

and indexed. If the editors' promise holds good, others will follow and will be in demand by the growing body of students who are finding that forest science contains intellectual challenges of first magnitude. A major value in the series is its international coverage, long needed in forest science.

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Communications Facilities

Data Transmission. William R. Bennett and James R. Davey. McGraw-Hill, New York, 1965. xii + 356 pp. Illus. \$14.50.

This book presents a survey of the development and current technology of data transmission; attention is focused on techniques applicable to transmission over band-limited channels, with special emphasis on voice-band telephone circuits.

The central problem of data transmission over such channels is the intersymbol interference that results from band-limiting and nonuniformity of channel amplitude and phase. Efficient transmission requires a signal design suited to the bandwidth limitations of the channel and equalization of the channel characteristics to reduce channel-induced perturbations to an acceptable level. The authors focus their attention on the question of signal design for band-limited channels; in particular, for each of a number of modulation-detection systems, received-signal spectra are derived which result in zero intersymbol interference. Results are obtained for the low-pass, or "baseband," channel and for amplitude, frequency, and phase modulation. The spectra derived are directly applicable for signaling over an ideal, band-limited channel. The effects of perturbations inherent in real channels are considered only qualitatively. Although the results presented are interesting in their own right, the degree of mathematical detail tends to emphasize the differences between the various signaling systems rather than the underlying principles that lead to zero intersymbol interference. It should also be noted that the "raised-cosine" shape which forms the basis for most of the spectra considered is only one of a class of spectra that

lead to the desired result; omitting consideration of alternatives results in a biased picture of their relative importance.

Considering the book as a whole, great emphasis is placed on the question of signal design, whereas questions of channel equalization, carrier recovery, and synchronization are given comparatively brief treatment. The potential for much more efficient utilization of band-limited channels, which has been demonstrated in recent work on error correction techniques and adaptive receivers, is mentioned only in passing.

In summary, this book presents a useful compilation of contributions to the problem of signal design for data transmission and includes a brief survey of other topics relating to data transmission by telephone line.

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Note

Biographical Memoirs of the Fellows of the Royal Society, vol. 10 (Royal Society, London, 1964. 394 pp. \$6) contains biographical memoirs of 21 Fellows: Kenneth Bailey by A. C. Chibnall; Gordon Herriot Cunningham by J. Ramsbottom; Gerhard Domagk by L. Colebrook; Claude Gordon Douglas by D. J. C. Cunningham; Herbert Spencer Gasser by Lord Adrian; Reginald Ruggles Gates by J. A. Fraser Roberts; George Ridsdale Goldsbrough by J. Proudman; Alan Arnold Griffith by A. A. Rubbra; Maurice Pascal Alers Hankey, First Baron Hankey of the Chart by Sir Basil Schonland; Edward David Hughes by Sir Christopher Ingold; David Keilin by T. Mann; David Keith Chalmers MacDonald by K. Mendelssohn; Sisir Kumar Mitra by J. A. Ratcliffe; Joseph Lade Pawsey by Sir Bernard Lovell; Carl Johan Fredrik Skottsberg by Sir Edward Salisbury; Edgar William Richard Steacie by L. Marion; Otto Struve by T. G. Cowling; Edward Charles Titchmarsh by Mary L. Cartwright; William Ernest Stephen Turner by R. W. Douglas; Ojvind Winge by M. Westergaard; and Sidney William Wooldridge by J. H. Taylor.

Each memoir includes a photograph of the Fellow and a bibliography of his published works.

New Books

Biological and Medical Sciences

Actions chimiques et biologiques des Radiations. M. Haissinsky, Ed. Masson, Paris, 1965. 250 pp. Illus. F. 86. Three papers: "Dissociation processes in electronically excited molecules" by K. Funabashi and J. L. Magee; "Attachement électronique en phase gazeuse" by F. Fiquet-Fayard; and "Primary physical and chemical effects associated with emission of radiation in nuclear processes" by S. Wexler.

The Adrenals and Resuscitation. Mikhail Grigor'evich Kolpakov. Translated from the Russian edition (Moscow, 1964) by Basil Haigh. Consultants Bureau, New York, 1965. 113 pp. Illus. Paper, \$17.50.

Advances in Fluorine Research and Dental Caries Prevention. vol. 3. Proceedings, 11th Congress, European Organization for Research on Fluorine and Dental Caries Prevention (Sandefjord, Norway), July 1964. J. L. Hardwick, Hans R. Held, and Klaus G. König, Eds. Pergamon, London; Macmillan, New York, 1965. 289 pp. Illus. \$17.50. Thirty papers; the majority are in English, the others in German.

The American Oyster. *Grassostrea virginica* Gmelin (*Fishery Bull.* 64). Paul S. Galtsoff. Fish and Wildlife Service, U.S. Department of the Interior, Washington, D.C., 1964. 484 pp. Illus. Paper, \$2.75 (order from Superintendent of Documents, Washington, D.C.).

Annual Review of Pharmacology. vol. 5. Windsor C. Cutting, Robert H. Dreisbach, and Henry W. Elliott, Eds. Annual Reviews, Palo Alto, Calif., 1965. 554 pp. Illus. \$8.50. Twenty-three papers.

Autogenic Training: Correlations Psychosomaticae. Wolfgang Luthe, Ed. Grune and Stratton, New York, 1965. 339 pp. Illus. \$14.50. Fifty-four papers on the following topics: Theory and Research (18 papers); Clinical Application (21 papers); and International Perspectives (15 papers); the papers are in German, English, or French.

The Behaviour of Arthropods. J. D. Carthy. Freeman, San Francisco, Calif., 1965. 156 pp. Illus. Paper, \$2.50. University Reviews in Biology Series, edited by J. E. Treherne.

