kan" and "Penutian" groupings, or even of his narrower "California Penutian"; but they include a chapter on "Hokan inter-branch comparisons" by William H. Jacobsen, Jr., who speaks of "the Hokan family" as "rather comparable to Indo-European in its time depth" (p. 545), and a chapter in which Michael Silverstein states that "California Penutian . . . is established or at least virtually certain" (p. 675). On the whole, the book shows too much insistence on genetic pigeonholing, whether of the lumping or the splitting school, and too little recognition of the possibility—frequently referred to by Franz Boas and by more recent students of areal linguistics—that some similarities between languages may reflect shared history, but at such a remote historical period that we cannot distinguish the effects of borrowing from those of common origin.

A notice on the verso of the title page states: "For reasons of economy and speed this volume has been printed from camera-ready copy furnished by the editors and contributors, who assume full responsibility for its contents." In fact, the goal of economy is poorly served by the format, which is mostly that of double-spaced typescript: the purchaser of the volume is paying for too much white space, and for a correspondingly bulky volume. In some sections, faults of typing, spelling, grammar, and style are fairly numerous. On the positive side can be mentioned the full and useful index of language names. Apart from such technical matters, and in spite of its more substantive shortcomings, this book is an essential and authoritative reference guide to current research on the historical study of North American Indian languages.

WILLIAM BRIGHT
Department of Linguistics, University of California, Los Angeles 90024

Molecular Genetics

Genetic Recombination. Thinking about It in Phage and Fungi. FRANKLIN W. STAHL. Freeman, San Francisco, 1980. xiv, 334 pp., illus. $25.

Bacteriophage and fungi provide most of the best systems for studying genetic recombination. Their respective contributions are complementary. The fungi are an unrivaled source of detailed information about the end results of meiotic recombination in what we hope are representative eukaryotes. Some aspects of the data on fungi, especially those relating to gene conversion, postmeiotic segregation, and the correlation of these with crossing-over, invite speculation about molecular mechanism—speculation that, however, is difficult to check at the molecular level. Bacteriophages, with their readily accessible genomes of more tractable size, provide unrivaled opportunities for the physical isolation of recombination intermediates and even for the reconstruction in vitro of some of the steps through which these intermediates are formed and resolved. The hope is that the physical and enzymic mechanisms revealed in phage experiments will eventually be found to apply to eukaryotes also. Conversely, genetic phenomena revealed by data on fungal tetrads may be found to have their counterparts in phage; gene conversion, interpreted as heteroduplex correction, is a case in point.

There are few better qualified than Stahl to pull these different threads together, and in this book intended for "anyone with some background in genetics and a willingness to work" he attempts to do so.

The book contains more algebra than biochemistry, even though the latter aspect is not neglected. The author is mainly concerned with exploring the logic of the models that have been advanced from time to time to explain recombination in its various aspects. He shows in a number of instances that a rigorous working through of the algebra can sometimes uncover implications of the models different from the ones that intuition initially suggested. So as not to overburden the text, many relevant sets of data and working examples are presented in the form of problems at the ends of the chapters. A novel feature is the inclusion of a number of problems arising from the published mistakes of the author's (former?) friends and colleagues. Stahl does something to preserve his reputation for fair play by including an error of his own. In spite of some effort, this reviewer has so far been unable to discover any more errors in the present book.

This is hardly a book for mass purchase by college undergraduates. The issues dealt with are often difficult (though the author makes them as clear as possible), and the subject matter may strike some as too esoteric for a wide readership. But the book will be valuable at at least three different levels. It will be compulsory reading for specialists in the genetic analysis of recombination mechanisms, who number perhaps only a few hundred worldwide. It will be attractive to a much wider audience of biologists with a liking for puzzles and elegant reasoning. And it will be of value as a means of providing bright students with some insight into the value and limitations of precise model-building as a means of coming to grips with a complex piece of cellular mechanism.

The book is excellently illustrated and written in a style that, though never sloppy, is pleasantly informal. It comes as close to being light reading as its subject matter allows.

J. R. S. FINCHAM
Department of Genetics, University of Edinburgh, Edinburgh EH9 3JN, Scotland

Paleobotany: Lives and Works

The Fossil Hunters. In Search of Ancient Plants. HENRY N. ANDREWS. Cornell University Press, Ithaca, N.Y., 1980. 442 pp., illus. $28.50

This book is an unusual and engaging history of paleobotany based on Andrews's 40 years of collecting at innumerable localities, visiting laboratories, using the literature, and studying biographical accounts, diaries, and letters. It is a sampling both of workers and of their contributions. It is the antithesis of a ponderous chronological account. Its style is informal, presenting our predecessors as human beings variously adapted to their roles in science and viewed sympathetically in the light of their times. This results in many human interest stories that can be used advantageously by teachers seeking to enliven the historical aspect of the subject. Andrews's fondness for reminiscences adds an intriguing autobiographical flavor to the narrative.

Forgoing the work of the Ancients, Andrews commences with the late 1600's, when fossils were regarded by many as "formed stones" or "freaks" or "sports of Nature," although some, such as Robert Hooke, understood that fossils had been living plants that were petrified in water. There are numerous accounts of the struggles of several less well known workers and of the early interpretations of the time of year in which the Great Flood occurred. Those who found fossils preserved in the vernal state were convinced that it was spring; those who collected mature seeds or fruits knew autumn was the answer.

The relatively sparse work of the 1700's is followed by the remarkable productivity of the 19th and 20th centuries. Chapters are devoted to men and their