statics and static stability, scalar and graphical analysis, cross-section analysis, isobaric analysis, and a short treatment of isentropic analysis. The chapter "Analysis of the surface chart" appears to be rather brief but, as pointed out by the author, most of the concepts of surface analysis have been covered in earlier sections. The chapter is devoted to pressure patterns, pressure tendencies, and fronts and associated weather. Chapter 10 presents kinematic analysis in a comprehensive manner, covering streamlines, air trajectories, and the properties of motion of a wind field. The book concludes with short chapters on analysis of large-scale weather patterns in middle and high latitudes, of local weather, and of tropical weather.

The book is well illustrated, although a few of the maps suffer from too great a reduction in size. An appendix contains several useful tables and charts. Reading references in standard meteorological works, which are listed at the end of each chapter, are supplemented by extensive footnote references to the literature. The double-column format permits a large manuscript to be published in a compact volume without reduction of readability.

Saucier has successfully combined into one volume both meteorological fundamentals and practical aspects of synoptic weather analysis. This book should prove useful as a textbook for students of meteorology, whereas those who seek a ready reference on how to draw a weather map would do well to look elsewhere.

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Solar Energy Research. Farrington Daniels and John A. Duffie, Eds. Univ. of Wisconsin Press, Madison, 1955. xv + 290 pp. Illus. + plates. $4.

This book, the first in the United States, may also be a milestone in accelerated efforts to utilize solar energy. It is not an organized textbook but a compendium of articles presented at a symposium on solar energy in Madison, Wisconsin, in September 1953. About 30 scientists participated, exchanging informal talks about the possibilities of using solar energy. Their papers cover most of the possible fields including: expected world energy demands, the nature and availability of solar energy, space heating and domestic uses of solar energy, solar power, solar evaporation and distillation, atmospheric phenomena, conversion of solar to electric energy, solar furnaces, photosynthetic utilization of solar energy, photochemical utilization of solar energy, a British viewpoint, miscellaneous applications of solar energy, and suggestions for further research.

The presentation is not homogeneous. Some of the articles are merely short abstracts. Others are highly technical. A few are interesting reading for the layman. There is a general trend that is shared by most authors; they all stress the need for further research and for funds that will make research possible. Relatively few articles express pessimism about the technical or economical limitations of the use of solar energy.

The book is a "must" reader for all those who are attracted to the pioneering prospect of capturing the sun's energy. There is ample reference to the scattered literature of the subject and a list of patents that have been issued in the United States. The book is a storehouse of ideas that may be developed through research, which it will doubtless stimulate.

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Determination of Organic Structures by Physical Methods. E. A. Braude and F. C. Nachod, Eds. Academic Press, New York, 1955. xiii + 810 pp. Illus. $15.

The ever-increasing use of physical methods for the determination of the molecular structures of organic substances has greatly altered the character of organic chemical research during the past two decades. The present book is intended to be an authoritative and comprehensible survey of the various physical methods of structural analysis, each given in sufficient theoretical and practical detail to acquaint a nonspecialist with its scope and limitations. Seven of the book's 22 authors are British, one is Swedish, and the remainder are American. The 16 chapters comprising the book are grouped into three parts: part I is concerned with the determination of molecular size, part II with molecular pattern, and part III with molecular fine structure.

In Chapter 1, entitled "Phase properties of small molecules," H. F. Herbrandson and F. C. Nachod discuss various correlations of melting point, boiling point, molar volume, and parachor with molecular size and structure. Their discussion of mixed melting points is especially good. Chapter 2 by P. Johnson deals with the determination of molecular weights, dimensions and shapes of macromolecules by techniques involving the measurement of osmotic pressure, sedimentation equilibrium and velocity, diffusion rate, and viscosity. The omission of the more recently developed light-scattering technique from this otherwise excellent chapter is to be regretted.

Part II begins with a chapter by W. Klyne on the use of optical rotation in the determination of molecular configuration. The present treatment of this topic is considerably more detailed than another given by the same author in collaboration with J. A. Mills that has very recently appeared elsewhere [*Progress in Stereochemistry,* vol. *1,* W. Klyne, Ed. (Academic Press, New York, 1954), pp. 204–215], although a good deal of repetition is inevitable. Chapter 4 by Braude deals with absorption spectroscopy in the ultraviolet and visible regions. I question the value (and validity) of the grossly oversimplified explanations of electronic transitions with valence bond notation. (For example, the B_{2u} excitation of benzene is explained as a transition between Kekulé structures.)

