DINOSAUR DINOSAUR DISCOVERIES

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Good-bye, Ultrasauros!

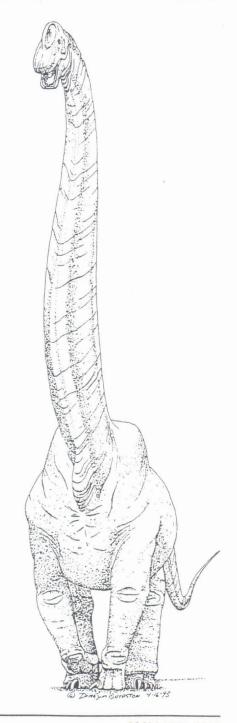
by Brian Curtice

James Jensen of Brigham Young University opened the Dry Mesa Dinosaur Quarry (Morrison Formation, western Colorado) in 1972 in hopes of collecting more elements of a "supercarnivore" whose huge phalanx [toe bone] had been collected in 1971. Though much of a large theropod was eventually collected (and named *Torvosaurus tanneri*), it was the discovery of two 8-foot+ scapulocoracoids [an element consisting of the shoulder blade and shoulder socket bones] from a diplodocid sauropod that made the quarry world renowned. Seven years later, the discovery of a third 8-foot+ scapulocoracoid, this one belonging to a brachiosaurid sauropod, put Dry Mesa back into the spotlight. Along with these massive bones, several huge vertebrae (including cervical [neck], dorsal [back], and caudal [tail] bones) and large pelvic elements were collected. In 1985, Jensen formally described three new sauropods from the quarry: *Ultrasauros macintoshi*, *Dystylosaurus edwini*, and *Supersaurus vivianae*. At the time, they were reputed to be, respectively, the heaviest, most enigmatic, and longest sauropods ever found.

Jensen chose a posterior dorsal vertebra as the holotype specimen [the name-bearing specimen] of *Ultrasauros*. He referred [i.e., assumed to be part of the same type of animal] a 5-foot long cervical vertebra, the world's largest caudal vertebra, and the brachiosaurid scapulocoracoid to this genus. Jensen believed that the holotype dorsal vertebra represented a new kind of brachiosaurid, one with extremely tall spines on the vertebrae just in front of the pelvis, which contrasted strongly with the low spines of known brachiosaurids. The large size of the scapulocoracoid led to the belief that *Ultrasauros* represented the world's heaviest dinosaur (seen at right by James Boydson).

A large, somewhat crushed, dorsal vertebra was made the holotype of *Dystylosaurus edwini. Dystylosaurus*, or "double beamed lizard," received its name for a pair of bony structural supports located near the front of the vertebra. No other material has ever been found for this animal.

Jensen made one of the two giant diplodocid scapulocoracoids discovered in 1972 the holotype specimen of Supersaurus. Several other elements were referred to this animal, including the other scapulocoracoid of equal size found in 1972, an ischium [the pelvic bone closest to the tail], and a string of 12 articulated caudal vertebrae. Later (1987), Jensen referred the 5-foot cervical vertebra, originally believed to be part of Ultrasauros, to Supersaurus, after further preparation of the specimen revealed the presence of a bifurcate neural spine, a character unknown in brachiosaurids but present in all diplodocids. Subsequently, I (Curtice, 1995) referred the caudal vertebra of Ultrasauros to Supersaurus as well because of its diplodocid characters. This left Ultrasauros with only two elements, a scapulocoracoid and the holotype dorsal vertebra. The original assignment of the scapulocoracoid to Ultrasauros was based on its large size. In fact it is no larger than the largest Brachiosaurus scapulae and should be properly considered a part of that animal.



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An enormous pelvis was discovered at the Dry Mesa Dinosaur Quarry in 1988, and a disagreement over its taxonomic identity ensued. Due to its similarity with pelves of diplodocids, it was thought by some to belong to Supersaurus. However, Jensen felt that the pelvis belonged to Ultrasauros because of the similarity of the sacral [pelvic] vertebrae with the Ultrasauros holotype. As it turns out, both viewpoints were right. While conducting research on the Dry Mesa sauropods, I, like many previous researchers, noticed the crushed condition of the Ultrasauros dorsal vertebra. With the aid of the Brigham Young University Earth Science Museum staff, the vertebra was taken out of its protective cradle and placed in a sandbox so that the other side, hidden by the cradle, could be studied. Quite unexpectedly, this side was nearly uncrushed and revealed the extent of bone "smearing" that had occurred on the side that had been facing up for a decade. We were able to firmly establish the location of the parapophysis (the area where part of the rib attaches to the vertebra) and confirm Jensen's (1985) conclusion that the vertebra was from the posterior part of the dorsal vertebral column. Once its position was confidently known, it was compared to other sauropods and found to most closely resemble the dorsal vertebrae of Diplodocus and Barosaurus and not at all those of brachiosaurids. Therefore I referred this holotype vertebra to the giant diplodocid Supersaurus, which makes Ultrasauros macintoshi a junior synonym of Supersaurus vivianae, and the disputed pelvis became an element of Supersaurus. With the referral of its holotype specimen to Supersaurus and scapulocoracoid to Brachiosaurus, I sadly said good-bye to what once was considered the "world's heaviest dinosaur."

