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WAS TOUMAÏ (*SAHELANTHROPUS TCHADENSIS*) BURIED?

In memoriam Fanoné Gongdibé (1962–2007)

ABSTRACT: Was Toumaï (Sahelanthropus tchadensis) buried? Photographs taken when the skull of Toumaï was discovered establish that the holotype of one of the earliest known hominid species was probably reburied in the recent past. Taphonomic analysis reveals the likelihood of one, perhaps two, burial(s) which seemingly occurred after the introduction of Islam in the region during the 11th century. Two other hominid fossils (a left femur and a mandible) were in the same "grave" along with various mammal remains.

KEY WORDS: Toumaï – Sahelanthropus – *New fossils – Burial – Femur*

RÉSUMÉ: Toumaï (Sahelanthropus tchadensis) a-t-il été inhumé? Les documents photographiques de la mise au jour de Toumaï permettent d'établir que cet holotype de l'une des plus anciennes espèces d'hominidés se trouvait probablement au sein d'une sépulture aménagée récemment. L'analyse taphonomique révèle en effet la possibilité de l'existence d'une, voire de deux, inhumation(s) vraisemblablement en rapport avec l'introduction de l'islam dans la région au XIe siècle. Deux autres fossiles d'hominidé (un fémur gauche et une mandibule) se trouvaient dans la même « sépulture » avec divers restes de mammifères.

MOTS-CLEFS: Toumaï – Sahelanthropus – *Nouveaux fossiles – Sépulture – Fémur*

INTRODUCTION

Alain Beauvilain (Docteur d'Etat in Geography, Lecturer at the University of Paris Ouest Nanterre La Défense), present in Sahelo-Saharan Africa since 1969 and in Chad since 1989, was in 2001 'Coordinator of the Palaeontological Activities in the Republic of Chad'. Indeed, within the framework of its functions, he initiated in 1993 Palaeo-Anthropological research in the Chadian Sahara where he organized and led 29 missions on these themes. The second mission enabled on January 20th, 1995 the discovery of the mandible of 'Abel', *Australopithecus bahrelghazali*. Having located since 1997 a small tectonic undulation bringing locally to the outcrop of the deeper layers of grounds elsewhere, in June 2001, he decided and organized a mission of four men (A. B. and three Chadians). On July 19th, 2001 they discovered the remains of *Sahelanthropus tchadensis*, 'Toumaï'.

These fossils were found in an area where the scientific community did not await them: the assumption suggested by Yves Coppens, baptized 'East Side Story', must be re-examined. Indeed, this one saw a difference in climatic evolution between the east and the west of Africa, difference generating a divergent evolution between ancestors of apes and humans. East of the Great Rift, the development of the dryness, started here 20 million years ago and which accelerated between 10 and 1 million years ago, would have involved the disappearance of the dense forest, replaced

successively by a clear forest, a wooded savannah, savannah and finally a steppe. The adaptation to this new environment, which gets less vegetable food resources and corresponds to a medium potentially more dangerous, would have caused the hominisation. However, west of the Great Rift, the forest would have remained, allowing the apes themselves to remain adapted to life in the forest. However, thanks to in particular the searches of Alain Beauvilain, we now know that at that time in this area located west of the Great Rift, it was already the same climate and the same vegetable landscape than in the east... it is necessary to seek another cause for the radiation man/apes. This also means that the geographical cradle of humanity is much wider than it was thought.

We know relatively well the evolution of the primates 10 million years ago and the last pre-humans after 5 million years ago. Between these two dates, the fossils are rare: all new specimens which come to be intercalated in this period of time will make a further step in understanding the separation of apes and humans. The taphonomic examination of the remains of Toumaï is therefore essential in particular to determine the age of the fossils. Those, as demonstrated in this article by Alain Beauvilain and Jean-Pierre Watté (Doctor of Prehistory, University of Paris 1 Panthéon-Sorbonne, Archaeologist Emeritus of the Museum of Le Havre) were not in place. The analysis of the surrounding sediment cannot thus be used as a means of dating. Considering the fact that erosion affected by deflation the different layers of ground, the bones collected in the area date from 5 to 7, even 10 million years ago: it is in this time range that it is advisable to place Toumaï.

