doubtful that the International Rice Research Institute ever drove a scientist out of employment for the purpose of capturing his collection of rice.

The chapter that developed Kenya as a case study added little to the book, but it was not a distraction either. I did wonder why the focus was on Africa; the issues addressed by the author are truly international and of global concern.

I found the book both enlightening and readable. The topics covered are of broad interest, and the issues addressed will provide a challenge to readers concerned about future world food supplies.

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PLAYING THE FIELD


It is always gratifying to recognize high quality, and this book on current techniques in plant physiological ecology is one of the best I have had the honor to review. It covers, in 17 detailed chapters, everything from a review of basic instrumentation (e.g., schematics of Wheatstone versus Maxwell bridges) and the construction of an open-top fumigation chamber for studying the effects of atmospheric pollutants, to discussions of the validity of stable-isotope techniques to determine nitrogen fixation in the field, to the compromises one faces in selecting appropriate systems to measure photosynthesis.

Because of the emphasis on techniques, Plant Physiological Ecology is designed for the serious researcher in physiological plant ecology. Fortunately, however, it is not simply a cookbook: enough details are given to allow researchers to modify the instruments and procedures to fit their particular needs. At the same time, one does not have to be an electronic whiz to use the book. The introductory chapter on instrumentation gives a good review of the basic physics common to most physiological studies, and the remaining chapters present a wide variety of examples illustrating various techniques and systems.

One of the nicest features of the book is the abundance of clear, informative illustrations. Some, such as the one illustrating a system for supplying $^{14}$C to leaves in the field, would allow even a naive researcher to set up the system with basic laboratory equipment. Others, such as the illustration of a periscope for observing root growth in the field, provide an excellent complement to the textual information on the variety and installation of complex or innovative systems. Finally, there are many schematics designed to illustrate the steps in a technique, such as one outlining the fractionation procedure to identify the carbon, nitrogen, and phosphorus fractions in plant materials. These schema are especially useful when describing a procedure to a new technician or student.

Although most of the techniques were developed in the laboratory, the authors discuss measurements on intact plants in the field as well. Fortunately, they are successful in avoiding the tendency for instrument-oriented scientists to become so enamored with their instrumentation that they are unwilling to tolerate the variances and vagaries of fieldwork. In fact, the authors seem to relish the opportunity to work in the field, even as they recognize the compromises and limitations of such work. This is, of course, the real nature of physiological ecology.

Despite my enthusiasm for this book, I must express by dismay at one feature—its price. Plant Physiological Ecology should be part of the library of every plant ecophysiologist, especially those who are preparing dissertation proposals. Unfortunately, at $110, the book is likely to be found only in the personal libraries of well-funded researchers or in the science libraries of major universities. I hope the publishers plan to produce a less expensive, soft-cover version so the book can be made available to all who could use it. It is clearly a book worth having.

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CRASH COURSE ON GENES


Understanding Genetic Engineering is based on a course for patent practitioners given at the University of Warwick from 1986 to 1989. The book assumes a basic knowledge of chemistry, but not of biochemistry or cell biology. Those areas are briefly but well summarized in the first two chapters. The third chapter covers genetics, from the basics of DNA structure to transcription, translation, and the operon. It concludes with the central dogma, the currently accepted rules governing the flow of information through a cell, leaving the reader with the impression that the flow is only from DNA to RNA to protein. The flow of information from RNA to DNA, which violates this original form of the central dogma, is not mentioned (although reverse transcriptase is mentioned in a later chapter as an enzyme useful for DNA cloning).

Subjects in the second half of the book include gene cloning in Escherichia coli, the introduction and expression of foreign genes in plants and animals, commercial applications of genetic engineering, and various factors necessary to get high-level expression of functioning proteins in microbial systems. Specific examples of cloning problems, such as the expression of the hormone somatostatin and vaccine production, keep...
the book from being too abstract. The theory and application of antisense RNA to targeted gene inactivation are illustrated with the disruption of pigment formation in *Petunia*. The final chapter covers the biology and biochemistry of monoclonal antibodies and their applications.

The chapters are concise, and drawings clearly illustrate the concepts being described. A detailed glossary is provided; it will be useful to those just entering genetic engineering. The authors point out that a book of this size can only provide an introduction to the subjects it covers. It is unfortunate, therefore, that no research publication or textbook references are provided for those wishing to delve deeper into the subject.

Genetic engineering is a rapidly moving field, so it is inevitable that the most recent developments will not be included in a book on the subject. For example, the use of DNA-coated microprojectiles to introduce DNA into plant cells (biolistics) is not included. One of the most important techniques now available to molecular biologists, the polymerase chain reaction, is mentioned nowhere in the book.

In spite of these qualifications, this slim book does an excellent job of providing the basic concepts used in genetic engineering. It will be useful to students and professionals who want an introduction to the theory and application of genetics to biotechnology.

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MATH INCAL EVOLUTIO NARY THEORY

Mathematical Evolutionary Theory contains contributions from many prominent theorists in the field of mathematical population genetics and in the neighboring areas of behavior, ecology, and molecular evolution. The book is dedicated to Samuel Karlin of Stanford University, an outstanding mathematician and mathematical biologist, whose scientific and personal influence on the development of mathematical evolution has been great. The areas of his scientific interests during last 30 years are reflected by the work of scientists who have been closely associated with him in the course of their careers.