or that concepts of consciousness or awareness are needed to explain the parrot's skills.

Yoerg and Kamil provide a variety of other examples in arguing that cognitive ethology must use the rigorous methods of human and animal cognitive psychology in combination with an ecological and evolutionary perspective. I agree completely with Yoerg and Kamil. It is possible to explore the cognitive capacities of nonhuman animals without recourse to mentalistic concepts such as consciousness, intentionality, and deception. Studies that avoid mentalistic terminology are likely to be more effective in convincing other scientists of the significance of the abilities of nonhuman animals.

Cognitive Ethology is a particularly well-edited book. The authors of individual essays actually appear to have read each other's chapters, and Ristau provides an excellent overview and integration of the issues raised in the book in her epilogue. It is a tribute to the editor and to Griffin himself that a book of essays in his honor does not contain only essays sympathetic to Griffin's views but an equal number that take issue quite vigorously with many of his ideas. *Cognitive Ethology* is an excellent forum for learning about one of the most controversial and exciting issues in animal behavior research.

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The Dinosaurs of '47

The Age of Reptiles. The Great Dinosaur Mural at Yale. VINCENT SCULLY, RUDOLPH F. ZALLINGER, LEO J. HICKEY, and JOHN H. OSTROM. Abrams, New York, 1990. 48 pp., illus., + foldout plate. $19.95.

Within a museum the ratio of creative to mundane endeavors is always small, and operational pressures tend to reduce it further still. Thus one of the heroes behind the famous mural of prehistoric life in the Yale Peabody Museum of Natural History was surely its director, A. E. Parr, who found the talent and budgeted the funds and time for the creation of this powerful synthesis of art and science. The other hero is, of course, the artist, Rudolph Zallinger, who by tapping the traditions of art, existing paleontologic expertise, and his own genius created a painted poem of epic proportions which spans 110 feet and 300 million years.

The mural was completed more than four decades ago, and the object of this small volume is to situate the work within the history of art (V. Scully), to describe its fabrication (Zallinger), and to relate it to the history of life on Earth as currently understood (L. J. Hickey and J. H. Ostrom). The text will help scientists to appreciate their contribution to human civilization, as well as the labor that is involved in great art. Conversely, some of the paleontologic comments, particularly those relating to ancient plantscapes, are beautifully written. However, the primary contribution of the volume is a foldout color reproduction (on a scale of about 1:23) of the mural itself, as photographed by W. K. Sacco and J. Szaszfai.

The mural is painted with courageous precision. Because it dared to depict what was not known as well as what was known, it illustrates a history of land life during the Mesozoic as that history was understood in 1947. Somewhat paradoxically, links to one point in time enhance the quality of timelessness, for the mural provides a gigantic and beautiful yardstick against which subsequent (and future) changes in our view of the past can be assessed.

The dinosaurs, which dominate the mural, are no longer the dinosaurs we know. They obey an unwritten law that the tail must drag upon the ground and often bear a coarsely serrated fleshy crest along their backs. Few would so restore dinosaurs today. Where are the indications of trampled soils or browsed vegetation that figure so largely in recent research? How many viewers of the mural realize that, although good skeletons were then known from Canada, East Africa, and Europe, most of the dinosaurs illustrated are American forms? And that only three dinosaurian assemblages are depicted (these being of late Triassic, late Jurassic, and terminal Cretaceous age)? Rising up on the left margin of the mural are mighty volcanoes that appear to represent the great Laramide interval of mountain-building and the disappearance of the dinosaurs. In 1947 there was no debate on whether or not the impact of an asteroid exterminated the dinosaurs.

The artist, however, was conceptually ahead of his time in combining extinct plants and animals into ancient landscapes. The juxtaposition naturally posed the kinds of questions on dinosaurian ecology that have since been so profitably examined. Indeed, a synthesis of an even higher order is suggested, as Scully (p. 17) perceptively concludes: "[The mural] is the habitat of more than mythical creatures. . . we seem to recognize some ancient truth in them which the more recent paintings of dinosaurs may not touch upon so closely; perhaps we remember something basic to our nature, hear once again the old authentic tread of the divine."

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The photographing of the dinosaur mural, summer 1988. [From *The Age of Reptiles*]