In Chapter 5, R. C. Gore discusses the instrumentation, theory, and application of infrared spectroscopy to micromolecular substances. A special section of this chapter by E. S. Waight is concerned with the infrared spectroscopy of macromolecular substances. The chapter is distinguished by the emphasis that it places on the uses of polarized radiation. There has existed for some time a need for a substantial yet comprehensible exposition of the theory and uses of Raman spectroscopy and magnetic susceptibility. Chapter 6 by F. F. Cleveland and Chapter 7 by C. A. Hutchison, Jr., are devoted to these topics, but in my opinion they do not fulfill the need. Admittedly, the subjects are highly complex, but skillful writers with due regard for the limitations of their readers should do more than leave one with an impression of the complexities of their subjects.

Part III is introduced with a chapter by E. Stenhagen on the use of surface films in the elucidation of molecular structures. This is followed by a chapter written by L. E. Sutton on the theory and application of dipole moment measurements. Sutton is to be commended for the freshness and clarity he brings to the subject. Chapter 10 by J. Karle and I. L. Karle deals with electron diffraction, while Chapter 11 by J. M. Robertson deals with x-ray diffraction. Both of these chapters achieve their objectives. In the ensuing chapter, E. B. Wilson, Jr., and D. R. Lide, Jr., present a very welcome discussion of the newest spectroscopy—microwave spectroscopy. Then follows a chapter by J. G. Aston on thermodynamic properties and their use in the investigation of molecular structure. Aston has taken serious liberties with the term *isomer* and uses it interchangeably with the term *conformation* or, as he sometimes prefers, *conformer!*

Chapter 14 by H. C. Brown, D. H. McDaniel, and O. Häfliger constitutes, in my opinion, one of the book's highlights. The chapter contains perhaps the most complete compilation of acid and base dissociation constants in the literature, and the writers skillfully employ these data in their presentation of contemporary stereoelectronic theories. The major defect of the chapter is its slighting of entropy effects, whch are only briefly mentioned. The use of reaction kinetics in structural problems is discussed by Braude and L. M. Jackman in Chapter 15. I believe it would have been improved by a more thorough examination of the problem of molecularity and kinetic order of reaction.

The final chapter is by C. A. Coulson and deserves special praise for its conciseness and clarity. Its subject is the application of wave mechanics to structural problems: specifically it treats the topics of aromacity and bond order in a descriptive way from the viewpoints of both the valence bond and the molecular orbital methods of approximation. The ideas put forward here should stimulate research in a number of new directions.

With few exceptions, the book succeeds admirably in its objectives. A compilation of this sort always presents serious problems from an editorial point of view, and in general they have been adequately solved by the editors. It would have been better, however, to have chosen either the symbol F or G for the free energy function rather than to use both symbols for the same function in different chapters of the book (pp. 257, 667). With two exceptions (p. 206, last paragraph; p. 224, line 4), the proof has been carefully read. Only one typographic error has come to my attention (naphthalene in Fig. 4.5).

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Magnetic Materials in the Electrical Industry. P. R. Bardell. Philosophical Library, New York, 1955. xiv + 288 pp. Illus. + plates. $10.

This book is an introduction to the design of apparatus that depends primarily on the magnetic properties of materials. The presentation naturally calls for a careful description of the magnetic materials available, and the first half of the book is devoted to this subject, including a chapter on the theory of magnetic behavior.

As far as I am aware, this is the only book that gives materials and design equal amounts of space in exposition, and for this reason it is an important forward step in bringing together two essentially related subjects. It thus appears to be well adapted for use as an introductory textbook. As is indicated by the size of the book, the amount of material is limited, and other publications should be consulted for information regarding both materials and design. A larger bibliography would have been useful for this purpose.

The applications that are discussed include power transformers and chokes, direct-current machines, relays, communication transformers and cores, magnetic recording, magnetic amplifiers, electromagnetic and magnetostrictive transducers, and a number of instruments, including magnetrons, that depend on the use of permanent magnets. The uses of magnetic materials in the relatively new fields of the storage of information and of microwave transmission are not covered.

The centimeter-gram-second system of units is used throughout. It is difficult to see how this kind of book could approach its present usefulness if the millimeter-kilogram-second system had been used.