Bioastronautics Data Book. Paul Webb, Ed. Scientific and Technical Information Division, National Aeronautics and Space Administration, Washington, D.C., 1964 (order from Superintendent of Documents, Washington, D.C.). 410 pp. Illus. Paper, \$2.25. The contributors are Kenneth C. Back, Charles E. Billings, Jr., W. Vincent Blockley, A. Charles Bryan, Randall M. Chambers, Charles E. Clauser, Beatrice Finkelstein, John G. Fletcher, George G. Frost, Douglas Grahn, Fred E. Guedry, H. T. E. Hertzberg, Harry J. Jerison, Gerald S. Kanter, Richard W. Lawton, Mildred K. Pinkerton, Emanuel M. Roth, Norman G. Roth, John W. Senders, A. A. Thomas, Paul Webb, and William J. White.

Biochemical and Neurophysiological

(Continued on page 1502)

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NEW BOOKS

(Continued from page 1457)

Correlation of Centrally Acting Drugs. E. Trabucchi, R. Paoletti, and N. Canal, Eds. Pergamon, London; Macmillan, New York, 1964. 296 pp. Illus. \$13. Twenty-two papers presented at the Second International Pharmacological Meeting sponsored by the Section on Pharmacology of the International Union of Physiological Sciences (Prague).

Biology in the Laboratory. Addison E. Lee and Osmond P. Breland. Harper and Row, New York, 1965. 339 pp. Illus. Paper, \$3.95.

The Biology of Hemichordata and Protochordata. E. J. W. Barrington. Freeman, San Francisco, Calif., 1965. 182 pp. Illus. Paper, \$2.50. University Reviews in Biology Series, edited by J. E. Treherne.

The Brachiopod Superfamily Stenosismataceae (Smithson. misc. Collns. 148, No. 2). Richard E. Grant. Smithsonian Institution, Washington, D.C., 1965. 198 pp. Illus. Plates. Paper, \$4.50.

Calcium et maladies métaboliques de l'os. vols. 1-3. vol. 1, *Os et métabolisme du calcium à l'état normal* (342 pp.); vol. 2, *Os et métabolisme du calcium à l'état pathologique* (592 pp.); vol. 3, *Intestin, Rein et métabolisme du calcium* (455 pp.). A. Lichtwitz and R. Parlier, Eds. L'Expansion Scientifique Française, Paris, 1964. Illus. Paper.

Catalogue of the Type Specimens of Microlepidoptera in the British Museum (Natural History), Described by Edward Meyrick. vol. 5, Timyridae, Hyponomeutidae, Ethmiidae, Metachondidae, Cosmopterigidae, Walshiidae, Blastodacnidae, Scythridae. J. F. Gates Clarke, British Museum (Natural History), London, 1965. 585 pp. Illus. £15.

The Chemistry of Plant Processes. C. P. Whittingham. Philosophical Library, New York, 1965. 209 pp. Illus. \$7.50.

Clinical Endocrinology. For practitioners and students. Laurence Martin. Little, Brown, Boston, ed. 4, 1964. 314 pp. Illus. \$12.50.

The Common Liver Fluke. Fasciola hepatica L. E. M. Pantelouris. Pergamon, London; Macmillan, New York, 1965. 267 pp. Illus. \$12. International Series of Monographs on Pure and Applied Biology, Zoology Division, vol. 21.

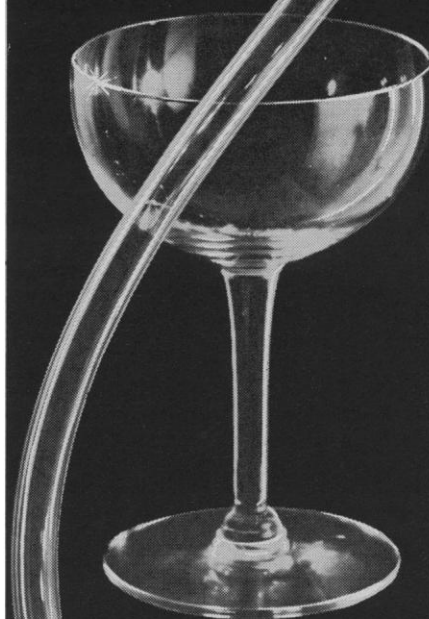
Cybernetics and Biology. F. H. George. Freeman, San Francisco, Calif., 1965. 146 pp. Illus. Paper, \$2.50. University Reviews in Biology Series, edited by J. E. Treherne.

Electrophysiology of the Heart. Proceedings of an international symposium (Milan, Italy), October 1963. B. Taccardi and G. Marchetti, Eds. Pergamon, London; Macmillan, New York, 1965. 354 pp. Illus. \$15. Twenty-one papers presented at a symposium sponsored by the Istituto di Cardiologia Sperimentale dei Servizi Scientifici Simes.

Essentials of Histology. Gerrit Bevelander. Mosby, St. Louis, ed. 5, 1965. 329 pp. Illus. \$6.50.

Fish as Food. vol. 3, pt. 1, *Processing.* Georg Borgstrom, Ed. Academic Press, New York, 1965. 503 pp. Illus. \$17.50. Thirteen papers contributed by A. C.

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Function and Structure in Micro-Organisms. Fifteenth symposium, Society for General Microbiology (London), April 1965. M. R. Pollock and M. H. Richmond, Eds. Cambridge Univ. Press, New York, \$13.50. Seventeen papers contributed by D. D. Woods; H. L. Kornberg; J. Lascelles; R. J. Britten; H. Holter; J. O. Lampen; K. McQuillen; K. A. Stacey; H. J. Rogers; B. A. Newton and D. Kerridge; R. E. Burge and M. E. J. Holwill; L. Wolpert; W. Hayes; Ruth Sager; H. O. Halvorson; P. C. Fitz-James; and D. Mazia.

General Zoology. Tracy I. Storer and Robert L. Usinger. McGraw-Hill, New York, ed. 4, 1965. 749 pp. Illus. \$8.50.

