

appeal to most readers of even scientific literature, others present features capable of useful application, and the whole volume constitutes an important record of high-class research. Such a miscellaneous assortment of papers does not provide an easy task for a reviewer, but it is hoped that sufficient indications have been given to enable readers interested to appreciate the real value of the work.

Impedance Networks.

Transmission Networks and Wave Filters. By T. E. Shea. Pp. xvii + 470. (London: Chapman and Hall, Ltd., 1930.) 32s. net.

THE study of impedance networks has acquired much importance during the past decade, as a result very largely of the pioneer work of G. A. Campbell on wave-filters. The literature of the subject has hitherto been scattered through the pages of patent specifications and technical journals, particularly the Bell System technical journal; the present very thorough account, which is particularly complete in its treatment of wave filters, will therefore be of the highest value to electricians. Although wave-filters have hitherto been used mainly in their practical applications to telephony, telegraphy, and wireless transmission, the precision with which they can be made to suppress some frequency bands while admitting others may render them of service in some branches of pure research.

Part I. deals with general principles, such as impedance-matching and the determination of iterative and image impedances—properties of asymmetric networks which correspond to the characteristic impedance of a uniform cable; propagation constants, the real part of which determines the attenuation of oscillations transmitted through the filter chain, while the imaginary part determines their phase change or velocity of propagation; and equivalences between various types of impedance combinations. Part II. deals with wave filters, as distinct from artificial lines for imitating cables, from retardation lines for producing progressive phase-change, and from attenuation equalisers for correcting distortion in telephony. It discusses the criteria for determining the 'cut-off frequencies' at the edges of the suppressed and transmitted frequency bands; the principal types of filter, particularly the 'constant- K ' in which the product of the series and shunt impedances in each filter section is constant for all frequencies; the design of band-pass, low-pass, and high-pass filters; and the evaluation of the reflection losses which arise

when a filter is not terminated by matched impedances.

Part III. is devoted to the transmission through impedance networks of transient impulses, such as telegraphic impulses, and gives *inter alia* an interesting analysis of the blurring caused in television by the fact that the width of the scanning aperture is not zero—a defect which can be remedied by the insertion of a suitably designed network. There are an excellent bibliography, numerical tables and graphs, a list of U.S. patents, and an index.

Although the wording of the book does not always strike an English reader as perfectly lucid, the author contrives to make his complicated subject clearly intelligible, and the mathematical treatment is simple and direct. The style in which the mathematical formulæ are set out suggests that they were originally typewritten with an ordinary typewriter, and leaves something to be desired. The choice of symbols is irritating: dashes, suffixes, and sub-suffixes appear and disappear like 'bats in a belfry', and the list of symbols on page xv omits the most puzzling of them. Nevertheless, as an intelligible exposition of subject matter which has not previously been summarised with anything approaching the present thoroughness, the book will be indispensable to all whom it concerns.

C. W. HUME.

Our Bookshelf.

Christ's Hospital: from a Boy's Point of View, 1864-1870. By the late Rev. W. M. Dignes La Touche. Edited by his Brother. Pp. xii + 82 + 2 plates. (Cambridge: W. Heffer and Sons, Ltd.; London: Simpkin Marshall, Ltd., 1928.) 3s. 6d. net.

THE appointment of Mr. Hamilton Fyfe as the head of a university in Canada and of Mr. Flecker as his successor recalls one's mind to the famous school which the one is leaving and the other taking over. The Blue Coat School has always held a special place in the affections of English people, partly from the picturesque dress to which the boys remain loyally and proudly attached, partly from its old situation in the heart of London, partly from the lustre which a long array of distinguished ex-scholars have shed upon it. What school would not shine brighter in the light of Charles Lamb and Samuel Taylor Coleridge? It has since 1902 been housed in the most magnificent group of buildings provided for any school in England, and its efficiency in education reached its highest point under the able direction of its late chief.

The little book before us gives a lively and interesting account of the school in its old home from the pen of an 'old boy' now dead, the Rev. W. M. Dignes La Touche, a member of one of the many gifted Huguenot families who came over from France