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Archaeological excavations at Kerma (Sudan)

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Preliminary report for the seasons 1980-1981 and 1981-1982

The work of the Archaeological Mission of the University of Geneva to the Sudan has been continued during the last two years, with several months of research work on the site at Kerma (Northern Province). The studies have much increased our knowledge of this Nubian culture – a culture which developed at the dawn of the history of the African continent [1]. The support of the Antiquities Service of the Sudan has considerably aided our work, despite the unfortunate accident suffered by the Director of the Service, Mr. Nigm Ed Din Mohammed Sherif, who was only recently able to resume his activities. In the interim, collaboration was assured by Mr. Akasha Mohamed Ali and his assistant, Mr. Khidir Adam Eisa. We must express our gratitude also to Mr. Harry Blackmer, who, for many years, supported our work in the Sudan, and financed the Mission until such time as financial aid was provided by the Swiss National Science Foundation and by the Geneva Museum of Art and History. We have also benefited on many occasions from the advice of the members of the Commission of the University [2]. The excavations at Kerma have been carried out in accordance with the scientific norms as they have been defined in recent years, while also taking into account the results of new findings. At the same time, the protection of several sites situated within our concession has obliged us to intervene urgently at certain places. Our study programs have had to be modified in consequence, without, however, causing us to lose sight of the main objectives. The eastern necropolis is particularly vulnerable. For almost 4000 years, it was isolated from cultivated areas. As a result, the stone circles which strengthened the tumuli, together with the ceramic vessels which were placed on the surface of the ground during the funerary ceremonies, were well preserved. Recently, agricultural exploitation has extended to all the available land, and this, combined with the use of machines, has greatly accelerated the degradation of the site and its surroundings. This major problem, characteristic of the present time, now confronts a region which, in terms of the conservation of the archaeological remains, was previously especially privileged.

Field work was carried on from the 6th of December, 1980 to January 26th, 1981, and from December 14th, 1981 to the 4th of February, 1982. Gad Abdallah and Saleh Melieh, both from Tabo, after a period of training on our sites in Geneva, again directed a team of 30 to 50 workers. Saleh Eddin Mohamed Ahmed, inspector of the Sudan Antiquities Service participated in the excavations, and in recording the finds. He likewise solved numerous administrative problems for us. We were also greatly aided by the experience of the members of the Mission: Ms. B. Privati, responsable for the classification and study of the archaeological material, also drew the tombs of the eastern necropolis, as well as the bronze-founders workshop. The architectural surveys were made by several specialists: Mr. T. Kohler worked in the western annexes of fired brick, and in the town, where he studied the plans of the huts; Mr. M. Mermod took part in the excavation of the tombs of the eastern necropolis, and surveyed the foundations of several houses. Ms. S. Moddel drew the plans of the western chapels of the Deffufa, as well as of several structures in the western quarter. Mr. L. Chaix and Mr. C. Simon studied the bones found on the site. Their research is continuing in Switzerland, since it was possible to export part of this material for more detailed analysis. The appendices at the end of this report illustrate the interesting results obtained from a close collaboration between archaeozoology, anthropology and archaeology. Mr. J.-B. Sevette, who has participated in the work of the Mission for many years, was responsible for the administrative work as well as for the photography. Ms. V. Zorzi aided both on the site and at the camp.

The City

During the last months, our efforts have been concentrated on the religious centre of the city. It seemed to us essential to understand the architectural organisation of the quarter which was reserved for the priests. Nevertheless, excavations were also continued in the western zone, where new observations on the houses of Middle Kerma date were made [3]. In addition, a sounding carried out to the south-west of the Deffufa has allowed us to begin the study of a group of huts.

The western sector excavated in 1979 was enlarged by a surface clearance. To the south of house 15, we found two annexes. Another habitation *(house 17)* shows a less coherent plan: the long room which borders the eastern

side of the courtyard is constructed on foundations forming a trapezoid. In front of this room, the remains of another small room of irregular plan, as well as a granary, have appeared. The latter, with a diameter of nearly 4 m, resembles other structures of the same type discovered in the sector. House 17 is posterior to certain of the walls of house 15, but belongs to the same group, arranged along a street running north-south. Further on, this street turned to the east and then back towards the south. On the other side of this passage, a group of buildings was uncovered. The quadrangular room in *house 18* seems to be associated with three circular silos, of which the two largest are identical to that of house 17. These granaries were protected by a small enclosure. The circular foundations supporting the walls of the silos as wel las the weight of their stores, were constructed on a framework of stone blocks covered with a thick layer of hardened earth and a coating of dried mud. The narrow walls (0.15-0.20 m), in places still well preserved, could not have exceeded 1.5 to 2 m in height. A large courtyard with shelters for livestock completed these installations. Other older foundations were found at a lower level, but their study is rendered very difficult since the ground suffered considerable disturbance during the construction of the tombs in the Meroitic cemetery.

To the south-west of the Deffufa, there is a vast area of loosely packed earth. Within this zone, the sherds which are found in the sand are very worn, and of small dimensions. Here we cleared a large depression, which had been dug into the virgin soil. The layers of fill were hardly distinguishable in the stratigraphy, but certain layers seemed more compact than others; possibly these had been hardened by the action of water. A large number of postholes were distributed around this depression. On the northern side, the holes are small and it has not been possible to interpret their purpose. To the south, the holes are of larger diameter, and placed so that they form several almost perfect circles on the ground. These holes had been filled with wet mud which, when hardened, must have held the posts firmly in place. Separated by 0.20 to 0.35 m, the posts must have been used to support a roof. This system of construction eliminated the necessity for a central beam. The roof was probably finished with a covering of palm fronds, straw or reeds. It is possible that the walls were mud-covered, but we have no evidence for this. It is notable that the imprint of one of the posts in the ground still shows traces of red ochre paint.

In plan, the huts had a diameter of 4.3 to 4.7 m. We have been able to distinguish at least six successive phases of development. The overlapping of the circles of postholes, and the variable depths of the holes, indicate, moreover, a long period of occupation. It should be added that traces of other buildings in levels belonging to a later period, were likewise found in the layers of fill of the depression. Curiously, there are no foundations of mud-brick walls in this area. Nevertheless, the presence of two bricks reddened by fire found in the debris could indicate the existence of another different type of construction at the same period.

Our research is not yet sufficiently advanced to allow for a full architectural analysis of this part of the city of Kerma. We remark, however, that these huts are reminiscent of certain habitations of the C-Group Period [4], and, especially, of constructions that are still found today in the centre and the south of the Sudan. During the next seasons of excavation, we will attempt to determine whether this area was a quarter occupied by a poor population, co-existing with a richer class. In view of the long history of the city, however, this quarter could also be explained as due to changes in the methods of construction. The rare identifiable potsherds in the area, though of a coarse manufacture, seem to be contemporary with Middle Kerma.

The Western Deffufa and its Annexes

Little by little, the need for a complete reappraisal of the study of the Deffufa and its surroundings has become apparent. The rapid clearance of the monument by G. Reisner, some years ago, is now seen to be insufficient for the understanding of the function and of the complicated chronology of this religious complex which appears to have undergone frequent alterations during the centuries of its existence.

As a first step, the entire area excavated by the American archaeologist has been recleared. Displacement of the mound of debris left by the initial excavation has permitted us to complete the plans of several buildings, and to uncover some new ones. This work has produced a new interpretation of the various structures: it appears that we have discovered a form of brick architecture, the style of which recalls certain Egyptian models characteristic of the Middle Kingdom and of the Second Intermediate Period. Thus, the temple of Ezbet Rushdi, in the Delta [5], with its very thick walls and rooms of modest dimensions, represents an architectural conception very close to that of the chapels on our site and to that of the western Deffufa. It would be exagerating to envisage at Kerma an exact copy of the Egyptian monuments, but the influence exerted by the latter is nevertheless undeniable, and we are trying to understand how this foreign mode of construction was introduced and adapted to the necessities of the Kerma region. Contemporary Egyptian examples are, unfortunately, rather rare, and new discoveries will be necessary to allow us better to follow the evolution of this brick architecture.

During the excavations at the beginning of the century, a sounding had been sunk in the centre of the Deffufa, in the room which provided access to a sort of sanctuary [6]. This trial pit, about 3 m in depth, has been used to test our hypotheses concerning the earlier stages of the monument. The removal of the masonry down to a depth of 7 m has revealed the face of a wall or possibly of a solid block of masonry. Judging by the quality of the brickwork, this

structure seems to belong to a period posterior to the first stage of construction of the religious building. The coating of the surface of the wall is preserved to a height of 1 m. The existence of this new wall may signify that the interior organisation of the edifice was conceived from the start with a side entry, or else that cult chambers may have been situated in front of the original temple.

Study of the constructions situated to the west of the Deffufa has greatly contributed to the extension of our documentation. It has become clear that from very early times religious buildings were erected in the centre of the city. The most ancient foundations have not yet been studied systematically, but several elongated buildings have been recognised; they do not display the same kind of plan as is common for houses studied elsewhere. Despite their thin walls, these buildings covered a large surface, and seem to form two or three separate groups. It is very difficult to specify their function, but it may be noted that, at certain places, traces of floors painted with red ochre have been detected, a practice which later became frequent in religious edifices at Kerma.