Grundzüge der Biochemie der Pflanzen. Wacław Leonowitsch Kretowitsch. Fischer, Jena, East Germany, 1965. 485 pp. Illus. DM. 69.

Human Genetics and Its Foundations. Maurice Whittinghill. Reinhold, New York; Chapman and Hall, London, 1965. 447 pp. Illus. \$8.95. Reinhold Books in the Biological Sciences Series.

Insecticides. A. J. Feuill. Cramer, Weinheim, Germany, 1965. 250 pp. Illus. Paper.

Introduction to Modern Biochemistry. P. Karlson. Translated from the German edition (Stuttgart, 1964) by Charles H. Doering. Academic Press, New York, ed. 2, 1965. 456 pp. Illus. \$11.

Laboratory Manual for General Biology. Mary E. Hawthorne, Ernest H. Blaustein, and Robert F. Slechta. Brown, Dubuque, Iowa, 1965. 267 pp. Illus. Paper, \$3.95.

Manual for Nutrition Surveys. Interdepartmental Committee on Nutrition for National Defense, National Institutes of Health, Washington, D.C., ed. 2, 1964 (order from Superintendent of Documents, Washington, D.C.). 343 pp. Illus. Plates. \$2.50.

Mechanisms of Hormone Action. A NATO Advanced Study Institute (Meersburg, Germany), May 1964. P. Karlson, Ed. Thieme, Stuttgart, Germany; Academic Press, New York, 1965 (order from Intercontinental Medical Book Corp., New York). 287 pp. Illus. DM. 49.80. Twenty-two papers.

Medical Orthodoxy and the Future of Psychoanalysis. K. R. Eissler. International Universities Press, New York, 1965. 604 pp. \$12.

Metabolism and Physiological Significance of Lipids. Proceedings, Advanced Study Course (Cambridge, Mass.), September 1963. R. M. C. Dawson and Douglas N. Rhodes, Eds. Wiley, New York, 1964. 667 pp. Illus. \$21. Forty papers on the following topics: Metabolism (13 papers); Lipid Absorption (4 papers); Physiological Significance (15 papers); Lipids of the Nervous System (4 papers); Lipids and Proteins (2 papers); and symposia (2 papers).

The Metabolism of Insects. Darcy Gilmour. Freeman, San Francisco, Calif.,

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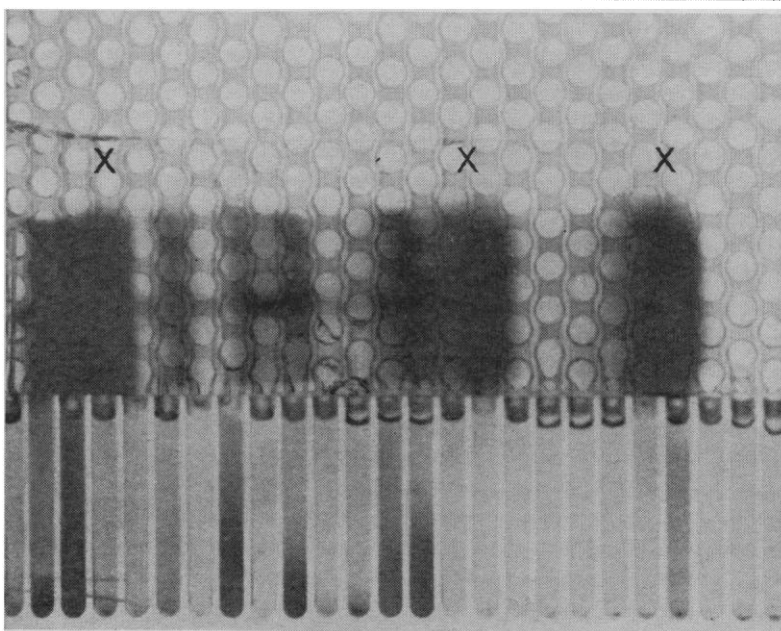
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1965. 207 pp. Illus. Paper, \$2.50. University Reviews in Biology Series, edited by J. E. Treherne.

Microbial Inhibitors in Food. Fourth International Symposium (Goteborg, Sweden), June 1964. N. Molin and A. Erichsen, Eds. Almqvist and Wiksell, Stockholm, 1964. 408 pp. Illus. \$9. Thirty-three papers listed under the following topics: Action of Microbial Inhibitors in Foods (11 papers); Use of Microbial Inhibitors in Foods (12 papers); Natural Occurrence of Microbial Inhibitors in Foods (4 papers); and General Papers (6 papers).

Pharmacology of Cholinergic and Adrenergic Transmission. Proceedings, Second International Pharmacological Meeting (Prague), August 1963. vol. 3. G. B. Koelle, W. W. Douglas, and A. Carlsson, Eds. Pergamon, London; Macmillan, New York, 1965. 358 pp. Illus. \$15. Thirty papers.

The Physiology of Nematodes. D. L. Lee. Freeman, San Francisco, Calif., 1965. 164 pp. Illus. Paper, \$2.50. University Reviews in Biology Series, edited by J. E. Treherne.

Plant Anatomy. Katherine Esau. Wiley, New York, ed. 2, 1965. 789 pp. Illus. \$14.50.

Preparation and Bio-Medical Application of Labeled Molecules. Proceedings of a symposium (Venice), August 1964. J. Sirchis, Ed. European Atomic Energy Community, Brussels, Belgium, 1964. 520 pp. Illus. Forty-six papers presented at the symposium sponsored by the Radiation Chemistry and Radioelements Centers of the Universities of Bologna, Padua, and Rome, the Italian National Research Council (C.N.R.), and the European Atomic Energy Community (Euratom).

Principles of Animal Biology. Lawrence S. Dillon. Macmillan, New York, 1965. 573 pp. Illus. \$7.95.

