Chapter 9 covers fiber preparation. Not surprisingly, the British Post Office's double crucible method is most thoroughly described; the treatment of what might generally be classed as chemical vapor deposition is certainly adequate although not exhaustive, NTT's vapor-phase axial deposition is not mentioned.

Chapters 10 and 11 cover loss and propagation measurements. Most of the techniques in use today are mentioned and one develops an excellent idea of the sources of difficulty and ambiguity in such measurements.

Chapter 12 covers fiber strength and cabling. The treatment of strength problems is clear as far as it goes, but the problem of time dependent stress corrosion is shortchanged. An explanation of the statistical techniques and testing methods which may be brought to bear on this problem would have been appropriate, particularly since the rate of corrosion can now be made smaller than the range quoted by Midwinter.

Fiber-to-fiber and source-to-fiber coupling techniques are covered in Chapter 13. The theoretical problems are well treated, and the reader is again given a good understanding of why and how difficulties arise. The description of extant demountable connections is, however, less than complete, because this is an area where significant advances in simplicity and performance have occurred since the writing of the book.

Receiver design is covered in Chapter 14. The purpose of this abbreviated account of a vast subject is presumably to give an appreciation of the problems encountered by the designer of such a device, and the general nature of the solutions he or she might employ. In this sense, the chapter is a success.

Finally, Midwinter raises some questions relating to overall system design. The emphasis is on telecommunication systems, but any intelligent reader who needs to, will be able to do his own systems design using Chapter 15 as a model.

Altogether, this is an excellent book. Some of the material isn't completely up to date. Some subjects are treated rather sketchily, others (e.g., the static hydraulic head in a double crucible puller) receive more attention than is to my taste. Such choices are the author's prerogative in a book of this type. Nearly all of the basics are there; Midwinter covers virtually every aspect of the physics and technology involved in the concept and realization of point-to-point fiber-optic links. Whole books have been, or could be written about some subjects he covers in a few chapters; yet this is one of the best and most complete introductions to fiber optics that has been written.

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**Modern Transmission Line Theory and Applications**—Lawrence N. Dworsky (New York: Wiley, 1979, 350 pp., $18.50). *Reviewed by G. L. Matthaei, Department of Electrical Engineering, University of California, Santa Barbara, CA.*

The author states that: "the purpose of this book is to extend the initial treatment of transmission line theory received by most electrical engineers to the point where transmission line effects can be properly considered, and transmission line properties can be calculated as a function of materials and geometries. Properties of stripline and microstrip circuits are emphasized, since there are the two line types that emerge naturally in the microwave integrated-circuit, printed-circuit layout." The book is lucidly written in much the style of a textbook; concepts and mathematical methods are carefully developed and explained. This book is not intended as a reference for previously computed design data for transmission lines. (That is, there are not much data such as charts of transmission-line impedance or dispersion versus relevant parameters.)

The book has 12 chapters. The first three are a relatively brief review of key material in basic transmission-line theory, including both steady-state and time-domain analysis with or without loss. Some of the topics covered include derivation of the transmission-line equations and wave concepts, use of position-time diagrams, solution by use of the Laplace transform, Smith-chart analysis, and transmission-line two-port parameters.

Chapter 4 gives a very clear treatment of the basics of scattering parameters including introductory examples of their use and measurement. Microstrip, parallel-strip line, helical line, and slotline are described in Chapter 5, along with a few approximate design equations for microstrip (mostly not derived). Surprisingly, ordinary stripline is not discussed in this chapter. The frequency-dependent properties of microstrip are analyzed in terms of an equivalent-circuit model, but means for relating this model to a specific microstrip line structure are not treated.

Chapter 6 gives an introduction to conformal transformation techniques for finding the capacitance per unit length (and impedance) of transmission lines. Several elementary examples are worked out, but the reader is referred to references for the much more involved cases of stripline and microstrip.

The concepts of skin effect, incremental inductance, and their relation to transmission-line resistance are developed in Chapter 7, while Chapter 8 deals with symmetrical and unsymmetrical coupled transmission lines and some of their applications. The equations for coupled lines are developed quite thoroughly, but coupled lines as used for bidirectional couplers are analyzed for the center frequency situation only. A brief discussion is included which indicates the filter properties of coupled lines for various combinations of short-space or open-circuit terminations on two of their four ports.

Discrete-variable methods for solving Laplace's equation are clearly explained in Chapter 9. The discrete form of Laplace's equation is developed for regions having one or more dielectrics, and iterative solution procedures are illustrated which use simple relaxation or overrelaxation. Stripline, microstrip, and microstrip coupled-line examples are included. The chapter ends with a short introduction to Monte-Carlo methods for solving discrete-variable problems.

Chapter 10 continues the development of methods for solving Laplace's equation, but using continuous-function methods this time. The case of stripline having two dielectrics in a rectangular housing is attacked by developing a Green's function expressed in terms of a Fourier series, and the capacitance per unit length is found using a approximate charge distribution optimized with the aid of Thomson's theorem. Another approximate method based on finding the parallel-plate and fringing capacitance is also explained, along with capacitance-matrix procedures which can be applied to three-dimensional transmission-line discontinuity problems. (Considering the goals of this book, more on discontinuities and junction effect would have been desirable.)

Chapter 11 surveys various types of impedance-transformer networks including step transformers, tapered-line transformers, and coupled-line transformers (including coupled lines wound on a toroidal core). Related balun circuits are also discussed. The applications of transmission lines as elements in circuits such as dc blocks, dc returns, diode switching circuits, diode attenuator circuits, etc., is surveyed in Chapter 12.

This book should be of value as supplemental reading for conventional electromagnetic theory courses in universities. Also, practicing engineers will find the book to be a useful, lucid reference for many fundamental concepts and mathematical methods related to transmission lines. However, they will probably often wish that the material presented was treated in more depth to give more fully the information needed for problems of major practical interest. They may also miss more of the related, ready-to-use plotted numerical data which exist in the literature. Though the book gives the reader good grounding in the fundamentals for many topics, the reader must often go to the references given for treatments of practical problems. In this regard, the reference lists are sometimes rather skimpy considering the large amount of important work that has been done in this area.

In summary, the book is a well-written source for fundamental concepts and methods in the area of modern transmission line theory and prepares the reader for further reading in the literature associated with this subject.

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**Analog and Digital Communication Systems**—Martin S. Roden (Englewood Cliffs, NJ: Prentice-Hall, 1979, 377 pp., $23.95). *Reviewed by C. R. Patisaul, Harris Corporation, Melbourne, FL.*

Professor Roden states in the preface to this book his goal to provide a textbook suitable for an introductory course in analog and digital communication. In the opinion of this reviewer, the effort has been successful. As described in the following, the presentation is straight forward and largely uncomplicated.

The first three chapters of the book provide the fundamentals of signal analysis, linear system theory, and probability theory needed in the remaining chapters. In fact, nearly half of the text, excluding appendices, is devoted to this background material. Chapter 1 deals with signal analysis and covers the Fourier series, the Fourier transform, convolution, singularity functions, and the sampling theorem. Abbreviated presentations of the discrete Fourier transform and the $z$-trans-