In the first Maxwell Knight describes and clarifies what the field naturalist is able to observe. This section, which covers the results of innumerable field observations and of experiments designed to clarify some of them, is arranged not by the types of animals but by the senses, and it brings together in logical cohesion a vast amount of data. In the second section, which is concerned with how the senses work, L. Harrison Matthews deals with the structural and functional bases for the sensory life of animals. The material is again arranged by the senses, although it includes two chapters on special topics-echolocation and monitors.

The volume should be a useful addition to the library of biologists interested in animal behavior. Its chief weakness as a source book is the lack of a bibliography and even of references in the text to the publications from which data have been extracted. It thereby falls short of providing the serious worker with what he needs, but for the amateur observer and the more superficial student it presents a readable and accurate presentation of the senses of animals.

HERBERT FRIEDMANN
Los Angeles County Museum,
Los Angeles, California

Stream and Lake Biology

Freshwater Ecology. T. T. Macan. Longmans, Green, London, 1963. x + 338 pp. Illus. \$6.50.

Carpenter's small volume, Life in Inland Waters (1929), has been badly out of date for many years, and I have been searching fruitlessly for a modern volume that would replace it as required reading for university seniors and beginning graduate students who are thinking of doing work in freshwater biology. This book, at long last, fills such a need in admirable fashion. Macan is adept at weaving together such phases of freshwater ecology as communities, transport, behavior, interrelationships, physical factors (two chapters), chemical factors (four chapters), production, and methods. The whole treatment, however, is physiological, and the "integration" of many viewpoints has meaning far beyond the usual pedagogical implications of this

The style remains remarkably lucid

and, in places, nearly conversational, despite the fact that Macan, carefully and in a scholarly fashion, has sifted a mass of data on stream and lake biology. Almost every page suggests further research problems, and for the receptive and perceptive student, this is perhaps the most valuable aspect of the book. To be sure, emphasis is on English and European aquatic ecology, but the principles discussed are common to aquatic habitats everywhere and most of the genera mentioned are also found in North America.

Much of Macan's own research interests have been in the ecology of freshwater insects, and an excellent summary of this field is appropriately placed in several chapters of *Freshwater Ecology*. There is a good summary of animal ecology through the Baltic Sea salinity gradient. The chapters on the ecological significance of temperature and dissolved oxygen are especially well done and free from the stilted qualities found in similar chapters in other texts. The 500 items in the list of references are well chosen.

The theme of Freshwater Ecology is perhaps best expressed by a sentence from the preface: "The only doctrine I wish to preach is toleration; the school that is brilliantly leading the world today may be nearing the end of its seam, whereas the school that has been plodding along an unprofitable road for years may be about to strike a rich vein."

ROBERT W. PENNAK Department of Biology,

University of Colorado

Note

African Natural Resources

A Review of the Natural Resources of the African Continent (UNESCO, Paris; Columbia University Press, New York, 1963. 437 pp. \$15), a timely compendium of the natural resources of Africa, consists of 14 papers by as many authors. Each author catalogs the present sources of knowledge and suggests needed work with respect to a particular resource or field. An anonymous "outline" summarizes the volume as a whole. All except three of the papers include helpful bibliographies, several of them elaborately classified. Each paper also has a brief list of contents,

but the volume suffers because it does not have an index, either general or to specific chapters. The group of contributors is cosmopolitan, but only the three specialists from the United Arab Republic now reside in Africa. One author, the director of a bureau, prepared his report "on the basis of notes provided by" five others. A review of such a collection of "reviews" cannot do justice to its subject in brief compass. Suffice it to say that the book touches on most aspects of its field and that it will be particularly useful to those who want to know where to find the available information, or to administrators or politicians who are seeking recommendations for action.

PRESTON E. CLOUD, JR. School of Earth Sciences, University of Minnesota, Minneapolis

New Books

Mathematics, Physical Science, and Engineering

Absorption Spectra in the Ultraviolet and Visible Region. vol. 4. L. Lang, Ed. Academic Press, New York, 1963. 414 pp. Illus. \$20.

Acylation Reactions. Their applications and mechanisms. P. F. G. Praill. Pergamon, London; Macmillan, New York, 1964. 170 pp. Illus. Paper, \$2.95.