The presence of postholes shows that there were other phases of occupation, which probably correspond to reconstructions following periods of trouble. They occupy levels both anterior and posterior to the buildings described above. It should also be mentioned that certain plots of land were surrounded by sinuous walls.

After the construction of the first Deffufa, with its bastion to the north, the western annexes were linked to the temple by a wide temenos wall. The wall was completed in some places by the exterior walls of certain buildings. The large enclosure thus formed, isolated from the habitations of the city, was, without doubt, used as a sacred precinct devoted to the worship of several divinities. The chapels and their annexes were transformed so many times that we are unable to reconstruct each of the stages of their complex evolution.

The principal entry to this religious centre lay doubtless on the south side, as it was imperative to have a convenient entrance to both the Deffufa and the western annexes; a room of very large dimensions provided this necessary access to the different sanctuaries. This great entrance hall belongs to the Classic Kerma period, but other foundations, of similar importance, indicate that several installations preceded the final stage. Moreover the two square chapels constructed to the north also belong to an older group, re-used after restoration.

The entrance hall must have been of considerable height, since heavy rectangular supports interrupt the open area of its floor. The vestibule in its original form was 8 m wide and 23 m long. An abutment situated perpendicularly to the southern wall provides an approximate localisation of the entrance door. A similar structure was later added on the western side, allowing access to another sanctuary and to five annexed rooms.

The changes which were made to this entrance hall show that the architects attempted to develop its monumental appearence. The width was increased by 2 m, and the total length eventually measured more than 24 m. New supports made of fired brick were built against the western wall. This construction is thus very different from the other buildings; it more closely resembles the massive architecture of the Egyptian fortresses of Batn El-Hagar (Second Cataract), which were known to the inhabitants of the Kingdom of Kush since they occupied that territory during the Second Intermediate Period.

A building consisting of three rooms was built to the south-west, during the first stage of construction of the group studied; it belonged, as did the entrance hall, to a phase anterior to that of the Deffufa in the state in which it is preserved today. This group, constructed with fired bricks, and characterized by especially fine masonry work, is thus older than previously thought. The uniformity of the firing of the bricks implies the development of a technique of firing, of which we know no other examples in the valley of the Nile at the same period. Certainly, fired bricks were used elsewhere for building, but this was never on such a large and systematic scale as at Kerma.

The most important room was situated to the north. Its roof was supported by three wooden columns, whose bases, made of white quartzite, have been discovered. The brick floor, covered with dried mud, was painted with a coat of red ochre. To the east, a narrow corridor may have belonged to the liturgical installations. The bases of the roof supports, and the foundations of the walls lay on a bed of sand. This chapel was preceded by an ante-chamber, in which there remains a large flat stone used as a support for a vertical beam. Another annexed room is found further to the south.

Both the general plan and the character of the arrangements indicate the religious nature of this building. It must be supposed that these functions were maintained during later times, when the building was enlarged. Six more rooms were constructed with a narrow corridor on the north-east connecting the new building with another chapel. The constructed area was thus extended towards the west, doubling the available surface, a development which does not appear on the plans drawn by G. Reisner [7]. The masonry of these later reconstructions was less carefully made, and the walls show many signs of the re-use of bricks from previous buildings. It is noticeable that the massive masonry of the entrance hall, whose walls were faced, likewise present an interior fill consisting essentially of small fragments of fired brick.

Underneath the northern wall of this new building, a circular pit had been dug, and then partially filled by the foundation bed of the first courses of the walls. The plundering of the objects which had been present in the pit, permits us to make only some partial observations. However we can safely surmise that a foundation deposit had been placed here. Several dozen small clay models were mixed in with the sand: bovine and caprine figurines, sometimes decorated with spots of red ochre, fragments of rings of dried mud, conical objects with wide bases,

balls of dried mud, etc. A fragment of a miniature "tulip" beaker, a small bronze droplet, bone pins and a gold bead also formed part of the deposit.

Within the court which separated this building from another chapel, a well was installed during the last years of occupation of the site. A large circular cavity had been made to allow the builder to erect the rectangular structure of fired bricks from the exterior; the space inside the actual well, in which water was raised, measured only 0,40 by 0,60 m.

At the northern extremity of the large entrance hall stood a rectangular building of complicated design. An early phase of construction, comprising a square well in stone masonry and several long rooms, seems to suggest that there were habitations at this place. Possibly they were occupied by the priests, and that during a long period, since the well continued to be in use up to the time of the abandonment of the city.

Between this building and the entrance to the Deffufa, we have uncovered the foundations of a row of four columns. A second series of supports is indicated by two column bases found in their original positions. This particular room communicated with the entrance door of the Deffufa, which was, at this rather late stage of construction, thus provided with a side passage, rather inconveniently situated in view of the proximity of the stairs. The floor of this columned room is very much damaged. There are, however, traces of a relatively thick red coating visible on several mud bricks which are still *in situ*. Localisation of the western lateral wall of the columned room can be inferred from the foundations of a block of masonry, built up against the base of the entrance door to the Deffufa.

On the northern side, two chapels complete this vast architectural complex. The square plan of these chapels and their thick walls, differentiate them from other constructions in the city. Their roofs were doubtless supported by a central row of wooden columns, as is indicated by the continuous foundation wall and a stone base found in one of the rooms. On the floor painted in red ochre, four small rounded bases modeled in clay, were uncovered, which probably represent a late addition designed as supports for food offerings placed in ceramic vessels. As in certain other nearby constructions, the foundations of these sanctuaries rested on a bed of sand.

These two square buildings are not unique to the city of Kerma. In the eastern necropolis, G. Reisner uncovered the foundations of several funerary chapels, situated near the tombs of persons of high rank. The thick walls, the bases of a row of axial columns [8], as well as the square plan (sometimes slightly irregular) of these edifices, are all identical to those of the two examples we have found. It will be recalled that the entrances to these funeral chapels were also on the southern side, and that their roofs were constructed of beams together with other lighter materials.

In this sector, the chronology is again very difficult to follow. The buildings themselves were often modified, and the service rooms which surrounded them likewise underwent many transformations. Whereas the north-eastern chapel, erected at an early date, was dismantled in favour of a long building, the north-western chapel, on the contrary, remained in use up until the time when the city was abandoned. In the latter, the sanctuary appears to have been preceded by an ante-chamber. We have discovered several sandstone bases, which seem to indicate that the early cult-chamber formed part of a reasonably developed complex, perhaps with a separate entrance, through the temenos wall, probably opening towards the west. The debris which has accumulated in this area causes us certain technical difficulties, and prevents us from gaining an overall view of the remains. It was probably during the period of Middle Kerma that the ante-room of the north-western chapel was abandoned to be replaced by a bronze workshop. Subsequently, the chapel, restored and linked to the neighbouring buildings by a kind of corridor, in turn replaced the metallurgical kilns.

A Bronze Workshop

The bronze workshop that we have discovered was situated within the temenos walls of the ancient religious centre of Kerma. Several kilns were installed in the workshop, and it seems that an elaborate technique was employed by the artisans. No comparable structures have been excavated either in Egypt or in the Sudan, which could help us in interpreting the remains at Kerma. For example, the findings at the sites of Serabit el Khadim in the Sinai [9] and at Buhen in Nubia [10] lead to the conclusion that the ore was treated on the spot. At Kerma, the slag heaps which are a by-product of the extraction of the ore are absent, and it must be concluded that both the mines and the "blast furnaces" were situated elsewhere. Native copper was possibly obtained from a neighbouring region, since G. Reisner noted the presence of beds of copper oxide in the quarries at Tumbus, about 25 km to the north of the ancient town of Kerma [11]. It was, of course, easier to prepare the ingots in close proximity to the lodes, and, especially, near to a watercourse and to a source of fuel for feeding the furnaces. The origin of the ore treated by the artisans of Kerma remains to be discovered, but the hypothesis which situates the mines in the region of the third cataract would seem to be plausible. In any case, the first stages in the extraction of the ore would have been very difficult to carry out in the centre of the town, because of problems of transport, not to mention fire risks. In contrast, the preparation of bronze from ingots, and the casting of moulded objects, could quite well have been carried out in the workshop.

The foundry occupied a square surface, about 10 m on each side. Its installation was detrimental to certain other buildings, which were later reconstructed, when the

workshop was abandoned. Thus, for a certain period, the bronze-workers seem to have enjoyed the protection of the religious enclosure. This would not be surprising if the "temple" and its clergy were as powerful and as directly associated with the economic life of the country as was the case in Egypt [12]. The situation is reminiscent of the discoveries of Petrie in the temple of Serabit el Khadim. The workshop seems to have been in use over a long period, since we have uncovered several remnants of older kilns burnt red by a violent fire. Unfortunately, these remains are badly preserved, and it is only by their levels that we can differentiate between them. Above the destruction level, however, a much better preserved kiln has enabled us to study the artisans' technology.

The fire-chamber consisted of eight parallel channels, in which the hearths were situated. This rectangular structure was dug into the floor of the workshop, and access to the hearths was by means of eight descending shafts, distributed equally on two sides of the oven. The downshafts ended in coupled doors, through which the fuel was fed into the fire-chamber. We know that the fuel, at least in some cases, was palm wood. The channels and downshafts were oriented according to the prevailing north/south winds, thus assuring a good air draught when the doors were closed on one side. During the excavation, we found a number of bricks still *in situ*, in front of the doors on the northern side, which had been used presumably to regulate the intensity of the air draught to the fire-chamber.

