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Dinosaurs and Birds Nat 305 Christopher Meadows 11-2-00 Are birds really dinosaurs or are they simply related? That is a question that has gained new life in recent years due to the overwhelming facts they are pouring in from newly found fossils and studies from fossils that have been found in the past.

Two groups have formed in the study of this question: those who believe birds are a direct result of dinosaurs and those who feel dinosaurs and birds must have had a common ancestor. Determining which view is correct is a matter of opinion based on fact. The main problem involves the use of cladistics or phylogenetic systematics to group organisms according to characteristics they share. When one looks at dinosaur fossils, he or she may feel that certain characteristics are used for something entirely different than someone else who has looked at the same fossil. One cannot talk about dinosaur and bird lineage without mentioning Archaeopteryx. Most paleontologists agree that Archaeopteryx was the first bird. Archaeopteryx thus represents what paleontologists would call a transitional form between two major groups of animals, the reptiles (dinosaurs) and birds.

The main difference between the theropods and Archaeopteryx were the long arms of the Archaeopteryx, adapted as wings, the feathers, and the presence of a wishbone that the theropods did not have. All of these features tie it to birds and its other characteristics tie it to theropods. One might say it was the missing link between the two. Opponents of this idea say that the similarities between Archaeopteryx and theropods were due to convergence, with the birdlike dinosaurs appearing in the Cretaceous some 75 million years after Archaeopteryx. Also, support is gaining that Archaeopteryx was not in fact the first bird, but instead a descendent of an earlier bird ancestor

that had developed along a different pathway and actually represents an evolutionary dead end.

Two opponents of the birds are dinosaurs theory are Alan Feduccia of the University of North Carolina and Larry Martin of the University of Kansas. They believe that birds evolved from some unknown reptile from a time before dinosaurs came to be. One point they make is that flight must have begun from tree climbing or an arboreal ancestor but that all the proposed dinosaurian ancestors were ground dwellers or cursorial. On the other side, supporters for the birds are dinosaurs theory feel there is an unknown dinosaur bird that was arboreal, or simply that birds evolved flight from the ground by chasing after insects. In recent years other fossil finds have stirred the argument even more. One of these is the fossil named *Sinosauropteryx* found in China.

It appears to be an important link between birds and dinosaurs.

*Sinosauropteryx* appears to be a feathered dinosaur having a mane of feathers along its neck, back, and tail a feature until then seen only in birds. *Sinosauropteryx* appears before *Archaeopteryx* and gives a substantial link between the theropods and birds. One opponent of this find is Martin who feels the structures that are considered to be feathers are simply frayed collagenous fibers beneath the skin having nothing to do with birds. Another find involves a fossil that was found in Madagascar in 1995. The fossil was identified as a bird because its arm bones contained knobs where feathers would have been attached. It also has a reversed first toe, a characteristic of birds unknown in any other type of theropod dinosaur, according to

Catherine Foster of the State University of New York at Stony Brook and discoverer of the fossil.

The real link between the Madagascan bird and dinosaurs is the retractable claw on its second toe, which does not appear on any other birds. This is, according to some, direct proof showing a link between birds and theropods. Opponents like Martin feel the creature is actually a dinosaur and not a bird at all. One of the main problems in deciding this argument is the time scale in which the fossils are found. Feduccia feels that one of the biggest problems is the time paradox, meaning that the so-called birdlike dinosaurs came too late to address avian evolution.

Supporters of the theory feel they will eventually find the fossils they need to