Advances in Computers. vol. 4. Franz L. Alt, Morris Rubinoff, A. D. Booth, and R. E. Meagher, Eds. Academic Press, New York, 1963. 326 pp. Illus. \$12. Five papers: "The formulation of data processing problems for computers," W. C. McGee; "All-magnetic circuit techniques," D. R. Bennion and H. D. Crane; "Computer education," H. E. Tompkins; "Digital fluid logic elements," H. H. Glaettli; "Multiple computer systems," W. A. Curtin.

Advances in Inorganic Chemistry and Radiochemistry. vol. 5. H. J. Emeléus and A. G. Sharpe, Eds. Academic Press, New York, 1963. 439 pp. Illus. \$14.50. Eight papers: "The stabilization of oxidation states of the transition metals." R. S. Nyholm and M. L. Tobe; "Oxides and oxyfluorides of the halogens," M. Schmeisser and K. Brandle; "The chemistry of gallium," N. N. Greenwood; "Chemical effects of nuclear activation in gases and liquids," gases and liquids," I. G. Campbell; "Gaseous hydroxides," O. Glemser and H. G. Wendlandt; "The borazines," E. K. Mellon, Jr. and J. J. Lagowski; "Decaborane-14 and its derivatives," M. F. Hawthorne; "The structure and reactivity of organophosphorus compounds," R. F. Hudson.

Analysis of Petroleum for Trace Elements. O. I. Milner. Pergamon, London; Macmillan, New York, 1963. 136 pp. Illus. \$5.

(Continued on page 210)

LEA & FEBIGER BOOKS

NEW 3rd (1964) EDITION

Wohl and Goodhart— Modern Nutrition in Health and Disease

Edited by MICHAEL G. WOHL, M.D., Nutrition Clinic, Philadelphia General Hospital; Emeritus Clinical Professor of Medicine, Temple University School of Medicine; and ROBERT S. GOODHART, M.D., Scientific Director, The National Vitamin Foundation, New York City. About 1180 pages. 75 illustrations. 155 tables. New 3rd edition. Ready in June.

This complete presentation of nutritional management of specific disease entities and stress situations is in a new and fully up to date 3rd edition. The subject is considered under the three major headings of normal nutrition, nutrition in disease, and nutrition in periods of physiologic stress. Drugs, rest, exercise and other therapeutic procedures are included.

NEW (1964) BOOK

Galigher and Kozloff— Essentials of Practical Microtechnique

By the Late Albert E. Galigher, Berkeley, California; and Eugene N. Kozloff, Ph.D., Professor of Biology, Lewis and Clark College, Portland. About 350 pages. 60 illustrations. New. Ready in May.

Detailed procedures commonly used in preparing animal materials for microscopic study are given clearly in this up to date new book. Although designed as a text for students, the coverage of human and mammalian tissues is presented so extensively that this book will prove to be of considerable value to medical technicians and histologists. Subjects include use of the microscope; organization of laboratory; fixation; staining; paraffin, nitrocellulose and freezing methods; metallic impregnation; and a summary of recommended procedures. Personal experiences of both authors dominate the text.

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New Books

(Continued from page 168)

Analysis of Variance. William C. Guenther. Prentice-Hall, Englewood Cliffs, N.J., 1964. 207 pp. Illus. \$9.

Analytic Trigonometry. William J. Bruce. Pergamon, London; Macmillan, New York, 1963. 355 pp. Illus. Paper, \$5.

The Analytical Chemistry of Thorium.
D. I. Ryabchikov and E. K. Gol'braikh.
Translated from the Russian edition
(Moscow, 1960) by A. D. Norris. R.
Belcher and L. Gordon. Eds. Pergamon,
London; Macmillan, New York, 1963. 330
pp. Illus. \$14.

Astronomy. Robert H. Baker. Van Nostrand, Princeton, N.J., ed. 8, 1964. 565 pp. Illus.

The Atomic Nucleus. M. Korsunsky. Translated from the Russian edition (Moscow, 1958) by G. Yankovsky. Dover, New York, 1963. 413 pp. Illus. Paper, \$2.

Autohesion and Adhesion of High Polymers. S. S. Voyutskii. Translated from the Russian edition by S. Kaganoff. V. L. Vakula, Ed. Interscience (Wiley), New York, 1963. 286 pp. Illus. \$15.

