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15. HUMAN BURIAL EVIDENCE

15.1 BACKGROUND

A large assemblage of Iberomaurusian (Later Stone Age) skeletons was recovered from Grotte des Pigeons during excavations directed by the Abbé Jean Roche between 1951 and 1955. Preliminary details of the archaeological context of fragmentary remains found in 1951 and a series of burials excavated between 1952 and 1955 were published by Roche (1953a; 1953b; 1959; 1963) and a more detailed account of the human osteology was published by Denise Ferembach in 1962.

In 1951, Roche reopened Ruhlmann's trench "S2" (north trench), which ran for about 16 m east to west, turning northwest and running for another 4 m under a large block of debris from the cave roof. During cleaning of the trench, a small fragment of cranial vault was recovered from level "D" in Square M21. The fragment was considered to date from the later part of the Aterian (Roche 1953a; 1953b) but, since the trench had been left untouched for several years, it is possible that it had fallen from a higher stratigraphic position due to erosion of the sides of the trench. During the same season, human bones from at least two individuals were recovered from level "A" (Roche 1953a). These comprised a cranium of a male aged about 15 years who had undergone dental evulsion, a robust humerus that could have belonged to the same individual, and a fragment from the anterior part of the cranium of a child aged about 7 years (Roche 1953b).

In the spring of 1952, two partial skeletons were exposed in Square L18 due to erosion of the "*coupe Nord*" of trench S2, and assigned to level "B" (Roche 1953b; 1963). The lowermost skeleton lay beneath a stone slab measuring 20 cm thick and 70 cm long. A layer of horn cores of Barbary sheep (*Ammotragus lervia*, referred to by Roche as *mouflon*) was located between the stone and the skeleton. As the burial was at risk of collapsing into the adjacent trench, the skeleton was removed by the R. P. Bienvenu Blondeau, who was then priest at Tafoughalt. The second skeleton was located slightly above the first, lying on its side with the legs tightly flexed (Roche 1953a; 1963). This skeleton was observed *in situ* by participants of the 2nd Pan-African Congress on Prehistory during an excursion to the site (Cole/Clark/Davis 1952). Balout (1954) reported that the lowermost skeleton was found at a depth of 4 m but the source and reliability of this information are unclear.

At the end of 1952, excavations were extended into the alcove located to the north of Ruhlmann's north trench (**fig. 15.1**). Approximately 70 cm of unusually stony sediment were removed to the base of layer "A", revealing, in layer "B" below, a dozen more or less complete skeletons (Roche 1953a; 1953b). In one publication, Roche describes the skeletons as placed one on top of another with no apparent order (Roche 1953b). In a second paper published in the same year, he reports that the majority of the skeletons were lying on their backs with the head to the west and the face turned towards the rising sun (Roche 1953a). One burial containing remains of several young children was described consistently in both papers (Roche 1953a; 1953b). The bodies were placed in the centre of a trapezoidal pit and aligned on an east west axis with the heads to the west. The pit was delimited by stone blocks. The stone block on the north side of the grave was from the roof of the cave, whereas the stones on the east and west sides were Liassic limestone from an external source and must have been deliberately transported to the cave. Crania from three Barbary sheep were placed directly above the bodies, with the horns pointing outwards, and were held in place by a

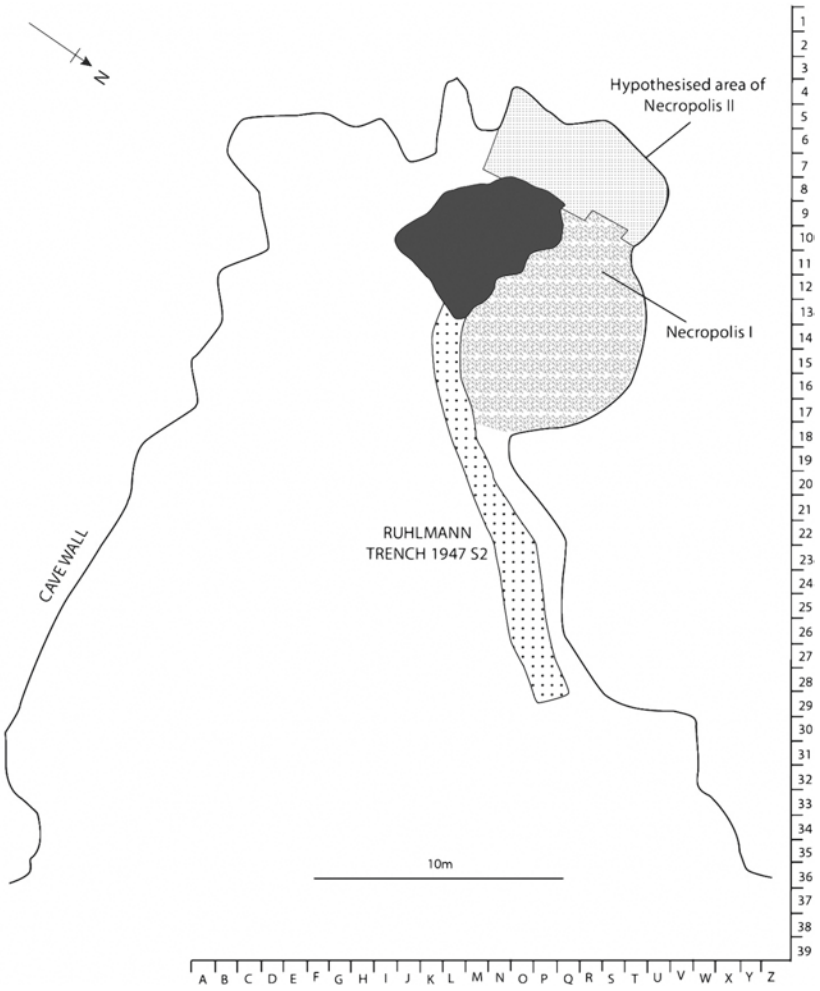


Fig. 15.1 Map of Grotte des Pigeons showing Ruhlmann's (north) trench S2 and the Iberomaurusian Necropolis I & Necropolis II excavated by J. Roche. Ruhlmann's trench undercut a large block of debris at the western end (shaded black).

centrally positioned stone. Another infant was buried flexed on its left side with the face turned towards the stone block on the north side of the burial pit. The grave was filled with fine black sediment and contained no lithic artefacts or charcoal (Roche 1953b). Roche reports that all of human bones recovered in 1952 were sent to Professor Vallois in Paris.

No burials were excavated in 1953 (Roche 1963). At the end of the 1953 season, a pile of scree situated between L13 and N17, blocking access to the west part of the cave, was carefully removed. Excavation of the burial area was resumed in 1954 with the assistance of A. Jodin. An area located between Ruhlmann's S2 (north) trench and the wall of an alcove on the northern side the cave was excavated to a depth of 1.5 m. The long east-west axis of the excavated area ran between Squares L18 and O/P11 and the shorter north-south axis ran between Squares L14 and R14. Excavation of this area, designated Necropolis I, continued in 1955, and extended deeper into the alcove and down to the level of the underlying yellow (dominantly mineral) deposit. The total excavated area covered an approximately ellipse-shaped area of 10 × 7 m with the longest east-west axis running between Squares M18 and S10 and the shorter north-south axis running between Squares S16 and M13 (Roche 1963).

Towards the end of the 1955 season, excavations were extended into a second burial area, designated Necropolis II, in the extreme west of the cave. This area is described as an approximately rectangular-shaped recess measuring 9 × 3 m (Roche 1959). Roche did not specify the exact location of Necropolis II but the dimensions suggest that it must have occupied most of the previously unexcavated northwest part of the cave. The presumed location is shown in **figure 15.1**. Excavation of Necropolis II was halted abruptly and

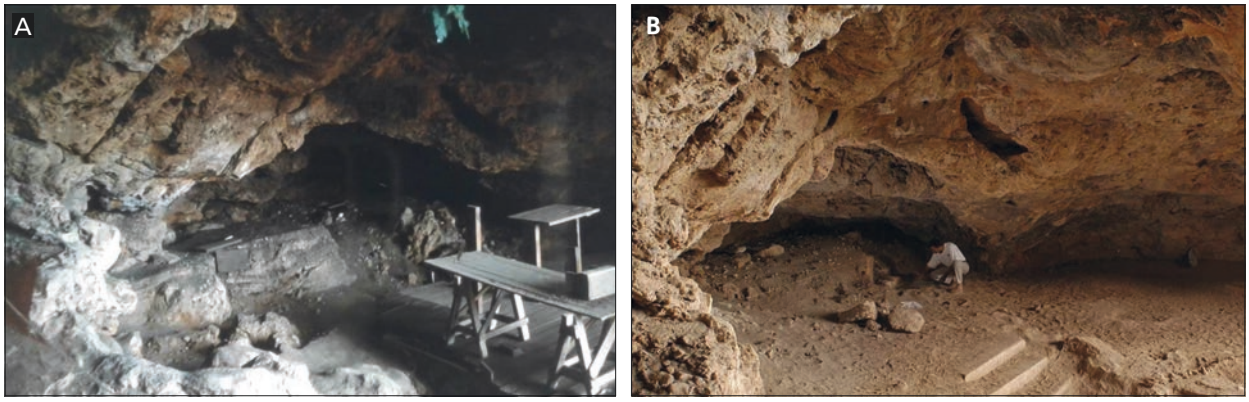


Fig. 15.2 **A** Photograph showing the northwestern alcove taken by Serge Kostomaroff (photographer for the *Service des Antiquités du Maroc*) and labelled "1962" (slides held in the George Souville Archive at *la Maison Méditerranéenne des Sciences de l'Homme, Centre Camille Jullian (UMR7299-CNRS) à Aix-en-Provence, Université d'Aix-Marseille*). – **B** Sector 10 as it appeared in 2004 (photo by Ian Cartwright).

never completed (Roche 1963). A photograph from the George Souville Archive shows the northwest recess of the cave in 1962 (fig. 15.2).

Additional information about the archaeological context of the burials from Necropolis I and Necropolis II can be inferred from the descriptions of the osteological series made at the time of the excavation or shortly thereafter (Balout 1954; Ferembach 1962) or through re-analysis the skeletal collection (Mariotti et al. 2009; Belcastro/Condemi/Mariotti 2010). Balout (1954) published a brief summary of skeletal elements recovered between 1951 and 1953, including a preliminary inventory prepared by Vallois. The inventory lists the contents of six burials, each containing bones assigned to several individuals. These burials were reported to have been excavated from level B in 1952-53. Since no human remains were recovered in 1953, the inventory presumably refers to the skeletons excavated in 1952 (Roche 1953a; 1953b; 1963).

The first comprehensive description of the human remains excavated between 1951 and 1955 was published by Denise Ferembach in 1962. Ferembach listed the partial skeletons and isolated bones found in 28 separate *sépultures,* or graves, and calculated a minimum number of individuals for each of these assemblages. She also recognised 13 juveniles from *sépulture* E, one child from *sépulture* 52C, five children from levels A, B and C and two further children based on cranial fragments found at the surface of level A. This method yielded a cumulative total of 183 to 186 individuals, including 80 adults, 6 adolescents, 53 to 55 children and 44 to 45 infants (Ferembach 1962). The inventory presented by Ferembach (1962) differs in so many details from the previous inventory (Balout 1954) that it is not possible to confirm the same numbering of burials. One point of consensus is that Balout's burials 4a and 4b correspond to Ferembach's burials IV and IVa and are consistent with Roche's description of a trapezoid burial pit containing the bodies of several small children and an infant (Mariotti et al. 2009). In most cases, the specific skeletons referred to in the preliminary reports of the burial context published by Roche cannot be individually identified among the osteological assemblage now held at the Institut de Paléontologie Humaine (IPH) in Paris (Mariotti et al. 2009).

Ferembach did not attempt to match human bones found in different levels or *sépultures,* thus assuming that each of these burial deposits represented a separate and closed entity. More recent analyses of the osteological assemblage has revealed that bones that belong to the same skeleton are sometimes marked with different numbers implying that they were found in different *sépultures* (Mariotti et al. 2009; and LH personal observation). Mariotti and colleagues re-evaluated adult and adolescent skeletons from the osteological assemblage at the IPH to determine a minimum number of individuals in this age group, disregarding the separation by *sépulture*. Their estimate of the minimum number of adults and adolescents is only 35-40

for the entire assemblage (Mariotti et al. 2009), which is less than half (41-47 %) of the original estimate for this age group (Ferembach 1962). The extent to which the number of juveniles in the assemblage may also have been overestimated has not yet been determined. Assuming that the extent of overestimation by Ferembach was similar across in all age groups, the actual numbers of children and infants in the original assemblage may be as low as 22-29 and 18-21 respectively.

15.2 NEW EXCAVATIONS: SECTOR 10

Necropolis I and Necropolis II may have formed part of a contiguous burial area in the northwest part of the cave, or may have been separated by the pile of rocks from the roof fall that lay directly on top of the Aterian levels. All of the burials were removed from Necropolis I but the burial area in the extreme west of the cave, designated Necropolis II, was only partially excavated when Roche closed his excavations in 1955 (Roche 1959). Preliminary surveys of archaeological deposits at Grotte des Pigeons in 2003 and 2004 revealed human and animal bones and bone fragments eroding out of deposits in an alcove of restricted height in the northwest corner of the cave. The presence of a partially articulated human foot indicated that there were relatively undisturbed burials within this deposit (Humphrey et al. 2012).

Excavation of part of the surviving burial deposits was undertaken to: (a) investigate the spatial and chronological extent of the mortuary deposits at Grotte des Pigeons and their relationship to archaeological deposits elsewhere in the cave; (b) investigate the processes underlying the accumulation of the mortuary deposits; (c) document funerary treatment at an individual level and determine whether there was patterning in relation to age and sex; (d) provide an additional perspective on the diversity of funerary behaviour of Late Pleistocene and early Holocene populations of the Maghreb.

The uppermost archaeological deposits in the rear alcove of Grotte des Pigeons comprise a large accumulation of human and non-human bones, burnt land snails, lithic artefacts and lithic debris within fine powdery ashy grey sediment. In 2004 and 2005 bone fragments judged to be eroding out of the surface and no longer *in situ* were collected over an area covering approximately four square metres (**fig. 15.3**). This area was designated Sector 10. Excavations in Sector 10 took place over eight seasons between 2005 and 2016 and are ongoing. The deposits judged to be least stable, situated at the front of Sector 10, were excavated during the first two seasons and excavations were then extended towards the rear wall of the cave.

A unique find number and three-dimensional coordinates were allocated to each diagnostic or recognisable fragment of human and non-human bone, horn core and ostrich eggshell, and to isolated teeth, lithic artefacts, bone pins, marine shells and other objects of interest. Drawings were made and photographs taken at each stage of the excavation.

Complete and fragmentary human bones and teeth were allocated to an individual skeleton on the basis of spatial consistency and anatomical associations within the deposit. Partially articulated skeletons and recognisably associated groups of skeletal elements from the same skeleton were given an "Individual" number, and the burial is referred to by the same number. Isolated bones and bone fragments were assigned to an Individual, where possible, by reconstructing broken bones, matching bones from the left and right side and ensuring consistency in skeletal size and developmental stage. Age and sex were determined using standard dental and osteological methods (see **Chapter 16** and Humphrey et al. in press for further details). Genetic sex was determined for seven individuals including all six infants and one adult (van de Loosdrecht et al. 2018). At the end of each season all archaeological material was removed to *L'Institut National des Sciences de l'Archéologie et du Patrimoine* (INSAP) in Rabat for curation and further study.

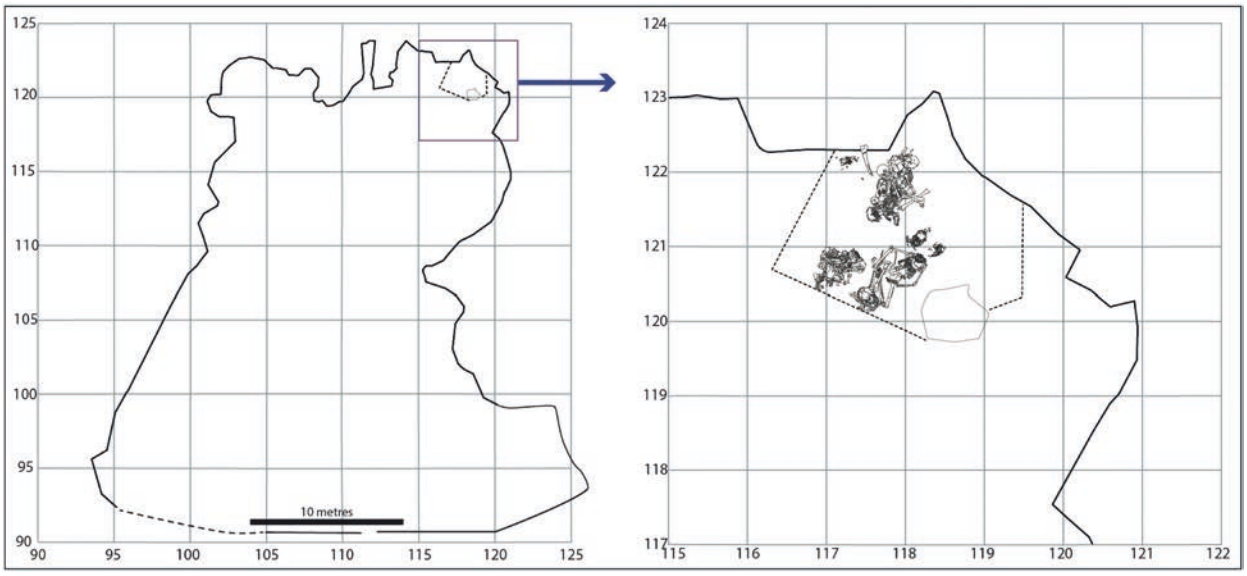


Fig. 15.3 Map of Grotte des Pigeons showing location of Sector 10 in the cave, excavated area (demarcated by dotted lines, cave wall and large *in situ* rock) and location of human burials excavated since 2005; the cave outline is based on X-Y coordinate data and is shown here with the digital (total station) grid used during the current excavation, with units in metres from site datum (see **fig. 15.1** for broad comparison with Roche's grid).

15.3 BURIAL DESCRIPTION

The excavations in Sector 10 revealed relatively complete skeletons from three adults and four infants, and incomplete but articulated skeletons of three further adults and an infant. The deposit also incorporated another reasonably complete but disturbed infant skeleton and a broken adult cranium and associated mandible. The position of each body at the time of burial was reconstructed from the undisturbed parts of the skeletons. Many of the bones recovered from Sector 10 were not in anatomical articulation but could be allocated to one of the numbered Individuals. These included bones that had become relocated within the burial during decomposition due to empty space within the burial or loosely packed sediment. Other bones had been moved from their original position by taphonomic factors including pressure from above, erosion (short-distance displacement at an open surface) or burrowing. Many of the burials had been truncated by subsequent burial activity, resulting in deliberate or accidental relocation of bones from the disturbed burial. Where possible, these different causes of movement were identified.

Individuals 1, 2 and 4 were found in a stack one above the other. Parts of all three skeletons were visible on the sloped surface of Sector 10 or found very close to the surface, and for this reason the numbering of the skeletons is inconsistent with the order in which they were buried. The uppermost skeleton was Individual 2 and the lowest Individual 4, with Individual 1 located between these two burials (**fig. 15.4**).

