Book Reviews

Microwave Theory and Techniques. H. J. Reich, H. L. Krauss, P. F. Ordung, J. G. Skalnik. Van Nostrand, New York-London, 1953. 901 pp. Illus. $10.

Microwave Theory and Techniques presents a profusely documented treatment of theory, components, and measurement techniques employed at frequencies extending upward from approximately 300 or 400 magacycles per second. It is chock-full of useful information, of interest not only to students but also to research workers and communication engineers. It is very well suited either as a classroom textbook or as a reference book. The approach is mainly descriptive rather than rigorously mathematical. For each topic, basic relationships are defined, methods of solving the mathematical forms for specific boundary restrictions are outlined, and final conclusions are formulated as equations involving required variables. Appropriate illustrations appear throughout and include graphs and tables.

The first nine chapters are devoted to field and impedance concepts related to propagation and diffraction in transmission systems. Following an introduction to vector analysis, various electromagnetic laws, theorems, and boundary restrictions are developed as applicable to static and dynamic fields. Distributed circuit theory is explained and applied to the steady-state description of transmission lines under the influence of different load conditions in terms of traveling waves. Applications of resonant lines and transmission line charts are emphasized. This is preceded by the representation of guided waves as modes in rectangular, circular, ridge, and surface wave guides. Numerous wave-guide and coaxial line components are described, such as matching devices, transition sections, phase shifters, wave-guide tees, hybrid rings, directional couplers, wave meters, filters, and duplexers. Also included are devices for the measurement of field strength, power, and standing-wave ratio as well as measuring techniques. There is a chapter on broad-band antennas which delineates characteristics and excitation methods. Another chapter treats microwave resonators, exemplified by parallel-wire, coaxial-line, and wave-guide types, and contacting and noncontacting plungers.

The last six chapters are concerned with microwave tubes, amplifiers, and oscillators. The influence of density-modulated beams on equivalent circuits and performance is first considered. This is followed by a discussion of transit-time effects and the manner in which conventional triodes and tetrodes can be improved for applications at microwave frequencies. Special tubes designed for use with coaxial-line and cavity resonators are described. Among them are acorn and doorknob tubes, lighthouse tubes, pencil triodes, closed-spaced triodes, and disk-seal tetrodes. Two comprehensive chapters are devoted to velocity-modulated tubes or klystrons. A chapter on magnetrons treats various types of magnetron principles and their realization into practical arrangements. The last chapter is on traveling-wave and electron-wave tubes. It includes physical principles of operations and examples of designed tubes.

An outline of typical microwave laboratory experiments is described in the final pages. The MKS system of units is used throughout the book. With the exception of one, each chapter has been concluded with an interesting list of problems.

The subject matter is expertly treated. Since the coverage is intended to be broad, certain topics appear to be briefly mentioned. However, this is not a serious drawback since references are available for the reader who is interested in learning more about specific items. The authors are to be complimented for the diligent choice of topics.

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Australian and New Zealand Botany. John McLuckie and H. S. McKee. Associated General Publ., Sydney, Australia, 1954. xx + 758 pp. Illus. £4 4s.

At first thought it seems odd to have a national botany textbook, but immediately one realizes that British, French or American is usually implicit in the title of botany textbooks. Considering the uniqueness of the Australian and New Zealand flora, it is reasonable that a book should be written for Australian and New Zealand university students which relates the general facts learned about plants from study of those of the Northern Hemisphere to the plants with which they have been familiar since childhood.

McLuckie and McKee's textbook teaches its main lessons from the well-known plants such as bean, sunflower, corn, and *Tradescantia*. Students will be familiar with the anatomical and physiological facts derived from study of these plants when they go on for graduate work at home or in other countries, or when they read research reports based on work with crop or ornamental plants of Europe and North America that are also grown commonly in their own country. In addition, they will be able to see wherein the native plants of their countries are like or unlike those plants.

The chapters on the Australian flora and the New Zealand flora will be most helpful to students in those countries. They will also be valuable to visiting European or American botanists. A great deal of information is in these pages that was unavailable in any one place before. The chapters on the botanical history of the two countries are also very useful and, among other things, remind us that Darwin, Wallace, Huxley, and Hooker were all familiar to some extent with the flora of this part of the world and were undoubtedly influenced in their thinking by this knowledge.

In the more standard parts of a botany textbook,