model for the atom has been recorded in several biographies. He was born in New Zealand in 1871. As a student at Nelson College in New Zealand, Rutherford demonstrated his outstanding qualifications and won a scholarship to Canterbury College, from which he graduated with a double "first" in mathematics and physics. He next had the good fortune to work with the eminent J. J. Thomson (later Lord Kelvin) at the Cavendish Laboratory in Cambridge. It was there that he started his main life work on radioactivity.

After several years as research professor at McGill University, Montreal, he returned to England. He soon established himself (at Manchester and later at Cambridge) as the spiritual leader of a group of scientists and students who evolved theories that were to influence and change not only the field of physics but (by showing the possibility of splitting the atom) the destiny of the entire world.

These five lectures comprise a host of additional personal facts and anecdotes. We get a good inside view of the way Rutherford attacked a problem; how he could drive his collaborators and students to search and probe until a question had been answered; how he infused the people around him with the idea that only by working together harmoniously can good results be achieved; and how he taught that, for a real scientist, the victorious feeling of having wrung one more secret from nature should be the ultimate goal, not the financial reward. Another lesson from his life is the importance of the collaboration of scientists from many countries.

These lectures represent an important addition to the biographies already published. Although the lectures do deal with scientific problems and their solutions, they make fascinating reading for the layman, because they reveal the way in which Rutherford lived and worked. A number of photographs and facsimiles, unfortunately not too well reproduced, are enclosed. This publication will serve as a memento to a great scientist and a great man.

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Modern Chemical Processes, vol. III. A series of articles describing chemical manufacturing plants. Editors of Industrial and Engineering Chemistry, Reinhold, New York, 1954. v + 276 pp. Illus. $5.

The 23 papers that make up this new volume comprise an interesting selection of new chemical processes. From an educational standpoint, the three volumes in this series offer the student of chemistry or of chemical engineering a wonderful opportunity to gain a broad understanding of the economic factors that govern industry to a large extent, such as raw materials, plant location, transportation, power, labor, and markets.

The clear-cut photographs and flow-sheets of the various manufacturing plants provide an insight into their operation and design which should be obtained before student inspection trips are made to such plants. In fact, the knowledge students gain from reading these volumes might well take the place of an expensive inspection trip in some instances.

Last but not least, the student will acquire an ability to express himself more clearly in writing, as a result of observing the good grammar and rhetoric contained in these papers.

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Biochemistry. Abraham Cantarow and Bernard Schepartz. Saunders, Philadelphia–London, 1954. xxv + 848 pp. Illus. $11.

In this book, Cantarow and Schepartz, who are, respectively, professor and assistant professor of biochemistry at Jefferson Medical College, have placed their main emphasis on the dynamic aspects of mammalian biochemistry and have devoted relatively little space to structural, organic, and physical chemistry. Although the book does not pretend to serve as a textbook on the clinical or pathological aspects of biochemistry, certain abnormalities such as diabetes mellitus and disturbances in "acid-base" balance are discussed fully. Moreover, the important role of microorganisms in the over-all picture of the metabolism of higher animals has not been neglected.

The volume starts with a series of relatively short chapters dealing with the chemistry of carbohydrates, lipids, proteins, nucleic acids, and porphyrin-containing compounds. This is followed by a lengthy chapter on the vitamins, which includes a description of their chemistry, occurrence and biosynthesis, nutritional function, and biological action. As an introduction to the general subject of metabolism, there are chapters dealing with the mechanism of action and classification of enzymes, the activity of the digestive enzymes, and the mechanism of "detoxication." Then respiration, water balance, "acid-base" balance, and energy metabolism are discussed. A brief but very helpful survey of the methods used to investigate intermediary metabolism precedes the section on biological oxidation and the mammalian metabolism of carbohydrates, lipids, proteins, nucleic acids, porphyrins, and inorganic compounds. This section also includes a noteworthy discussion of metabolic antagonism. The chemistry and physiology of the hormones is covered in one chapter. The last section deals with various aspects of the chemical composition of animal tissues and fluids.

The book obviously was prepared with a view to making it a readily useful reference. The table of contents is detailed, there are many cross references, and the index (67 pages) is excellent. In the belief that a first-year medical student would be confused rather than benefited by numerous references to the experimental literature, the bibliography for each chapter lists mainly the more recent review articles and monographs. However, these were chosen carefully and in-

clude publications dated 1953. It is to be hoped that the student will have occasion to refer to them and thence to some of the original experimental papers. It would be well for him at least to learn the names of some of the investigators whose findings have been so ably summarized in this textbook.

