feldspar group under high simultaneous pressures of water and carbon dioxide at elevated temperatures, is described extensively under consideration of the latest developments in this field. A detailed analysis of the silicate hydrates of the Zeolite and Permutit group also covers the dehydration of silicate hydrates and the various types of water binding.

Part IV, entitled "Solid state reactions and their ceramic use," considers the mechanism of sintering and correlation between structural defects and their reactions in the solid state, with special emphasis on the work by Hedvall. The material migration on the contact between reacting solids and systematic investigations on reactions in the solid state for silicate synthesis are some of the high lights of this general review of the present status of solid state research and development. This part further contains a description and discussion of the reactions in ceramic bodies and in hydraulic cements, with accent on the hydration of cements, including valuable comments on the colloidal theories of cement hardening.

The last part of this standard work is concerned with the silicate melts and industrial glasses and slags and describes the reactions in glass melting and the highly complex constitution of slags.

This monumental encyclopedia is characterized by an especially careful system of indexing. A 72-page subject index is followed by an index to minerals and rock species, a systematic index of the special silicate melt equilibria, an index of chemical compounds, and a 44-page author index for references. Each paragraph of the book is numbered, which permits quick reference and cross-reference. Clearly and systematically written and well printed, this will be used as a standard work for many years.

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Fundamentals of Ecology. Eugene P. Odum. Saunders, Philadelphia, 1953. xii + 384 pp. Illus. $6.50.

This is the first introductory textbook in ecology since the publication of "that noteworthy milestone" by Allee *et al.* in 1949. Where the trees were obscured by the forest, so to speak, here they are neatly arranged and the forest appears as an orderly grove; in short, Odum has done an excellent job in conciseness, and his title is fully justified. This is also the first effort to summarize the ecosystem or trophodynamic approach (characteristic of the Yale or Hutchinson school) to ecology, but adequate consideration is also given to the traditional habitat approach. Since the author is a terrestrial ecologist, it is natural that most of his examples and illustrations should be drawn from terrestrial studies and that marine ecology should be slighted somewhat (at least from the viewpoint of a marine ecologist). Almost six pages in the chapter on marine ecology are devoted to a series of figures from a standard textbook; these pages might better have been used for fuller discussion of some points. The section on commensalism is too short to be of real value. On the whole, however, the book presents a well-balanced view of the broad field of ecology, drawn from practical teaching experience.

The writing is clear, concise, and for the most part free from specialized terminology. The author's recommendation that *littoral* be abandoned as a term in marine ecology will not be well received, and his use of *biogenic* for "dissolved salts vital to life" will startle marine ecologists, who have used "nutrient salts" in this meaning and adhere to the long-established meaning of *biogenic* in its geologic sense as applying to inorganic materials or structures formed by biological agency. There are few such slips, however, aside from the author's apparent inability to spell people's names correctly, and these can be corrected in a new edition. The illustrations are clear and well chosen, and there is a good bibliography and index.

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Nuclear Moments. Norman F. Ramsey. Reprinted in part from ***Experimental Nuclear Physics,*** vol. I, E. Segrè, Ed. Wiley, New York; Chapman & Hall, London, 1953. 169 pp. Illus. $5.

Since World War II, a large number of papers have appeared in the literature on research in radio- and microwave-frequency resonance phenomena. *Nuclear Moments* by Norman F. Ramsey performs a service, which has long been in demand, of describing the basic achievements of various resonance experiments dealing with the magnetic dipole and electric quadrupole moments of stable nuclei. Along with liberal references, complete tables of nuclear moments and related properties, an appendix on nuclear shell structure, and a review of the theory of nuclear moments as applicable to any experiment, the author devotes the main discussion to a correlation of various experimental results obtained by different workers. In short order the reader is given an excellent survey and a pertinent description of topics of current interest that will serve as a useful guide in seeking further details in the scattered literature.

The book is written in five parts. Particular emphasis is placed on resonance studies of chemical structure and the solid state, in the interest of many who are currently engaged in such work. Two introductory chapters present the fundamental definitions and properties of nuclear moments. A precise formulation is given of the types of interactions between the nucleus and surrounding atomic and molecular fields. The next chapter opens the topic on experimental methods by a review of molecular-beam nonresonance experiments, followed by a discussion of present-day molecular beam and neutron beam resonance techniques. The next part outlines the techniques and

theory of nuclear paramagnetic resonance and microwave spectroscopy. Next, a chapter presents the results of nuclear moment measurements with tables and complete references on measured values of nuclear moments, nuclear moment ratios, magnetic-shielding corrections, and hyperfine structure separations. The last part of the book covers a wide variety of topics on recent developments in chemical and solid state applications of resonance techniques.

