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Recensiones

M. Marois, Ed.: From Theoretical Physics to Biology. Proceedings of the third International Conference, held in Versailles, in June 1971 under the auspices of the "Institut de la Vie". Basel: S. Karger, 1973. 467 pages, US-$ 42.25.

The International Conferences "From Theoretical Physics to Biology" organized every second year, since 1967, by Professor Marois, under the auspices of the Institut de la Vie, have become important events of international scientific life having as a perceptible consequence a closer collaboration between physicists and biologists. It is the great merit of the organizers of these symposia to realize the importance of such a collaboration and also its difficulties. They have chosen the best way towards success by bringing together physicists and biologists to an extent seldom achieved before and by inciting them to discuss problems of obvious common interest, with the logical assumption that even if the discussions sometimes start as a series of monologues they have to end, sooner or later, as a dialogue. Another guarantee of success was the selection of a remarkable list of participants among which we find such eminent personalities as Professors A. Katchalsky (assassinated since by terrorists at Lod airport), Prigogine, Szent-Gyorgyi, Fox, Löwdin, Eigen, Lipmann, Kasha, Perutz, Edelman, Sela, Cournand, Wilkins, Sobolev, Dubos and many others.

The third conference was centered about five major subjects: 1) Physical aspects of the order in biological systems, with major contributions dealing with cooperative phenomena in systems far from thermal equilibrium (Haken), thermodynamics of bionetworks (Katchalsky), fluctuations and the mechanism of instabilities (Prigogine); 2) The first steps of evolution and the nature of life, with interesting contributions on prebiotic syntheses by Katchalsky and Fox, on electron transfer by Eley and Löwdin and on resonance transfer by Kasha; 3) Systems of order recognition with lectures on the mechanism of enzyme activity (Richards and Koshland) and on antigen-antibody relationship (Edelman, Sela); 4) Systems of sensorial analysis with particular emphasis on the neurophysiological aspects of vision (Ratcliff, Campbell, Julesz) and 5) Perspectives of theoretical physics and biology and their social implications, discussed by Sobolev, Cournand and Wilkins.

The communications have been followed by numerous and lively discussions, large parts of which are reproduced in the volume. The shock of arguments between theoreticians and experimental biologists is thrilling and fruitful.

Altogether, the volume contains a great amount of data, statements, thoughts, concepts, suggestions and proposals which make it a rich source of documentation for all those who are interested in the interrelation of theoretical physics with biology and it certainly will stimulate new ideas and new efforts towards bridging the two. On a number of occasions it suggests to the theoretician paths of research in which his contribution is awaited. Surprisingly, and in contrast to the previous volumes, there are, however, only very few contributions of the quantum-mechanical viewpoint and methodologies in this volume although there were ample opportunities for them in connection with a number of subjects discussed. It is hoped that this regretful omission will be corrected in the future meetings. The concepts of theoretical physics evoluate frequently at the level of bulk matter. Those of quantum biochemistry and biophysics descend to the molecular and submolecular level. A balanced conjunction of the two explorations is indispensable for the fulfilment of the goal proposed by these symposia.

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Jerry Goodisman: Diatomic Interaction Potential Theory, two volumes. New York and London: Academic Press 1973. 316 and 426 p., US-$ 58.00.

Jerry Goodisman has written a clear and vivid book on the theoretical aspects and background of potential energy curves. It contains a large amount of material from quantum chemistry on a medium level of sophistication. The book is suitable for graduate students in quantum chemistry, and for research workers who desire a survey of topics related to potential curves of diatomic systems. The reader should have an elementary knowledge of quantum mechanics. The treatment covers the developments up to about 1967–1970, but not the more recent ones. At the end of each chapter, the relevant literature is given. The book also contains a list of related bibliographies and review articles. The book may be recommended to libraries of physical chemistry and molecular physics.

In Chapter I of the first volume (55 p.) the concept of potential curves is introduced, emphasizing the underlying physics of the adiabatic and Born-Oppenheimer approximations and of nonadiabatic couplings in the diatomic case. Also a short review on the experimental determination of potential curves is given. Chapter II (35 p.) contains a qualitative discussion of potential curves for large and small internuclear distances and suitable functional representations. The topic of the main Chapter III (200 p.) is the quantum chemical calculation of ground state energies of small molecules: Hartree-Fock and CI-method, perturbation theoretical approaches, meaning and applicability of virial and Hellmann-Feynman theorems. The statistical approximation and the local energy methods are also covered.

More details on the calculation and evaluation of potential energy curves are found in the second volume. Chapter I (140 p.) treats large and small distances (van der Waals constants, united atom approach and related subjects). Chapter II (155 p.) is devoted to *ab initio* Hartree-Fock and configuration mixing methods. In the final Chapter III (100 p.) semiempirical MO-theory, the pseudopotential approximation and the method of atoms in molecules are discussed. Finally some empirical relationships and very simple models such as those of Rittner, Frost or Parr are discussed.

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