

REVIEWS

A New Physical Chemistry*

Physical Chemistry may be defined as a consideration and interpretation of the facts of chemistry in the light of physical principles. An exposition of the relevant physical principles followed by an application of the same to specific chemical themes should accordingly form the plan of any rational treatise on the subject. The kinetic theory of gases and the principles of thermodynamics formed the common ground between physics and chemistry till some two or three decades ago. The remarkable developments which have taken place of recent years in atomic physics have, however, tended to bring physics and chemistry into much closer union at the present time. We may specially mention here the interpretation of atomic structure on the basis of the spectroscopic evidence, the elucidation of molecular structure by studies on band-spectra, infra-red absorption and light scattering, and the analysis of crystal structure by studies on X-ray and electron diffraction. The development of the new quantum mechanics has also made possible an understanding of the nature of the atomic forces operative in chemical reactions. We have not yet reached the stage when theoretical chemistry may be described as a branch of mathematical physics, but we are certainly tending in that direction. It is, therefore, only appropriate that the coming generation of physical chemists should realise the situation and make themselves familiar with the newer physical ideas and mathematical methods before they become "too old to learn". Only thus can they hope to really understand their subject or to make any contributions to it.

The treatise under review will undoubtedly assist in giving the new orientation desired for the teaching of physical chemistry to the rising generation. It may be a shock to the orthodox physical chemist to find a treatise on his subject which leaves out the theory of solutions, ignores colloid chemistry and even makes no mention of the phase-rule. But such omissions could scarcely be avoided if room were to be found for developing the foundations on which could be based a rational treatment of chemical thermo-dynamics, chemical equilibria and chemical kinetics.

As remarked by the author in his Preface, "the book is complete in itself; it does not expect of the student that he shall have at his elbow a number of other books. All theorems are derived; no proof is taken for granted". These are valuable features which will be greatly appreciated by teacher and student alike.

The book is very heartily commended.

C. V. RAMAN.

* *Physical Chemistry—An Introduction*. By Dr. E. A. Moelwin-Hughes. (Cambridge University Press), 1940. Pp. viii + 660. Price 45s/6.

Advances in Enzymology, Vol. I. Edited by F. F. Nord and C. H. Werkman. (Interscience Publishers, Inc., New York), 1941. Pp. x + 433. Price \$5.50.

Early in 1939, it was learnt that Professor Nord chose to leave his country and that the University of Fordham had extended its hospitality to the illustrious founder and editor of *Ergebnisse der Enzymforschung*. His friends the world over were expecting that he would organise the publication of another series.

The present volume marks the commencement of the expected series and is intended to be of "service to those investigators who are devoting their efforts to extending our knowledge" in the field of enzymes and related subjects. The scope of this series is sufficiently broadbased to include critical reviews on proteins, viruses, photosynthesis and differs in this respect from the series, the *Ergebnisse der Enzymforschung* whose eighth, and we believe, the last volume, was published early in 1939; the series has apparently suspended its publication, presumably on account of the distractions and privations incidental to modern wars which render the peaceful pursuit of fundamental research difficult if not impossible.

The volume consists of ten contributions; the appropriateness of prefacing the series with a provocative review on protein structure is realised if attention is called to the impressive assemblage of "active proteins" which have been isolated during the last decade in a state of integral purity and crystallinity. Although the nature of the prosthetic group of several of the dehydrogenases, has been largely elucidated, practically nothing is known about the corresponding apodehydrogenase and the virus proteins. The next phase of development in the field of oxidation and reduction enzymes and viruses will lie in the elucidation of the nature of the active groups characterising these "active" proteins. Bull's discussion on protein structure which draws pointed attention to the several shortcomings in the present theory of protein structure, is most opportune; it will serve to focus attention on the several obscure points and stimulate further work in this important field.

The second contribution by Holzapfel relates to a consideration of the physicochemical behaviour of plant viruses in relation to their activity. Bergman and Fruton have discussed the specificity of proteinases, a subject to which they have made fundamental contributions. The phosphorylations which precede the step-wise fission of carbohydrates, the intermolecular transfer of hydrogen and the transportation of entire groups or radicles from one molecule to another, are all coupled with the energy changes associated with the phosphate bond. In an informative article on the metabolic generation and utilisation of phosphate bond energy, Lipmann has surveyed the subject of the energetics of cell metabolism in relation to the role played by

phosphorus. The chemical nature of catalase has been reviewed by Summer and the functional character of the low molecular weight prosthetic groups—coenzymes which include vitamins, heavy metals, etc., is discussed by Green whose share in the development of this field has been large and spectacular. Other contributions include reviews on photosynthesis, Bacterial photosynthesis, Enzymatic processes in living plants and the Digestion in lower vertebrates. It will thus be seen that the volume covers a wide and comprehensive field of Enzymology and related subjects. Scientific workers will feel particularly grateful to Professor Nord and his collaborators for inaugurating this series and we wish to take this opportunity of wishing their venture an uninterrupted career of service in promoting the advancement of Enzymology.

