

Section IV (*Chemical Composition of Animal Tissues and Related Data*, 300 pages) consists of a monumental compilation of chemical analyses. There are for example no less than ten pages devoted to analytical data (sodium, potassium, total protein, soluble protein, etc.) of various parts of the eye, such as the aqueous humor (with separate columns for man, rabbit, ox, horse, etc.), the vitreous humor, the cornea, the ciliary body, etc. The remainder of this section is similarly detailed and the whole is impressive testimony to the skill and perseverance of the analyst. Whether such data are of value to the modern biochemist is another question.

Section V (*Chemical Composition of Plant Tissues and Related Data*, 124 pages) is similar to section IV, but concerned with leaves, flowers, pine cones, etc. (example: an 11-page table on tannins). No analytical data for bacteria are given, but analyses for the amino acid, purine and pyrimidine content of some viruses are included.

Section VI (*Physiological and Nutritional Data*, 65 pages) gives the chemical composition of common foods, with a minimum of elaboration, and contains articles on a few miscellaneous topics, such as the composition of tissue culture media, the effect of disease on the composition of blood, and histochemical analysis.

A major deficiency of the Handbook is that it fails to include, apart from the section on enzymes, much biochemistry on the molecular level. It is astonishing, for instance, to find no mention of *any* of the properties of hemoglobin, no reference to DNA as a carrier of genetic information, no reference to immunochemistry, etc.

It is clear from the foregoing summary that only certain portions of this Handbook contain subject matter of interest to the modern biochemist, and even these are partly obsolete. At the same time, much that is of vital interest to present-day biochemistry is entirely omitted. These reviewers cannot therefore recommend this Handbook as an important addition to a library which is already moderately well equipped with biochemical reference works. On the other hand, it should be noted that sections IV and V contain detailed analytical data which it is useful to find collected in a single volume. As these sections together comprise about 40% of the total content (*i.e.*, \$10 of the \$25 price of the book), the degree of interest in such data may well be the criterion by which an individual reader should judge the potential usefulness of the Handbook. Even for this kind of information, however, there is an alternative and perhaps better source, the "Handbook of Biological Data" (W. S. Spector, ed., published by W. B. Saunders Co., Philadelphia, Penna., 1957).

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**The Plasma State.** By E. J. HELLUND, Formerly, Plasma-dyne Corporation, Santa Ana, California. Reinhold Publishing Corporation, 430 Park Avenue, New York 22, N. Y. 1961. 197 pp. 15.5 × 23 cm. Price, \$6.50.

The dust jacket of this book displays, as a sort of subtitle, the explanatory remark: "Summarizes all available information on highly ionized gases." Indeed, the author has attempted to give an elementary introduction to the entire field of plasma physics, including a remarkably broad coverage of existing and proposed practical applications. The treatment is essentially non-mathematical, *i.e.*, only about a dozen important relationships are expressed symbolically, some others are explained in words but most

aspects are discussed only qualitatively. Apparently, the text is meant for readers who abhor algebra and yet wish to gain an insight into this new field of science. The result, unfortunately, is very disappointing.

First of all, the vocabulary used, and much of the reasoning presented, requires that the reader has a substantial scientific background. A complete layman, I am afraid, would very soon be lost. It is doubtful, therefore, that the studious avoidance of mathematical expression really represents an advantage. Worse, however, is the fact that many of the descriptions and discussions are hard to follow and perhaps even misleading. Of course, it is extremely difficult to cover a broad subject in a short treatise without being superficial and sketchy. Anyone undertaking such a task must therefore be particularly careful in his manner of expression and it seems, to this reviewer at least, that E. J. Hellund has not been entirely successful in this matter. Several examples could be cited where the treatment is incomplete in some of its essentials and certain statements made will be recognized by the experts as actually wrong.

This is not to say that the book is entirely without merit. By and large the text is quite readable. A quick perusal, in which not much attention is paid to detail, may serve very well to give the outsider a fair impression of the nature and scope of plasma physics and may stimulate interest in some of its many applications. In the first two chapters the subject is introduced and the fundamental concepts are explained. The third chapter is devoted entirely to arc discharges as the best known form of plasmas generated in the laboratory. It includes brief descriptions of many different types of arcs, almost in the manner of an encyclopedia. Chapter 4 is entitled "Plasma Chemistry." It is a unique feature of this book in that it discusses a large number of electronic and chemical reactions that are likely to occur in various types of partially ionized gases and at surfaces exposed to ionized gases. The listing is of course by no means complete and must only be taken as an illustration of the complexity of the phenomena. Here, the author does not hesitate to make abundant use of symbolic representation of chemical reactions.

A brief summary of the controlled fusion problem and some of the major experimental approaches presently pursued is given in Chapter 5. Chapter 6, which carries the heading "Electro and Magneto Plasma Dynamics," should logically be read before Chapters 3, 4 and 5. It is concerned again with fundamental properties and the behavior of plasmas in general. It is here, for instance, that Saha's equation is mentioned, concepts such as "magnetic pressure" and "skin depth" are explained, and waves in plasma as well as the entire field of magnetohydrodynamics are very sketchily surveyed. Finally, the last chapter is made up of short discussions of an impressive variety of technical applications that are either already existing or being developed, from plasma torches for spray coating to advanced propulsion schemes for interplanetary travel. It is not clear for what type of audience this book is really intended. Perhaps chemists or engineers who have advanced to administrative positions in industry or governmental laboratories, or possibly high school teachers in science, might be interested in reading it if they wish to obtain a bird's eye view of plasma physics and its applications. But whoever they are, the readers should be warned that the contents of this book are not always accurate in scientific details. All the important material is there, to be sure, but it would be better if the book were worked over and rewritten more carefully.

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