Book Reviews

Population Genetics from France

The Genetic Structure of Populations. ALBERT JACQUARD. Translated from the French edition (Paris, 1970) by D. and B. Charlesworth. Springer-Verlag, New York, 1974. xviii, 570 pp., illus. $39.40. Biomathematics, vol. 5.

The long domination of population genetics by its three founders has resulted in a high degree of international homogeneity. Although there are some national differences of style, differences on matters of substance have cut across national boundaries. In population genetics, Madison is closer to Mishima than either is to Davis or Nottingham. A few nations are apparent exceptions. To Anglophones, the greatest engima by far has been France. Although the French literature is not often read by outsiders, most of us are at least vaguely aware of the school founded by Malécot and devoted to the study of inbreeding and consanguinity measures. It seems to embody a different approach, perhaps fundamentally different.

The publication in English of Jacquard's fine textbook of population genetics now demonstrates clearly that this has been an illusion. At its best, the book is clear and elegant in its presentation. At its worst, it shares the faults of other major texts, notably Crow and Kimura's *An Introduction to Population Genetics Theory*. It should take its place as a major reference work. But it does not seem to embody any fundamentally different approach to population genetics.

Of course, to those who like to infer basic difference in philosophy from the relative lengths of chapters Jacquard's book will seem quite distinct. He concentrates much attention on inbreeding and assortative mating. An interesting notation called the "trimat" is used. This is a triangular array of genotype frequencies, represented by a symbol. Many of the expressions that in other texts require long strings of summation signs can be represented economically in this notation. Jacquard introduces operations called "contraction" and "genetic product" to go from genotype to gene frequencies and vice versa. But since these operations are not stated in terms of standard matrix operations, the trimat notation enables no new breakthroughs.

The trimat notation also replaces the standard inbreeding coefficient, F. Although the book is implicitly Wrightian in inspiration (Fisher and Haldane get short shrift), Jacquard makes little use of F, preferring trimats and a set of no fewer than nine coefficients that give much more information than is contained in F. This gain in information is achieved at the expense of comprehensibility to the casual reader. The absence of F from many derivations may also leave the reader ignorant of the wide range of applicability of this quantity.

Jacquard's emphasis is on that part of population genetics which can be applied to studies of human population structure. Two chapters treat genetic distance measures in some detail. A short chapter on overlapping generations was contributed by Brian Charlesworth. Conversely, Jacquard pays less attention to theories whose application is evolutionary (multilocus selection theory, the theory of natural selection in finite populations), medical (statistical methods in medical genetics), or agricultural (quantitative genetics).

The book may therefore be compared to Cavalli-Sforza and Bodmer's *The Genetics of Human Populations*. In that work, studies of human populations were carefully integrated with the results of theory, but with a corresponding sparseness of derivation of the theory. Jacquard's work does the opposite: although examples from human populations are described frequently, and the final chapter describes four studies of human population structure in some detail, the book is too heavily theoretical for many teaching purposes. The same difficulty afflicts Crow and Kimura's book. We still lack a textbook that teaches the theory integrally with its applications.

Jacquard has made an effort to keep the mathematics from getting out of hand: there are appendices on difference equations and matrix methods. The choice of translators is fortunate, and has probably increased the clarity of the presentation: Deborah and Brian Charlesworth are both active in population genetics, the latter having worked extensively on the interface between population genetics and demography, which is one of Jacquard's greatest interests.

It seems likely that the shortcomings of all the major textbooks of population genetics reflect the weakness in the integration of theory and observation in this field. Until someone manages to bridge this gap, we must make do with the existing texts, to which *The Genetic Structure of Populations* is a welcome addition.

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Faunal Areas

Marine Zoogeography. JOHN C. BRIGGS. McGraw-Hill, New York, 1974. xiv, 476 pp., illus. $25. McGraw-Hill Series in Population Biology.

As the author of this book points out, the last attempt to synthesize the entire field of marine zoogeography was Ekman's classic *Zoogeography of the Sea*, first published in English in 1953. Although Briggs's book updates that work, there is room for doubt that it supersedes it. The author's emphasis is clear from the table of contents. Nine of the 12 chapters are devoted to a description of shallow-water faunas by geographic region. The pelagic and the deep benthic are treated as habitats, but again most of the discussion is an attempt to document geographic subdivisions. The last section (one long chapter) is the author's evolutionary synthesis. As an ichthyologist, the author gives most attention to fishes in his discussions, but his literature lists contain abundant citations to works on other groups.

Throughout the book the main emphasis is on the establishment of regions, provinces, and boundaries. Nowhere, however, is there an explicit statement of criteria to be used in establishing such entities, other than "good evidence in the form of endemism." One therefore has no way of comparing regions and provinces. Thus the Indo-West Pacific Region includes a high percentage of endemic species and families (p. 13) and is clearly a major center of evolution. On the other hand, the small mixed warm-temperate fauna of eastern South Amer-