PRIMATE EVOLUTION

African dawn for primates

Philip D. Gingerich

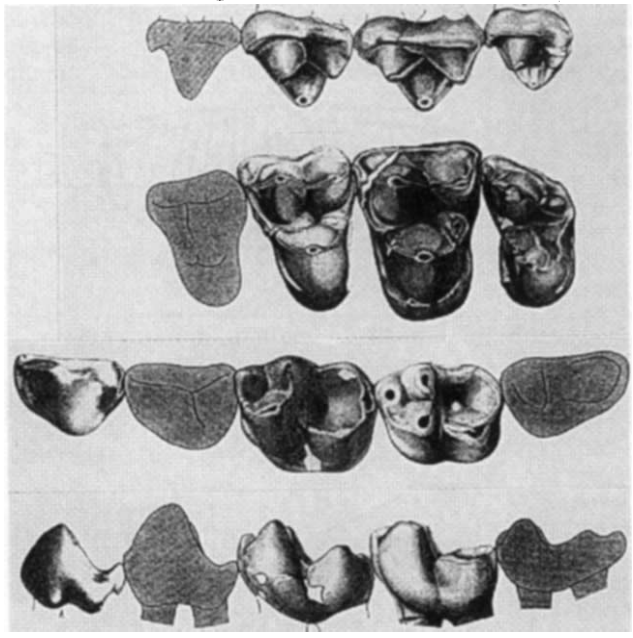
THE fossil record of primates is one of the most intensively studied of all major mammalian groups. But until recently, fossils of the most ancient true primates were absent from Africa, where primates are a diverse faunal component today. This gap has now been filled with the discovery of the first true primate from the Palaeocene of Africa, by Sigé *et al.* at the University of Montpellier in France[1].

This new find, *Altiatlasius koulchii* Sigé, comes from late Palaeocene sediments at Adrar Mgorn, in the eastern Quarzazate Basin of Morocco, at the foot of the High Atlas mountains, a locality discovered in 1977 (ref. 2). Fossils occur in a hard calcareous matrix deposited in a nearshore marine setting. These are fragile and extracted with difficulty in acid. Shark teeth indicate that the age is Thanetian (late Palaeocene, about 60 million years ago)[3]. Twenty-three mammalian species are represented in the Adrar Mgorn fauna[4,5], some by beautiful dentaries and maxillae, but most by isolated teeth. Small mammals predominate, especially insectivorous species. All are eutherians, including genera familiar in the Palaeocene of Europe or North America (*Aboletylestes*, *Cimolestes* and *Palaeoryctes*) showing that communication with northern continents was possible at times.

The new primate is represented by ten isolated cheek teeth (see figure). One dentary fragment of a juvenile preserves a single erupting molar, but no two teeth were found in association. The upper molars are trapezoidal at the base with a broadly basined trigon. The lower molar trigonids are low and talonids too are broadly basined. Tooth size indicates that *Altiatlasius* was comparable in body size with the mouse lemur *Microcebus murinus* or Demidoff's galago *Galago demidovii*. In life, *Altiatlasius koulchii* probably weighed no more than 50–100 grams.

Sigé and colleagues assign *Altiatlasius* to the family Omomyidae and regard it as the oldest haplorhine and the oldest true primate. They note close resemblances with younger, possibly more derived forms such as *Omomys* and *Chumashius* from the Eocene of North America[6] and *Kohatius* from the Eocene of southern Asia[7,8].

The single known premolar is unusual and does indeed suggest an affinity with *Kohatius*. Sigé and colleagues also compare *Altiatlasius* favourably with the contemporary plesiadapiforms *Berruvius* from the Palaeocene of Europe and *Micromomys* from the Palaeocene of North America, and to a lesser degree with the adapid *Donrussellia* from the early Eocene of Europe and the adapid or catarrhine *Oligopithecus* from the Oligocene of Africa. Bulbous cusps on lower molars remind me a little of *Cantius*. Sigé and colleagues do not discuss Asian *Altanius*, but *Altiatlasius*, like *Altanius*, is sufficiently primitive that it does not fit clearly into any single familial grouping[9]. Sigé and colleagues are probably right that *Altiatlasius* is an omomyid and the oldest true primate, but isolated teeth are difficult to interpret and more complete specimens with anterior teeth will be required to remove some lingering doubt.



Left upper and lower cheek teeth of *Altiatlasius koulchii* Sigé, a late Palaeocene primate from Adrar Mgorn in Morocco. Upper molars (top) are shown in lateral and occlusal view. Lower molars (bottom) are shown in occlusal and lateral view. The largest upper molar is the holotype, and it measures 1.75 mm in length and 2.45 mm in width. No teeth were found in association, so the position of each in the tooth row is necessary conjectural. Drawings by Ariane Beaux and Christian Pondeville.

The African origin of primates is an old idea[10], but fossil evidence to support it has emerged only in recent years. The discovery in 1975 of *Azibius* in Eocene sediments in Algeria[11] — the most ancient primate then known from Africa — helped convince me that primates originated in Africa[12], although others preferred a centre of origin in central[13,14] or southern[15] Asia. Since then, further discoveries in Algeria[16] and Egypt[17] have added weight to the idea of an African origin. Now we have *Altiatlasius* from the Palaeocene of Morocco. Another new form, from the Eocene of Tunisia, is under study at Montpellier by Hartenberger and Godinot. Taken together, these specimens provide strong support for an African origin of primates. Diversification in Africa in the late Palaeocene followed by northward dispersal when climates warmed globally across the Palaeocene/Eocene boundary[18] may explain why true primates are not found on northern continents until the early Eocene.

Sigé and colleagues conclude by ranking *Altiatlasius* as the sister group of Anthropoidea (Simiiformes), and suggest that it indicates, first, that anthropoid primates differentiated during the Palaeocene, and second, that platyrrhine anthropoids (New World monkeys) rafted the Atlantic Ocean in the Palaeocene when Africa and South America were closer together. Some doubt remains that *Altiatlasius* is a true primate (after all, its teeth compare well with some plesiadapiforms), and it is certainly not an anthropoid. If *Altiatlasius* is not an anthropoid, then it does not prove anthropoids existed, let alone differentiated, in the Palaeocene: and crossing the South Atlantic in the Palaeocene would have been a big stretch when *Altiatlasius* seemingly could not cross the Tethys Ocean to Europe. □

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