Individual 1

Individual 1 was a young adult with an estimated age-at-death of 20 years (**fig. 15.5**). The skeleton was originally inferred to be female based on cranial features but was revealed by aDNA to be male (van de Loosdrecht et al. 2018). The body had been carefully placed in a slightly reclined, seated position with both legs flexed (**fig. 15.6**). It was orientated on an east-west axis and faced approximately east towards the en-

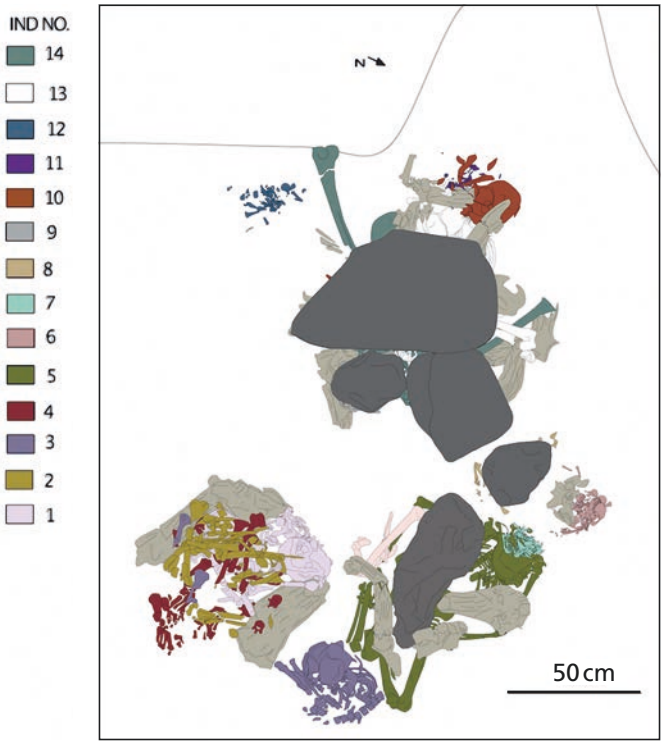


Fig. 15.4a Composite drawing of Sector 10 burials showing Individuals 1-14 and including cover stones and horn cores.

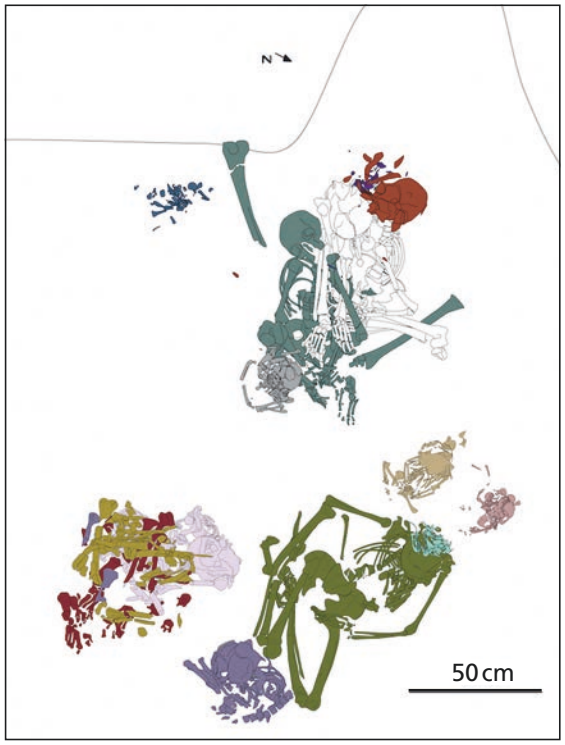


Fig. 15.4b Composite drawing of Sector 10 burials showing Individuals 1-14 but with cover stones and horn cores removed.

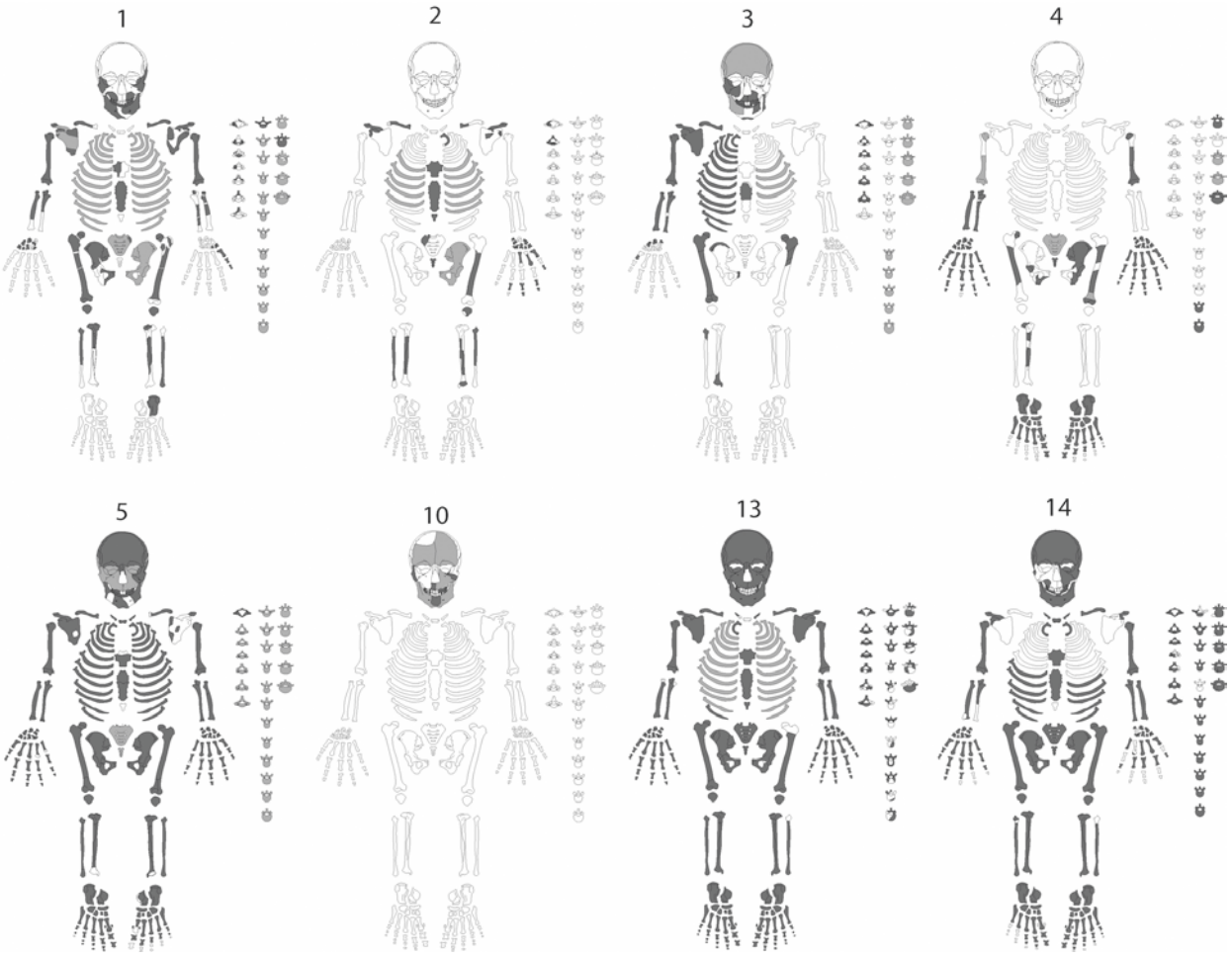


Fig. 15.5 Charts representing recovered skeletal elements of adult burials from Grotte des Pigeons, showing Individuals 1-5, 10, 13 and 14; lighter grey areas represent badly fragmented bone, dark grey represents better preservation.

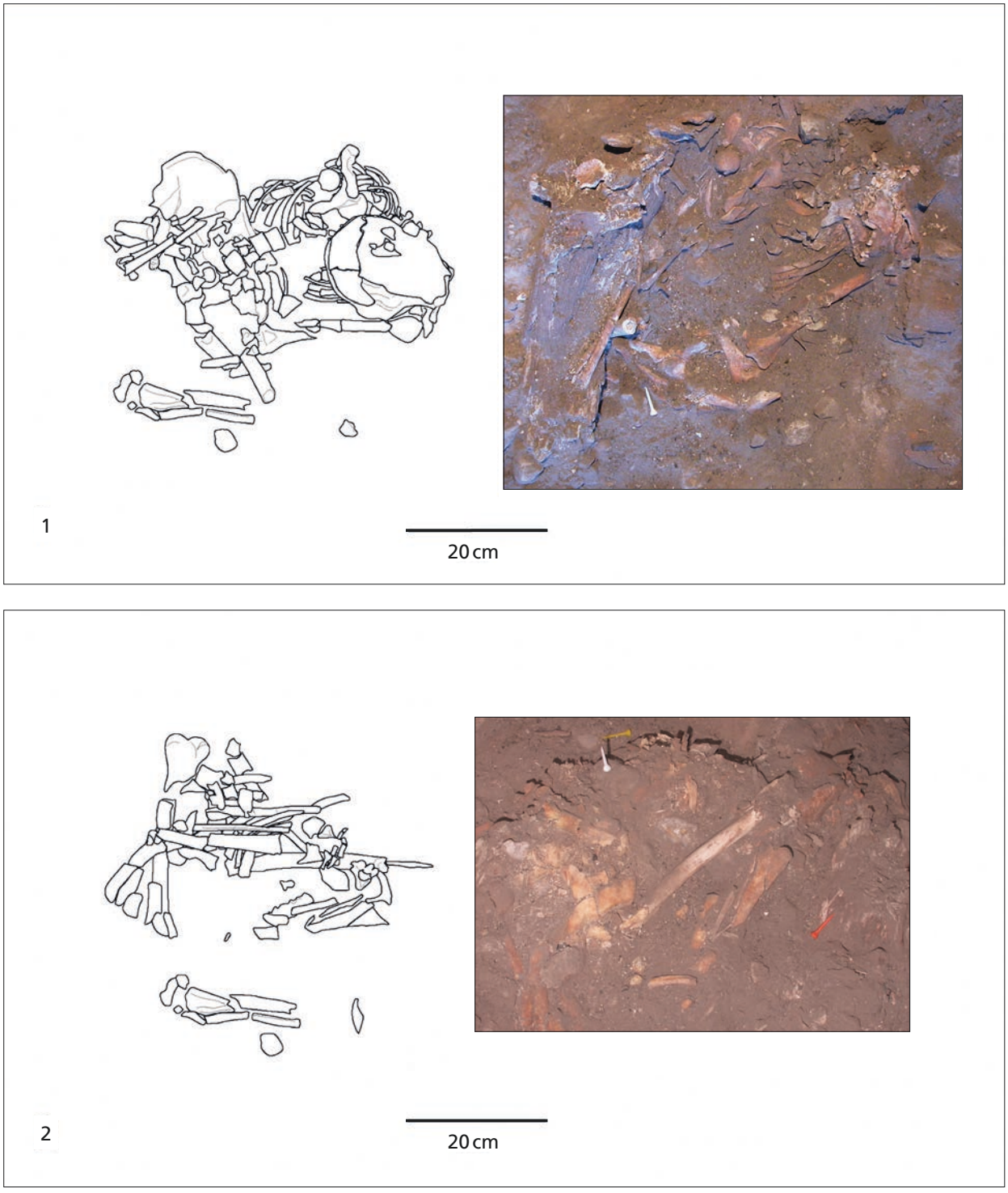


Fig. 15.6 Adult Individuals 1 & 2: drawings showing all skeletal elements assigned to each individual, along with photographs taken during excavation.

trance of the cave. Most parts of the skeleton were present with the exception of some of the small bones of the hands and feet. Many of the bones were in a fragmentary state, particularly the cranium, mandible, pelvis and ribs. Despite the poor condition of the skeleton, some of the bones were found fully articulated indicating a largely undisturbed primary deposition. These instances included the articulations of the bones

of the left shoulder and right elbow and the left *os coxa* and left femoral head. The vertebrae and ribs were found in anatomical position, in some instances still articulated.

The cranium and several cervical vertebrae had fallen forwards, forming an acute angle with the rest of the vertebral column, but the atlas and occipital bone remained articulated. The mandible was laterally compressed against an adjacent horn core and broken along the symphysis but the temporo-mandibular articulation was partially maintained. The surviving articulations indicate that the collapse of the head probably occurred when the body was not completely decomposed (Haglund 1991). The head may have shifted into this position during the burial of the overlying skeleton or may have simply collapsed forwards under its own weight. The collapse of the cranium forwards onto the mandible and underlying sternum and rib cage, the flattening of the rib cage and the collapse of the pelvic girdle suggests either the body was deposited in an empty or semi-empty space or that the fine silty characteristics of the surrounding sediment allowed a gradual displacement of the bones during and subsequent to decomposition of the body.

The left and right horn cores from a single large bovine had been placed on either side of the body of Individual 1. Both horn cores are preserved to a length of approximately 400 mm with the upper parts missing (cf. **Chapter 9**). The horn core located at the southern side of the burial on the right side of the body had a portion of the frontal bone attached, which was located towards the front of the burial. The horn core located on the left side of the body was in a reverse orientation, with the occiput pointing towards the recess of the cave. The long axis of this horn core followed the same orientation as the body and its position in the grave marked the northern limit of the burial. The southern horn core was almost parallel to the northern but converged by about 10° towards the centre of the grave at its tip. Both horn cores had been compacted and flattened. This may have been caused by human or animal activity above the burial or due to the weight of the overlying burial. It is also possible that the burial was originally marked or closed by a large rock, and that this had been removed during previous excavations.

The relationship between the horn cores and the skeleton demonstrates that they were added to the grave subsequent to the deposition of the body. The northern horn core was placed above the left shoulder (scapula, clavicle and humerus) and may have caused a slight rotation in the torso of Individual 1 toward its left side, which would account for the collapse of the head towards the left side of the body. The southern horn was positioned above the right ilium and alongside the right humerus. The right ulna, radius and several hand bones were found lying against and on top of the southern horn core, and their positions indicate that the right arm was extended with the hand placed facing palm down on the horn. As the horns were placed in the grave after the body, it is unlikely that this position could be obtained without the intervention of somebody who lifted the hand into this position. The left arm was positioned between the legs in an extended position. The hand was resting palm upwards and may have been touching the left foot. The legs were tightly flexed at the hips and knees with the ankles close to the pelvis at the centre of the burial. The presence of both patellae and part of the knee articulations on each horn core indicates that the legs were parted at the knees, with the knees resting against the horn cores. The articulation of the left *os coxa* with the femur was maintained, with the distal portion of the femur resting against the horn and the broken diaphysis lying flat at the bottom of the grave. The right femur was partially buried by the southern horn core but fragments of the right tibia and fibula and the right patella were found on the horn core. It is possible that the loss of the knee articulation was caused by movement of the southern horn core toward the centre of the burial area after partial decomposition of the body.

In addition to the two large bovine horns, several other faunal remains were found within the sediment surrounding Individual 1. One hemi-mandible of a Barbary sheep was found directly below the pelvis. A horse incisor lay directly across the sternum and a broken bone point (artefact) was found nearby in the thoracic region. Other fragmented pieces of horn and animal bone were found close to the body but it is uncer-

tain whether there was a deliberate association between these objects and the body. A smooth-textured blue/grey stone measuring approximately 15 × 12 cm was situated immediately above the cranium, and a small fragment of this stone had dislodged and become wedged into the parietal bone.

Individual 2

Individual 2 was directly below the surface of the surviving deposit, partially overlying and in close proximity to the underlying skeleton of Individual 1. The two bodies were separated by several small irregular stones but the significance of the latter, if any, is unclear. The stones may have been placed immediately prior to the deposition of Individual 2 with the intention of separating the two bodies, or deposited earlier to close the burial of Individual 1. Alternatively the stones may have accumulated unintentionally as a result of human activity or natural causes during the interval between the two burials; stones of these dimensions are frequent throughout the Grey Series deposit.

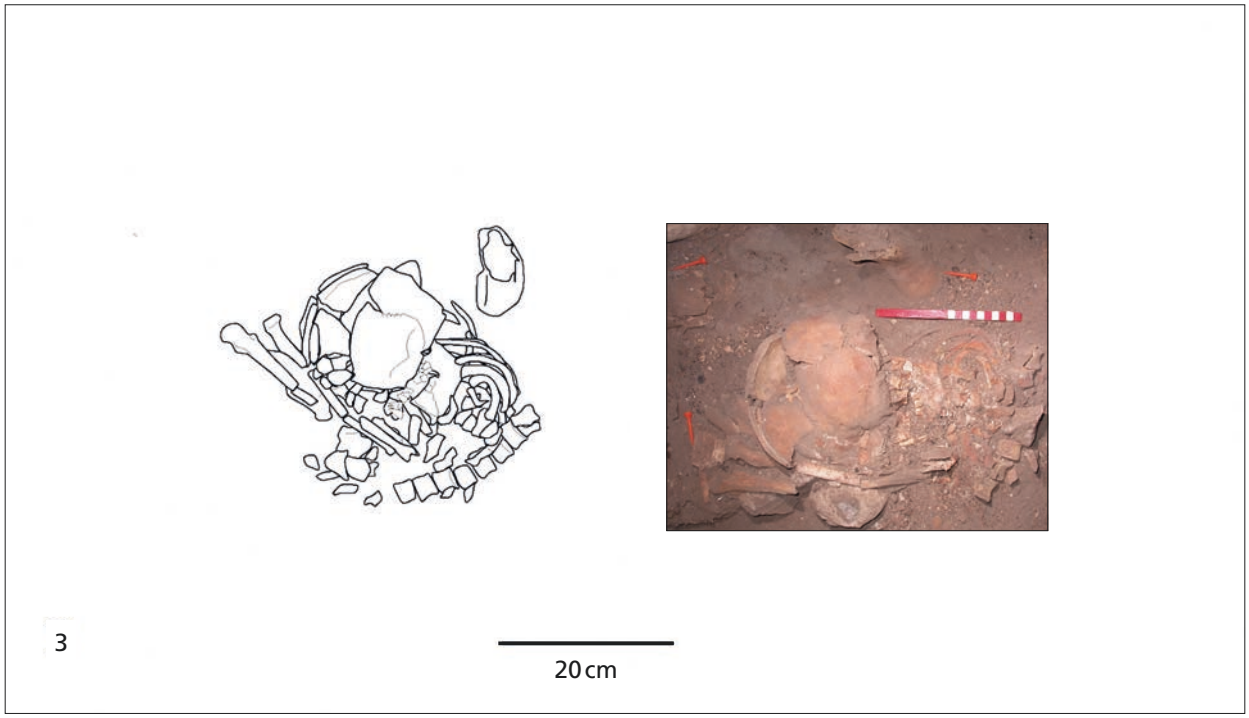
Individual 2 was a mature and probably older adult (**fig. 15.5**). The skeleton of Individual 2 was incomplete and poorly preserved, and sex was not determined. Individual 2 was larger-bodied than Individuals 1, 4, 5 and 13, and smaller-bodied than Individuals 3 and 14. Enough of the post-cranial skeleton was present to indicate that Individual 2 had been placed on its left side with both legs flexed and folded against the chest (**fig. 15.6**). The distal end of the left femur rested against the cranium of Individual 1. Two carpal bones from the left hand were found lying on the proximal part of the left femur, suggesting that the left hand was placed between the thighs. The pelvis was located to the south and the head to the north with the vertebral column forming an arc stretching north from the sacrum towards the missing cranium.

