

examination of the electron motions' in diodes (without and with treatment of initial velocities, and under the condition of constant emission temperature at the cathode) in triodes and in the ideal tetrode. Static and dynamic tube capacities are discussed, and important and interesting sections are devoted to the characteristic tube admittances in the short-wave region and to dynamic measurements of the electron motions in hexodes, heptodes and octodes. The last few sections include brief examinations of transit-time effects, of the relatively new, rapidly widening and extremely promising field of secondary-emission tubes, of the vital question of fluctuation-noise and the construction of low-noise tubes, and of some important thermal problems in multi-grid receiving tubes. It is significant to observe that the utilization of secondary-emission phenomena has already made commercially available tubes of exceptionally high mutual conductance

(14 milliamperes per volt), and tubes of exceptionally low noise-level.

The work is made still more valuable by the use of practical units, by the prominence given to numerical evaluation throughout, and by the provision of a bibliography of approximately three hundred independent entries.

These volumes are indispensable to the circuit designer who wishes to make the best use of the lavish gifts showered on him by the valve-physicist. But it makes good reading for a much less specialized circle; to trace throughout the work the whole story of the octode, its growth from less complex multi-grid tubes, the interactions and secondary effects which must be considered in its design, is an exercise which will impress any physicist with the high quality of the scientific insight and diligence which are so generously and compactly built into the modern multi-grid receiving valve.

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## A Study of Drugs

### A Text-Book of Pharmacognosy

By George Edward Trease. Third edition. Pp. x + 740. (London: Baillière, Tindall and Cox, 1938.) 21s.

IT is a far cry from the *materia medica* of the old days to the modern pharmacognosy. The change has come about largely as a result of the policy of the Pharmaceutical Society of Great Britain in setting this subject on a scientific basis and in demanding a high standard of attainment in it in its qualifying examinations.

The chief exponent of pharmacognosy in Great Britain for some time was the late Prof. H. G. Greenish, who developed the teaching of it at the Society's School of Pharmacy in Bloomsbury Square. He lived just long enough to revise his valued text-book of pharmacognosy in the light of the 1932 edition of the *British Pharmacopœia*. Since his death, his successor, Mr. T. E. Wallis, has continued to enlarge the scope of pharmacognostical practice, especially in the field of quantitative micro-analysis. Simultaneously, developments have occurred in the schools of pharmacy in British and foreign universities and colleges.

Mr. Trease's book has largely replaced that of Greenish in the teaching institutions. It was first published in 1934 and has gone through two editions in four years. The present edition is fully

abreast of the recent advances in pharmacognosy, and much time and thought have been devoted to its production. The complete pharmacognosist is a man of many parts. His preliminary training in botany, zoology, chemistry and physics furnishes him with a foundation on which to build experience in the technique of microscopy, histology, morphology, taxonomy, descriptive botany, plant geography. He learns how drug-yielding plants are cultivated, how the drugs are collected, prepared, exported, stored, marketed. He must know something of their active principles and the chemical tests by which they are recognized, and he must be able to appraise quality, and detect sophistication or substitution, particularly in relation to powdered drugs.

The author has gone to great pains to secure accurate information, and has obtained the help of several collaborators who have special knowledge. He presents his subject-matter in an interesting and readable form, illustrating it where possible by numerous reproductions of photographs, drawings and diagrams. The text-book is of great practical as well as theoretical value. It is almost indispensable to students of pharmacognosy; but the older pharmacists as well as all botanists would do well to peruse it. The publishers also are to be congratulated on a carefully printed and faithfully illustrated volume.

W. O. HOWARTH.