The attempt to oversimplify the picture, which is so often necessary in this type of work, makes for a handful of lapses in rigor, such as the erroneous contention that cubic iron readily slips along planes as a means of explaining the symmetry observed in the early Bitter patterns. On the whole, this book can hardly be recommended as a primer in domain theory but will undoubtedly prove a fine reference to workers in the field as an exposition of an important and active phase of magnetic effects arising from domain phenomena which is, in fact, the avowed purpose of the monograph series of which this book is a part.

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The Kinetic Basis of Molecular Biology. Frank H. Johnson, Henry Eyring, and Milton J. Polissar. Wiley, New York; Chapman & Hall, London, 1954. vii + 874 pp. Illus. $15.

Theories and techniques of modern physical chemistry are just beginning to assume an important place in the investigation of biological systems. This book is the most advanced and most useful presentation of the applications of physical chemistry to biology that has appeared. It is a valuable guide for all whose research approaches problems of living systems at the molecular level, particularly problems of a dynamic nature for the book emphasizes the application of classical and modern chemical-kinetics. It provides a source of prototype mechanisms, an extensive collection of reference material, and, most important of all, a solid introduction to the philosophy of present-day physical chemistry presented by men familiar with both the power of that subject and the complications encountered in biological systems.

The book breaks down into three parts. The first surveys rapidly, and probably inadequately for many natural scientists, the theories of modern physics and chemistry. Only Chapter 1, in which the theory of absolute reaction rates is derived, is essential for reading the remainder. The middle section is based on the well-known work of Johnson and Eyring and their collaborators on bioluminescence, but is extended to cover a wide variety of other problems more or less closely related to problems which have appeared in bioluminescence.

The third section examines permeation and diffusion phenomena in living systems, including extensive discussions of muscular contraction and nervous function. While there is less original material in this section, modern theories of the phenomena are presented on a more comprehensive and more satisfactory theoretical framework than has previously appeared. In particular, the discussions of active ion transport are the best thus far.

The book is uneven, somewhat special, and not comprehensive. Specialists reading discussions of subjects in their own fields will occasionally be dissatisfied, if not antagonistic, to detailed interpretations for little attempt has been made to examine alternative theories and frequently it seems that subjects have been "shoehorned" into a preconceived and inapplicable framework. Such objections are probably not particularly important. Although the authors have stated as their purpose the interpretation of a representative collection of biological phenomena, their major success lies not in this direction but in the procedures of thought and technique for the use of physical chemistry, implicit throughout the book. Especially important in this direction are the frequent uses of idealized systems that emphasize only the most essential molecules and characteristics of complicated systems, a technique exemplified in the authors' treatment of nerve processes. Undoubtedly many of the specific interpretations will not stand the test of time. The general methodology, on the other hand, is well tested and here to stay. The natural scientist will find this a useful handbook of application and a stimulating source of new ideas.

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Acoustics. Leo L. Beranek. McGraw-Hill, New York–London, 1954. x + 481 pp. Illus. $9.

Those who learned their acoustics from textbooks dated before about 1915 will gasp when they compare this up-to-date textbook with those of yesteryear. They will look in vain for the familiar chapters on the theory of vibrating strings, rods, bars, plates, and pipes, but they will find that acoustics has acquired a "new look" and many new sounds during these past four decades. Modern acoustics, in many respects, began in 1915 with the advent of electronics and the high-quality microphone. Beranek's book begins where the classical books ended. It is primarily a treatise of modern acoustics, a thoroughly teachable and practical book that can be commended to both professional and amateur acousticians. The acoustial engineer, and even many of those who retain him, will find ready solutions to many problems concerned with noise and electroacoustical devices.

Chapter 1 gives a brief introduction to modern acoustics and summarizes relevant American Standards acoustical definitions and terminology. Chapter 2 presents solutions of the wave equation in two parallel columns; the one-dimensional derivation in the first column and a juxtaposed three-dimensional vector derivation in the second column. Chapters 3–5 deal comprehensively with acoustical circuits, elements, radiation, and directivity patterns. Chapter 6 is a good compendium of available high-quality microphones, their characteristics and uses. Chapters 7–9 are a rich storehouse of descriptions, formulas, and design charts of the principal types of loudspeakers. High-fidelity fans will find this material helpful in selecting or constructing these crucially important parts of their high-fidelity radio receivers and phonographs, for example, page 212 gives directions for the design of a closed-box baffle for a high-quality loudspeaker, and page 242 gives practical design data for

a bass-reflex. (The directions are for those who wish to know *why* as well as *how*.) Chapter 10 deals with architectural acoustics, with emphasis on wave acoustics and sound insulation. Chapter 11, which deals with noise control, will be found extremely useful for the reduction of industrial noise. Chapter 12 is a good summary of acoustical measurements, especially those essential for noise surveys. The concluding chapter contains an up-to-date account of hearing, speech intelligibility, and pertinent psychoacoustic criterions. These criterions are as yet tentative but they will be welcome and useful to the acoustical engineer and to all those who are concerned with noise control.