Several features of Individual 2 suggest a primary deposition. The vertebral column was in anatomical position but the individual vertebrae were not strictly articulated with each other. The left *os coxa* and femur were articulated and the proximity of the left femur and tibia indicates that they were in anatomical association, although no articulation was observed. Several bones from the neck, chest and shoulder girdle, including the axis, manubrium, sternum, clavicles and a first rib, had collapsed downwards during decomposition. These bones were relocated between the vertebral column and the left leg and no longer articulated, suggesting decomposition in an empty or semi-empty space. Some skeletal elements had eroded further down slope, including a fragment of the atlas and cranial bones that might be associated with Individual 2. The distribution of bones downslope is indicative of post-depositional disturbance or erosion of the surface deposits.

Individual 3

Individual 3 was a middle-aged adult male and was one of the largest adults buried in Sector 10 (**fig. 15.5**). Individual 3 was found in a single burial to the north of the burials of Individuals 1, 2 and 4. The position of the vertebrae, ribs and right *os coxa* suggests that Individual 3 was placed in a semi-upright or reclining position facing approximately southeast towards the southern corner of the cave entrance (**fig. 15.7**). The right forearm was folded onto the lap. A flat stone found above the right *os coxa* and below the right ulna and radius, must have been present prior to the decomposition of the body and may have been deliberately placed.

The right and left lower limb and foot bones, sacrum and left *os coxa*, most of the left side of the upper body, the right humerus, clavicle, scapula and hand were not recovered *in situ* due to the post-depositional



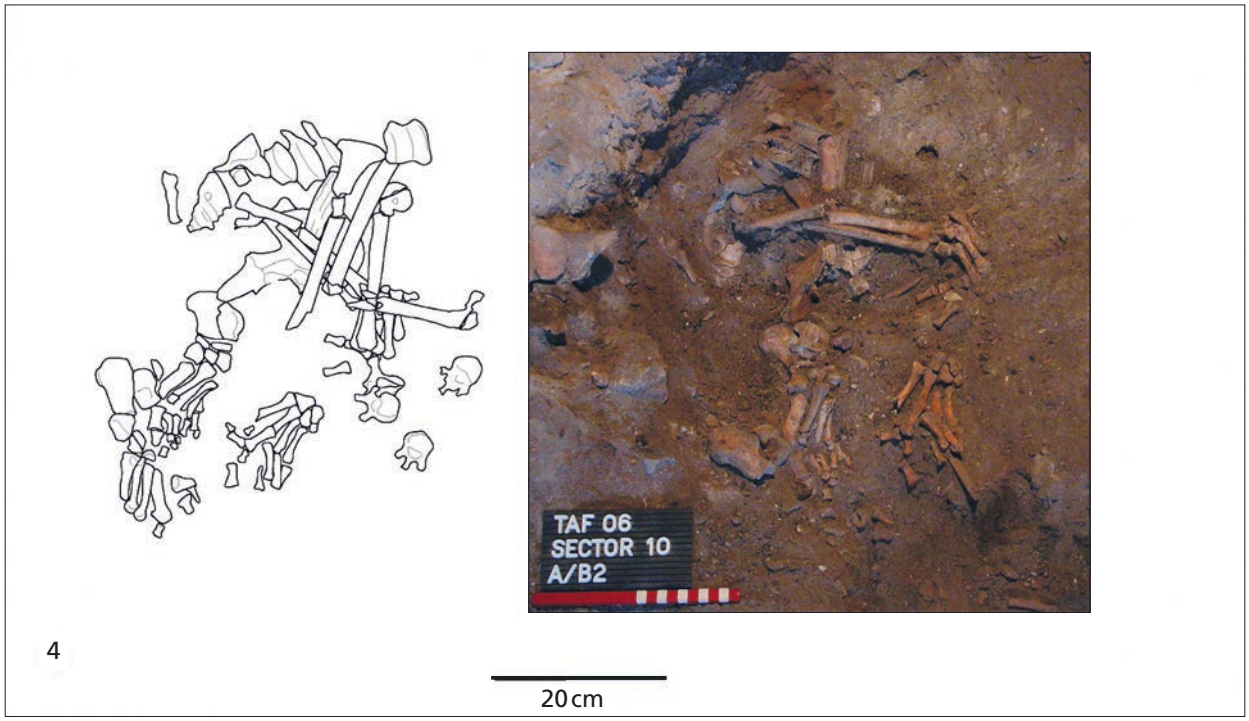


Fig. 15.7 Adult Individuals 3 & 4: drawings showing all skeletal elements assigned to each individual, along with photographs taken during excavation.

disturbance of the grave. The anatomical articulation of many of the skeletal elements indicates a primary deposition. For example, the temporo-mandibular articulation was maintained, the right radius and ulna were in anatomical position with respect to each other, and most of the vertebrae were articulated. Most of the right ribs were found in anatomical position and were still articulated with the corresponding vertebrae, although overall the thoracic cage was flattened. The cranium and mandible and three of the cervical

vertebrae appear to have collapsed forward against the chest, with these vertebrae forming an acute angle with the rest of the vertebral column. The collapse of the cranium and attached vertebrae forward and the flattening of the ribcage suggest burial and partial decomposition in empty or partially filled space (Duday 2006).

The burial of Individual 3 had been deliberately or inadvertently disturbed by subsequent burial activity in the surrounding deposit. The western edge of the burial was truncated by the subsequent burial of Individual 5, displacing the right femur, right shoulder girdle and the upper thoracic and lower cervical vertebrae of Individual 3. These vertebrae would have formed an acute angle at the edge of the grave following the forward collapse of the cranium and mandible. The right hand and the left side of the body of Individual 3 would have been located beyond the eastern limit of the remaining burial deposit. It is not known whether this part of the skeleton was truncated by another burial but it is more likely that these bones were removed during earlier excavations or lost to erosion.

The southern part of the burial of Individual 3 was probably disturbed during the burial of Individual 1 as several displaced skeletal elements from Individual 3 had been incorporated into the deposits surrounding Individual 1. These included broken parts of a left proximal femur, and a fragment of proximal fibula found close to the northern horn core and the distal portion of right tibia situated close to the southern horn core and above bones assigned to Individual 1 and Individual 4. The massive size of these skeletal elements is consistent with their belonging to Individual 3, and they were assigned on that basis. Displaced bones from the right shoulder girdle (humerus, clavicle and scapula) and the right lower limb (femur) of Individual 3 were found within the burial pit of Individual 5. The location of these bones suggested that they were disarticulated and added to the burial pit after placement of the body of Individual 5. They may have been knowingly recovered and deliberately placed within the burial pit as part of a funerary rite or put there for practical reasons.

Individual 4

Individual 4 was an older adult male and was one of the smallest adults from Sector 10 (**fig. 15.5**). The articulated partial skeleton of Individual 4 was located directly below Individual 1. The right radius and ulna, three lumbar vertebrae, left *os coxa* and sacrum were found in anatomical position and partially articulated (**fig. 15.7**). Both hands and feet were found in almost complete anatomical articulation. All of hand bones apart from one distal phalanx were recovered. The partial right foot that was found eroding out of the sloped surface of the surviving grey deposit in 2004 was assigned to Individual 4 based on its position and orientation within the deposit, recovery of *in situ* bones from the same foot, and matching with corresponding elements from the left foot.

The burial of Individual 4 was truncated through the lower part of the vertebral column during the burial of the overlying Individual 1. The parts of the skeleton of Individual 4 that were uppermost in the burial, including the cranium and mandible, femora, tibiae, fibulae and most of the bones of the upper body, were removed from their primary depositional context during this process. Some of these skeletal elements were found incorporated into other burials, either deliberately or inadvertently, and others were found distributed within the sediment between burials. Fragments of a right ilium that could be matched with the *in situ* left ilium for Individual 4 were identified among the intrusive disarticulated bone fragments surrounding Individual 1. Other displaced skeletal elements were assigned to Individual 4 on the basis of degenerative changes to the bone and size compatibility. The left and right humeri of Individual 4 lay across the lower body of Individual 1. The right femur, right tibia and right fibula lay alongside the right arm of Individual 1

and against the southern horn core. The left femur was found against the same horn core but slightly separate from the bones of the right lower limb. The extent to which the incorporation of these bones into the burial of Individual 1 was deliberate is uncertain. The bones had either been placed within the space between the chest and lower limbs of Individual 1 and the two horn cores or they had been placed directly above the body of Individual 1 and fallen into this position during decomposition. One thoracic and two cervical vertebrae assigned to Individual 4 lay directly below the northern horn core indicating that the vertebral column of Individual 4 had decomposed at the time of disturbance. Many of the displaced skeletal elements from Individual 4 were less well-preserved than those found in their primary depositional context. Several bones were not identified including the cranium, mandible, sternum, scapulae, clavicles, left fibula and tibia and the right ulna and radius. The sediment surrounding Individual 1 contained several unassigned long bone mid-shaft fragments and some of these are likely to have belonged to Individual 4. Some parts of Individual 4 may have been lost to erosion or removed during the excavation of Necropolis II in 1955.
Most of the hand and foot bones belonging to Individual 4 were in anatomical articulation suggesting that the body decomposed in a filled space (Duday 2006). The position and orientation of the bones, including the almost vertical position of the lowest three lumbar vertebrae, indicates a seated position with both lower limbs tightly flexed and the feet folded together in front of the pelvis. The right forearm was resting across the lap with the hand to the left of the body, facing palm down and with the fingers folded around the thumb. The left arm was extended with the open hand facing palm down next to the feet. The orientation of the sacrum and *os coxae* suggests that the body was aligned on an east-west axis and that Individual 4 was facing east towards the entrance of the cave. The flexed upright position of the body is consistent with the size of the burial pit. There were no human bones or teeth from any other individual in the undisturbed part of the burial. Some animal bones were found in the pit but it is not known whether these were deliberately placed alongside the body or inadvertently incorporated into the fill of the burial.

Individual 5

Individual 5 was a young adult or late adolescent female with an estimated age-at-death of 16-18 years (**fig. 15.5**). Individual 5 was buried in a semi-reclined position. The skeleton was almost complete and most bones were articulated (**fig. 15.8**). The position of the atlas implied that the neck was held upright, but the rest of the vertebral column was less vertically orientated. It is possible that the head and neck were deliberately tilted into a more vertical position to face forwards or fit the constraints of the burial pit. The head had shifted slightly forward and to the right. The maxilla was fragmented and pushed into the eye orbit implying that pressure was applied from above. The pressure was sufficient to cause breakage of the facial bones but did not smash the cranial vault.
The pelvis was fully articulated at the base of the grave. The lower limbs were flexed and leaned towards the left of the body with the right leg overlying the left leg and the left and right knees close together. Both lower limbs were fully articulated at the pelvis, knee and ankle. The feet were close together, and drawn up towards the pelvis and located slightly to the right side of the body. The undisturbed anatomical articulations of the pelvis and lower limbs imply decomposition in a filled space. The left upper limb was fully articulated. The proximal end of the left humerus was directly adjacent to the left side of the cranial vault, and the upper arm lay alongside the left side of the upper body. The left forearm was flexed inwards at the elbow towards the body. The left hand was tightly folded and tucked between the upper left femur and the front of the pelvis. The right upper limb was disarticulated at the wrist, elbow and shoulder. The proximal end of the right humerus was found close to the scapula, but out of articulation. The right humerus was pointing

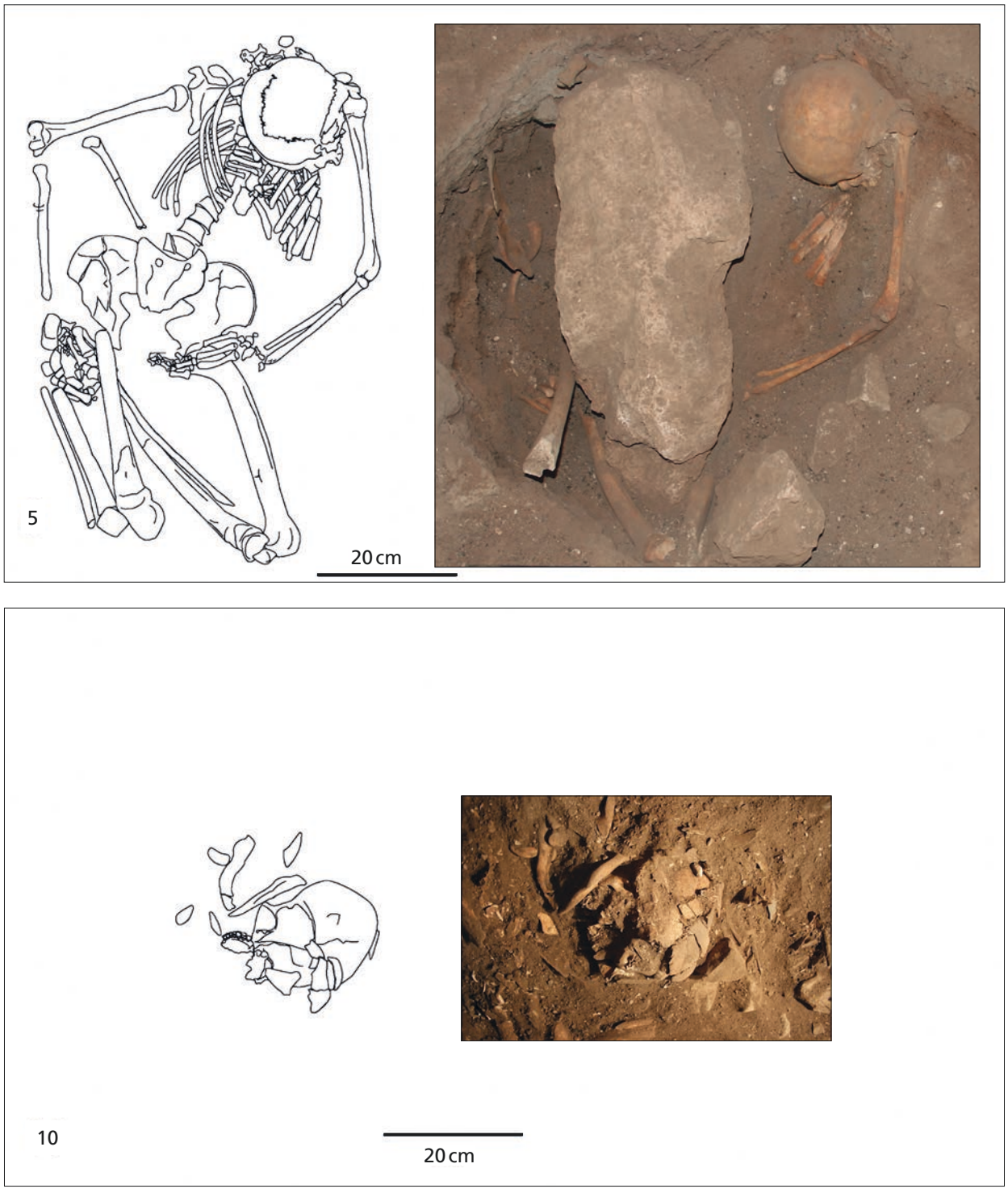


Fig. 15.8 Adult Individuals 5 & 10: drawings showing all skeletal elements assigned to each individual, along with photographs taken during excavation.

distal end upwards propped against the steep edge of the grave cut. The lower arm bones had fallen out of articulation and may have been shifted due to movement of the overlying rock. The right hand was clasped and resting on the sternum, hyoid body and upper left ribcage.

The southern edge of the burial was defined by a deep vertical cut into denser underlying sediment. It was not possible to define a clear cut on the north side of the burial. The position of skeleton and surrounding

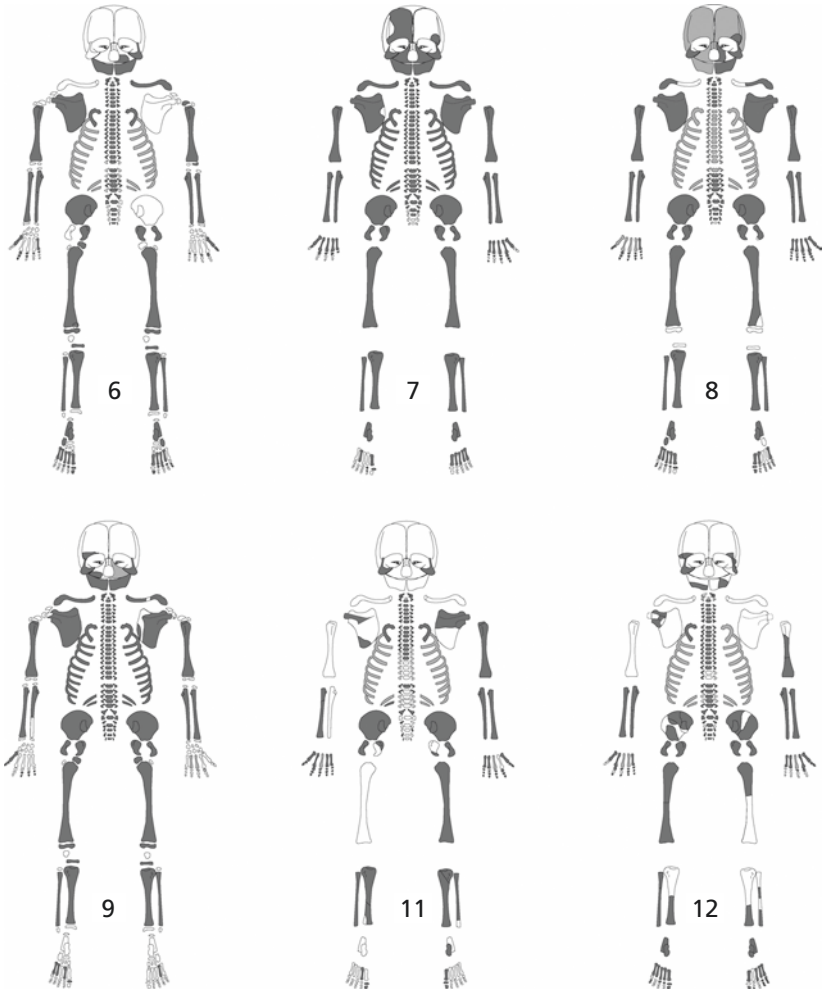


Fig. 15.9 Charts representing recovered skeletal elements of infant burials from Grotte des Pigeons, showing Individuals 6-9, 11 and 12; lighter grey areas represent badly fragmented bone, dark grey represents better preservation.

