

BOOK REVIEWS

Photographic Chemicals and Solutions: J. I. Crabtree and G. E. Matthews, *American Photographic Publishing Co.*, Boston, Mass. (1939), 366 pp., \$4.00.

This is a book that can be recommended unreservedly as filling a need too long neglected by photographic writers. While a large portion of the material has necessarily been taken from papers published in the *SMPE JOURNAL* and other publications, many original items have been incorporated to form a thorough and extremely useful text and reference book.

An excellent introduction discusses the differences between the British and American systems of measurement and the many advantages of the metric system, but recommends that both American and metric equivalents be given for all formulas for the benefit of those who prefer not to change their present methods.

Next follows an effective discussion of "photographic" arithmetic, illustrated by many examples of conversion of formulas and related topics.

The chapter on apparatus not only covers numerous types of units but includes many useful hints as to the most effective use of these units. Then follows a comprehensive chapter on materials used in the construction of photographic apparatus of all kinds.

After these preliminaries and chapters on the importance of temperature control and water purity, follows a chapter on the mixing and using of photographic solutions. The thoroughness of the treatment of this topic may be gathered from the fact that there are 63 pages of concise and accurate information furnished.

Following chapters on solutions at high temperatures, storage of solutions, and substitution of chemicals, is an authoritative discussion of stains and their cause and treatment. This is succeeded, logically, by a discussion of the proper cleaning of photographic apparatus and general suggestions and precautions.

The book closes with an extensive formulary, list of solubilities, a valuable list of manufacturers of suitable materials, and an index. The book is well printed on high-grade paper and should be on every photographers bookshelf.

R. F. MITCHELL

Moderne Mehrgitter Elektronenroehren ("Modern Multigrid Electron Tubes"); M. J. O. Strutt, Eindhoven, Holland. Second volume: **Electro-Physical Foundations**, *Julius Springer*, Berlin (1938), 144 pp.

The first volume of *Modern Multigrid Electron Tubes*, published in 1937 dealt with their construction, operation, and properties. Its reception by the professional world encouraged Dr. Strutt to prepare this second volume, which deals with the electrical and physical fundamentals of electron tubes.

The first part of this second volume, starting from the laws of electrodynamics, derives the characteristics of the tubes from their constructional data. The second part deals with the highly complex electron movement in multigrid tubes. Not only are screen-grid and pentode tubes, discussed but also hexodes, heptodes,

and octodes. The second portion contains also detailed descriptions of the apparatus and methods developed in the Research Laboratory of the Philips A. G. for determining the characteristics of these multigrid tubes particularly in their relation to short-wave work.

Some appreciation of the completeness of this text can be gained from the table of contents: (1) Basic equations, mechanical analogies, and units, (2) Electron movement in a diode, with and without initial velocity, (3) Electron movement in a diode with constant cathode emission temperature, (4) Electron movement in a triode, (5) Static tube capacities, (6) The screen grid-plate spacing of an ideal tetrode, (7) Applications of the screen grid-plate spacing in high-frequency amplifier tubes, high-frequency, mixing, and power-amplifier tubes, (8) Dynamic tube capacities, (9) The characteristic tube admittances in the short-wave region, (10) The electron time of travel effect in amplifier tubes, (11) Dynamic measurements of the electron movement in hexodes and heptodes, (12) Electron movement in an alternating current field, (13) Dynamic measurements of the electron movement in an octode, (14) Tubes with a curved electron track, secondary emission tubes, (15) Ground-noise and the construction of low-noise-level tubes, (16) Comments on electrode temperatures, (17) Appendix, supplementing some computations in the text.

The author's very concise and clear representation of the abundant material is supported by numerous graphical and pictorial illustrations.