Radioactive Fallout, Soils, Plants, Foods, Man. Eric B. Fowler, Ed. Elsevier, New York, 1965. 325 pp. Illus. \$14. Eleven papers.

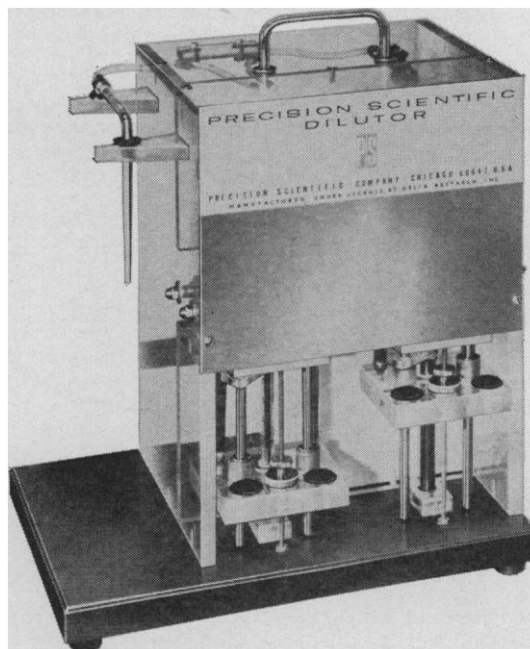
Radiotracer Methodology in Biological Science. C. H. Wang and David L. Willis. Prentice-Hall, Englewood Cliffs, N.J., 1965. 400 pp. Illus. \$16.

The Rational Use of Dyes in Biology: And General Staining Methods. Edward Gurr. Williams and Wilkins, Baltimore, 1965. 434 pp. Illus. \$14.

Recent Advances in Biological Psychiatry. vol. 7. Proceedings of the 19th Annual Convention and Scientific Program of the Society of Biological Psychiatry (Los Angeles, Calif.), May 1964. Joseph Wortis, Ed. Plenum Press, New York, 1965. 312 pp. Illus. \$13.50. Twenty-eight papers on the following topics: Symposium on Lysergic Acid Diethylamide (LSD) (4 papers); Clinical Studies (4 papers); Conditioning and Memory: Experimental Studies (3 papers); Clinical Studies of Memory and Allied Function (3 papers); Contemporary Views on the Biological Bases of Psychiatry (4 papers); Research in Genetic and Biochemical Determination (3 papers); and miscellaneous studies (7 papers).

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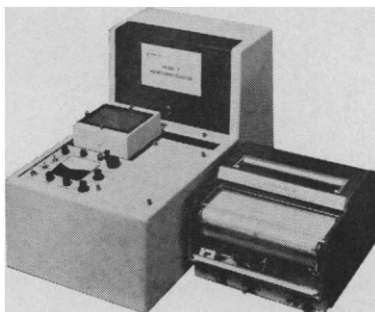
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sented at a symposium (Cambridge, Mass.), July 1964. George Wolf, Ed. M.I.T. Press, Cambridge, Mass., 1965. 220 pp. Illus. \$7.50. Twenty-five papers on the following topics: Synthesis, Analysis, Distribution, Biosynthesis, and Turn-over of Carnitine (8 papers); Function of Carnitine in Fatty Acid Metabolism (7 papers); Metabolic Role of Carnitine and Lipid-Bound Carnitine (6 papers); and Physiological Effects of Carnitine (4 papers).

The Redox Potential of the Blood in vivo and in vitro: Its Measurement and Significance. Ernst Ziegler, with a chapter by J. Rehm. Translated by J. E. Smith. Thomas, Springfield, Ill., 1965. 206 pp. Illus. \$8.50.

Reproduction in the Insects. K. G. Davey. Freeman, San Francisco, Calif., 1965. 106 pp. Illus. Paper, \$2.50. University Reviews in Biology Series, edited by J. E. Treherne.

Respiratory Failure. (*Ann. N.Y. Acad. Sci.* 121, art. 3). Harold E. Whipple, Ed. New York Acad. of Sciences, New York, 1965. 307 pp. Illus. Paper, \$10. Twenty-nine papers presented at a conference held in February 1964. The topics considered were Pathophysiology of Respiratory Failure (6 papers); Methods of Therapy: Mechanical Ventilation (6 papers); Methods of Therapy: Oxygen Therapy and Associated Therapeutic Measures (9 papers); and Management of Respiratory Failure (8 papers).

Spores. vol. 3. Symposium (Allerton Park, Ill.), October 1964, held under the auspices of the University of Illinois and with the support of the Office of Naval Research. L. Leon Campbell and H. Orin Halvorson, Eds. American Soc. for Microbiology, Ann Arbor, Mich., 1965. 256 pp. Illus. \$6. Twenty-one papers.

Strasburger's Textbook of Botany. Rewritten by Richard Harder, Walter Schumacher, Franz Firbas, and Dietrich von Denffer. Translated from the 28th German edition (Stuttgart, 1962) by Peter Bell and David Coombe. Longmans, Green, London, 1965. 864 pp. Illus. 84s.

Structure and Function in Biological Membranes. vol. 2. J. Lee Kavanau. Holden-Day, San Francisco, 1965. 448 pp. Illus. \$14.75.

Structure and Function in the Nervous Systems of Invertebrates. vols. 1 and 2. Theodore Holmes Bullock and G. Adrian Horridge, with chapters by Howard A. Bern, Irvine R. Hagadorn, and J. E. Smith. Freeman, San Francisco, 1965. vol. 1, 818 pp.; vol. 2, 929 pp. Illus. \$75 set.

Theory and Practice in Experimental Bacteriology. G. G. Meynell and Elinor Meynell. Cambridge Univ. Press, New York, 1965. 300 pp. Illus. \$9.50.

