



Late Triassic vertebrates from Revuelto Creek, Quay County, New Mexico

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LATE TRIASSIC VERTEBRATES FROM REVUELTO CREEK, QUAY COUNTY, NEW MEXICO

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INTRODUCTION

Fossil vertebrates from the Dockum Formation of eastern New Mexico have been known since the late 1800's, but the first major collection was made in 1916 by M. G. Mehl. Little additional collecting was made until the 1930's and late 1940's. During that time, material was collected for various universities and museums by E. C. Case, J. T. Gregory, J. W. Stovall, T. E. White and R. V. Witter (Gregory, 1972). These collections were important in correlating the vertebrate faunas of the Chinle Formation in Arizona with those of the Dockum Formation in northern Texas (e.g., Colbert and Gregory, 1957). Current work by Chatterjee (1983) is adding significantly to our understanding of the Dockum fauna of west Texas.

Some of the most important sites (Fig. 1) were discovered by Gregory along Revuelto Creek near San Jon in Quay County. Many of these sites were revisited in 1981 by the University of Colorado Museum in order to determine local stratigraphy and to locate any new fossils which may have eroded out since Gregory's work in the area. It was found that the most productive fossil horizon is a purple-weathering mudstone which caps the upper edge of the badlands along Revuelto Creek in secs. 10, 14, and 15, T9N, R33E. These mudstones overlie a thick sequence of unfossiliferous orange mudstone with large carbonate nodules scattered throughout. The purple mudstone contains lenses of cross-stratified, reworked caliche as BB- and pea-sized carbonate nodules.

One of these lenses was found to truncate a large phytosaur skull just in front of the orbits. The unweathered purple mudstone is grayish-pink and criss-crossed by red streaks of iron stain. Numerous gray-mudstone interclasts are scattered throughout. Less fossiliferous horizons occur stratigraphically higher along Revuelto Creek as irregular channel sandstones. One exception is an exhumed channel composed of imbricated unionid shells.

THE REVUELTO CREEK VERTEBRATE FAUNA

Most of the vertebrate fossils from Revuelto Creek occur as isolated bones and skulls, although a single concentration of both small and large bones is also known. Screenwashing of the matrix around the bones produced a small, but important, microvertebrate faunule. This concentration of bones was found at the site where Gregory collected a complete, large phytosaur skull in 1947.

Fish in the Revuelto Creek area are represented by numerous diamond-shaped ganoid scales and a single compressed specimen lacking head or tail. Unfortunately, this material is too incomplete to determine which of the five or so species of ganoid fish known from the Late Triassic of the western United States it belongs to. Several knobby tooth plates of a colobodontid are known as well.

At least two amphibian species are present. A very small one, represented by an atlas and possibly some jaw fragments, is presently under study by John Bolt of the Field Museum of Natural History, Chicago. The large amphibian is a metoposaur, but its preservation is fragmentary. Consequently, it is not possible to assign the material to *Metoposaurus*, the most common genus, or to the less-known *Anaschisma* or *Laticopus*.

Reptiles are the most abundant fossils in the area, especially the phytosaur *Rutiodon gregorii*, and include: an as yet undetermined species represented by tiny toothed-jaw fragments (under study by John Bolt); the armored aetosaur *Desmatosuchus*; the poposaurid thecodont *Poposaurus*; a theropod dinosaur; and possibly a mammal-like reptile—an ichtiosaur. Except for the dinosaur, the material consists of only a few bones. The dinosaur is represented by a partial skeleton which differs from *Coelophysis* in that the bones are considerably more robust. The pubis is straight rather than curved and has a less-developed distal end. It most clearly resembles the pubis of *Podikosaurus* from the Early Jurassic. Although different from all other theropods known from the Late Triassic of North America, the skeleton is too incomplete to warrant naming. At best, it indicates the presence of a carnivorous dinosaur larger and more primitive than *Coelophysis*.

AGE OF THE FAUNA

Because of the abundance and wide distribution of phytosaurs in the Late Triassic, they have been the chief means of correlating various stratigraphic intervals of the Chinle and Dockum Formations (e.g., Colbert and Gregory, 1957). The presence of *Rutiodon gregorii* at Revuelto Creek indicates affinities with the lower part of the Chinle Formation of Arizona and with the upper Dockum Formation of Crosby County, Texas (Table 1). This correlation is also supported by the presence of the aetosaur *Desmatosuchus*. The absence of the primitive phytosaurs *Angistorhinus* and *Paleorhinus* suggests that the fauna is younger than the lower Dockum Formation of Howard County, Texas, and the Popo Agie Formation of Wyoming. The absence of the advanced form of *Rutiodon* (type B) and of the aetosaur *Tyothorax* indicates an age older than the upper Chinle of Arizona and New Mexico (see Parrish and Carpenter, in press). From this it is concluded that the Revuelto Creek vertebrate fauna is of middle Norian age.

