Davis. Wiley, New York, 1974. xii, 412 pp., illus. \$17.50. Series in Soil Engineering.

Electroanalytical Chemistry. A Series of Advances. Vol. 7. Allen J. Bard, Ed. Dekker, New York, 1974. xii, 294 pp., illus. \$24.50.

Electronic Properties of Crystalline Solids. An Introduction to Fundamentals. Richard H. Bube. Academic Press, New York, 1974. xvi, 524 pp., illus. \$35.

Everything You Wanted to Know About Drug Abuse . . . but were afraid to ask. Charles L. Winek. Dekker, New York, 1974. x, 214 pp., \$12.75.

The Evolutionary Imperative. Man's Role in the Immediate Future. Paul S. Henshaw. Exposition Press, Jericho, N.Y., 1974. xii, 140 pp. \$6.

Experimental Plant Physiology. Anthony San Pietro, Ed. Mosby, St. Louis, 1974. xiv, 176 pp., illus. Paper, \$6.75.

Form and Function of Phospholipids. G. B. Ansell, J. N. Hawthorne, and R. M. C. Dawson, Eds. Elsevier, New York, ed. 2, 1973. xiv, 494 pp., illus. \$45. B.B.A. Library, vol. 3.

Foundations of Experimental Research. Robert Plutchik. Harper and Row, New York, ed. 2, 1974. xviii, 332 pp., illus. Paper, \$5.95. Harper's Experimental Psychology Series.

Gazelle-Boy. Jean-Claude Armen. Translated from the French edition (Neuchatel, Switzerland, 1971) by Stephen Hardman. Universe Books, New York, 1974. 128 pp., illus. \$5.95.

Gebräuche und Leistungsfähigkeit des Menschen im Tragen von Lasten. Eine biogeographische Untersuchung. Georg Kenntner. Junk, The Hague, 1973. xii, 230 pp., illus. + maps. Dfl. 65. Biographica, vol. 3.

Genetic Structure of Populations. Proceedings of a conference, Honolulu, Hawaii, 1973. Newton E. Morton, Ed. University Press of Hawaii, Honolulu, 1973. xiv, 314 pp., illus. \$17.50. Population Genetics Monographs, vol. 3.

A Guide to the Birds of Trinidad and Tobago. Richard French. Livingston, Wynnewood, Pa., 1974. xx, 470 pp., illus. + plates. \$12.50. The Asa Wright Nature Centre Publication No. 1.

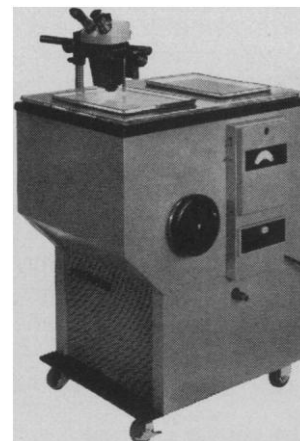
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Handbook of Micromethods for the Biological Sciences. Georg Keleti and William H. Lederer. Van Nostrand Reinhold, New York, 1974. xvi, 166 pp., illus. \$12.50.

The Immortality Factor. Osborn Segerberg, Jr. Dutton, New York, 1974. xviii, 392 pp. \$10.

Indians of Arizona. A Contemporary Perspective. Thomas Weaver, Ed. University of Arizona Press, Tucson, 1974. xii, 170 pp., illus. Paper, \$3.95.

Individual Differences in Children. Jack C. Westman, Ed. Wiley-Interscience, New York, 1973. xvi, 346 pp., illus. \$15.95.

Injection Molding. Theory and Practice. Irvin I. Rubin. Wiley-Interscience, New York, 1973. xiv, 658 pp., illus. \$24.95. Society of Plastics Engineers Monographs Series, vol. 1.

Integral Equations. Harry Hochstadt. Wiley-Interscience, New York, 1973. x, 282 pp. \$16.95. Pure and Applied Mathematics Series.

Intracellular Staining in Neurobiology. Stanley B. Kater and Charles Nicholson, Eds. Springer-Verlag, New York, 1973. xiv, 332 pp., illus. + plates. \$24.80.

Introduction to the Properties of Crystal Surfaces. J. M. Blakely. Pergamon, New York, 1973. xii, 262 pp., illus. \$10.50. International Series on Materials Science and Technology, vol. 12.

Introduction to Rational Elasticity. C.-C. Wang and C. Truesdell. Noordhoff, Leyden, The Netherlands, 1973. xii, 556 pp., illus. Dfl. 130. Mechanics of continua.

