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S O U D A N

ARCHAEOLOGICAL EXCAVATIONS AT KERMA (SUDAN): PRELIMINARY REPORT ON THE 1993-1994 AND 1994-1995 CAMPAIGNS

By Charles Bonnet

Two new excavation campaigns led by the Swiss Archaeological Mission in Nubia have once again unearthed evidence of considerable interest. Little by little, light has been shed on the importance of the Kingdom of Kerma, whose strength made even the Egyptians fearful. Through the considerable extent of its remains, the eponymous site is an inexhaustible source of information for the better understanding of Sudanese history.

Thanks to a subsidy from the Swiss National Fund for Scientific Research and a private donation, the work was undertaken under very favourable conditions. A generous grant was also awarded to us by the Excavations Commission of the University of Geneva, whose president is Professor Michel Valloggia. These have enabled us to publish the proceedings of the 7th international congress on Nubian studies which was held in Geneva from 3 to 8 September 1990¹. The editorial work was the responsibility of Mme Nora Ferrero, to whom we offer our very sincere thanks.

The support in the field of Professor Ahmed M. Ali Hakem and Hassan Hussein Idriss, Director General of the Antiquities Service of the National Museum, was most valuable. For many years, a very close collaboration has been maintained with the members of the Antiquities Service, and many of their inspectors have participated in the work of the Mission, under the direction of Salah el-Din Mohamed Ahmed. Mustafa Ahmed el Scherif joined our latest campaign.

The excavations took place between 7 December 1993 and 31 January 1994, and 7 December 1994 and 31 January 1995. Almost 150 people were involved, of whom around a third were assigned to restoration and protection work under the direction of the rais Gad Abdallah and Saleh Melieh, assisted by Abdelrazek Omer Nouri. A wall of almost 1300 metres was constructed around the main site. After work on the palace and the great roundhouse, a residential district and the remains of seven chapels of the secondary town were "restored". As a result of this restoration work, the impressive view from the top of the defuffa now affords a much better understanding of the urbanisation of this vast quarter. The research work was focused on the secondary urban centre (fig. 1 and 2), and on the eastern necropolis. Several tombs were excavated in a transition zone between those of the Ancient and Middle Kerma peri-

ods (around 2100 BC), and a new analysis of chapel K XI was undertaken. Excavations were continued within the pre-Kerma settlement. The facsimiles of the wall paintings from chapel K XI are perhaps the most spectacular discoveries from the last campaign: they depict aspects of the Kerma environment that are still not well understood, and suggest that a fauna that was as much wild as domestic played a preponderant role.

Once again, we should like to express our gratitude to the members of the Mission, whose competence and experience ensured our success. Béatrice Privati was responsible for studying and drawing the finds, and the survey of the mud brick buildings and the tombs was undertaken by Thomas Kohler, whose patience was severely tested by a deposit of jars comprising several thousands of sherds. Daniel Berti kept the photographic record, and he was also responsible for making the facsimiles of the paintings in chapel K XI, and for the restoration of several leather objects found in the tombs. Marion Berti was our administrator and conservator and she also acted as a draftsman. The human bone material was studied by Christian Simon and the wild and domestic animal bones by Louis Chaix. Their reports are to be found as appendices to this report. Finally, in 1995, the prehistorian Matthieu Honegger undertook the study of the pre-Kerma site, and of the lithic material in general. His first observations are also given in an appendix, and have considerable significance for our current and future research.

Several publications relating to different studies of the site have been published during recent years².

THE PRE-KERMA SETTLEMENT

Between 1986 and 1988, a settlement was discovered, which, although related to the "Group A" horizon of lower Nubia, we prefer to call "pre-Kerma" in view of certain differences in the ceramic assemblage³. Chronologically, the site lies between the end of the fourth and the beginning of the first part of the third millennium. It was hoped that an experienced prehistorian would undertake the study of this site, and this was achieved in 1995.

Forty six storage pits were studied, in addition to the 134 previously excavated. One still contained an intact jar,

upturned on the bottom of the pit. Part of a long rounded palisade was indicated by series of postholes. The archaeological material was not very abundant, but it added to the existing ceramic assemblage.

When the first level had been cleaned, the remains of an earlier occupation came to light. An alignment of postholes and a hearth may have been related to a layer of sand full of charcoal fragments and marked by traces of rubification. The presence of this or these layers were found at a depth of 20 or 30 centimetres over a large area. Only a small surface was cleaned, revealing flint flakes, animal bones and two decorated sherds. Clearly, such a stratigraphy constitutes an important find in the study of the protohistory of the region south of the third cataract, and it would be worth enlarging the area of excavation.

THE SECONDARY SETTLEMENT

The origins of the secondary settlement established beyond the walls of the ancient town remain difficult to define. Even though the extensive clearance undertaken during the last season provided a good picture of the remains of Ancient and Middle Kerma, their interpretation remains very difficult. Traces were found of a fortification wall defining the east-west limits, with a return towards the south. The line of the wall was marked by the impressions of parallel arrangements of branches, and by double postholes. At the western extremity, a ditch provided another element in the defensive system. Postholes were found in the slope of the ditch, which indicated a series of rounded palisades in front of a gate. This was kept as an entrance until the end of the Classic Kerma period (fig. 3).

Many circular structures, aligned over a considerable distance, have been found in the deposits of the Ancient and Middle Kerma period. They are characterised by powerful foundations, against which are sometimes built rectangular walls. Such foundations are similar to those of grain silos, but this does not exclude other interpretations of their function.

On the other hand, the excavation of the sanctuary of chapel E I uncovered several layers which demonstrated its architectural history. Even though the earliest layers were not reached, it is certain that the first structure was of the Ancient Kerma period. It was a circular hut, 4.3 metres in diameter. Modifications of its walls suggested a significant period of occupation. Areas for rubbish disposal around its periphery indicated by animal bones suggest that this building was within an area of habitation (fig. 4).

This first building was cut by a second which had a diameter of 4 metres, and posts with sections identical to those of the earlier building of between 0.06 and 0.08 metres. The second building was rebuilt and enlarged to a diameter of 4.30 metres. The diameter of the new posts was slightly increased (fig. 5, stage 1).

The next level was indicated by holes for much larger posts, this time delimiting a rectangular building with two, or perhaps three bays. It is possible that the change in the plan of the building was for religious purposes; this is suggested by the presence of hearths on the ground surface, a feature found in many chapels. The orientation of this building respected the siting of the earlier round houses (fig. 5, stage 2). The next edifice was still rectangular in plan, and built of wood. It was, however, larger than the previous one, and fitted almost exactly within the mud-brick chapel E I which succeeded it (fig. 5, stage 3). This latter was modified many times: built first with a central colonnade, an eastern annex was added, and, finally, it became tripartite, with the addition of two other colonnades. It is possible that the elongated courtyard in front of the entrance was in existence at the time of the wooden buildings (fig. 5, stages 4 and 5).

This complex evolution, with the transition of the architecture from wood and mud to mud brick, has been found in other monuments such as chapel E X, where post constructions of a more or less rectangular plan have been recovered. Building E VIII, with its two colonnades placed at right angles, may also have succeeded a more ancient wooden building⁴.