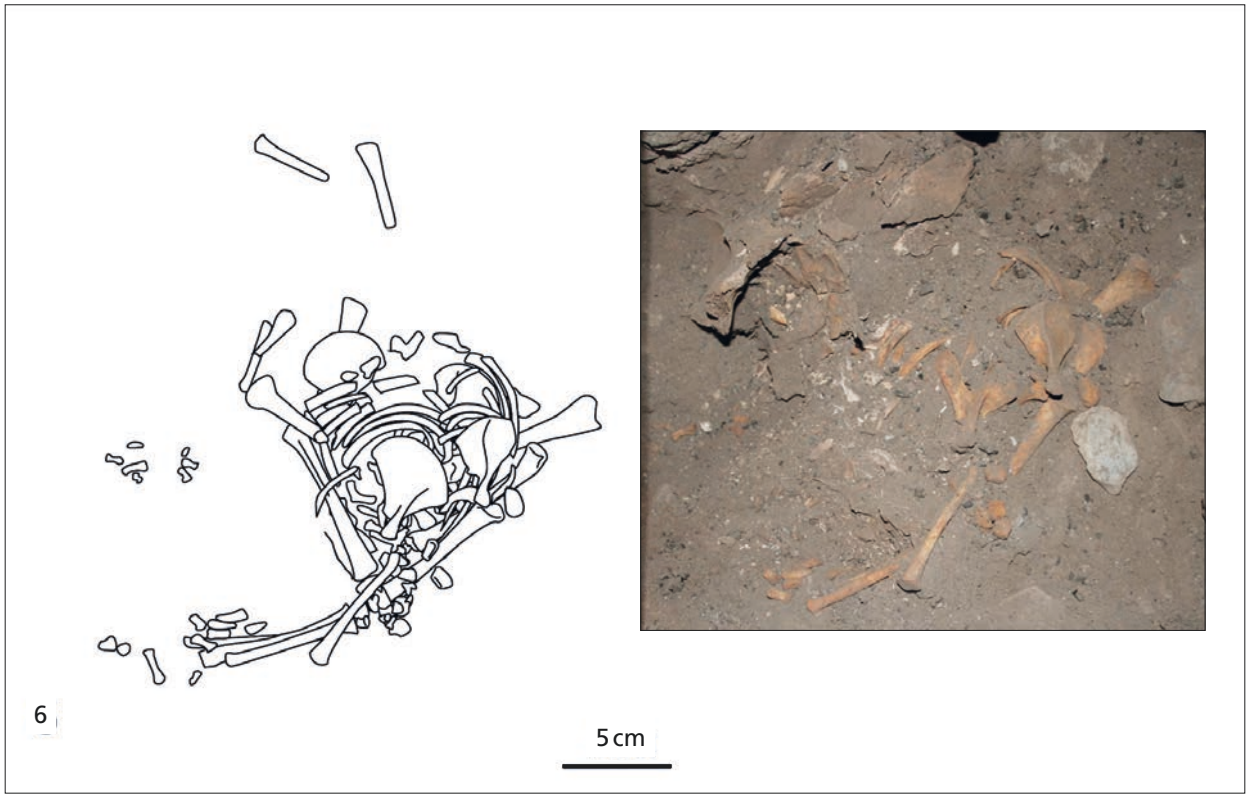
horn cores suggests a gentle slope, assuming these objects rested at the edges of the pit. This may mean that a steep vertical cut was made on the southern side to accommodate the height of the flexed lower limbs and the sediment was then scooped outwards towards the north creating a sloped edge to the pit. A large irregularly shaped rock measuring approximately 53 × 24 cm had been placed directly above the pelvis and right part of the thorax. The rock was tilted downwards towards the front of the cave and may have shifted down in a southeast direction due to pressure from above or the presence of empty space or loosely packed sediment on the right side of the body. Several Barbary sheep horn cores had been placed between the central stone and the edges of the burial. A large horn core with part of the cranium attached had been placed above the left elbow with the broken tip pointing towards and overlying the central stone. A modified cranium with both horn cores attached and broken at the tips, was located above the left forearm and left upper leg, and slightly overlying the central stone. Another partial cranium with horn cores was situated close to the flexed knees with one of the horn cores orientated vertically adjacent to the right knee and the other in a more horizontal position alongside the central stone. The horn core situated to the south of the central stone appears to have been shifted and broken by the stone as it settled. The displaced bones from Individual 3 were found between the rock and the southern edge of the burial, above the feet of Individual 5 and below the horn core. It is not clear whether these intrusive bones were added to the burial before or after the placement of the central stone.

Individual 6

Individual 6 was a male infant with an estimated age-at-death of 6-12 months, and delayed skeletal growth relative to the state of dental development (**fig. 15.9**). Individual 6 was positioned flexed forwards at the pelvis with the head overlying the upper body and upper right leg. The position of the cranial bones and mandible indicated that that the infant lay with the face downwards (**fig. 15.10**). Both scapulae lay flat with the dorsal side upwards indicating that the upper body was in an almost horizontal position during decomposition. The pelvis was closest to the rear of the cave (west), with the head orientated towards the front of the cave (east). The left leg was tightly flexed at the knee with the foot resting directly in front of the pelvis. The right leg extended forward from the pelvis and was flexed outwards at the knee with the lower leg and foot orientated away from the body. The left arm was extended forwards from the shoulder and towards the right side of the body with the upper left arm overlying the lower left leg and the left forearm overlying the lower right leg. The right arm lay alongside the body and was disarticulated at the elbow with the forearm and hand no longer in anatomical association. The right ulna and radius were broken, and the distal parts were found close together and slightly removed from the rest of the body, suggesting that this part of the burial had been disturbed. The overall position of the body may imply a hasty and slightly careless burial but it is also possible that the original intention was to place the infant body in a seated position facing east towards the cave entrance and that the body was floppy and slumped forward during burial or shortly thereafter. Fragments of cranium and horn core from at least one juvenile Barbary sheep were found along the right side of the body, and overlying the right forearm and right ilium. A relatively large end-scraper made on chert lay close to the left upper arm. These items are considered to have been deliberately included within the burial. A marine shell (*Dentalium*) was located close to the displaced right forearm bones and may also have been deliberately placed within the burial.

Individual 7

Individual 7 was a male pre-term infant who died perinatally (**fig. 15.9**). Individual 7 was buried in a seated position facing west towards the back of the cave (**fig. 15.10**). The body had slumped slightly forwards and to the right. A small rock located on the right side of the body may have propped it up and prevented further slumping. The left leg was tightly flexed at the knee with the foot tucked beneath the pelvis. The right leg was flexed at the knee with the lower leg orientated towards the centre of the burial and the right foot in front of the pelvis. The right side of the ribcage overlay the right lower leg. The head was positioned above the upper body, right arm and leg and the adjacent rock. The left upper arm overlay the ribcage but the left elbow was no longer articulated indicating that the arm had either been disturbed, or had shifted under the influence of gravity during decomposition. The right forearm rested on the right upper leg. The right scapula and humerus had fallen out of anatomical association, with the humerus found above the scapula, suggesting that decomposition had occurred in a somewhat empty space. There were no objects clearly associated with this burial and no traces of red ochre on the bones. A hartebeest deciduous tooth (upper dp3 of *Alcelaphus buselaphus buselaphus*) was found close to the left forearm bones and a deciduous incisor of a medium sized animal was found among the cranial bones but, as isolated animal teeth occur throughout Sector 10, it cannot be assumed that these objects were deliberately placed adjacent to the infant body during burial.



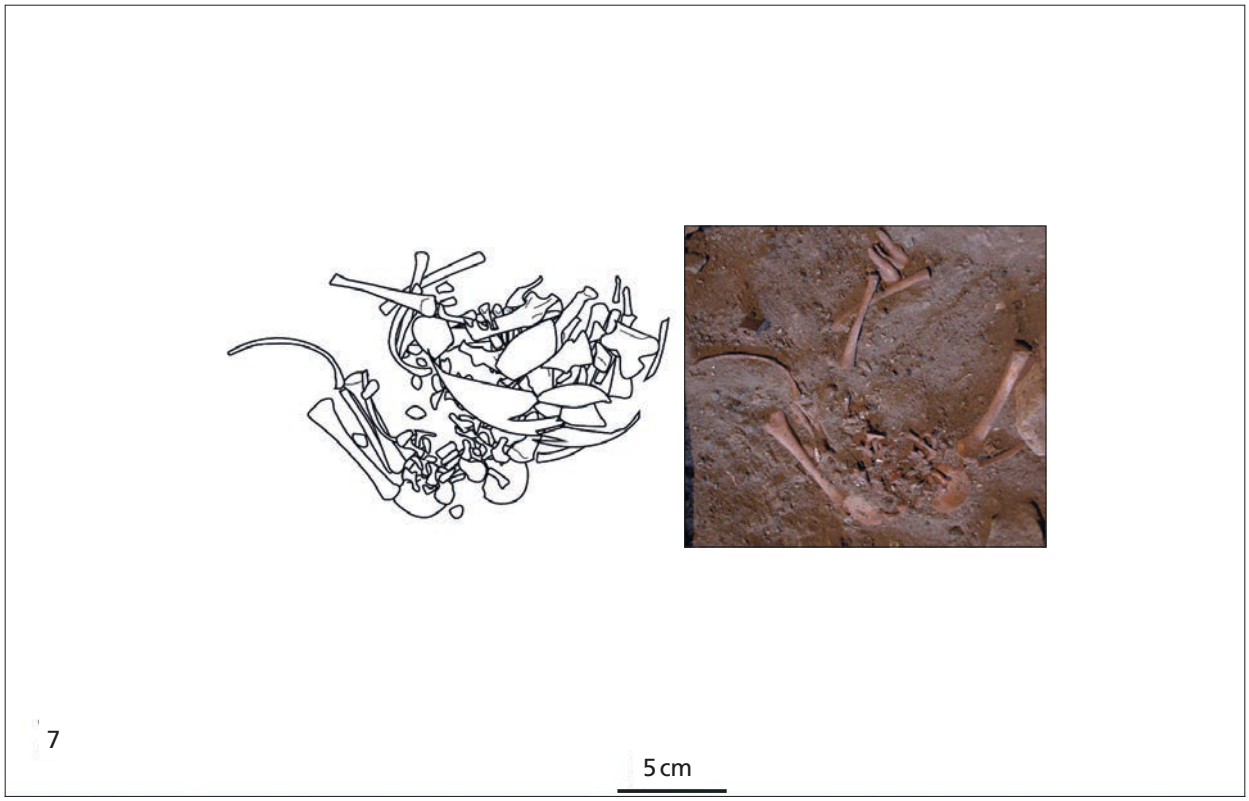


Fig. 15.10 Infant Individuals 6 & 7: drawings showing all skeletal elements assigned to each individual, along with photographs taken during excavation.

Individual 8

Individual 8 was a male infant with an estimated age-at-death of 2-3 months (fig. 15.9). Most of the skeleton of Individual 8 was located beneath a blue/grey-coloured stone measuring 30 × 23 cm that had been placed above the baby at the time of burial. The baby was buried lying on its back, orientated northwest to southeast with the head furthest from the cave exit (fig. 15.11). The overlying stone had settled onto the burial during decomposition, crushing the more fragile underlying bones. Most of the ribs, cranial vault and part of the facial skeleton had been reduced to a mass of bone fragments. Both lower limbs were flexed at the hip and knee, with the knees extending beyond the edges of the cover stone. The feet met at the front of the stone with the right foot pointing directly upwards. The right arm was flexed at the elbow with the right forearm folded over body and the hand resting palm downward on the left ilium. The left arm lay alongside the body with the hand slightly disturbed and resting palm upwards. The surface of the overlying stone that rested directly on top of the baby's body was stained with a well-defined circular outline of red ochre. The red ochre did not extend into the concave central area of this surface. The shape of the stone is consistent with a grindstone but the absence of ochre staining in the concave central area suggests that the stone had not recently been used to prepare ochre. Instead the pattern of ochre distribution on the inferior surface of the stone suggests that the more prominent areas of the stone may have rested on an ochre layer that covered the baby's body or any (hypothetical) covering of the body and that the ochre was transferred in this way. Traces of ochre were also found on other surfaces of the stone. The concentration of charcoal within the grave appeared to be even higher than the frequent background levels for Sector 10. During excavation, three lithic artefacts were recorded adjacent to the left shoulder and upper arm, but these are knapping debris and as such unlikely to be funerary objects. There were no animal bones or horn cores clearly associated with this burial.

Individual 9

Individual 9 was a female infant with an estimated age-at-death of 5-6 months (fig. 15.9). Individual 9 was placed in a seated position facing southeast away from the cave wall (fig. 15.11). The back rested against and was supported by a large irregularly shaped rock associated with an earlier adult burial. The cranium and mandible directly overlay the post-cranial skeleton, and the body remained in an almost upright position, tilted slightly forwards and to the right. Both lower limbs were flexed, with the knees parted and the feet folded together in front of the overlying stone. The right upper limb had been disturbed but some of the hand bones were found adjacent to the right temporal, suggesting that the head may have been cradled in the right hand. The left upper limb extended in front of the body, and was flexed at the elbow with both the upper and forearm overlying the left upper leg. A blue-/grey-coloured stone measuring approximately 24 × 18 cm was placed directly above the body of Individual 9. The left elbow projected beyond the limits of the overlying stone. The cranial bones were only slightly damaged as a result of settling of the overlying blue/grey cover stone, implying that the stone had not moved downwards into an empty space. Most parts of the skeleton were found in their original anatomical position and the pelvic bones maintained a bowl shape instead of lying flat at the base of the grave as was the case for the other infant burials. This implies that the body must have been closely surrounded by sediment or tightly wrapped during decomposition. The distinctive stone placed directly above Individual 9 was stained with red ochre and was similar in size and shape to the stone overlying Individual 8.

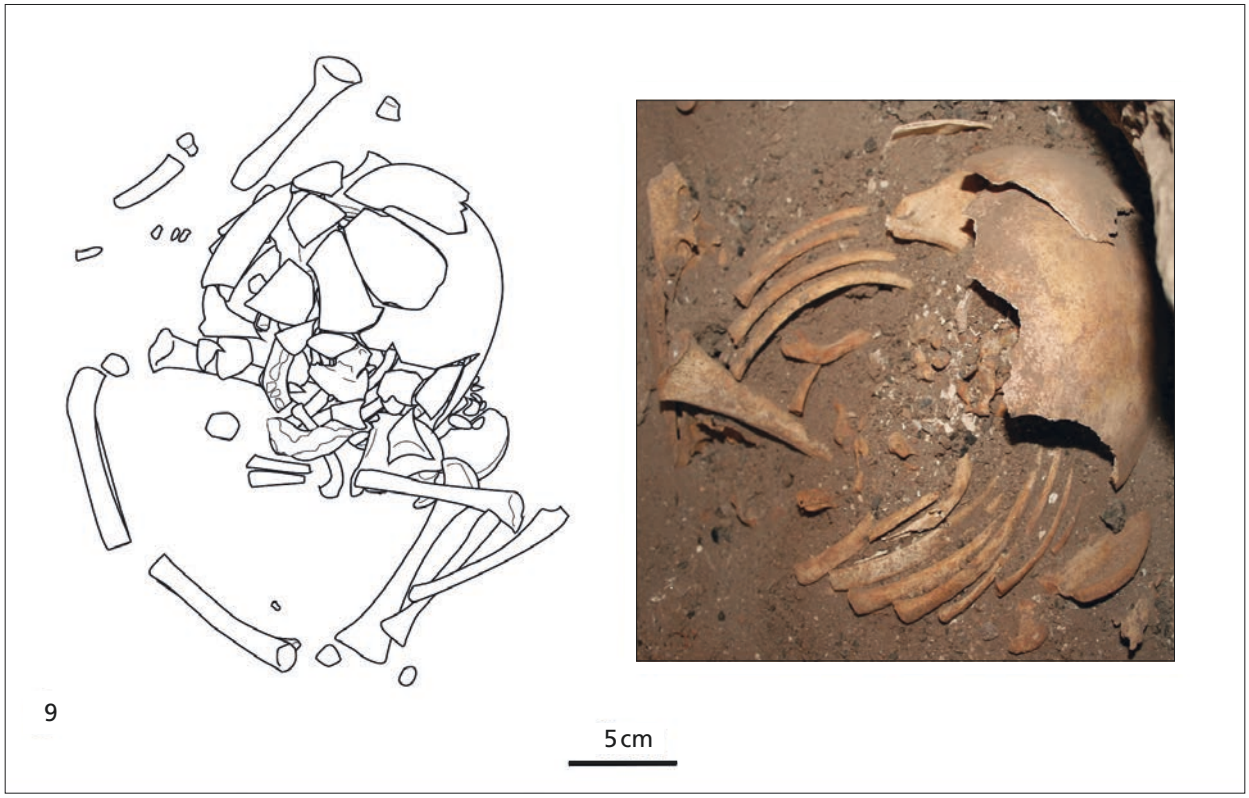
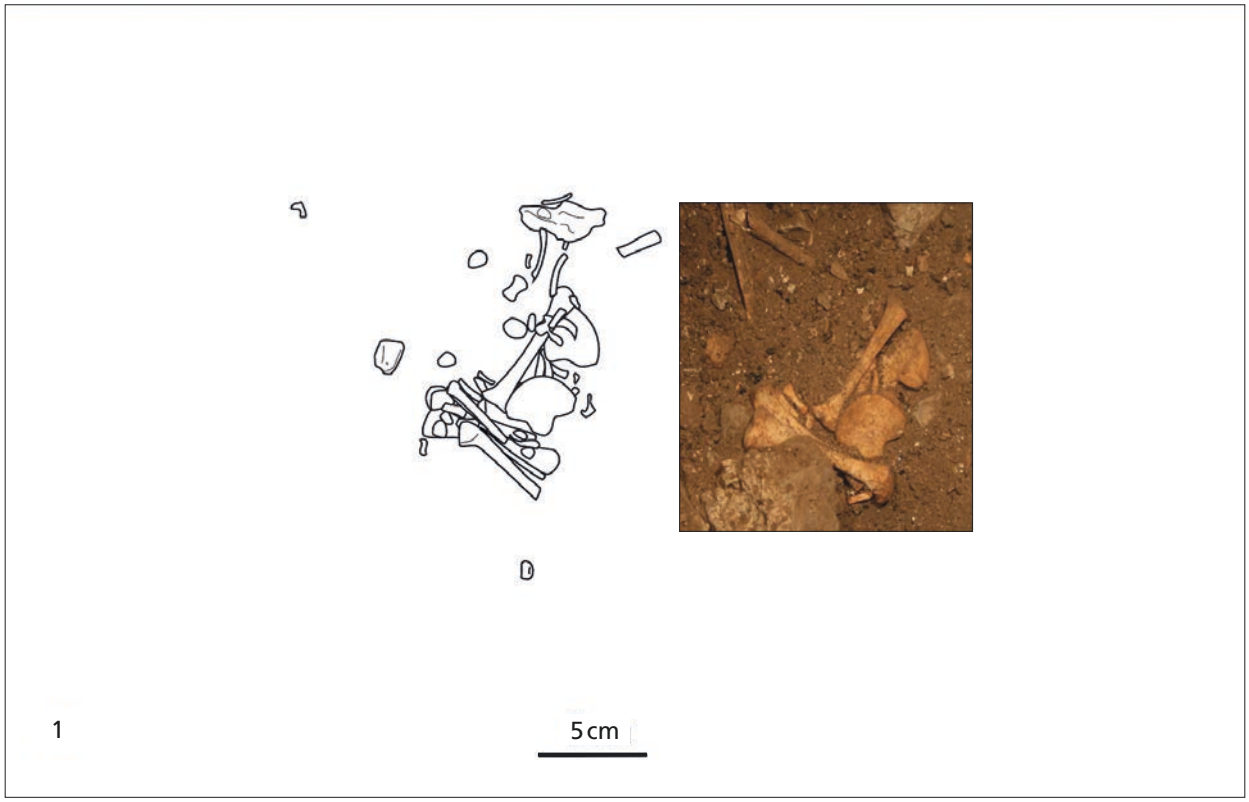


Fig. 15.11 Infant Individuals 8 & 9: drawings showing all skeletal elements assigned to each individual, along with photographs taken during excavation.



