Tetrahedron, 1959, Vol. 6, p. 268. Pergamon Press Ltd. Printed in Northern Ireland

BOOK REVIEW

JOHN T. EDSALL and JEFFRIES WYMAN: **Biophysical Chemistry.** Vol. 1. **Thermodynamics, Electrostatics and the Biological Significance of the Properties of Matter.** Academic Press, New York, 1958. XV 699 pp., $14.00.

THIS book has grown out of a course given at Harvard in the physical chemistry of biochemical systems; it contains accounts of a number of aspects of biophysical chemistry. The authors have deliberately chosen to treat a limited number of subjects very deeply rather than to attempt a complete treatise. The emphasis is on broad general principles and no attempt has been made to provide comprehensive tabulations of experimental data such as are to be found in COHN and EDSALL's *Proteins, Amino Acids and Peptides.* In some ways this is a pity since it is now 15 years since COHN and EDSALL's monograph appeared, in which time a great deal of new material has become available.

The present work starts with a chapter called "Biochemistry and Geochemistry" in which the distribution of chemical elements in living organisms and in the earth's crust is discussed, together with sections on the early history of the earth, the ocean and the central importance of carbon in biology. This is followed by a chapter devoted to that most important substance, water. The next chapter is called "Problems of Protein Structure"; it contains lucid descriptions of many of the modern methods employed in this field, and of the results obtained with them.

Chap. 4 is entitled "Thermodynamics", it extends over 100 pp, of which nearly 70 are devoted to an account of the fundamental ideas of thermodynamics which might well be considered outside the scope of such a book, being more suitable to a text on physical chemistry. The latter part of this chapter is largely concerned with the application of thermodynamics to a number of biological systems. Then follow chapters on electrostatics, dielectric constants and conductivity of electrolytes in which are developed in detail the theory of electrolytic solutions, with particular reference to solutions of dipolar ions. Acid-base equilibria are considered *in extenso* in Chap. 8 and in the next chapter there is a most valuable and interesting account of polybasic acids, bases and ampholytes which includes both proteins and synthetic polyelectrolytes. There follows, somewhat curiously, a chapter devoted to carbon dioxide and carbonic acid which one cannot help feeling would have found its place more naturally in Vol. 2, which will be called *Physical Chemistry of Macromolecules and of Blood.* The last chapter in the present volume contains an excellent account of molecular interactions with particular reference to binding of ions to polyelectrolytes, though it is a pity that such protein–protein interactions as the interaction of antigens with antibodies are not discussed in any detail.

It is impossible to express an opinion on this book as a whole without being able to read Vol. 2, thus there are a number of topics which the present reviewer would have liked to see treated but which may well be found in the next volume. One thing in particular is the lack of any account of kinetics without which no work on biophysical chemistry can be anything like complete. The authors mention this deficiency in the preface and hold out some hope that they will cover the subject in some future volume, it is to be hoped that they will be able to do so. The production is throughout of a high standard and the equations, however complex, are all printed very clearly though some of the symbols used appear strange. Thus ω is used to denote ionic strength instead of μ, which is general in the American literature. There is no doubt, however, that this is a most excellent book which will be the constant companion of biophysical chemists for many years to come and one looks forward eagerly to the publication of Vol. 2.

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