

fraction by single crystals. Most readers of this review will not find themselves in this category, so I offer this much abbreviated background:

Our present-day understanding of the solid state comes fundamentally from our knowledge of the arrangements of atoms in crystals, and this is provided chiefly from studies of crystals by their diffraction of x-rays. There is a straightforward relation between the characteristics of the diffraction and the arrangement of atoms producing it, so that, if the first is known, the second can be routinely deduced. Unfortunately, the only part of the diffraction of crystals which is observable is the amplitudes of the reflections; the phases are not observable. If a crystal structure is to be deduced from diffraction data, the phases of these reflections (or their equivalent) must be supplied. This book is concerned with the theory of how to do this. For crystals having a center of symmetry the phases reduce to 0 or π , and this is equivalent to attributing a sign + or - to the amplitude of the reflection.

Fortunately, in 1947 David Harker (one of the translators of this book) and J. S. Kasper showed that relations exist between the set of diffraction amplitudes and their signs. Many contributors have added to this initial discovery, notable among them the author of this volume, Kitaigorodskii. His book is a systematic and integrated treatment of the whole subject, from his own point of view. This occupies six chapters and covers some 270 pages.

After developing the general background of the subject, the author comes, in chapter 4, to his favorite treatment, the application of the Gram determinant. This has useful properties for the problem of sign determination, because this determinant cannot be negative. From this determinant another, whose elements are the amplitudes, may be derived, which must have a value greater than, or equal to, zero. Inequalities useful in sign determination can be deduced from this. Chapter 4 really represents the core of the book, and it gives the reader an insight into the author's point of view in crystal-structure analysis.

Chapter 5 deals with the Patterson synthesis. This is treated in an illuminating analytical fashion. Nevertheless, since the subject is really concerned with geometry, the analytical treatment leaves a good deal which must be geometrically imagined.

This book is a valuable addition to the literature of crystal-structure analysis; those who work in this field will be glad to have this integrated treatment of phase determination. The translators are to be congratulated for making this difficult subject available in easily read English. The printing is by photography from typescript, so that there are places where the equations appear a little awkward and a few other places where the typescript appears to have been smudged.

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Climates of the Past

Descriptive Palaeoclimatology. A. E. M. Nairn, Ed. Interscience, New York, 1961. xi + 380 pp. Illus. \$11.

The contents of this important volume include an essay on the scope of paleoclimatology (by Nairn, who is also the editor), an article on the fundamentals of climate (by H. H. Lamb), eight articles (by G. Y. Craig, R. F. Flint, Robert Green, R. Kräusel, Nairn, N. D. Opdyke, A. S. Roemer, N. Thorley, and F. B. Van Houten) appraising the various kinds of evidence (desert sandstones, evaporites, evidences of cold climates, geophysics, vertebrates, invertebrates, and plants) that can be used in attempting paleoclimatological interpretations, and four articles (by E. D. Gill, L. C. King, T. Kobayashi and T. Shikama, and M. Schwarzbach) on the sequence and kinds of past climates for various areas.

The volume is well documented and has a list of references for each article (in all there are nearly 1250 references). These will be of immeasurable value as guides to more detailed information, while the appraisals will be significant guides for future studies.

Nairn unsuccessfully attempts to establish and maintain an attitude of critical and impartial evaluation of all possible evidence and interpretations. In the interpretive section the consideration of the southern continents and India under the Gondwanaland concept, and the unit treatment accorded North America and Europe, introduce, in the first case, a bias towards continental drift, and in the second, a bias towards permanency of relative position.

With respect to the controversy over

the permanency of the continents and ocean basins, four articles favor "drift," two are opposed, and two favor "polar wandering." A truly impartial attitude is maintained in only five of the articles.

The article on the fundamentals of climate is well written and is a "must" for one who desires to consider the causes and effects of past climates. However, in view of the controversy over "continental drift," it would appear that an examination of the probable changes in atmospheric and oceanic circulation resulting from the "drift" and "polar wandering" concepts would have been a profitable addition. No matter what his philosophy, each reader will disagree with some of the contributions describing the paleoclimates of different parts of the earth, for each author represents a different viewpoint.

One final comment: the title of the volume is *Descriptive Palaeoclimatology*. In my opinion only the last four contributions, occupying just slightly over one-fourth of the book, fit the title. A simple "Palaeoclimatology" would have been better.

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Aircraft Materials

Metallic Fatigue. W. J. Harris. Pergamon, New York, 1961. xi + 331 pp. Illus. \$12.50.

This is an excellent engineering review of fatigue in commercial metals and alloys with very special emphasis on aircraft materials. The author borrows very heavily from his experiences at the de Havilland Aircraft Company of Great Britain, as evidenced by the fact that by far the majority of data quoted and illustrated appear to have originated from the de Havilland laboratories.