Invariant Subspaces. Heydar Radjavi and Peter Rosenthal. Springer-Verlag, New York, 1973. xii, 220 pp. \$20.50. Ergebnisse der Mathematik und ihrer Grenzgebiete, Band 77.

Ion Beams. With Applications to Ion Implantation. Robert G. Wilson and George R. Brewer. Wiley-Interscience, New York, 1973. xii, 500 pp., illus. \$19.95.

Ion Transport in Plants. Proceedings of a meeting, Liverpool, July 1972. W. P. Anderson. Academic Press, New York, 1973. xx, 630 pp., illus. \$28.

Iron-Sulfur Proteins. Vol. 2, Molecular Properties. Walter Lovenberg, Ed. Academic Press, New York, 1974. xiv, 344 pp., illus. \$29. Molecular Biology Series.

Issues in Physiological Psychology. Francis Leukel, Ed. Mosby, St. Louis, 1974. viii, 340 pp., illus. Paper, \$6.95.

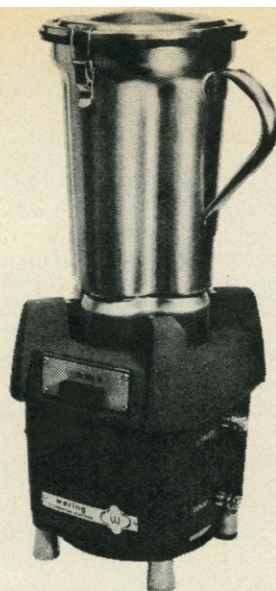
The Kairos Dimension. Dorelle Heisel. Interface (Gordon and Breach), New York, 1974. iv, 300 pp. Cloth, \$8.95; paper, \$3.95.

The Legacy of Mikolaj Kopernik. One Man's Love Affair with the Universe. Czeslaw Jozef Szymczak. Great Lakes Publishing Co., Milwaukee, Wis., 1973. xviii, 84 pp., illus. Paper, \$3.

Linear Microelectronic Systems. A. G. Martin and F. W. Stephenson. Macmillan, London, 1974 (U.S. distributor, Crane, Russak, New York). x, 242 pp., illus. \$16.50. Electrical and Electronic Engineering.

Linguistics and Information Science. Karen Sparck Jones and Martin Kay. Academic Press, New York, 1973. xii, 244 pp. \$14.50. Library and Information Science. International Federation for Documentation, No. 492.

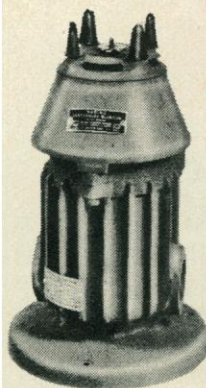
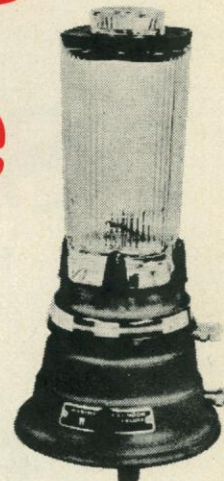
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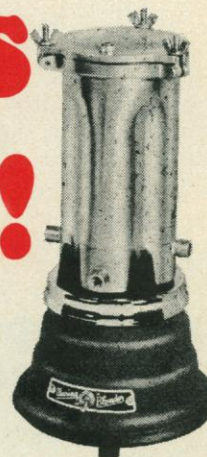
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Lipid Analysis. Isolation, Separation, Identification and Structural Analysis of Lipids. William W. Christie. Pergamon, New York, 1974. xiv, 338 pp., illus. \$18.

Literature in Digital Signal Processing. Terminology and Permuted Title Index. Howard D. Helms and Lawrence R. Rabiner, Eds. Institute of Electrical and Electronics Engineers, New York, 1973 (distributor, Wiley, New York). x, 98 pp., illus. Cloth, \$8.95; paper, \$4.50. IEEE Press Selected Reprint Series.

Lymphocyte Recognition and Effector Mechanisms. Proceedings of a conference, Uppsala, Sweden, Aug. 1973. Kerstin Lindahl-Kiessling, David Osoba, and Vera Runnström-Reio, Eds. Academic Press, New York, 1974. xxx, 692 pp., illus. \$24.50.

Methods of Animal Experimentation. Vol. 4, Environment and the Special

Senses. William I. Gay, Ed. Academic Press, New York, 1973. xiv, 384 pp., illus. \$29.50.

Micromethods in Molecular Biology. Volker Neuhoﬀ, Ed. Springer-Verlag, New York, 1973. xvi, 428 pp., illus. \$40.20. Molecular Biology, Biochemistry, and Biophysics, vol. 14.

