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SOUTH ARABIAN NECROPOLIS

ALESSANDRO DE MAIGRET
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ROME 2005

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Italian Excavations at Al-Makhdarah and Kharibat al-Ahjur (Republic of Yemen)

With contributions by
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FOREWORD

This volume on the South Arabian necropolises is a continuation of the publications on research activities carried out between 1983 and 1992 by the IsIAO Italian Archaeological Mission in Yemen within the framework of a Project of Archaeological Training in Yemen funded by the General Direction for Development Cooperation of the Italian Ministry of Foreign Affairs. The other two volumes published previously in the Institute's series Reports and Memoirs consist of the one on the archaic Sabaean complex of Wādī Yalā [1] and that on the Bronze Age in South Arabia [2].

The present report, which presents and compares the results of the excavation of a nomadic people's cemetery and a necropolis of sedentary population, expresses above all, as in the two preceding publications, the sense of the chronological, ethnic and cultural complexity that characterizes the pre-Islamic populations inhabiting inland Yemen. The Wādī Yalā excavations unexpectedly set the date of the beginning of the Sabaean culture to the second half of the 2nd millennium B.C. and the discovery of the Bronze Age threw the spotlight on an earlier population, quite different from the Sabaeans. Nevertheless early research on the dead and their funeral customs actually revealed some particular ethnic and chronological juxtaposition and/or overlapping, as well as parameters of cultural diversity that, while no doubt complicating the previously known historical frame of Arabia Felix, also make our research work so much more fascinating.

The problem of the origins and pre-/protohistorical peopling of inland southwestern Arabia is in any case the central issue and represents the reason for being and, until 1987, the main focus of the Italian Archaeological Mission. With the present volume on the tombs, it may be said that, in broad outline, a start has been made on providing good solutions to the problems of 'who' and 'when'. It is also for this reason that, ever since 1987, the focus of the research has begun to shift towards the other, huge, category of problems, represented by 'how' and 'why', initiating systematic excavation programmes in several of the main South Arabian towns such as Barāqish/Yathill and Hajar Kuḥlān/Tamna'.

The research on the tombs in particular was carried out by the Italian Archaeological Mission in the years 1986-87. What emerged clearly was the large number and, above all, the extraordinary variety of burial methods and the highly sporadic nature of the specific research carried out before this. Masonry, pit, rock, hypogean and turret tombs, etc. definitely seemed to reflect the ethnic/cultural heterogeneity that, as has been said, we have been endeavouring to decipher for some time. The research strategy followed thus led us to select two burial models as far as possible apart both typologically and geographically for the purpose of carrying out two excavation campaigns – namely the 'turret tombs' of Al-Makhdarah on the desert edge of Jawf and the hypogean tombs of Kharibat al-Ahjur on the Dhamār plateau.

The archaeological evidence made it possible to complement the architectonic differences by means of data referring to inhumation methods and find types; to weigh up the significance of the presence and absence of certain categories of objects; to assess the cultural significance of the various building strategies as a function of the lithological constraints; to observe the analogies and difference within a diachronic framework that finally became possible. The archaeological conclusions provide autonomous separate data for each of the two necropolises, leading to the assumption that populations of different cultures lived in Yemen at the same time. This hypothesis is fully confirmed by the results of an in-depth anthropological survey carried out by Prof. Alfredo Coppa of 'La Sapienza' University of Rome on numerous bones found in the graves.

As will be shown in the conclusions to this report, the implications of this discovery will certainly be of great importance in any hypothetical reconstruction of the way the South Arabia was peopled in ancient times, as well as in that of the socio-political events concerning the South Arabian populations in historical times.

At this point I should like to thank the members of the

[1] A. de Maigret, ed., *The Sabaean Archaeological Complex in the Wādī Yalā (Eastern Ḥawlān aṭ-Ṭiyāl, Yemen Arab Republic). A Preliminary Report*, Reports and Memoirs, Series Maior, XXI, Roma 1988.

[2] A. de Maigret, ed., *The Bronze Age Culture of Ḥawlān aṭ-Ṭiyāl and Al-Ḥadā (Republic of Yemen). A First General Report*, Reports and Memoirs, Series Maior, XXIV, Roma 1990.

Mission who (in addition to the present authors) participated with enthusiasm and abnegation in the excavation campaigns of Al-Makhdarah and Kharibat al-Ahjur, in particular, Vittoria Buffa, Fiorella Rispoli, Edoardo Gatti, Vincenzo Labianca, Mario Mascellani and Antonio Solazzi.

Moreover I wish to thank Roberto Bocchino for his generous help in arranging the plates of this volume.