The two elongated buildings, E XVII and E XVIII, which were found in the north-eastern part of the secondary agglomeration belong to the beginning of the Middle Kerma period. They are similar to those found in the first of the levels studied in the religious quarter of the ancient town, to the west of the principle temple, the defuffa⁵. Such buildings no doubt served a number of functions but they certainly had cult associations. E XVIII, which was 18 meters long by 5 metres wide, was equipped with bakeries where bread was prepared for offerings. Four ovens placed side by side were found. E XVIII must also have been the origin of the later complex of buildings of the large chapel E XVI. Whatever they were, E XVII and E XVIII, both had a double or triple colonnade and formed a prestigious grouping in a sector marked by a long architectural history (fig. 6).

During more or less the same period, and throughout the whole of the Middle and Classic Kerma periods, other chapels were to be built. Single rooms, frequently of mod-

est proportions, they were oriented north-south with the door opening to the south as protection against the prevailing wind. There were frequently bases for a stele to the north and traces of a hearth in the centre, but archaeological material was rarely found. While at first the siting of these chapels seemed to follow no particular rules, later they were placed next to each other, on either side of a street. We have already described in an earlier report the architectural characteristics of some of these chapels, which generally take the form of a colonnaded sanctuary, with one or two side annexes and a southern courtyard⁶.

Two rather large dwellings, probably belonging to someone of importance, are still to be mentioned. Houses M 137 and M 138 were occupied during the Middle and Classic Kerma periods. The kitchens, with their domestic ovens which were appreciably larger than those usually found, were placed in a separate and probably communal courtyard between the two houses. Cattle and sheep feet had been discarded behind the ovens (see L. Chaix's report below).

Finally, two workshops were found, one of which had been built during a major modification which was undertaken in order to create a new north-south road over a filled-in ditch. These workshops were distinguished by their divisions into small rooms (A 142) in which were found hearths and benches. In one of these rooms was a perfectly plastered square block with sides of 1.3 metres. Holes for the posts of a wooden structure raised above its surface suggest that it may have served as the base of a workbench. Fragments of crucibles with traces of copper and a tiny ingot of gold, ready for working, give an indication of the activities carried out in the workshop.

The wooden palisades which protected the western gate in Ancient and Middle Kerma were replaced by an almost square tower, which lasted for several centuries. This entrance was protected by a system that was similar, although less well developed, to that discovered near the large roundhouse⁷. In order to reach the settlement, it was necessary to cross the ditch, follow a road whose width was reduced by a palisade of large posts, skirt the tower to arrive at the narrow doorway in the fortification walls and finally emerge on the road leading to the chapels.

Such a system, and indeed the enormous bastions to the east, illustrate the desire to protect a settlement that encompassed both the places of prayer, very likely for a cult to the memory of the dignitaries of the kingdom, and workshops where precious objects were no doubt made.

Over the years, the defensive system was to be enlarged, and several chapels were sacrificed in order to build power-

ful terraces to support circular masonry structures. The ditch dug between the main town and the secondary settlement was deepened to more than 6 metres. A sondage demonstrated that flooding had caused progressive silting. Moreover, a wall made from large ferruginous sandstone slabs from the third cataract had collapsed into the ditch and we were able to excavate the stones which had slid down the slope in an area that had frequently been flooded (fig. 7).

THE DEPOSIT OF JARS

During the last decades of the Classic Kerma period, most probably during an unsettled period, a large depression, 25 metres by 17 metres, had been dug near the eastern gate of the secondary settlement, at the expense of the defensive system. It was at least 1.5 metres deep. On its slopes, and no doubt also on its flooded base, between 200 and 250 jars had been deposited. They were globular in form with an open neck, and showed signs of use and repair. The rim and the body were decorated with an incised or stamped geometrical pattern (fig. 8).

The jars had been inverted, with their rims driven into the moist earth. The base of the depression was littered with innumerable sherds. The whole collection seems to have been abandoned at the same time, after a brief period of use: the depression was 'closed' with the spoil from nearby mud brick buildings. The fill was particularly compact, being made of more or less horizontal layers of masonry which also appeared to have been flooded.

Finally, a circular well had been dug through the fill, with walls made of curved fired bricks which were specially made for the purpose. A layer of sand surrounded the walls, facilitating the run off of water. The material found inside the well belonged to the same period as the jars, that is to say to the end of the Kerma culture.

It is difficult to determine the circumstances that motivated this deposit. Was it a votive offering? Had it been deposited during a festival, as still happened in villages until fairly recently? On these occasions each participant prepared beer or date wine and it was not at all rare to see stored in the village square a hundred or so vessels of similar form to those found in the depression. Once emptied, the pots were inverted to diminish the smell of the alcoholic vapours (fig. 9).

THE EASTERN NECROPOLIS

During the last two campaigns, we worked in an intermediate zone, dated to the period between Ancient and Middle Kerma (c. 2100 BC). Sixteen tombs were excavated, characterised by a large number of ovicaprines placed inside the tombs, and of bucrania placed on the ground to the south of the *tumuli*. The whole of this area seems to have been systematically plundered, no doubt because the graves were richly endowed. Only two tombs (184a and b), in *sector CE 20* had escaped destruction. They were superimposed and seem to have been part of the secondary inhumations associated with tomb 185 (fig. 10).

In the vast circular burial pit of this tomb, the subject, a male of 39 years, rested on a bed, along which the traces of a bow were visible. The base of a partly preserved leather quiver contained the remains of three arrows with their ostrich feather fletching still intact. A large pendant made from an pearlised oyster shell from the Red Sea was found in the disturbed layers, together with many ceramic vessels. A goat and three sheep were found near the bed, one of the latter wearing a headpiece of ostrich feathers. A lamb, cut into several pieces was placed to the north of the burial pit, together with several pots. On the ground level seven bucrania were placed at regular intervals between the frontal bones of cattle (bulls, cows and calves) which were arranged in a crescent shape to the south of the tumulus; they were from large antelopes, similar to a hartebeest, or from cattle with deformed horns.

The two tombs 184 a and b were placed against the tumulus of tomb 185, and had not been pillaged, thus providing a complete inventory of the grave goods. The lower grave was that of an adult female, placed in a flexed position with her head to the east, on a leather cover. She was holding a staff and was wearing a bracelet of faience beads and a necklace with a single silver bead. Besides joints of meat and pottery vessels, there was a complete sheep huddled to the west. Baskets, cushions of a vegetable material, and goat and cattle skin covers completed the deposits (fig. 11).

The tomb placed above was that of a boy, a year and a half old, lying on a leather cover with a lamb. A small bronze dagger with an ivory pommel was tucked into his belt. His jewellery consisted of a large discoid pendant and earrings, both made of gold (fig. 12).

In the same sector, tomb 186 had a chapel to the north-east of a circle of stones that had been placed to protect the tomb from erosion. The inhumation, a 50 year old man, was accompanied by three sheep and a goat. In the southern part of the grave was a partially preserved leather chest

reinforced with wood. At first we thought that it had been reused as a coffin, but the discovery of a second and very similar chest in *sector CE 21* demonstrated that it had a domestic use (fig. 13 and 14).

The five graves in *sector CE 21* contained a very large number of sheep - up to eleven in a single tomb. Ostrich feather discs were found on the skulls of several animals. These were made using a different technique from that used for the discs found in other sectors of the necropolis. In order to give the decoration volume, they had been assembled from a circle of small bundles of feathers, whose spines had been bent to form a loop for the fastening cord.