Mathematics, Physical Sciences, and Engineering

Advances in Morphogenesis. vol. 4. M. Abercrombie and Jean Brachet, Eds. Academic Press, New York, 1964. 297 pp. Illus. \$12. Six papers: "The transplantation of living cell nuclei" by J. B. Gurdon; "Morphogenesis in *Micrasterias*" by H. Waris and P. Kallio; "Problems in

corneal morphogenesis" by Alfred J. Coulombre; "Regeneration in lower plants" by Luise Strange; "Regeneration in annelids" by Henriette Herlant-Meewis; and "Biological aspects of the yolk of the hen's egg" by Ruth Bellairs.

The Barker Index of Crystals. A method for the identification of crystalline substances. vol. 3, pts. 1 and 2. vol. 3, *Crystals of the Anorthic System*; pt. 1 "Introduction and Tables"; pt. 2, "Crystal Descriptions, A.1 to A.831, Atlas of Configurations." M. W. Porter and L. W. Codd. Published for Barker Index Committee by Heffer, Cambridge, Eng. Unpagged. Illus. Tables £12 set.

Data for Plasmas in Local Thermodynamic Equilibrium. Hans-Werner Drawin and Paul Felenbok. Gauthier-Villars, Paris, 1965. 503 pp. F. 64.

Dynamic Circuit Theory. Hugo K. Messerle. Pergamon, London; Macmillan, New York, 1965. 679 pp. Illus. \$15.

Electromagnetics in Space: Antenna Considerations as Related to Space Communications. Karl R. Spangenberg, Ed. McGraw-Hill, New York, 1965. 289 pp. Illus. \$15. Chapters contributed by A. S. Dunbar, T. H. Lee, J. L. Bellamy, and E. A. Blasi.

Elementary Differential Equations and Boundary Value Problems. William E. Boyce and Richard C. DiPrima. Wiley, New York, 1965. 503 pp. Illus. \$8.95.

Ergodic Theory in Statistical Mechanics. I. E. Farquhar. Interscience (Wiley), New York, 1965. 243 pp. Illus. \$12. Vol. 7, Monographs in Statistical Physics and Thermodynamics, a series edited by I. Prigogine.

Hydraulic Control of Machine Tools. E. M. Khaimovich. Translated from the Russian edition by O. Tedder. K. Foster, Translation Ed. Pergamon, London; Macmillan, New York, 1965. 585 pp. Illus. \$17.50.

Introduction to Mathematics with Applications. Herbert Barkan and Carl Konove. Van Nostrand, Princeton, N.J., 1965. 379 pp. Illus. \$7.95.

Laboratory Manual for Introductory College Chemistry. Floyd J. Quick. Macmillan, New York, 1965. 272 pp. Illus. Paper, \$3.95.

Nuclear Techniques in Analytical Chemistry. Alfred J. Moses. Pergamon, London; Macmillan, New York, 1965. 150 pp. Illus. \$6.50. International Series of Monographs on Analytical Chemistry, vol. 20.

Number Theory. J. Hunter. Oliver and Boyd, Edinburgh; Interscience (Wiley), New York, 1964. 159 pp. Illus. \$2.75. University Mathematical Texts Series.

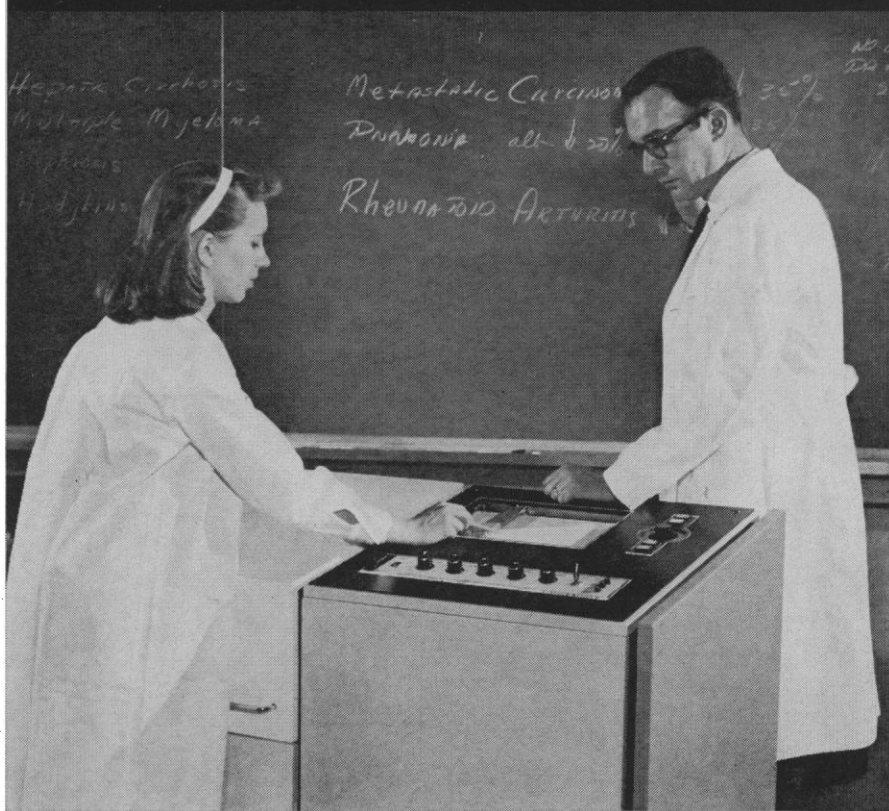
Numerical Methods. vols. 1 and 2. vol. 1, *Iteration, Programming, and Algebraic Equations* (168 pp., \$3); vol. 2, *Differences, Integration, and Differential Equations* (224 pp., \$2.75). Ben Noble. Oliver and Boyd, London; Interscience (Wiley), New York, 1965. Illus.

Open Tubular Columns in Gas Chromatography. L. S. Ettre. Plenum Press, New York, 1965. 184 pp. Illus. \$4.95.

