

Fossil Frogs: Dinosaur NM

By Amy Henrici

The name Dinosaur National Monument (DINO) brings to mind images of the enormous sauropod dinosaurs that roamed the earth some 144 to 160 million years ago. Within the past decade paleontologists have been striving to enrich this picture of the late Jurassic time epoch by searching for new localities at the monument in which non-dinosaurian remains are preserved. One such locality, the Rainbow Park Microsite, contains fossils that represent all the major groups of vertebrates except birds (Chure and Engelmann, 1989). Several tiny frog skeletons as well as many isolated frog bones have been found here. The isolated bones were collected by washing "dirt" through screens and sieves and picking out pieces of bone from the trapped debris

with the use of a microscope. The frog skeletons, on the other hand, were collected intact on slabs of rock from a quarry.

Even though the isolated frog bones in the screen wash material are mostly broken pieces of limb bones, vertebrae, and a few skull bones, study of these fragments has revealed the presence of at least four different frog types. Two of these frogs, *Comobatrachus* and *Eobatrachus*, were previously known only from another site, the Quarry Nine locality at Como Bluff, Wyoming, which has an age approximately equivalent to that of Dinosaur National Monument. Unfortunately, the affinities of these fossils to other frogs remains obscure in part because they are known only by fragments of the humerus, or upper arm bone (Hecht and Estes, 1960). Fragments of other humeri are distinct

enough to indicate that at least two other frog types were present. It will take many hours of comparison of these humeri to those of recent and fossil frog specimens to determine if they are new taxa and also their relationship to known frogs, both living and extinct.

The tiny frog skeletons collected from the quarry may represent yet another taxa new to science. Preserved on one slab of rock are the remains of at least 7 individuals bunched together in an area measuring roughly 5 x 2 inches. One of the skeletons has a head body length of only 3/4 of an inch. The small size of these frogs skeletons coupled with incompletely ossified vertebrae suggest that these specimens are tadpoles. However, the level of development found in the limb and hip bones is reminiscent of frogs that have completed metamorphosis. In order to determine whether or not these frogs are indeed tadpoles careful comparison with tadpole growth series of living frogs and the few known tadpoles of prehistoric frogs will be undertaken.

The frogs and dinosaurs at DINO were collected from a widespread unit of rock known as the Morrison Formation, which is in the Jurassic Period in the geologic time scale. The Jurassic is one of three time periods in the Mesozoic Era, and it is preceded by the Triassic Period and followed by the Cretaceous Period. Generally, these periods are subdivided into epochs which are designated by prefixing the period name with early, middle, or late, in which early is the oldest and late the youngest.

This late Jurassic frog fauna from DINO should add to knowledge concerning the early evolution and distribution of frogs. It is generally believed that frogs evolved sometime during the Triassic, the evidence for which is a fossil that shows some similarities to frogs, and may be ancestral to frogs, from the early Triassic of Madagascar. The first unequivocal frog dates back to the early Jurassic of Argentina and frogs are known from North and South America and Europe by the late Jurassic. However, frogs were not very diverse by the late Jurassic. Of the 22 currently recognized families of frogs, both extinct and living, only 3 of these families are represented in the fossil record by the late Jurassic.

There also are four other late Jurassic frogs which cannot be placed into any known families due to the poor preservation or incompleteness of these fossils. This sparse record of frogs in the late Jurassic is due in part to frogs not having diversified much at this point in time, and also because frogs are generally very rare in the fossil record. Thus, study of these new frogs from DINO will add considerably to knowledge on the early evolution and distribution of frogs and also helps to round out the picture of vertebrates that co-existed with dinosaurs during the late Jurassic. Perhaps mention of Dinosaur National Monument now will evoke an image of tadpoles frantically swimming away from a drinking dinosaur, or frogs leaping into the water to avoid a dinosaur approaching the lakeshore.

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References

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