Modern Pottery Manufacture. By H. N. Bose. (Ceramic Publishing House, 1, Church Road, Bhagalpur), 1942. Pp. vi + 481. Price Rs. 6-8-0.

This book has been written mainly as a text-book for undergraduate students of ceramics in India, but it will also be found useful to many practical workers in the field, particularly for the assortment of practical formulas using Indian raw materials which have been tried out by the author in the laboratories and ceramic plants of the Benares Hindu University. Considered purely from the didactic point of view, there is scope for improvement in the presentation: expressions such as "graphite is a peculiar form of carbon" on page 320, and elementary portions such as the "mathematical calculations" on page 437, can be eliminated, and some of the diagrams such as Figs. 6, 23, 25 and 51 can be corrected and improved. An index will add considerably to the value of the book as a reference volume, particularly as it embraces all the different branches of the subject such as porcelain, stoneware, refractories, fuels, furnace and kilns, in one handy volume. We do hope that in the future editions to come, this essentially practical volume will grow to a higher standard of usefulness to all ceramists in India.

The book is rightly dedicated to "Reverend Pandit Madan Mohan Malaviya, the great Indian Educationist, who had the keen insight to recognise the importance of Ceramics to India, and first started the scientific training in the subject in the Benares Hindu University. S. J.

Pheretima (An Indian Earthworm). By Karm Narayan Bahl. (*The Indian Zoological Memoirs*, Lucknow), January 1943. Price Rs. 1-12-0.

The series of Zoological monographs entitled "Indian Zoological Memoirs" is so well known to all zoologists in this country that it should not need any further introduction for the readers of *Current Science*. It may, however, be noted that the series was started in 1926 under the editorship of Dr. Karm Narayan Bahl, Professor of Zoology, Lucknow University, and eight memoirs have already been published. The memoir under review is the third edition of the first memoir of the series, the editor's *opus magnum*, on *Pheretima* (an Indian earthworm). The first edition was published in 1926, the second in 1936, while a new and entirely revised edition has been issued in January 1943. The usefulness of the work can be gauged from the fact that within less than two decades two new editions have been issued.

The work, as it stands, is probably the most complete account available of any of the commoner Invertebrates of India. The author has spared no pains in bringing the text up-to-date by incorporating the results of all recent work, by thoroughly revising the descriptive account, and by the incorporation of additional illustrations. He has also indicated where our knowledge about this worm is deficient and where further research is desirable. The memoir is excellently printed and is remarkably free from misprints. The author deserves the best thanks of the zoologists in India for this excellent memoir, and it is hoped that further volumes in the series will be published as and when ready so as to provide students of Indian Zoology with authoritative accounts of various Indian types. B. P.

INDIAN STATISTICAL CONFERENCE

A LAST minute change in the venue of the Conference, the inability of the Governor of the Province to open the Session in person and with customary ceremony, a demonstration at the gates timed to synchronise with the arrival of the Vice-Chancellor of the University and the Chairman of the Reception Committee, and above all, the threat of air raids and the sight of enemy aircraft actually brought down in wreck and fire in the area, are not occurrences expected by any known statistical law or hypothesis and yet the goodness of fit between the Sixth Session of the Indian Statistical Conference at Calcutta in January last and the previous five annual meetings is both high and helpful. There was a Message from His Excellency the Governor which reminded that when peace comes, when

commerce, future of industry and of the economic life of the peoples have to be planned, it is statistical science that would largely help in fashioning them. The Hon'ble Mr. N. R. Sarkar stressed the same thought in his presidential address. "It is well nigh impossible", said the President who is also the Commerce Member in the Viceroy's Executive Council, "to prosecute a totalitarian war without the aid of the statistician at every turn. Problems of price control, rationing, production and distribution of food and clothing, maintenance of real wages and regulation of dearness allowance, all these required careful collection of data and the scientific study of relevant statistics."

The stage thus set was a valuable lead to the scientific meetings of the Conference. In