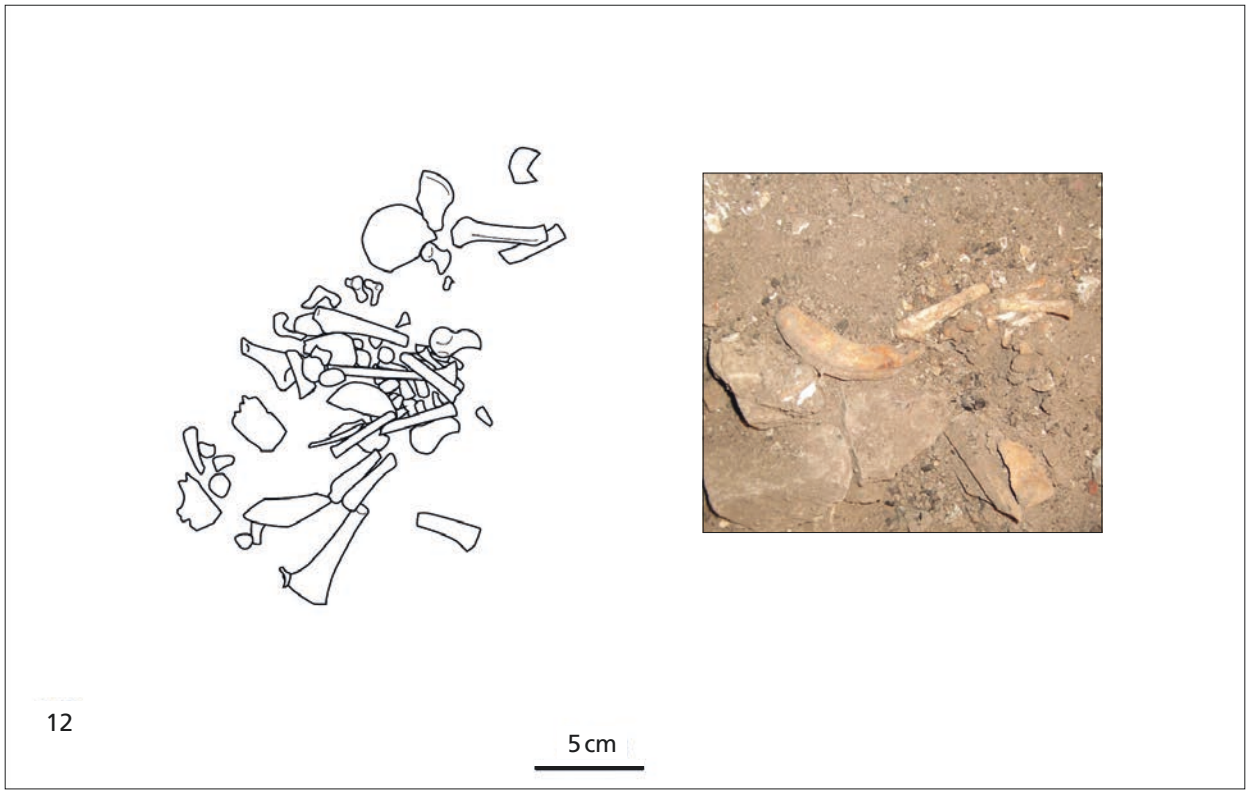


Fig. 15.12 Infant Individuals 11 & 12: drawings showing all skeletal elements assigned to each individual, along with photographs taken during excavation.

Individual 10

Individual 10 was a middle-aged adult male (fig. 15.5). The skull of Individual 10 was found just below the surface of the Sector 10 deposit and close to the back of the cave (fig. 15.8). The cranium was badly damaged with some recent breaks, and appeared to have been broken *in situ,* possibly as a result of pressure on the shallow overlying deposit. The left maxilla and fragments from the right were found with the palate facing upwards, together with part of the cranial base, implying that the cranium was lying with the cranial base upwards when it was broken. The mandible was found adjacent to the cranium and in three parts, with the base of the mandibular body facing upwards. The mandible may originally have been deposited still articulated with the cranium and subsequently become dislodged and displaced to one side. Two heavily worn right maxillary molars found close to the skull of Individual 10 could be matched to this individual. The alveolae for the upper central incisors of Individual 10 were well-preserved and showed no evidence for *ante mortem* remodelling. The two central incisors were subsequently found separately in lower deposits, confirming that Individual 10, uniquely amongst the adults excavated from Sector 10, had not undergone evulsion of the upper central incisors prior to death. No other bones belonging to Individual 10 have been identified and Individual 10 is considered to represent an intrusive element rather than an *in situ* burial.

Individual 11

Individual 11 was a male full-term infant who died perinatally (fig. 15.9). Bones from Individual 11 were found disarticulated and within a restricted area overlying the burial of Individual 13 (fig. 15.12). The disarticulated state of most of the skeleton suggests that the body had been disturbed at a late stage of or subsequent to decomposition. Some bones from Individual 11 had accumulated against a small stone which overlay the cranium of Individual 13. The position of some of the bones relative to others was consistent with their anatomical relationship, suggesting that some parts of the skeleton had not shifted far from their original location. The right ilium was found close to the right pubis and rested flat with the auricular surface upwards. The left ilium lay with the lateral side upwards close to the left pubis and proximal left femur. The left tibia and fibula were orientated with the proximal end upwards and propped against the stone, suggesting that the left lower limb was originally flexed with the knee pointing upwards, but the femur had dropped into a horizontal position. The baby appears to have been buried lying on the right side with the upper body orientated towards the rear cave wall. Both upper limbs were disturbed and most of the right upper limb was missing. The left humerus overlay the pelvis and left lower limb and may have shifted into this position during disturbance or slippage of the skeleton. The left ulna and part of the right radius were among the stack of bone parts that had accumulated against the stone that overlay the cranium of Individual 13. The left radius was found closer to the cave opening, but may have been moved inadvertently into this position when the large stone slab found above Individual 13 was removed during the current phase of excavations. The original position of the head of Individual 11 could not be determined. The crushed skull of Individual 10 was found immediately above Individual 11 and it is possible that placement or subsequent breakage of this skull may have caused parts of the skeleton of Individual 11 to shift both downwards and eastwards towards the cave entrance. It is not possible to discern whether any funerary objects were deliberately placed in the burial of Individual 11 due to its disturbed state and placement directly above an existing burial.

Individual 12

Individual 12 was a male full-term infant who died perinatally (fig. 15.9). Fragmentary parts of Individual 12 were identified among the accumulation of small bones, shells and stones on the flat surface of the unexcavated deposit close to the cave wall during the 2005 season. There was no discernible anatomical cohesion in the positioning of the bone fragments but they were distributed within a restricted area. The human bone fragments appeared to have weathered out from the underlying sediment, over an unknown period of time. In a subsequent field season, part of the skeleton of Individual 12 was excavated from the immediate sub-surface sediment in the same location (fig. 15.12). Both sides of the pelvis were found in approximate anatomical position, although the left ischium was slightly removed from the ilium and pubis. The right radius and ulna were found in correct anatomical association resting almost above the right ilium. The position of the pelvis indicated that Individual 12 was buried with the back towards the closest cave wall (the south side of the deepest alcove) and facing north towards the cave wall on the far side of the alcove. The infant appears to have been placed in a reclining position with the left arm resting across the lap, the right arm alongside the body and the legs flexed and parted at the knee. A horse tooth (permanent upper incisor) was tucked against and under the left elbow. A blue/grey-coloured rock was located close to the left side of the body and a lithic artefact made from a red-coloured raw material was within the sediment close to the burial but these may not have been deliberate associations. A marine shell (*Dentalium*) was collected from the surface deposits directly above the burial. Faint traces of red ochre were present on some cranial fragments but did not appear to have been applied directly to the bone.

Individual 13

Individual 13 was an adult male with an age-at-death of 18-20 years (fig. 15.5). The position of the pelvis and lower vertebrae and vertical orientation of the right shoulder blade indicate that Individual 13 was buried in a seated position (fig. 15.13). Both lower limbs were tightly flexed. The right foot was placed in front of the pelvis and pointed forwards. The left foot was angled at 90° towards the heel of the right foot and was partly underneath the right wrist. The right shoulder and elbow were in articulation and the right arm extended forwards and downwards. The right elbow rested just above the most lateral part of the right iliac crest and the right hand rested alongside and medial to the right foot. The right hand rested palm downwards and the fingers were slightly cupped. The left elbow was articulated and flexed towards the body at an angle of about 45°. The left hand lay alongside the left foot and directly below the right forearm. The bones of the hands and feet maintained their burial position in near-perfect articulation. They lay alongside and over one another undisturbed, apart from some phalanges which may have shifted in the loose powdery sediment during excavation.

The cranium, mandible, upper part of the vertebral column, sternum and the left shoulder girdle and ribcage had been relocated to a lesser or greater extent from their original position. Several groups of vertebrae had shifted in articulated blocks, suggesting that the vertebral column had not completely decomposed when this disturbance took place. Some of the bones from the upper central and left part of the body had fallen slightly out of anatomical position including the left scapula and clavicle, proximal half of the left humerus, left ribs, sternum and manubrium. The mandible had fallen to the base of the grave. These movements indicate the presence of empty space in the burial during decomposition. The burial of Individual 11 and placement of Individual 10 directly above Individual 13 may have caused some disturbance. There was clearly some empty space within the sediment surrounding Individual 13 subsequent to these events, as this

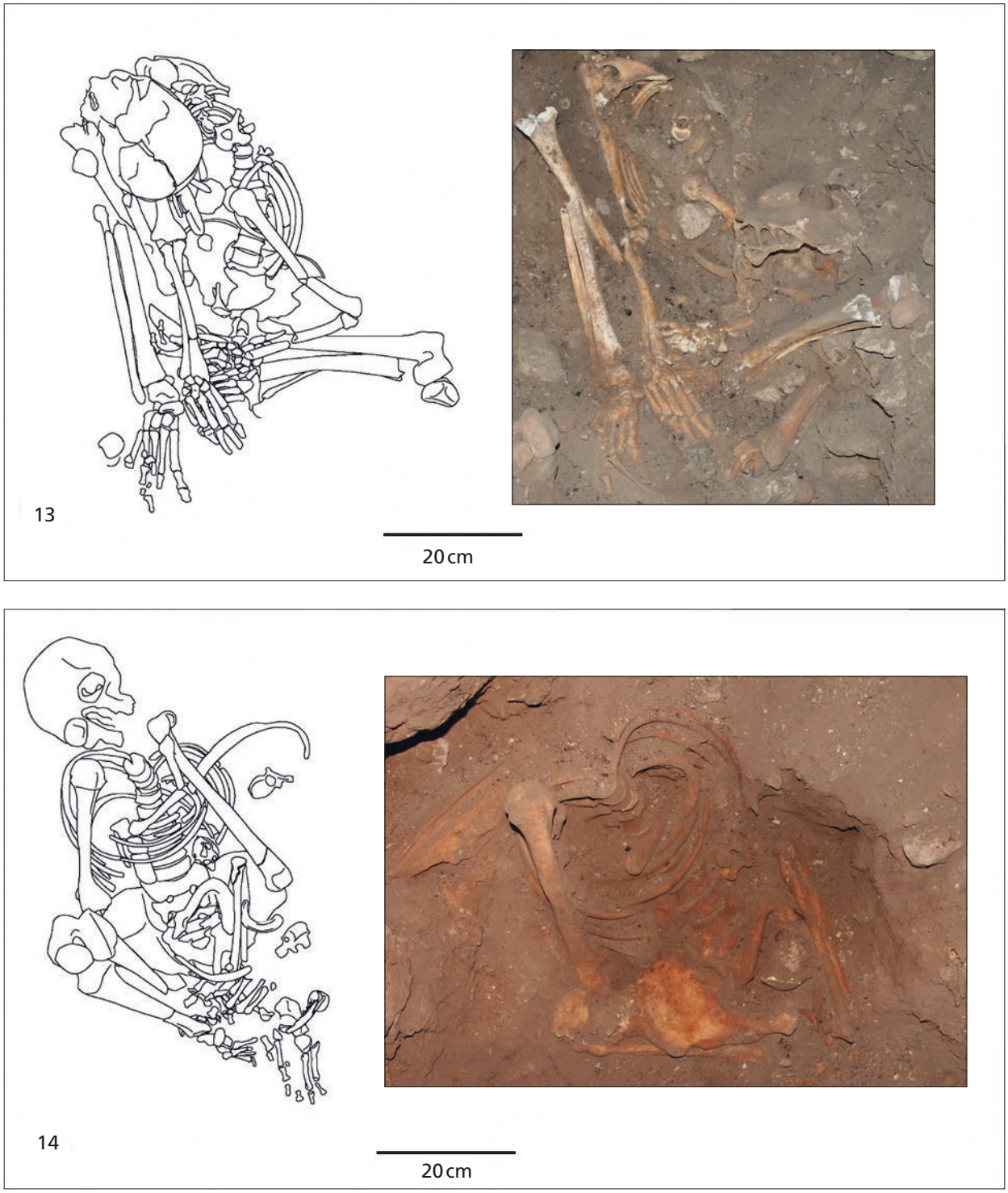


Fig. 15.13 Adult Individuals 13 & 14: drawings showing all skeletal elements assigned to each individual, along with photographs taken during excavation.

allowed two teeth from Individual 10 and some of the bones from Individual 11 to fall or trickle downwards into the burial of Individual 13. The left radius of Individual 13 shows gnaw marks, suggesting that the burial deposits were disturbed by burrowing or that there were empty spaces that allowed a small gnawing animal to enter the burial.

A large stone slab measuring approximately 81 × 45 cm directly overlay the burial of Individual 13. A large part of this rock was visible at the surface of the grey ashy deposits. The skeleton of Individual 13 was overlain by a jumbled assemblage of partial crania and horn cores from at least seven Barbary sheep. Many of these were in poor condition due to pressure from the overlying stone slab. The cranium of Individual 14 was situated below the uppermost layer of horn cores alongside the cranium of Individual 13. A long curved section from close to the tip of a horn core from a large bovine was found alongside the crania of Individuals 13 and 14 in a horizontal position. A second piece of bovine horn core measuring approximately 40 cm pointed downwards towards the base of the grave alongside the large irregularly shaped rock next to the feet of Individual 13. A large piece of bovine cranium was found at the base of the burial on the left side of body. Two bone points and a freshwater snail shell (*Melanopsis* sp.) were found within the sediment surrounding the skeleton, but it is not certain that these were deliberately incorporated into the burial. Some of the objects found close to the skeleton of Individual 13 may have been relocated from the underlying burial of Individual 14.

Individual 14

Individual 14 was an adult male with an age-at-death of 18-20 years, and was one of the largest adults from Sector 10, comparable in size to Individual 3 (**fig. 15.5**). Individual 14 was buried in a seated position, facing away from the back cave wall (**fig. 15.13**). The burial of Individual 14 was disturbed by the subsequent burial of Individual 13 situated almost directly above. As a result, the skeleton of Individual 14 was truncated at the level of the intersection of the 8th and 9th thoracic vertebrae. The lower vertebral column, ribs and pelvis, together with bones from the right arm and leg, the left forearm and left foot were found in approximate anatomical association. Several disarticulated bones belonging to Individual 14 were identified as intrusive elements in the overlying burial. Displaced parts of Individual 14 include the cranium, left femur, tibia and fibula, left humerus, parts of both scapulae and several ribs and vertebrae. None of the displaced bones from Individual 14 were articulated suggesting that the body was already fully or almost fully decomposed at the time of disturbance.

The right lower limb was flexed with the right foot resting flat in front of the pelvis at the base of the grave. The right upper limb was articulated at the elbow with the upper arm resting alongside the rib cage. The right forearm was positioned beneath the right side of the pelvis with the right hand in front of the pelvis. The left hand was above the right hand, and was in a fist shaped position with the outstretched thumb overlying the flexed fingers. The left foot lay at the base of the grave and was slightly tilted laterally with the first digit uppermost. The position of the left foot relative to the pelvis suggests that the left lower limb, which was not found *in situ*, was also buried flexed at the knee and angled upwards from the ankle.

The mandible and several bones from the upper thoracic region of Individual 14 were found below the level at which the burial was truncated but out of anatomical association. The mandible rested above the sacrum with the teeth facing downwards. The atlas, axis and third cervical vertebra were found in articulation on the left side of the body, with the superior side of the atlas facing down. These three bones must have dropped into this position while still connected by soft tissues. The left clavicle, left first rib, sternum and hyoid rested against the lower vertebral column. The displaced bones suggest that the body was buried in an empty or semi-empty space, allowing bones to fall into a lower position in the grave as they became disconnected during the process of decomposition of supporting soft tissues. The left ulna and radius were found adjacent to one another but were not in anatomical association. The proximal left radius had shifted sideways and was found resting above the left side of the pelvis and slightly overlying the mandible. It may

have shifted into this position during decomposition or when the left humerus was removed from its original position, as this would have disturbed the articulation of the elbow.
The lower outline of the grave cut of Individual 14 could be defined in its entirety. The grave was cut through a more compact brown-coloured sediment ('Brown Layer') that underlay the ashy grey sediment and into the underlying orangey-coloured sediment. There was a sticky deposit adhering to the proximal end of the right femur which matched the underlying sediment, suggesting that the part of the body that was lowest in the grave was pushed downwards into the sediment underlying the grave cut. The body of Individual 14 was tightly flexed but did not extend to the edges of the burial pit. This suggests that the corpse may originally have been bound or wrapped to hold the legs, arms and thorax close together, and then placed in an upright position, supported on one side by the cave wall. Alternatively the space between the lower legs and the front of the grave may have been filled by other objects that subsequently decomposed.
Several unusual animal bones were found in close proximity to the undisturbed part of the skeleton of Individual 14. These included half of the lower jaw of a fox, which was found directly above the left ankle, part of a canid jaw located close to the pelvis, a large piece of Barbary sheep jaw located directly above the right elbow, and part of a large animal cranium found adjacent to the right shoulder. Bird bones from several species were also found within the burial and surrounding sediment. A large ochre-stained discus-shaped stone rested alongside the right leg. The ochre staining is most pronounced on the concave side, suggesting that the stone may have been used as a mortar. An ochre stained pestle/grindstone was found at the base of the burial pit on the far side of the skeleton, and is probably associated with the mortar. An unusual deep-red-coloured stone was found adjacent to the left foot and below the fox jaw and a well-made backed blade was found close to the feet. One half of a bivalve marine mollusc shell identified as a species of bittersweet clam (*Glycymeris nummaria*) was found in an alcove in the cave wall alongside the right upper arm. A stack of three Barbary sheep horn cores was located on the left side of the body and a single large horn core was found adjacent to the right knee. A large irregularly shaped rock, measuring 53 × 24 cm, was situated above one edge of the burial of Individual 14, although it is not certain that this formed part of the burial as the large rocks situated above other burials, for example the burial of Individual 5, were typically placed more centrally. It is possible that the rock was moved during the burial of Individual 13. Part of this rock was visible at the surface of the grey ashy deposits, but the rock became wider towards its base.