The author covers, in a lucid manner, the problems of stress concentration in fatigue and considers the various ways of improving the fatigue life, such as by shot peening, tensile prestretching, and other novel techniques. A special chapter is devoted to the role of frequency on fatigue. The role of corrosion on fatigue is briefly covered, and a well-documented chapter is devoted to fretting ("rubbing") fatigue.

Crack propagation and the philosophy of "safe-life" and "fail-safe" design are

covered in a special chapter. A short section is devoted to the statistical nature of fatigue. A 50-page chapter deals with a description of some current standard aircraft processes and their relation to fatigue life.

All in all, the book appears well written and the figures are well illustrated and clearly documented. The author has written from the viewpoint that the reader already knows about the elementary aspects of fatigue, and therefore the book would not be well suited for the "uninitiated" researcher or student. Extensive references are listed at the end of each chapter and seem to be complete up to the year 1956. Very few papers are quoted beyond that year.

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New Books

Biological and Medical Sciences

The Cell. Biochemistry, physiology, morphology. vol. 2, *Cells and Their Component Parts*. Jean Brachet and Alfred E. Mirsky, Eds. Academic Press, New York, 1961. 929 pp. Illus. \$25.

Electrophysiological Methods in Biological Research. J. Bures, M. Petran, and J. Zachar, Eds. Publishing House of the Czechoslovak Acad. of Sciences, Prague; Academic Press, New York, 1960. 515 pp. Illus. \$15.

Etudes d'endocrinologie. pt. 1, *Les gonadotropines*; pt. 2, *Rapports entre le complexe hypothalamo-hypophysaire et la fonction adrénocorticotrope*. Hermann, Paris, 1961. 350 pp. Illus. Séminaires 1960 de la chaire de morphologie expérimental et endocrinologie du Collège de France dirigés par le Professeur Robert Courrier.

Fish as Food. vol. 1, *Production, Biochemistry, and Microbiology*. Georg Borgstrom, Ed. Academic Press, New York, 1961. 741 pp. Illus. \$24.

General

Anatomy of the Future. Roderick Siedenbergh. Univ. of North Carolina Press, Chapel Hill, 1961. 173 pp. \$3.50.

Darwinism and the Study of Society. A centenary symposium. Michael Banton, Ed. Tavistock, London; Quadrangle Books, Chicago, Ill., 1961. 211 pp. \$5. Contributions by Michael Banton, S. A. Barnett, Tom Burns, B. Farrington, Morris Ginsbert, Lancelot Hogben, George Shepperson, J. Maynard Smith, W. Stark, C. H. Waddington, and Basil Willey.

Educators Guide to Free Films. Mary Foley Horkheimer and John W. Diffor, Eds. Educators Progress Service, Randolph, Wis. ed. 21, 1961. 646 pp. \$9.

Essay on Atomism. From Democritus to 1960. Lancelot Law Whyte. Wesleyan

Univ. Press, Middletown, Conn., 1961. 108 pp. \$2.95.

Fabric of Freedom 1763-1800. Esmond Wright. Hill and Wang, New York, 1961. 311 pp. \$4.50.

Growing Old. The process of disengagement. Elaine Cumming and William E. Henry. Basic Books, New York, 1961. 309 pp. \$6.75.

Management Games. A new technique for executive development. Joel M. Kibbee, Clifford J. Craft, and Burt Nanus. Reinhold, New York; Chapman and Hall, London, 1961. 359 pp. Illus. \$10.

Marriage and the Family. Alfred McClung Lee and Elizabeth Briant Lee. Barnes and Noble, New York, 1961. 396 pp. Paper, \$2.25.

Michael Faraday. A list of his lectures and published writings. Alan E. Jeffreys. Published for the Royal Institution of Great Britain. Academic Press, New York; Chapman and Hall, London, 1960. 114 pp. Illus.

The Mystery of Life. Arnold M. Ludwig. Thomas, Springfield, Ill., 1961. 158 pp. \$5.75.

Mythologies of the Ancient World. Samuel Noah Kramer, Ed. Quadrangle Books, Chicago, Ill., 1961. 480 pp. \$7.50.

The Nature of Genius. Andrew Gemant. Thomas, Springfield, Ill., 1961. 216 pp. \$6.50.

Nuclear Physics in Peace and War. Peter E. Hodgson. Hawthorn, New York, 1961. 156 pp. \$3.50.

A Patent Manual for Scientists and Engineers. George M. Naimark. Thomas, Springfield, Ill., 1961. 123 pp. \$5.50.