To the south of a large tumulus close to the sectors under study, a fragment of calcite bearing the cartouche of the Egyptian Pharaoh Meryra or Pepi I, whose reign was at the end of the Old Kingdom, This discovery, in a context that is transitional between Ancient and Middle Kerma, provides a very valuable chronological marker. We thus decided to investigate *sector CE 22*. Three tombs were excavated, and another piece of calcite, without epigraphy, was found close to the surface. The excavation of the large neighbouring tomb will perhaps provide further chronological indicators.

In one of the tombs that were excavated (t. 193) there were the scattered remains of two inhumations, a 55 year old woman and a 30 year old whose sex could not be determined. The principle burial was of a man of 60 years, lying on the remains of a bed. Some of the grave goods remained in the filling of the tomb, including a stick used as a handle for a circular ornament made of ostrich feathers, a bronze dagger, fragments of an ivory bracelet, and a pendant consisting of a rock crystal prism mounted in gold. There were also eight sheep, 46 butchery joints and grains of barley.

CHAPEL K XI

The great funerary monument excavated by G. A. Reisner between 1913 and 1915⁸, has suffered because of intemperate weather and animal and human depredations; recently, a door post had even been removed. The heavy rains of 1994 caused even more damage, and so further clearing was required. To our astonishment, the wall decorations were still sufficiently well preserved to be analysed. Several scenes that had not been recorded by Reisner were surveyed in detail (fig. 15).

The architectural study of the building was also continued, and we were able to draw up a new large scale plan. If it is

indeed correct that in its original state the building had a vaulted roof, this was fairly quickly replaced by a less substantial roof, signified by the addition of a colonnade. The two layers of painted murals in the northern chamber (B) were associated with a floor which was later than the dolomitic marble colonnade bases. In the southern chamber (A), the very well made sandstone paving seems to have been cut for the foundations. The cavities near to the entrance to the chamber which, according to Reisner, were from a dais or a funerary bed, belonged to the vaulted phase without a colonnade.

The discovery of three imposing monolithic stele in front of the entrance to the monument was another surprise, as there was no mention of them in the report on Reisner's excavation. One, broken at the base, measured 4.73 metres in height. Like the two others, its surface had been pitted. It would be necessary to enlarge the cleaned area in front of the facade of K XI in order to find the pits in which these stele had been erected. It is already possible to restore at the base of the wall of bonded stones a bench, which is still *in situ* to the west (fig. 16).

At the foot of the facade three fragmentary slabs were found, deeply engraved with several rows of rosettes. They were encrusted with fragments of blue "faience", attached with plaster. These slabs were not sufficiently solid to have formed the "star" ceiling of the entrance and more probably belonged to the decoration of the facade wall. Two other fragments showing the same rosettes are in the Fine Art Museum at Boston⁹ (fig. 17).

In the interior, the painted murals were only preserved to a height of around one metre, sometimes even less; they were on a thick layer of plaster. The floor seemed to have had a red ochre and white wash. This is not the place to describe in detail the successive alterations to the building; we should simply state that the decoration of the internal walls took place at a late stage towards the end of the work of enlarging the building. In chamber B, two layers of murals were found, showing that the painting had been re-done; moreover, part of the original decoration had collapsed onto the floor.

At the northern extremity of chamber B was a rectangular stone foundation, 0.94 metres wide, placed directly on the ground. Some traces of paint were found on its surface. In the filling of sand and earth beside it was a broken slab of the same type, also painted. Minute examination of its surface revealed part of the design. It was made up of two figures; one is female and is bending over an object, probably a container, and seems to be leaning on a ladder, while the second is climbing another ladder. It is impossible to say if

these slabs formed a plinth, an altar or a stele. Whatever it was, the scene represented would have been visible from the entrance, as the columns were slightly off line towards the west, allowing a direct view.

As one enters the monument, one sees first of all, on the left, a sailing boat with two figures. Following this are at least six series of nine superimposed hippopotami, a motif that is to be repeated on the jambs of the oldest door of chamber A (fig. 18). There is a stylised tree on the back of the western door jamb. In contrast, in the corridor leading to room A, four bulls painted in red with black highlights are treated very realistically. They have their heads lowered, but there are traces in red of the outline of a raised head, which suggests a change of thought. A long procession of giraffes constitutes the decoration of the western wall and of the corridor between chambers A and B.

The eastern walls have a more varied decoration. In the space between the first and second doors is a fishing scene: a man, his body leaning forward, is manoeuvring his net which seems to be held on a wooden frame and secured by two ropes. A group of twelve fish perhaps indicate the hoped for catch. Above the fishers is a reed boat with two women. Diagonally across the composition is a large black and white crocodile, adding a dramatic element. Some water birds can still be seen above the water: a pelican, a goose and a wader. In the middle ground, two cows are pulled into the water by a man while in the background is a wooden construction (fig. 19).

At the back of the door are wild animals and cows, and the famous scene of the well discussed by Reisner¹⁰. It is likely that his description was based on poor photographs: the animal closest to the well is indeed not a donkey, but far more likely a bull or a ram, as the form of its horns and hooves suggest. Facing this animal is a magnificent bull; the well extends higher, as does the yellow cord that is being used to pull up the leather bucket. Thus this whole scene needs to be re-examined¹¹ (fig. 20).

Several rowing boats were depicted on the eastern wall of chamber A and its corners, and there were five decorating the northern wall of chamber B. There were giraffes on the walls of the connecting corridor. However, for us, the most impressive scene was that in chamber B in which three sets of two bulls confronted each other, head against head, before a very tall figure.

Unfortunately, the preservation was such that the removal of the paintings could not be considered, and the monument was thus filled in again.

THE WESTERN NECROPOLIS

Several hundreds of tombs had been dug at different periods into the ruins of the old town. During earlier campaigns we studied several Meroitic graves, without attempting to undertake a systematic clearance. On the other hand, in the secondary settlement to the south west, a larger number of tombs, all from the Napatean period, had been excavated. These tombs were particularly interesting as they confirmed the observations made by F. Ll. Griffith at Sanam in 1912, concerning a double funerary tradition: one was a flexed inhumation, placed on its side, with many grave goods, while the other was an extended inhumation, laid on its back, and usually in a sarcophagus. The first tradition has been found in Nubia since the Neolithic, while the second is associated with Egyptian customs¹². Thus, according to Griffith, at Nuri, Kurru or Gebel Barkal the royal tombs were those of an Egyptian population while on the whole the middle classes remained faithful to the indigenous rites¹³. However, it should be noted that this double tradition is not known in lower Nubia and Kerma and the region of the third cataract could thus mark its limit.

Of the 40 graves that were studied, around a quarter were of the Nubian type. In the grave goods there were many scarabs and amulets, objects of iron (knives, tweezers) or bronze (razors) and miscellaneous beads. The pottery included both wheel and hand thrown vessels. Several could have originated from the workshop of the potter, found about ten years before a few hundred metres away¹⁴. The dead, all in flexed position, were usually oriented east-west, with the head to the west, and the face turned to the south or the north (fig. 21).

