netic system is not designed for the convenience of mathematical theorists. All theory has done is disprove postulated generalizations. The mathematical tools at hand have not revolutionized our understanding of the evolutionary process.

The papers in this well-produced volume reflect this. They are excellent papers, clarifying how various phenomena are best described mathematically (such as effective population sizes, neutral alleles in population bottlenecks, two-locus linkage disequilibria, kin selection at two loci, and evolutionarily stable sex ratios). Many of the authors passed through Stanford or were associated with the parallel Australian school. Their mathematical powers are put to effective use, and anyone interested in mathematical theory in population genetics will find this book worthwhile to have.

At the same time, many evolutionists will fail to find the clear and simple messages that population genetics theory once seemed to promise. Sabin Lessard's careful examination of genetic models of sex ratio is typical here. After much work, Lessard is unable to conclude in favor of a simple rule put forward by the late Robert MacArthur. But he notes that the exceptions to it are rare and of small effect. Mendelian genetic systems are maddeningly close to allowing simple and general conclusions to be drawn. Similar situations occur in the papers by Marcy Uyenoyama on multilocus kin selection and to a lesser extent by Uri Liberman and Marcus Feldman on evolution of migration rates.

All of which is not to say that the models in this book are divorced from reality. A number of the papers are inspired by the need to draw conclusions about the role of selection in molecular evolution of proteins observed electrophoretically (papers by Warren Ewens, Geoffrey Watterson, and Simon Tavaré) or by sequencing (John Gillespie), of interspersed DNA repeats (Norman Kaplan and Richard Hudson), or of HLA (Walter and Julia Bodmer). Jonathan Roughgarden develops theory relevant to when marine life cycles will have benthic stages, Feldman and Luca Cavalli-Sforza attack models of gene-culture coevolution in the case of human lactose intolerance, and Peter O'Donald and Michael Majerus integrate theory and experiments on ladybird beetle color polymorphisms.

It is clear from those papers that, with enough information, population genetics theory can be extraordinarily powerful. It is when we must generalize over a wide range of possible models that the intractability of the mathematics becomes infuriating. When computer simulations are done on a less general, more realistic range of models the models behave in a less lawless fashion. It would be a great help if we could find some way to express that in the theory. How to do so is one of the main challenges of the future. The papers in this volume are a fair portrait of population genetics theory at a moment when it has cleaned up its act mathematically but has yet to find a way through the resulting complexity to speak powerfully to a future generation of evolutionists.

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Macrocyclic Chemistry

The Chemistry of Macrocyclic Ligand Complexes. LEONARD F. LINDOY. Cambridge University Press, New York, 1989. viii, 269 pp., illus. $69.50.

The Pimentel Report, *Opportunities in Chemistry* (National Academy Press, Washington, D.C., 1985), predicted that chemistry was on the verge of a renaissance because of the emerging ability to fold experiment and theory together to design chemical structures with properties of choice. This ability is amply demonstrated in the field of macrocyclic chemistry, where scientists with organic, biochemical, and inorganic backgrounds have produced novel compounds that show remarkably selective chemical behavior. This work has attracted attention in many fields where selectivity is of primary concern, including chemical catalysis, enzyme action, selective transport of ions and molecules in membrane systems, and chemical separations. The significant progress in macrocyclic chemistry is reflected by the selection of three of its pioneers—C. J. Pedersen, D. J. Cram, and J.-M. Lehn—for the 1987 Nobel Prize in chemistry.

The creation of new molecules with predetermined properties is not a trivial process. It requires a combination of factors including recognition of a problem, a creative approach to its solution, the ability to visualize the molecular properties needed, and the ability to synthesize the required compound. Central to this process are the thought processes that precede the actual synthetic work.

Using many examples, Lindoy has provided a well-organized overview of the main developments in the chemistry of macrocycles. He emphasizes the description of the many types of macrocycles that have been prepared and studied. The examples given offer convincing evidence that macrocycles have excellent selectivity for particular ions and molecules and that their presence can result in significant modifications of the chemical properties of the complexed species.

The book discusses the structures and properties of macrocyclic compounds; the synthesis of macrocycles; the complexation chemistry of polyether crowns, cryptands, aza crowns, cyclophanes, cyclodextrins, and naturally occurring macrocycles; molecular recognition aspects; and kinetic, thermodynamic and electrochemical aspects of a variety of macrocyclic systems.

The chapter on natural macrocycles provides a good summary of the variety of these compounds found in nature. Their uses in biological systems are many and varied. One of their most interesting characteristics is the way in which they change the properties of metal ions. This ability is illustrated by iron (II), which will bind O_2 in its myoglobin complex, and vitamin B12, where bound cobalt plays an important role. Lindoy gives numerous examples of the active effort to design synthetic macrocycles to mimic the cation binding behavior of natural systems.

The book is organized and written appropriately for a senior undergraduate or graduate course on macrocyclic chemistry. It will also be of interest to the non-specialist who desires a general introduction to macrocyclic chemistry. References are supplied throughout, and the excellent illustrations make it easy to follow the text.

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Reprints of Books Previously Reviewed

Natural Obsessions. Natalie Angier. Warner, New York, 1989. Paper, $14.95. *Reviewed* **242**, 602 (1988).

Racial Hygiene. Medicine Under the Nazis. Robert Proctor. Harvard University Press, Cambridge, MA, 1989. Paper, $12.50. *Reviewed* **242**, 785 (1988).

Books Received

Central Limit Theorems for Generalized Multilinear Forms. P. de Jong. Centrum voor Wiskunde en Informatica, Amsterdam, 1989. viii, 84 pp. Paper, Dfl. 14.10. CWI Tract 61.

The Challenge of d and f Electrons. Theory and Computations. Denis R. Salahub and Michael C. Zerner, Eds. American Chemical Society, Washington, DC, 1989. x, 405 pp., illus. $89.95. ACS Symposium Series, vol. 394. From a symposium, Toronto, Ontario, June 1988.

Characterizations of Banach Spaces Not Containing l^1. D. van Dulst. Centrum voor Wiskunde en Informatica, Amsterdam, 1989. vi, 163 pp. Paper, Dfl. 25.30. CWI Tract 59.

Chemical Hazards of the Workplace. Nick H. Proctor, James P. Hughes, and Michael L. Fischman. 2nd ed. Lippincott, Philadelphia, 1989 (distributor, Van Nostrand Reinhold, New York). xviii, 573 pp. $56.95.

The Chemistry of Macrocyclic Ligand Complexes. Leonard F. Lindoy. Cambridge University Press, New York, 1989. viii, 269 pp., illus. $69.50.