In their preface, the authors state that "this book is designed primarily to meet the needs of the first-year medical student." They have been eminently successful in their work.

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Metabolic Interrelations. With special reference to calcium. Trans. of the Fifth Conference. Jan. 5–6, 1953. Edward C. Reifenstein, Jr., Ed. Josiah Macy, Jr. Fdn., New York, 1954. 386 pp. Illus. $5.

This volume provides that peculiar mixture of stimulation and disappointment that readers have come to expect. Spontaneous discussions lose a good deal in the recording, are repetitive and disorganized. Nevertheless, when the best brains of the country discuss the subject, a recording of the discussion is valuable. Some of the presentations are very good, and one might say that "fringe benefits" are included. It may be of satisfaction to less eminent readers to see how little progress is made and how few new ideas there are in some of the areas. One is also struck with the persistence of old ideas that seem to have little validity and how they influence the thinking of the group. Throughout this volume, for example, references to the equilibrium between the bone salt and solubility product occur repeatedly, in spite of the fact that Neuman insists, also repeatedly, that there is no single crystal type, the bone is not a single phase, and thus there is no reason bone should dissolve or be formed at any particular calcium and phosphorus level in the blood. There seems to be no serious disagreement upon this point. Yet, because the mechanism which does control bone formation or dissolution is obscure, most of the group still thinks in terms of a solubility product.

The chapter headings do not give a clear picture of the contents since some are short extemporaneous remarks while others are more finished presentations of the subject material. Calcium and phosphorus homeostasis, transport, and so forth, are discussed at considerable length, including the roles of the kidney, parathyroid, and vitamin D. Nutritionally minded people will find the section on "Adaptation to low calcium intakes,' by R. A. McCance, stimulating and frustrating. One of the more complete discussions is that of R. T. Follis upon "Diseases, particularly of the bone, associated with derangements of calcium and phosphorus metabolism." The transactions also provide some idea of the newer or revived interests in the field of calcium metabolism. The relation of citric acid and citrate metabolism to bone formation and vitamin D function is attracting considerable attention. The discussion on chelating agents, the mucoproteins, and radio calcium will bring readers with borderline interest somewhat up to date.

Anyone who has had his "off-the-cuff" remarks recorded will realize the editorial effort required to bring the proceedings to their present form. In spite of the limitations, this is probably the only way to make these conferences available to more than the limited group which can attend. The discussion remarks are well documented with reference to the literature. For most of us interested in calcium metabolism, they should be required reading. There may be a few fortunate individuals who can keep thoroughly abreast of all the current literature in the fields touched on in these transactions. They may be excused.

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Introduction to Atomic Physics. Otto Oldenberg. McGraw-Hill, New York–London, ed. 2, 1954. xiii + 421 pp. Illus. $6.

The second edition of Oldenberg's *Introduction to Atomic Physics* preserves all the positive features of the first. There are, in addition, two major changes. First, the material has been extended to include more of "modern physics," such as nuclear physics, cosmic rays, and high energy processes. There is also a short discussion of the solid state. Atomic physics *per se* is the subject of about two-thirds (280 pp.) of the book. Second, a number of technical improvements have been made; the electron charge and mass are denoted by the conventional e and m instead of the rather individualistic ε and μ; the number of problems has been approximately doubled and a selection of answers provided.

The advantages of the treatment are familiar to users of the first edition. The author sets out to present the concepts and experimental facts of atomic physics with an absolute minimum of mathematics. The second edition avoids calculus more scrupulously than the first, if possible. The connection between theory and experiment is continuously emphasized. This is particularly satisfactory in the chapters (8–10) dealing with the birth of modern atomic physics in the interpretation of α-particle scattering, the photoelectric effect and the hydrogen spectrum. The problems give the student opportunity to work by himself through arguments supplementary to the text and to obtain a feeling for the magnitudes involved.

The strength of this treatment is also its weakness. If a student is eventually to learn a fuller mathematical treatment of atomic physics, is it worth while for him first to run through whatever material can be treated without calculus? Most undergraduates majoring in science or engineering have more mathematical equipment than secondary school algebra. The limitations of the present textbook become more severe with increasing "modernity" of the subject matter. For example, the entire subject of space quantization