

New Mexico's oldest dinosaur

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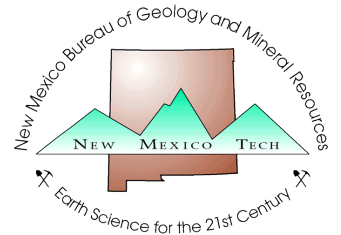
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New Mexico Geological Society

The New Mexico Geological Society annual spring meeting was held at New Mexico Institute of Mining and Technology (Socorro) on April 8, 1994. Following are abstracts from sessions given at that meeting. Abstracts from the other sessions appeared in 1994 issues of *New Mexico Geology*. This concludes the series from the 1994 meeting.

Structural geology and paleontology session (Continued from last issue)

TRIASSIC STRATIGRAPHY IN THE LUCERO UPLIFT, CENTRAL NEW MEXICO, by S. G. Lucas, New Mexico Museum of Natural History and Science, 1801 Mountain Road NW, Albuquerque, NM 87104; and A. B. HECKERT, Department of Earth and Planetary Sciences, University of New Mexico, Albuquerque, NM 87131

Triassic strata exposed in the Lucero uplift of Cibola, Valencia, and Socorro Counties are non-marine red beds of the Moenkopi Formation and Chinle Group. Moenkopi formation strata disconformably overlie middle Permian (Guadalupian) limestones and dolomites of the San Andres Formation and are as much as 55 m thick. Moenkopi strata are laterally persistent benches of grayish-red, trough-crossbedded and ripple-laminated, micaceous litharenite intercalated with beds of intraformational conglomerate and grayish-red, micaceous siltstone and mudstone. Charophytes, ostracods, and capitosauroid amphibians indicate the Moenkopi Formation in the Lucero uplift is of Middle Triassic (early Anisian) age. Overlying Chinle Group strata consist of (ascending) the Shinarump, Bluewater Creek, petrified Forest, Owl Rock, and Rock Point Formations. Shinarump Formation strata are extrabasinal conglomerates (mostly Paleozoic limestone clasts) and sandstones as much as 17 m thick that disconformably overlie Moenkopi strata. Locally, pedogenically modified sandstones, conglomerates, and siltstones—the “mottled strata”—laterally replace Shinarump conglomerates and sandstones. Bluewater Creek Formation strata are as much as 50 m thick and are mostly reddish-brown siltstones, mudstones, and ripple-laminated sandstones. The distinctive McGaffey Member—5–6 m of mostly ripple-laminated sandstone—is present in the upper half of the Bluewater Creek Formation. Below the McGaffey Member, the Bluewater Creek Formation contains an Adamanian (late Carnian) tetrapod fauna that includes cf. *Buettneria*, indeterminate phytosaurs, and *Stagonolepis*. The base of the Petrified Forest Formation in the Lucero uplift is the Sonsela Member; evidently the Blue Mesa Member has been removed by erosion at the pre-Sonsela unconformity. Sonsela strata are as much as 15 m thick and are mostly trough-crossbedded micaceous litharenite. Overlying Painted Desert Member strata are mostly reddish-brown bentonitic mudstone at least 100 m thick. Owl Rock and Rock Point strata are only exposed in the Petaca Pinta area (SW ¼ T6N R6W and SE ¼ T6N R7W). The Owl Rock is mostly grayish-red and very pale

green, calcareous mudstone and grayish-purple bioturbated sandy siltstone and is up to 37 m thick. Rock Point strata are up to 70 m thick and consist of laterally extensive beds of massive, moderately reddish-brown sandy siltstone and laminar to trough-crossbedded moderately reddish-brown quartzose sandstone. Middle Jurassic (Entrada) to Upper Cretaceous (Dakota) strata disconformably overlie Upper Triassic Chinle Group rocks in the Lucero uplift.

NEW MEXICO'S OLDEST DINOSAUR, by A. B. Heckert, Department of Earth and Planetary Sciences, University of New Mexico, Albuquerque, NM 87131; S. G. Lucas, New Mexico Museum of Natural History and Science, 1801 Mountain Road NW, Albuquerque, NM 87104; and A. P. Hunt, Department of Geology, University of Colorado at Denver, Campus Box 172, P.O. Box 173364, Denver, Colorado 80217-3364