Automatic Control and Computer Engineering. vol. 2. V. V. Solodovnikov, Ed. Translated from the Russian edition (Moscow, 1959) by Tribhuan Prasad. Pergamon, London; Macmillan, New York, 1963. 339 pp. Illus. \$15.

Basic Matrix Algebra and Transistor Circuits. G. Zelinger. Pergamon, London; Macmillan, New York, 1963. 132 pp. Illus. \$6.50.

The Bending and Stretching of Plates. E. H. Mansfield. Pergamon, London; Macmillan, New York, 1964. 160 pp. Illus. \$6.50.

Chemical Aspects of Nuclear Reactors. vols. 1-3. vol. 1, Gas-Cooled Reactors (284 pp. \$11); vol. 2, Water-Cooled Reactors (404 pp. \$15); vol. 3, Miscellaneous Topics (215 pp. \$10). J. K. Dawson and R. G. Sowden. Butterworth, Washington, D.C., 1963. Illus.

The Chemistry of Cationic Polymerization. P. H. Plesch, Ed. Pergamon, London; Macmillan, New York, 1963. 744 pp. Illus. \$30.

Collected Scientific Papers of Wolfgang Pauli. vols. 1 and 2. R. Kronig and V. F. Weisskopf, Eds. Interscience (Wiley), New York, 1964. vol. 1, 1161 pp.; vol. 2, 1422 pp. Illus. Set. \$70.

Combinatorial Geometry in the Plane. Hugo Hadwiger and Hans Debrunner. Translated from the German edition (1955) by Victor Klee. Holt, Rinehart, and Winston, New York, 1964. 123 pp. Illus.

Communication Satellites. G. E. Mueller and E. R. Spangler. Wiley, New York, 1964. 290 pp. Illus. \$10.

Consecutive Chemical Reactions. Mathematical analysis and development. N. M. Rodiguin and E. N. Rodiguina. Translated from the Russian edition by Scripta Technica. Robert F. Schneider, Ed. Van Nostrand, Princeton. N.J., 1964. 146 pp. Illus. \$5.

ConstitutionalProblemsinOrganicChemistry.M.B.WatsonandG.W.Youngson.VanNostrand,Princeton,N.J.,1964.142pp.Illus.\$4.75.



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Coordination Compounds. Dean F. Martin and Barbara B. Martin. McGraw-Hill, New York, 1964. 109 pp. Illus.

Paper, \$1.95; cloth, \$4.95.

Crystallographic Data on Metal and Alloy Structures. Compiled by A. Taylor and Brenda J. Kagle. Dover, New York, 1963. 269 pp. Paper, \$2.25.

Divalent Carbon. Jack Hine. Ronald, New York, 1964. 212 pp. Illus. \$7.

The Dynamics of Real Gases. J. F. Clarke and M. McChesney. Butterworth, Washington, D.C., 1964. 429 pp. Illus.

Electric Waves. Being researches on the propagation of electric action with finite velocity through space. Heinrich Hertz. Translated from the German edition by D. E. Jones. Dover, New York, 1962 (reprint of 1893 edition). 296 pp. Illus. Paper, \$1.75.

Electrons, Atoms, Metals, and Alloys. William Hume-Rothery. Dover, New York, revised ed. 3, 1963. 387 pp. Illus. Paper, \$2.25.

Elements of Astromechanics. Peter Van de Kamp. Freeman, San Francisco, 1964. 148 pp. Illus. Paper, \$2; cloth, \$4.

Elements of Mathematical Logic. Jan Lukasiewicz. Translated from the Polish edition (Warsaw, ed. 2, 1958) by Olgierd Wojtasiewicz. Pergamon, London; Macmillan, New York. 1964. 136 pp. Illus. \$6.50.

Elements of Pulse Circuits. F. J. M. Farley. Methuen, London; Wiley, New York. ed. 2, 1962. 169 pp. Illus. \$3.50.

Equations of Mathematical Physics. A. N. Tikhonov and A. A. Samarskii. Translated from the Russian edition (Moscow, 1953) by A. R. M. Robson and P. Basu. D. M. Brink, Ed. Pergamon, London; Macmillan, New York, ed. 2, 1963. 781 pp. Illus. \$17.50.