Lastly, although the Chadian State, in 2001, put the bones of the site TM 266, place of Toumaï's discovery, at the disposal of palaeontologists in charge of their study, the presence of a femur (inventoried TM 266-01-063, the skull of Toumaï being inventoried TM 266-01-060-01 and the mandibular symphysis TM 266-01-060-02) has never been mentioned before this article. It is, however, a basic element to give information upon the walk of *Sahelanthropus*. It is fundamental that the scientific community is informed to enrich the scientific debate.

THE SKULL OF TOUMAÏ AND ITS IMMEDIATE SURROUNDING

On July 19th, 2001, a team comprised of three Chadians, Ahounta Djimdoumalbaye, Fanoné Gongdibé, and Mahamat Adoum and a Frenchman, Alain Beauvilain, heading the team, discovered the skull of a hominid, *Sahelanthropus tchadensis*, alias Toumaï in the middle of the Chadian Sahara, at a place designated TM 266 (Beauvilain 2003). Because of observations and speculations that were published in the meantime (Vignaud *et al*. 2002, Lebatard *et al.* 2008), it is necessary to point out the taphonomic and archaeological conditions of this discovery, and to attempt to explain them.

Whereas the other fossils at this site are separated from one another and scattered at random, with no concentration of large specimens, the skull of Toumaï was part of a dense group of fossils. In general, apart from articulated skeletons, concentrations of bones are rare in the Djourab. This is why my Chadian colleagues declared at that time that the concentration of fossils was a "palaeontologist's dump". This is not the case. Palaeontologists' or geologists' dumps encountered in the Toros-Menalla zone, as well as that of KB, are completely different; bones are broken, crumbly, "digested" by the crust, unidentifiable, sometimes mixed with broken beer bottles and wine jugs. A skull would never have been abandoned like this, unless it were completely covered beneath its crust. *Figures 1a* and *1b* lead us to propose an alternative explanation.

In these photos, the fossils coloured yellow are those that Ahounta Djimadoumalbaye and the late Fanoné Gongdibé had in their hands at the moment of discovery of the skull. Those on the right were placed onto the ground by Ahounta Djimdoumalbaye, just before he picked up the skull. Those on the left comprise two mandibles and a bovid maxilla, posed by Fanoné Gongdibé when he joined Ahounta, from whom he was only a few steps distant. The skull was repositioned for the photograph, which led to a tibial fragment (?) being displaced (green arrows, and fossil highlighted in green). A hominoid mandible, at the time unrecognised as such, was tipped over during the displacement of the skull.

At the time of discovery, the skull was positioned to the northeast of this assemblage of bones which was aligned in two parallel bands (*Figure 1a*). These remains are mainly fragments of large mammals; especially long bones, a distal end of a femur, a proximal end of a tibia, a humeral diaphysis, possibly a radius, an unidentified long bone broken in two, and phalanges. Species identification of these large mammal bones on the basis of the images is not possible. Smaller fragments of bones are present here and there in line with the long bones. Erosion could not have regrouped and aligned so many different fossils. These fossils are barely encrusted and some still carry traces of white siliceous cement. A left hominoid femoral diaphysis is also present. Its encrustation is similar to that of the skull.

The whole set forms a quadrilateral about a metre long by 40 centimetres wide, oriented northeast-southwest.

Figure 1b reveals that the fossils were not arranged while the team leader (A. B.) was collecting samples in the eastern part of the site. The surface of the sand, as witnessed by the presence of small accumulations (sand shadows) and by the undercutting of sand beneath bones due to wind turbulence is as it was left by the last wind. There are no signs of hand or foot prints inside the quadrilateral. Foot prints largely circumvent three sides of the fossil concentration. They only appear in the foreground where Ahounta Djimdoumalbaye and the late Fanoné Gongdibé approached the site to collect the skull after having put on the ground the few fossils that they had in their hands. The skull was shifted in order to take the photo, which is clearly shown by the hand and foot prints in this sector.

