



TYRANNOSAURUS REX: THE TYRANT KING

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Peter Larson and Kenneth Carpenter (editors)
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All hyperbole aside, *Tyrannosaurus rex* is truly an iconic dinosaur in both the public and the scientific eye. The animal has the distinct honor of being one of the few organisms (aside from *Homo sapiens*) readily recognizable to the lay public by a binomen. Additionally, *T. rex* is frequently the center of contentious debate – whether in the old scavenger vs. predator argument, or disputes over specimen ownership. Finally, the taxon is one of the most written-about dinosaurs in both the scientific and the popular press. A recent search on Google Scholar produced about 3,750 entries for *Tyrannosaurus*, compared to the contemporary and much more common *Triceratops*, which weighs in at a paltry 1,960 entries. *Jurassic Park* catapulted *T. rex* from stardom to superstardom. Despite this wealth of literature, a host of questions still remains. How did *Tyrannosaurus* use its dinky arms? How many species existed? Is there any evidence for sexual dimorphism?

A new edited volume brings together a varied crew of researchers on the *Tyrannosaurus* problem, with an equally varied spectrum of approaches, hypotheses, and goals. The opening chapter by Neal Larson is a useful, illustrated listing of all associated *Tyrannosaurus* skeletons. Larson circumvents much of the hyperbole surrounding some specimens by implementing standardized, reproducible estimates for skeletal completeness. Although some may object to the inclusion of privately-held specimens in the list, this chapter is extremely useful in being the only pub-

lished documentation for a number of specimens.

A series of contributions by various authors presents some of the first publications on the geological settings for individual *Tyrannosaurus* specimens. All too frequently, such data remain unre-ported in favor of “sexier” topics.

Most of the remainder of the book focuses on questions related to the biology and anatomy of *Tyrannosaurus* (but only a handful of chapters will be addressed here, for brevity’s sake). A nagging issue, and one which has achieved a huge amount of media attention, is whether or not it’s possible to “sex a rex.” Peter Larson addresses sexual dimorphism in the species, concluding that it is possible to separate robust and gracile morphotypes. The analyses presented here are based in part on a visual assessment of relative robusticity (not without precedent in analyses of other dinosaurs) with later projection onto bivariate plots. Although some interesting suggestions are made, much more quantitative work clearly remains in this area—the



issue of sexual dimorphism is not yet finished (and ultimately may prove unresolvable). More complete documentation of geographic and temporal variation will also be critical.

A chapter by Lockley et al. on “Why *Tyrannosaurus rex* had puny arms,” is one of the most puzzling in the book. It invokes homeobox genes, “balancement of organs,” and some other approaches in an attempt to address the issue of *T. rex*’s relatively tiny forelimb in a novel, but rather unconvincing, manner. The forelimb features again in a well-illustrated chapter by Lipkin and Carpenter that updates previous contributions by Carpenter on forelimb strength. Other chapters discuss cranial kinesis, cranial musculature, hypothetical resting postures, problems and pitfalls in interpreting dinosaur trackways, and paleopathology, among other topics. A very interesting chapter by Don Glut rounds out the volume, with an overview of *Tyrannosaurus* in pop culture. Breithaupt et al. also offer a brief historical account of early discoveries. Most of the contributions are well-illustrated, although the quality and depth of the individual descriptive chapters varies.

Of course, no book would be complete without another volley in the “predator, scavenger, or both” wars. Chapters by Greg Paul, John Happ, and Tom Holtz address the controversy to various degrees using paleopathological evidence, paleobiological speculation and quantitative approaches. Holtz’s chapter is probably the most effective in this regard (although Happ identifies some intriguing pathologies), with various anatomical metrics used to reject obligate scavenging. We probably have not yet seen the last of this debate. It is somewhat unfortunate that some of the more “conservative” viewpoints on *Tyrannosaurus* are not better represented (although this is less a major fault and more an opportunity for a future volume). Thus, readers may be left with the impression that most major

issues are completely settled in one direction or another.

The book also includes a supplementary CD-ROM. Although this media brings great promise, the execution in the present work is a disappointment. Three main areas are contained on the CD – color figures from the chapter on *T. rex* histology, a movie from Stevens et al.’s sitting tyrannosaurs chapter, and an atlas of *T. rex* skull bones. The main problem is that the real advantages of a CD-ROM presentation just aren’t pursued. The user interface is attractive and intuitive, but the good points end there. Fewer than 50 megabytes of disk space (on a disk with a capacity of 700 megabytes) is used, leaving lots of “empty” file space. Particularly, I was disappointed with the cranial atlas. The photographs themselves are quite well-executed, and present a number of elements and views that have not been illustrated before. Unfortunately, the digital files themselves are low resolution for the current state of technology (460 by 437 pixels). . . given the amount of space available, one would have hoped for much higher resolution images.

In terms of overall physical appearance, the book has a new, and quite attractive, design compared to previous entries in Indiana University Press’s paleontological series. Figure quality is also quite good throughout. Regrettably, the volume follows the new IUP convention of omitting abstracts or summaries for each chapter. Thus, the reader sometimes has to hunt for the main points of each paper.

Tyrannosaurus rex: The Tyrant King is a must-have for anyone with an interest in theropod dinosaurs, and recommended for those focused on the Late Cretaceous of North America. Although not all readers will agree with the main points of some chapters, this will undoubtedly spur additional investigations. *T. rex* has not yet breathed its last!