The oven was constructed of thin bricks, placed edgeways. The vertical walls were carefully coated with dried mud, and the system of heating by means of channels guaranteed the solidity of the oven. The sole was made of a bed of horizontal bricks, covered with a thick layer of dried mud, thus assuring complete separation between the heating chamber and the fire-chamber. The high temperatures obtained in the kiln had imparted a bluish tint to the evenly smoothed surface of the sole. The height of the heating chamber cannot be reconstructed, but in plan it occupied a rectangular space of 1.80 m by 1.20 m. The thickness of the walls, and of the bricks found in the debris, seems to indicate that the heating chamber was vaulted. On one of the shorter sides several openings may have served to regulate the temperature, or perhaps to support the moulds or crucibles in the kiln. In many places, metal droppings still adhered to the walls.

Several fragments of crucibles containing traces of metal were found in the descending shafts. Those which we have been able to reconstruct have a somewhat flaring silhouette, with a diameter of about 0.20 m. A small, almost square opening was present at about mid-height. They were made of a particularly light clay fabric, mixed with a large proportion of ashes, mica, limestone and straw. These crucibles are in all ways comparable to those found on many other sites [13].

Analyses made on some of the metallic fragments show that the oven and the crucibles were used for the working of a "copper-tin" bronze [14]. The high tin content is unusual, but this has not so far helped in elucidating the source of the metal.

The workshop at Buhen has up till now been considered one of the rare examples known that throws some light on the technology of copper working. The plans of its circular ovens, discovered in strata dated to the Old Kingdom, have been reproduced many times. At Kerma, and on other sites, this type of circular installation was used exclusively for pottery. The circular fire-chambers discovered at Kerma were provided with a door for feeding the hearth and with a central support, as was found at Buhen. The question arises as to what type of work was carried out at Buhen in kilns of a type which, normally, were used for ceramics. Possibly they were used as were the even simpler structures found in Sinai, for the treatment of the ore. In any case the kiln at Kerma indicates the existence of bronze-working techniques very different from those which have previously been recognised. The temperatures were certainly very much higher than obtained with the circular ovens, which explains both the quality and the quantity of the bronze objects which have been found in the eastern necropolis of Kerma.

Dating

In our previous excavation reports, we mentioned datings obtained by means of the C^{14} method, without discussing their validity [15]. It would be premature, at present, to further analyse the results obtained. We possess only a few chronological indications, and it seems reasonable to wait until more complete information is available. The dates seem to be too late, which is not particularly surprising, since this is also true for other datings in Egypt as well as in Nubia [16]. Calibration using dendrochronology would probably permit at least a partial correction of these results. Two new samples from the ancient town have now been analysed. The charcoal recuperated from the bronze kiln gave dates of 3680 ± 70 BP and 3860 ± 70 BP, i.e. 1910–1730 BC. The workshop would thus have been active at an epoque contemporary with the Middle Kingdom in Egypt.

The Eastern Necropolis

The impressive eastern necropolis of Kerma has, in recent years, been much damaged. Agricultural exploitation of the surrounding plain has begun, numerous wells have been dug, and a school building has been erected very close to the Eastern Deffufa. It was therefore decided, in agreement with the Antiquities Service, that as much as possible should be done to save this heritage; supervision of the site has been increased, and the extension of the agricultural zones has been stopped. Nevertheless, the presence in the immediate neighbourhood of an ever-increasing population, as well as the passage of vehicles across the site, has forced on us a program of inter-

vention. It has become necessary to gather as quickly as possible information on the superstructures of the tombs, the types of graves, and the funerary customs.

The necropolis covers an immense zone; since an exhaustive study of the several thousand tombs of which it is composed is impossible, we have been forced to restrict our studies to a relatively limited area. Our objective, nevertheless, is to illustrate the complexity of the evolution of the Kerma cultures, and to attempt to link each series of tombs with the different periods of occupation found within the city.

An exceedingly large amount of archaeological information is now available, and this must be utilized whilst trying to limit as much as possible the areas excavated. Our strategy of intervention is based on an overall vision of the evolution of the cemetery, as indicated by previous research. A preliminary synthesis of this research has been made by B. Gratien [18]. It has been assumed that the development of the different Kerma cultures is reproduced in the necropolis according to a linear pattern extending from north to south, the more ancient burials lying to the north. This "topo-chronology" needs to be verified, and should eventually permit the identification of groups of tombs associated with the three main periods proposed by B. Gratien, namely Ancient, Middle and Classic Kerma, together with two periods of transition. Such an approach, which conveniently highlights certain cultural traits associated with the approximately thousand years of development of the culture, leads, however, to a systematisation of a historical situation which is, in fact, much more complicated. It is clear that, in the city, there was an almost continuous evolution, which we are not always able to follow. The situation is thus different from that in Egypt, where previous knowledge of the different periods provides a framework for the archaeological research.

Our studies were begun in the northern part of the necropolis, since this region is the most menaced, due to its proximity to the cultivated plain. In addition, it seemed opportune to clear and study the oldest tombs of the Kerma civilisation as an aid to subsequent seriation.

The placing of the trial trenches, at distances of 50 to 70 m from each other, was determined by the topography of the site, and by the state of the superstructures preserved, while at the same time taking into account the areas most endangered by the passage of vehicles and by the cultivation of the neighbouring area. Information gleaned from the large amount of ceramic material on the surface was also decisive.

The quality and diversity of the information gathered from the work carried out forced us to slow down excavation. Thirty tombs only have been opened, apart from the eight tombs partially excavated in 1979 and 1980. The latest discoveries significantly complicate both present ideas about Ancient Kerma and the general hypothesis of a linear development of the cemetery. It is certainly the case that the tombs which have been studied belong to an ancient phase of the Kerma cultures, and that they are concentrated at the northern extremity of the necropolis. It is possible, however, even within this restricted zone, to distinguish several different types of burials, and to observe that the organisation of the graves seems to reflect a desire to group the tombs around a central point, probably the tumulus of a person of high rank. It must be admitted however that the various series of tombs which we have tried to reconstitute by no means represent a complete picture of the evolution of Ancient Kerma. On the contrary, our impression is that a more precise chronology of the burials requires a considerable extension of the excavations; and it is probable that this will reveal a development with almost imperceptible phases of transition, and an irregular spatial organisation.

In view of the extent of the surface to be excavated, it would be practically impossible to achieve this goal. We must therefore be content with a partial picture only, and try to establish a preliminary classification, in the hope that this will be refined little by little during future studies.

After this last season of excavations, five or six groups of tombs can be identified. The series of 10 graves which are provisionally considered to be the most ancient (KA 1) were found almost in the centre of the zone studied. A little farther south, two tombs (KA 2) can be distinguished from the first group by the burial customs and by the decoration of the caramics; these two tombs have provided much new material for study. An intact tomb (KA 3), situated to the north-west of the first group, is also to be differentiated from the earlier group by the special character of its ceramics. Almost at the northern extremity of the necropolis, eight tombs (KA 4) seem to belong to a later phase; the quality and variety of the ceramics is less notable, and there are changes in the size and shape of the burial pits. A group of seven graves (KA 5) was excavated farther to the east, in which a new type of ceramics appears, probably of southern origin, and distinguished by a decoration of small dots in relief on the body of the vessel; the funerary customs are also different. Eight graves (KA 6), damaged by a tractor three years ago, likewise differ in certain respects from the other tombs. They are situated to the south-west of the area studied since 1980.

The first series of tombs (KA 1) is not homogeneous. The superstructures are of two types, and, in one case, a relative chronology is possible. The tumuli of the earlier graves were strengthened as well as decorated by the use of small slabs of black basalt and ferruginuous sandstone, both of which are to be found at the foot of, or on the neighbouring jebels. The decoration was completed with white pebbles [19] from the surrounding desert. The pebbles, embedded in the mud of the superstructure while it was still wet, formed concentric circles over the whole surface. The white quartz pebbles gave a certain relief to this circular design (KA 1a). The superstructures of the other tombs (KA 2b), without doubt belonging to a later phase, were constructed of upright sandstone slabs, sometimes

placed in a circle. The latter, whose number varied from two to ten, measured about 0.30 m in height.

Certain of the potsherds discovered around the superstructures belong to vessels which had been placed beside the tumulus. Two bowls, lying in their original positions, had been placed upside-down, their tops embedded in the layer of mud which covered the tomb. It is thus clear that a ceremony took place around the tumulus after it had been closed; this was probably a funerary meal, shared with the deceased. In fact, the vessels found *in situ* (and which tend to be more frequently associated with the later tombs) are always turned upside-down on the ground. They are generally found in an orderly arrangement to the east of the superstructures, and are accompanied by fragments of cattle skulls.

The practice of a funerary meal appears to be a change from the custom of placing offerings within the tombs, as is attested in the earlier A-Group or Neolithic burials. This custom continued to be followed in the Kerma necropolis, even though the placing of bowls or small jars by the side of the deceased already makes its appearance during the Ancient Kerma period. It is probable that these offerings are to be associated with the practice of funerary feasts for which evidence is forthcoming throughout the history of the Kingdom of Kush.