The sarcophagus burials had an impoverished grave furniture; in contrast, however, veritable funerary chambers had been constructed. The chambers were accessed from the east by a ramp or a stair perfectly cut into the natural silt. These sometimes had elements of mud bricks, which were also occasionally used on the sarcophagus. Although the wood of the sarcophagi had been eaten by termites, it was possible to see traces of a decoration in lively colours (yellow, red, green, black and blue). The head of the occupant was always turned to the west. Two inhumations were distinguished by the presence of a net of beads covering the corpse, with rather complicated geometric motifs over the face and the chest. Both burials were those of women (fig. 22).

The depth of these two types of burial and their proximity suggest they were more or less contemporary. The other burials included, in one case two broken polished goblets

with a red slip were found on the stair; these were entirely the same as those found in tombs with the indigenous tradition of burial. Further research is needed to better comprehend these differences. The question of Egyptian influence, particularly important for the XXVth Dynasty, and often debated in respect of the ancient tombs of Kurru¹⁵, merits particular attention, even though the regions of Middle Nubia are still far from having been fully investigated (fig. 23).

Translated by Annie Grant

Notes:

- 1 Ch. BONNET, *Etudes Nubiennes, Conférence de Genève, Actes du VIIe Congrès international d'études nubiennes, 3-8 septembre 1990, Communications principales*, vol. I, Geneva, 1992, *Communications*, vol. II, Geneva, 1994.
- 2 Ch. BONNET, "Les fouilles archéologiques de Kerma (Soudan), Rapports préliminaires", in: *Genava*, 1978, 1980, 1982, 1984, 1986, 1988, 1991 and 1993; "Les fouilles archéologiques de Kerma au nord du Soudan", in: *La Nubie, Les Dossiers d'Archéologie*, No. 196, September 1994, pp. 16-21; "Habitat et palais dans l'ancienne Nubie", in: *Bulletin de l'Institut d'Égypte*, vol. LXXII, Cairo, 1994, pp. 71-86; Ch. BONNET and B. PRIVATI, "Un nouvel ensemble religieux à Kerma, Note préliminaire", in: *Cahiers de recherches de l'Institut de papyrologie et d'égyptologie de Lille (CRIPEL)*, No. 15, Lille III, 1993, pp. 13-17; Ch. BONNET, "Kerma, Les apports historiques de l'archéologie", in: *Etudes Nubiennes, op. cit.*, vol. I, pp. 101-110.
- 3 Ch. BONNET, *Kerma, Royaume de Nubie*, Geneva, 1990, pp. 28-31; "Rapport préliminaire 1986-87 & 1987-88", in: *Genava*, n.s., vol. XXXVI, 1988, pp. 5-9, B. PRIVATI, "La céramique de l'établissement pré-Kerma", *ibid.*, pp. 21-14.
- 4 See also: Ch. BONNET, "Rapport préliminaire 1988-89, 1989-90 & 1990-91", in: *Genava*, n.s., vol. XXXIX, 1991, pp. 9-11.
- 5 Ch. BONNET, "Rapport préliminaire 1980-81 & 1981-82", in: *Genava*, n.s., vol. XXX, 1982, p. 29 ff.
- 6 Ch. BONNET, "Rapport préliminaire 1991-92 & 1993-93", in: *Genava*, n.s., vol. XLI, 1993, pp. 10-15.
- 7 *Ibid.*
- 8 G.-A. REISNER, *Excavations at Kerma, Part III, Harvard African Studies*, vol. V, Cambridge (Mass.), 1923, pp. 255 ff.
- 9 *Ibid.*, pp. 266-267.
- 10 *Ibid.*, pp. 263-264.
- 11 P. LACOVARA, "The funerary chapels at Kerma", in: *CRIPEL*, 8, Lille III, 1986, pp. 53-58.
- 12 F. Ll. GRIFFITH, "Oxford Excavations in Nubia, the Cemetery of Sanam", in: *Annals of Liverpool*, X, 1923, pp. 73-171, pl. LXVIII.
- 13 W. Y. ADAMS, *Nubia, Corridor to Africa*, London, 1977, pp. 288 ff.
- 14 Salah el-Din MOHAMED AHMED, *L'agglomération napatéenne de Kerma, Enquête archéologique et ethnographique en milieu urbain*, Paris 1992, pp. 75-86; Ch. BONNET et Salah el-Din MOHAMED AHMED, "Un atelier de potiers d'époque napatéenne et quelques tombes chrétiennes", in: *Genava*, n.s., vol. XXXIX, 1991, pp. 25-28.
- 15 For example: B. G. TRIGGER, *Nubia under the Pharaohs*, London, 1976, pp. 140 ff.; P.-L. SHINNIE, *Meroe, a civilization of the Sudan*, London, 1967, pp. 146 ff.

SIXTH NOTE ON THE FAUNA FROM KERMA (1989-1995 CAMPAIGNS)

By Louis Chaix

Seven seasons of excavation of various sectors of the site of Kerma have brought to light abundant faunal remains and have made significant advances in our understanding in many areas. This is a brief résumé of the principal findings of these last years including some new information that has enhanced our view of the exploitation of the animal kingdom in this culture (Chaix 1993a).

THE ANCIENT TOWN

The year by year excavation of the complex archaeological assemblage has made possible, particularly during 1991 and 1992, study of diachronic variations in those species that had the most economic importance, cattle and ovicaprids (sheep and goats).

The systematic excavation of many well-dated pits and houses brought to light material that belonged to the different phases of the Kerma culture. The results, which have been published in more detail elsewhere (Chaix 1994a), demonstrate a steady reduction in the importance of cattle from Ancient Kerma to Classic Kerma (2400-1500 BC). This is paralleled by an increase in the importance of domestic ovicaprids (sheep and goats), so that by the Classic Kerma period they represent 88.9 percent of the livestock. We have hypothesised that this is in part related to a deterioration in the climate with increasing desertification, but also to a demographic expansion of the human population (Chaix & Grant 1992). These two factors could explain the increasing value accorded to cattle, but also the very unexpected and progressive substitution of animal offerings by more and more frequent and numerous human sacrifices in the cemetery.

Other interesting finds from the old town include the domestic oven in house 137 which has been dated to the end of Middle Kerma and the beginning of Classic Kerma, that is around 1700 BC. A well defined accumulation of bones was found against the western side of the oven. The analysis of these finds showed that they consisted in the main of bones with a low meat yield (skulls, mandibles, vertebrae and feet). The bones were not burnt but bore many traces of butchery. The species represented were mainly sheep and goats (60 percent) with the remainder (40 percent) cattle. The nature of this deposit suggests that they were either rubbish discarded before cooking, or

bones that had been boiled, which would explain why they bore no traces of burning. It is worth noting that in the region today, the majority of meat is boiled, with tomatoes and bread added.

The recovery of bones, by chronological assemblage, has also added to the collection of different bone elements and shown that the majority are those, such as the carpals, tarsals and phalanges, that are the most resistant to destruction.

THE NECROPOLIS

The excavation of around 40 tombs has added to our understanding of the role of animals in the funerary ritual. The animal deposits consisted mainly of complete animals and joints of meat placed inside the tombs, and bucrania placed on the southern edge of the tumuli. Several new observations should be noted.

In a southern sector of the cemetery (CE 19), we found in the interior of many tombs, isolated horns of very large cattle, placed in contact with the deceased (Bonnet, 1993). They were often from animals with very impressive horns in tomb 167 we found the remains of an animal that had a horn spread exceeding 125 cm. They are all from animals of 'longhorn' type as described by Epstein (1971). Some tombs contained ten or more, while others had only one.