15.4 UNASSIGNED BONES

Fragments of cranium and mandible consistent with two middle-to-old aged adults were found in deposits close to Individual 1. These may be associated with Individual 2 and/or Individual 4. They included left and right maxillary fragments from separate individuals, each showing evulsion of an upper central incisor. The right fragment included four anterior teeth which survived only as polished dentine stumps due to heavy wear. This was found lying on the left tibia of Individual 2, suggesting that it may have eroded downslope from Individual 2 together with other cranial parts. The alveolar region of the first upper central incisor had fully remodelled. The left maxillary fragment was found below the disturbed long bones of Individual 4, but above the *in situ* bones of Individual 1, close to the right femur. The location suggests that it potentially belonged to Individual 4 and had been disturbed and redeposited during the burial of Individual 1. Only the two premolars remained in the maxilla and these were heavily worn. The alveolar region of the first upper central incisors had fully remodelled and the bone surrounding the lateral incisor and first permanent molar

was actively remodelling indicating *ante mortem* tooth loss. The canine appears to have been lost *post mortem* since there was no evidence of remodelling of the socket and surrounding bone.
A broken but complete mandible was recovered between Individual 3 and the northern horn core from the burial of Individual 1. The anterior teeth exhibited compensation, consistent with evulsion of the upper central incisors (Marchand 1936; Humphrey/Bocaege 2008). The degree of wear on the anterior teeth was less than that of the teeth from the isolated right maxillary fragment, but the relatively slight amount of wear on the mandibular incisors could reflect the absence of upper central incisors to occlude against. There was substantial dentine exposure on the third molars but a thin rim of enamel was retained on all sides. First and second molars, both second premolars and the left first premolar had been lost *ante mortem.* The remaining premolar was worn to a dentine stump. Neither of the two isolated partial maxillae could be unambiguously associated with this mandible, but in the case of the left maxillary fragment this was due to the absence of occluding teeth. Given the completeness of this mandible and its location, it was more likely to have belonged to Individual 4 (and been associated with the left maxilla) than to Individual 2.
A piece of the right side of a second mandible including part of the body and ramus, collected from the sediment surface in 2004, may be associated with one of the heavily worn maxillae. All three permanent molars had been lost *ante mortem* with the surrounding bone completely remodelled. The bone surrounding the missing anterior teeth showed evidence of active remodelling associated with *ante mortem* tooth loss. The gonial region of this mandible showed less expression than that of the mandible from below the horn core, suggesting a more gracile individual. This mandible and the right maxilla may be associated with Individual 2.
Several other cranial pieces were found close to the surface of deposits downslope from Individual 2. They included an almost complete occipital bone with a small fragment of parietal attached, fragments from each side of a frontal bone including the superior orbital margins, a fragment of the temporal bone and part of a zygomatic arch. The cranial sutures of the occipital showed minimal closure on the ectocranial surface but were at an advanced state of closure on the endocranial side.
An isolated partial mandible of a juvenile containing several developing tooth germs was found at the surface of deposits in 2004. The mandible does not belong to any individual subsequently excavated. The state of dental development and fusion of the mandibular symphysis indicate an age-at-death of about 1 year.
Two isolated bone fragments were found close to the burials of Individuals 13 and 14. A fragment of *os coxa*, which included the pubic symphysis, belonged to an older adult. It may have been displaced from an earlier burial than any of those excavated. Part of a foot bone of a small and lightly built adult was found close the back wall of the cave, and potentially belonged to the same adult as the *os coxa*. The foot bone exhibits gnaw marks, and may have been gnawed *in situ* or transported to this location by a bone-collecting animal.

15.5 BURIAL SEQUENCE

The horizontal distribution of the burials within the excavated part of Sector 10 is shown in **figure 15.4**. The bulk of Sector 10 deposits comprise fine ashy sediment and it was not possible to identify clear burial limits within that interval. The edges of a burial could sometimes be identified where it had been cut into the firmer underlying sediment. The edges of the grave pits could also be inferred from the position of the skeletons and associated horn cores and objects within the grave. All of the burials identified in Sector 10 are considered to be primary inhumations of intact bodies, as there is no evidence to suggest that any of the individuals were incomplete or disarticulated at the time of deposition. As the area was extensively used

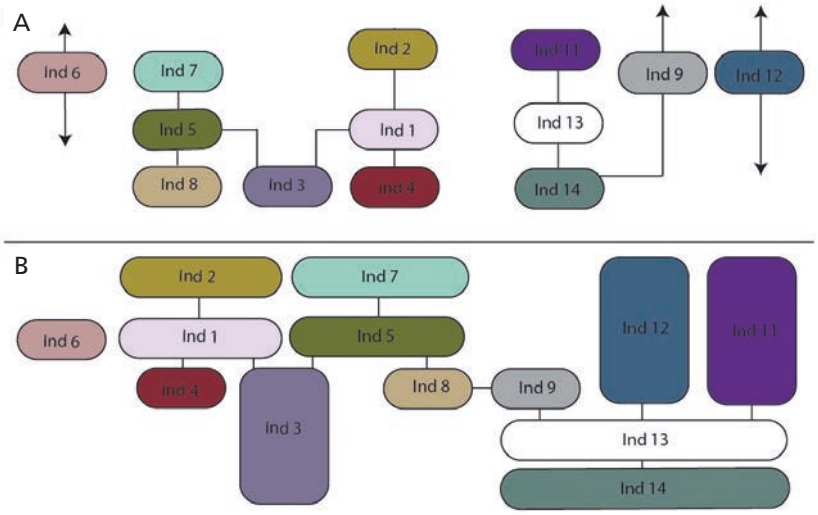


Fig. 15.14 **A** Graphic showing the sequence of Sector 10 burials based on their stratigraphic relationships; **B** The sequence of Sector 10 burials refined by the inclusion of radiocarbon dates and aDNA data.

and reused, many of the burials had been truncated or disturbed by subsequent funerary activity. During this process, bones from the disturbed graves were deliberately or inadvertently removed from their primary burial context and reincorporated into subsequent burials or the surrounding deposit. As a result many of the graves incorporate skeletal elements from an earlier period and may also incorporate other objects previously associated with earlier burials (Humphrey et al. 2012). It is uncertain whether the cranium and mandible of Individual 10 were deliberately buried or inadvertently relocated to the position in which they were found.

The sequence of burial events could be partly resolved based on their spatial relationships and the distribution of disturbed and undisturbed bones, and is shown here as a stratigraphic matrix (**fig. 15.14A**). The burials comprise two main groups. The first group was situated closer to the cave entrance and comprises Individuals 1-5 and Individuals 7 and 8. Individual 6 lay alongside the first group but its chronological relationship to those burials could not be established. The burials of Individuals 1, 2, 3 and 4 extended slightly beyond the limits of the remaining deposit, and some bones from these skeletons had either been lost to erosion or removed during previous excavations. The second group was situated close to the rear cave wall and comprises Individuals 9, 11, 12, 13 and 14 and the intrusive skull of Individual 10.

Individual 4 was interred in an upright seated position in a small individual grave. The lower edges of the grave for Individual 4 could be clearly identified as it was cut into the underlying sediment. The uppermost edges could not be detected. The surviving contours of the burial pit for Individual 4 indicate that a steep vertical cut was made on the south and west sides of the burial pit to a depth that would accommodate the height of the flexed legs and the height of the upper body in an almost upright seated position. A larger burial pit was prepared for Individual 1 directly above Individual 4. The skeleton of Individual 4 was severely truncated during this process and the uppermost parts of the skeleton were deliberately or inadvertently displaced from their primary depositional location. The larger bones belonging to Individual 4 must have been noticed and consciously set aside. Individual 1 was placed in the burial pit in a seated position facing east towards the entrance of the cave. Some of the larger bones from Individual 4 appear to have been gathered up and deliberately placed within the burial of or directly above Individual 1. The other displaced skeletal elements from Individual 4 must have been inadvertently scattered, pushed aside or perhaps deliberately removed from this burial area. The burial of Individual 1 was not truncated by any subsequent burial, but it may have been disturbed during the deposition of Individual 2. The burial pit for Individual 1 must have extended beyond the boundaries of the underlying burial pit for Individual 4 in order to accommodate the

slightly reclined body and the two massive horn cores placed on either side of the body, but no clear cuts were identified. Finally, Individual 2 was placed in a highly flexed position on the left side directly above the skeleton (or body) of Individual 1. The horizontal distribution of the skeleton of Individual 2 was contained entirely within the boundaries of the horizontal distribution of Individual 1 and no trace of a burial cut was detected.

Individual 3 was buried in a separate grave adjacent to Individual 4. There was not an obvious intersection between the burial pits for Individuals 3 and 4, so the sequence of these two burials is uncertain. The original outline of the burial pit for Individual 3 could not be determined due to erosion and truncation of the edges of the burial. Most long bones and hand and foot bones from Individual 3 were missing due either to erosion of the deposits or truncation by previous archaeological interventions. The skeleton of Individual 3 had also been truncated during construction of the adjacent burials. Several large and robust skeletal elements found among the surplus bones surrounding Individual 1 are likely to belong to Individual 3, but it is not clear whether they were redeposited directly from their primary burial location or whether they had already been disturbed. There is no indication that these elements were deliberately or consciously incorporated into the burial of Individual 1.

Individual 5 was buried in a wide shallow grave in a slightly reclining position. The burial pit of Individual 5 cut through the western part of the burial of Individual 3. During this process bones from the right shoulder girdle of Individual 3 were displaced and subsequently reincorporated into the burial pit of Individual 5. Individual 8 was situated adjacent and to the southwest of Individual 5. The left tibia and fibula and some foot bones from Individual 8 were found at the edges and base of the burial pit for Individual 5, with the tibia directly below the lumber region of the spine of Individual 5. This indicates that the burial pit for Individual 5 was dug immediately alongside the stone overlying Individual 8 causing the bones of the lower left leg to be relocated into the new burial.

Individual 7 was located directly above the skull of Individual 5. The skeleton of Individual 7 was found in almost perfect anatomical articulation, suggesting that the underlying body had decomposed and settled into its final position prior to the burial of Individual 7 or that Individual 5 was buried in a filled space so that the body did not settle during decomposition. The burials of Individuals 3 and 8 must have predated those of Individuals 5 and 7. Both of these must have been at least partly decomposed when their burials were disturbed because the re-deposited bones from these burials were not found in anatomical association. Individual 6 was situated close to Individuals 7 and 8 but the burial did not truncate or directly overly any other burial and had not been disturbed by any subsequent burial activity.

Individuals 9 to 14 were farther back in the cave recess and are within or at the periphery of a complex sequence of intercutting burials that includes two partially articulated adult burials (Individual 13 overlying and truncating Individual 14), two infant burials (Individuals 11 and 12) and an isolated skull (Individual 10). The location of these burials within the cave suggests that they are earlier than the burials of Individuals 1-8. The timing of burials within each of the two groups of burials relative to those in the other group is unclear, but the similarity and spatial proximity between burials of Individuals 8 and 9 (referred to on site as the "blue stone babies") suggests that these two burials may have occurred within a short space of time.

The earliest burial in the sequence was Individual 14. Individual 14 was buried in a seated position in a well-defined circular pit that cut though the 'Brown Layer' underlying the grey ashy deposit and into the underlying orange-coloured sediment. The right shoulder of Individual 14 was situated close to the back wall of the cave. A large irregularly shaped rock overlay one edge of the burial of Individual 14 but it is not clear whether this formed part of the burial of Individual 14. The burial of Individual 14 was truncated from above by the burial of Individual 13, and parts of the skeleton were disturbed and displaced. The burial of Individual 13 is situated entirely within the grey ashy sediment and the edges of the grave cut could not be

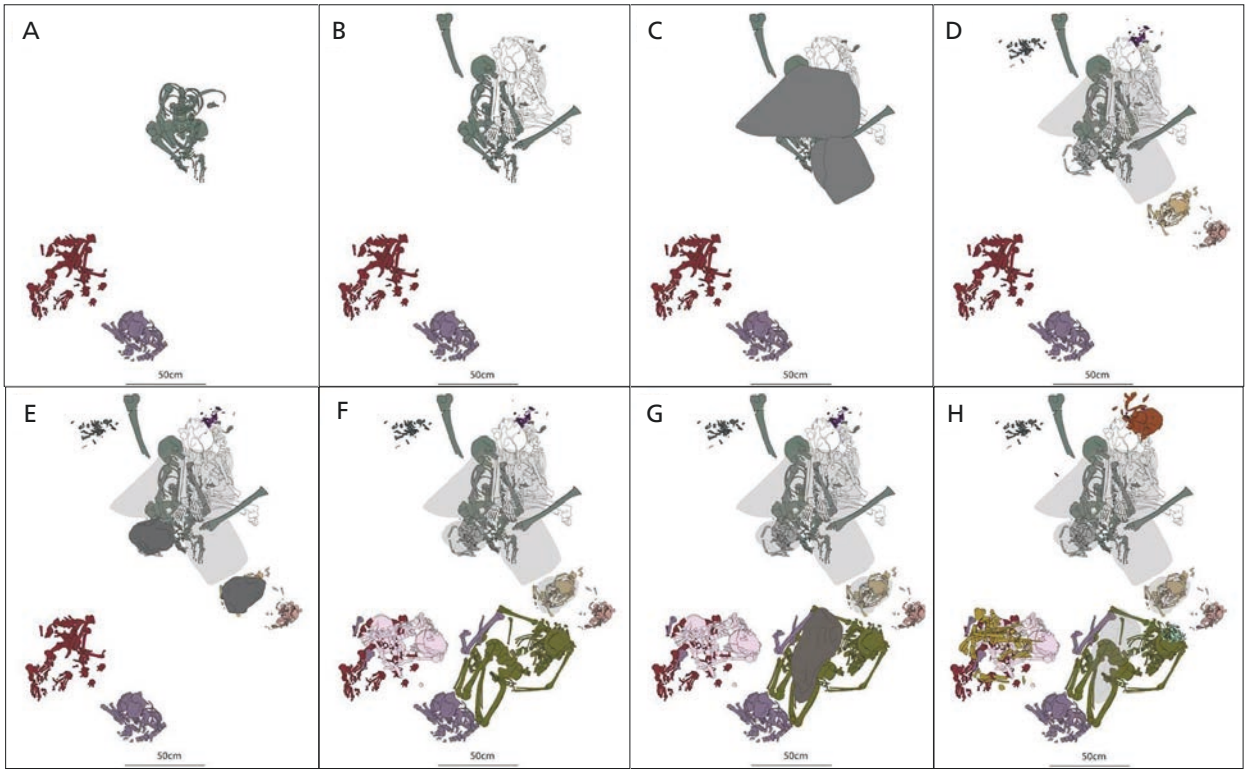


Fig. 15.15 **A-H** Plan drawing of burials in Sector 10, reconstructing successive stages of deposition of the bodies and overlying stones, inferred from stratigraphic, dating and aDNA information; depositions are shown to occur concurrently where the actual sequence has not been determined; the stones are shown in dark grey at first appearance and faded out in subsequent frames.

defined. Individual 13 was also placed in a seated position. Some of the bones from Individual 14 were incorporated into the burial of Individual 13. The cranium of Individual 14 was located close to the top of the burial at the same level as and alongside the cranium of Individual 13 and its placement may have been deliberate. A layer of horn cores and a large shallow stone slab was situated above the burial of Individual 13 and the displaced cranium of Individual 14.

Individual 11 was located within the upper part of the grave fill surrounding Individual 13 and directly below the broken skull of Individual 10. The flat slab overlying the burial of Individual 13 did not extend over Individuals 11 and 10. Individual 11 may have been buried subsequent to Individual 13 or at the same time. The skeleton of Individual 11 was disturbed after decomposition of the body, possibly at the time that the skull of Individual 10 was incorporated into the top part of the grave. It is unclear whether the skull of Individual 10 was deliberately placed at the top of this grave as part of a funerary ritual and subsequently crushed *in situ* or was accidently shifted into this position and crushed as a result of human activity unrelated to burial rituals. Although Individual 10 was positioned above Individuals 11, 13 and 14, it is not possible to determine whether Individual 10 belongs to a later period than all of the underlying burials or whether the skull had been relocated from an earlier burial. A sample of cranial bone was submitted for radiocarbon dating but did not yield sufficient collagen.

Individual 12 was found at or just below the surface of surviving deposits to the south of Individuals 14, 13, 11 and 10. Parts of Individual 12 were located very close to the disarticulated left femur of Individual 14, and it is likely that Individual 12 was buried after the femur of Individual 14 was relocated to this position. Despite its close spatial proximity, none of the bones from Individual 12 has been displaced into the sediment surrounding Individuals 14, 13, 11 and 10, suggesting that the burial of Individual 12 was more recent.

Individual 9 was positioned directly above the articulated feet and lower right leg of Individual 14 but separated by a considerable depth of sediment. The burial of Individual 9 caused damage to a vertically projecting horn core that was associated with the underlying Individual 14. The ochre-stained stone placed above Individual 9 was located within the angle formed by the two rocks situated above the burial of Individual 13. The large rock that was situated partly above Individual 14 must already have been present since the skeleton of Individual 9 was almost in contact with one side of the rock suggesting that the infant's body rested against it. It is possible that both rocks were already present and visible and that the burial pit for Individual 9 was deliberately situated in a niche between them. Alternatively, the second more superficial stone slab may have been added subsequently (**fig. 15.15**).

Two other types of information can be used to constrain the sequence of burials in Sector 10. Direct dates on human bone representing six individuals were obtained by AMS using ultrafiltration (Humphrey et al. 2014; Humphrey et al. in press; **Chapter 4**). The most recent dated burial is that of Individual 6, which was more or less contemporaneous with that of Individual 5. The burials of Individuals 9 and 4 are slightly earlier, and the earliest reliably dated burial is that of Individual 14. The dates for these five burials are consistent with the stratigraphic matrix and allow Individual 6 to be better anchored within this sequence. The two dates for Individual 7 are earlier than those of Individual 5 which directly underlies Individual 7. This reversal is highly improbable as both skeletons were articulated and the burials were undisturbed, and it is more likely the dates for one of the burials are less accurate (although the uncalibrated dates all still overlap at 2σ). The dates for Individual 7 are also inconclusive with respect to the other dated burials and have a higher standard error than the other Sector 10 dates.

Analysis of DNA from seven of the Sector 10 burials revealed that two of the infants (Individual 8 and Individual 9) are likely to be brother and sister (van de Loosdrecht et al. 2018). Comparison of pairwise nucleotide mismatch rates between library pairs revealed a particularly low rate for Individual 8 and Individual 9 indicating that they are first degree relatives. The two infants also had identical mitogenome sequences indicating that they could be maternally related. Individual 8 and Individual 9 were buried in a similar manner and at a comparable depth and were separated by only 65 cm measured horizontally from centre of the overlying stones. Individual 8 is a male who died aged ~2-3 months and Individual 9 is a female who died aged ~5-6 months. The two burials could have taken place within an interval of 3 months if the siblings were dizygotic twins and one died a few months after the other. At the other extreme, the time difference between the burials could have been ~30 years if the mother gave birth to the infants at ~15 years and ~45 years, but the interval is more likely to be less than this (Humphrey et al. in press). Assuming that the burials of Individuals 8 and 9 were more or less contemporaneous (within the resolution of available information on the burial sequence), the stratigraphic matrix can be realigned, providing a basis for anchoring the timing of the two main groups of Sector 10 burials with respect to one another (**fig. 15.14B**).