Excavation of these tombs – circular, oval or very narrow, and about 1.6 m deep – has proved to be difficult. The deceased lay on an ox hide which, in certain cases, seems to have been used to lower the body into the tomb. Leather thongs passing through small holes in the hide may well have been used for this purpose. The leather is surprisingly well preserved. We have discovered loincloths of goatskin which still retain their covering of black fleece. The bodies of the deceased were often wrapped in clothing of carefully treated, soft leather. The seams, almost invisible, were sewn with very fine leather thread. Sometimes, a piece of leather pierced with holes covered the head. In general, the tombs were plundered and the faience or bone bead decorations sewn onto the clothing have disappeared, except for a few fragments left behind in a number of tombs. Almost all the deceased wore leather sandals embellished with geometrical designs, incised on the soles.

The bodies lay on the right side, with the legs bent and the hands in front of the face. The usual orientation was east-west, with the head to the east. Objects of finery were not very numerous–so far we have found necklaces of faience, bone or rock crystal beads, gold rings, a hair bracelet, and an ankle bracelet of faience beads.

This series of tombs is thus characterised by very well designed superstructures above pits which are deep but of small dimensions. There are no ceramics within the tombs. On the other hand, the presence of down-turned vessels on the surface is no doubt linked to the practice of funerary meals. The tombs of both children and adults are relatively poor in ornaments, and we have been unable to establish, within the zone studied, any social differentiation amongst the deceased from the quality of the material found in the tombs.

The tombs 53 and 54 (KA 2) form a separate group characterised by the richness of the ceramics disposed around the tumuli, and by certain changes in the funerary customs. The superstructures are more elaborate, with a diameter of almost 3 m. Black stones were generally arranged in concentric circles on the surface, but, in cases, they were used only to reinforce the edges of the tumulus. On the east side of *tomb 53*, traces of at least seven down-turned bowls were found, and the number was certainly originally greater since this whole area was thickly strewn with sherds. The ox skull found to the south, as well as the down-turned bowls, is reminiscent of the tombs of earlier periods. The tomb pits are still oval or circular, but *tomb 53*, with a diameter of almost 2 m, as well as other neighbouring graves not yet excavated, are of much larger dimensions. *Tomb 54*, with an oval pit, is, in contrast, of modest size, and could well have been only a subsidiary grave.

The bodies lay on an ox hide and were covered by a second skin. Traces of a wash of red ochre are present on the leather. The deceased, with head to the east, lay on his right side, with legs bent. An ostrich feather fan was placed in front of the hands; the spine of the fan was glued together with a kind of resin and protected by a piece of leather. Both skeletons were shod with sandals of which one pair was decorated with an incised geometrical design. A long wooden needle was probably used to secure the shroud, which was made of several leather garments. Traces of a cushion made of vegetable material, and the remains of a framework on which the body was placed were likewise present in both tombs.

This zone of the necropolis is distinguished by the richness of the decoration of the ceramics placed on the surface, near the tombs. These geometric designs, almost always incised below the vessel rim, seem to be the originals of themes which can still be found today in painting or bas-relief. These motifs, in an infinite variety, remained the principal source of inspiration for the artisans of Kerma.

In *tomb 72 (KA 3)* the superstructure was almost completely preserved. Five circles of hard stone protected the edge of the steeply elevated tumulus; large quartz pebbles holding in place the longer black stones. The matrix of earth was not well consolidated and the superstructure was less carefully made than those of earlier tombs. The central circular space was originally decorated with white pebbles. On the east side, three or four bowls had been overturned on the ground, after the construction of the tumulus. One of these, of black pottery, was entirely covered with a geometric design characteristic of the early C-Group period [20]. The narrow, almost circular tomb was not very deep. The body was lying on its back, with the legs contracted. It was covered by an ox hide,

while a second skin had been placed underneath it. The deceased had been wrapped in leather clothing, held in place by a belt formed by strings of rectangular beads sewn together by means of fine thongs. A small sack, placed on the pelvis, contained two flint tools, a bone pin and a small amount of lime. The jewellery is particularly interesting: two wooden earrings, which seem to have been painted red, two rings of the same material on the index of the right hand, and a necklace of faience beads enhanced with an alabaster pendant.

The series of graves KA 4 differs considerably from the earlier inhumations. The tombs are only about 20 m distant from tomb 72, but we place them chronologically later than this tomb. No remains of superstructures, nor of deposits on the surface of the ground have been found with them. The pits are very large (up to 3 m by 2 m) and, for the first time, pottery is found inside the tombs. Their exceptionally good state of preservation has allowed us to make some important observations.

Tomb 57, although partially plundered, still contained the remarkably well-preserved body of a young man 17 years old, covered with a large skin. The hair, arranged in long curls thickly covering the skull, and the somewhat negroid physiognomy, were strikingly reminiscent of the representations of Nubians in Egyptian iconography. In front of the body, traces of two bows were visible, the bowstring of one of these passing through the right hand of the deceased. The tomb had no doubt been plundered with the aim of obtaining arrow-heads since we found only the broken ends of five reed arrows fletched with small bird feathers. The leather quiver, very much damaged, was held to the side of the body by a cross belt. The bowstrings, made of animal gut, were wound in several spirals around the ends of the bows. A bundle of ostrich feathers placed at the end of the bows may originally have been attached to it. On the forehead of the young archer there were the traces of a headband, and a pendant was suspended by a string from his neck. Another shell object, in the form of a blade, was left behind by the plunderers in the tomb. Its fragmentary condition does not permit its function to be determined. During one of the *Survey*, an identical object, probably an item of jewelry, was discovered at Ambikol (Northern Province); it is at present on exhibition in the National Museum of the Sudan [21]. The body of the archer was wrapped in a fabric shroud, and the only piece of clothing worn was a leather loincloth decorated with a row of faience beads; however, two pairs of sandals were placed in the tomb. An upturned bowl lay behind the body, witness, perhaps, to a funerary meal. Remains of a rectangular wooden or fibre structure still existing in places probably represent the remnants of the framework on which the deceased was placed. The bottom of the tomb was covered with matting; stretched over the matting, a skin served as a couch, on which were placed the framework and a pillow. The leather coverings were very large and very carefully treated – only one border of about 0.03 m was left covered with hair, thus forming a decoration. Several holes show that the skins had been attached together in some way, and signs of usage were evident.

The remaining tombs of this series have allowed us to add further to the rich amount of material already gathered. The burials were systematically made between two leather coverings. The presence of ostrich feathers has been noted several times. In contrast, sherds are not numerous, and represent a rather simple kind of pottery. It should be remarked that a large proportion of the tombs within this zone are those of children or of adolescents.

In the south-eastern part of the area chosen for excavation, *a group of seven graves (KA 5)* is also characterised by large pits, oval or rectangular in shape, with small circular superstructures. The circular traces left by the stones placed on the tumuli, and the well-preserved complex of *tomb 70* indicate a change in the arrangement of the superstructures as compared with earlier periods. The mass of the tumulus is not solid, and the stone circles are irregular. The custom of funerary meals seems to have continued, since fragments of several bowls were found on the surface during preliminary clearing, as well as two cattle skulls. In this zone, the number of cattle skulls is much greater; to the south of certain tombs, they are found in dozens, arranged in three or four parallel rows.

Tomb 67, a large rectangular pit with rounded corners, contained the skeleton of a female lying, as usual, on its right side, the head to the east and the legs folded. Despite the plundering of the eastern part of the tomb, the ox skin covering remained almost intact. The body was draped in a cloth shroud, held in place by an acacia needle. A staff, placed in front of the body, was held between two fingers of the right hand. Underneath the same hand lay a small jar, and an ostrich feather fan. A bowl containing a small leather purse was found beside the left hand. The deceased wore a leather loincloth, and a pair of almost rectangular shaped sandals. She had been placed on a framework composed of a soft ligneous substance in which the imprint of the head and part of the hair were preserved. Behind the body, near the feet, a red-haired dog had been placed. The animal had been strangled with a leather noose, which still encircled his neck, this had resulted in a partial displacement of the vertebral column and had produced a clear mark on the hair of the neck. The young dog thus accompanied its mistress in death and, like her, had been placed between two cattle skins.

In the same series, *tomb 70* was found intact. It contained the body of a young girl, likewise protected by two leather skins and a fabric shroud; she was curled up on her right side, her head to the east. In front of her chest, a small bowl of coarse manufacture had doubtless been used for a modest offering, while on the surface at the eastern side

of the tumulus lay at least three inverted pots. A necklace was found around the neck of the young girl, composed of alternating faience and shell beads. Her fine leather loincloth was held by leather thongs, on which the hair is still preserved. Her head rested on a mass of vegetable matter on which traces of white-wash were still visible.

Tomb 68, with a very large pit (3 m × 2 m), was prepared for two females. Although the grave had suffered serious plundering, the lower parts of the bodies, still in place, and the presence of other, loose bones allowed some observations to be made. The two deceased lay on their right sides, heads to the east. They seem to have possessed the same funerary material for, in the northern part of the tomb, a copper mirror and a jar were found, whereas a second mirror was present in the fill, probably abandoned there by the plunderers. Similar objects have been discovered in the Ancient Kerma cemetery at Sai [22], and in the Scandinavian excavations between Faras and Gemai [23]. It is interesting to note that at Debeira, the mirror was associated with a tomb dated to the early C-Group. On all these objects, the form of the tang used to attach the wooden handle is the same [24]. Traces of the handle were still present on the mirror of *tomb 68*.