The mks system of units is used throughout the book. Although many physicists and engineers may believe that this choice is not justified in view of the widespread use of cgs units, it is apparent, especially in Chapters 3 and 10, that simplicity results from the choice of the mks system. But for one who has been steeped for two score years and more in cgs units, the mks ones are distasteful pills for a mild disease. Beranek has sugar-coated most of these pills by adding in parentheses the more familiar cgs units.

The drawings and illustrations are well chosen and executed and supplement the text admirably. Throughout the book typical examples involving practical design are worked out in detail, and these are often followed by other useful examples and problems that the student is expected to solve. Acoustical engineers, as well as students and others interested in acoustics, will be greatly indebted to Beranek for this useful and well-written book.

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Chemical Constitution. An introduction to the theory of the chemical bond. J. A. A. Ketelaar. Trans. by L. C. Jackson. Elsevier, Houston, Engl. ed. 1, 1953. 398 pp. Illus. $6.50.

The purpose of this book, according to the author, is to so complement the standard textbooks of organic and inorganic chemistry that it will enable students to convert the large volume of chemical information into a single, coherent body. In this he has completely succeeded and thus has contributed a significant advance to the integration of chemistry on a graduate level.

The first chapter serves to set forth the four types of chemical affinity (ionic, atomic, metallic, and Van der Waals) upon which the division of subject matter is based. In the next chapter the concept of the ionic bond, developed on the basis of electrostatic attractive forces between charged spheres, is applied to ionic complexes as well as to simple salts. The third and longest chapter is a wave-mechanical development of the covalent bond, with many examples and applications to complex compounds, conjugation, and the theory of color. The interatomic attractive forces and various properties of metals are developed in the following chapter with the analogy of the electron in a box and the concept of Brillouin Zones. In the fifth and last chapter Van der Waals binding, explained as a combination of Keesom orientation energy, Debye inductive effects, and London dispersion forces, is applied to volatility, solubility, and hydrogen bonding.

This book has many excellent examples and correlations of theory and fact. Many of the relationships described, particularly in connection with ionic and metallic binding, are too frequently omitted from textbooks in this country. The author points out the importance of Coulomb forces, rather than electron pairing, as the source of exchange energy, and emphasizes this point by substituting a newly coined term, *atomic bond,* for the more familiar *covalent bond.*

It is unfortunate that such a useful book is marred by many errors. The English expression is so awkward that the meaning is sometimes obscured. In some cases lack of clarity is due to the omission of details and explanations required in the coverage of such a broad subject in a relatively small number of pages. Many authors are referred to without specific literature references. One might disagree with the classification of the hydrogen bond as a Van der Waals, rather than an ionic, type of bond. One might also wish that more space had been devoted to molecular refraction and polarizability, acids and bases, electrophyllic and nucleophyllic properties, and the role of *d*-orbitals in the formation of coordination compounds.

The main usefulness of this book lies in its value as a survey and integration of chemical theory and fact. In my opinion, it cannot be used by students without previous courses in organic, inorganic, and quantum chemistry, unless extensive simultaneous use is made of standard references in these fields.

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The Kidney. A Ciba Foundation Symposium arranged jointly with the Renal Association. A. A. G. Lewis and G. E. W. Wolstenholme, Eds. Little, Brown, Boston, 1954. xvi + 333 pp. Illus. + plates. $6.

This is a verbatim account of the proceedings of an international symposium held in London in July 1953. Not since 1935, when the Minneapolis symposium of a lustrum earlier became *The Kidney in Health and Disease,* has any volume appeared of substance and merit comparable to Ciba's *The Kidney.* Interestingly, there was no individual who contributed to both of these symposiums.

Twenty papers are allocated in five parts: I, "Structural and functional relationships in the kidney" (Oliver, Raaschou, Darmady, Wirz); II, "Tubular functions other than the regulation of acid-base balance" (Bradley, Taggart, Lambert, Reubi); III, "Renal share in the regulation of acid-base balance" (Robinson, Pitts, Berliner, Sanderson); IV, "General problems of electrolyte excretion" (Merrill, Le