Nuclear Moments is useful to those who desire an introduction to experiments and theory of current interest in radio-frequency resonance and also to those who are specialists in this field.

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The Philosophy of Science. Stephen Toulmin. Hutchinson's Univ. Library, London, 1953. (U.S. distr.: Ulric Nisbet, 62 E. 83 St., New York 28.) 176 pp. $2.25.

With so many books available on the subject, one may well consider the justification of introducing this additional work. Nevertheless, in discussing the philosophy of science, Toulmin writes succinctly, enabling the layman to comprehend better the role of science in today's world and assisting the scientist to grasp the significance of his endeavors.

The book is aimed toward the layman in that the author has assumed "no special knowledge either of mathematics or of natural science." It differs from many popular treatises, however, in that a rigorous philosophical presentation is advanced. In fact, it is this rigor that distinguishes Toulmin's work from that of many contemporary authors. With the help of frequent examples, the transition from common sense to science is unfolded. The relative roles of theories, hypotheses, principles, laws, and mathematics are all distinguished. For instance, in clarifying the role of physical law, we have

> . . . there is no need for us to be puzzled by the question whether Newton's laws are descriptions, definitions, or assertions about methods of measurement: rather, it is up to us to see how in some applications physicists may use them.

Again,

> . . . physics is not in the formulae . . . as we are often inclined to suppose. . . . The problem of *applying* the theoretical calculus remains in physics the central problem, for a science is nothing if its laws are never used to explain or predict anything.

Since the evolution of physics to quantum mechanics and relativity, much has been written in an attempt to assimilate philosophy and these modern concepts. Consequently, much of what is written now concerning the philosophy of science delves deeply into phases of physics not understood by the layman, most philosophers, and indeed not all physicists. Toulmin considers the philosophy of such basic scientific concepts as uniformity of nature, determinism, and induction. That he does so without sacrifice of rigor makes this introduction to the philosophy of science a compelling attraction for the scientist, the philosopher, and the student.

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A Glossary of Terms in Nuclear Science and Technology. National Research Council Conference on Nuclear Glossary. American Society of Mechanical Engineers, New York, 1953. 9 sections. $7.

The National Research Council established a Conference on Glossary of Terms in Nuclear Science and Technology in 1948 to prepare definitions of terms peculiar to the field of nuclear energy or used in that field differently or more frequently than in other fields. Separate sections were initially prepared on the following subjects by the individuals indicated: *Physics* (Henry Semat); *Reactor Theory* (Nicholas M. Smith, Jr.); *Reactor Engineering* (Clinton J. T. Young); *Chemistry* (T. O. Jones and Hoylande D. Young); *Chemical Engineering* (Arthur P. Weber); *Biophysics and Radiobiology* (Edith H. Quimby); *Instrumentation* (G. Wesley Dunlap); *Isotopes Separation* (Karl Cohen); and *Metallurgy* (Morris Kolodney). After review by a number of persons and by special committees, the sections were issued as preliminary editions from 1950 to 1953. They range in length from 7 pages for *Isotopes Separation* to 62 pages for *Physics* and can be purchased separately at prices ranging from 60¢ to $2.50 or bound together with an index for $7.

The index lists almost 2000 terms for the glossary as a whole. There are variations in the approach and amount of detail among the different sections, the one on *Physics* being the most thorough. The sections on *Chemical Engineering* and *Metallurgy* consist largely of terms in common usage in nonnuclear as well as nuclear fields. The section on *Physics* includes a number of equations and the section on *Reactor Theory* a number of mathematical terms, some of which are difficult to explain in a brief space. Numerous terms are included in two or more sections, often with different wordings of the definition. About 50 typographical errors were found in the entire glossary, the largest number being in the *Physics* section. Many of these errors are obvious but some are confusing.

This glossary is a useful one and fills a particular need, since the rapid growth of the field of nuclear energy has introduced many new or specialized terms into scientific and technical language. Their systematic collection and definition is a valuable undertaking that should assist in the clarification and standardization of usage. Now that all the sections have been issued, they need to be coordinated and consolidated into a unified glossary. The prefaces of the various sections indicate that this is under consideration.

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