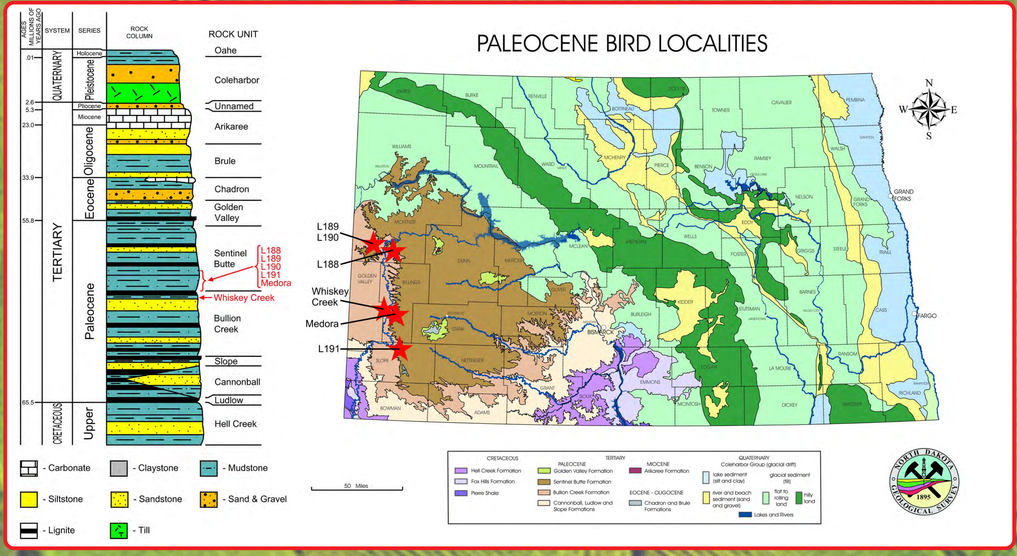
NEW MIDDLE PALEOCENE (TIFFANIAN NALMA) BIRDS FROM NORTH DAKOTA

THOMAS A. STIDHAM

Key Laboratory of Evolutionary Systematics of Vertebrates,
Institute of Vertebrate Palentology and Paleoanthropology
Chinese Academy of Sciences, Beijing 100044

JOHN W. HOGANSON and JEFF J. PERSON

North Dakota Geological Survey
600 East Boulevard Ave.
Bismarck, ND 58505



Vertebrate Faunal List
Tiffanian 3 NALMA

Taxon	Medora (L78)	Poker Jim (L188-L191)
Osteichthyes		
Lepisosteus	X	X
Amia	X	?
Esox	X	
Amphibia		
Piceoerpeton	X	
Chelonia	X	X
Plastomenus	X	
Protochelydra		X
Archosauromorpha		X
Simoedosaurus		X
Champsosaurus	X	X
Borealosuchus	X	
Mammalia		
Neoplagiaulax	X	
Titanoides	X	X
Leptacodon	X	
Carpodaptes	X	
Palaeoryctes	X	
Aves		
cf. *Cimolopteryx*	X	
Presbyornis n.sp.	X	X
aff. Gruiformes	X	
cf. Trogonidae	X	

Overview

The middle Paleocene Sentinel Butte Formation has produced a diverse vertebrate fauna including fish, amphibians, reptiles, mammals, and birds. Recent work in localities in western North Dakota has uncovered a large number of bird bones that represent at least 4 taxa that have not been recorded before. Based on the mammalian fauna, those localities are within the Tiffanian-3 subzone and thus are approximately 59 Ma. These new specimens are some of the very limited number of Paleocene bird fossils known from North America and help to fill in a major gap in the avian record after the Cretaceous and before the Eocene.

This avian fauna exhibits a transitional combination of taxa including one specimen similar to the latest Cretaceous *Cimolopteryx* and a new presbyornithid species closely related to the common Eocene species. The other taxa appear to be related to other extant taxa, but their fragmentary nature (and homoplasy) prevent exact identification. Other fossils are clearly avian, but lack any diagnostic features to hypothesize their phylogenetic relationships.

The presence of avian taxa that would have been associated with freshwater environments is not unexpected given the abundance of fish, turtles, champsosaurs, and crocodilians. One of the bird bones exhibits damage that may have resulted from predation. This potential evidence of predation is consistent with the large numbers of crocodilian coprolites that occur at the Medora locality.

Acknowledgments

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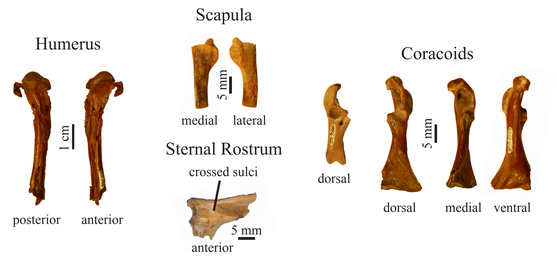
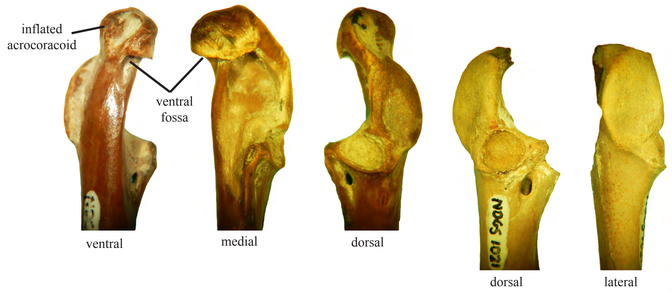
Presbyornithidae
Presbyornis n.sp.