Mössbauer Spectroscopy. An Introduction for Inorganic Chemists and Geochemists. G. M. Bancroft. Halsted (Wiley), New York, 1973. xii, 252 pp., illus. \$21.50.

The Neurosciences. Proceedings of the Third Intensive Study Program, Boulder, Colo., July 1972. Francis O. Schmitt and Frederic G. Worden, Eds. MIT Press, Cambridge, Mass., 1974. xxviii, 1108 pp., illus. \$22.50.

New Concepts I. A. Davison, Ed. Springer-Verlag, New York, 1973. iv, 150 pp., illus. \$19.70.

Nonlinear Parameter Estimation. Yonathan Bard. Academic Press, New York, 1974. x, 342 pp., illus. \$22.

Nonlinear Waves. Sidney Leibovich and A. Richard Seebass, Eds. Cornell University Press, Ithaca, N.Y., 1974. xiv, 332 pp., illus. \$16.50.

Occupational Careers. A Sociological Perspective. Walter L. Slocum. Aldine, Chicago, ed. 2, 1974. x, 350 pp., illus. \$12.50.

The Oviduct and Its Functions. Papers from a symposium, Athens, Ga., Oct. 1972. A. D. Johnson and C. W. Foley, Eds. Academic Press, New York, 1974. xviii, 370 pp., illus. \$14.

A Phylogenetic Tree of the Animal Kingdom. Including Orders and Higher Categories. Jarmila Kukalová-Peck. National Museums of Canada, Ottawa, 1973. 78 pp., illus. + charts. Spiral bound, \$5.75. National Museum of Natural Sciences Publications in Zoology, No. 8.

Physiology of the Kidney. Lawrence P. Sullivan. Lea and Febiger, Philadelphia, 1974. xiv, 150 pp., illus. Paper, \$6.50.

Planning and Budgeting in Poor Countries. Naomi Caiden and Aaron Wildavsky. Wiley-Interscience, New York, 1974. xxxvi, 370 pp. \$14.95. Comparative Studies in Behavioral Science.

Polymer Chemistry. Bruno Vollmert. Translated from the German (Karlsruhe, 1973) by Edmund H. Immergut. Springer-Verlag, New York, 1973. xviii, 652 pp., illus. \$29.50.

Progress in Hematology. Vol. 8. Elmer B. Brown, Ed. Grune and Stratton, New York, 1973. xvi, 332 pp., illus. \$22.50.

Proteins. Structure and Function. Albert Light. Prentice-Hall, Englewood Cliffs, N.J., 1974. x, 166 pp., illus. Paper, \$6.95.

The Psychobiology of Sensory Coding. William R. Uttal. Harper and Row, New York, 1973. xviii, 680 pp., illus. \$16.95. Physiological Psychology Series.

Regulation of Insect Populations by Microorganisms. Papers from a conference, New York, Oct. 1972. Lee A. Bulla, Jr., Ed. New York Academy of Sciences, New York, 1973. 244 pp., illus. Paper, \$26. *Annals of the New York Academy of Sciences*, vol. 217.

Science for the People. The Origins of the School Science Curriculum in England. David Layton. Science History Publications, New York, 1974. 226 pp., illus. \$10.

Scientific Activities 1972. Weizmann Institute of Science, Rehovot, Israel, 1973. xii, 472 pp. Paper. Reports of Scientific Activities.

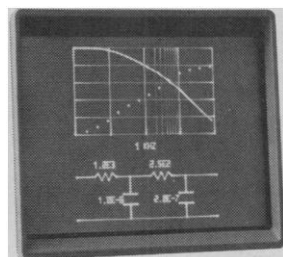
Scientific Papers of Arthur Holly Compton. X-ray and Other Studies. Robert S. Shankland. University of Chicago Press, Chicago, 1973. xxxviii, 778 pp., illus. \$27.50.

Scientific Progress Report. January 1970-June 1972. Faculty of Health Sciences, State University of New York at Buffalo, Amherst, N.Y., 1973. vi, 280 pp. Paper.

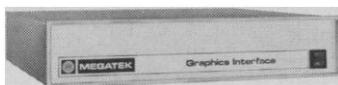
Sea Urchin Development. Cellular and Molecular Aspects. Louis W. Stearns. Dowden, Hutchinson and Ross, Stroudsburg, Pa., 1974. xii, 340 pp., illus. \$20.