A study of the bucrania was made, beginning with the systematic excavation of the southern edges of the tumuli. A corpus of 340 recovered from various parts of the necropolis was measured and studied. A study still in progress is dedicated to the detailed description of the cattle of Kerma and should afford a better understanding of this most important animal of the livestock. We already know that they were of large size, with a withers height of 1.50, and with well developed horns (Chaix 1994b). It will be interesting to see if there is any development in the size and morphology of these animals over the two thousand years of the Kerma culture. It should also be noted that several bucrania, in particular those from tombs 189 and 190, excavated in 1995, bore traces of red paint and marks of fire on the anterior surface of the frontal. This practice has been observed on bucrania exhibited in the Ashmolean Museum in Oxford; these belong to the C-Group culture

and were found in cemetery of Aniba, to the north of the second cataract.

Amongst the bucrania found in 1995 in tomb 190 there was one with a marked deformation of the left horn, which was twisted towards the base and the front (fig. 1). This find has a particular interest since this practice is known in several regions of Africa from late prehistoric times onwards. There were three deformed bucrania from Faras, in a C-Group cemetery (Hall, 1962), and also numerous Egyptian representations from the Vth Dynasty to the New Empire. There are also the rock engravings and paintings from the Sahara, particularly the eastern part (Huard, 1964). This practice is also known amongst modern Sudanese herdsmen, particularly the Nuer (Evans-Pritchard, 1974) and the Dinka (Seligman & Seligman, 1965).

During the 1993 excavations of tomb 185, in sector CE 19, 7 frontals were found with a very unusual morphology (fig. 2). These exceptional remains were placed within the crescent of bucrania around the tomb with a clear desire for symmetry. The tomb was that of a man of around 40 years of age. The remains of a simple curved bow were found together with the ostrich feather fletching of several arrows (Chaix, in press). At first sight the bucrania appeared to be the frontals of a very large antelope similar to a hartebeest (*Alcelaphus* sp.). However, several features did not correspond to the cranial morphology of this species, including amongst others, the section of the horn cores and the very marked sagittal crest between the two horns. They thus are more likely to be the bucrania of cattle (*Bos taurus*) whose horns had been severely deformed in straining them to make them parallel. This has been observed in the cattle of certain populations of the extreme south-east of the Sudan, such as the Murle (Streck, 1982). Less pronounced examples of these traits are found in particular amongst cattle of the "bukedi" race in Uganda (Epstein, 1971) or the Asiatic cattle of the Kalmuck race, between the Don and the Volga (Adametz, 1926). If this hypothesis is confirmed, we will have here further confirmation of the importance of cattle in the Kerma culture, and of its influence on much more recent pastoral cultures.

Several of the buried sheep were found with the ostrich feather discs that have already been described elsewhere (Chaix, 1992b). These decorations were found in sector CE 21, and in tomb 192 there were two young rams each wearing a disc.

As one moves towards the south of the cemetery, more of the tombs contained joints of meat. In some cases over 60 were found, representing the ritualised butchery of several

young lambs. The preparation of these joints is very similar to that practised today in the Kerma region. Only the skulls and feet (metapodia and phalanges) were missing. However, there was one exception which was found in a basket of vegetable fibre deposited to the north-east of the body in tomb 184b. This was a young kid, two or three months old, butchered but with its metapodia and phalanges still present. A detailed analysis was undertaken which made comparisons with the ritual divisions of the carcass or the butchery practised in other regions of Africa (Chaix & Sidi-Maamar, 1992).

THE PRE-KERMA SETTLEMENT

Excavations continued of the pre-Kerma settlement, first discovered during the 1986-1987 campaigns (Bonnet, 1988). They confirmed the results of earlier work and provided new finds for analysis (Honegger, this volume). Amongst them were a very few animal bones. In general, they were both very fragmented and encrusted. This material has not yet been studied in detail, since more extensive excavations is need to increase the size of the very small sample and perhaps provide elements that are more distinctive. However, we can record the presence of post-cranial bones from cattle (vertebrae and ribs) and also a tooth attributed to this animal. The other identified bones were those of domestic ovicaprids. It seems that better conditions of preservations exist at a depth of thirty or so centimetres, where the remains of a hearth were found. Future research will no doubt provide further information.

THE REPRESENTATIONS OF ANIMALS IN CHAPEL K XI

This funerary structure, first excavated by the American Mission of Harvard between 1913 and 1916 (Reisner, 1923), was cleared out, revealing a number of scenes or figures that had not previously been published. Animals such as the hippopotamus, the crocodile and cattle were easily recognisable, but the representation of some animals made possible an attempt at species or genus identification, although there are some question marks remaining.

The large panel with the fishing scene

Amongst the fish two species were identified: at the back of the shoal of fish was an individual characterised by a long dorsal fin with a large number of rays. It is certainly a *Tilapia*, a fish of the Cichlid family, which is abundant in the Nile and valued for its flesh, both in ancient Egypt and today (Brewer & Friedman, 1989). The 14 other fish all

seem to belong to the same species. The presence of teeth in several examples, a well developed adipose fin and an open dorsal fin place these fish in the genus *Hydrocynus*, in the Characid family (Amirthalingam & Khalifa, 1965). This fish, known as the 'dog of the river' is valued by the Sudanese population for its fine and tasty flesh.

There are three birds represented on the same fresco. The best preserved, which is beneath the cattle crossing the river, has in the main the features of a pelican (*Pelecanus* sp.), with its posture, its short and heavy feet and its enormous beak. This bird is fairly infrequently found in the iconography of ancient Egypt (Houlihan, 1986) or the Sudan (Hofmann & Tomandl, 1987). In front of the pelican is another bird. The length and the curve of its beak and its long legs suggest a wader of indeterminate species. A third bird found below has a plump body and short heavy feet which seem to be webbed. In the absence of other criteria, we somewhat hesitantly suggest that it is an Anseriform, perhaps a goose.

It thus appears that all the creatures on this panel are those of an aquatic environment; this is also evoked by the two cattle as the way in which their heads are held suggests that they are swimming.

Other figures

Still in the entrance corridor, on the eastern wall, to the north of the panel of the fishers, there are two other animal representations. One is a ruminant, drawn in black and characterised by two long, arched horns, with a simple curvature. It has a relatively stocky body, short, robust legs, ears pricked and a short tail. All these characteristics eliminate the antelopes, such as the oryx or the roan antelope, but suggest an ibex (*Capra ibex nubiana*). The horn core of an ibex was found in a primitive chapel to the north east of the western deffufa (Chaix, 1990). Is it possible that the ibex, like the giraffe and the crocodile, played a role in the religion of the inhabitants of Kerma?

The other figure is more enigmatic. Its outline is red and black, and its striking characteristics are its long head, which seems to end in a snout, its well developed straight ears, the position of its body, with its raised hind-quarters, its short legs, and very enlarged extremities. All these elements suggest an armadillo (*Orycteropus afer*), a mammal of the family Tubulidentae, peculiar to the African continent. It is an animal of around 70 kilograms which frequents open dry sandy areas, where it digs burrows in search of the termites and ants which it eats. The armadillo has been found in Neolithic faunas of central Sudan, at Jebel Shaquadud to the north-east of Khartoum and at Khasm-el-

Girba, in the region of Kassala (Peters, 1986). Today, this species has a more southerly distribution, in the area around Bahr-el-Abiad and in the Kordofan (Setzer, 1956). Another possible hypothesis, which is much less plausible, is that it is a warthog, whose characteristic upper canines have not been drawn.