Palynology in Oil Exploration. A symposium (San Francisco, Calif.), March 1962. Aureal T. Cross, Ed. Society of Economic Paleontologists and Mineralogists, Tulsa, Okla., 1964. 208 pp. Illus.

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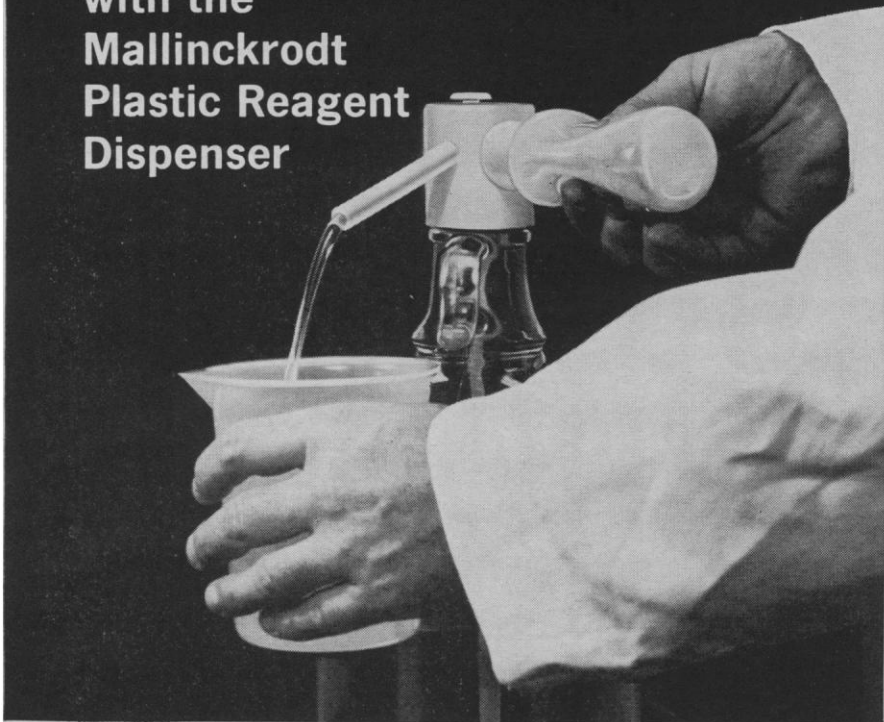
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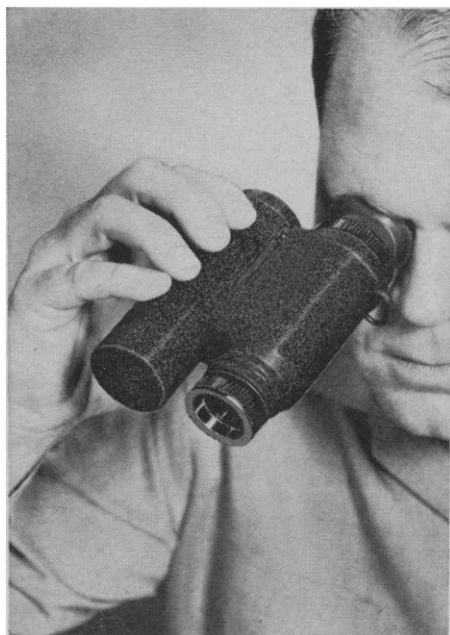
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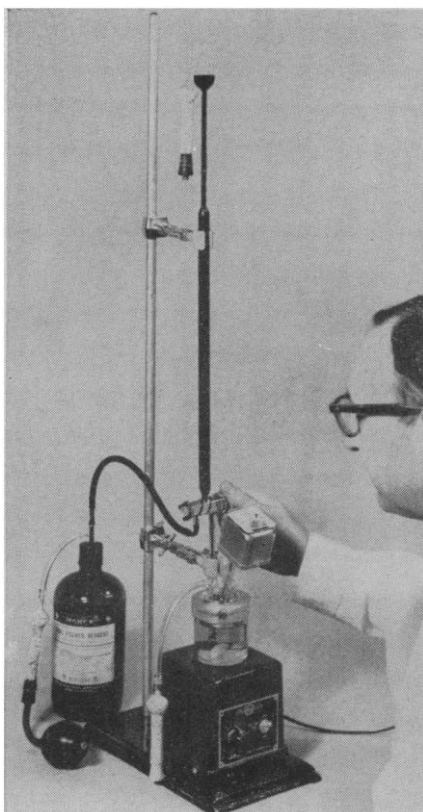
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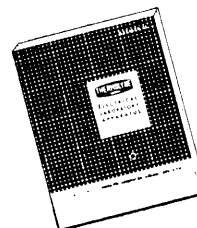