It is thus possible that certain graves of Ancient Kerma date are contemporary with burials of the first phases of Group C as is suggested by the presence of C-Group sherds in our necropolis. It may be that these two cultures developed at the same time.

This series of tombs seems to indicate an evolution of the funerary customs. Much richer offerings are found with the burials, deposits of caprine horns can be detected in the fillings, and new types of ceramic vessels make their appearance. In two of the burial pits there are also sacks containing sacrificed lambs.

The last group of tombs (KA 6) has so far provided very little information. Cultivation of this sector using machines has resulted in the destruction of the tomb pits. The remaining traces allow a restitution of the circular form of the pits; but the rare potsherds found are of types different from those found in the other soundings. Caprine animals were again placed beside the bodies, which were clothed in leather decorated with bone beads. An exceptional discovery was a necklace made of large stone and smaller faience beads.

Though these latter burials, situated within the southern zone of the cemetery, seem to belong to a relatively late period of Ancient Kerma, other examples found by us seem, at least partly, to invalidate the idea of a linear topo-chronology extending from north to south. Thus, a few meters from the northern extremity of the necropolis, a mound indicates the site of a distinct funerary area. Here two large circular pits *(tombs 55 and 56)* belonging to the period of Middle Kerma were excavated. The bodies lay on beds, and were surrounded by numerous offerings. Pieces of meat had been placed on the northern side while, on the opposite end, there was found a sack containing a caprine animal. Both the ceramics and the arrangement of these tombs resemble the graves excavated during our previous seasons. They belong to a much later period than the tombs excavated in the northern zone.

A large tumulus, almost contemporary with tombs 55 and 56, is being studied in the middle of the necropolis. A survey has been made of the cattle skulls placed around the superstructure, since these were in danger from erosion and the passage of vehicles. Almost five hundred skulls were found on the southern side of the tumulus, and the horns of certain of the adult animals are very impressive. A sherd of Minoan style was discovered in the soil covering the cattle skulls; its study should be rewarding [25].

After the manuscript of this report had been sent to the press, a publication of Mr. Dows Dunham [26] was received, which complements the previous reports on the excavations by G. Reisner. It illustrates, in a remarkable manner, several sectors of the necropolis, principally in the central (M) and northern (N) zones. "Cemetery N" is very close (in a south-east direction) to the series of tombs that have been presented in this report, and this new documentation provides numerous additional elements to our study. The ceramic material, often placed within the tombs, is very different, and it is possible that this extensive sector marked a separate phase in the evolution of the cemetery. The large size of these tombs, with pits of more than 10 m in diameter, suggests that they were designed for important persons.

The Northern Meroitic Cemetery

Research has also been continued in the western quarter of the ancient city where several Meroitic tombs were uncovered. The cemetery, known from the work of Reisner and from our previous campaigns [27], is immense. Excavation should be continued here in the future, but it is clear that the amount of work involved will be considerable.

Clearing operations brought to light two large funerary chambers *(CV t 12, CV t 18)*, which attest to the development and wealth of Kerma during the end of the Meroitic period. In the entrance shafts of these tombs, we were able to identify the remains of libations made during the funerary ceremonies. Wine-jars had been broken in front of the door, as was also the case in *tomb CV t 9*. Even though these tombs had been plundered, a large quantity of archaeological material was collected: glass lachrymatories [28], toilet articles in bronze or iron, multicolored glass beads, etc. The ceramics are of high quality, and will be useful for comparison with findings elsewhere. Bowls from the Classic period were found next to vessels from later times; the shoulder of a jar, decorated with a serpent, is identical with one discovered at Karanog (tomb 566), which has been dated to the 2nd or 3rd century [29].

Conclusion

The findings made during the last two seasons of excavation by the Mission of the University of Geneva to the Sudan confirm the exceptional importance of the site of Kerma as early as the 3rd millenium. The ancient city was constructed at a key position between central and northern Africa, at a time when new contacts were being made, both politically and commercially.

Composed essentielly of nomadic herdsmen, the population of Kerma seems rapidly to have formed a strongly centralized kingdom. Largescale architectural construction was begun very early for, as in Egypt, the local religious practices necessitated vast constructions in which the various ritual ceremonies could take place. Little by little, fortifications were erected to protect the city, and we know that, from the time of Ancient Kerma on, archers were used to defend the frontiers of the new "state". Wars were probably frequent, as shown by the numerous reconstructions of the town. The vitality of the population is likewise evident in the work of its craftsmen, as shown by the high quality of the ceramics, and by the numerous objects of everyday life. In this connection it is noteworthy that the recently found bronze workers' kiln implies the presence of a very advanced technology for this period.

It is no longer necessary to demonstrate the interest of continuing our study of the oldest African civilisations and we hope that means will be available to extend our investigations on the site of Kerma. This is all the more to be hoped for in view of the dangers which now menace the archaeological remains still preserved.

[1] See for the work in progress:
C. Bonnet, *Fouilles archéologiques à Kerma (Soudan), Rapport préliminaire de la campagne 1977-1978; 1978-1979 et 1979-1980*; in *Genava*, n.s., t. XXVI, 1978, pp. 107-143; t. XXVIII, 1980, pp. 31-62; *La deffufa occidentale à Kerma, essai d'interprétation*, in *Bulletin de l'Institut Français d'Archéologie Orientale*, t. 81, 1981, pp. 205-212; *Excavations by the Archaeological Mission of the University of Geneva to the Sudan; 1979-1980 season; 1980-1981 season;* in *Nyame Akuma, a Newsletter of African Archaeology*, No. 16, May 1980, p. 31-37; No. 18, May 1981, p. 32-33.
J. Leclant, *Fouilles et travaux en Egypte et au Soudan, 1977-1978; 1978-1979*; in *Orientalia*, vol. 48, fasc. 3, 1979, pp. 394-395; vol. 49, fasc. 4, 1980, pp. 406-407.

[2] The Commission for Excavations in the Sudan, presided over by Professor M.-R. Sauter, is formed of Professors J. Dörig and O. Reverdin. We thank Professor D. van Berchem for his help and advice as president of the Commission in recent years.

[3] C. Bonnet, *Rapport préliminaire..., 1980*, pp. 35-43.

[4] M. Bietak, *Ausgrabungen in Sayala-Nubien 1961-1965: Denkmäler der C-Gruppe*, in *Österreichische Akademie der Wissenschaften, Philosophisch-historische Klasse*, Denkschriften 97, Vienna, 1968;
G. Steindorff, *Aniba*, vol. 2, Glückstadt, 1937;
W. Y. Adams, *Nubia, Corridor to Africa*, London, 1977, pp. 147-152;
B. Trigger, *Nubia under the Pharaohs*, London, 1976, pp. 50-52 et pp. 100-102.

[5] Communication by Mr. Barry J. Kemp.
Shehata Adam, *Report on the Excavations of the Department of Antiquities at Ezbet Rushdi*, in *Annales du Service des Antiquités de l'Egypte*, N° 56, 1969, p. 207-226;
M. Bietak, *Vorläufiger Bericht über die erste und zweite Kampagne der österreichischen Ausgrabungen auf Tell Ed-Dabʿa im Ostdelta Ägyptens (1966-1967)*, in *Mitteilungen des Deutschen Archäologischen Instituts*, bd 23, 1968, p. 83.

[6] C. Bonnet, *Rapport préliminaire..., 1980*, pp. 47-48.

[7] G.-A. Reisner, *Excavations at Kerma*, part I, Harvard African Studies, vol. V, Cambridge (Mass), 1923, pl. XI.

[8] G.-A. Reisner, *op. cit.*, part III, p. 482, Chapel D.

[9] W. M. F. Petrie, *Researches in Sinaï*, London, 1906, p. 162 et pp. 240-243, fig. 161 et 172.

[10] W.-B. Emery, *Egypt Exploration Society: Preliminary Report on the Excavations at Buhen, 1962*, in *Kush*, vol. XI, 1963, pp. 116-120.
H.-S. Smith, *The Fortress of Buhen, I. The Archaeological Report*, Egypt Exploration Society, London, 1979, pp. 65-66, p. 94, pl. 25.

[11] G.-A. Reisner, *op. cit.*, part IV, pp. 176 et 135. Observations by Stanley Dunn.

[12] For example:
B. Menu, *Le régime juridique des terres et du personnel attaché à la terre dans le papyrus Wilbour*, Institut de papyrologie et d'égyptologie, I, Lille, 1970;
B. J. Kemp, *Temple and town in ancient Egypt*, in *Man, Settlement and Urbanism*, Part III, Section 2, Regional and local evidence for urban settlement, London and Cambridge (Mass.), 1972, pp. 657-680.

[13] For example:
W. M. F. Petrie, *op. cit.*, p. 162, fig. 161;
G. Brunton, *Qau and Badari*, British School of Archaeology in Egypt, vol. I, London, 1927, p. 36 et 67, pl. XII.
A. Vila, *Un dépôt de textes d'envoûtement au Moyen Empire*, in *Journal des Savants*, 1963/3, p. 156, fig. 11 et 16;
H.-S. Smith, *op. cit.*, p. 94, pl. 43.

