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Short note: The track of a new cradle of mankind in Sahelo-Saharan Africa (Chad, Libya, Egypt, Cameroon)

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ABSTRACT

This paper deals with the impact of the successive discovery of two early hominids from Mio-Pliocene of Chad (*Australopithecus bahrelghazali*, nicknamed Abel dated to 3.5 Ma and *Sahelanthropus tchadensis*, nicknamed Toumaï dated to 7 Ma) on our understanding of how far back go the roots of mankind and what kind of environment they lived in. These discoveries introduce new geographic and phylogenetic paradigms to explain the African evolution of our prehuman ancestors.

1. East Side Story

The state of fossil hominids has been recognized very late, in 1856, with the discovery in Neander Ravine (Germany) of the first remains of the Neanderthal man (Fuhlrott, 1859). So the idea of an ascendance for our species is quite recent (about 150 years ago). But who was our ancestor, and when and where did it arise?

In the 1980's, early hominids were known in south and east Africa, and the discoveries of the oldest fossils in east Africa led to the proposal of an "East Side Story"—the bipedal hominid original savanna hypothesis (Coppens, 1983, Fig. 1).

2. Discoveries in Chad

Since 1994, excavations by La "Mission Paléoanthropologique Franco-Tchadienne (MPFT)[1] in the Djurab desert (Northern Chad) unearthed a new australopithecine nicknamed Abel (*Australopithecus bahrelgarazhi*, Brunet et al., 1996 dated to 3.5 Ma, Fig. 2), the first hominid fossil ever found west of the Rift Valley (Brunet et al., 1995). Thereafter a new hominid (nicknamed Toumaï) represented the earliest fossil yet found of the family (*Sahelanthropus tchadensis*, Brunet et al., 2002, Fig. 3) from the Late Miocene, dated to 7 Ma (Vignaud et al., 2002; Lebetard et al., 2008). It is this latter new milestone, in particular, which has interesting and important implications for palaeoanthropology. Toumaï suggests that an exclusively southern or eastern African origin of the hominid clade is unlikely to be correct (Fig. 1).

3. Roots and environment of the prehuman ancestors of mankind

Since 1994, these new fossils reveal that the hominid phylogenetic tree has far deeper roots than previously known; they extend the age of the oldest known fossils from 3.6 Ma to 7 Ma, with three new Late Miocene species: *Ardipithecus kadabba* (5.2–5.8 Ma, Middle Awash, Ethiopia, Haile-Selassie, 2001) and *Orrorin tugenensis* (ca. 6 Ma, Lukeino, Kenya, Senut et al., 2001). Of these, the oldest (7 Ma) is the Chadian Toumaï. The scientific impact of these recent discoveries recalls that which followed on the discovery of the Taung child on October 1924 of *Australopithecus africanus* (Dart, 1925).

S. tchadensis displays a unique combination of primitive and derived characters, which clearly reveals it is related to neither chimpanzees nor gorillas. Instead, it clearly suggests that it is related to later hominids. Moreover, it is temporally closer to the last common ancestor between chimpanzees and humans (Brunet et al., 2002, 2005; Zollikofer et al., 2005), Figs. 3–6.

"La Mission Paléoanthropologique Franco-Tchadienne" has also employed cosmogenic isotope (Beryllium 10) dating to constrain the ages of these fossils. This study has demonstrated a novel technique to date sediments that lack volcanic tuffs. It provides

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[1] 'La Mission Paléoanthropologique Franco-Tchadienne' headed by Michel Brunet, is an international and transdisciplinary scientific project in collaboration between 'Collège de France' (Paris), University of Poitiers (France), University of N'Djamena and CNAR (N'Djamena, Chad) including more than 60 researchers from 10 countries.