Still on the eastern wall of the entrance corridor is the image of a well, to the right of which is an animal. This latter is a ruminant, easily identifiable by its cloven hooves which are drawn in black; the rest of the body is in red, with fragments of yellow. The animal bears horns, which are shown from a lateral perspective. It also has a long tail, whose end has disappeared. It seems to be a cow rather than a sheep, mainly because the drawing of the horns gives no suggestion of the spiral twist which is characteristic of Nubian sheep at this period. The long tail also reinforces this impression.

In the two rooms to the north of the entrance, as well as clearly recognisable cattle, there are numerous giraffes, of which only the feet are preserved. Certain elements which are still visible suggest that they are likely to be the reticulated giraffe, represented in ancient Nubia by the sub-species *Giraffa camelopardalis camelopardalis*.

CONCLUSIONS

Once more the site of Kerma has yielded archaeozoological information that is both abundant and diverse. The possibilities offered by an in-depth study over 15 years of excavation are enormous. The importance of cattle is confirmed, not only in the economic sphere, but also in the funerary ritual and the religion, as is the truly African character of certain practices. The discovery of pre-Kerma settlements also promises new information on the origins of the exploitation of the animal world in this area. This information will also be complemented by that from the faunas of various Neolithic and later sites in the region of Kadruka (Reinold, 1994). Lastly, the representation of several species of animals (giraffes, hippopotami, cattle etc.) attests their importance in the religion of Kerma, and bears witness to a culture in which wild animals hold an important place.

Translated by Annie Grant

References:

- L. ADAMEITZ, *Lehrbuch der allgemeinen Tierzucht*, Springer Verlag, Wien, 1926.

- C. AMIRTHALINGAM, M. Y. KHALIFA, *A Guide to the common commercial freshwater fishes in the Sudan*, Game & Fisheries DP¹, Government Printing Press, Khartoum, 1965.
- Ch. BONNET, "Les fouilles archéologiques de Kerma (Soudan)", in: *Genava*, n.s., vol. XXXVI, 1988, pp. 5-20.
- Ch. BONNET, "Les fouilles archéologiques de Kerma (Soudan)", in: *Genava*, n.s., vol. XLI, 1993, pp. 1-18.
- D. J. BREWER, R. F. FRIEDMAN, *Fish and fishing in Ancien Egypt, The Natural history of Egypt*, vol. II, Aris & Phillips, Warminster, 1989.
- L. CHAIX, "Le monde animal", in: Ch. BONNET (ed.), *Kerma, royaume de Nubie*, Ed. Tribune, Geneva, 1990, pp. 108-113.
- L. CHAIX (1993a), "The archaeozoology of Kerma (Sudan)", in: W. V. DAVIES, R. WALKER (eds.), *Biological anthropology and the study of Ancient Egypt*, British Museum Press, London, 1993, pp. 175-185.
- L. CHAIX (1993b), "Les moutons décorés de Kerma (Soudan): problèmes d'interprétation", in: *Memorie della Soc. Italiana di Sc. Nat. e del Mus. Civico di Stor. Nat.*, Milano, 26, 2, 1993, pp. 161-164.
- L. CHAIX (1994a), "Nouvelles données de l'archéozoologie au nord du Soudan", in: *Hommages au Professeur J. Leclant, Bibliothèque d'Etudes*, IFAO, vol. 2, 106, 2, 1993, pp. 105-110.
- L. CHAIX (1994b), "Das Rind: eine wichtige und allgegenwärtige Komponente der Kerma-Kultur (N Sudan, zwischen 3000-1500 v. Chr.)", in: *Forschungen und Berichte zur Vor- und Frühgeschichte in Baden-Württemberg*, 53, 1994, pp. 163-167.
- L. CHAIX, "Une tombe inhabituelle à Kerma (Soudan)", in: *Archaeolingua*, Budapest (in press).
- L. CHAIX, A. GRANT, "Cattle in Ancien Nubia", in: *Anthropozoologica*, 16, 1992, pp. 61-66.
- L. CHAIX, H. SIDI-MAAMAR, "Voir et comparer la découpe des animaux en contexte rituel: limites et perspectives d'une ethnoarchéozoologie", in: *XIIe Rencontres internat. d'Arch. et Hist. d'Antibes, Ethnoarchéologie: justification, problèmes, limites*, Ed. APDCA, 1992, pp. 268-291.
- H. EPSTEIN, *The origin of the domestic animals of Africa*, Africana Publ. Corp., New-York, 1971.
- E. E. EVANS-PRITCHARD, *The Nucr*, Oxford University Press, Oxford, 1974.
- H. T. B. HALL, "A note on the cattle skulls excavated at Faras", in: *Kush*, 10, 1962, pp. 58-61.
- I. HOFMANN, H. TOMANDL, "Die Bedeutung des Tieres in der meroitischen Kultur", in: *Beiträge zur Sudanforschung*, Beiheft 2, Wien, 1987.
- P. F. HOULIHAN, *The Birds of Ancient Egypt, The Natural History of Egypt*, vol. I., Aris & Phillips, Warminster, 1986.
- P. HUARD, "A propos des bucranes à corne déformée de Faras", in: *Kush*, 12, 1964, pp. 63-81.
- J. PETERS, *Bijdrage tot de archeozoologie van Soedan en Egypte*, Université de Gand (Thesis), 1986.
- J. REINOLD, "Le Néolithique de la Nubie soudanaise", in: *Archeologia*, 196, 1994, pp. 6-11.
- G. A. REISNER, "Excavations at Kerma", in: *Harvard African Studies*, 5 et 6, Cambridge, Mass., 1923.
- C. G. SELIGMAN, B. Z. SELIGMAN, *Pagan Tribes of the Nilotic Sudan*, Routledge & Kegan, London, 1965.
- H. W. SETZER, "Mammals of the Anglo-Egyptian Sudan", in: *Proc. of the US Nation. Mus.*, 106, 3377, 1956, pp. 449-587.
- G. STEINDORFF, *Aniba I*, Gluckstadt & Hamburg, 1935.
- B. STRECK, *Sudan. Steinerne Gräber und lebendige Kulturen am Nil*, DuMont Buchverlag, Köln, 1982.

NOTE ON THE RESUMPTION OF THE EXCAVATIONS OF THE PRE-KERMA SETTLEMENT

By Matthieu Honegger

New research was undertaken on the pre-Kerma settlement, of which an area of around 1,000 square metres was excavated between 1986 and 1989¹. Two sectors (400 square metres in all) to the north of the site were opened in January 1995. Although the area had been somewhat disturbed by more recent tombs, 46 pits and a series of postholes were found. The occupation surface was not preserved, thus all the finds were recovered from pits.

