sense. Nevertheless, the terminology is confusing to the layman, and calling genetic fitness "Darwinian" does not entirely eliminate confusion. It is, moreover, historically inaccurate, because Darwin himself did not make the distinction.

Chapter 7 is a brief but adequate summary of what is known of the phylogeny and taxonomy of man, fossil and living. On evidence from the australopithecines, Dobzhansky now withdraws an earlier opinion that the Hominidae have always been monophyletic, but he continues to maintain (as does the consensus) that the later lineage has been unispecific and that *Homo sapiens* was monophyletic in origin. The next chapter, on human mental faculties and their antecedents, is in effect a combined biological and cultural definition of the species in terms ranging from brain size to esthetics. Prehuman antecedents for all those faculties are indeed found, but their level and combination in man are uniquely diagnostic. Two chapters are then devoted to the knotty and touchy subjects of polymorphism, class, caste, and race. With his customary calm good sense, the author summarizes the known facts and steers equally clear of the hysteria of the left ("There are no races!") and of the right ("There are absolutely superior and inferior races!").

The last two chapters give Dobzhansky another chance to counteract hysteria in evaluating contrasting views of present evolutionary trends in mankind. Biological evolution is continuing and will continue in our species. It will certainly be affected by increased radiation (including fallout), by the population explosion, by medical relaxation of selective mortality, and by other current trends. Some of the effects may clearly be detrimental and call for remedies. It is by no means clear, on present evidence, that the overall trend is detrimental or that proposed panaceas are either practical or needed.

Dobzhansky's careful balancing of evidence and his avoidance of premature conclusions prevent him from giving absolute answers to many of the questions he raises. Unlike some of his colleagues, whom he opposes firmly but without rancor, he makes no apocalyptic pronouncements and gives no *ex cathedra* solutions for all the world's ills. To those who find comfort in dogma and fiat, his book may seem bothersomely inconclusive. The firmest general conclusion is that not enough is known. What is actually known or reasonably surmised is here splendidly summarized and interpreted. No one who is concerned with his own nature and that of mankind—and this includes the poets, philosophers, and theologians—can afford to miss this book.

Theory and Application

Molecular Orbital Theory for Organic Chemists. Andrew Streitwieser, Jr. Wiley, New York, 1961. xvi + 489 pp. Illus. $14.50.

This book is divided into three nearly equal parts covering (i) molecular orbital theory, (ii) its application to the interpretation of the properties of molecules, and (iii) its applications to reactions and intermediates. The first part proceeds lucidly, perhaps brilliantly, through a discussion of the orbital approach to quantum mechanics, the Hückel molecular orbital theory, and the technique of applying the theory to π-electron systems. Even the chapter on matrices and group theory should be clear to students with limited mathematical training, and numerous problems are presented so that the reader can test his skill. Since the book is, among other things, a text, we were particularly interested in its handling of the approximations obviously necessary in the application of quantum theory to organic chemistry. We were slightly bemused to observe that half of the solutions were omitted for the only problem the author discusses "exactly" (that of one particle on a circle). As a result of this omission, the reader might be rather at a loss to understand the degeneracy of the second energy level in the perimeter model for benzene. More significant, however, is the disturbing omission of critical discussion of approximations. Surely, organic chemists are capable of a qualitative understanding of the errors involved in neglecting antisymmetry and electron spin, the limitations inherent in the orbital approach even with self-consistent field orbitals, the further approximation of pairwise occupied orthogonal orbitals, and the neglect of quantities such as electron repulsion and bond integrals. (These integrals are not necessarily zero, even for orthogonal orbitals, despite statements in the book to the contrary.) Some of these topics are skirted briefly, and some are adequately discussed in the final chapter of the book; but it would be most desirable to have the discussion of all of these topics where it would be read by those studying the apparatus presented in the initial chapters.

Parts 2 and 3 are almost overwhelming in their detail and completeness of coverage. They comprise a highly documented and impartially critical comparison of a manifold of theoretical predictions with experimental results. In several cases the calculations are the author's own; by this means if by no other he establishes himself as an expert in the field. Among the topics covered are bond order, dipole moments, electron spin resonance, ionization and reduction potentials, spectra, aromaticity, transition state theory, nonclassical ions, acidity, and certain reaction mechanisms.

In spite of the criticisms expressed here, *Molecular Orbital Theory for Organic Chemists* is an important work which nearly every organic chemist will want to study. Its lucidity and completeness make it good, both as a text and as a reference. Its main limitation is that the curtailment of the discussion of spin and related topics will, to some extent, prevent the book from serving as a guide to the future as successfully as it now serves as a monument to the progress made in applied molecular orbital theory during the last decade.

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Numerical Analysis

Discrete Variable Methods in Ordinary Differential Equations. Peter Henrici. Wiley, New York, 1962. xi + 407 pp. Illus. $11.50.

High-speed, automatic, stored-program digital computers were developed about 10 years ago, and as a result of their mushroom-like growth they can now be found in the research laboratories of industries, governments, and universities throughout the world. It seems unquestionable that they will become increasingly useful in the future; their impact on applied mathematics and nu-