

# CITY OF STONES IN THE MOROCCAN MIDDLE ATLAS: SPECIAL FUNERAL RITES

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**Abstract.** The Middle Atlas and particularly the Boulmane region is full of pre-Islamic funerary monuments. The overwhelming majority of them are circular tumuli. However, two burials from the “City of Stones” are completely different from this common pattern and are exceptional in many respects. They are an extension of each other. Each is topped by an imposing horizontal sandstone slab which gives it a megalithic appearance although they are natural formations in reality. The underlying cavity was used as a burial chamber. The first CPSI site displayed the incomplete skeleton of 3 individuals. One of them, found in lateral decubitus, is relatively complete in anatomical connection up to the pelvis. The remains of two incomplete skeletons without any anatomical connection are also present. The second burial of the CPSII monument, however, does not contain any anatomically connected skeleton but bones belonging to 4 different individuals. The pre-Islamic populations of the Moroccan Middle Atlas erected tumulus-type funerary monuments to accommodate primary burials which could be single or multiple. And at the same time they could desecrate some by exhuming the skeletons to redeposit them in natural rock cavities which serve as burial chambers for a secondary burial or a deposit.

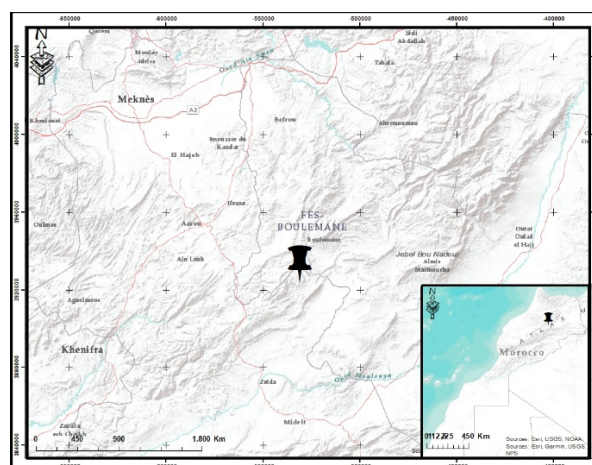
## 1. Introduction

The City of Stones and its surrounding region are rich in burial mounds. The research program carried out between 2005 and 2015 made it possible to study more than sixty funerary monuments spread over an area of 8km<sup>2</sup> [1, 2]. Their method of construction is remarkably homogeneous. Their size is modest, just enough to maintain in elevation a dome, most often circular in shape, sometimes flattened at its top. The excavations undertaken on these monuments reveal the practice of very diverse burial methods both in terms of the burial position and the number of individuals sharing the same monument. The most common burial position is lateral or dorsal decubitus. The burial can be single or multiple. Secondary burial is rarer and presents several forms, the individuals being most often represented only by a few long bones and their skull. This is the case for the CPSI and CPSII funerary slabs which are the subject of this study.

## 2. Presentation of archeological study area

The study region is located in the northwest part of the Middle Atlas (Figure. 1) and less than 10 km southwest of the town of Boulmane. In 2005, we identified a truly spectacular geographical entity in the rural commune of Essaf. It is a plateau area crossed by several small deep valleys. From a geological point of view, this area belongs to the folded Middle Atlas domain and develops

in a secondary format. It is the result of the erosion of Cretaceous sandstone formations. The Triassic overlaps the Cretaceous and Liassic formations via a vertical fault which tends to tilt towards the West [3-5]. The sandstone layers were literally chiseled by erosion which gave birth to a ruin form landscape offering a multitude of columns and fairy chimneys sheltering a set of rock shelters.



**Fig. 1.** Geographical location of the archeological study area in southwest of Boulmane, Morocco.

We have renamed this venerable place which ignites the imagination “City of Stones” [6]. Numerous prehistoric sites and funerary monuments are located in the City of

Stones but also in the neighboring valleys [6,7]. In the western part of the City of Stones, we inventoried dozens of tumuli grouped into small necropolises. On the western slope of a small, very deep valley oriented NW-SE, there are two unique and particular funerary monuments in this region, CPSI and CPSII. They are located on an area of scree and occupy a fairly high position overlooking the valley (Figure 3). These are natural sandstone slabs which have a megalithic appearance, each offering a cavity which served as burial chambers.