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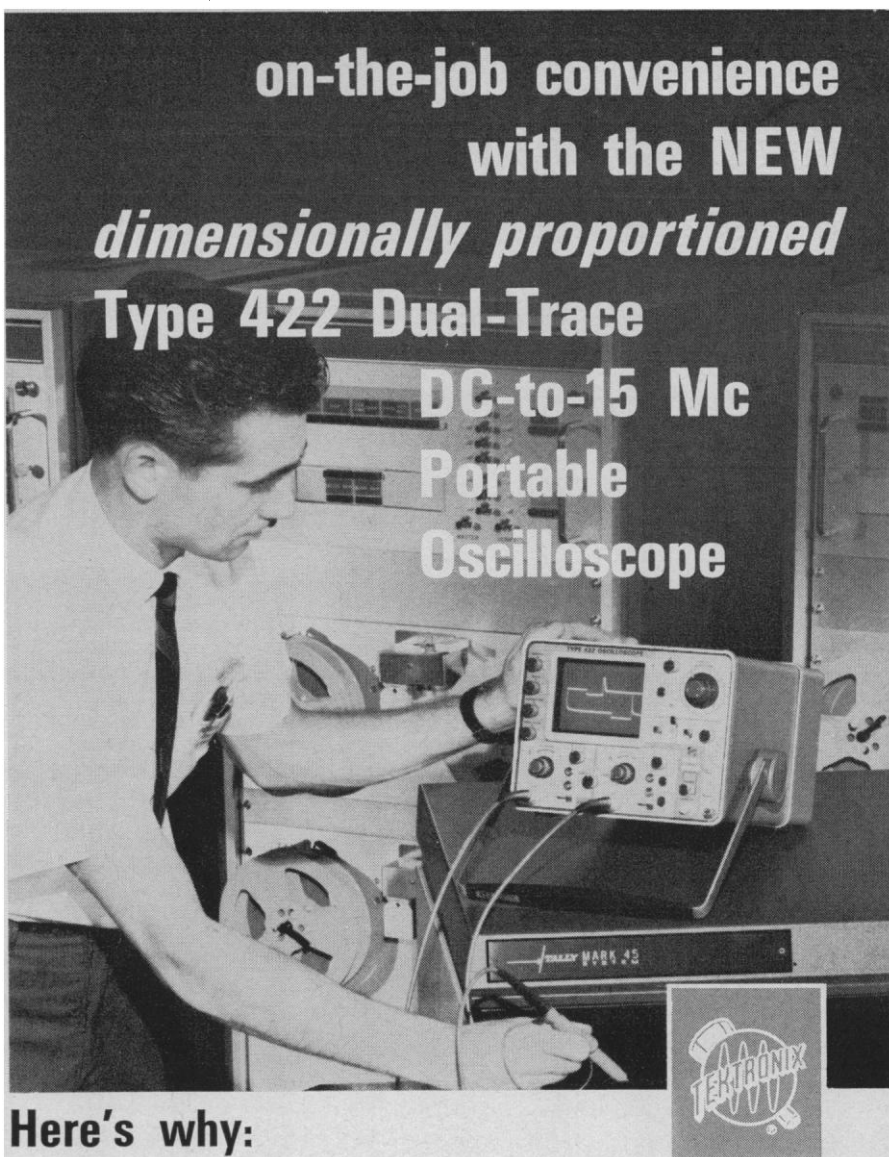
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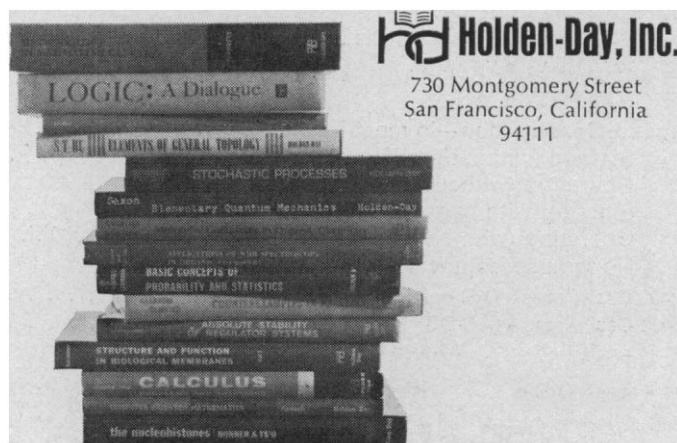
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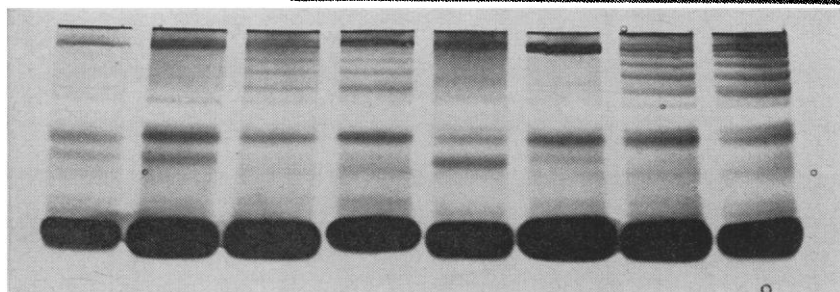
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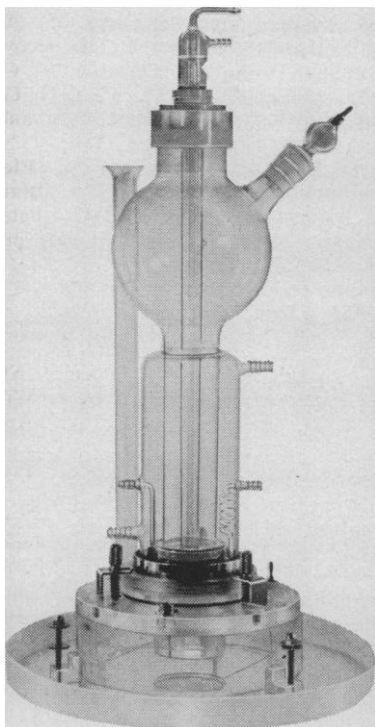
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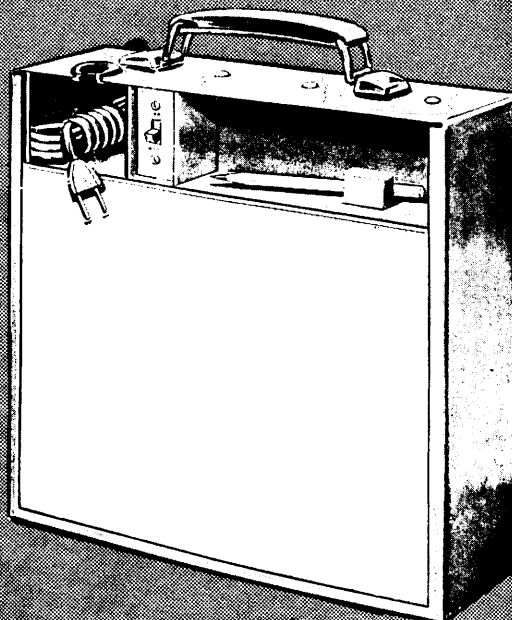
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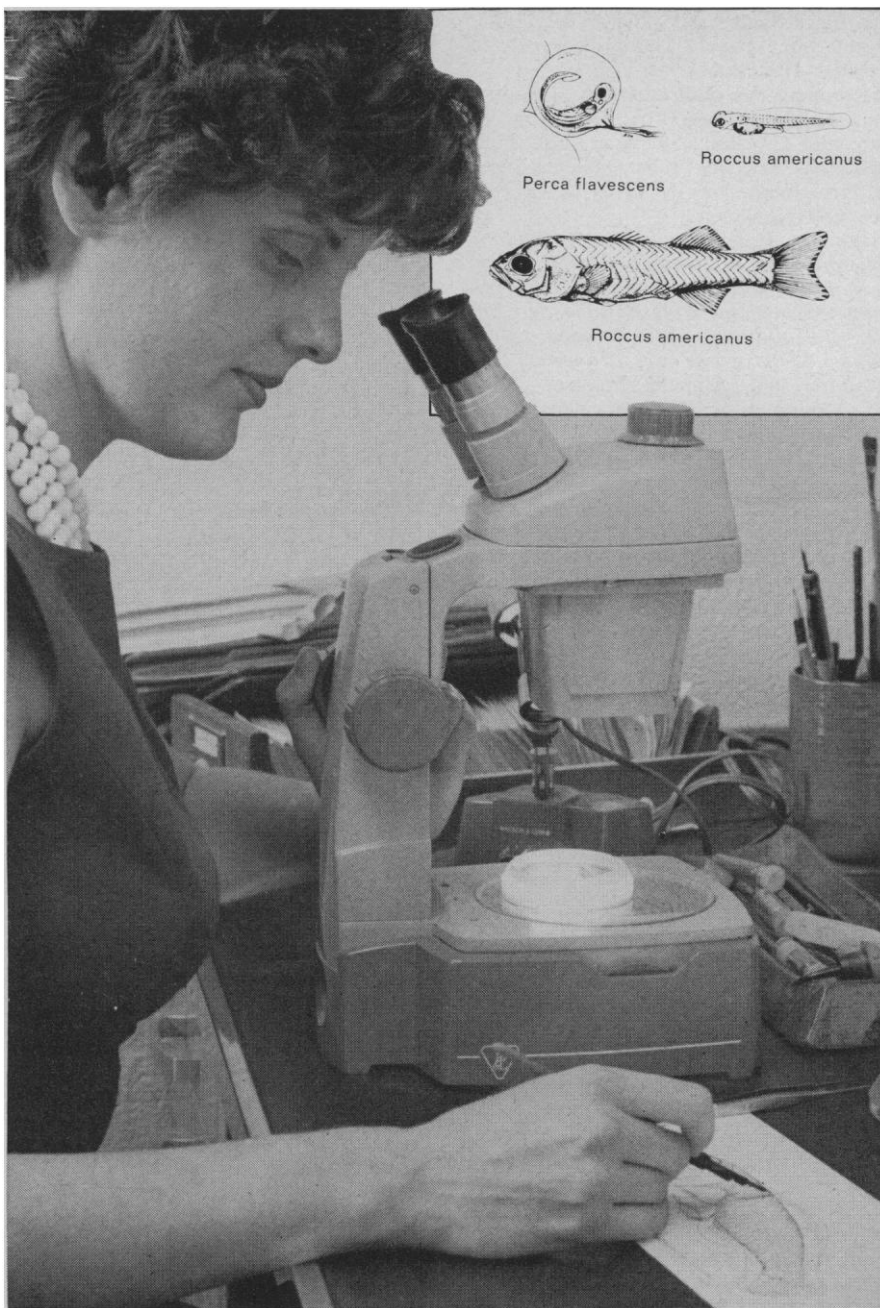