Equations of the Mixed Type. A. V. Bitsadze. Translated from the Russian edition (Moscow, 1959) by P. Zador. I. N. Sneddon, Ed. Pergamon, London. Macmillan, New York, 1964. 174 pp. Illus.

Essays on the Theory of Numbers. pt. 1., Continuity and Irrational Numbers; pt. 2, The Nature and Meaning of Numbers. Richard Dedekind. Translated from the German edition by Wooster Woodruff Beman. Dover, New York, 1963 (reprint of English translation, 1901). 121 pp. Illus. Paper, \$1.

Etude Geologique du Carbonifere Brianconnais (Hautes-Alpes). Robert Feys. Editions B.R.G.M., Paris, 1963. 387 pp. Illus. Maps. Paper.

European Miniature Electronic Components Data Annual 1963-64. Including a six-language glossary of electronic components with pictorial and symbolic representations. G. W. A. Dummer and J. Mackenzie Robertson, Eds. Pergamon, London; Macmillan, New York, 1962. 1103 pp. Illus. \$30.

Experimental Spectroscopy. Ralph A. Sawyer. Dover, New York, ed. 3, 1963. 368 pp. Illus. Paper, \$2.

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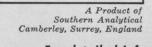
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The Friction and Lubrication of Solids, pt. 2. F. P. Bowden and D. Tabor. Oxford Univ. Press, New York, 1964. 564 pp. Illus. \$13.45.

From Low-Speed Aerodynamics to Astronautics. Theodore von Kármán. Shih I. Pai, Ed. Pergamon, London; Macmillan, New York, 1963. 98 pp. Illus. \$3.75

Fundamentals of Microwave Electronics. V. N. Shevchik. Translated from the Russian edition (Moscow 1959) by L. A. Thompson. W. A. Gambling, Ed. Pergamon, London; Macmillan, New York, 1963. 287 pp. Illus. \$9.50.

Geology of Japan. Fuyuji Takai, Tatsuro Matsumoto, and Ryuzo Toriyama, Eds. Univ. of California Press, Berkeley, 1963. 289 pp. Illus.

Hamiltonian Dynamics. C. W. Kilmister. Wiley, New York, 1964. 156 pp. Illus. Paper, \$4.75.

Handbook of Microwave Measurements. vols. 1–3. Max Sucher and Jerome Fox, Eds. Polytechnic Press, Brooklyn, N.Y., ed. 3, 1963 [order from Interscience (Wiley), New York]. vol. 1, 436 pp.; vol. 2, 403 pp.; vol. 3, 377 pp. Illus, Set, \$40.

A History of Geometrical Methods. Julian Lowell Coolidge. Dover, New York, 1963 (reprint of 1940 ed.). 469 pp. Illus. Paper, \$2.25.

A History of the Mathematical Theories of Attraction and the Figure of the Earth. From the time of Newton to that of Laplace. I. Todhunter. Dover, New York, 1962 (reprint of 1873 ed.). 544 pp. Illus. \$7.50.

Identity and Reality. Emile Meyerson. Translated from the French by Kate Loewenberg. Dover, New York, 1962 (reprint of 1930 ed.). 495 pp. Paper, \$2.25.

Mathematics in Aeronautical Research. K. N. Dodd. Oxford Univ. Press, New York, 1964. 144 pp. Illus. \$3.40.

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Mineralogy and Types of Deposits of Selenium and Tellurium. N. D. Sindeeva. Translated from the Russian edition by the Geochemical Society Translation Committee. Interscience (Wiley), New York, 1964. 379 pp. Illus. \$13.50.

Molten Salt Chemistry. Milton Blander, Ed. Interscience (Wiley), New York, 1964. 785 pp. Illus. \$25.

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Progress in Applied Mechanics. The Prager anniversary volume. Macmillan, New York, 1963. 398 pp. Illus.

Progress in Ceramic Science. vol. 3. J. E. Burke, Ed. Pergamon, London; Macmillan, New York, 1963. 270 pp. Illus. \$12. Four papers "Crystallographic aspects of some decomposition and re-

crystallization reactions," G. W. Brindley; "Current status of the Griffith crack theory of glass strength," F. M. Ernsberger; "Electric conduction and dielectric relaxation in glass," A. E. Owen; "Sintering in ceramics," R. L. Coble and I. F. Burke.

