

a moot point. One supposes, however, that medical and junior biology students will always have to study, with the optical microscope, sections prettily stained by current histological methods.

The frontispiece has a photograph of Harry Carleton. No doubt we all become less beautiful with age, but to those who have other photographs of Carleton, the choice made for this book will seem unfortunate.

There is a foreword by Sir Roy Cameron which informs the reader that, "A pupil of Gustav Mann, whom he succeeded at Oxford, and of Champy, he inherited their common sense and uncanny intuition". Actually, Carleton never saw Mann, was not his pupil, and did not succeed him. Carleton was trained as a cytologist by the reviewer and succeeded the latter after he had migrated to University College, London. There seems little doubt that Sir Roy's kindly piece about "common sense and uncanny intuition" must have belonged to Carleton's period with C. Champy at Paris. J. BRONTË GATENBY

TELECOMMUNICATION

Communication Engineering

By Dr. W. L. Everitt and Prof. G. E. Anner. Third edition. Pp. xi + 644. (London: McGraw-Hill Publishing Company, Ltd., 1956.) 67s. 6d.

THE recognition of telecommunication as a separate and distinct branch of applied science involving fundamental principles of great generality and requiring powerful mathematical weapons for attack upon some of its problems may be said to have developed during the nineteen twenties. Prof. W. L. Everitt's text-book, when it first appeared in 1932, was one of a very small group of pioneer texts which exemplified this recognition and endeavoured to treat the subject of telecommunication as a unity. The book, which was written at a level appropriate to university undergraduate courses, was quickly accepted by teachers as a work of exceptional quality and before long had established itself as one of the standard text-books for students.

The third edition of "Communication Engineering" appears under the same title but under the joint authorship of Prof. Everitt and Prof. G. E. Anner. In the preface to the new edition the authors remark that, at the time at which the first edition was planned, it did not appear presumptuous to cover, in one volume, the major fundamental concepts in the field. Now, however, that is quite impracticable, and "it has been decided to concentrate on the area which must precede the study of all other divisions of communication, namely, the fundamentals of linear-network analysis and synthesis including the use of unilateral elements".

The book opens, as did its predecessor, with a chapter on the fundamental principles of communication networks. This introduction is excellent. The basic concepts underlying multi-channel frequency-division communication systems are introduced almost at once, and this is followed by a clear description of amplitude and angle modulation and of the relative effects of interference in the two systems. A similar treatment is given of the principles of signal sampling, pulse-modulation and time-division multiplex. Finally, there is a section dealing

briefly with the quantitative measure of information and with the implications of the Hartley-Shannon law.

Two chapters are devoted to the transient and steady-state analysis of linear networks. These are followed by a chapter giving a thorough treatment of resonance and a chapter on bridge networks. This last chapter deals with the important applications of the bridge principle in communication circuits, namely anti-side tone, duplex and phantom circuits, two- and four-wire repeater circuits and circuits for the stabilization of radio frequency amplifiers. The treatment of passive networks with lumped parameters is completed by two further chapters on iterative networks and wave filters. Transmission lines, in the new edition, occupy a good deal more space than in the old, there being a separate chapter on lines of low loss which includes a very satisfactory treatment of impedance charts and their applications. It is noteworthy that in addition to deriving the transmission line equations as the limiting case for a repeated lumped network these are also established from the fundamental differential equations. In my opinion Prof. Everitt's application of the compensation theorem to establish the steady-state relationships for mismatched termination and reflexion is a most valuable illustration of the power of circuit theory, but it lacks the quality of developing physical insight. The concept of a true time delay in transmission can be first developed unambiguously for the genuinely distributed system and then interpreted for the repeated lumped system satisfactorily, but the reverse sequence presents some awkward problems.

Impedance transformation receives very full and satisfactory treatment, excellent illustration being given of the use of the Smith chart in relation to broad-band impedance transformation. One chapter is devoted to equalization and includes a fairly full treatment of the semi-graphical method of computing the attenuation response curve which is known as the 'corner plot' method.

Two further chapters complete the main text of the book. The first of these treats linear amplifiers. Again the treatment is on as general a basis as is practicable, figure of merit being introduced at an early stage, design for maximally flat response receiving considerable attention and the relations of steady-state response, transient response and amplitude response being studied. The final chapter, entitled "Electromechanical Coupling", gives a brief elementary treatment of the more important electro-mechanical transducers employed in telecommunication.

Comparing the new book with the old, there are inevitably losses as well as gains. Those like the present reviewer who had come to regard certain sections of the old book, as for example that on modulation and demodulation, as giving some of the clearest and most illuminating elementary treatments available, cannot but regret the disappearance of a good many well-tried and familiar sections. On the other hand, the more comprehensive treatment of linear communication networks on a 'broad-band' basis is of the highest value.

As a text for students the new edition of "Communication Engineering" is a work of excellent quality which should commend itself as did its predecessors to the good opinion of teachers of the subject.

JAMES GREIG