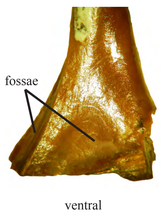


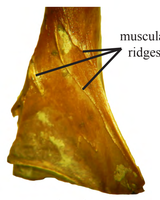
The most common avian taxon is a new species of presbyornithid. It is represented by a humerus, 2 coracoids, a scapula, and a sternal rostrum. All of the specimens come from the Medora and Poker Jim set of localities. All of the other avian taxa are from the Medora locality.

Anterior Coracoids

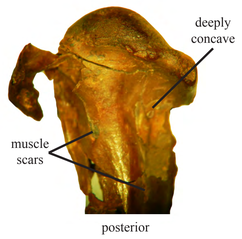


Posterior Coracoid





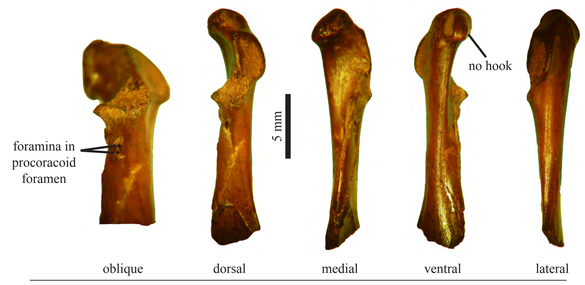
Proximal Humerus



Scapula

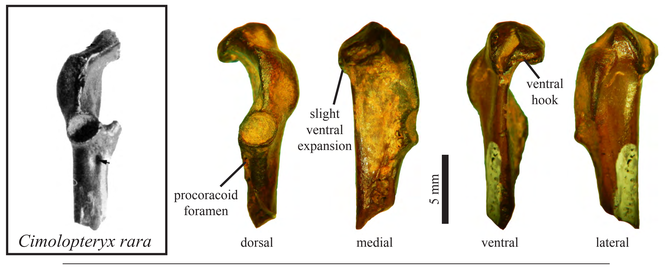
This new species is much smaller than *Presbyornis isoni* and slightly smaller than *Presbyornis pervetus*. *Presbyornis pervetus* has less distinct muscular ridges on the coracoid, a smaller procoracoid foramen, and lacks the fossa on the lateral sternal end. The North Dakota humerus, scapula, sternal rostrum, and coracoids share a large number of derived characters with Presbyornithidae including the inflated acrocoracoid, position of the fossa on the scapula, crossed coracoidal sulci, and deeply concave area on the dorsal part of the posteroproximal end of the humerus. However, the presence of the fossa on the ventral posterior end of the coracoid (present in Anatidae, but not *Presbyornis*) may indicate the presence of reversed characters in *Presbyornis pervetus*.

aff. Gruiformes



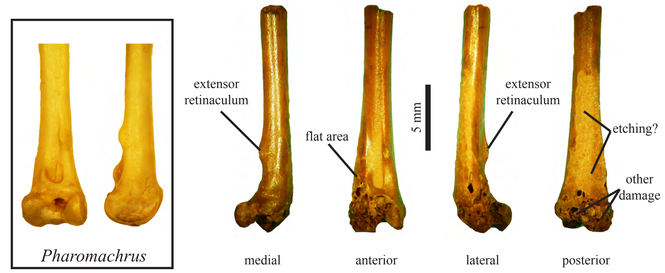
The presence of a deep scapular cotyla and procoracoid foramen indicates an overall primitive phylogenetic placement of this taxon. The scapular cotyla morphology and shape of the glenoid resemble rails and *Eurypyga*.

cf. *Cimolopteryx*



The presence of a deep scapular cotyla and procoracoid foramen indicates an overall primitive phylogenetic placement of this taxon. The morphology is very similar to that of *Ceramornis* and *Cimolopteryx*. It is most similar in size with *Cimolopteryx rara*. This identification is consistent with the previous identification of "graculavid" specimens in North Dakota.

cf. Trogonidae



The position and morphology of the medial extensor retinaculum attachment, presence of the wide flat area on the lateral side, and the mid-shaft position of the extensor canal are all shared with trogons. However, *Vanellus* and *Thinocorus* do exhibit some similarities with this fossil too.

Aves Indet.

This specimen appears to be a distal femoral shaft. It lacks any diagnostic characters and is very different in morphology from that in *Presbyornis*. It may represent an additional avian taxon. Other avian fossils come from the Whisky Creek locality.