history of the subject is followed by a neat splitting of modern geology into its four main compartments: physical geology; mineralogy and petrology; palæontology; and historical geology. This is followed by chapters on geological surveys and maps, on the relatively new sciences of geophysics and geochemistry, and finally an interesting short chapter on the methods of drilling boreholes in the ground.

The second half of the book introduces economic geology, and the author is able to draw upon his practical experience in the selection of some suitable British examples. There are chapters on water supply, building materials, engineering geology, coal mining, ores, petroleum geology, and on geology and agriculture. The penultimate chapter refers to a number of other aspects of applied geology, such as the problems of mining subsidence, but concludes strangely with a few paragraphs on early man. A final chapter touches briefly on the possibilities for amateur work in geology.

This book, as the author writes in his preface, is "in no sense a text-book". The second part would justify its inclusion in a school library, but otherwise it is suitable only for the general reader. Such a book, intended for the layman, should be attractively illustrated and interestingly written. Compared with some of the beautifully illustrated popular science works to which we are becoming accustomed, this book makes a poor impression. Of the photographs a few, such as the one of a fissure produced by mining subsidence, are impressive; but others, such as the small aerial view of King George V Dock during construction, are of doubtful value. The diagrams throughout are uninspired, and the writing, though clear, is pedestrian in style.

Errors are few, though Chapter 4, on historical geology, contains several. It is stated, for example, that Great Britain "contains representatives of every one of the geological systems from the Cambrian upwards", while later, under "Miocene System", we find that "there are no Miocene deposits in Great Britain". In the stratigraphical table on pp. 76–77 Oligocene rocks are incorrectly referred to as being restricted to the Isle of Wight. In this table, too, the Devonian rocks are curiously listed stratigraphically as comprising Lower Old Red Sandstone, Marine Devonian, and Upper Old Red Sandstone. Finally, the placing of the Downtonian Series in the Silurian instead of in the Old Red Sandstone is not in accordance with the practice now followed by British workers on these rocks. There are several misprints in page and plate references which could easily have been avoided. The contents list on p. 5 contains two of these incorrect numbers.

C. H. Holland

PROTECTIVE CURRENT TRANSFORMERS

Protective Current Transformers and Circuits
By P. Mathews. (Advanced Engineering Textbooks.) Pp. xv+253+4 plates. (London: Chapman and Hall, Ltd., 1955.) 36*s*. net.

MEMBERS of the staff of the British Thomson-Houston Company are preparing a series of advanced text-books on electrical engineering, and the second book of this series covers the subject of protective current transformers. This is the first book of any standing on this subject and will be welcomed by all concerned with the design and use of protective gear for the wealth of information it contains, supported by the authority of a leading designer. Mr. Mathews does not shirk any of the difficulties of his subject and has written his book for the benefit of workers in this field of engineering. It is scarcely to be considered suitable for engineering students. The title of the book suggests two subjects, but it is clear that the author is mainly interested in transformers: circuits are discussed only in so far as they affect the transformer design. It is perhaps somewhat surprising that the author does not give an introductory chapter surveying the whole field of protection and indicating the function of the transformer in this field, but apparently he assumes his readers to be already well versed in the general subject and he starts immediately on the transformer.

The book is divided into two parts, the first dealing with design for steady-state conditions and the second with design for transient conditions, which are becoming more important with the increasing use of high-speed protection. Each chapter has its own references—a procedure which is preferable to collecting all the references in one block.

The author bases his treatment on the linear theory of current transformation but does not make clear why the vector theory is unsatisfactory. His development of the linear theory is on the whole clear and easy to follow except for some awkward jumps. For example, he introduces ratio error before he has defined ratio and he passes from the general theory of coupled circuits to the theory applicable to single turns only without any clear dividing line. This leads him into a minor error when he states that the leakage inductance of a toroidal secondary winding with respect to a bar primary is zero, a statement which is only true for a single-turn secondary, although it is a close approximation for a single-layer secondary. For multi-layer secondary windings the leakage inductance is negative. It is noteworthy, however, that minor blemishes of this kind only occur in relatively unimportant places, and the author has evidently taken great trouble to develop a sound treatment of the important parts of his subject. The reading of the book is perhaps made a little more difficult by the author's ruthless disregard of the standard symbols of the British Standards Institution. Some sympathy may well be felt for him when he finds himself at variance with this Institution over the irrational definitions of ratio error and the sign conventions for phase angle of transformers adopted by this body; he is on less sound ground when he uses a small 'e' to indicate current, small and capital letters indiscriminately for r.m.s. currents, $\log_e$ instead of ln, and other variations from standard usage. The coining of new words is always an attractive occupation and the author has allowed himself the luxury of creating the word 'decroachment'. Whether others will accept this rather ugly word remains to be seen.

It is inevitable that the minor faults mentioned in this review should appear disproportionately important; but there appear to be no major faults and the treatment of the transient operation of transformers, in particular, is excellent.

It would not be out of place to include a word of praise for the publishers and printers for the attractive lay-out of the book, the pleasing contrast between the type and the paper surface and the very few errors.

A. H. M. Arnold