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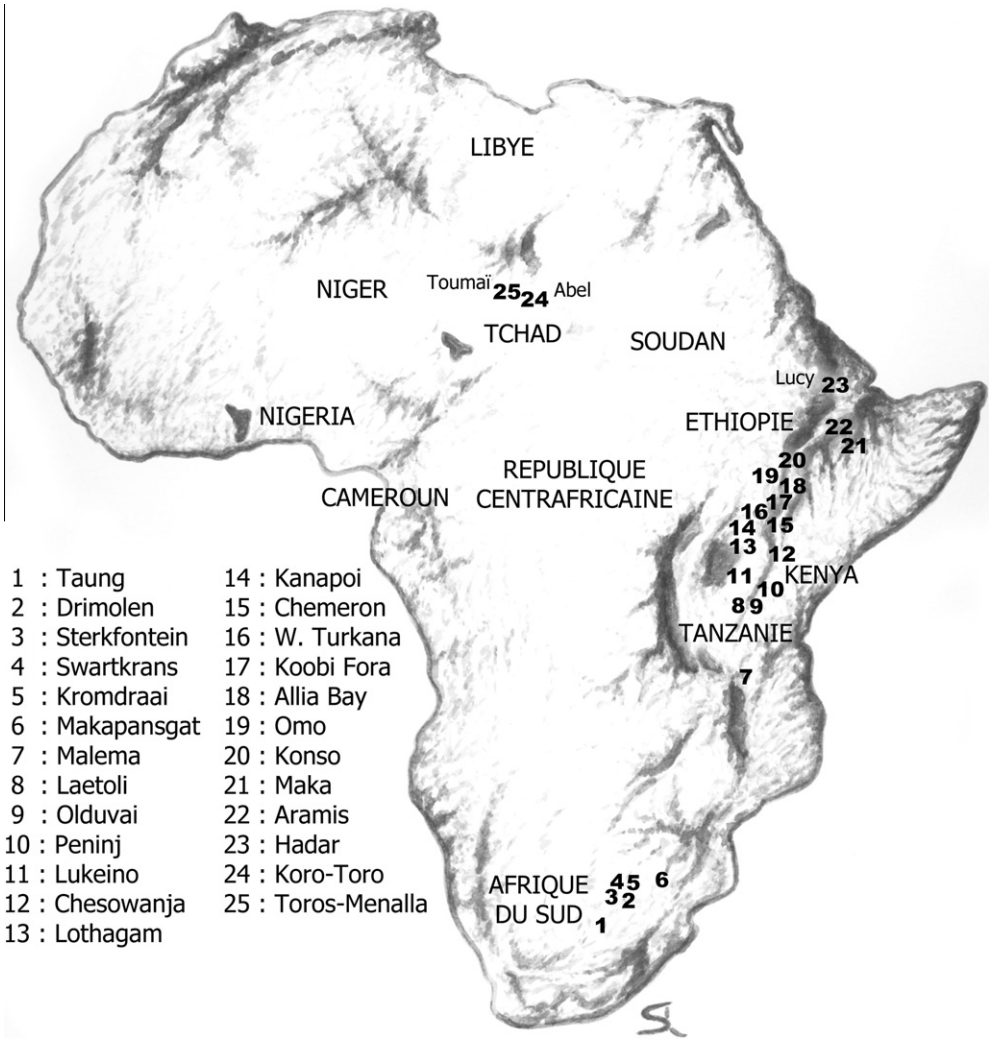

Fig. 1. Main early hominid localities in Africa.

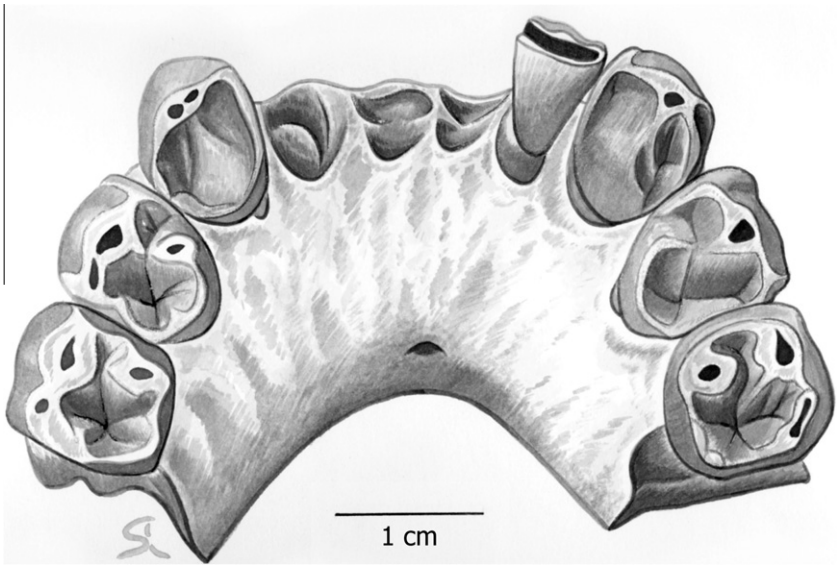

Fig. 2. *Australopithecus bahrelghazali* (Brunet et al., 1996) (nicknamed 'Abel'): lower jaw, holotype species.

exciting potential to analogous situations in similar Neogene sediments (Lebetard et al., 2008).

The Late Miocene sedimentological and paleobiological data, from Chad, point to the existence of a mosaic landscape (Vignaud