main physical features, and the modern concept of the soil and vegetation catena is introduced and illustrated.

The chapter entitled "Forest" includes neat descriptions of structure and physiognomy (including Raunkiaer's lifeforms), climatic peculiarities, and floristic composition. A similar treatment is given to savannas in another chapter. The two make up the vast bulk of West African vegetation.

Human effects on the forest, universal and dramatic as they are in West Africa, merit description in another chapter, "The relationship between forest and savanna." Finally, appendices give, in simplified form, descriptions of modern techniques of vegetation analysis and suggestions for student projects.

Through this pioneering little book, West African students will be introduced to the descriptive side of the study of vegetation. They will still need an introduction to the physiological, genetical, and evolutionary aspects of tropical ecology. But this is a start.

H. G. BAKER
Botany Department,
University of California, Berkeley

Medical Technology

Manual for the Identification of Medical Bacteria. S. T. Cowan and K. J. Steel. Cambridge University Press, New York, 1965. x + 217 pp. $9.50.

The heart of this manual consists of 21 tables of cultural characteristics that have practical use in identifying various species of 43 bacterial genera. The species included are those whose strains are most likely to be found in association with tissues, secretions, and habitats of man or animals. Bacterial or closely allied groups of importance to medical bacteriologists that are *not* included are *Mycoplasma*, spirochetes, bedsoniae, and rickettsiae.

In compiling the tables, the authors tried to do minimal injury to existing classifications and to avoid creating any new names. They found large gaps in published works, and their own data are, in many instances, the only source of information. The features used in the tables can be determined in nonspecialized (routine) laboratories with a minimum of reagents, apparatus, and highly trained personnel. Omitted are methods of identification that require the use of fluorescence or elec-

tron microscopy as well as methods of serotyping (except for streptococci) and bacteriophage typing.

In addition to the tables, the manual contains useful appendices on the preparation of culture media, reagents, and stains; methods of performing the tests; and micromethods; approximately 600 references are provided. Classification, nomenclature, identification, and unsolved problems in bacterial taxonomy are discussed. Although methods of isolating cultures from natural sources are not described, the authors stress the importance of obtaining pure cultures before attempts at identification are made. They observe that the main source of impure cultures is the use of media containing substances that inhibit, but do not kill, unwanted contaminants.

The tests contained in the tables are mainly of a physiological nature; little emphasis is placed on colonial morphology because this will vary with the medium employed and is seldom sufficiently characteristic to be diagnostic. I quote with pleasure: "Thus the reader will not find in this *Manual* diagrams of the different shapes, edges, surfaces, and elevation of colonies . . . the elimination of these relics of 19th century bacteriology makes unnecessary a glossary of descriptive terms that now have but limited use."

In summary, this manual should serve its intended purpose: to assist technologists in medical, veterinary, and public health laboratories as well as students in diagnostic bacteriology who have isolated a bacterial culture and who wish to identify it at the species level.

EUGENE D. WEINBERG
Indiana University,
Bloomington, Indiana

Linear Discrete Systems

Discrete-Time Systems: An Introduction to the Theory. Herbert Freeman. Wiley, New York, 1965. xiv + 241 pp. Illus. $10

At a time when most engineering textbooks on linear systems have a drab tendency to uniformity of content and when so many writers compete in saying the same old thing in what seems to them to be a better way, this is a refreshing little book. It should be pointed out that this is a book on *linear* discrete systems—that is, on

systems best described by linear difference equations—rather than one predominantly devoted to sampled-data systems and z-transform analysis. The book is well conceived and well written, and the material covered is well chosen. It would make an excellent textbook for a one-semester introductory course on linear discrete systems. One could possibly level two criticisms at this book—(i) that it is occasionally imprecise in its mathematics and (ii) that it is somewhat superficial. However, neither of these defects substantially impairs its usefulness as an elementary textbook.

Let us now take a short look at the contents. In the first chapter the reader is introduced to the concepts of state, linearity, operators, system equivalence, controllability, and observability. I venture the opinion that this is not only the first but also the worst chapter in the book. It is too imprecise and too inaccurate to be of much value. However, once past this hurdle, the author settles down in the second chapter to a clear exposition of elementary aspects of scalar and vector difference equations, weighting sequences, formulation of state equations, and so on. The next chapter is on transformation calculus and presents elementary z-transform theory. Then the author goes on to a very interesting chapter on sampling of continuous functions, in which he gives a very clear exposition of the Shannon sampling theorem and a few extensions. Chapter 5 is devoted to interpolation and extrapolation, and the author discusses, in a very elementary way, polynomial interpolation, Newton-Gregory extrapolation, and zero-order, first-order, and second-order extrapolation. This part of the chapter is particularly interesting because of the way it dovetails with the next two chapters on sampled-data systems in which zero-order, first-order, and second-order holds are discussed. The chapters on the sampled-data systems contain standard elementary material, with the exception of the introduction of Liapunov functions in the section on stability analysis, which treats both input-output as well as Liapunov stability. The author completes the book with a short chapter on discrete stochastic processes in which he concentrates on discrete-state systems.

E. POLAK
Department of Electrical Engineering,
University of California, Berkeley