

A NEW OCCURRENCE OF DROMAEOSAUR FROM THE LATE CRETACEOUS COLERAINE FORMATION (CENOMANIAN) FROM THE MESABI IRON RANGE

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ABSTRACT

During summer field surveys at the Hill Annex Mine State Park in 2015, researchers from the Science Museum of Minnesota discovered an ungal belonging to a Dromaeosaur. This specimen represents the second fossil of Dromaeosaurus that has been discovered at the Hill Annex Mine to date. The new discovery adds to the sparse record of dinosaurs in Minnesota and our understanding of the Cretaceous deposits of the Mesabi Iron Range District.

INTRODUCTION

During the 2015 field surveys the Hill Annex Mine Paleontology Project (HAPP) found an ungal from a Dromaeosaur during exploration of Cretaceous spoil dumps at the Hill Annex Mine in Calumet, Minnesota (Fig.1). This specimen is the second occurrence of dinosaurian material from the Coleraine Formation. The first specimen was collected in 1928 by C.R. Stauffer and was found in a box containing 133 random fish scales by the authors in 2012 (Fig.2). Using original notes it is possible to determine the approximate location these fossil scales were collected in the then active Hill-Annex Mine. It is noteworthy that in addition to these scales, vertebrate material consisting of "reptilian vertebrae and teeth which are rather plentiful" were also collected in this same area (Bergquist, 1944) but have long since been lost to science.

GEOLOGY

The predominately marine Coleraine Formation overlies the Bibwabik Iron Formation and is exposed to varying degrees along the Mesabi for 114 km from Coleraine eastward to Virginia, Minnesota. These sediments are found north in Koochiching County and in Aitkin and Crow Wing Counties to the south and numerous outliers and well cores. While heavily buried by glacial drift, the Coleraine Formation most certainly extends westward to the Red River Valley in western Minnesota (Winchell, 1899; Sloan 2005). Recent fieldwork in the Hill-Annex area has led to a more detailed stratigraphic record of the Cretaceous deposits (Hanks, et al., 2015) than first reported in earlier surveys of the Mesabi Iron Range (Hall 1869; Grant, 1899; Winchell, 1887; Bergquist, 1938, 1944; Sloan, 1964, 2005).

DESCRIPTION

SMM P.15.12.3

A nearly complete ungal of a *Dromaeosaurus* sp. (Fig.1) measuring 40mm x 22 mm with a strong curvature and groove that extends along the lateral surface from the base of the ungal to the tip. The base of the ungal shows an articular facet that is clearly defined. A very pronounced and robust tubercle on the ventral surface is present.



Fig. 1. SMM P.15.12.3

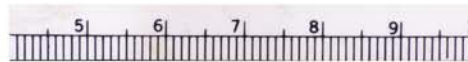


Fig 2. SMM P.12.7.14.



Fig.3. SMM P.95.3.1

PALEOECOLOGY

Dromaeosaurids are reported from both the Upper and Lower Cretaceous of North America and Asia (Lucas, 1994; Weishampel et al. 1990). With fossils occurring in Montana and Wyoming as well as along the gulf coast of the present day United States (Kiernan et al 2004) and more recently in South Carolina (Hanks et al. 2012; Schwimmer et al. 2015) this suggests a diverse geographic range of this species. Dromaeosaurs inhabited the floodplains, riverbanks and lowland areas along or near the margins of the Cretaceous Inland Sea. Many specimens occur in claystones, channel sands, and arkosic, poorly cemented sandstones which also suggests a predominately fluvial depositional environment. Current research of the mostly non-marine Coleraine Formation of Northern Minnesota has produced a more detailed and in-depth stratigraphic understanding of the Cretaceous deposits of the Hill-Annex Mine and surrounding areas (Hanks, et al. 2015).

Coarse sandstones, claystone, and arkosic sandy marls are present here. The fossils collected in-situ by Stauffer in 1928 occurred in coarse to medium grained sandstone approximately 3 meters above the contact of the Bibwabik Iron Formation with the Cretaceous Coleraine Formation. Included in the sandstones are abundant leaf and wood impressions and fragments. It was in this matrix that the fish scales were collected in 1928. Figure 2 is noted here for inclusion in the dinosaurian fauna of the Coleraine Formation. It is a badly weathered and abraded ungal measuring 18mm x 8mm with the worn but clearly visible articular facet. A dromaeosaur tooth (Fig 3.) from the Carlile Formation near Milbank, South Dakota is noted herein for reference to the geographic occurrences of Dromaeosaurs along the eastern margins of the Cretaceous Inland Seaway.



Fig. 4. Dromaeosaur occurrences in the United States (Modified from pubs.usgs.gov)

CONCLUSIONS

Dromaeosaurids ranged along, but were not limited to, the coastal margins of the Inland Sea during the Cretaceous.(Fig.4) Many specimens occur in claystones, channel sands, and arkosic, poorly cemented sandstones which also suggests a predominately fluvial depositional environment. New fossil evidence from Minnesota contributes to the documentation of Dromaeosaurids along these coastal floodplains. With access to areas along the Mesabi Iron Range, some closed for 40 years, future fieldwork stratigraphic surveys of the Coleraine Formation will undoubtedly produce additional fossil evidence of dinosaurian remains in Minnesota.

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