Special thanks go to Prof. Gherardo Gnoli, President of IsIAO (IsMEO, at the time) who, with his wisdom and farsightedness, was close to me in my anything but easy task as Mission leader.

One deep and sincerely affectionate thought must lastly go to all the Yemeni Antiquities officials who followed us through the excavations as participants in the Archaeological Training Project. Today, many years after, I think what we taught them in terms of archaeological science was matched, if not surpassed, by what we, the heirs to Aelius Gallus, learned from them, the descendants of *Arabi felices*.

Alessandro de Maigret
Naples, 26 November 2000

PART 1

1. EXCAVATIONS OF THE TURRET TOMBS OF JABAL AL-MAKHDARAH

Introduction

The Turret Tombs

In North Yemen the turret tombs (1) are visible on practically all hillsides in the country's interior. The greatest concentration is found along the pre-desert piedmont zone, where the tombs tend to be clustered into necropolises, some of which are very large. As you climb towards the highlands, the distribution continues but thins out and the tombs are increasingly scattered and isolated (in the Khawlān aṭ-Ṭiyāl, for example [de Maigret 1983: 343, figs. 55-56]).

Along the edges of the desert, the necropolises are dug out of the Jurassic limestone rock of the so-called 'Amrān Series — as in the southern Jawf (Jabal Kharāb, Jabal Yām, Jabal Makhdarah, Jabal Balaq) —, as well as out of the crystalline pre-Cambrian rocks of the Arabian Basement — as in the northern Jawf (Jabal Lawḏ), on the northern boundaries of Ramlat Sab'atayn (Jabal 'Alam al-Abyaḍ, Jabal 'Alam al-Aswad, Jabal Ruwayk), in the mountains at the mouth of the Wādī Yalā (near Madinat Khuraym). There are also rarer examples in Quaternary volcanic rocks (2).

What is striking is the contrast between these necropolises, situated on the rock slopes and the numerous fortified South Arabian cities that, in this pre-desert strip, all stand on Quaternary sediments supported by these slopes. There is therefore practically always a substantial distance between classical period settlements and turret tombs.

There are a variety of possible explanations for these distribution differences, which will be discussed in the conclusions. However, it is also possible to state *a priori* that while the position of the cities must have been dependent more on the need to exploit the sediments for farming purposes and at the same time to be in a more suitable position for intercepting the caravan routes, that of the necropolises must be accounted for by the need to obtain materials required for the construction of the turret tombs and perhaps by the need to comply with a funeral ritual in which the rock and the mountain had an intrinsic importance of their own (de Maigret 1996).

But does any relationship (political, sociological and above all chronological) exist between the cities and this type of necropolis? The presence near the cities of necropolises of a completely different type (see, for instance, those of Tamna' and Mārib) seems to discount (or at least complicate) any hypothetical relationship. The aim of the present study is indeed to examine the problem in greater depth and, if possible, to suggest some possible explanation of the phenomenon.

The Al-Makhdarah Necropolises

In December 1986 and October 1987, the Italian Archaeological Mission had the opportunity to carry out two short reconnaissance and excavation campaigns at the Al-Makhdarah necropolis, one of the largest and best preserved in the Jawf basin (de Maigret 1986).

The necropolis runs along the initial portion of the Wādī Makhdarah, at the point where it opens into the Jawf valley from the pass between the Jabal Marthad (2240 m) to the West, and the Jabal Makhdarah (2120 m) to the East (Fig. 1). On the 1:250,000 scale geographic map (sheet 1) produced in 1974 by the Military Survey, UK Ministry of Defence, it is located at 15°33' N and 45°01' W, between the Wādī Makhdarah and a small circular hill ('Hill A') identified by the 1400 m contour line situated 13 km N of Ṣirwāḥ.

In aerial photograph 850/179 supplied by the Yemeni Survey Authority, the ruins can be clearly seen (Fig. 2). At the foot (E and NE) of the above-mentioned Hill A lie the necropolises (marked by the acronym MKD), while to the S an old quarry is visible, which stands out with its crescent shape and reflecting appearance (acronym: MNQ); to the S of the quarry a tomb is marked which is

(1) Here we shall use the term 'turret tomb' in order to obtain a clearer and more direct definition of the morphology of these monuments. We feel it is more impersonal and objective than the nevertheless more firmly established term of 'pill-box' coined at the time by H.St.J. Philby (1939: 371 ff.).

(2) The references are limited here to the zone granted at the time for study purposes to the Italian Archaeological Mission (Khawlān aṭ-Tiyāl, al-Ḥadā, southern Jawf, northern Ramlat as-Sab'atayn).

