

stimulate yet more work, so that it will require considerable expansion in its second edition. It is at present small enough to permit of such expansion, and the foundation already laid should be ample to carry it. Anyway, by the time the second edition appears, these copies will be due for honourable retirement; they are not likely to get much peace until then.

D. ROGERS

THE SYNCHRONOUS INDUCTION MOTOR

The Synchronous Induction Motor

By J. Griffin. Pp. 136. (London: Macdonald and Co. (Publishers), Ltd., 1954.) 18s. net.

ROTATING electromagnetic machines form a family of machines in which a field-producing element and a current-carrying element react in such a way as either to convert electrical into mechanical energy or vice versa. The different methods used to activate the elements give rise to the various types of machines and include the use of direct or of alternating current and, in the latter case, of supply by direct connexion or by induction. Most types maintain the same methods during running as during starting, and their behaviour under both conditions of operation can be understood from consideration of the basic characteristics of their individual types. But the synchronous induction motor embodies the characteristics of two fundamentally different types: one, the induction motor, actuates both elements from a single source; the other, the synchronous motor, uses two different sources to energize the elements. One difficulty presented to the student of this machine is in understanding how the transition from induction motor to synchronous motor occurs, and how it will affect the machine in its ability to pull into synchronism; and another is in appreciating the effect of direct current flowing in a polyphase winding and producing a magnetic field.

The author of this book treats these problems in a practical manner, and his review is materially helped by the co-operation of manufacturers, who have provided the material for the many plates with which the book is illustrated. Mr. L. H. A. Carr, in a foreword, points out the value of a book which explains to utilization engineers the properties of a machine permitting power-factor control and to teachers the theory of the cylindrical rotor type of synchronous machine.

In the introduction the author pays tribute to the Swedish inventor Danielson, who brought out the motor in 1900, and gives in an appendix a translation of an article in *Elektrotechnische Zeitschrift* (December 26, 1901) by Danielson. A chapter is given to methods of starting, and some important points are made such as the necessity on the grounds of temperature rise to limit horse-power output demands when over-exciting the machine for power-factor correction. There are useful chapters on synchronous motor theory and on the economics of power-factor correction, and the effect of first cost is well discussed. Overload capacity, automatic control and electro-dynamic braking are adequately and simply described. The merits of making the rotor carry the primary winding are well brought out, and general limits of the method as to voltage and output are stated.

Secondary windings are described generally and include double three-phase star, open delta, unsymmetrical three-phase star, two-phase with single-phase excited; and the general theory concludes with a comprehensive treatment of the problem of the exciting current and its calculation. A brief chapter on the salient-pole synchronous induction motor is interpolated, presumably for purposes of comparison of performance, and the book concludes with details and examples of general construction. There are a useful bibliography and a good index.

H. M. CLARKE

A MODERN VIEW OF INORGANIC CHEMISTRY

Comprehensive Inorganic Chemistry

Edited by Prof. M. Cannon Sneed, Prof. J. Lewis Maynard, and Prof. Robert C. Brasted. Vol. 1: Principles of Atomic and Molecular Structure. By W. N. Lipscomb. Theoretical and Applied Nuclear Chemistry. By P. R. O'Connor. The Actinide Series. By G. T. Seaborg. Pp. xi+232. (New York: D. Van Nostrand Company, Inc.; London: Macmillan and Co., Ltd., 1953.) 35s. net.

THERE can be many plans for the writing of books. In this case different authors have contributed separate sections, each of which is, in its own way, complete within itself and relatively independent of the others. In such circumstances, one might ask whether the choice of articles is the best and whether any given topic has been developed in the most suitable manner.

The introductory section to the first volume of this series, by William N. Lipscomb, deals with principles of atomic and molecular structure. Discussion is restricted to extra-nuclear properties such as electronic structure, chemical bonds and structures of molecules and crystals. The material is very well presented in a space of eighty pages, an impression of completeness having been achieved by strict adherence to the main theme. The second chapter, on theoretical and applied nuclear chemistry, by P. R. O'Connor, also eighty pages in length, includes a useful account of elementary particles, nuclear structure and radioactivity, followed by a discussion of methods of radioisotope production and applications to chemical problems. The last chapter, on the actinide series, has been written by Prof. G. T. Seaborg. It is, of course, authoritative, and extremely well presented, although perhaps written with rather more bias towards the radiochemical point of view than is necessary in a volume on inorganic chemistry.

This criticism is one which might be levelled at the volume as a whole. The development of atomic energy has undoubtedly led to a great development in radiochemistry, and it is a good thing that this aspect of inorganic chemistry should be well to the fore in a modern treatise. If it seems to have been overdone in this instance, it is probably because the volume has the character of a collection of independent review articles rather than that of a really cohesive treatise. On the other hand, it must not be denied that the system has its merits, particularly when the standard of the individual articles is as good as in the present instance. The book should, therefore, be well received by students and research workers alike.

R. SPENCE