Progress in Chemical Toxicology. vol. 1. Abraham Stolman, Ed. Academic Press, New York, 1963. 450 pp. Illus. \$14. Eleven papers: "Isolation and separation techniques for identification of poisons," H. C. Freimuth; "Application of gas chromatography to toxicology," L. R. Goldbaum, Eugene L. Schloegel, and Abel M. Dominguez; "Aliphatic alcohols," R. N. Harger and Robert B. Forney; "Acidic and neutral poisons," A. S. Curry; "Ataraxics and nonbarbiturate sedatives," A. J. McBay and Elvera J. Algeri; "The determination of antiarthritics, antihistamines, and thymoleptics," F. Rieders; "Narcotics and related bases," by C. G. Farmilo and K. Genest; "Toxicity of air pollutants," by M. Feldstein; "Analytical methods for air pollutants," M. Feldstein; "Poisonous mushrooms," V. E. Tyler, Jr.; "Poisonous seeds and fruits," by A. E. Schwarting.

Progress in Nuclear Physics. vol. 9. O. R. Frisch, Ed. Pergamon, London; Macmillan, New York, 1964. 316 pp. Illus. \$15. Six papers: "Spark chambers," J. G. Rutherglen; "Semiconductor counters," G. Dearnaley; "Theoretical techniques of high-energy beam design," N. M. King; "Introduction to the structure analysis of collision amplitudes," R. J. Eden; "The interaction of strange particles with nuclei," E. H. S. Burhop, D. H. Davis, and J. Zakrzewski; "Electromagnetic properties of the Muon," F. J. M. Farley.

Progress in Oceanography. vol. 1. Mary Sears, Ed. Pergamon, London; Macmillan, New York, 1963. 391 pp. Illus. \$15. Five papers: "Geological investigation of near-shore sand-transport," E. Seibold; "Electrification of the atmosphere," by D. C. Blanchard; "Suspended organic matter in sea water," T. R. Parsons; "The salinity problem," R. A. Cox; and "Gulf stream '60," F. C. Fuglister.

Properties and Applications of Transistors. J. P. Vasseur. Translated from the French edition by D. E. Radley and J. R. Garrood. Pergamon, London; Macmillan, New York, 1964. 462 pp. Illus. \$15.

New York, 1964. 462 pp. Illus. \$15.

Regge Poles and S-Matrix Theory.

Steven C. Frautschi. Benjamin, New
York, 1963. 208 pp. Illus. Paper, \$3.95;
cloth, \$7.50.

Rocket Propellant and Pressurization Systems. Elliot Ring, Ed. Prentice-Hall, Englewood Cliffs, N.J., 1964. 320 pp. Illus. \$13.

The Scattering of Electromagnetic Waves from Rough Surfaces. Petr Beckmann and Andre Spizzichino. Pergamon, London; Macmillan, New York, 1963. 511 pp. Illus. \$15.

A Short Course in Differential Equations. Earl D. Rainville. Macmillan, New York, ed. 3, 1964. 318 pp. Illus. \$5.95.

The Smelting of Ferroalloys in the Blast Furnace Using Oxygen-Enriched Blast. A collection of articles. L. M. Tsylev, Ed. Translated from the Russian edition (Moscow, 1959) by C. M. Burnell.

H. T. Protheroe, Ed. Pergamon, London; Macmillan, New York, 1963. 181 pp. Illus. \$9.75.

The Theory of Mathematical Machines. Yu. Ya. Bazilevskii, Ed. Translated from the Russian edition (Moscow, 1958) by C. A. R. Hoare. J. M. Jackson, Ed. Pergamon, London; Macmillan, New York, 1963. 274 pp. Illus. \$10.

Theory of Spin Relaxation. W. J. Caspers. Interscience (Wiley), New York, 1964. 172 pp. Illus. \$9.75.

Theory of the Motion of the Heavenly Bodies Moving About the Sun in Conic Sections. Karl Friedrich Gauss. Translated from the German edition by Charles Henry Davis. Dover, New York, 1963 (reprint of the 1857 edition). 344 pp. Illus. Paper, \$2.95.