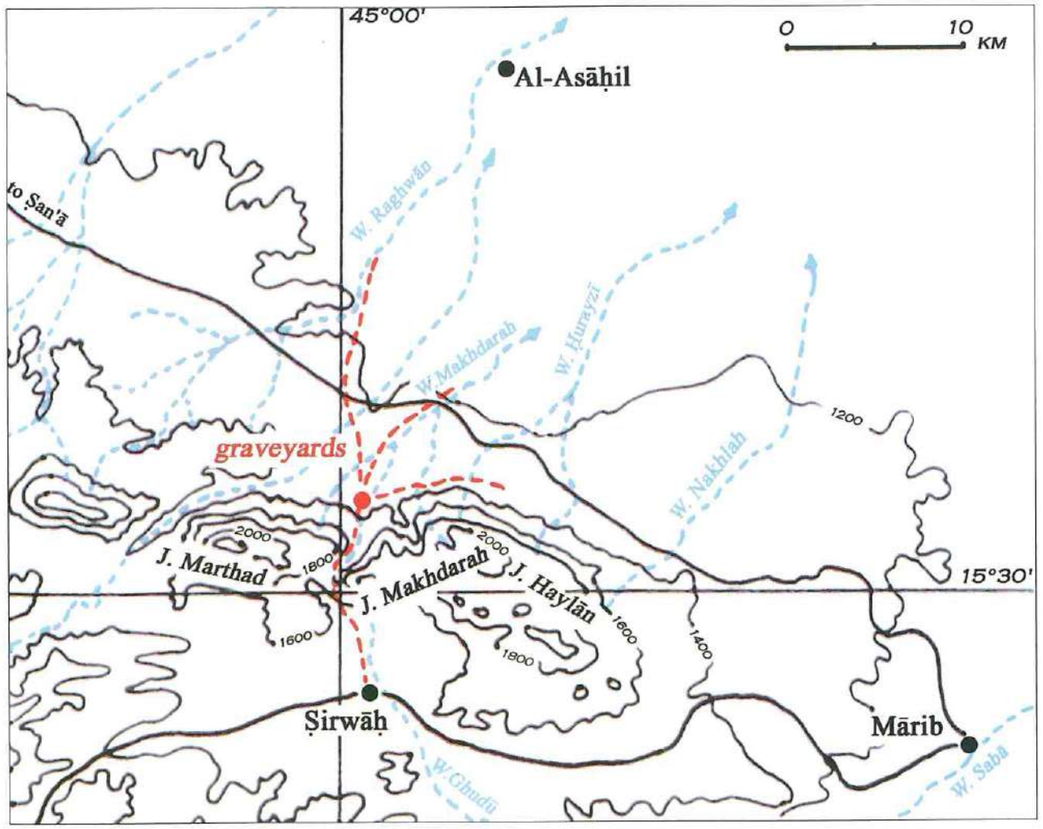


Fig. 1. Geographic position of the Al-Makhdarah necropolises.

surrounded by circular annexes (MNQ/T1); the Wādī Makhdarah cuts the lower left corner of the image.

The average altitude here is 1400 m, with the ground sloping gently northward. The rock, which often outcrops, consists of the Jurassic limestone of the 'Amrān Series, which here takes on the reddish hue and typical porosity of dolomite. As it moves further northward it sinks into the Pleistocene alluvial deposits of the Jawf from which, in this strip contiguous with Jabal Marthad and Jabal Haylān, outcropping dark coloured lava flows from the same period are visible.

The tombs are easy to spot. At the service station known as Kamb Bin Ka'lān, situated on the bitumen road of southern Jawf about 130 km from Ṣan'ā and about 40 km from Mārib, a track runs off towards the South; after 7 km it reaches a flat area on which the long narrow necropolis lies (approx. 800 × 80 m).

On the land itself it is possible to see that the turrets are distributed in different directions (Fig. 3). Starting from the S, a first group slopes downward in a NE direction following the Wādī Makhdarah (MKDi); a second group, further on, proceeds northward, in the direction from which the Kamb Bin Ka'lān track rises (MKDii); a third group, even further on, extends in an elongated form towards the NW following the base of Hill A (MKDiii).

It is probable that these three distribution directions — which are underlined also by the direction of peculiar, long lines of stones decorating the tombs ('rays') — bear witness to the existence in this point of an ancient road junction. This hypothesis will be further developed in the following.

