

Early Eocene *Cantius torresi*— oldest primate of modern aspect from North America

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The oldest primates of modern aspect (primates of prosimian tarsiform-lemuriform or higher grade) are known from Lower Eocene strata of Sparnacian age in Europe^{1,2}, Bumbanian age in Asia^{3,4}, and Wasatchian age in North America⁵. These first appearances coincide on all three northern continents with initial records of Artiodactyla, Perissodactyla and other modern mammalian groups appearing approximately 53 Myr ago^{6,7}. Here I report that a newly discovered basal Wasatchian faunal assemblage older than any known previously includes the well-preserved dental remains of a new species of *Cantius*, the earliest representative of Eocene Adapidae and the oldest evidence of primates of modern aspect known from North America. This new *Cantius* is possibly ancestral to all later adapids, including the European *Donrussellia* and North American *Pelycodon*. *Cantius torresi* has premolars reminiscent of those in Omomyidae, suggesting that earlier lemuriform and tarsiform primates were closely related and little differentiated at the beginning of the Eocene.

Two major groups of primates of modern aspect, tarsiform Omomyidae and lemuriform Adapidae, are represented in the early Eocene of Europe⁸⁻¹², Asia^{3,4,13} and North America¹⁴⁻²⁰. Both groups appeared suddenly on northern continents during an interval of climatic warming²¹. No plausible ancestors of the two groups are present in known European, Asian or North American faunas of late Palaeocene age, suggesting their immigration from equatorial areas. The oldest North American omomyid, *Taibandina americana*, is similar to the European *Taibandina belgica*^{15,19}. The oldest North American adapid known previously, *Cantius ralstoni*, is likewise similar to the European *Cantius eppsi*^{17,18}. The discovery of a new North American *Cantius* demonstrably older than *C. ralstoni* is important in clarifying the dental morphology of primitive Adapidae.

Cantius torresi n. sp.

Holotype. University of Michigan [UM] 83470, left dentary with P_1 - M_1 , collected by Victor Torres from locality SC-67 in the Willwood Formation at the south end of Polecat Bench, Park County, Wyoming.

Age and distribution. Earliest Wasatchian Land-Mammal Age (early Eocene) of the Clark's Fork Basin, Wyoming, western North America. This species is known from two adjacent localities (SC-67 and 69) in a restricted 10-m stratigraphic interval within the Clarkforkian-Wasatchian boundary sandstone of Kraus²².

Referred specimens. Holotype; UM 83467, left dentary with M_2 ; and UM 83475, right maxilla with M^{1-2} from the type locality. UM 66143, right dentary with M_{2-3} , from SC-69.

Diagnosis. Differs from *C. ralstoni*, *C. eppsi* and all other species of *Cantius* in being smaller, having relatively square upper molars, and having shorter, relatively broader lower premolars and molars. P_4 is distinctive in having a broad trigonid and talonid. The paracristid connecting the paraconid and protoconid on P_4 forms a right-angle with the metaconid connecting the metaconid and protoconid.

Description. The holotype dentary (Fig. 1a) preserves matrix-filled alveoli for the lower canine, a single-rooted P_1 and a double-rooted P_2 . The crown of P_1 is simple with a single central protoconid cusp, no accessory paraconid or metaconid, and little more than a trace of a talonid. P_2 is 2.4 mm long and

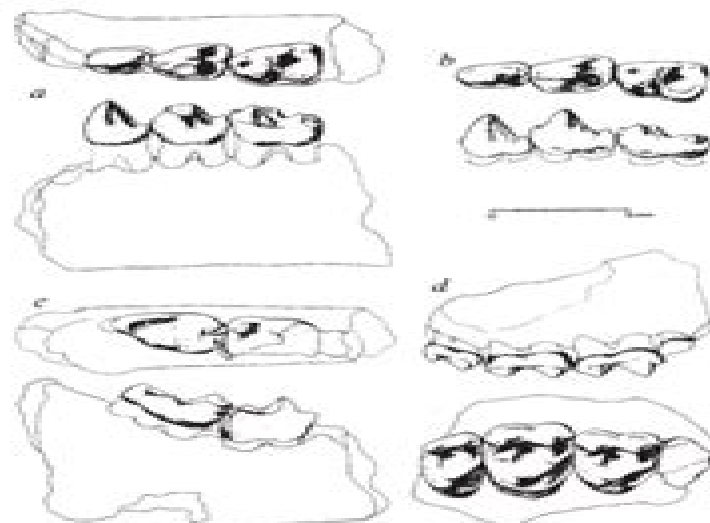


Fig. 1 Dentition of *Cantius torresi*, from the earliest Wasatchian of western North America, and *Cantius eppsi*, from the Sparnacian of UK. a, Left dentary of *C. torresi* [UM 83470, holotype] with P_1 - M_1 in occlusal (top) and lateral (bottom) view. Partial alveoli for the single-rooted P_1 and double-rooted P_2 are shown in outline. The remains of the alveoli for the larger lower canine are obscured in these views. b, Right P_2 - M_2 (reversed for comparison) of *C. eppsi* [Br. Mus. (Nat. Hist.) 15773, holotype] in occlusal and lateral view. c, Right dentary of *C. torresi* [UM 66143] with M_{2-3} in occlusal and lateral view. d, Right maxilla of *C. torresi* with M^{1-2} in lateral and occlusal view. Note the short *Namespiter* fold of enamel running up the posterior surface of the protoconid in occlusal view. This enamel fold does not join the postcingulum, and the earliest *Cantius* lacks a fully developed postprotocingulum.

1.8 mm in maximum breadth. The crown of P_4 is more complex, with a well-developed paraconid and metaconid in addition to the central protoconid. The metaconid is medial to the protoconid, making the trigonid unusually broad. The talonid on P_4 is also broad, with a prominent central cristid obliqua and shallowly basined posteromedial corner. P_4 is 2.8 mm long and 2.4 mm in maximum breadth. The crown of M_1 is tritubercular with three distinct trigonid cusps and a broadly basined talonid. M_1 is 3.3 mm long and 2.9 mm in maximum breadth. The crown of M_2 is partially preserved in two specimens (UM 66143 and 83467), both are small, measuring 3.4×3.2 mm and 3.2×3.1 mm in length and width, respectively. The crown of M_3 , preserved in UM 66143 has a short trigonid, with paraconid and metaconid cusps closely appressed (Fig. 1c). M_3 is 4.3 mm long and 2.7 mm in maximum breadth. The talonid of M_3 resembles that in other early *Cantius* species in having a very narrow hypoconal lobe (1.5 mm broad).

Upper molars are preserved intact in one specimen (UM 83475; Fig. 1d). The crowns of both M^1 and M^2 are relatively square by comparison with later species of *Cantius*; both have prominent protocones, distinct paracones and metacones, and small but distinct paracauls and metaconules. There is a crest behind the protocrista representing a 'Namespiter fold' or partially developed postprotocingulum as in other primitive adapids and omomyids. In later Adapidae this crest is either reduced and lost (*Donrussellia*, *Protadapis*) or it is expanded

New Eocene Primate Genus Cantius Revis

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