

## REVIEWS

**Chemical Species** (*La Notion D'Espece En Chimie*). By Jean Timmermans. Translated by Ralph E. Oesper. (Macmillan, London), 1941. viii + 177. Price 18sh.

We owe to Lavoisier, among so many other things, a correct exposition of the meaning of the word 'element'. The famous controversy between Berthollet and Proust was responsible for bringing out clearly the difference between definite compounds and mixtures. Since then our ideas about chemical species have become clearer as a result of progress in chemical theory on the one hand and the accumulation of exact experimental data on the other. But, confusion in distinguishing between different types of homogeneous substances—leaving aside the question of isotopes in elements—has not been rare. In fact, as late as 1908, Le Chatelier found it necessary to say "The inorganic chemists (less favoured than their organic brethren) have too often allowed themselves to be seduced into artificially augmenting the number of real compounds."

Preparation of pure materials, determination of the purity of substances, identification of the homogeneous nature of different kinds of matter by physical and chemical criteria is supposed to be and should be an essential part in the training of a chemist. Le Chatelier's accusation, however, would never have been made if such training had been uniformly imparted in all chemical research centres to investigators at some stage of their chemical education. The need for a thorough training in the foundations of chemical science is as great to-day as ever before and should an outline of a sound scheme for such education be needed, one has only to secure a copy of Prof. Timmermans' 'Chemical Species' translated from the French original into English by Prof. R. E. Oesper. The book under notice deals, in an admirable manner, with the different aspects of the points mentioned above. Information of great value is included in the 26 chapters of this small volume of 177 pages. Special mention may be made of two very brief but very important chapters, one on critical appraisal and choice of published data, and the other on scientific and technical applications of pure materials.

*La Notion D'Espece En Chimie* was first published in 1928. But, as the translator remarks "probably through lack of proper advertising this valuable little book became known to too few chemists and has never been accorded the attention it merits". Prof. Ralph Oesper has rendered a great service to the scientific reading public by translating a specially revised manuscript from which 'both the novice and the seasoned veteran' have much to learn.

A. N. K.

**The Applications of Chemical Engineering**. Edited by Harry McCormack. (Chapman & Hall, Ltd., London), 1940. Pp. x + 431. Price 21sh. net.

This book is the outcome of the recognition of a long-felt need for a practical laboratory handbook on the subject of Chemical Engineering. It is a co-operative effort of the editor and a group of co-authors who are all in the profession of teaching Chemical Engineering in different American institutions. These authors have collected and co-ordinated all the available material on the practical applications of chemical engineering and then have selected only what they deemed suitable for this publication, avoiding unnecessary and unsatisfactory matter.

This book is well printed and well got up. It describes seventy-five experiments covering the important subjects of temperature measurement, flow of fluids and heat, and the unit processes of evaporation, distillation, drying, humidification, gas absorption, classification of solids, and size reduction. We find that the number of these experiments apportioned to the various subjects does not conform strictly to the relative importance of these subjects but this cannot be considered as a drawback because a comprehensive set of experiments is not necessary for an average course of practical training. In the opinion of the editor, one-third of these experiments is sufficient and the teacher may select the most suitable ones for the purpose and the available equipment.

The absence of chapters on industrial crystallisation and conveyance of solids is a little disappointing. The scope of this



treatise will considerably increase by an inclusion of these important subjects.

The scheme underlying the chapters, each of which deals fully with a subject, is quite comprehensive. Each subject is introduced with a description of the underlying general principles in sufficient detail. Then the experiments are described with a statement of the object, details of the necessary equipment and the practical procedure. The preliminary and detailed reports with the forms of recording data and calculations are given. What is perhaps a very helpful feature is that each experiment is concluded with 'sample data' and 'calculations'. There are graphs illustrating general principles and practical results, diagrams and pictorial representation of laboratory equipment and complete bibliography on each subject.

The authors should be thanked for this valuable contribution to the teaching of practical chemical engineering. Those who are keen on equipping their laboratory and drawing up a scheme of experiments in this branch of engineering will do well to consult this work freely. Even the practising chemical engineer finds this a very helpful book when he is called upon to make tests on his large-scale units. In short, this book admirably fulfils one of the wants hitherto felt by the teacher, the student and even the practising chemical engineer.

G. G. RAO.

**Text-Book of Physical Chemistry.** By Samuel Glasstone. (Macmillan & Co., Ltd., London). 1940. Pp. xiii + 1,289. Price 42sh.

It is welcome to have under review this lucid and comprehensive presentation of Physical Chemistry by an experienced author whose other well-known books are "popular" with students, both undergraduate and post-graduate. The avowed object of the book is to "take the student with a very elementary knowledge of Physical Chemistry, such as might be gained in a normal course on general chemistry and lead him by easy stages and with the simplest mathematical methods to such an understanding of the subject as will permit him to appreciate the more advanced treatises and recent Journal literature". Judged as a whole and overlooking a few minor blemishes the author has been eminently successful in achieving this object. By judicious use of small types for difficult

matter and suitable appendices to each chapter, the subject-matter has been made clear, interesting and up to date. It is difficult to single out any chapter or chapters for particular mention but the order of presentation starting with the atomic structure, and the modern theories of valency and leading on through radioactivity, thermodynamics, states of matter, etc., progressively covers the entire field of Physical Chemistry in a precise and thoroughly modern manner.

The get-up of the book and the typography are excellent, and there is no doubt that this book will have a wide appeal both to the teachers and to the taught.

**An Introduction to Chemistry. Part I. Inorganic Chemistry.** By A. C. Cavell. (Macmillan & Co., London), 1940. Pp. 512 + xiii. Price 6sh.

The aim of the book is to provide a complete course in elementary, theoretical and practical chemistry. The historical notes at the end of each chapter form a new and welcome departure and would no doubt stimulate the interest of the young student in the development of the subject. Emphasis has rightly been placed on the electrochemical series as the basis for the study of metals in an elementary course. A large number of numerical problems are included to familiarise the student with theoretical principles. The collection of well-selected questions at the end of each chapter renders the book very useful as a text-book. Full practical details are included for a large number of experiments.

A few blemishes have to be pointed out. The quantities of chemicals the student is asked to employ in some experiments seem to be excessive (cf. pp. 20 and 21). On p. 31, the definition of solubility is incorrect as no mention of saturated solution is made therein. Structural formulae are of value in an elementary course and could usefully have been considered in dealing with the three phosphoric acids. The reversible nature of the effect of heat on calcium carbonate (p. 405) and of red lead (p. 451) has not been indicated.

The book, which is primarily intended to meet the requirements in inorganic chemistry of the school certificate examination in England, would be useful as a text-book for the intermediate examination of Indian universities.

B. S. RAO,