Patients' Views of Medical Practice. Eliot Freidson. Russell Sage Foundation, New York, 1961. 268 pp. Illus. \$3.75.

Proceedings of the Natural Rubber Research Conference, Kuala Lumpur, 1960. Rubber Research of Malaya, Kuala Lumpur, Selangor, Federation of Malaya, 1961. 1015 pp. Illus.

A Report to the National Academy of Sciences-National Research Council from the USA National Committee of the International Scientific Radio Union. On the 13th General Assembly, 5-15 September 1960, London, England. Publ. 880. John P. Hagen, Ed. Natl. Acad. of Sciences-Natl. Research Council, Washington, D.C., 1961. 595 pp. Illus. \$5. Discussion of the status and problems of radio science.

The Slow Learner in the Classroom. Newell C. Kephart. Merrill Books, Columbus, Ohio, 1960. 303 pp. Illus. + plate.

Technical Report Writing. Fred H. Rhodes. McGraw-Hill, New York, ed. 2, 1961. 175 pp. Illus. \$5.50.

Toward the Conquest of Cancer. O. A. Battista. Chilton, Philadelphia, Pa., 1961.

Mathematics, Physical Sciences, and Engineering

Absorption Spectra in the Ultraviolet and Visible Region. L. Lang, Ed. Academic Press, New York, 1961. 414 pp. Ring binder, \$18.

International Conference on Theoretical Aspects of Very High-Energy Phenomena. J. S. Bell et al., Eds. European Organization for Nuclear Research, Geneva, Switz-

erland, 1961. 431 pp. Conference sponsored by the International Union of Pure and Applied Physics, held at CERN 5-9 June 1961.

Introduction to Astronomy. Dean B. McLaughlin. Houghton Mifflin, Boston, 1961. 471 pp. Illus. \$7.50.

Molecular Sieves. Charles K. Hersh. Reinhold, New York; Chapman and Hall, London, 1961. 136 pp. Illus. \$6.50.

Nuclear Reactor Instrumentation. M. W. Jervis. Temple Press, London, 1961. 81 pp. Illus. \$2.95.

On the Various Forces of Nature. Michael Faraday. Crowell, New York, 1961. 186 pp. Illus. \$2.75. Christmas lectures given by Faraday at the Royal Institution (London) in 1859-60; introduction (by J. Arthur Thomson) is an adaptation of material published in the Crowell edition of *The Chemical History of a Candle*.

Probability and Experimental Errors in Science. An elementary survey. Lyman G. Parratt. Wiley, New York, 1961. 270 pp. Illus. \$7.25.

Systems: Research and Design. Proceedings of the first systems symposium at Case Institute of Technology. Donald P. Eckman, Ed. Wiley, New York, 1961. 323 pp. Illus. \$8.50.

The Teaching of Arithmetic. F. F. Potter. Philosophical Library, New York, 1961. 471 pp. Illus. \$4.75.

Transactions of the Symposium on Electrode Processes. Ernest Yeager, Ed. Wiley, New York, 1961. 388 pp. Illus. \$20. Papers presented at a symposium sponsored by the Electrochemical Society (Philadelphia, Pa., 4-6 May 1959).

Transactions of the Vacuum Metallurgy Conference, 1960. Rointan F. Bunshah, Ed. Interscience, New York, 1961. 362 pp. Illus. \$13.50.

Natural History Reprints

Dwellers in Darkness (S. H. Skaife. 194 pp. \$0.95); **From Fish to Philosopher** (Homer W. Smith. 313 pp. \$1.45); **Horses** (George Gaylord Simpson. 359 pp. \$1.45); **John and William Bartam's America** (Helen Gere Cruickshank, Ed. 396 pp. \$1.45); **John Burroughs' America** (Farida A. Wiley, Ed. 310 pp. \$1.45); **Modern Science and the Nature of Life** (William S. Beck. 351 pp. \$1.45); **The Mountains of California** (John Muir. 316 pp. \$1.25); **The Ocean Island (Inagua)** (Gilbert C. Klingel. 430 pp. \$1.45); **The Exploration of the Colorado River** (John Wesley Powell. 189 pp. \$0.95); **The Pacific Islands** (Douglas L. Oliver. 479 pp. \$1.45); **Shearwaters** (R. M. Lockley. 272 pp. \$1.25); **The Wandering Albatross** (William Jameson. 154 pp. \$0.95); **White Waters and Black** (Gordon MacCreagh. 351 pp. \$1.45). First in the new paperback series, "The Natural History Library." Scientists at the American Museum of Natural History will help to select titles for the series and will write forewords to some of the volumes, which will be published in cooperation with Doubleday and Company (Garden City, N.Y.). Additional titles are planned for early 1962.