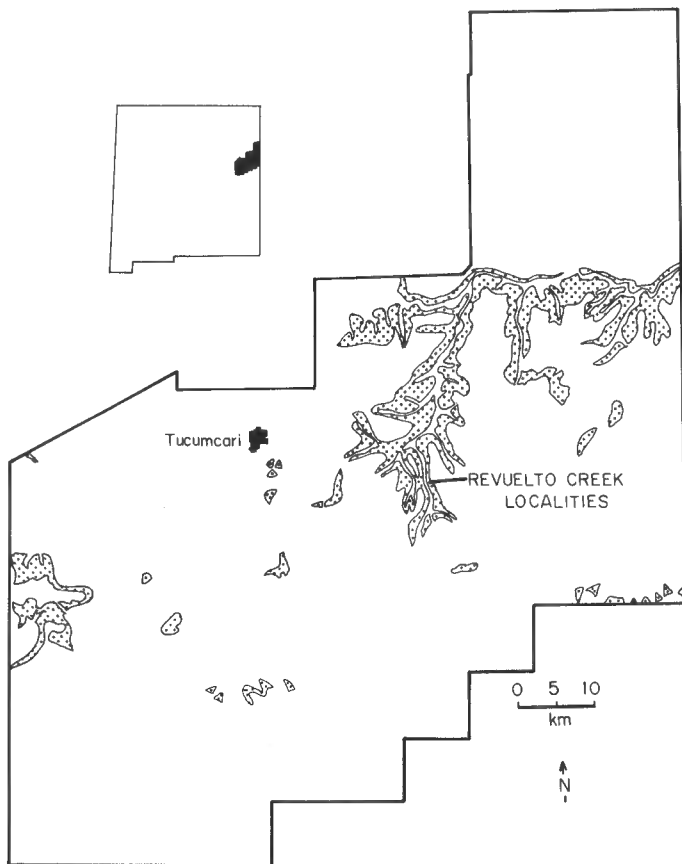


FIGURE 1. Distribution of the Dockum Formation in Quay County and the Revuelto Creek localities (modified from Hunt, 1977).

TABLE 1. Stratigraphic distribution of key Late Triassic reptiles in the western United States.

| ARIZONA | NEW MEXICO | WEST TEXAS | WYOMING |
|-----------------------|--------------------------|-------------------------------|------------------------|
| Chinle Fm. | Chinle Fm. | | |
| Upper Fauna | Ghost Ranch | | |
| Aetosauria | Aetosauria | | |
| <u>Typothorax</u> | <u>Typothorax</u> | | |
| Phytosauria | Phytosauria | | |
| <u>Rutiodon B</u> | <u>Rutiodon B</u> | | |
| Saurischia | Saurischia | | |
| <u>Coelophysis</u> | <u>Coelophysis</u> | | |
| Lower Fauna | Dockum Fm. Revuelto Crk. | Dockum Fm. Crosby Co. | |
| Aetosauria | Aetosauria | Aetosauria | |
| <u>Desmatosuchus</u> | <u>Desmatosuchus</u> | <u>Desmatosuchus</u> | |
| Rauisuchia | Rauisuchia | Rauisuchia | |
| <u>Poposaurus</u> | <u>Poposaurus</u> | Poposaurid | |
| <u>Lythrodynastes</u> | | | |
| Phytosauria | Phytosauria | Phytosauria | |
| <u>Rutiodon A</u> | <u>Rutiodon B</u> | <u>Rutiodon B</u> | |
| <u>Paleorhinus</u> | | | |
| Dicynodontia | | | |
| <u>Placerias</u> | | | |
| Saurischia | Saurischia | | |
| Procompsognathid | Procompsognathid | | |
| | | Dockum Fm. Howard & Post Cos. | Popo Agie Fm. |
| | | Aetosauria | |
| | | <u>Desmatosuchus</u> | |
| | | <u>"Typothorax"</u> | |
| | | Rauisuchia | Rauisuchia |
| | | <u>"Postosuchus"</u> | <u>Dolichobrachium</u> |
| | | Phytosauria | <u>Poposaurus</u> |
| | | <u>Paleorhinus</u> | <u>Heptasuchus</u> |
| | | <u>Angistorhinus</u> | Phytosauria |
| | | | <u>Paleorhinus</u> |
| | | | Dicynodontia |
| | | | <u>Eubrachiosaurus</u> |

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