quartz slowly inverts to beta quartz at 573°C. On page 171 the statement is made that granites melt within a range of 1215° to 1260°C, whereas on page 173 the more nearly correct statement is made that dry granites begin to melt at 900° to 950°C. I also noted the standard errors of omission—for example, the statement that calcite at normal pressure undergoes dissociations at 910°C but at 20 bars pressure the temperature of dissociation is 1110°C. The unwary student may not realize that the pressure here involved is actually partial pressure of carbon dioxide and not total confining pressure.

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Microbial-Molecular Biology

Tetrapyrrole Biosynthesis and Its Regulation. June Lascelles. Benjamin, New York, 1964. xii + 132 pp. Illus. $7.70.

This book can be highly recommended, to both students and specialists, as a compact introduction and review of the biosynthetic chain that is concerned with the synthesis of the two major pigments of protoplasm, heme and chlorophyll. The student of biochemistry will find here more detailed and extensive information than that provided by the chapter reviews now available; and the specialist will find a useful review of the porphyrin biosynthetic chain in microorganisms, for the author is a recognized authority in this field. The most novel part of the volume is a review of the recent studies of control mechanisms of heme and chlorophyll biosynthesis, a subject that has been greatly enriched by the author's own contributions.

The book contains five chapters. The first is concerned with the nomenclature and formulas of the various tetrapyrrole pigments, characteristics of their absorption spectra, and general principles of isolation, all briefly summarized with adequate references.

The second chapter summarizes the distribution of heme proteins with especial attention to the heme proteins of the lower organisms. These include the hemoglobins of fungi, protozoa, and legume-root nodules, and the cytochromes of fungi, photosynthetic purple-sulphur bacteria, and the aerobic and anaerobic bacteria. The distribution of the porphyrins of photosynthetic and nonphotosynthetic bacteria, the vitamin B_{12} group, and the chlorophylls is also reviewed.

Chapters 3 and 4 describe the individual steps of biosynthesis from succinate and glycine to heme and chlorophyll.

The control mechanisms are discussed in the last chapter. Evidence for feedback inhibition and repression of heme biosynthesis in *Rhodopseudomonas spheroides* is reviewed. The intriguing effects of the presence or absence of oxygen on the hemoglobin level in vertebrates, and on the formation of various cytochromes in higher and lower organisms, are discussed. Finally, the regulation of heme synthesis in animal tissues is reviewed.

This book is the second of a series of specialty monographs on areas of microbial and molecular biology. The editors are to be congratulated on their excellent choice of an author who knows firsthand the material discussed, and who has lucidly synthesized the story of heme and chlorophyll formation from an intimate knowledge of the biology and biochemistry of both the lower and higher forms of life.

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Low-Energy Nuclear Physics

Introduction to the Atomic Nucleus. J. G. Cunninghame. Elsevier, New York, 1964. xii + 220 pp. Illus. $9.

The author has succeeded admirably in his purpose which is "to present the essentials of the physics of the atomic nucleus in a way which will be intelligible to those scientists who are not nuclear physicists, but who need some knowledge of nuclear physics in their work." The book is concise (210 pages), and Cunninghame's approach is descriptive rather than mathematical. The book is especially concerned with nuclear phenomena at low excitation energies. Physical concepts are emphasized with illustrations that are quite relevant and helpful. Where necessary —for example, in treating the theory of beta decay—mathematical expressions are used, but the reader is not burdened with their justification. The expression itself is used to elucidate the physical situation. An excellent bibliography, which refers to more advanced texts or, in many cases, to the original literature, is given at the end of each chapter.

Because attention is directed to low-energy nuclear physics, where applications are more likely, the nuclear shell model and the liquid drop model are stressed, although the collective models are only briefly mentioned. Direct reactions and the optical model are not treated.

A short but pertinent historical introduction precedes a general description of nuclear properties and forces. Natural and artificial radioactivity are discussed quite adequately, with additional chapters on alpha and beta decay and gamma emission. The major aspects of nuclear fission are well described in the chapter devoted to this subject.

Those who are concerned with applications of nuclear physics should find the concluding chapter quite useful. In that chapter the author discusses the interaction of heavy charged particles, electrons, gamma rays, neutrons, and fission fragments with matter. The salient features of each type of interaction are concisely but accurately presented, and many references are provided for those who wish additional information.

This book should be most welcome to the nonnuclear scientist in that it provides an excellent survey of the principal features of low-energy nuclear physics in a thoroughly readable manner.

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Documents on Modern Physics

Motion of Charged Particles in the Earth's Magnetic Field. Joseph W. Chamberlain. Gordon and Breach, New York, 1964. x + 33 pp. Paper, $1.95; cloth, $3.95.

This booklet, which is published as a part of the Documents on Modern Physics Series, contains one of the series of lectures presented at the Les Houches Summer School of Theoretical Physics (1962), and published in