HONR 259C: "Fearfully Great Lizards": Topics in Dinosaur Research
Spring Semester 2007

Critical Review III: Functional Anatomy and Biomechanics
DUE: Thursday April 5

Overview

Animals are more than just their physical bodies; they are interesting because they actually do things! (Networks like Animal Planet and The Discovery Channel would hardly be successful if all they showed were still photos of animals at rest…) But how can we determine how extinct dinosaurs moved and operated in the living world?

One approach is functional anatomy: considering the physical body of animals as machines made of meat, gristle, and bone interacting with the physical world. Much of traditional functional anatomy was based solely on comparisons with living animals that have similar anatomical structures. However, there has been an increasing trend to the use of modeling: creation of models (physical, mathematical, or virtual) to test whether a particular motion or behavior were possible given the physical constraints of the animal. You will examine one such modeling study.

P.S. Don't be worried about the math in these papers! You can go through the equations if you really want, but be more concerned about the structure and results of the tests rather than the calculations themselves.

Specific Questions to Address

What hypothesis or hypotheses are being tested?

Are the models based on specific real specimens, or are they generalized models of the particular species?

What sort of model was created? Was it physical, mathematical, virtual (i.e., a 3-D computer object), or something else?

To what degree was the modeling technique tested against modern animals as well?

To what degree did the modeling technique take into account soft tissues (cartilage capsules of joints; muscle strengths; etc.), since living creatures are not just bones?

Did the results support the initial hypothesis, or reject it?

In your analysis and observations, do the conclusions of the authors seem justified? Are there other reasonable hypotheses that you think might be better supported by the evidence? If so, what are they and how would the evidence better support them?