Figure 2 shows the skull of Toumaï on the 19th of July, 2001 at 7.30 a.m. U. T. repositioned as carefully as possible

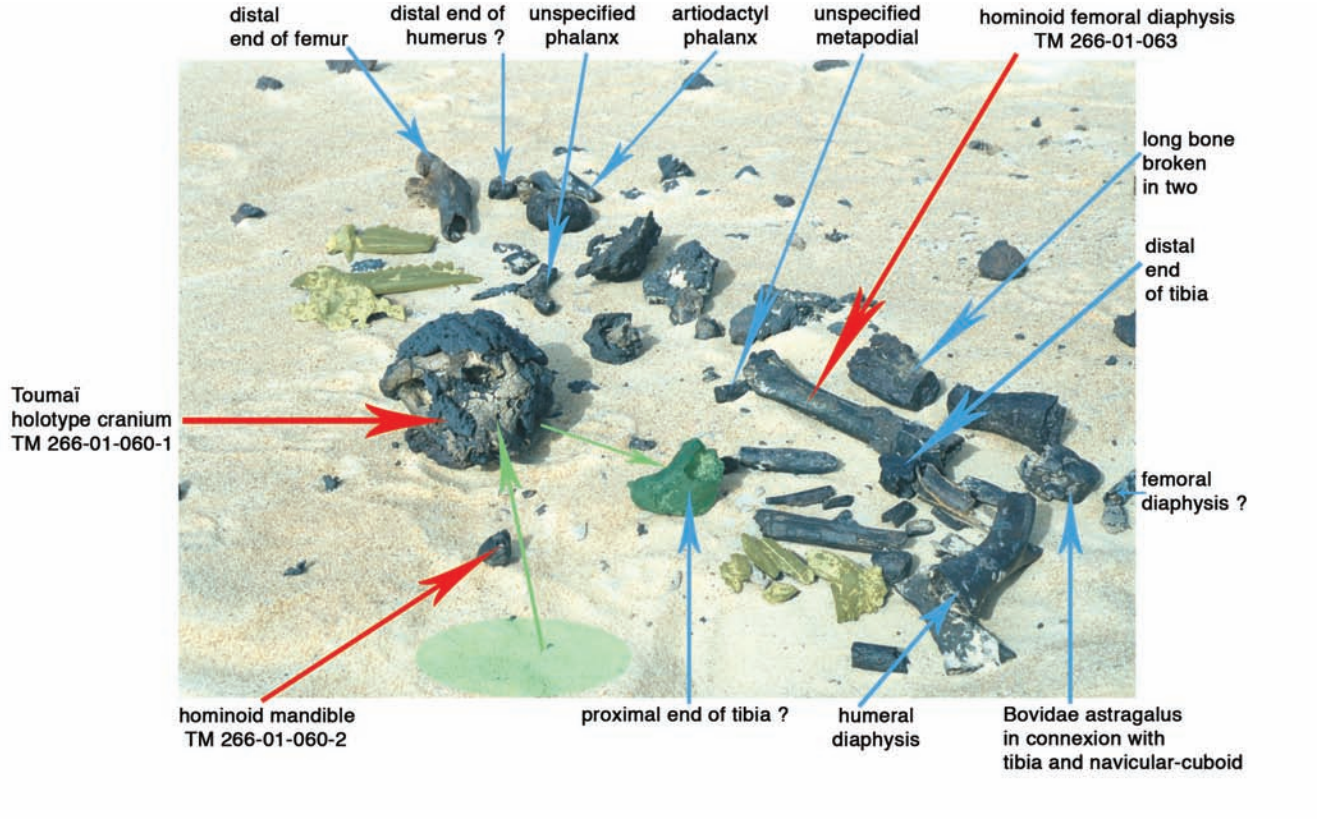

FIGURE 1a. TM 266, the fossil assemblage. A grave? (Photo Alain Beauvilain)