Signals and Linear Systems. Robert A. Gabel and Richard A. Roberts. Wiley,

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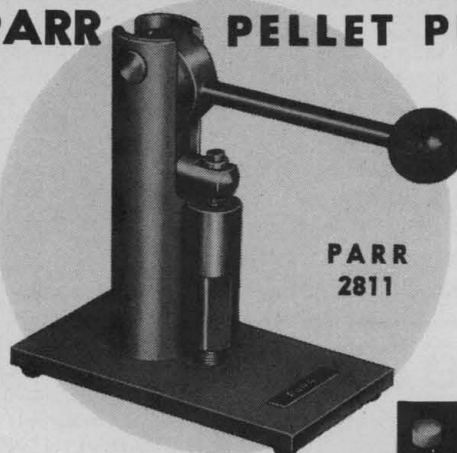
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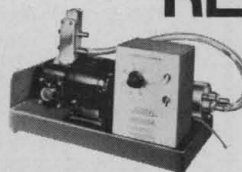


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Social Processes of Scientific Development. Richard Whitley, Ed. Routledge and Kegan Paul, Boston, 1974. x, 286 pp., illus. \$19.95.

Social Treatment. An Approach to Interpersonal Helping. James K. Whittaker. Aldine, Chicago, 1974. x, 270 pp. \$9.75. Modern Applications of Social Work Series.

Specific Production of Aquatic Invertebrates. V. E. Zaika. Translated from the Russian edition (Kiev, 1972) by A. Mercado. Halsted (Wiley), New York, and Israel Program for Scientific Translations, Jerusalem, 1974. vi, 154 pp., illus. \$19.75.

Spectroscopic and Chromatographic Analysis of Mineral Oil. S. H. Kägler. Translated from the German edition (Heidelberg, 1969) by J. Schmorak. Halsted (Wiley), New York, and Israel Program for Scientific Translations, Jerusalem, 1974. xiv, 560 pp., illus. \$65.

The Structure and Function of Muscle. Vol. 4, Pharmacology and Disease. Geoffrey H. Bourne, Ed. Academic Press, New York, ed. 2, 1973. xx, 572 pp., illus. \$40.

The Structure of Marine Ecosystems. John H. Steele. Harvard University Press, Cambridge, Mass., 1974. xii, 128 pp., illus. \$7.95.

The Structure of Matter. The Growth of Man's Ideas on the Nature of Matter. Joan Solomon. Halsted (Wiley), New York, 1974. 180 pp., illus. \$9.95. Physics and Humanities Series.

The Structure of Space. The Growth of Man's Ideas on the Nature of Forces, Fields and Waves. John Solomon. Halsted (Wiley), New York, 1974. 220 pp., illus. \$10.95. Physics and Humanities Series.

Symposium on the Theory of Scheduling and Its Applications. Papers from a symposium, Raleigh, N.C., May 1972. S. E. Elmaghraby, Ed. Springer-Verlag, New York, 1973. viii, 438 pp., illus. Paper, \$13.20. Lecture Notes in Economics and Mathematical Systems, vol. 86.

Télédétection et Stéréophotogrammétrie dans les Sciences de la Terre. Serge Paul. Doin, Paris, 1973. xviii, 342 pp., illus. + charts. Paper, 59 F.

Temporal Aspects of Therapeutics. Proceedings of a conference, Yosemite Valley, Calif., Oct. 1972. John Urquhart and F. Eugene Yates, Eds. Plenum, New York, 1973. x, 214 pp., illus. \$14.50. ALZA Conference Series, vol. 2.

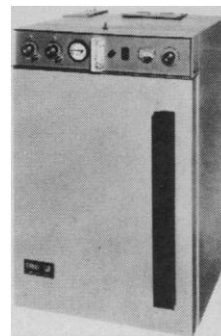
Thin-Shell Structures. Theory, Experiment and Design. Proceedings of a symposium, Pasadena, Calif., June 1972. Y. C. Fung and E. E. Sechler, Eds. Prentice-Hall, Englewood Cliffs, N.J., 1974. xxiv, 616 pp., illus. \$21.95.

Vertebrate Regeneration. C. S. Thornton and S. C. Bromley, Eds. Dowden, Hutchinson and Ross, Stroudsburg, Pa., 1973. xiv, 512 pp., illus. \$25. Benchmark Papers in Biological Concepts.

Wave Mechanics and its Applications. P. Gombás and D. Kisdi. Translated from the Hungarian edition (Budapest, 1973) by J. Schanda. Pergamon, New York, 1974. xii, 238 pp., illus. \$10.50. International Series of Monographs in Natural Philosophy, vol. 58.

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