knowledge, or in the more applied form of industrial research; and Dr. Kenneth Mees' experience—he is vice-president in charge of research, Eastman Kodak Company, Rochester, New York—gives weight to his analysis of the problem. The book concludes with a short chapter in which the "Path of Science" is reviewed, particularly with reference to methods of government and political leadership.

H. D. ANTHONY

TEACHING OF INORGANIC CHEMISTRY

General and Inorganic Chemistry

For University Students. By Prof. J. R. Partington. Pp. xxiii + 916. (London: Macmillan and Co., Ltd., 1946.) 36s.

HOWEVER much a new text-book from an authoritative writer may be welcomed, an even warmer reception usually awaits a well-established text after searching revision. Prof. Partington's "Text-Book of Inorganic Chemistry for University Students" is familiar to every student of chemistry, and an up-to-date text-book, planned in a generally similar way and from the same pen, is a valuable addition to our teaching resources. The new "Partington" is a distinct advance on its predecessor, particularly in the provision of much-expanded sections on the chemistry of the less common elements.

The book is divided into two distinct sections. The first, comprising rather less than one third of the text, is an outline of classical physical chemistry, at a standard adequate to provide for intermediate and university scholarship candidates. The second section treats the chemical elements in the order of groups in the 'short' Periodic Table; this section is of substantially higher standard than the first, and it is designed as a basis for work up to general degree level in inorganic chemistry, the intention being that honours students should read the more advanced aspects of the subject in original papers and specialized texts. The book thus provides all the physical and inorganic chemistry needed by a university scholarship candidate, with sufficient additional material in inorganic chemistry to make it useful right up to the honours degree examination. The policy of covering so much ground in a single volume is perhaps open to question, but Prof. Partington's succinct style of writing and careful selection of material have ensured thorough treatment of the whole field, and consequently a wide appeal for his book.

The general and physical chemistry section of the book is well planned on conventional lines, and proper attention is given to atomic and molecular weights, the kinetic theory, the phase rule, solutions, thermochemistry, electrochemistry, and chemical and electrochemical equilibria. Four chapters at the end cover the Periodic Law, modern atomic theory, the solid state, and the quantum theory of the atom and of valency; these chapters provide a basis of general principles for the inorganic section of the book. Unfortunately the pace of recent developments and war-time restrictions have been such that the treatment of radioactivity will need considerable expansion at an early date. The discussion of valency affords a useful picture of modern views without being too highly theoretical, and is well adapted to students' needs. The sections on the structure of

solids, however, are disappointing, and do not sufficiently reflect the basic importance of structural concepts in the inorganic chemistry of solids. Non-stoichiometric relationships in solids, particularly, merit more consideration in view of the rapidly growing appreciation of their fundamental significance.

The inorganic section of the book, considered as a concise and accurate presentation of chemical facts, is uniformly excellent, and the author is to be congratulated on covering a large and diverse field of knowledge in a way that is open to little detailed criticism. However that may be, the general approach to the subject as a whole is unattractive; in its condensed and rather uninspiring presentation of factual chemistry, the book may tend rather to weaken than to arouse interest in the inorganic field. Admittedly there is no short cut to a knowledge of the descriptive chemistry of the elements, and for this reason the adoption of a simple system of treatment based on the Periodic Table merits hearty commendation; too early an attempt to systematize the facts of inorganic chemistry leads to disillusionment when the exceptions are discovered to be far too numerous to prove the rules. Nevertheless, many branches of modern inorganic chemistry lend themselves to discussion in such a way that broad lines of progress are emphasized, and genuine interest promoted in the reader. The present work retains the classical style of inorganic text-books rather too tenaciously.

Prof. Partington maintains in his preface that students should consult original papers in the course of their studies, and he gives a century-old quotation by George Fownes in support of his view. During the past century, however, inorganic chemistry has developed rapidly, particularly in the application of new experimental techniques, and university courses have also changed a good deal. Modern students complain, not without good reason, that they are expected to read far too much; they will scarcely welcome the author's suggestion that his admittedly concentrated survey is intended as a companion to more or less extensive reading elsewhere. They will find it a hard task, in fact, to use the book in this way. The references are too numerous and insufficiently discriminating, and unless they are followed up with a measure of wisdom uncommon in students they will lead to a detailed knowledge of a few selected topics, at the expense of a broad general acquaintance with inorganic chemistry. Certainly a graduate in chemistry should have studied original memoirs of recognized merit; but their selection requires much more definite guidance than this book affords. In inorganic chemistry, original papers are best used in the study of special experimental methods and their application, which usually possess sufficient inherent interest to hold the reader's attention and infuse in him something of the spirit in which the science has developed.

Prof. Partington's book deserves popularity, but its limitations should be realized and counteracted by wise counsel from the teacher—an indispensable adjunct, after all, to any university course. If the book arouses interest in the whole subject of teaching methods in inorganic chemistry, Prof. Partington's service to chemists, already great, will be yet greater.

Adequate descriptions of lecture experiments are given throughout the book. The diagrams are clear and well chosen, and the standard of printing and production is high.

A. J. E. WELCH