**Fig. 2.** City of Stones; Ruiniform landscape in cretaceous sandstone.



**Fig. 3.** Two funerary monuments CPSI and CPSII formed by the juxtaposition of two sandstone slabs

### 3. Funerary monument CPSI

The CPS I funerary slab was discovered during surveys carried out in the region in 2007. It measures 2.4 m in length, 1 m in width and 0.8 m in height. It has a very small internal cavity: 1.90 m in length, an average width of 0.80 m and a ceiling height of barely 0.60 m. the excavation of the funerary monument revealed human remains of three adult individuals in the presence of an ornament (Figure 4).



**Fig. 4.** Sandstone slab housing the burial chamber

#### 3.1. CPSI-H1

The skeleton of this individual is very incomplete. The inventoried bones are composed of a mandible, a clavicle, two scapulas, two radii, two ulnas, a sternum, two metacarpals, ten hand phalanges, a femur, a sacrum, a coxal, a patella, a tibia, two fibula, three tarsal bones, two metatarsals and eight phalanges of the feet. These discovered human remains have no anatomical connection and are mostly grouped along the wall (Figure 5). The teeth of this subject are not complete. The styloid process of the left radius is absent. The left femur is complete and its femoral head is subcircular. The right fibula is complete and has a groove on the inner side and on the upper half. The left fibula is also incomplete, part of its proximal epiphysis is missing and has a vertically elongated groove [8].

The mandible is robust compared to the other two mandibles and has extroverted gognions. It has a protruding chin and presents alveolar prognathism. The mandibular body shows a decrease in the symphysis towards both edges [9], its dental arch is parabolic in shape and has incomplete teeth. The estimation of the age at death of the CPS I-H1 individual was deduced from the dentition and long bones. The molars show a very advanced degree of wear. The epiphyses of the long bones, all fused to the diaphyses, show that this is an adult subject [10; 11]. The resorption of the socket of the third molar and the degree of wear of the teeth demonstrate that this subject would be an adult of an advanced age.

The study of sexual distinction is based on the measurements of the right hip bone of this individual, which makes it possible to reveal a clear sexual

dimorphism [12, 13]. The opening angle of the greater sciatic notch shows that we are in the presence of a male individual [6].

Stature is calculated from the study of the long bones present (ulnas, tibia, fibulas, femur and radius) using multiple regression formulas [14]. The height of this individual is estimated to be 166 cm and is within the average height of modern humans [6].



**Fig. 5.** CPSI-H1: Some remains of the skeleton grouped at the bottom against the wall.

### 3.2. CPSI-H2

The skeleton of this individual is incomplete. The inventoried human remains contain a mandible, two clavicles, a sternum, a humerus, two radii, an ulna, a coxal bone, two femurs, a patella, two fibulas and three tarsal bones. The collected bones show no anatomical connection. The right femur is incomplete; it is missing both condyles and part of the diaphysis. The two fibulae are almost complete with two damaged epiphyses (Figure 6).

The Mandible is less robust compared to that of the CPSI-H1 individual. It has a parabolic dental arch with complete dentition. Its ascending branches are divergent and its condyles are long and parallel to the horizontal plane. The teeth show wear on the premolars and molars. Alveolar prognathism is well marked and the gonions are not extroverted. The mandibular body decreases from front to back [9].

The advanced eruption of the third molar and the degree of wear of the first molar show that this is an adult subject. The right hip is complete and has a fairly wide sciatic notch, which shows that the skeleton belongs to a female subject. The height calculated from the average of all the sizes obtained for each long bone is 158 cm [6].



**Fig. 6.** CPSI-H2: Different bones (a mandible, ribs and long bones, etc.) are buried grouped together and without any anatomical connection.

### 3.3. CPSI-H3

The skeleton of this individual is the most complete. His ribcage and upper limbs were in anatomical connection. The bones collected are composed of a mandible, two scapulas, eleven ribs, a humerus, two radii, two ulnas, a coxal bone, part of the sacrum, a femur, a patella, two tibias, two fibulas, three tarsal bones, four carpal bones, a metacarpal, the last seven thoracic vertebrae and the five lumbar vertebrae (Figure 7). The mandible revealed on its underside shows incomplete teeth.

The right radius of this individual is complete, while the left distal epiphysis is absent. The distal epiphysis of the left tibia is absent and the left part of the right tibial plateau is missing. The right fibula is incomplete; both epiphyses and half of the diaphysis are missing. Part of the proximal epiphysis of the left fibula is absent.

