of this collection learn of these implications, both practical and theoretical? Something, but not nearly enough.

Thus the book has three kinds of shortcomings: recent, important developments are omitted; transitions between experiments are not described or are unclear; the significance of some of the work is lost because it is out of context. It could be argued that such shortcomings are inherent in the nature of collections of this kind; or that this is an important book because it reviews the work of an unquestionably important scientist. Each of these arguments has a certain validity. Yet one comes away from the collection feeling that it could have had a wider impact had some of the gaps been filled, if not by Miller then by someone else versed in the various areas in which Miller has made so many important contributions. A few papers not crucial to an adequate coverage of Miller's work could have been deleted to make room for transitional and explanatory material, and the collection could thus have been converted from one that is undoubtedly valuable to the sophisticated professional into one of far wider usefulness and importance, a book that would have been more nearly commensurate with the breadth and significance of Miller's contribution to the daily more important problem of understanding behavior.

PETER L. CARLTON
*Department of Psychiatry,*
*Rutgers Medical School,*
*New Brunswick, New Jersey*

## Approaches to Ecology

**Analysis of Temperate Forest Ecosystems.** A seminar-workshop, Gatlinburg, Tenn., July 1968. DAVID E. REICHLE, Ed. Springer-Verlag, New York, 1970. xii, 304 pp., illus. $14.50. Ecological Studies, vol. 1.

This volume aims to summarize existing data on temperate forest ecosystems and to establish a conceptual framework for ecosystem analysis. It begins with an introduction to systems analysis as it applies to the study of ecosystem structure and function, moves on to consider the roles of primary producers, consumers, and decomposers, and ends with sections devoted to nutrient and hydrologic cycles.

A lucid account of systems modeling is given by F. E. Smith, using a simple hypothetical ecosystem to illustrate the methods. D. W. Goodall points out the conceptual difficulty associated with interpreting the response of an ecosystem to variations in environmental factors when the environment itself is part of the ecosystem, emphasizing further the lack of distinction between dependent and independent variables when, as happens in ecosystems, most variables are interrelated.

The importance of recognizing and accounting for temporal variation in productivity studies is stressed by several authors. An interesting paper by H. A. I. Madgwick points to the value of canopy models in gaining an understanding of photosynthetic processes, a view reinforced by J. S. Olson in relation to carbon exchange in the biosphere. Olson's analysis of available data leads him to suggest that the contribution of terrestrial ecosystems in general, and forests in particular, to the biogeochemical cycle of carbon has previously been underestimated. A stimulating paper by G. M. Woodwell and D. B. Botkin outlines the Brookhaven approach to solving the basic production equations for terrestrial ecosystems. Based on the applications of gas exchange techniques, but still heavily dependent on harvest methods (which are discussed in greater detail by other authors), it illustrates nicely the interdependence of the several approaches to a study of ecosystem productivity.

The degree to which compensatory responses of "dependent" variables stabilize ecosystems is a contentious issue. D. R. McCullough discusses this question, defining stability as the capacity of the system to adjust to modifications. According to this view, the continuing change during community succession does not necessarily involve instability. McCullough comes down on the side of those ecologists who affirm that there is a "balance of nature," a balance which functions mainly by setting limits on deviations.

The section on decomposer populations contains a description of the use of chemical methods in estimating microbial density (L. Steubing) and a comprehensive account of the role of soil invertebrates in the decomposition of organic matter (C. A. Edwards, D. E. Reichle, and D. A. Crossley, Jr.). Lack of knowledge on the part of the reviewer concerning water flux inhibits comment on the papers which deal with this aspect of ecosystem analysis.

Because the book appears only a few years after the English translation of Rodin and Bazilevich's comprehensive summary of production and cycling in terrestrial vegetation, the first of its stated objectives, to summarize existing data, was perhaps the more easily met. Taken overall, it achieves both this and its other aim of providing a conceptual framework for ecosystem studies, though it leaves largely to the reader the task of erecting the framework from the planks scattered among the contributions of various authors. The volume is complementary to (and in my view much more valuable than) the International Biological Programme handbook on primary production in forests.

BRYANT N. RICHARDS
*Department of Botany,*
*University of New England,*
*Armidale, New South Wales,*
*Australia*

## Evolutionary Cytogenetics

**Chromosomal Evolution in Higher Plants.** G. LEDYARD STEBBINS. Addison-Wesley, Reading, Mass., 1971. viii, 216 pp., illus. Cloth, $9; paper, $4.50. Contemporary Biology series.

After its heyday in the 1930's and 1940's, chromosome cytology suffered something of an eclipse with the burgeoning of work on microorganisms and the resulting clarification of so many aspects of the structure and function of the prokaryotic genome. Now fashion is changing again: "chromosome" and "chromatin" are becoming words of common use once more as interest moves back to the higher organism and problems connected with the eukaryotic genome and its expression in development and differentiation. As the new work gathers momentum, there is the distinct possibility that a considerable body of information bearing upon chromosome structure, behavior, and function will be lost or overlaid, necessitating rediscovery at some future date, following a pattern not unfamiliar in the history of biology. This excellent book by Stebbins therefore comes at an opportune time. Aimed at graduate-course level, it brings together in compact form a great deal of chromosome lore which will ultimately have to be integrated into any general account of the function of eukaryotic genomes, and does so in the lucid and readable style that has been a hallmark of the author's work over many years.