[14] Analysis by the Laboratory of the Geneva Museum of Art and History: F. Schweizer, *Identification and Analysis of Traces of Metal on Crucibles:*
The analysis by X-ray fluorescence was carried out:
1) to identify and characterise qualitatively the alloy which had been melted in the crucible
2) to analyse quantitatively the elements in a fragment of metal.

1) 001 Green deposit on a large fragment of crucible.
Major elements: copper and iron
Minor elements: calcium, potassium, titanium, tin
Result: a residue of bronze mixed with slag

002 Brown-red layer on the inside of a sherd fragment.
Major elements: copper and iron
Minor elements: calcium, potassium, titanium, tin
Result: combination of bronze with the argillaceous material of the crucible.

003 Light brown scoria.
Major elements: iron and manganese
Minor elements: potassium, calcium, titanium
Trace element: copper
Result: a fragment of baked earth which was not in contact with molten metal in the crucible.

(Light elements such as aluminium and silicon, which are the major constituents of clay material, are not detected by the X-ray fluorescence spectroscopy.)

2) Bronze Fragment
The fragment was covered by a layer of corrosion. This was removed from an area of 2 × 2 mm before analysis. Three determinations were made, and the levels of tin, iron and arsenic found using appropriate standards:
Result: copper = 91.8 ± 1%
tin = 6.9 ± 0.3%
iron = 0.3 ± 0.2%
arsenic = 1.0 ± 0.3%
It is a copper-tin bronze. The low content in arsenic is probably due to the use of a copper ore which contained a low proportion of arsenic.

[15] C. Bonnet, *Rapport préliminaire...*, 1980, pp. 34, 48, 56; *Nouveaux travaux archéologiques à Kerma (1973-1975)*, in *Etudes Nubiennes, Colloque*

de Chantilly, 2-6 juillet 1975, Cairo, 1978, pp. 31-33; *Remarques sur la ville de Kerma*, in *Hommages à la mémoire de Serge Sauneron*, vol. I, Cairo, 1979, p. 4.

[16] H.-S. Smith, *Egypt and C14 Dating*, in *Antiquity*, vol. XXXVIII, 1964, pp. 32-37;

T. Säve-Söderbergh, I.-U. Olsson, *Neolithic and A-Group Sites, The Scandinavian Joint Expedition to Sudanese Nubia*, vol. 3:1, Uppsala, 1972, pp. 29-32, p. 250;

R.-D. Long, *Ancient Egyptian Chronology. Radiocarbon Dating and Calibration*, in *Zeitschrift für Ägyptische Sprache und Altertumskunde*, Bd 103, 1977, pp. 30-48.

[17] Analysis by Ms. T. Riesen of the Institute of Physics of the University of Bern (November, 1981).

[18] B. Gratien, *Les cultures Kerma, Essai de classification*, Lille, 1978.

[19] A study of several samples has been made by Mr. J. Deferne of the Department of Mineralogy and Petrography of the Geneva Museum of Natural History. The black stones are of basalt with a specific gravity of about 2.96; the reddish fragments are of ferruginous sandstone with specific gravity 3.16; the white gravel is of quartz.

[20] See for this production:

M. Bietak, *Studien zur Chronologie des Nubischen C-Gruppe und der Pan-Gräber-Kultur*, in *Österreichische Akademie der Wissenschaften, Philosophisch-Historische Klasse*, Denkschriften 97, Vienna, 1968.

[21] Attributed to the C-Group, this object discovered in 1967 is 6 cm long. It carries the No. 16-R-18/37-1 (21088). T. Mills (SAS-Unesco) suggests it was used as a hairclip.

[22] B. Gratien, *La grande nécropole Kerma de l'île de Saï*, in *Cahier de recherches de l'Institut de papyrologie et d'égyptologie de Lille*, N° 5, 1979, p. 179, fig. 9.

[23] T. Säve-Söderbergh, *Preliminary Report of the Scandinavian Joint Expedition, Archaeological Investigations between Faras and Gemai, Nov. 1961–March 1962*, in *Kush*, vol. XI, 1963, p. 55, cemetery 65 «of the oldest stage of the C Group». Two mirrors of this type have been found by the Mission. One is on exhibition in the National Museum of the Sudan, No. 62-12-36, 179/150:3; the other is in the Sheikan Museum, No. 65/6:1.

[24] Identical mirrors have been found in Egypt as early as the Old Kingdom, see:

C. Lilyquist, *Ancient Egyptian Mirrors from the Earliest Times through the Middle Kingdom*, in *Münchner Ägyptologische Studien*, Heft 27, 1979.

for Kerma, see:

C. Lilyquist, *op. cit.*, p. 46 et pp. 141-144, fig. 69, 82-88.

D. Dunham, *Excavations at Kerma*, Part VI, Museum of Fine Arts, Boston, 1982, p. 196, pl. XXXVIIa (excavation N by G.-A. Reisner).

[25] This potsherd is being studied by Ms. V. Hankey, who should be able to decide if it is from a vessel originating from the Aegean region (Minoan, Cycladic, Helladic). But, it is possible that an Egyptian workshop could have produced this type of ceramic.

[26] D. Dunham, *op. cit.*

[27] C. Bonnet, *Rapport préliminaire...*, 1980, p. 60.

[28] Professor D. Paunier has examined drawings of the three balsamaires, and provided the following details:

Object CV t18/1 and CV t12/3b: form Isings 28 a: 50-225 p. C. The first object is a variant of Trier 71, dated on the site by a grave of the Flavian period to the middle of the 2nd century. However, a period up to about 225 is possible.

Objet CV t12/3: form Isings 28 b: 50-325; frequent in the 4th century: cf. Trierc 79 b.

All these forms are widely found in the Empire, from North Africa to Germania. They do not permit a fine chronology. Regional workshops: for Kerma, perhaps Alexandria. See:

C. Isings, *Roman glass from dated finds*, Groningen-Djakarta, 1957.

K. Goethert-Polaschek, *Katalog der römischen Gläser des Rheinischen Landesmuseums Trier*, Mainz, 1977.

[29] St. Wenig, *Africa in Antiquity, The Art of Ancient Nubia and the Sudan, II. The Catalogue*, The Brooklyn Museum, New York, 1978, pp. 284-285, No. 230.

New elements for a classification of the ceramics of Ancient Kerma

by Béatrice Privati

Examination of the pottery discovered in the city of Kerma during the 1977-1978 excavations [1] allowed us to propose a classification which, on the whole, corresponded with the typology established by B. Gratien for the material at Saï[2]. During the subsequent seasons of excavation, we have attempted to verify these first results and to work them out in greater detail. It can now be affirmed that the remains of the three principal phases of development of Kerma are clearly distributed according to a topo-chronology characterized by well-defined concentrations of sherds – the oldest being found in the centre of the constructed area, and the latest on the periphery. However, the sequences within the major groups remain difficult to observe, principally because of the excavation technique which has been adopted. The complexity of the site, where a surface clearance reveals the presence of several stages of construction at the same place, has incited us to clear large areas, before undertaking excavations in depth. Stratigraphic research, in certain zones, has thus only just begun; it will be further developed when the study of the most recognizable structures has been finished.

Several isolated observations have nevertheless brought some additional information to our still superficial view of the ceramics of the city. We have thus noted that Ancient Kerma sherds are relatively infrequent and localised in the immediate neighbourhood of the Deffufa, in houses destroyed when the religious building was constructed. This pottery is relatively coarse; the categories represented correspond, on the whole, to only part of the material of the same period found at Saï, and there attributed to late Ancient Kerma [3]. They foreshadow the shapes and decoration of the pottery of Middle Kerma. It may therefore be possible that the first habitations were situated on the site of the Deffufa, or to its north; or even in a distinctly separated zone. In places, a well preserved stratigraphy is accessible beneath the temple; this will be

studied during the coming seasons in order to test these ideas.

Although it is not too difficult to establish a general classification and to define the limits which separate the pottery groups characteristic of the three major periods of the Kerma civilisation, information is still lacking, in the city, concerning the internal distribution of the different categories of pottery within each group. The identification of transition phases from one period to another is not sufficient. Indeed, considering the numerous stages of construction identified in each part of the city and attributed to one period [4], it is likely that the pottery also underwent a slow evolution. However, the transformations undergone by a certain culture and those which characterize its ceramic development, do not necessarily coincide. These transformations may be very numerous, indicating an equally large number of almost imperceptible transition phases. Nor is it by any means certain that pottery provides a perfect illustration of the development of a culture; thus, it is noteworthy that the production of Middle Kerma is generally less rich and less well finished than that of other periods, despite the fact that this era enjoyed an important economic expansion.

The possibilities offered by the size and wealth of the necropolis of Kerma should allow certain of these nuances to be distinguished. During the six soundings carried out in the northern zone of the cemetery, attributed to the old Kerma period, a large number of ceramic vessels, complete or fragmentary, have been collected. The quantity varied considerably from one area to another. The forms show little diversity, being composed principally of flared bowls, with flat, pointed or rounded bases. It is not always possible to be certain of the form, since most of these pots were found on the surface, where they had been placed upside-down near the tombs; they had therefore often been damaged in the course of time by the passage of men or animals. The majority of the vessels are black-mouthed red wares, the red colour turning to brown underneath the rim. In the most recent sectors of the zone excavated, jars sometimes make their appearance inside the graves, together with other containers, even though the custom of placing bowls on the outside was maintained. The fabric, originally very homogeneous, changed gradually – in particular, grains of calcite are observed [5], which caused eruptions on the surface of the pottery. It is, however, by means of the decoration that the evolution of these ceramics can be most clearly perceived.