Recent work in west-central New Mexico has resulted in the discovery of the oldest known dinosaur fossil in the state. Disarticulated cranial and postcranial remains of a small theropod were found in the Bluewater Creek Formation of the Chinle Group (NMMNH locality 2739) near Fort Wingate in McKinley County, along with isolated bone fragments of the labyrinthodont amphibian *Buettneria* and Phytosauridae. The theropod was found in a bluish-purple mudstone in the Bluewater Creek Formation approximately 10 m above its base and about 29 m below the base of the McGaffey Member. The presence of abundant *Buettneria* and *Desmatosuchus* in the Bluewater Creek Formation, as well as its stratigraphic position below the Blue Mesa Member of the Petrified Forest Formation, indicate it is of late Carnian (Adamanian) age. The cranium of this dinosaur is represented by a single tooth, a lacrimal, and an occipital condyle. The tooth is laterally compressed, serrated, and slightly recurved. The lacrimal is distinctly L-shaped, as is typical in basal theropods. The postcranial material includes portions of the cervical, dorsal, and caudal vertebral series (30+ total vertebrae), pelvic fragments, a distal femur, the proximal and distal ends of the left tibia, two nearly complete metapodials, phalanges, at least two claws, and other fragmentary elements. The vertebral centra are transversely narrow and extensively hollowed, as are all the long bones of the limbs. The hollow nature of both the vertebrae and the limb bones indicates that this dinosaur is a theropod similar to, albeit older than and smaller than, *Rioarribasaurus colberti*. This fossil is the second most complete Triassic dinosaur known from New Mexico. It provides insight into the origins of dinosaurs, not only in the American Southwest, but also in the world, as it was contemporaneous with the earliest dinosaurs on other continents. This spring, additional matrix collected from NMMNH locality 2739 will be screenwashed and should provide additional skeletal material.

THE DINOSAUR FAUNA OF THE BULL CANYON FORMATION (UPPER TRIASSIC: NORIAN) OF EAST-CENTRAL NEW MEXICO AND WEST TEXAS AND THE BIOGEOGRAPHY OF LATE TRIASSIC DINOSAURS, by A. P. Hunt, Department of Geology, University of Colorado at Denver, Campus Box 172, P.O. Box 173364, Denver, CO 80217-3364.

The Bull Canyon Formation is a Norian (Revueletian) red bed unit that is widely exposed in east-central New Mexico and west

Texas. It contains a large, but generally fragmentary, dinosaur fauna. The dinosaur fauna of the Bull Canyon Formation in New Mexico contains eight taxa. The largest theropods are two new herrerasaurids (A, B), which are represented by several partial skeletons. A third, smaller herrerasaurid (C) is only known from vertebrae. Another smaller theropod (D) represents a new taxon of uncertain affinities. *Shuvosaurus* sp. is known from one edentulous premaxilla. A single dorsal centrum is the only evidence for the presence of a prosauropod. Orinthischian teeth represent two species, *Revueltosaurus callenderi* and *Lucianosaurus wildi*. All dinosaurs from the Bull Canyon Formation in Texas come from the Post quarry and include *Shuvosaurus inexpectatus*, *Technosaurus malli*, a prosauropod, and possibly *Protoavis texensis*. Two dinosaur faunas can be distinguished in the Bull Canyon Formation. The lower fauna includes herrerasaurids A and C, theropod D, *Shuvosaurus*, a prosauropod, *Revueltosaurus*, and *Technosaurus*. The upper fauna includes herrerasaurids B and C and *Lucianosaurus*. Theropod dinosaurs discriminate three biogeographic provinces in the Late Triassic. A northern province (e. g. Western Europe) contains only ceratosaurs whereas a southern province (South America, South Africa, India) yields only herrerasaurids. A central province, which includes the United States, contains both ceratosaurs (e. g., *Rioarribasaurus*) and herrerasaurids. Prosauropod distributions provide some evidence for the recognition of three provinces with plateosaurids and the condontosaurids being most common in the northern province, melanosaurids and blikanasaurids in the south, and prosauropods being rare in the central province.

APTIAN-ALBIAN BOUNDARY IN LOWER CRETACEOUS STRATA, SOUTHWESTERN NEW MEXICO, by S. G. Lucas, New Mexico Museum of Natural History and Science, 1801 Mountain Road NW, Albuquerque, NM 87104