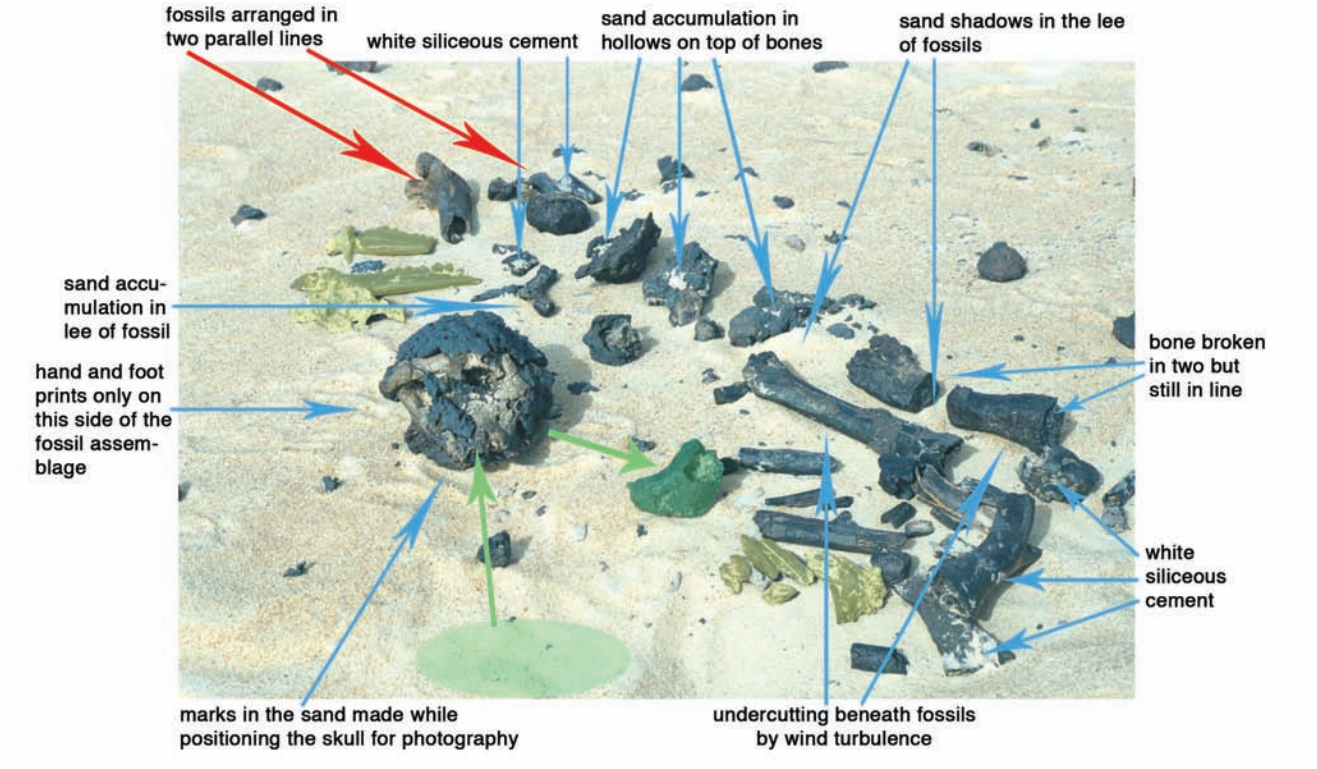

FIGURE 1b. The fossil assemblage in its natural context. (Photo Alain Beauvilain)

FIGURE 2. Toumaï at the time of its discovery on July 19th, 2001. On the surface, posed on the sand. (Photo Alain Beauvilain)

in its initial position by Ahounta Djimdoumalbaye. On this day at locality TM 266 (Lat 16°15'12'' N; Long 17°29'29'' E), the sun rose at 4.28 a.m. U. T. and at its zenith was slightly to the south (sun height 85°28'). Thus the long shadow of the morning indicates that the top of the skull roof is oriented to the east. The mandible, which has not been touched, is located in line with the skull. It is only incidentally that it is in the photo because at the time it had not yet been recognised as such, all the attention being focused on the skull. The latter is lying on its left side. A thick crust, dark bluish on the outside, dark brown-black inside, protects the skull. In some places the crust is stuck fast to the fossil, but in others it is not, in which case a space of 1 mm filled by loose sand separates them.

