is too bad that none of the Russian literature on echolocation is included, and it would seem appropriate to elaborate more on some topics such as the ultrasonic communication and ontogeny of echolocative pulses in infant bats. The brief appendix might also be profitably expanded to further assist those unfamiliar with the application of information theory to animal sonar systems. Nevertheless, Sales and Pye have achieved a reasonably balanced and complete coverage of their subject within the restrictions of a limited space. Their authoritative and readable book will be much appreciated by all who are interested in bioacoustics.

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The New Paleoprimatology

Approaches to Primate Paleobiology. F. S. SZALAY, Ed. Karger, Basel, 1975. x, 326 pp., illus. Paper, $60.25.

Paleobiology and its glamorous sister group paleoanthropology are essentially empirical sciences. Recently, however, their practitioners have applied a veritable battery of new and refurbished techniques, methods, and inferential strategies to the stock-in-trade of their realms, the fossils. "Approaches" is indeed appropriate in the title of this nine-chapter volume. It exemplifies the new paleoprimatology.

Savage (p. 15) looks forward to a halcyon period in which sophisticated geochemical-geophysical methods will permit paleontologists to withdraw their fossils from a central position in geochronological dating and to concentrate instead on paleobiological puzzles. He provides many clearheaded caveats for orthodox practice during the interim.

Russell epitomizes the faunas and environments of four Paleocene localities and more numerous (over 50) early Eocene sites in Europe. Very few European Paleocene forms persisted into the early Eocene, which was characterized by many new types of animals. Russell concludes that only a "mass migration" via a land connection with North America reasonably explains this faunal transition. Europe and North America had more than 50 percent of genera in common during the early Eocene whereas only 20 percent were identical in the late Paleocene (p. 43).

Andrews and Van Couvering's open-minded essay on paleoenvironments and pongid distributions in the East African Miocene is a provocative contribution to paleoanthropology. Around 16 million years ago Africa rejoined Eurasia, great faunal interchange occurred, volcanic activity produced prominent altitudinal relief in East Africa, and lakes formed in the Eastern Rift (pp. 69–70). Montane forests developed on the upper slopes of the volcanoes (p. 77) and inter-rift evergreen forests gave way to a greater complexity of vegetation types.

Andrews and Van Couvering disagree with hypotheses directly linking *Dryopithecus africanus* and *Dryopithecus major* with modern chimpanzees and gorillas, respectively. They speculate that the East African Miocene apes represent adaptive radiations into ecological niches now occupied by monkeys (pp. 92–93). The validity of Andrews's two "new" species of *Dryopithecus* (*D. gordoni*, represented by 24 individuals, and *D. vancouveringi*, represented by seven) remains to be substantiated by detailed morphological treatises (perhaps à la Ramaekers, Delson, and Eldredge and Tattersall, this volume). If they are in fact referable to established species of *Dryopithecus* (and perhaps *Limnopithecus*) then, *pace* Andrews and Van Couvering (p. 97), *D. africanus* might be safely returned to the forest.

Delson's handsomely illustrated paper on the evolutionary history of the Old World monkeys clarifies the positions of many species. It is based on a study of numerous fossils, interpreted by a cladistic approach emphasizing shared derived characters. Delson concludes that the adaptive radiations of the Colobinae and Cercopithecinae were geochronologically relatively late events (beginning about 12 million years ago). He also constructs hypothetical craniodental morphotypes for each major ancestral population.

Three chapters (Eldredge and Tattersall, Gould, and Every) contain applications of novel approaches to aspects of hominid evolution. For instance, at the conclusion of a lengthy discussion on allometry and brain evolution in primates and the types of scaling that might provide information on evolutionary mechanisms, Gould resurrects the pedomorphic theory of human origins, swaddled in the concept that ontogenetic scaling reasonably explains the outsized human brain.

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Do Ecosystems Converge?

Mediterranean Type Ecosystems. Origin and Structure. FRANCESCO DI CASTRI and HAROLD A. MOONEY, Eds. Springer-Verlag, New York, 1974. xii, 406 pp., illus. $30.10. Ecological Studies, vol. 7.

Five fairly localized regions of the earth's surface share an unusual unimodal annual precipitation regime with moderate winter rainfall but a pronounced and prolonged summer drought. These areas lie mostly between latitudes 30° and 40° on the western sides of continents. They are widely separated geographically, not only being scattered all around the Mediterranean Sea but also occurring along the southern edges of both Africa and Australia and in central Chile and parts of California. Unimodal annual marches of precipitation occur elsewhere, but with the wet season invariably during the warmer months. A result of the unique "mediterranean" climate is that the seasonal difference between winter and summer is accentuated. As might be expected, these extraordinary spots typically support a drought-resistant, evergreen, and tough-leafed vegetation, often termed chaparral. Although they tend to have basically similar life forms, the actual species of plants differ between regions.

The present compendium is an outgrowth of a symposium held in Chile in 1971. It is mainly an attempt to discern whether these various mediterranean systems originated and evolved independently of one another, and, if so, to assess the extent to which their structure and function might have converged over evolutionary time. If present, such a convergence in ecosystem structure and function would indicate the degree to which evolutionary pathways are predictable and determinate. Ecosystem convergence is an attractive prospect in that convergent responses to similar selective pressures would encourage ecologists in their continuing quest for general principles of community organization.

Natural selection does not act upon entire ecosystems but operates through differential reproductive success of individual organisms within communities. Organisms living in an ecosystem often evolve in response to antagonistic counteradaptations of other organisms, such as their predators and competitors. Coupled with accidents of history, such biotic interactions must of-