In *sector KA 1*, thought for the moment to be the most ancient, ten graves were excavated (t 43-52); pottery, consisting solely of bowls, was associated with eight of these. In two cases only, a bowl was found still in place, to the east of the superstructure, turned over on the surface in the wet mud, which had then hardened, leaving an imprint of the rim of the bowl still visible. The sherds making up the rest of the material were found either near the tombs, or in the filling of those which had been plundered.

This group is quite homogeneous, in the quality of its clay as well as in form and decoration. It is composed for the most part of black-mouthed red bowls, polished or burnished; the forms are tall, sometimes carinated, and frequently have pointed bases. The decoration, incised or impressed with a rocker-stamp, and emphasised by a reddish pigment, consists of simple or crisscrossed oblique lines arranged continuously or in groups of motifs (pl. I, t 49/4-8), and hatched triangles (pl. I, t 50/1). Decoration executed rather coarsely with a triangular point has been found, as well as three motifs formed by zigzags combined with oblique lines; we find this theme developed *ad infinitum* on the bowls belonging to the group of tombs immediately posterior (KA 2).

Two sherds and a bowl of black ware with white filled ornamentation, very similar to C-Group pottery, have also been noted (pl. I, t 49/9). The last container could be attributed to the level Ib defined by M. Bietak [6].

This series of tombs was characterized by two types of superstructure, formed either of concentric stone circles or of sandstone stelae. Only five of these were preserved, but, although it was possible to establish a relative chronology showing that graves with stelae were posterior to the others, this difference could not be detected in the pottery.

During excavation of *sector KA 2*, only two graves were uncovered, both with superstructures of large dimensions constructed of concentric stone circles. They were surrounded by a large quantity of sherds, and by entire bowls, always turned upside-down.

The pottery of this zone differs from that collected in the preceding group of graves, especially by its decoration. Red, black-topped bowls, polished or burnished, are the most numerous. The majority of the forms are tall, sometimes carinated, and the bases are often pointed (pl. II, t 53-54/23, 28), occasionally rounded. The motifs decorating the rims are more varied; they are incised or made with a rocker-stamp, emphasized with a red colour, and consist mainly of combinations of lozenges, triangles and zigzags arranged in several rows.

In this group, nevertheless, several black-topped red bowls have been found which possess a more modest decoration, formed by groups of incised lines, similar to the ornamentation of the ceramic discovered in KA 1. More coarsely made bowls, decorated on the rim with a pointed instrument, also form part of this series, in which there are examples of pottery similar to those of the C-Group. One of these vessels is decorated with bands of hatched triangles, whose incisions are filled in with white colour. This type of pottery appears rather late in the chronology proposed by M. Bietak [7].

It is difficult to ascertain whether sector KA 2 is really more ancient than *sector KA 3* (t 72). In the latter zone, the pottery, found only outside the tombs, represents a compromise between the types encountered in KA 1 and KA 2. The fabric of the black-mouthed red bowls is uniform but the forms and the decoration borrow from those met with in both groups (pl. III, t 72).

The presence, in sector KA 3, of a bowl identical with certain examples found in level Ib of the C-Group [8] (pl. III, t 72/8) ought to provide us with supplementary information, but the relation between the two cultures, in this region, is not yet well defined for the more ancient periods of Kerma.

It is not possible, of course, to dissociate the pottery from its context. In the case of tomb 72, the other archaeological evidence, particularly the quality of the superstructure, the size and shape of the pit as well as the type of material it contained, suggest that this grave should be placed in third position in our proposed relative chronology. This hypothesis should be tested during the coming season by extending the excavation.

The clearance of *sector KA 4* has brought to light eight graves (t 57-64). It is in this zone where pottery is rather scarce that we begin to find vessels placed inside the tombs. Although sherds were found on the surface, there was no trace of ceramic deposits around the tombs. However, since all the superstructures have been destroyed, and the graves more or less plundered, it is not possible to state with certainty that such deposits had not existed. Tomb 57 contained a bowl which had been placed upside-down behind the deceased, without doubt after a funerary meal (pl. IV, t 57/3). This vessel, slightly carinated, of a reddish-brown colour with a black border, has a rounded base and a decoration of criss-crossed lines incised on the rim. The other bowls are decorated with more simple motifs, similar to those already observed. The material associated with grave 58 is somewhat special, since it comes from a child's tomb. A small oval jar (pl. IV, t 58/1), though displaced, was found in the pit. The fabric is red, becoming brown near the rim, which is lightly coloured in black. The surface, which shows traces of a vertical polishing, is marked by rather large calcite grains, a particularity which is found in other black-topped red vessels in the same group.

A bowl with a spout, decorated on the rim with a rocker-stamp (pl. IV, t 58/4) and the base of a vessel similar to those of the C-Group (pl. IV, t 58/5) complete this series.

Sector KA 5, where seven graves have been excavated (t 65-71), has provided ceramic material of great abundance and variety, though often of coarse manufacture. Although the greater part of these vessels was found outside the graves, where they had been placed upside-down around the superstructures, two jars and two bowls were placed at the bottom of three pits, beside the deceased.

The majority of the pottery collected in this zone is composed of black-topped red bowls whose walls are sometimes less carinated than in the previous groups. The red colour is closer to brown and the range of patterns incised around the rim, though still inspired by the same themes, has changed slightly. Incised criss-cross lines again become common (pl. V, t 65/6, 8 and 9), filled with red colour. Lozenge motifs are still present, but arranged somewhat differently, and often executed with a rather thick instrument, producing a less well finished impression. Several sherds of bowls indentical with those of the C-Group have also been found.

The bowls and jars placed within the pits are always badly fired, and there is a large quantity of calcite grains in the fabric, visible on the surface of the vessels.

The appearance of jars in this series brings in a new factor, which must no doubt be related to a change in the funerary customs, and to the increased importance of offering deposits, as shown by the presence of cattle skulls in always increasing numbers around the graves. We may mention the sherds of a large black-topped red jar decorated with impressed lozenges made with a pointed instrument (pl. V, t 65/11), of an almost spherical red jar with four vertical bands of opposed triangles impressed on the shoulder and body, and of another vessel of a buff-coloured fabric with a yelow slip (pl. V, t 65/13). The latter is one of the rare examples of thrown pottery found up till now in the older section of the cemetery. Imported ceramics and pottery of Egyptian tradition is infrequent in this older part of the necropolis; contacts between Kerma and Egypt became more developed later on [9].

A new type of decoration formed of vertical lines of small dots in relief (pl. V, t 65/7) appears on the bowls made of buff-coloured fabric. A similar ornamentation has been observed on pottery discovered in the centre of the Sudan, in the region of Kassala [10]. Still other vessels have a saw-tooth decoration on the body, impressed with a rocker-stamp.

In *sector KA 6* (t 35-42), which we consider to be the latest, eight graves have been excavated. This zone had been disturbed by the passage of a tractor, but the information obtained from the material recovered, even though incomplete, is precious, since certain elements prove that this group is posterior to the others.

In one of the graves, a small jar, slightly carinated, had been placed at the bottom of the pit (pl. VI, t 40/1); the texture of this vessel is fine, and almost brown in colour; cracked in ancient times, it had been repaired and held together by a leather thong.

The red bowls with black rims are of high quality, but the fabric sometimes contains calcite grains. The decoration was coarsely executed, with large incisions, and with the motifs irregularly arranged. The interior of cer-

tain of the bowls had been smoothed with a brush (pl. VI, t 36/4, 5).

Bowls of the buff-coloured fabric ornamented with dots in relief are also present in this sector; the decoration of one of these includes lines made with a rocker-stamp on the rim, completed with incised triangles (pl. VI, t 36/7).

If we now compare the ceramics of sector KA 5 and 6 with that collected by G. Reisner in cemetery N [11], we find that, in the latter, there is a clear evolution of forms towards those recognised as Middle Kerma. The decoration of the red bowls with a black border becomes simpler, the dots in relief gradually disappear, whereas impressed saw-tooth decoration becomes frequent, both on the bowls and on the jars which become more numerous. Finally, the vessels reminiscent of the C-Group are rare.

In this approach to the ceramics of Ancient Kerma, we have certainly emphasised the element of decoration. It seems to us that ornamentation, which has retained its importance for everyday Nubian objects, is the most significant distinctive feature of the pottery of the first phases of Kerma. Fabric and form evolved more slowly during this period. The phenomenon is no doubt associated with the function of the vessels, a function in the cemetery which changed with the course of time. In order to understand this, it will be necessary to retrace more precisely the evolution of the funerary customs, distinguishing, for example, libations from offering deposits. It is likewise impossible to dissociate the ceramics from the other archaeological finds, and further studies must take into account the totality of the different elements which reflect the development of this culture.