To further unravel how these giant pieces came to be so jumbled, I decided to take a look at their relative positions in the quarry itself. Scrutinization of the quarry map and field notes of the excavation indicated that the holotype specimens of Ultrasauros and Dystylosaurus, the 5-foot cervical vertebra, and the huge caudal vertebra had been collected between the Supersaurus left and right scapulocoracoids (at right). The incorporation of paleocurrent data [the direction of flow of the stream that entombed the bones] into the composite quarry map revealed the large pelvis to be downstream from these other bones. The diplodocid-like morphology, giant size, close proximity to one another, and lack of duplicate elements suggested all the bones belonged to the same individual. The only other giant sauropod elements from the quarry, the Ultrasauros scapulocoracoid and a Brachiosaurus cervical vertebra, were collected quite a distance from this area.

No new Supersaurus elements have been collected from the Dry Mesa Dinosaur Quarry since 1988. Ken Stadtman, Curator of the Brigham Young University Earth Science Museum, has thus been focusing on preparation of a wealth of specimens already collected from the quarry. This emphasis on preparation has revealed new Supersaurus and Brachiosaurus material, and include pieces of baby sauropods (Curtice and Wilhite, 1996). Studies of this sauropod material are underway. As a result of other spectacular new finds

each season, field work continues at the Dry Mesa Dinosaur Quarry. During the 1995 field season, an articulated pelvis (complete with hind limbs and a tail!) of a small Diplodocus and a pristine Apatosaurus caudo-sacral [the bone that connects the tail to the pelvis] were collected. Preliminary analysis suggests the Diplodocus material belongs to a new species, but more preparation is needed before this can be confirmed. Due to its exquisite preservation, the Apatosaurus caudo-sacral reveals previously unknown morphology. A full season of excavation is planned for 1997. With continued preparation of previously collected material and collection of new material, the Dry Mesa Dinosaur Quarry will be sure to reveal many fascinating stories in the years to come!

For Further Reading:

Curtice, B. D., 1995. A description of the anterior caudal vertebrae of Supersaurus vivianae. Journal of Vertebrate Paleontology v. 15(3), 25A.

Curtice, B. D., Stadtman, K. L., and Curtice, L. J., 1996, A reassessment of *Ultrasauros macintoshi* (Jensen, 1985) in Morales, M., ed., The Continental Jurassic: Museum of Northern Arizona Bulletin 60, p. 87–95.

Curtice, B. D., and Wilhite, D. R., 1996, A re-evaluation of the Dry Mesa Dinosaur Quarry sauropod fauna with a description of juvenile sauropod elements in Huffman, A. C., Jr., Lund W. R., and Godwin, L. H., eds., Geology and Resources of the Paradox Basin: Utah Geological Association Guidebook 25, p. 325–338.

Jensen, J. A., 1985. Three new sauropod dinosaurs from the Upper Jurassic of Colorado. Great Basin Naturalist v. 45, 697–709.

Jensen, J. A., 1987. New brachiosaur material from the Late Jurassic of Utah and Colorado. Great Basin Naturalist v. 47, 592–608.

Portion of the Dry Mesa Dinosaur Quarry, 1972-1977

A-Supersaurus vivianae, right scapulocoracoid, holotype

B-Supersaurus vivianae (=holotype of Ultrasauros macintoshi), posterior dorsal vertebra

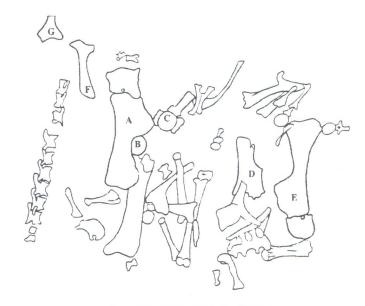
C-Supersaurus vivianae, proximal caudal vertebra

D-Supersaurus vivianae, caudal [posterior] cervical vertebra

E-Supersaurus vivianae, left scapulocoracoid

F-Supersaurus vivianae, right ischium

G-Supersaurus vivianae, left ischium



Bonebed Map by Linda Curtice