The Aptian-Albian boundary can be placed using ammonite biochronology in the U-Bar Formation of the Bisbee Group in southwestern New Mexico based on fossils collected in the central Peloncillo, Little Hatchet, and Big Hatchet Mountains. The most complete Aptian-Albian boundary sections in southwestern New Mexico are located at U-Bar Ridge (sec. 1 T32S R16W) in the Big Hatchet Mountains and east of Howells Ridge (sec. 12 T28S R16W) in the Little Hatchet Mountains. The youngest Aptian strata of the U-Bar Formation are the oyster-limestone member of Zeller in the Big Hatchet and Little Hatchet Mountains (=Carbonate Hill Formation of Gillerman in the central Peloncillo Mountains). These strata yield the ammonites *Acanthoplites berkeyi* Stoyanow, *Acanthoplites grandensis* Scott, *Acanthoplites hesper* Stoyanow, *Hypacanthoplites immunities* (Stoyanow), *Stoliczkaia patagonica* Stoyanow, “*Sonneratia*” *fosteri* Scott and *Kazanskyella spathi* (Stoyanow). These ammonites identify the *Kazanskyella spathi* zone of latest Aptian age. The oldest Albian strata of the U-Bar Formation are the limestone-shale member of Zeller, which overlies the oyster-limestone member in the Big Hatchet and Little Hatchet Mountains. This unit contains a diverse invertebrate fauna dominated by the ammonite *Douvilleiceras mammillatum* and the nautiloid *Cymatoceras neohispanicum*. The limestone-shale member thus belongs to the *Douvilleiceras mammillatum* zone of early Albian, but not earliest Albian, age. Ammonite

biochronology thus indicates a short hiatus in the U-Bar Formation at the Aptian–Albian boundary. This hiatus is equivalent to one ammonite zone, the earliest Albian *Hypacanthoplites cragini* zone. A marked lithologic change from *Exogyra* packstones of the uppermost oyster-limestone member to calcareous shales and ledgy, nodular limestones of the overlying limestone-shale member is physical evidence of the disconformity equivalent to this hiatus. In southeastern Arizona, the Aptian–Albian boundary is approximately at the lower Mural–upper Mural contact, and in central Texas it is at the contact of the Hensel Formation with the overlying Glen Rose Limestone, but at these sections earliest Albian strata are present. This suggests that tectonism local to southwestern New Mexico affected marine deposition during the Aptian–Albian transition. □

New Mexico Museum of Natural History and Science exhibit

On June 3, 1995 the New Mexico Museum of Natural History and Science (Albuquerque) will open its new exhibit featuring Early Permian footprints found in the Robledo Mountains near Las Cruces. The exhibit, "Ancient Evidence: Life Before the Dinosaurs," focuses on the phenomenal fossil record of invertebrate and vertebrate tracks preserved in Lower Permian strata of the Abo–Hueco transitional zone in Doña Ana County. In quantity, quality of preservation, and diversity of trackmakers, the Doña Ana County tracks are the best record on earth, one that provides a unique glimpse of terrestrial life and locomotion some 280 million years ago. The exhibit, which occupies about 2,000 square feet, reconstructs the environment in which the tracks were formed; Hueco Formation invertebrates and fossil driftwood are displayed with numerous tracks. The visitor is also taught how fossil tracks are studied and identified.

The New Mexico Museum of Natural History and Science is open 9am–5pm seven days a week; for more information, call (505) 841-8837. □

Barroll and Reiter (Continued from p. 7)

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Appendix A Present status of "B" series wells in the study area

We attempted to locate the "B" series of wells drilled by the USGS on the Bosque del Apache and described by Cooper (1968). It was found that none of these wells are accessible to a depth sufficient to allow temperature logging. (Subsurface temperature data shallower than about 90 ft is likely to be influenced by temperature fluctuations at the surface, and so such data is of little usefulness.)

B1—Apparently converted into a windmill well, named Army well. We located the well; it's an old broken-down windmill, no longer operational. Now open to about 40 ft (12.2 m), it still has the windmill 'sucker rods' in it, making access to the wellbore difficult.

B2—Cooper (1968) states this well was plugged and abandoned.

B3—Cooper (1968) states this well was plugged and abandoned.

B4—Cooper (1968) states this well was plugged and abandoned.

B5—This well is described as being drilled "on a topographical high in the old channel of the Rio Grande". We located the well in 1990 in the present channel of the Rio Grande, about 50 ft (15 m) from the east shore in shallow water. There is a concrete platform, which presumably was installed at about land surface, now about 3 ft (~1 m) above the surface of the water, attached to the well casing. The casing had a cover with a rusted-out hinge. When we opened the cover, the hinge broke. Inside the casing we found a 1" pipe that led to a serrated metal collar, below which the pipe seemed to widen, but which is blocked by a packer. Everything was rusted and couldn't be budgeted.

B6—Cooper (1968) reports this well was plugged and abandoned.

B7—We located this well just west of the road along a low-flow channel. The well was blocked just below the water level (no more than 10 ft [3.05 m] deep). □

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