CHEMICAL CONSTITUTION

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An Introduction to the Theory of the Chemical Bond. By Prof. Dr. J. A. A. Ketelaar. Pp. viii+398. (Amsterdam and New York: Elsevier Publishing Company, Inc.; London: Cleaver-Hume Press, Ltd., 1953.) 40*s*.

CHEMISTRY has been revolutionized in the past thirty years by the development of quantum theory, and by the fresh insight the theory gave into problems of atomic and molecular structure. The new ideas spread rapidly under the influence of several notable monographs. In recent years, however, a growing rift has separated the theoreticians from chemists in general, largely because the more recent developments have not been adequately described in simple terms in book form; and the lack of text-books has also hindered the teaching of theoretical chemistry. Prof. J. A. A. Ketelaar's book is an attempt to fill this gap: it is described as "an introduction to the theory of the chemical bond" and is clearly intended for the general reader.

The book falls into five sections. First, an introductory section on the Periodic Table, the basic ideas of wave mechanics and the types of chemical bond; next, a section on ionic compounds treated from the classical point of view; next, a section on the covalent bond, beginning with the quantum mechanical treatment of covalency and the structures of simple molecules, and continuing with a discussion, in terms of resonance theory, of complex molecules and of such topics as conjugation, bond properties, chemical reactivity and colour; next, a short section on metals; and finally, a section on van der Waals forces and the hydrogen bond. There are bibliographies at the ends of sections, but few references.

The intention and general plan of the book are excellent; but unfortunately the execution leaves much to be desired. First, the more elementary sections are too condensed to be intelligible to a reader who needed them; this criticism applies to the whole of the first section, to the quantum mechanical treatment of covalency in the third section, and to the section on metals. The situation is made worse by the introduction of irrelevant complications (for example, pp. 9–10) and by an approach sufficiently mathematical to intimidate the uninitiated reader but totally inadequate as an introduction to the detailed mathematical theory. Secondly, the book is very badly constructed. Throughout the text there are numerous references to later sections; new ideas are introduced without explanation (for example, the table on p. 20, dipoles on p. 72, the Planck and Einstein relations on p. 107, the Bohr atom on p. 109, overlap on p. 149, bond character on pp. 175, 186); and when new ideas are introduced they are often not treated coherently in one place (for example, *s-p* hybridization is discussed in detail on pp. 153–54, but dsp^2 hybridization is mentioned without explanation on p. 173). Thirdly, the segregation of ionic and covalent compounds has its drawbacks; typical covalent compounds are discussed as though they were ionic in the second section (pp. 54, 55, 60), and the relation between ionic and covalent bonds is nowhere adequately discussed.

There are various small errors and omissions. For example, it is implied incorrectly on p. 152 that a linear combination of non-degenerate solutions of a wave equation is itself a solution; the inductive effect is wrongly described on p. 221; the explanation for the instability of vinyl alcohol on p. 222 is incorrect; and on p. 239 the author has overlooked recent work on Tschitschibabin's hydrocarbon.

The general impression is of a book written without adequate planning or integration and consequently too obscure for the uninitiated reader. A reader familiar with the field will find much to interest him although he may feel the lack of adequate references. Most of the references are to papers dealing in detail with advanced and irrelevant topics (for example, nuclear resonance, p. 199).

The book is very well produced and pleasantly free from misprints. The price is very reasonable.

M. J. S. Dewar

BIOCHEMISTRY FOR MEDICAL STUDENTS

Biochemistry

By Prof. Abraham Cantarow and Dr. Bernard Schepartz. Pp. xxv+848. (Philadelphia and London: W. B. Saunders Company, 1954.) 55*s*.

THIS is designed primarily as a text-book for medical students; but it is doubtful whether as such it will have much appeal in Britain. In most British universities, the departments of anatomy and physiology and biochemistry compete keenly for the student's time, and as things work out the medical student simply has not the time to deal with biochemistry in anything like the detail in which it is presented in this 800-page volume. If he attempts to do so he is likely to miss the wood for the trees and to develop a dislike for the subject. To take one example of this excessive detail and of lack of balance between one topic and another, nearly forty pages are devoted to what the authors term the metabolic "rugged individualism" of the amino-acids, whereas the absorption of fat is dismissed in a couple of pages.

More might have been said about how some of the important advances in biochemistry have been made. For example, in dealing with carbohydrate metabolism, some description might surely have been given of Claude Bernard's fundamental experiments leading to the discovery of glycogen and its role in blood-sugar regulation. Things like this make a subject interesting and they are often remembered by the student, and are worth remembering, when a great deal else has long been forgotten. Instead, the student is faced as early as p. 3 with about fifty divisions and sub-divisions of the carbohydrates, and on the next page he is further discouraged by finding the names and structures of all twelve D-hexoses where three or four would have sufficed. It is surprising that the authors have not adopted the elegant and more realistic method of Haworth for showing the structures of the carbohydrates. The Fischer formulæ when applied, as they are here, to disaccharides and even to polysaccharides may well strike the student as looking like radio wiring diagrams rather than structures of molecules.

At one point, where apparently the authors felt that the book needed a bit of light relief, there is a deplorable reproduction of a dog which is said to be afraid that the essential amino-acid tryptophan has been omitted from its dish of food. The book needs lightening in a much more substantial way than this if it is to appeal to medical students and give them