The postholes were fairly dispersed and only with difficulty could any arrangement be discerned. However, there was an alignment that possibly indicated a palisade and two circular structures, partly cut by tombs, indicating the plans of roundhouses. The pits had a relatively constant diameter, although their depth was rather variable. The least deep (5 - 30 cm) had an indistinct profile and eroded walls. Those that were sunk further than 40 cm into the soil had better preserved sides that were vertical or angled and they sometimes showed signs of rubification. The contents of the pits were systematically sieved with a mesh of 5 centimetres. The fill consisted of a fairly light sandy silt and contained only a few finds which were distributed throughout the depth of the pits. Apart from a few faunal remains and rare fragments of quartzite, the majority of the finds were sherds of pre-Kerma pottery². Two fragments of unfired daub, the figurine of a bird, also in unfired clay and the base of an anthropomorphic figurine in fired clay complete the inventory. Only one pit contained a complete pot *in situ*: it was turned upside-down with the opening facing the bottom. This find can be added to that of two other pots found *in situ* in a pit excavated some years earlier. The find reinforces the hypothesis that the pits were used as granaries or stores.

At the bottom of a pit, 30 cm below the cleaned surface, part of a hearth was found from an earlier occupation of the site. An area 20 square metres was excavated in order to reach this deeper level. During the excavation, six well marked postholes were found, just above the hearth and sunk 50 centimetres into the ground. They formed a rectilinear alignment, interrupted by the digging of more recent tombs. The hearth consisted of a fire-reddened layer at the base, covered with charcoal and then a layer of cinders. At its north-western corner there was a concentration of material consisting of animal bones, flint fragments and two sherds, indicating that the occupation level was partly preserved. The objects were covered with a chalky encrusta-

tion which testified to the flow of water across the site. One of the two sherds, which had a rippled decoration on the rim, had very marked affinities with the pre-Kerma pottery, suggesting that the occupation was not a great deal earlier than that seen at the surface. There was also a number of postholes around the hearth. Their identification is difficult as they were not very clear. However, they do not seem to be in a structured arrangement.

This lower surface probably extends over a large area, if one takes as evidence the presence of sooty deposits found at depth in several places within the pre-Kerma settlement.

Charles Bonnet³ has already advanced the idea of a succession of several settlements on the same site, in view of the numerous intercuttings of the plans of roundhouses and postholes that cross the fillings of some of the pits. On the surface, this succession is not stratified, as the occupation layers were systematically eroded. A separation of the different phases of occupation must however be possible, at least in part, from the analysis of the spatial distribution of the structures and through the observation of the depth and state of preservation of the pits.

The hearth and the other finds at a depth of 30 centimetres constituted a stratified assemblage, with the related ground surface partially preserved. This discovery takes on a particular importance, considering the problems of conservation of the pre- and protohistoric settlements in the Kerma basin⁴. Changes in the course of the Nile during the Holocene⁵ are the cause of the erosion of the occupation levels, bringing about the disappearance of sites previously established on the alluvium. On the surface, the pre-Kerma settlement had well and truly suffered from flooding which destroyed the ground surface and probably silted up the pits where fragmentary finds became trapped. Lower down, the stratified layer had been less affected by this phenomenon.

Continuation of the excavation will make it possible to determine the spatial organisation of the settlement and its evolution over time. It will also be useful to gain a better understanding of the mechanisms of erosion and sedimentation and their effects on the differential conservation of the occupation.

Translated by Annie Grant

Notes:

- 1 Ch. BONNET, "Les fouilles archéologiques de Kerma (Soudan), Rapport préliminaire sur les campagnes de 1986-1987 et de 1987-1988", in: *Genava*, n.s., vol. XXXVI, 1988, 5-9.
- 2 The pottery is like that described by B. PRIVATI, "La céramique de l'établissement pré-Kerma", in: *Genava*, n.s., vol. XXXVI, 1988, pp. 21-24.
- 3 Ch. BONNET, *op. cit.*
- 4 J. REINOLD, "Conservation et préservation des sites archéologiques", in: *Actes du VII^e Congrès international d'études nubiennes (Genève, 3-8 septembre 1990)*, 1992, vol. 1, pp. 187-192.
- 5 B. MARCOLOGO, N. SURIAN, "Observations préliminaires du contexte géomorphologique de la plaine alluviale du Nil en amont de la III^e cataracte en rapport avec les sites archéologiques", in: *Genava*, n.s., vol. XXXI, 1993, p. 33.

SOME RESULTS FROM THE PALAEODEMOGRAPHIC STUDY OF SKELETONS FROM THE NECROPOLIS

By Christian Simon¹

Since 1987, the Archaeological Mission of the University of Geneva to the Sudan has excavated many tombs in the Kerma cemetery (eastern cemetery). More than 180 tombs containing nearly 250 skeletons have been opened. They were divided into three main chronological groups: Ancient Kerma (33 percent), Middle Kerma (40 percent) and Classic Kerma (27 percent). From this important collection of burials, we have tried to understand the nature of the funerary recruitment and to ascertain aspects of the demography of this population. However, it should be noted that despite the large number of tombs investigated the sample is not very homogeneous, as each of the zones excavated contained only small collections of tombs.

DETERMINATION OF SEX

Determination of sex has been based on the skull, the mandible, the ilium and the femur, using the method of Acsádi and Nemeskéri (1970) and on the metrical analysis of the coccyx (Gaillard, 1961; Moeschler, 1965). During the last campaigns, the method of Bruzek (1991), which is based on the morphoscopy of the coccyx, was also employed. For the skull, mandible and femur, sexual determination is mainly based on the degree of robustness. The bones of males are more robust, with more marked muscular insertions. The female pelvis is larger, for pregnancy and childbirth, and the pubis is longer and the ischium shorter than that of the male. It is possible to discern signs of parturition.

	Ancient Kerma	Middle Kerma	Classic Kerma	Total
Males	35	34	27	96
Females	23	25	23	71
Indeterminate adults	2	11	3	16
Indeterminate non-adults	24	31	12	67
Sex ratio	1.52	1.36	1.17	1.35

Table 1. Determination of sex

According to historical demographic studies, the expected value of the sex ratio (number of men/number of women) should be close to 1.05. However, our determination produced a mean value of 1.35, which indicated slightly more men than women. There were different values for the three chronological periods. In the Ancient Kerma period, the index was markedly in favour of men, with the figure for Middle Kerma only slightly lower. In the Classic Kerma period, the figure is closer to equilibrium. These data suggest that the inhumations in this cemetery were selected.

THE AGE OF THE NON-ADULTS

The age of the non-adults was determined with fairly good degree of precision, as it was based on the phenomena associated with growth. For children, the criterion of age determination was the eruption of the milk and permanent teeth (Olivier, 1960). For adolescents, once the permanent dentition was complete, observations were made on the degree of fusion of the epiphyses of the long bones (Brothwell, 1981); these fuse at different ages and thus mark the completion of bone growth.

	1-4 yrs	5-9	10-14	15-19	Adults
Ancient Kerma	9	5	6	8	56
TT $e^{\circ}_0 = 25$ yrs	38	5	3	3	56
Middle Kerma	13	7	7	9	65
TT $e^{\circ}_0 = 25$ yrs	44	6	3	4	65
Classic Kerma	2	3	2	10	48
TT $e^{\circ}_0 = 25$ yrs	33	4	2	3	48

Table 2. Age of the non-adults, compared with mortality type tables (Lederman, 1969)

There was a significant proportion of non-adults in the cemetery (47 percent), but it is lower than the 65% of the population that would be expected from the low life expectancy at birth of 25 years.