The texture of the bones is that of a subject whose growth is complete. Examination of the long bones shows that the epiphyses are fused to the diaphyses. The degree of eruption of the third molar is advanced and the extensive wear of the teeth shows that the CPS I-H3 individual is adult [10, 11]. It has slender bones and presents blunt muscular insertion reliefs. The sciatic notch of the coxal bone is wide and open, which indicates that it is a female subject [13].

The long bones are all present, with the exception of the left humerus and femur. It was possible to record all the maximum lengths and calculate the sizes for each long bone. The stature estimated by the multiple regression formulas is 156 cm [14].

The mandible of the CPSI-H3 individual is short and narrow; it presents neither extroverted gonions nor divergent branches. It is characterized by a reduced chin and alveolar hyperprognathism. Its dental arch is parabolic and the condyles are short. The height of the mandibular body decreases at the level of the symphysis towards both ends. All the alveoli of these teeth are open, which proves that their loss was post mortem.



**Fig.7.** CPSI-H3 : The entire upper part of the skeleton formed by the spine, the rib cage and the upper limbs are in anatomical connection

The maximum length of the radius is average, which reflects its slenderness. The two ulnas have classic curvatures and the bony crests are poorly developed. The femur of this individual is slender; its length in position is average and its femoral head is subcircular. The diaphysis of the tibia is rounded.

An ornament found in the burial chamber of the CPSI slab consists of two copper alloy bracelets and a fine oxidized metal needle which was associated with the bones of the female individual CPS I-H2 buried in a central position. A thin copper alloy bracelet, verdigris in color, was found on her left carpus. Its section is circular and these two rounded ends are juxtaposed with the clasp. A second incomplete copper alloy bracelet was linked to the right carpus. Its state of conservation is worse than that of the first bracelet and its shape suggests that it was cylindrical. Its width is approximately 1.5 cm.

#### 4. Funerary monument CPSII

The CPSII funerary monument was discovered in September 2012. It is a large, thin sandstone slab with an internal cavity and located just behind and in the extension of the CPSI monument. The slab measures 5 m in length, 2 m in width and 1m high. The internal cavity is 2m long with a height of 0.75m. (Figure 3). From an architectural point of view, this monument is identical to the CPSI funerary monument, but with a larger slab than the previous one. Both are unique in the region and occupy a fairly high position in a narrow, steep valley.

The search revealed human remains belonging to four incomplete individuals. These are adult subjects, one of whom is a female. The bones collected show no anatomical connection. They are buried in an elongated manner along the left wall of the cavity and occupy only half of the surface of the latter (Figure 8). Three skulls and two mandibles were exhumed. The long bones are aligned in bundles, all the bones are placed against the wall and the skulls occupy the ends and border the deposit. The two mandibles were found buried on their

lower surfaces and are placed at the edges of the deposit. During our a skull appeared at the entrance to the burial chamber but when we returned to the site for the excavations it had disappeared. A shoulder blade of a domestic bovid is associated with this burial and thus represents funerary furniture.



**Fig. 8.** CPSII : Incomplete human remains of four individuals placed grouped against the wall of the burial chamber.

##### 4.1. CPSII-H1

The majority of bones found are in a very good state of conservation. The calvarium and left coxal are present. The majority of long bones are also present with the exception of the bones of the right upper limb and the left tibia and fibula. All the vertebrae and clavicles are also absent. The maxilla of this individual has incomplete dentition. The second premolars and the first two molars are present. On the left side, only the canine is present and the sockets of the last two molars are closed, attesting to their ante-mortem falls [9].

The eruption of the third molar of the epiphyses of the long bones fused to the diaphyses reveals that the CPSII-H1 individual is an adult subject [10, 11]. The study of the measurements of the left hip bone and in particular the height and opening angle of the greater sciatic notch qualifies the sex of this individual as female [12]. The study of long bones shows that the height of the individual is estimated at 158 cm [2].

##### 4.2. CPSII-H2

The skeleton is very incomplete. The remains collected are composed of the calvarium, the left hip bone, the two femurs, part of the sternum (the manubrium), three vertebrae, a rib and a calcaneus. The majority of these bones are perfectly preserved, with the exception of the distal part of the right femur which is fractured.

The maxilla of this individual has incomplete dentition. On the right side, the second premolar and the first two molars are present. On the left side, the canine, the first premolar and the first two molars are present. Only the sockets of the last two molars are closed.