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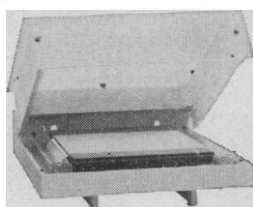
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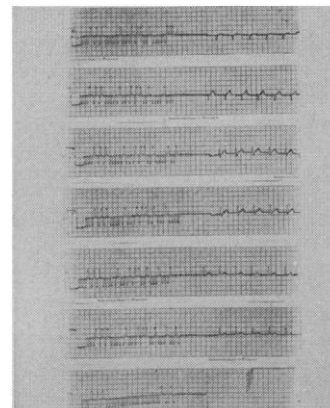
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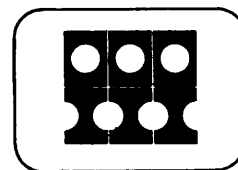


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Medical film records containing ECG (electrocardiogram), EEG (electroencephalogram), blood cell slides, chromosome patterns, soft tissue x-rays and other forms of medical data on film can now be read and analyzed rapidly in large quantities by means of a Programmable Film Reader system developed by Information International, Inc. Judgements approaching those which a human would normally make in analyzing the data may be implemented in highly sophisticated film reading programs which direct and monitor the film scanning process.

The Programmable Film Reader system is a means for reducing large quantities of photographic data at processing rates far exceeding those of semi-automatic systems utilizing a human operator. The system "recognizes what it sees"; only the data of interest is extracted. No further computer processing is necessary to obtain this data. Data output is in digital form on IBM-compatible magnetic tape.

Other applications include the automatic reduction of radar A-scope and theodolite film; spark and bubble chamber film; oceanographic current meter and bathythermograph film, and oil well log film. The firm also supplies services for reading and digitizing film sent to it for processing. A brochure describing the film reader and film reading systems we have developed is available on request.



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