

subservient to the evidence upon which they are based. Whatever may be the final verdict on the Pleistocene successions in the valleys of the Seine and Somme and the correlation of the archaeological and geological records, the facts recorded in this volume will have to be taken into account and will provide the basis for the resultant conclusions.

After a first part dealing with methods of study, the sections in a number of pits in the Paris region are considered, and afterwards the Mantes-Vernon area is dealt with in some detail. There follow accounts of sections and finds in the regions of Evreux-Nogent-le-Roi, Gisors-Fleury-sur-Andelle, Elbeuf, Rouen-Neufchâtel, Pont-Audemer and Duclair-Fécamp-Le Havre. For purposes of comparison there follow studies of sections in the Amiens, Beauvais-Clermont and Meaux-La Ferté-sous-Jouarre areas. Then comes the third part of the book, namely, several chapters dealing with the loesses of the region. M. Bordes divides the younger loess into three levels and the older loess into two. He considers the mode of deposition of the material, the fauna contained and the climate under which it was laid down. He studies the evolution of the human industries and their correlation with the loess levels, and ends with three short pages of general conclusions.

An excellent bibliography and list of the sites investigated, together with a map of the district covered, conclude the volume. Altogether, this is a first-class work, full of facts both from the geological and archaeological angles, and all students of the subject will welcome it.

M. C. BURKITT

ELECTRICAL MACHINES AND TRANSFORMERS

Electro-Magnetic Machines

By Prof. R. Langlois-Berthelot. Translated and revised in collaboration with Lieut.-Colonel H. M. Clarke. Pp. 535. (London: Macdonald and Co. (Publishers), Ltd., 1953.) 65s. net.

WHEN one reads the first sixty pages of this book, one gets the impression that it was written for youths, say, of fifth-form standard. But on reading further one soon realizes that the author's aim is more ambitious, and it appears that a sound knowledge of at least the elements of calculus and vector analysis is required for the full understanding of the book. But those who are not interested in the mathematical treatment of the subject will also find the book attractive, inspiring and thought-provoking. At a time when so much is spoken and written about the necessity of providing in Britain more opportunities for the education of technologists, the few pages in the last chapter on the relation between scientific and technical points of view and on the field of industrial research should appeal to many readers. Technological aspects are given prominence throughout. A special feature of the book is that the general principles and rules are outlined in a straightforward manner and that afterwards various complications to be met with in applying the rules are stated.

The book is written in that clear, logical style to be expected from a French author, and a word of praise should also be said about the competent translation. Much information is contained which is

not to be found collected together elsewhere. In this connexion, mention should particularly be made of the chapters on insulation and on ventilation, as well as the section concerning standardization of dielectric test requirements and the concise treatment of transient conditions.

Numerical examples scattered all over the book will prove helpful to the student and designer, and occasional hints for practical exercises to be performed by students will be welcome to the teacher; although he will miss, perhaps, specific problems usually to be found in British and American textbooks of this kind.

The six main parts of the book deal with the following: the family of electrical machines; general anatomy and physiology of electrical machines; the machine from the designer's point of view; the machine from the user's point of view; abnormal conditions of operation; and miscellaneous general comments, including a general introduction to technique of electrical machines. Some appendixes deal with the notations and symbols used, with simple relations like sinusoidal functions, complex quantities and polyphase systems, and with a brief introduction to circle diagrams and the like.

While the book deals in a general way with transformers, synchronous and asynchronous alternating-current machines, single- and three-phase collector machines and direct-current machines, further volumes are apparently planned by the author, a second one being already in preparation dealing in greater detail with transformers and alternators.

A few critical remarks may be permitted. It is somewhat astonishing that under the heading "Various Special Machines" no mention is made of the direct-current cross-field machines invented just fifty years ago by E. Rosenberg. They have been extensively used for lighting railway trains, the feeding of searchlights and for arc-welding purposes not only in Germany and Austria but also in France, where before the First World War quite a number of trains of the P.L.M. Railway were equipped with them; and also their further development connected with the name of Pestarini might have been mentioned, as the 'metadynes', 'amplidynes', 'rototrols' and 'magnicons' are now frequently used in regulating technique—for example, as auxiliaries for the excitation of large and small alternators or of the generators of Ward-Leonard sets.

In a book of this size, perhaps more emphasis could have been laid on the importance of a good power factor in induction motors. True, the power factor is mentioned in several places, particularly also in the appendix. But in the part dealing with the machine from the user's point of view a warning might have been expressed against installing outside induction motors in industrial plant, since this happens frequently in practice; as the power factor declines markedly at partial loads, an undesirable inductive load must be carried by the supply mains in these cases.

Very few misprints have been noticed, but one must be mentioned. In the explanation of the positive and negative phase-sequence on p. 447, the compositor apparently omitted half a sentence. But all these are minor blemishes, and the book can be strongly recommended and is a very welcome addition to the literature of electrical machines, in spite of the fact that this is already rather extensive. Author, translators and publishers can be congratulated upon this production.

R. NEUMANN