win raised concerning evolutionary patterns and processes, further elaboration is needed. *Molecular Zoology* is a compilation of information from diverse authors who use a common language (evolutionary theory) and common methodologies (genetics and molecular biology) to address the intricacies of the evolutionary process. The book emphasizes the application of molecular tools for the resolution of long-standing problems in zoology. Each chapter evaluates the usefulness of these molecular tools and provides experimental protocols for their application.

The book is subdivided according to four major subject areas: phylogenetics, population biology, developmental biology, and adaptational biology. Chapters within each section address questions related to either micro- (population) or macro-evolutionary (species and above) processes. If evolution is viewed as the transformation of diversity among individuals into discontinuity between populations and species, then the evolutionary dynamics of populations needs to be understood. Highly polymorphic genetic markers, described in this book, promote the study of the genetic structure of populations and the relationship of that structure to patterns of gene flow, mating systems, relatedness among individuals, the reproductive success of individuals, and differentiation within and between populations. One long-standing problem pertaining to population level processes is the dynamics of social interactions, especially those related to enhancing reproductive fitness. Robert Fleischer and Joan Strassmann and colleagues describe how molecular markers can be used both to determine genetic relatedness among individuals and to test hypotheses concerning altruism, kinship, and mating systems.

Since methods were developed to measure genetic variation within populations and species, the evolutionary significance of genetic variation has been debated. What role does selection play in maintaining genetic variation? Are polymorphisms at the level of genes and gene products adaptive? The neutralist theory was proposed as a counterargument to the view that all variation is subject to natural selection, and today many mutations involving nucleotide substitutions in DNA have been shown to be selectively neutral or slightly deleterious. Nevertheless, some genetic polymorphisms are clearly adaptive and can be related to ecological and physiological parameters of populations. Dennis Powers and Patricia Schulte provide an elegant summary of an ongoing research program on *Fundulus heteroclitus* that clearly demonstrates the success of a multidisciplinary approach for studying adaptation at both the molecular and the organismic levels.

One of the frontier issues in evolutionary biology is genetic control of development and how evolutionary novelty, especially morphological diversity above the species level, can arise as a result of changes in regulatory genes and timing of gene expression. The most fascinating chapters in this book discuss the use of model organisms and the comparative method in studies of gene expression and ontogeny. Raff and Popodi coin the term "evolutionary developmental biology" to describe the use of phylogenetic comparisons of development to investigate regions of the genome under strong developmental constraint, as well as how changes in gene expression can result in major morphological changes. From the chapters in this book it is clear that single genes can play a major role in the development of complex structures. For example, Swalla compares gene expression in closely related species (urochordates of the genus *Molgula*) to study morphological change. Recently, this research has demonstrated that disruption of expression in a single gene, *Manx*, can influence the development of the chordate larval phenotype (see *Science* **274**, 1205 [1996]). Holland *et al.* describe methods for establishing homology of body parts among distantly related organisms, such as the nerve cords of amphioxus and vertebrates. Comparison of gene expression patterns appears not to support the long-held view that the dorsal nerve cords are homologous.

As zoologists, we should never forget the foundation of our discipline, which is comparative and organismically based. I agree with the statements in Maddison's chapter regarding the importance of organismic biology. Systematics provides the interpretative framework, the phylogeny and classification, for the comparison of evolutionary processes. Many systematists, including Huelsenbeck *et al.*, who contribute a chapter on "parametric bootstrapping," are dedicated to the development of objective criteria to test alternative phylogenetic hypotheses. Ultimately, all changes at the level of nucleotide sequences, gene products, and gene expression must be linked to organismic diversity and the evolutionary hierarchy of life. In this regard, all the authors in this book demonstrate a clear understanding of natural systems and relate their research to the broader issues in evolutionary biology that deal with the diversity of organisms and the explanation of natural phenomena.

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Browsings

Carbon Nanotubules. Preparation and Properties. Thomas W. Ebbesen, Ed. CRC Press, Boca Raton, FL, 1996. viii, 296 pp., illus. $99.95. ISBN 0-8493-9602-6.

Nine variously authored chapters beginning with a general introduction to carbon materials (Dresselhaus *et al.*) and then taking up the production, properties, and potential applications of these structures "at the crossroads of traditional carbon fiber and fullerenes."

From Lucy to Language. Donald Johanson and Blake Edgar. Principal photography by David Brill. Simon and Schuster, New York, 1996. 272 pp., illus. $50 or C$67. ISBN 0-684-81023-9.

Human evolution presented largely by way of commentaries on large color photographs of remains ranging from the earliest known fossils to Upper Paleolithic artifacts.

The Physics of Skiing. Skiing at the Triple Point. David Lind and Scott P. Sanders. AIP Press, Woodbury, NY, 1996. xvi, 268 pp., illus. Paper, $24.95. ISBN 1-56396-319-1.

Torsional vibration, centripetal acceleration, static equilibrium, and other such concepts expounded as they bear on a sport whose playing field reaches its ideal condition when the three possible states of water are able to coexist.

Relic, Icon or Hoax? Carbon Dating the Turin Shroud. H. E. Gove. Institute of Physics, Philadelphia, 1996. xvi, 336 pp., illus., + plates. $35 or £19.50. ISBN 0-7503-0398-0.

A first-person account, by an accelerator mass spectroscopist who was one of the principals, of the often torturous enterprise of dating the putative burial cloth of Jesus.

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Reprints of Books Previously Reviewed

Antoine Lavoisier. Science, Administration, and Revolution. Arthur Donovan. Cambridge University Press, New York. Paper, $69.95 or £40 (ISBN 0-521-56218-x); paper, $24.95 or £14.95 (ISBN 0-521-56672-x). *Reviewed* **266**, 1890 (1994).

Dynamics and Modelling of Ocean Waves. G. J. Komen *et al.* Cambridge University Press, New York, 1996. Paper, $34.95 or £24.95. ISBN 0-521-57781-0. *Reviewed* **270**, 320 (1995).

How Many People Can the Earth Support? Joel E. Cohen. Norton, New York, 1996. Paper, $14.95 or C$19.99. ISBN 0-393-31495-2. *Reviewed* **272**, 696 (1996).

Lowell and Mars. William Graves Hoyt. University of Arizona Press, Tucson, 1996. Paper, $24.95. ISBN 0-8165-0514-4. *Reviewed* **193**, 754 (1976).

Neptune's Gift. A History of Common Salt. Robert P. Multhauf. Johns Hopkins University Press, Baltimore, MD, 1996. Paper, $19.95. ISBN 0-8018-5469-5. *Reviewed* **205**, 778 (1979).

Power from Wind. A History of Windmill Technology. Richard L. Hills. Cambridge University Press, New York, 1996. Paper, $29.95 or £18.95. ISBN 0-521-56686-x. *Reviewed* **264**, 855 (1994).

Shadows of the Mind. A Search for the Missing Science of Consciousness. Roger Penrose. Oxford University Press, New York, 1996. Paper, $16.95. ISBN 0-19-510646-6. *Reviewed* **266**, 1737 (1994).