Physikalische Chemie und Biophysik

by G. Adam, P. Lauger and G. Stark
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All of us who teach physical principles to students of biological disciplines are confronted with the question: how should our course differ from that delivered to students of physical chemistry? Any new text book on physical biochemistry or biophysics has to be judged from two points of view. First, satisfactory treatment of physical principles and, secondly, a suitable training for biologists has to be achieved. The second point is coupled to the problem of holding the interest of students who are not necessarily sympathetic towards the subject. The presentation of concepts and principles rather than facts and description turns students away from biophysical topics much more than the limited amount of algebra required.

There is little doubt that the volume under review contains a sound account of the basic topics of physical chemistry. However, in many places the presentation is condensed rather than elementary. The first 180 pages contain material which can be found more clearly presented in text books of physical chemistry. The occasional mention of a biological example does not make much of an impact. I nearly missed the brief reference to muscle; it does not appear in the index. The discussion of the solvation of ions does not refer to the later treatments of ion transport. Incidentally, I was rather surprised to read 'Feie Enthalpie' as the term for Gibbs energy. Is this really commonly used in modern German texts?

The book comes into its own over the next 150 pages when surfaces and membranes are discussed in considerable detail and with proper applications to biological systems. Experiments on membrane potentials in relation to signal transmission in nerve axons are described. Why does one find no such relevant experiments in other sections?

Kinetics is sadly neglected. Only half of the space is devoted to the whole of kinetics as compared to basic thermodynamic topics. Moreover, the discussion of the application of kinetics is quite unbalanced. The theory of modern kinetic techniques is presented briefly after the usual elementary introduction. However, the application to biological systems is quite inadequate. This is particularly serious because so few, and often rather old, references are quoted throughout the book. It is a pity that the authors did not carry their enthusiasm for experiments on membranes over to the application of thermodynamics and kinetics to many other aspects of biophysics. So many nice examples are now available; transport proteins, muscle contraction and replication, to mention just a few.

Obviously a lot of work has gone into this book and I am sorry to have to be so critical about the results of these efforts. Personally I shall find the centre section and some other parts of the book very useful for the design of lectures, but I doubt whether many students of biological subjects in English-speaking countries would use a translation of this book. A new edition would require considerable changes in balance of the early and late chapters. A revision would have to include more real data of interest to biologists and far more references as well as a good index.

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