Plant Chemistry: Techniques and Results

The Chlorophylls (Leo P. Vernon and Gilbert R. Seely, Eds. Academic Press, New York, 1966. 695 pp., illus. $25) goes far beyond the expectations induced by the title. This excellent book not only covers the isolation, identification, quantitative determination, chemistry, and spectroscopy of isolated chlorophylls and their derivatives; it also discusses their state in live cells and their functions in the partial reactions of photosynthesis. In this way it brings important parts of Rabinowitch's *Photosynthesis* (1945–1956) up to date. As well as providing clear views of many aspects of the subject, it contains enough data to qualify as a reference handbook. The efforts of 22 well-known authors are well coordinated to give an authoritative survey of wide scope. The book contains 19 chapters and has both author and subject indexes. The major divisions are: Isolation and Chemistry, Physical Properties in Solution and in Aggregates, State of the Chlorophylls in the Cell, and Photochemistry and Photophysics.

J. M. Olsen describes the isolation, crystallization, and characterization of the water-soluble chlorophyll-protein complex from green bacteria. The insolubility of the native chlorophyll complexes of mature green plants still prevents a comparable study of their chlorophyll complexes, and the state of chlorophyll in leaves and algae has therefore been studied indirectly, largely by spectroscopy. Such work is thoroughly surveyed by J. C. Goedheer and by W. L. Butler. In addition, N. K. Boardman writes about protochlorophyll, which is nearly as well characterized as the green-bacteria complex and is more similar to the chlorophyll complexes of higher plants.

Applications of different kinds of spectroscopy to the isolated chlorophylls and to the photosynthetic pigments in their native state, including chloroplasts, chloroplast fractions, live plants, and photosynthetic bacteria, are well presented. The various methods and results discussed include conventional absorbance spectroscopy in the visible, ultraviolet, and infrared regions, as well as derivative absorbance, absorbance changes induced by light, fluorescence and phosphorescence emission, electron paramagnetic resonance, nuclear magnetic resonance, and optical rotatory dispersion.

The book as a whole, and particularly the chapter by Vernon and Ke on "Photochemistry of chlorophyll *in Vivo*," shows how the photochemistry of isolated chlorophylls, here discussed by Seely, is now becoming applicable to the study of actual photosynthesis in live plants. This book represents an extraordinarily valuable achievement; subjects that until recently were separated from each other by terminology and by the contrasting outlooks of the pure chemists and physicists on one side of the fence and of the biologists dealing with intact organisms on the other side now overlap. Only a few years ago it did not appear likely that such convergence could come about so rapidly.

The effective investigation of photosynthesis now requires working familiarity with at least the basic concepts of chlorophyll photochemistry and several branches of chemical physics. This detailed presentation of modern chemistry and spectroscopy of plant pigments will be extremely useful, not only to specialists in these areas but also to those investigators trained in earlier approaches to biological problems and now faced with the newer concepts. The book is essential for all investigators of photosynthesis as well as of chlorophyll chemistry.

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New Books

Agricultural Anhydrous Ammonia: Technology and Use. Proceedings of a symposium (St. Louis, Mo.), September 1965. Sponsored by the Agricultural Ammonia Institute, American Society of Agronomy, and the Soil Science Society of America. Malcolm H. McVickar, W. P. Martin, Ivan E. Miles, and H. H. Tucker, Eds. American Soc. of Agronomy, Madison, Wis., 1966. 330 pp. Illus. $6. There are 17 papers.

Kinetic Equations of Gases and Plasmas. Ta-You Wu. Addison-Wesley, Reading, Mass., 1966. 304 pp. Illus. $12.50. Addison-Wesley Series in Advanced Physics.

Kirk-Othmer Encyclopedia of Chemical Technology. vol. 10. *Food Additives to Heterocyclic Compounds*. Herman F. Mark, John J. McKetta, Jr., and Donald F. Othmer, Eds. Interscience (Wiley), New York, ed. 2, 1966. 952 pp. Illus. $50; subscription, $40.

Linear and Multilinear Algebra. Ralph Abraham. Benjamin, New York, 1966. 115 pp. Illus.

Mathematical Methods in the Physical Sciences. Mary L. Boas. Wiley, New York, 1966. 800 pp. Illus. $11.95.

Measure and the Integral. Henri Lebesgue. Translated from the French by Scripta Technica. Kenneth O. May, Translation Ed. Holden-Day, San Francisco, 1966. 206 pp. Illus. $7.65. The Mathesis Series.

Methods of the Theory of Functions of Many Complex Variables. Vasiliy Sergeyevich Vladimirov. Translated from the Russian edition (Moscow, 1964) by Scripta Technica. Leon Ehrenpreis, Translation Ed. M.I.T. Press, Cambridge, Mass., 1966. 365 pp. Illus. $12.

Microwave Breakdown in Gases. A. D. MacDonald. Wiley, New York, 1966. 211 pp. Illus. $7.95.

The Oxidation of Cyclohexane. I. V. Berezin, E. T. Denisov, and N. M. Emanuel'. Translated from the Russian edition (Moscow, 1962) by K. A. Allen. Pergamon, New York, 1966. 304 pp. Illus. $15.

Plastics as Corrosion-Resistant Materials. V. Evans. Pergamon, New York, 1966. 235 pp. Illus. Paper, $4.50. The Commonwealth and International Library.

PL/I Programming Primer. Gerald M. Weinberg. McGraw-Hill, New York, 1966. 288 pp. $5.95.

Precision Gearing: Theory and Practice. George W. Michalec. Wiley, New York, 1966. 638 pp. Illus. $23.50.

Principles of Geochemistry. Brian Mason. Wiley, New York, ed. 3, 1966. 341 pp. Illus. $9.95.

Principles of Statistics. M. G. Bulmer. M.I.T. Press, Cambridge, Mass., 1966. 222 pp. Illus. $7.50.

The Science of Weather. John A. Day. Addison-Wesley, Reading, Mass., 1966. 224 pp. Illus. $6.95.

Set Theory and Logic. Abraham A. Fraenkel. Addison-Wesley, Reading, Mass., 1966. 110 pp. Illus. $7.50. Addison-Wesley Series in Logic.

Solid State and Semiconductor Physics. John P. McKelvey. Harper and Row, New York, 1966. 526 pp. Illus. $13.75. Harper's Physics Series.

Special Purpose Transistors: A Self-Instructional Programmed Manual. Federal Electric Corporation. Prentice-Hall, Englewood Cliffs, N.J., 1966. 141 pp. Illus. $9.

Spectrochemical Abstracts. vol. 11, *1964–1965*. Ernest H. S. van Someren, F. Lachman, and F. T. Birks. Hilger and Watts, London, 1966. 102 pp. Paper, 63s.

Spectroscopic Gas Temperature Measurement: Pyrometry of Hot Gases and Plasmas. Richard H. Tourin. Elsevier, New York, 1966. 151 pp. Illus. $10.75. Fuel and Energy Series.

Spot Tests in Organic Analysis. Fritz Feigl. Translated by Ralph E. Oesper. Elsevier, New York, ed. 7, 1966. 796 pp. Illus. $30.

Stochastic Processes. M. Girault. Springer-Verlag, New York, 1966. 138 pp. Illus. $7.

The Strength, Fracture, and Workability of Coal. Ivor Evans and C. D. Pomeroy. Pergamon, New York, 1966. 287 pp. Illus. $10.