The canines of Toumaï, worn flat, were particularly affected by erosion. The molars, because of their position, were less damaged. The right molars are barely exposed in their matrix, and their colour is red violet. A fragment of hominoid mandible is particularly deeply eroded. The teeth have disappeared exposing the alveoli.

In the Djourab, erosion is dominated by the frequency and force of the winds. During the very long dry season, from September to June, the Harmattan blows almost continuously from the northeast. For several weeks in June, but mainly from mid-July to the end of August, the region is affected by the monsoon, often violently, arriving from the southwest, a direction opposite to the Harmattan. No vegetation reduces the effects of the wind, the erosional capacity of which is reinforced by the presence of sand grains. The crust covering parts of Toumaï, along with exposed bone surfaces and teeth, were abraded and polished by the wind-driven sand. The specimen was also varnished by this patina so characteristic of the desert. The desert varnish is formed by mineral salts and morning dew which occurs frequently in the region.

Finally, a wide range of temperatures is experienced in the desert, with daily changes on the rock surface in excess of 50°C, even up to 100°C. It is also necessary to point out that, some years, freezing conditions occur. These temperature changes split the protective crusts on fossils and shatter the bones themselves, especially the teeth.

Even though erosional agents in the Djourab are strong, and their effects are obvious on poorly consolidated sandstone, their action is visible on fossils only after long periods of time. Fossils are resistant to erosion because of the quality of fossilisation of bones achieved mainly through silica salts which are hard and exceptionally resistant. The same applies to the incrustations. Thus it takes centuries for large pieces to disappear. In addition, the sand in the desert is not stationary. It can cover the fossils for long periods and so provide protection, especially when the area is characterized by dryness. Since 2004, part of the site which yielded Toumaï has been buried by sand.

At TM 266, white siliceous cement usually adheres to fossils, but no sign of it is visible on the skull or its encrustation, whereas it is present on another mandible of *Sahelanthropus* (TM 266-02-154-1), and most of the fossils from the Toros-Menalla zone. These fossils therefore do not all have the same age.

Figures 3a and *3b* show the right and left profiles of Toumaï respectively. They were taken at the end of July 2001 at N'Djamena. Comparison with the photos taken at the