15.6 DISCUSSION

A primary aim of the new excavations was to investigate the spatial and chronological extent of the mortuary deposits and their relationship to archaeological deposits elsewhere in the cave. Roche's publications provide a clear description of the size and location of Necropolis I and a much vaguer indication of the size and location of Necropolis II (Roche 1959; 1963). On the basis of these descriptions, it is likely that Sector 10 is within the part of the cave previously designated Necropolis II (**fig. 15.1**). Necropolis I and Necropolis II may have formed part of a contiguous burial area in the north and west part of the cave, or may have been

fully or partially separated by rock debris. Roche noted that it was not possible to connect the stratigraphy of the burial areas to the rest of the cave due to the intervening blocks of stone and the earlier Ruhlmann trench (Roche 1959; see **fig. 15.1**).

The burials from Sector 10 were located in the deepest recess of the cave in an area of restricted height. At the moment, this part of the cave receives a significant amount of natural light during the morning and a limited amount of light during the afternoon. When still present, the rock debris removed by Roche's team from 1954 onwards would have reduced the amount of natural light reaching the northwest of the cave. One possible route of access to the hypothesised area of Necropolis II would have been to the north of the rock debris, but this route would have been blocked following the use of this area for burials (Necropolis I). At present the most plausible hypothesis is that some or all of the burials in Necropolis II, including Sector 10, are earlier than those in Necropolis I.

At first sight, an early radiocarbon assay of 14,639-13,257 cal BP (L399E, 11,900 ± 240 BP), obtained by Roche on a large bulk charcoal sample from a level above the burials and close to the roof of the cave in the northern recess, specifically from Squares Q 12 to 13 and R 12 to 13, at a depth of 0.5-1.0 m from the then surviving top of the Grey Series (Roche 1959; 1976), seems consistent with a younger date for Necropolis I. However, the reliability of this assay is dubious (cf. **Chapter 2**), such that it is to be hoped that further material from the collections can be dated in the future to test this hypothesis.

Radiocarbon dates on human bone from Sector 10 span a period of only a very few centuries, between 15,086-14,189 and 14,431-13,993 cal BP (95.4 % range; cf. **tab. 4.5**). Used in combination, the direct dates and the stratigraphic matrix of the hypothesised burial sequence imply that the burial of Individual 14, which is the deepest burial situated next to the cave wall, is the earliest of the newly excavated burials. The burials excavated from Sector 10, and particularly those at the base of the sequence, are likely to be among the earliest burials at Grotte des Pigeons. There may be earlier as yet unexcavated burials at the site, for example to the north of Sector 10 where the cave roof is even lower. Cross-matching between the dates on human bone from Sector 10 and the dating evidence from the S8 sequence (**Chapter 4**), it seems that the burials took place perhaps a few centuries after the start of the GS accumulation, though exactly how long afterwards is still a matter of conjecture. It appears likely that the burials belong to the equivalent of the later Middle Phase of the archaeological sequence in Sector 8 but it is also plausible that there is some overlap with the earliest part of the Upper Phase, coinciding with the stony S8-G96 that began to accumulate at roughly 14,500 cal BP.

One issue that is not fully resolved is the original depth of the grey ashy deposits in the north and northwest alcoves of the cave and the impact of previous excavations. Roche (1963) illustrates a progressive outward shift in the outline of the north and northwest alcoves of the cave during successive excavation seasons between 1952 and 1955. The apparent enlargement of the cave probably reflects a gradual lowering of sediments, such that the intersection between the sediment and the cave wall shifted outwards. This would suggest that the original sediment level may have reached the ceiling in both north and northwest alcoves of the cave and that a substantial quantity of sediment was removed from both alcoves. Roche recorded that the sediments in the northern alcove of the cave, where Necropolis I is located, reached almost to the ceiling of the cave (Roche 1963). The entire thickness of grey sediment was removed from this alcove between 1952 and 1955. Roche did not directly comment on the original height of the deposits in the northwest alcove of the cave, where Necropolis II is located. This part of the cave was partially separated from the rest of the cave by a pile of rocky debris that included several large rocks, including a least one that had fallen from the cave roof prior to the formation of the Grey Series deposits, which would have affected light levels, access and formation of archaeological deposits. Roche's plan of the cave from 1972 (Roche 1973-1975) suggests that a narrow trench had been dug towards the back of the cave but that the sediment on either side was left untouched during this later phase of excavations.

The height and appearance of deposits in the northwest corner of the cave in the 1962 photograph (**fig. 15.2**) are more or less as they appeared in 2003. One difference is the presence of a large irregularly shaped rock located at the front of the remaining grey deposits and close to the location of Sector 10. This rock may have been part of the debris from the cave roof or may have been related to funerary activity. Specifically, the location of the rock suggests that it might have overlain the burial of Individual 3, which would account for the poor condition of that skeleton. The front of the remaining grey ashy deposits in the extreme northwest corner was sloped and eroding, causing an accumulation of heavier elements including stones and bone fragments at the base. Parts of Individuals 1 and 4 were visible on the sloped surface. The surface of deposits behind the eroding slope was flat, and covered in a thin layer made up of fragments of broken bone, other small objects and stones, vast quantities of broken snail shell and cobwebs, including bones from Individual 12. The flattening extends into the deepest part of the northwest recess of the main cave chamber where the surface is less than 50 cm below the cave roof and may have been created during previous excavations. The surface accumulation is consistent with deflation of the light ashy deposit, leaving behind a layer of heavier objects from within the sediment, and may have been caused by natural processes. There was no evidence of recent disturbance and it is unclear over what period this deflation surface would have accumulated.

The skeletons excavated from Sector 10 occupied a relatively narrow range of depths (**fig. 15.16**), spanning ~1.5 m below the site datum for the top of the shallowest burial (Individual 12) to ~2.4 m below the site datum for the base of the deepest burial (Individual 5). Several of the burials were lying immediately below the surface of the surviving deposits in Sector 10. There was no indication that any of the burials excavated from Sector 10 had been truncated from above by previous archaeological excavations. As a result it seems unlikely that any burials had been removed from immediately above the intact burials in Sector 10 during the 1955 excavation of Necropolis II. This suggests that sediment directly above Sector 10 was devoid of burials or that the burials were at a higher level and did not cut into the unexcavated sediment.

All of the human bones in Sector 10 were surrounded by grey ashy sediment. The shallower burials were contained entirely within the grey ashy sediment and the deeper burials cut through into the underling layers. These deeper burials may have been filled with mixed sediment, but this was indistinguishable from the grey ashy sediment during excavation. This implies that a reasonable depth of grey ashy deposits must have formed prior to the onset of burial activity. The grey ashy sediment in Sector 10 is similar in many respects to the typical Grey Series deposits from elsewhere in the cave (Barton et al. 2013) but lacks any recognisable stratigraphic horizons. This sediment may have formed *in situ* at the back of the chamber due to activities similar to those closer to the cave entrance or it may have been transported from elsewhere in the cave either as a means of disposal or to provide a medium for the burials.

The second purpose of the excavations in Sector 10 was to investigate the processes underlying the accumulation of the mortuary deposits at Grotte des Pigeons. Roche's published accounts of the archaeological context of the skeletons excavated from Necropolis I and Necropolis II provide some useful information but lack details of specific burials and an interpretation of the underlying funerary behaviour (Roche 1953a; 1953b; 1959; 1963). Early research on the osteological assemblage was primarily concerned with the demographic profile of the assemblage and the skeletal biology of those represented (Ferembach 1962).

More recent research on the human osteological assemblage from Grotte des Pigeons has yielded further insights into the funerary behaviour associated with burials in Necropolis I and Necropolis II (Mariotti et al. 2009; Belcastro/Condemi/Mariotti 2010). Mariotti and colleagues (2009) documented evidence of deliberate *post mortem* manipulation of human bones in the form of cut marks and percussion damage. Human bones that had been intentionally stained with ochre were found in 13 of the 28 *sépultures* or graves from Roche's excavations (Mariotti et al. 2009). The location and extent of ochre staining of skeletal elements

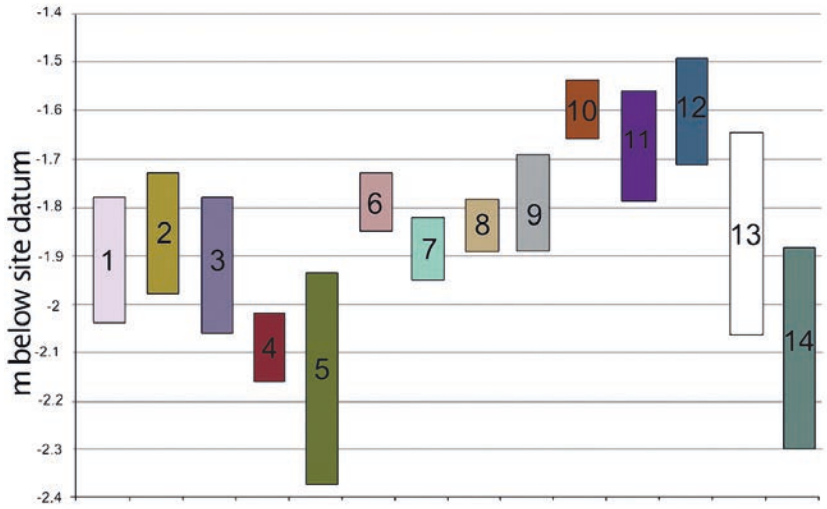


Fig. 15.16 Approximate depths of burials relative to one another based on the height distribution of undisturbed bones within each burial.

from both adults and children implies that disarticulated and sometimes fragmentary human bones were handled after decomposition (Mariotti et al. 2009; Belcastro/Condemi/Mariotti 2010). Ochre staining occurs on bone surfaces that would not have been accessible prior to decomposition or removal of soft tissues and fragmentation of the bones, including endocranial surfaces, orbits, sutures, broken surfaces, and within the empty sockets of teeth that had been separated from the jaw after death. On bones where both cut marks and ochre staining were present, the ochre occurs within the cut marks and therefore must have been applied subsequently. The human bones from Grave XII, which contained two juveniles and three adult males, showed particularly pronounced evidence for intentional modification including extensive cut marks consistent with dismemberment and defleshing and dying with ochre (Belcastro/Condemi/Mariotti 2010).

The extent to which the structuring of the burial deposit excavated during the 1950s reflected a set of deliberate and presumably meaningful interventions is difficult to ascertain. The presence of bones or teeth from the same skeleton in more than one of the numbered graves ("*sépultures*") clearly invalidates the original assumption (Ferembach 1962) that the osteological assemblage could be interpreted as a set of discrete burials (Mariotti et al. 2009) but this situation could arise through intentional or unintentional actions. In cases where there is no evidence for intentional manipulation of skeletal remains, the redistribution of bones from a single skeleton into multiple graves may simply have been an unintended consequence of successive episodes of burial activity in the same location. Contrastingly, the evidence for manipulation of human bone following decomposition is unequivocal for some of the elements recovered during the Roche excavation. Mariotti and colleagues concluded that these bones were deliberately retrieved from burials with the intention of handling and modifying them for ritual purposes. An alternative explanation is that some of the bones were recovered unintentionally following unforeseen disturbance of previous burials. Some skeletal elements that show evidence of *post mortem* manipulation were subsequently reincorporated into the burial deposits. This may have involved a deliberate decision to place those elements within another burial or other significant location (Mariotti et al. 2009) or the bones may simply have been abandoned or discarded and inadvertently incorporated into other burials.

The new excavations at Grotte des Pigeons provided an opportunity to record Iberomaurusian mortuary activity using modern excavation techniques. Excavations in Sector 10 revealed a succession of single burials placed in very close spatial proximity. All of the burials involved the primary deposition of complete bodies, with the possible exception of the skull of Individual 10. In numerous cases existing burials were disturbed or truncated by subsequent burial activity that encroached into the same space. During this process, some skeletal parts from disturbed burials were incorporated into the fill of subsequent burials or into the surrounding

deposit. Small or unrecognised bones and bone fragments from disturbed burials are likely to have been relocated unintentionally. Larger and more obvious skeletal elements such as the long bones could not have been so easily overlooked. Some of these bones seem to have been purposefully gathered up following disturbance and were either set aside or deliberately incorporated into other burials. It is also possible that some of the disturbed bones were deliberately removed from the burial deposits for utilitarian purposes, such as use as a tool, or for inclusion in a more complex set of funerary rituals, but the new excavations did not reveal any evidence of this behaviour.

The newly excavated adult burials from Sector 10 lack several aspects of the funerary traditions inferred from the assemblage excavated earlier. There was no indication that any of the Sector 10 burials had been deliberately reopened to retrieve human bones. Furthermore, there was no evidence for the manipulation of human bones following decomposition. The evidence recorded in Sector 10 for movement of bones between burials is entirely consistent with a practical interpretation. Several of the newly excavated skeletons were incomplete but, in each case, missing parts could be accounted for either by truncation of the burials during subsequent burial activity or by erosion of the surface of the burial deposit. The photograph showing the back of the cave following the completion of the excavations directed by Roche (**fig. 15.2**) reveals that, outwards, the uppermost grey ashy deposits had been removed more or less to the edge of the surviving deposit. The burials of Individuals 1-4 situated at the front of Sector 10 may have been truncated during the Roche excavation and would have been vulnerable to erosion due to the powdery nature of the deposits.

A third aim of the excavations was to document funerary treatment of individuals and determine whether there was patterning in relation to age, sex or other factors. Several features were common between all or most of the burials in Sector 10. All of the burials in Sector 10 were primary single inhumations. Many of the bodies were placed in a seated or semi-reclined position, with the pelvis, feet and often the hands at the base of the grave and the head and knees uppermost. The adults were placed so that they were facing approximately towards the cave entrance. The location of *in situ* bones suggested that most bodies were buried in pits with at least one side dug to sufficient depth to accommodate the height of the vertically flexed legs. In the three cases where all or part of the grave cut could be determined, the outline of the graves at the base appeared to be more or less circular. The hands and feet often remained in anatomical articulation suggesting that the lower part of the graves were filled. Many of the crania, mandibles, bones from the upper part of the vertebral column and thoracic region and occasionally the upper limbs, had shifted out of anatomical association and fallen downwards onto the chest or to the base of the grave. This suggested that there may have been empty space at the top of the burials or that empty space occurred during the process of decomposition. There was no evidence for direct application of red ochre to human bones, and no evidence for deliberate dismemberment, defleshing or other intentional modification of bones.

The newly excavated burials are those of infants and adults, including four young adults who had not yet reached skeletal maturity. The absence of juveniles may imply that few individuals died at this stage of life or that they were buried elsewhere. Three of the adult burials (Individuals 3, 4 and 14) had clearly been truncated from above or from the side by subsequent burials. All three of these individuals were male but the number of adult burials from Sector 10 is too small to determine whether this is significant or relevant. The disarticulated state of the bones relocated from the three disturbed burials indicate that the bodies had already decomposed when the burials were disturbed, and suggest that the existence and identity of the underlying burials would not have been known to those responsible for the disturbance. Burials 1 and 5 had not been truncated by subsequent burials, and both had another individual buried directly above and in close proximity to their heads. A pre-term infant, Individual 7, was buried almost directly above the head of Individual 5 (**fig. 15.4b**) but it is not possible to determine at present whether these burials were penecontemporaneous or whether the two individuals were related to one another. An older adult, Indi-

vidual 2, was buried directly above Individual 1 with its knee almost abutting the cranium of the underlying burial. Uniquely among the Sector 10 adults, Individual 2 was buried on its side in a position that would have required less vertical space than the other seated or reclined burials. This may indicate that the depth of sediment available in the preferred location was only sufficient to accommodate the body in a horizontal position. Neither skeleton has been dated, but their proximity and the lack of truncation of the lower burial suggest that the deposition of Individual 2 occurred not long after that of Individual 1. This may imply a memory of the underlying burial and a deliberate decision to bury the two individuals with a close spatial association. There is no reason to infer or exclude a familial relationship between these two adults.

All of the undisturbed adult burials were associated with multiple horn cores, regardless of the sex of the deceased. The most richly endowed burial in Sector 10 was that of Individual 14, a large bodied young adult male. Objects unambiguously associated with the burial include several horn cores of Barbary sheep, jaws from a fox and another canid, bird bones, a seashell, an ochre stained pestle and mortar, a distinctive red coloured stone and a side scraper. As the burial of Individual 14 was truncated it is possible that other items that were originally associated with the burial had been displaced into adjacent burials or into the surrounding sediment. The three undisturbed adult burials revealed evidence for an elaborate funerary tradition, but the burials did not contain valued utensils such as those found with Individual 14. Two horn cores from a large bovine were incorporated into the burial of Individual 1, and had been deliberately placed on either side of the body. Other items situated close to the body and considered to represent deliberately placed funerary items included a horse incisor found above the sternum, one half of a Barbary sheep mandible placed below the pelvis at the base of the grave, and a smooth blue/grey-coloured stone that partially overlay the cranium. Individuals 5 and 13 were both associated with numerous horn cores and each burial was marked or closed with a large and irregularly shaped rock. The burials of Individuals 2, 3 and 4 had been disturbed or truncated and there was no unequivocal evidence for the presence of horn cores or other burial items, or a cover or marker stone.

The infants were buried in single graves and are situated in close proximity to adult burials as well as those of other infants. The sequence of burials reveals that infants were buried in this part of the cave both subsequently and prior to adult burials (**fig. 15.14**). This demonstrates that, despite the high representation of infant burials, Sector 10 was not used selectively for the burial of stillborns and babies. The baby burials were typically located closer to the surface of the surviving deposit than adult burials which may imply that they were deliberately buried in shallower graves than most of the older individuals. The dimensions of each burial pit were probably determined according to the size of the deceased individual, such that the depth of the grave reflected the amount of space required to accommodate the body (Tocheri/Dupras/Sheldrick/Molto 2005). Some of the baby burials may have occurred when the burial deposit was considered too tightly packed to accommodate more seated adult burials but still acceptable for the smaller infant bodies. However, one infant burial (Individual 8) had been truncated by a larger and deeper subsequent burial (Individual 5).

The infants showed a greater diversity in the positioning of the body than the adults. This might reflect the more compact shape of the infant body and greater difficulty in maintaining the head in an upright position, but could indicate that less care was taken in some cases. As with older individuals, the bodies were placed with the lower limbs flexed at the hip and knee and one or both feet tucked beneath or in front of the pelvis. The position of the upper body varied from almost supine to almost vertical, and in some cases directly overlying the lower body. Several of the bodies appear to have slumped forwards or towards one side and these might have been placed initially in a seated position. In contrast to the adult burials, there was no consistency in the orientation of the bodies within the cave, with some infants buried facing or with the head leaning forwards towards the cave wall and others with the head or face orientated towards the

cave entrance. The slight rearrangement of skeletal elements within most of the burials suggests that some of the bodies were surrounded by pockets of empty space during decomposition, which may imply that the bodies were loosely wrapped or covered by an organic material.