Although the book is written primarily for English students, it is equally well adapted to Americans. The style is simple and clear. References to articles and books for further reading could well have been enlarged, and a longer index would have been more useful. The number of illustrations, about 1.7 per page, is more than average and is a welcome aid in presentation. The price of $10 seems rather high for a book of under 300 pages.

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Books Reviewed in The Scientific Monthly, February

Augustine to Galileo, A. C. Crombie (Harvard Univ. Press). Reviewed by M. Brodbeck.

Science in Our Lives, R. Calder (Michigan State College Press; New American Library). Reviewed by P. Le Corbeiller.

Early American Science, Whitfield J. Bell, Jr. (Inst. of Early American History and Culture, Williamsburg, Va.). Reviewed by J. Oppenheimer.

Ethical Judgment, A. Edel (Free Press). Reviewed by S. C. Pepper.

Current Trends in Psychology and the Behavioral Sciences, J. T. Wilson, C. S. Ford, B. F. Skinner, G. Bergmann, F. A. Beach, F. Pribram (Univ. of Pittsburgh Press). Reviewed by R. W. Gerard.

Politics and Science, W. Esslinger (Philosophical Library). Reviewed by B. Glass.

Charles Darwin: a Great Life in Brief, R. Moore (Knopf). Reviewed by B. Glass.

How to Know the Fresh-Water Algae, G. W. Prescott; H. E. Jaques, Ed. (Brown, Dubuque, Iowa). Reviewed by W. R. Taylor.

Careers and Opportunities in Science, P. Pollack (Dutton). Reviewed by H. A. Meyerhoff.

Bird Navigation, G. V. T. Matthews (Cambridge Univ. Press). Reviewed by J. G. Pratt.

Psychoanalysis and the Education of the Child, G. H. J. Pearson (Norton). Reviewed by P. S. Sears.

Introduction to Theoretical Organic Chemistry, P. H. Hermans (Elsevier). Reviewed by C. Walling.

Culture and Human Fertility, F. Lorimer (UNESCO, Paris; distr. by Columbia Univ. Press, New York). Reviewed by I. B. Taeuber.

The Story of Medicine, K. Walker (Oxford Univ. Press). Reviewed by I. Galdston.

Highway to the North, F. Illingworth (Philosophical Library). Reviewed by F. Rainey.

Poissons. IV. Téléostéens Acanthoptérygiens, M. Poll (Institut Royal des Sciences Naturelles de Belgique). Reviewed by J. W. Hedgpeth.

Africa Today, G. G. Hames, Ed. (Johns Hopkins Press). Reviewed by H. T. Straw.

New Books

Men, Rockets and Space Rats. Lloyd Mallan. Messner, New York, 1955. 335 pp. $5.95.

Travels and Traditions of Waterfowl. H. Albert Hochbaum. Univ. of Minnesota Press, Minneapolis, 1955. 301 pp. $5.

You and the Atom. Gerald Wendt. Whiteside; Morrow, New York, 1956. 96 pp. $1.95.

Alloy Series in Physical Metallurgy. Morton C. Smith. Harper, New York, 1956. 338 pp.

Science in Action. vol. 1, *TV Library.* Benjamin Draper, Ed. California Acad. of Sciences, San Francisco, and Merlin Press, New York, 1956. 157 pp. $3.50.

Chemical Engineering. vol. 2, *Unit Operations.* J. M. Coulson and J. F. Richardson. McGraw-Hill, New York; Pergamon, London, 1955. 975 pp. $9.

Fundamentals of Electroacoustics. F. A. Fischer. Trans. by Stanley Ehrlich and Fritz Pordes. Interscience, New York–London, 1955. 186 pp. $6.

Yoga Dictionary. Ernest Wood. Philosophical Library, New York, 1956. 178 pp. $3.75.

Combustion Processes. vol. II, *High Speed Aerodynamics and Jet Propulsion.* B. Lewis, R. N. Pease, and H. S. Taylor, Eds. Princeton Univ. Press, Princeton, N.J., 1956. 662 pp. $12.50.

Quantitative Bacterial Physiology Laboratory Experiments. Michael J. Pelczar, Jr., P. Arne Hansen, and Walter A. Konetzka. Burgess, Minneapolis 15, 1955. 150 pp. $2.75.

Proceedings of the International Conference on the Peaceful Uses of Atomic Energy. Held in Geneva, 8–20 August 1955. vol. 3, *Power Reactors.* United Nations, New York, 1955. 389 pp. $7.50.