Thermodynamic Assessment of Rocket Engines. B. A. Nikolayev. Translated from the Russian edition (Moscow, 1960) by W. E. Jones. B. P. Mullins, Ed. Pergamon, London; Macmillan, New York, 1963. 168 pp. Illus. \$9.50.

General

Accelerators of Charged Particles. B. S. Ratner. Translated from the Russian edition (Moscow, 1960) by L. A. Fenn. H. W. Curtis, Ed. Pergamon, London; Macmillan, New York, 1964. 128 pp. Illus. \$3.50. A popularization for readers with "no specialized background."

American Drug Index, 1964. Charles O. Wilson and Tony Everett Jones. Lippincott, Philadelphia, Pa. 1964. 782 pp. \$6.75.

The American People: A Study in National Character. Geoffrey Gorer. Norton, New York, ed. 2, 1964. 267 pp. \$4.50. The main body of the book has been slightly revised (by footnotes), and the author has added a postscript (pp. 247–267).

The A.T.A. Manual of Laboratory Animal Practice and Techniques. Douglas J. Short and Dorothy P. Woodnott, Eds. Thomas, Springfield, Ill., 1963. 360 pp. Illus. \$9.75.

Beyond Time. Michel Siffre. Translated from the French by Herma Briffault. McGraw-Hill, New York, 1964. 228 pp. Illus. \$5.95.

Blueprint for Life. The story of modern genetics. Julius Fast. St. Martin's Press, New York, 1964. 218 pp. Illus. \$5.

Cosmetic Science, 1962. Proceedings, second congress, International Federation of Societies of Cosmetic Chemists (London) 1962. A. W. Middleton, Ed. Pergamon, London; Macmillan, New York, 1963. 286 pp. Illus. \$12.50.

Georges Cuvier, Zoologist. A study in

Georges Cuvier, Zoologist. A study in the history of evolution theory. William Coleman. Harvard Univ. Press, Cambridge, Mass., 1964. 224 pp. Illus. \$4.75.

Charles Darwin. Evolution by natural selection. Gavin de Beer. Doubleday, Garden City, N.Y., 1964. 302 pp. \$4.95.

Dictionary of Architecture and Building Trades. In four languages: English, German, Polish, and Russian. A. Zboinski and L. Tyszynski, Eds. Pergamon, London; Macmillan, New York, 1963. 498 pp. \$20.

Earthquakes and Earth Structure. John H. Hodgson. Prentice-Hall, Englewood Cliffs, N.J., 1964. 176 pp. Illus. Paper, \$3.95.



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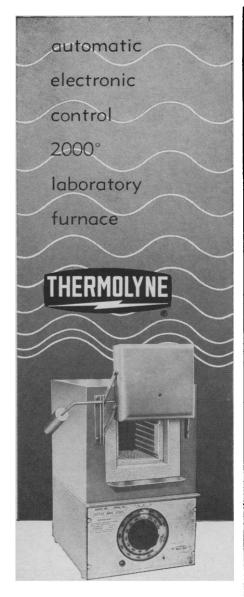
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Episodes from the Early History of Mathematics. Asger Aaboe. Random House, New York, 1964. 143 pp. Illus. Paper, \$1.95; cloth, \$2.95.

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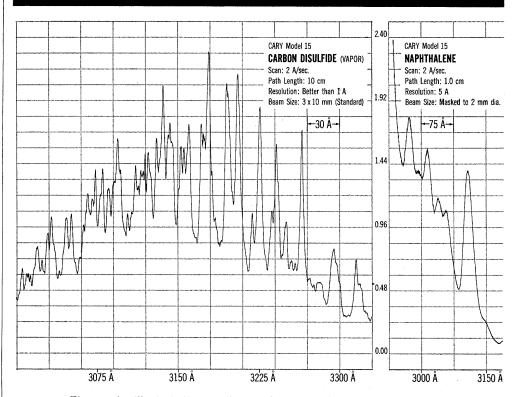
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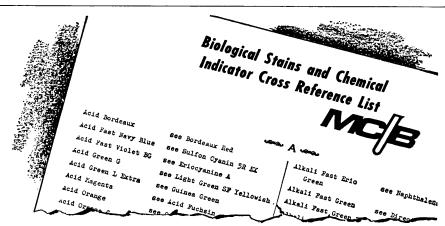


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