The infant burials in Sector 10 were associated with a variety of funerary objects, and some items may have been overlooked as the nature of the burial deposits means that it is difficult to demonstrate an unambiguous association. Two of the infants were found directly below ochre stained stones (Individuals 8 and 9). The distinct blue/grey colouration and ochre-staining of these stones may have had a symbolic meaning or reflected the social status of the deceased or their immediate family. Alternatively these may simply have been a convenient way to close or mark a burial. The stones are locally sourced from outside the cave, with similar rock occurring in the wadi bed below the cave. Notably, these two infants are those who were identified as probable siblings based on genomic analysis (van de Loosdrecht et al. 2018) suggesting that kinship contributed to the patterning of funerary behaviour in Sector 10 (Humphrey et al. in press). A smaller rock of the same blue/grey colour was situated close to another infant, Individual 12. This was similar to the piece of stone found next to the head of Individual 1. Interestingly, both Individual 1 and Individual 12 were also found in association with horse incisors. This may be coincidental or may reflect a tradition specific to one family group, but this cannot be demonstrated at present as it was not possible to extract reliable genetic information from Individual 1. Only one of the newly excavated infant burials was associated with a piece of cranium and horn core from a Barbary sheep (Individual 6) although these are commonly found in association with the adult burials. Two of the infants were associated with small marine shells (Individuals 6 and 12), which occur relatively rarely in Grey Series deposits across the site. An end-scraper was found lying flat alongside the left arm of Individual 6 and was notably larger than most other end-scrapers (**Chapter 12**) suggesting a particular value or significance. Two of the infants lacked any clear association with burial items and showed no evidence for the use of ochre during burial (Individuals 7 and 11). The burial of Individual 11 had been disturbed and the body may originally have been buried alongside other items.

The fourth aim of the research was to provide an additional perspective on the diversity of funerary behaviour of Late Pleistocene and early Holocene populations of the Maghreb. Human remains have been reported from a variety of Iberomaurusian contexts, including both burials and disarticulated skeletal elements. An isolated, nearly complete cranium and associated mandible were recovered from the upper stratum at Taza Cave I, situated close to the Eastern Algerian coast (Meier/Sahnouni/Medig/Derradji 2003). The skull was found close to the base of a horizon dated between 23,717-16,390 cal BP and 16,915-16,475 cal BP (16,100 ± 1,400 BP and 13,800 ± 30 BP in Meier/Sahnouni/Medig/Derradji 2003) and, if it is reliably associated with this horizon, it may be the earliest known Iberomaurusian skull. Isolated human bones from at least four individuals were found in a disturbed horizon at Kehf el Hammar in the western Rif. The bones have not been dated but the right maxilla of a young adult showed evulsion of the upper central incisor, which is consistent with an Iberomaurusian cultural affiliation (Barton et al. 2005; Humphrey/Bocaege 2008).

Elsewhere a range of funerary contexts have been described demonstrating that funerary traditions varied within and between Iberomaurusian sites. Excavations at Afalou Bou Rhummel in Algeria between 1927 and 1929 revealed partial remains of approximately 48 individuals in level I, at a depth of 3.25 m and covering an area of approximately 3 × 4 m (Arambourg/Boule/Vallois/Verneau 1934). Only six of the skeletons were reported to have been found in anatomical association, and some of those skeletons were incomplete suggesting disturbance or truncation by subsequent depositions or other agents. No burial items were recorded in association with this assemblage but a lump of crushed iron oxide was found on top of the cranium of an adult male located in level III, together with a piece of polished bone (Arambourg/Boule/Vallois/Verneau 1934). Arambourg proposed three possible explanations for the main osteological assemblage. The first

suggestion, that bodies may have been lowered or dropped onto the cave floor through an opening in the roof of the cave, appears unlikely because the closely articulated position of some of the bodies suggests that they were covered by sediment prior to decomposition. Secondly, Arambourg suggested that some of the bodies were secondarily deposited in the cave following partial or complete decomposition elsewhere, which could account for the uneven representation of different skeletal elements and under representation of post-cranial bones. Arambourg also speculated that the assemblage could have accumulated following a massacre by another group (Arambourg/Boule/Vallois/Verneau 1934), but this would not account for variation in the degree of anatomical articulation of the skeletons or uneven representation of skeletal elements. A possible alternative to the explanations suggested by Arambourg is that the deposit accumulated through a succession of closely spaced burials similar to that observed at Sector 10, with earlier depositions truncated or pushed aside to make space for later burials.

More recent excavations at Afalou Bou Rhummel revealed a further assemblage of partially articulated human bones in a low alcove on the southern wall of the rock shelter (Hachi 1996). Eight crania, including some in anatomical connection with their vertebral columns, were located towards the back of the alcove. Anatomical connections were also maintained between some of the vertebrae and ribs, indicating that complete bodies must have been deliberately placed within the alcove and not lowered from above or secondarily deposited. Some of the lower limb bones were located above the articulated thoracic skeletons suggesting a highly flexed burial position. The bones closest to the front of the alcove were disordered and lacking anatomical associations. This distribution of skeletal elements may have resulted from the gradual introduction of new bodies with each successive burial contributing to the breakage and displacement of the more exposed bones from previous burials (Hachi 1996). The most recently excavated burials from Afalou Bou Rhummel were from layer V of the deposits. The dates available for layer IV are 16,894-14,409 cal BP (Alger 0008, 13,120 ± 370 BP), 15,300-13,770 cal BP (Ly 3228, 12,400 ± 240 BP) and 14,477-13,461 cal BP (Gif 6532, 12,020 ± 170 BP), and it is likely the layer V burials are of a similar age or slightly older. The skeletons excavated between 1927 and 1929 have not been directly dated and it is not clear how these relate chronologically or stratigraphically to those from more recent excavations at the site.

Excavations at Columnata in Algeria carried out between 1938 and 1959 revealed a series of burials from the Iberomaurusian, Columnatian (transitional Epipalaeolithic) and Neolithic, incorporating partial skeletons and isolated skeletal elements from 48 adults and 68 sub-adults, including infants (Maître 1965; Chamla 1970). Nine of the burials, representing 13 individuals, were considered to be Iberomaurusian. These burials have not been dated and one individual, an adolescent from burial 1, had undergone evulsion of all 8 incisors. This pattern of tooth evulsion is not otherwise documented among Iberomaurusian human remains and is more typically associated with later periods (Humphrey/Bocaege 2008). Several of the burials contained bones or partial skeletons from more than one individual, implying multiple burials or reuse of the same space for successive burials and redistribution of disturbed bones.

Iberomaurusian burials have been reported at two open-air sites in Algeria. At Kef-oum-Touiza, a young adult male was buried in a highly flexed position with the knees on the chest (Balout/Briggs 1949). At Rachgoun, four adults were found in primary single burials. Two of the adults appear to have been buried on their side, one with traces of ochre on the uppermost femur. A third adult was in a highly flexed position with the knees on the chest and another was lying on the back, with the lower limbs flexed and at least one knee pointing upwards (Camps 1966). The burials at Rachgoun and Kef-oum-Touiza have not been dated.

Five burials, including four of infants and an adult male, were recovered from Iberomaurusian levels at Ifri n'Ammar in Eastern Morocco (Mikdad/Moser/Ben-N'cer 2002). Three of the infants were buried with the head orientated to the north, suggesting deliberate placement of the body. The fourth infant appeared to

have been dismembered before burial. Each of the burials was marked by a block of stone placed directly above the body but separated by a few centimetres of sediment (Mikdad/Moser/Ben-N'cer 2002). The adult was buried in an upright seated position with the lower limbs flexed and parted at the knees and the feet close to the pelvis (Eiwanger 2006). The cranium was found lying on its side immediately above the pelvis and right forearm, and may have collapsed into this position during decomposition, suggesting that there was empty space within the burial. The four infant burials were dated between 14,935 and 12,690 cal BP (Moser 2003) and are broadly contemporaneous with the human burials from Sector 10 at Taforalt.

At the nearby site of Ifri n'Baroud (Ifri el-Baroud), a single adult female was buried in a reclining seated position with both lower limbs flexed in front of the body (Ben-N'cer 2004). The close anatomical articulation of the bones suggests that the body was deposited in a gradually filling space ("*espace à colmatage progressif*") (Ben-N'cer 2004). The burial at Ifri n'Baroud was from a trench which has yielded radiocarbon dates on charcoal of between 14,315-13,830 cal BP (12,198 ± 65 BP) and 11,223-10,785 cal BP (9,677 ± 60 BP) (Ben-N'cer 2004; Görsdorf/Eiwanger 1998) and is probably slightly younger than the newly excavated Taforalt burials. The similarity in the positioning of the body within the grave observed for burials at Ifri n'Baroud and Ifri n'Ammar and six of the adults from Sector 10 at Taforalt suggests that this burial position was not unusual in the Eastern Rif and Beni Snassen during the Iberomaurusian. The absence of seated burials at other Iberomaurusian sites suggests that the tradition may have been geographically restricted. The burials at Ifri n'Baroud and Ifri n'Ammar were not associated with any deliberately placed funerary objects (Ben-N'cer 2004).

Further afield, a single burial of a young adult male was found at Hattab II Cave in northwestern Morocco. The body was placed in a flexed position on its left side (Barton et al. 2008). The burial incorporated several items considered to be funerary objects including a gazelle horn, a bladelet core, a marine shell, two bone points and a large animal vertebra found close to the skeleton. The male burial at Hattab II was dated indirectly at 8,900 ± 1100 years BP from a thermoluminescence age determination on a burnt lithic artefact. It is more recent than the Eastern Rif and Beni Snassen Iberomaurusian burials, geographically more distant, and exhibits a different funerary tradition. Other isolated human bones and teeth from Hattab II have not been dated, and may indicate the presence of other burials at this site.

At least three sites on the Atlantic coast have yielded Iberomaurusian human burials. At Dar es-Soltan I, an adult male cranium and partial skeleton together with cranial fragments and teeth from a juvenile aged 10-12 years were found in level C, indicating the possible burial of at least two individuals (Vallois in Ruhlmann 1951). Excavations at the neighbouring site of Dar-es-Soltane (Dar es-Soltan) II yielded evidence for the burial of a young adult female, found in *couche 3* in 1971. The body was placed in a highly flexed position on its left side, with the left side of the face resting on the right hand (Debénath 1972; 2000). The left arm was extended beneath the body with the hand lying adjacent to the left foot. No funerary objects were found in direct association with the burial but a large stone with a concave surface showing traces of red ochre was found close to the head, and the body was placed on a slab of rock and covered with smaller stones. Parts of a second poorly preserved skeleton, including a large robust mandible, were found nearby and may have been pushed aside to make space for the subsequent burial (Debénath 2000). *Couche 3* has been dated to 13.4 ± 0.7 ka (OSL4-X2402) (Schwenninger et al. 2010).

Excavations at El Harhoura 2 in 1996 revealed a well-preserved skeleton of a young adult male (H3) in *couche 2* (Oujaa/Lacombe 2012). The body was buried on an east-west orientation with the head towards the west. The upper part of the body was situated in a crevice between rocks. The body rested on the right side with the head tilted to the side. The legs were flexed backwards from the knees at an angle of 60° and rested on a rock at a slightly higher level than the rest of the body. The skeleton remained in anatomical articulation indicating decomposition in a filled space. The young man had undergone evulsion of the upper

right central incisor but not the upper left central incisor, which was broken at the base of the crown with the root still *in situ* (Oujaa/Lacombe 2012).
Funerary activity was highly variable during the Iberomaurusian. The burials reveal a variety of body positions including seated, extended, flexed or contracted. Six of the adults from Sector 10 at Taforalt were buried in a seated or slightly reclining position and this tradition is shared by broadly contemporaneous burials from the same region of Morocco. Roche's accounts of the burials from Necropolis I and Necropolis II indicate a diversity of burial positions and the possibility of multiple burials (Roche 1953a; 1953b; 1963). There is also no consistency concerning the deliberate inclusion of funerary artefacts, the presence of ochre, or the closure or marking of burials with a stone or other marker. The scarcity of funerary items at other sites contrasts markedly with the newly excavated burials from Sector 10. All of the undisturbed burials from Sector 10, apart from that of a pre-term infant (Individual 7), incorporate funerary items, although the nature of the objects varies between individuals. Two of the most recurrent and enduring features among the burials from Sector 10 and those described by Roche are the inclusion of horn cores above the bodies or at the edges of the burial pits and the presence of overlying stones or stone slabs, which could be interpreted as grave markers.
At most Iberomaurusian sites, the position and representation of skeletal elements indicate that bodies were intact before burial and that any disarticulation and fragmentation was caused by disturbance during subsequent funerary or other activities. One of the infants from Ifri n'Ammar may have been dismembered prior to burial (Mikdad/Moser/Ben-N'cer 2002). There is no documented evidence for deliberate manipulation of skeletal elements following decomposition or removal of soft tissues at any of the Iberomaurusian sites, apart from Grotte des Pigeons. The extent of manipulation of human bones from the latest part of the Iberomaurusian sequence at Grotte des Pigeons is comparable to the more recent Capsian period, during which *post mortem* manipulation of skeletal elements for ritual or practical purposes is well documented. The partial cranium (*crâne-trophée*) from the Capsian site of Faïd Souar in Algeria is an unequivocal case of recovery and deliberate modification of skeletal elements for ritual purposes (Vallois 1971). The perforated human frontal bone from Mechta el Arbi, another Capsian *escargotière* in Algeria, also exhibits intentional modification and is thought to have been suspended (Debruge 1927; Vallois 1971). Elsewhere, the underlying motive for manipulation of body parts may have been more pragmatic. Some of the skeletons recovered from Site 12, a Capsian *escargotière* in Algeria, were incomplete and partially disarticulated and detailed analysis of marks on the bones revealed evidence for decapitation and dismemberment of cadavers prior to burial (Haverkort/Lubell 1999). These actions may have been carried out to facilitate transportation of the cadavers, particularly the bodies of those who died far away. This implies that Site 12 had become a recognised burial locality and that considerable importance was attached to placement of the deceased in this location. Three of the skeletons from Site 12 were missing either the cranium and mandible or major long bones and it is possible that those parts of the skeleton were deliberately retained for another purpose (Haverkort/Lubell 1999).

15.7 CLOSING COMMENTS

The recently excavated Sector 10 and the burial deposits excavated by Roche in the 1950s (**fig. 15.1**) form part of a spatially demarcated collective burial area, with numerous closely spaced and inter-cutting burials. The earliest burials occur within a few hundred years of the onset of more intense phases of human activity marked elsewhere in the cave by a major sedimentary transition. One of the questions that arises is whether the burial deposits in Grotte des Pigeons qualify as a cemetery or a place of multiple burials. Several pa-

rameters contribute to the differentiation between places of multiple burials and cemeteries (Pettitt 2010). Places of multiple burials involve sequential burial of a small number of individuals (typically 6-12) over a short period of time. Cemeteries usually contain a greater number of burials (typically >20) and tend to be better organised and more enduring. Places of multiple burials typically lack a clear spatial demarcation between the living and the dead, with burials often surrounded by evidence of daily activity reflecting their placement within an occupational setting whereas cemeteries are areas set aside for burials and associated funerary behaviour and are usually located away from living areas. Even the most conservative estimate of the number of burials at Grotte des Pigeons is likely to exceed 100 individuals. The duration of use of Sector 10 has been shown by direct dating to cover at least 200 years and burials in Necropolis I may have continued for most of the period of formation of Grey Series deposits at Grotte des Pigeons.

The degree of spatial organisation and the extent to which the activities associated with the living and dead were separated are debatable. The burials at Grotte des Pigeons occur in a restricted area at the back of the cave and no human bones were recovered from midden deposits closer to the entrance. The high concentration of burials and disarticulated human bones in the north and northwest alcoves of the cave and absence of human bones in Grey Series deposits elsewhere suggests that these places were recognised repositories for human bones during the latter part of the Iberomaurusian and that other parts of the cave were not considered suitable for either casual or purposeful deposition of human bones. It is likely that this demarcation of areas of the living and of the deceased was deliberate and that the more secluded part of the cave was set aside for funerary activity.

However, it is not certain that all non-mortuary activity was excluded from these parts of the cave. The accumulation of occupational debris in the grey ashy deposits at the back of the cave may have occurred prior to or concurrently with burial activity or the use of the back of the cave may have alternated between phases of mortuary and occupational activities. One possibility is a that the grey ashy sediment at the back of the cave formed *in situ* as a midden during normal occupational over a period of up to 400 years and that this part of the cave was subsequently designated for burials. It is also possible that the grey ashy sediment was dumped in the back of the cave from occupational areas elsewhere in the cave over an unknown period of time prior to the period in which this area was used for burials. Alternatively grey ashy sediment may have been transported to the back of the cave from occupational areas elsewhere in the cave with the deliberate intention of providing a medium for burials. This process may have occurred only once at the onset of burial activity or on multiple occasions as required. One of the animal bones from Sector 10 is slightly earlier than any of the human bones for which dates are available, suggesting that at least some of the occupational debris predates the burials.

The burials uncovered from Sector 10 were primary inhumations of complete bodies. The distribution of articulated and disarticulated bones indicates intensive use and reuse of the area, with earlier burials disturbed or truncated by subsequent burials. The movement of skeletal elements can be accounted for by the unintentional disturbance of previous burials during subsequent funerary preparations. There was no evidence for intentional movement or modification of the corpse subsequent to the onset of significant decomposition among the Sector 10 burials. This contrasts with the burials excavated during the 1950s, where there is evidence for modification of bones following decomposition or removal of soft tissues and secondary deposition of manipulated bones. Burials situated towards the front of the cave and those higher within the deposits are likely to be progressively younger, which would mean that the burials in Sector 10, located in the deepest recess of the cave, are among the earliest so far recorded at Grotte des Pigeons. The differences between the funerary behaviour recorded in Sector 10 and that inferred for the burials excavated by Roche (Mariotti et al. 2009; Belcastro/Condemi/Mariotti 2010) is consistent with a change and specifically a diversification in the treatment of bodies and skeletal parts over time.

The more extensive and complex set of mortuary behaviours documented for burials in Necropolis I would have required a greater investment of time and resources. The simplest explanation for this change would be an increased sense of the importance and desirability of assembling and commemorating the dead at a single location. During the earliest phase of mortuary activity only burials of complete bodies are represented. This suggests that the people buried in Sector 10 were buried before the onset of significant decomposition and probably died within the immediate vicinity of the site. During this period, members of the community who died when they were engaged in activities further from the site may have been buried or abandoned close to their place of death. Over time, Grotte des Pigeons may have become a recognised repository for the dead, including those who died elsewhere. The bodies of individuals who died at locations far away from the cave may have been buried at those primary locations and then wholly or partly recovered following decomposition of soft tissues and returned to the cave for secondary burial. Alternatively they may have been dismembered or defleshed at a distant location to facilitate transportation of the all or part of the cadaver to the cave for burial. The specific motivation for these actions is likely to remain obscure, and may have changed over time. The developments in mortuary activity documented at Grotte des Pigeons are likely to have mirrored other changes in the use and perception of space and resources during the Iberomaurusian.