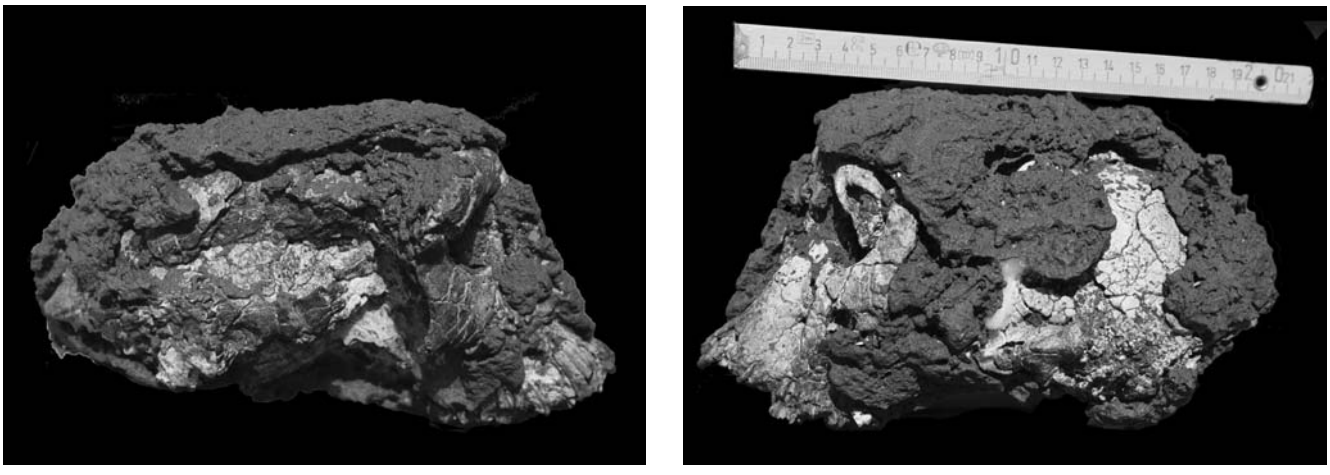

FIGURE 3. Toumaï, right profile (left image, *3a*) and left profile (right image, *3b*). The two sides show similar erosion. (Photos Alain Beauvilain)

moment of discovery shows that the precautions taken to insure perfect conservation of the skull and its crust allowed the fossil to be transported without any degradation or damage.

Traces of erosion are clear on the right side of the skull which was exposed to the sky at the time it was collected. More astonishing, photo *3b* shows that the left side had also been affected by erosion; the teeth are abraded, more than those on the right side, desert varnish is clearly present on the front and parietal bones, the matrix partially destroyed and thinned. Its edges have been abraded but not broken. The crust covering the parietal bone is extremely thin and almost circular in form, a detail which is emphasized by the shadow in the photo. The surface crust is bluish, like that on the right side. Several traces of matrix, reduced to a thin film in contact with the fossil are also bluish. Desert varnish is also present on the left side. The two sides of the skull were therefore subject to erosion in a similar manner.

These crusts form in fossil-bearing sediments. The fossils form physical discontinuities in the sediments almost like drains which facilitate the circulation of ground water and lead to incrustation by the precipitation of salts. The presence of organic matter provides a suitably carbonate-rich environment that favours their formation. In the Chad Basin, the crusts consist of iron and manganese oxides, and silica, forming an "alloy" which can be extremely hard. While Fe_2O_3 colours the crusts and fossils brown and red, and Fe_3O_4 green and grey, manganese salts colour them black. These different elements precipitate preferentially in different fossilized parts of the jaws, enamel, dentine, cement, and bone, yielding various colours that can be expressive and even aesthetically pleasing. After a long period of exposure, the action of the sun and air changes the colour of manganese salts from black to yield a nuance of blue. This phenomenon is why this type of crust frequently appears blue on the part exposed to the sky and black on the part that is buried or against the ground. This fact explains the blueness of the surface matrix covering Toumaï, even though rare earths and uranium salts could also yield the same tint.

On the ground, in its bed of sand, the left side of the skull should have been protected from erosion and exposure to the sun and winds. However, the photographs indicate that both the left and right sides of the skull are equally eroded. The skull must therefore have been turned over. Consequently, when found by our team, it was not in its original position within the sedimentary deposits.

TOUMAÏ'S SEPULCHRE (?)

Erosion could not naturally have produced such an alignment of so many different bones of different species. The matrix or the white siliceous cement which covers the specimens indicates that the fossils came from different layers and different places; the traces of erosion on the skull prove that it successively underwent erosion on both sides. The only logical hypothesis to account for the position of the bones is to admit that they were gathered together and regrouped, in which case the skull of Toumaï was not *in situ*.

The position of the skull relative to the two lines of long bones suggests the arrangement of a skeleton… This arrangement cannot be natural. On the contrary, one can imagine that this particular arrangement of fossils reveals the desire to give these remains the honour of a burial. The "skeleton" would have been reconstituted beginning with the skull which was recognisably "human". Effectively, the skull, which has the appearance of a human head, could not leave anyone indifferent. In this perspective, those responsible for this burial, if that is what it is, would have done their best applying their knowledge of anatomy and using the available animal fossils which they found scattered nearby. They mixed these with human bones, thereby bringing together other elements of body for the skull. They thus placed a humerus near the head, and the distal end of a femur, correctly oriented, at the other extremity of the "cadaver". Toumaï was therefore buried in recent times.