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Preliminary Anthropological Study on Material from Ancient Kerma (Kerma, Sudan)

by Christian Simon

During the last two seasons of excavation at Kerma (1980-1982), several sectors of the necropolis have been excavated. These were in the zone of Ancient Kerma (the northern part of the necropolis). The anthropological material exhumed is in an excellent state of preservation. The very hot climate, associated with the depth of the graves, contributed to the conservation of the remains. The exceptional state of preservation has allowed us to obtain samples of tissue such as skin and hair, and sometimes even the naturally mummified body.

This very interesting material will permit research in areas other than the classical study of the skeleton, such as palaeoserology, histology, the antigenic systems (H.L.A.), etc.

Determination of the sex and age of the deceased

We have obtained 28 subjects for which the sex was determined, by the method of Acsadi and Nemeskéri (1970), together with measurement of the hip bone (Gaillard 1960 and Moeschler 1966).

	Sector	*Male*	*Female*	*Indeterminate non-adult*
Season	1	6	2	–
1980-81	2	1	1	2
Season	3	2	2	4
1981-82	4	1	3	4

Distribution of sex by sector

We note that the sexual distribution differs in the different sectors. In total, however, the proportion of each sex is almost equal.

The age at death of the non-adults was determined by examination of the extent of cutting of the teeth (Olivier 1960) and, for the adolescents, by the degree of synostosis of the epiphyses of the long bones (Brothwell 1963 and McKern and Stewart 1957).

The number of non-adult subjects is relatively high (more than 45%), and they are situated mostly in sectors 3 and 4, where the proportion reaches 50%.

	Age classes				
Sector	*1-4*	*5-9*	*10-14*	*15-19*	*Adult*
1	1	—	1	1	7
2	—	—	—	1	1
3	3	—	2	—	3
4	2	1	1	—	4
Total	6	1	4	2	15

Age distribution of the non-adults

All age classes are represented, with the exception of the very young (class 0-1 year).

Due to the small sample of the skeletons, it is not possible to make a detailed study of the mortality. We remark only a high infant mortality, whilst for the adult subjects, the mortality for the two sexes is almost the same. Also, the distribution of the adult deaths is well spread out amongst the different age classes.

Morphology

This small group presents a large heterogeneity of forms. The general tendency, however, is for an elongated skull (dolicho to mesocrane M.72.8, F.74.9). The cranial vault is high, the face is medium to long, the nose sometimes large (60%), sometimes narrow. For most of the subjects (75%), there is a clear prognathism (alveolar or facial). The form and the colour of the hair could be observed on some of the subjects; the majority had hair of dark brown or black colour, with rather small curls (0.5 cm diameter). We have also found hair of light colour (blonde or light brown), which is wavy or straight.

In general, all the skulls are robust, with well marked muscle insertions.

Individuals of both sexes are very tall. The intermember indices indicate short to medium length arms; that is, the legs were relatively long and well developed. The robustness of the long bones confirm the observations made on the skulls.

Two predominant human types appear in this sample. On the one hand, there are subjects of average height, with average to long faces and narrow noses, and on the other hand individuals that are tall, with an average face and a large nose.

The mummified subject of tomb 57 (Fig. 1) is of interest, since his preservation allows for a picture of the appearance of an inhabitant of Ancient Kerma. The subject is a male adolescent, with characteristics as described above. The skull is elongated, the face is of average length with a large nose and prominent cheek bones, and the clear prognathism is associated with a strong development of the dental apparatus. The black hair was arranged in small, long curls, similar to those observed in 1979 (Simon 1980). The morphological characteristics of this subject are the same as for the present-day Nubians.

Traumatism

Even though a palaeopathological study has not yet been carried out, we have, nevertheless, observed traumatism for almost all the male skeletons. It consists of well united fractures, and evidence of blows to the head. We have detected several cases of fractures of the humerus and the cubitus (Fig. 2). The lower members do not show any fractures. The traces of blows to the skull are both frontal and parietal.

It is interesting to note that the female subjects are exempt from such traumatism. There is therefore a relationship between this and the masculine activity. It seems that the men had a violent comportment, rather consistent with warlike activity.

The study of these several skeletons throws a little more light on our knowledge of the population of Ancient Kerma, whose characteristics are still badly understood. It is evident that the view is very partial, given the small number of skeletons exhumed. We hope, therefore, that the next seasons of excavation will allow us to complete our understanding.

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Second Note on the Fauna of Kerma (Sudan)

Seasons 1981 and 1982

by L. Chaix

The last two seasons have continued with the same objectives as previously, that is:

1. Study of the fauna of the ancient city of Kerma
2. Study of the animals discovered in the eastern necropolis.

1. The collection of bone remains has continued by sectors, and confirm the observations made during the preceding years (Chaix, 1980). The preponderance of Bovidae in the livestock of the populations of Kerma is notable. The study in progress of the bones attributed to this species seems to indicate that these were large animals, close to *Bos africanus,* itself derived from a local subspecies of aurochs (*Bos primigenius.* Boj.).

The Caprinae (goat and sheep) were next in importance. The sheep were armed with horns, which were coiled for the rams. The goats, however, had only weakly twisted horns.

Cattle and caprine animals formed the essential part of the livestock. To these can be added several remains of dogs and donkeys.

To the north-west of the Deffufa, the debris left from the excavations of Reisner, attributed to Classic Kerma (1750-1200 BC), has produced two bones of Camelidae (*Camelus* sp.). If this discovery is confirmed by others where the chronology is certain, it will provide strong evidence for Camelidae in this zone.

Wild fauna is practically non-existent. The only discovery has been incisors of hippopotamus (*Hippopotamus amphibius* L.). One wonders what became of the rest of the skeleton.

Amongst the manufactured objects, we have found a very fine harpoon of elliptic section made from bone (or ivory) (Fig. 1). Numerous awls made from caprine metapodes have also been brought to light. These were no doubt associated with the working of leather, which was very developed at Kerma.

Several small earthen statuettes have been discovered in a foundation deposit situated in a western annexe of the Deffufa. Despite the disappointing workmanship of these pieces, it is possible to recognise the forms of Bovidae and Caprinae, as well as hippopotami and crocodiles. Amongst the Bovidae, there is one object which has a cervico-dorsal hump, unfortunately not very well developed. It could be the representation of a zebu (*Bos indicus* L.), but the absence of other information does not allow any certainty.

2. The study of the fauna of the eastern necropolis has been concentrated in two sectors. We have uncovered a number of cattle skulls situated on the southern border of a vast tumulus belonging to Middle Kerma, which has not yet been excavated. The signification to be given to these objects is described elsewhere (Chaix, to appear). The excavation of several areas has allowed both a study of the arrangement of the skulls and an estimation of the total number (more than 500 in this case). In addition, measurement and a morphological study of fifty of the skulls has been carried out. This has permitted a better description of the cattle, the rest of the skeletons of which are found in the city.

The northern sector of the cemetery, attributed to an ancient phase of Kerma, has also shown the presence of cattle skulls on the southern edge of the tombs. We have thus confirmed an observation already made on the site of Saï, to the north of Kerma (Gratien and Olive, 1980). It is possible to observe a difference in the preparation of these objects, however. In Ancient Kerma, the skulls always have the nasal bone present (Fig. 2), whereas for Middle Kerma, the frontal bone has been cut away transversally at the level of the spine. It can also be noted that the cattle skulls on the borders of the graves of Ancient Kerma seem to be of smaller size than those of later periods.

Amongst the graves attributed to more ancient phases, the tomb 67 deserves a particular comment: at the foot of the deceased, an adult, there rested a dog which had been naturally mummified, preserving the tissues and the fur. This animal, 9 to 10 months old and of average size (50 cm high), has a very similar morphology to present-day Sudanese dogs of the type "pariah" (Epstein, 1971) (Fig. 3). Certain aspects of the skeleton, such as the equal lengths of the femur and tibia, indicate that there had already been a long period of domestication (Ducos, p. 201 in Schiff-Giorgini, 1971). Another tomb, situated in a zone further to the south (No 25) revealed also the remains of a small dog, lying at the feet of the deceased.

The dog of tomb 67 had been strangled using a leather strap with a sliding knot, which is still visible.

In several graves, shrouds made of cattle skins have been observed. The dimensions of the skins show that they came from large-sized animals. The fur, brown in colour, had been removed, with the exception of a narrow strip, 3 cm wide, on the very edge (Fig. 4).

The various tombs excavated have also revealed some other very interesting remains. Thus, in tomb 70, there

were the remains of a necklace made from shells of a marine gasteropod (*Pollinices tumidus* Sw), which comes from the borders of the Red Sea *. The shells were separated from each other by vegetal objects (fruit stones?), the species of which remains to be ascertained (Fig. 5). This finding confirms the existence of movements or exchange over long distances.

We should mention finally the parts of the loincloths that have a decoration made of triangles of cattle hair. The light yellow colour of the triangles suggests the existence of cattle with a spotted coat, another sign of a long domestication.

In connection with the research on the livestock of the populations of Kerma, we have obtained a series of samples of the pollen on the site, in order to study, together with a specialist, the evolution of the vegetation. It seems likely that the ancient inhabitants of Kerma needed a large amount of pasture land for the upkeep of the vast herds of cattle and caprine animals of which we have found the remains. The pastures subsequently disappeared, to be replaced by large areas covered by asclepias *(Calotropis procera)*, an indication of an ancient clearance and overgrazing.

* We thank Mr O. de Villoutreys for this determination.

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