

Évolution

Origine et évolution des hominidés : Toumaï, une confirmation éclatante de la prédiction de Darwin

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Résumé

Le plus ancien hominidé connu *Sahelanthropus tchadensis* Brunet et al. 2002, dit Toumaï, Miocène supérieur (7 Ma) du Tchad, possède une association originale de caractères primitifs et dérivés qui permettent de le considérer comme proche dans le temps du dernier ancêtre commun aux chimpanzés et aux humains. Les Hominidés du Miocène supérieur : *Sahelanthropus* (Tchad), *Orrorin* (Kenya), *Ardipithecus* (Éthiopie) sont probablement à l'origine des Australopithèques dans lesquels doit s'enraciner entre 2 et 3 Ma le genre *Homo* qui, pour la première fois, va partir à la conquête de l'Eurasie. Par son origine géographique et son âge Toumaï confirme de manière éclatante la prédiction faite par Darwin en 1871. **Pour citer cet article : M. Brunet, C. R. Palevol 8 (2009).** © 2008 Académie des sciences. Publié par Elsevier Masson SAS. Tous droits réservés.

Abstract

Hominid origin and evolution: Toumaï enlightens Darwin's prediction. The earliest known hominid *Sahelanthropus tchadensis* Brunet et al., 2002, nicknamed Toumaï, from the Late Miocene (7 Ma) of Chad, displays a unique combination of primitive and derived characters which clearly shows that it is probably temporally close to the common ancestor of chimpanzees and humans. The Late Miocene Hominids: *Sahelanthropus* (Chad), *Orrorin* (Kenya), *Ardipithecus* (Ethiopia) are probably the ancestral group of Australopithecins from which the genus *Homo* appears between 2 and 3 Ma and then for the first time widespread in Eurasia. So, Toumaï seven millions years old confirms in a spectacular way the prediction Charles Darwin made in 1871. **To cite this article: M. Brunet, C. R. Palevol 8 (2009).**

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Abridged English version

The History of our story

During Antiquity, the universe, the earth and humans being shared a common origin.

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Thanks to the study of light, of rocks and of fossils, modern sciences discovered that these three events were separated by billions of years.

The concept of human fossils is very recent; it appeared in 1856 when the first Neanderthal remains were unearthed in the Neander ravine near Dusseldorf, Germany [16].

During the longest part of its story, humankind has lived with the creationist belief that denied all geological history and fossil remains.

In 1746, the great French philosopher Voltaire thought that the fish (in fact, fossil ones) found in the Mont Cenis (French Alps) were the meal remains of pilgrims coming back from The Holy Land [2]. Later, despite the transformism–evolutionism recommended by Jean-Baptiste de Lamarck (1744–1829) and Étienne Geoffroy Saint-Hilaire (1772–1844), Georges Cuvier, even though he is the Father of Paleontology, will also be the father of the fixism–catastrophism hypothesis! (« *Discours sur les révolutions de la surface du globe et sur les changements qu'elles ont produits dans le règne animal* ». 1822) [11].

In 1859, Charles Darwin published his theory of evolution, a masterly and visionary work: “On the Origin of Species by Means of Natural Selection” [13].

Thomas Henry Huxley, supporter of the Darwin Evolution theory, wrote that now, in nature, apes are our closest relations (Evidence as to Man’s Place in Nature, 1863) [23].

In 1871, Charles Darwin, in his work “The Descent of Man and Selection in Relation to Sex” suggested even closer relationships existed between man and African apes: “. . . consequently it is probable that Africa was previously inhabited by now extinct Apes, close to Gorilla and Chimpanzee, and as these two species are now the closest species to man, it is somehow more probable that our first ancestors would have lived in Africa than anywhere else. . .” [14].

These Darwin/Huxley predictions are going to be confirmed by molecular phylogeny and by paleontological evidences.

As early as 1967, A. Wilson and V. Sarich (University of California at Berkeley) demonstrated our close genetic proximity with the Chimp (less than 2% difference) [34]. It means *de facto* that we share a common ancestor: Chimps (=Panids) are the sister group of Humans (=Hominids).

Numerous human fossil remains were successively unearthed during this quest for our ancestor: first in Europe, at the end of 19th century (Neanderthals [17], Cro-Magnons [25]), then in Asia with *Homo erectus*:

Pithecanthropus from Java [15] and Sinanthropus from China [39].

Afterwards, Raymond Dart described in 1925 the first Australopithecine (*Australopithecus africanus*), the Taung child dated to 2–2.5 Ma, in South Africa [12].

Numerous discoveries were to follow in East Africa, between 2–3.6 Ma: *Paranthropus boisei* L. Leakey, 1959 [26]; *P. aethiopicus* Arambourg and Coppens, 1963 [1]; then in the 1970’s, Lucy (3.2 Ma) in 1974 and its relatives by French-US team headed by M. Taïeb, Y. Coppens and D. Johanson (described in 1978 as *Australopithecus afarensis* Johanson et al.) [24]. It is at this time that researchers became convinced that our story was deeply rooted in Africa.

This singular geographic distribution of prehumans (South and East Africa), linked to the fact that these earliest hominids are known only in East Africa (3.6 My at Laetoli in Tanzania) led Yves Coppens to suggest a paleoscenario he named the “East Side story”, the hypothesis of a bipedal prehuman origin in East African primary savannah [10], (Fig. 1).

This paleoscenario will definitively replace, in 1982–1983, the hypothesis of an Asiatic origin, when David Pilbeam demonstrated that *Ramapithecus* (known between 7–12 Ma in Siwaliks of Pakistan), the alleged earliest human Ancestor, was in fact a female *Sivapithecus*, genus related to the living *Pongo*, the Orang-utan [32].

At the beginning of the third Millenium the earliest hominids known are from the Late Miocene of Ethiopia (*Ardipithecus kadabba*, 5.2–5.8 Ma and its Pliocene relative *Aramidus*, 4.4 Ma) [20,41], Kenya (*Orrorin*, 6 Ma) [37] and Chad (Central Africa) [4]. My Team (the Mission Paleoanthropologique franco-tchadienne/M.P.F.T.) [31] and I have described Toumaï (Figs. 2–5) and his brothers in 2002–2005 [6,7,19,43] (7 Ma) [28,38]. This cornerstone definitely shows that the hypothesis of a southern or eastern African origin for the human clade must be reconsidered. These earliest hominids were living in a larger territory including at least Central Africa (Chad and Sudan) and most probably Libya and Egypt.

Like the other Late Miocene hominids, Toumaï was probably a biped and must have lived in woodlands of mosaic landscapes. For me, the Okavango delta in the central Kalahari Desert (Botswana) seems to be one of the best analogues [7]. The hypothesis of the primary grassland savannah as habitat for prehuman bipeds belongs definitely to the history of our story.

Although these early prehumans attest to an African human origin deeply rooted in time, we are once again confronted with powerful medieval ways of thinking which deliberately decided to ignore the scientific

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