The frequency of children of different age groups gives interesting information about the funerary ritual. The representation of the different age classes can be compared to

the expected ages using the tables of types of mortality (Lederman, 1969) for a life expectancy at birth of $e_0 = 25$ yrs. There is a complete absence of children under one year of age, and very few in the 1-4 year age group. In the older age groups, there is a discrepancy between the observed and expected values: in Ancient Kerma, the 5-9 year value equalled the expected value, while the 10-14 and 15-19 year classes were over-represented. The same phenomenon was found in the Middle Kerma period, while in the Classic Kerma period, only the number in the 15-19 year class exceeded the expected number.

It is also possible to derive information from the study of certain demographic parameters. The representivity of the age classes can be estimated by observing the ratio $D_{(5-9)}/D_{(10-14)}$, which in historic populations is close to 2.0, and $D_{(5-14)}/D_{(20-W)}$, which should be between 0.200 and 0.500.

	$D_{(5-9)}/D_{(10-14)}$	$D_{(5-14)}/D_{(20-W)}$
Ancient Kerma	0.83	0.196
Middle Kerma	1.00	0.215
Classic Kerma	1.50	0.104
Total	1.00	0.178

Table 3. Demographic parameters.

The first ratio is rather low, especially for Ancient Kerma. The value is also low for the population as a whole. The second ratio has a plausible value for the two earlier phases, but is too low for the Classic Kerma periods. The value seems acceptable for the population total.

On the basis of this demographic information, which indicates a relatively satisfactory representation of children, it is possible to try to estimate life expectancy at birth. The calculation of this parameter is based on the ratio $D(5-14)/D(20-W)$, which is well correlated with life expectancy at birth (e_0) (Bocquet and Masset, 1977). However, the 5-14 age group should have a normal representation, but as we have seen, the number of deaths in the 10-14 age group is a little too high here. An e_0 of 26 years is obtained, which seems nevertheless a plausible value in relation to what is known of European populations at the end of the Neolithic.

In conclusion, not all the children were buried in the Kerma cemetery. There were no very young children, but the 15-20 year old adolescents in particular were buried.

AGE DETERMINATION OF ADULTS

Age determination of adults is a great deal more difficult. Several methods are possible, but they are all related to the degree of biological and not chronological ageing; relevant written sources are generally unknown for archaeological populations. In this study, an approach was taken based on the degree of fusion of the endocranial sutures, using probability vectors (Masset, 1982). For each individual, a probability was calculated that it belonged to a particular age class, rather than to a precise age, thus avoiding some of the systematic errors that occur when moving from the age of the individual to that of the population. Almost 100 skulls were used (56 men and 38 women), and probability vectors were calculated for the three periods and for both sexes.

Age at death as a function of sex differed little from one period to another. The higher female mortality that is often observed in palaeoanthropological studies was not found. It is known that this phenomenon is in part due to a methodological problem (Masset, 1971; 1974; Simon, 1986); male and female skulls fuse at different ages. In fact, there is higher male mortality in all three periods (figures 1, 2 and 3), with a very marked difference between the sexes in the Classic Kerma period. It seems particularly high in relation to what is known of historic demography (a very slightly increased male mortality is found in historic populations).

Figure 4 shows the mortality structure (both sexes together) in the three periods. In general, many of the dead are between 20 and 40 years of age, although there are some individuals as old as 80 years. The mortality of young adults is highest in the Classic Kerma period, while the other two periods are very similar to each other, with a more balanced distribution.

THE ROLE OF HUMAN SACRIFICE

The palaeodemographic results must be moderated because of the presence of human sacrifices, which probably had an important influence on the age and sexual structure of the population. Twenty percent of the tombs were found to contain sacrificial victims, and their number increased from the Ancient to the Classic period.

The main burial (for which the tomb was constructed) was usually of a man, although in 20 percent of cases it was of a woman. In half these tombs there was a single sacrificial victim. The burial of several victims in a single tomb was rare, although up to 10 have been found. A woman was

frequently present, sometimes accompanied by a man and by one or more children. Half the tombs contained children who belonged to all age classes, although there was a preference for older adolescents in the Classic Kerma period.

	1-4 yrs	5-9 yrs	10-14 yrs	15-19 yrs
Ancient Kerma	1	0	1	0
Middle Kerma	3	5	3	0
Classic Kerma	2	2	2	6
Total	6	7	6	6

Table 4. Age distribution of the non-adult sacrificial victims

It should, however, be noted that the relatively small number of tombs containing human sacrifices cautions prudence in our interpretations, and does not allow estimation of life expectancy.

We also wished to know the age of the adults who were sacrificed, and so the mortality structures have been calculated for those who died naturally and those who were sacrificed. Figure 5 shows quite clearly that the sacrificed adults were generally younger than those who died naturally. This allows us to understand better the high male mortality found in the different periods.

Estimating e_0 for the population that died naturally, by ignoring those that were sacrificed (adults and children), gives a figure of 31 years. This relatively high life expectancy probably reflects a more elevated social status for this part of the population.

In conclusion, these palaeodemographic results have provided information on the funerary recruitment of the necropolis, the mortality of the population, and the social structures of this population.

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Note:

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References:

- G. ACSÁDI, J. NEMESKERI, *History of life span and mortality*, Budapest, Akademiai Kiadó, 1970.
 J.-P. BOCQUET, C. MASSET, "Estimateurs en paléodémographie", in: *L'Homme*, 17, 4, 1977, pp. 65-90.

D. R. BROTHWELL, *Digging up bones: the excavation, treatment and study of human skeletal remains*, British Museum, London, Oxford Univ. Press, 1981.

J. BRUZEK, *Fiabilité des procédés de détermination du sexe à partir de l'os coxal. Implication à l'étude du dimorphisme sexuel de l'homme fossile*, Institut de Paléontologie humaine & Muséum National d'Histoire Naturelle (Thesis), Paris, 1991.

J. GAILLARD, "Détermination sexuelle d'un os coxal fragmentaire", in: *Bulletin et Mémoires de la Société d'anthropologie de Paris*, 1, 11, 1960, pp. 255-267.

S. LEDERMANN, *Nouvelles tables types de mortalité*, Paris, P.U.F. (INED, Travaux et documents; 53), 1969.

C. MASSET, "Erreurs systématiques dans la détermination de l'âge par les sutures crâniennes", in: *Bulletin et Mémoires de la Société d'anthropologie de Paris*, 7, 12, 1971, pp. 85-105.

C. MASSET, *Problèmes de démographie préhistorique*, Université Paris I (Thesis), 1974.

C. MASSET, *Estimation de l'âge au décès par les sutures crâniennes*, Université Paris VII (Thesis), 1982.

P. MOESCHLER, *Structures morphologiques et dimorphisme sexuel: essai de différenciation métrique: application à l'os coxal*, Dép. d'Anthropologie de l'Université de Genève (Thesis), 1966; *Archives suisses d'anthropologie générale* (Geneva), 30, 1966, pp. 1-56.

G. OLIVIER, *Pratique anthropologique*, Paris, Vigot, 1960.

C. SIMON, "La surmortalité féminine. Mythe ou réalité?", in: *Bulletin d'anthropologie du Sud-Ouest* (Bordeaux), 21, 2, 1986, pp. 71-76.

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