The age at death of the CPSI-H2 individual was estimated based on the dentition. The resorption of the left and right third molars shows that this individual is of a very elderly age [10, 11]. This individual is a male

subject because the left hip bone has a high and narrow iliac fossa, an iliac crest with an upper 'S' shape and the opening angle of the greater sciatic notch is 50° [12] The calculated height is 163cm based on the study of long bones [14].

### 4.3. CPSII-H3

The skeleton of this individual is also incomplete. We exhumed two parietals, an occipital, a right temporal and some fragments of the frontal. The mandible of this individual, found buried on its underside, presents a poor state of conservation. The right ascending ramus is absent and the mandibular body is less preserved. The teeth are not complete, only the last two left molars are present. The socket of the first left molar is closed, The eruption of the third molar shows that the CPS I-H3 individual is an adult. Resorption of the left first molar suggests advanced age. The pelvic bones are absent and this does not allow us to determine the sex. And similarly we do not have long bones for estimating the size.

### 4.4. CPSII-H4

The skeleton of the individual is not very well represented and the majority of bones collected are not well preserved. The diaphyses of the two femur bones and the right tibia of the lower limbs are present. The sacrum is in a very good state of conservation. The mandible of this individual, found buried on its underside, is in a good state of preservation. On the right side, the two premolars and the last two molars are present. On the left side, only the first two molars are present. The alveoli of the second left premolar, the first right molar and the third left molar are closed, attesting to their ante-mortem falls. The sockets of the four incisors and two canines are still open, which allows us to claim that their falls are post-mortem. This state of affairs as well as the very advanced degree of wear of the teeth indicate that the subject is adult and probably of an advanced age [10, 11]. Analysis of the sacrum shows that he is male. The absence of the distal epiphyses of the femurs and tibia does not allow us to estimate the size of this individual.

### 4.5. Conclusion

The skeletons of the two subjects CPSI-H11 and CPS2II-H2 are incomplete and do not present any anatomical connection, which indicates that it is a secondary burial for these two individuals. They were exhumed from their primary burial and placed back in the chamber of this funerary slab. Several bones are missing from these skeletons and it is believed that during the exhumation only a few parts of the skeleton were chosen and removed.

The CPSI-H3 individual is the most complete of the 3 individuals on the one hand and presents an anatomical connection only for the upper part of the skeleton on the other. This indicates that he was the first to be buried under this funerary slab and it corresponds to a primary

burial which was subsequently disturbed. Given that the burial chamber is narrow, the lower limbs of CPSI-H3 were most likely reshuffled and moved to make room to deposit part of the remains of the other two individuals. The few remains of the SPSI-H1 individual were deposited and grouped at the bottom against the wall. Those of the female subject SPSI-H2 were carefully placed in the presence of an ornament in a central position.

The local population carried out clandestine excavations in search of treasures, which partially disrupted the burial. And they have a habit of re-burying the skulls elsewhere. It is for this reason that we believe that the skulls were present on site during the original burial.

The skeleton of the individual CPSII-H4 is not very well represented and the majority of bones collected are not well preserved. The diaphyses of the two femur bones and the right tibia of the lower limbs are present. The sacrum is in a very good state of conservation. The mandible of this individual, found buried on its underside, is in a good state of preservation. On the right side, the two premolars and the last two molars are present. On the left side, only the first two molars are present. The alveoli of the second left premolar, the first right molar and the third left molar are closed, attesting to their ante-mortem falls. The sockets of the four incisors and two canines are still open, which allows us to say that their falls are post-mortem. This state of affairs as well as the very advanced degree of wear of the teeth indicate that the subject is adult and probably of advanced age [10, 11]. Analysis of the sacrum shows that he is male. The absence of the distal epiphyses of the femurs and tibia does not allow us to estimate the size of this individual.

In the Middle Atlas and in the City of Stones we have the presence of dozens of tumulus distributed in small necropolises and only two particular funerary monuments, which are juxtaposed and look similar. Funerary slabs which are the results of the use of natural space only and therefore have no intentional construction like tumulus-type funerary monuments. Both have secondary burials of several individuals, all adults. The majority of skeletons are incomplete. This gives indications on the funerary practices of the pre-Islamic populations of the Moroccan Middle Atlas. They erected tumulus-type funerary monuments to accommodate primary burials which could be single or multiple. These tumuli are circular or oval in shape and built by the accumulation of stones and small blocks. And at the same time they can desecrate some by exhuming the skeletons to redeposit them in natural rock cavities which serve as burial chambers for secondary burials.

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