Why a burial? The abundance of fossils in this part of the desert is such that if the local inhabitants are aware of them, they usually take them only for stones that resemble animal bones, particularly jaws, without giving them a great deal of importance. Children play with them. In contrast, the skull, resembling as it does a human skull, could not have been taken for a toy left to children.

Who could have done this burial? The orientation given to the 'body' corresponds to that of the quadrilateral which is northeast-southwest. This orientation is important as it corresponds to the direction of Mecca. This burial, if indeed that is what it is, could have been carried out by nomads who regularly traversed the region. Islamized since the 11th century with the conversion to Islam of the sovereigns of the first kingdom of Kanem, the capital of which, Ndjimi (about hundred kilometres away from the discovery point of Toumaï), was permitted by the presence of underground water and, at that time, a more humid climate, these populations were obliged by their religion to offer a decent burial to their fellow human beings. In fact, the Muslim religion obliges the believers to bury bodies. Tradition dictates that the body should be arranged with the head oriented towards Mecca (Lat 21°25' N; Long 39°49' E). In the absence of instruments, believers take as reference the direction of the rising sun, which, in the proximity of the Tropic of Cancer, varies greatly throughout the year from northeast to southeast. This explains why Muslims often hesitate before deciding on the direction to pray. Only the North Star, during the night, provides a good indication. But how could believers determine the right direction of Mecca decades or centuries ago? It is therefore not surprising to find out that the orientation of the grave is clearly northeast, from where the Harmattan blows. In contrast, the shadow in *Figure 2* indicates that the orientation of the skull is better.

It is possible that the burial of the fossil could have been repeated twice. The first time, the nomads who found the skull of Toumaï, with pious intentions, would have searched the surroundings for the rest of the body which they then buried. Later, after the skeleton was re-exposed by erosion, the skull would have been reoriented with a better knowledge of the direction of Mecca.

The most recent history of Toumaï could thus be probably the first burial, followed later by a repositioning of the skull. In fact, traces of erosion on the specimen indicate that it lay with its maxilla to the northeast from where the most frequent winds come. It was brought to the surface by erosion, its left side upwards. The matrix was thus abraded and the surface turned bluish. The parietal bone was exposed whereas the maxilla, and in particular the molars, covered with a thick matrix filling the palate, were thus protected from abrasion. It was in this original position that the skull would have been found before being buried along with other fossils collected in the surroundings and arranged in two parallel lines. Later, after a second bout of erosion and exposure, someone moved the skull over in order to place the crown in the right direction for Mecca. During one or the other of these manipulations, the right side, which was covered in matrix, was placed upwards in order to protect the left side which was already degraded. The skull was found in this position after the erosion had time enough to abrade its right side. The possibility that the skull could have rolled over by itself cannot be valid because of the position of the other fossils. The mandible, because it was separated from the skull a long time ago, perhaps even before being fossilised, was strongly eroded. It must have been placed close to the maxilla during the repositioning of the skull.

This gesture occurred in a region that was for a long time a crossroads because it was rich in subterranean water near the surface and good pasturage during a period of less arid climate than that of today. This region remained a crossroads until the beginning of the 20th century, especially on account of the wells of Am Zao not far from TM 266. Thus the Largeau Column (almost 400 men and 600 camels) camped close to these wells from November 10th to 12th, 1913, before joining a second column which came from Ouadaï in order to go secure to Aïn Galaka, then Faya, Gouro and Ounianga. The desert appears to be empty only to those who do not understand it…

CONCLUSION

Whatever the details of the history of this fossil since erosion first exposed it, all the field evidence indicates that on the morning of July 19th, 2001, the skull of Toumaï was on the surface of the ground, and not *in situ* in Miocene deposits (Beauvilain 2008) as indicated in several scientific papers by scientists who examined the site months or even years after the original discovery. The holotype of *Sahelanthropus tchadensis* was associated with an assemblage of animal and hominid bones, the positions of which indicate that they had been recently placed in a grave and reburied before being once again uncovered by the wind. They were discovered in July 2001. The photographs of the discovery leave no doubt whatsoever and are a reminder that laboratory speculation has to cede to the realities of first-hand knowledge of the site.

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