The 'MKDi' Necropolis

Coming through the pass from the direction of Ṣirwāḥ and on reaching the flat ground to the SE of Hill A (Manqaz Plain), this is the first stretch of tombs one encounters (Figs. 1-3). Extending in a NE direction, it runs along the left side of the Wādī Makhdarah for a distance of about 500 m, descending by about 20 m. The tombs thus appear to follow a line that skirts the Jabal Makhdarah and the Jabal Haylān in the direction of Mārib. Its continuation in that direction is in any case proved both by the existence of another necropolis that can be glimpsed even further to the E (not explored) and by a modern track with the same alignment.

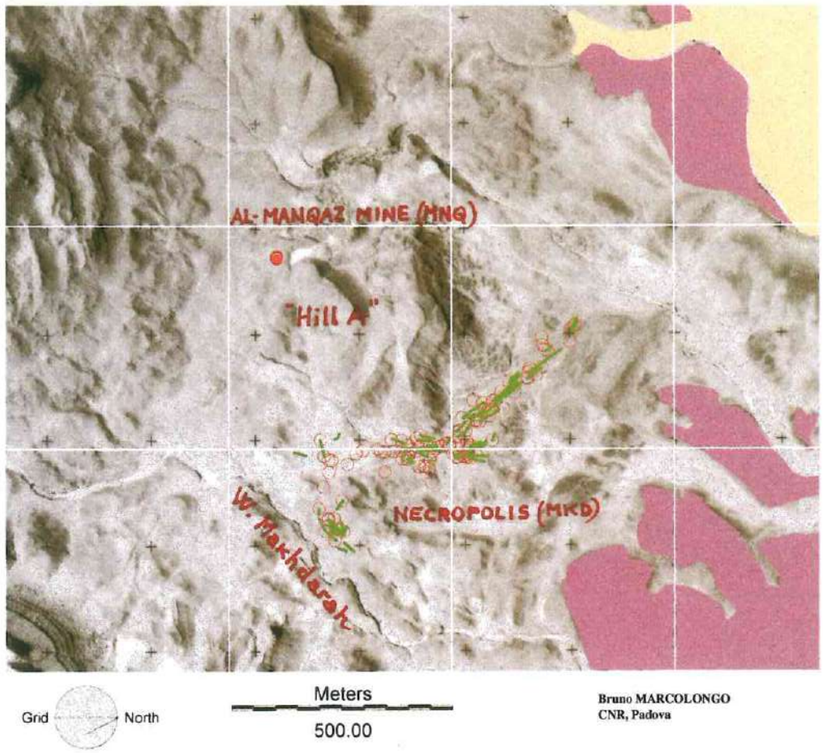
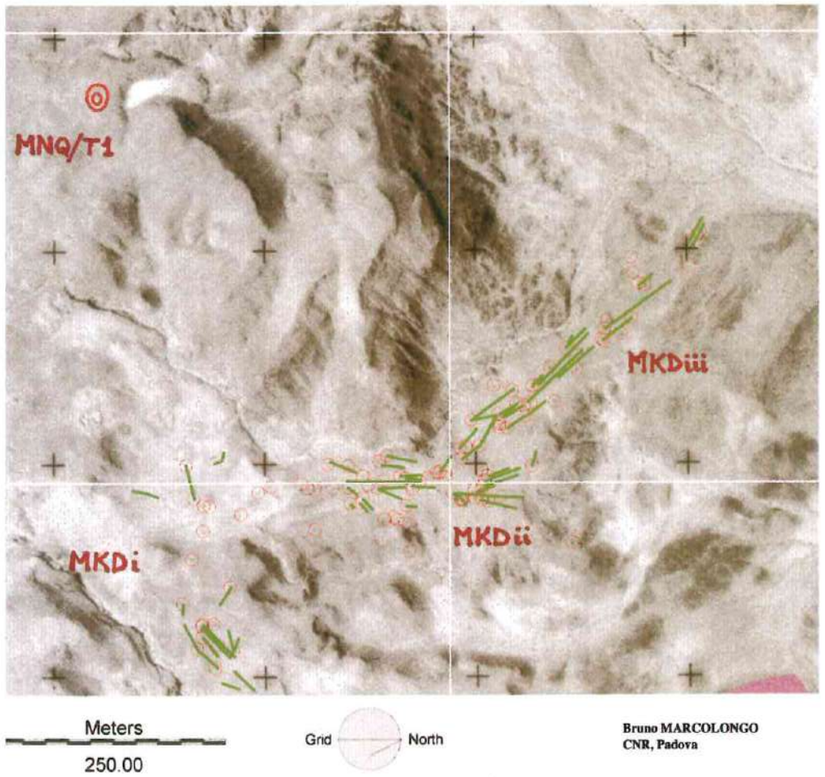


Fig. 2. Geo-archaeological sketch map of Al-Makhdarah antiquities.

Fig. 3. Photointerpretation image of the necropolises.



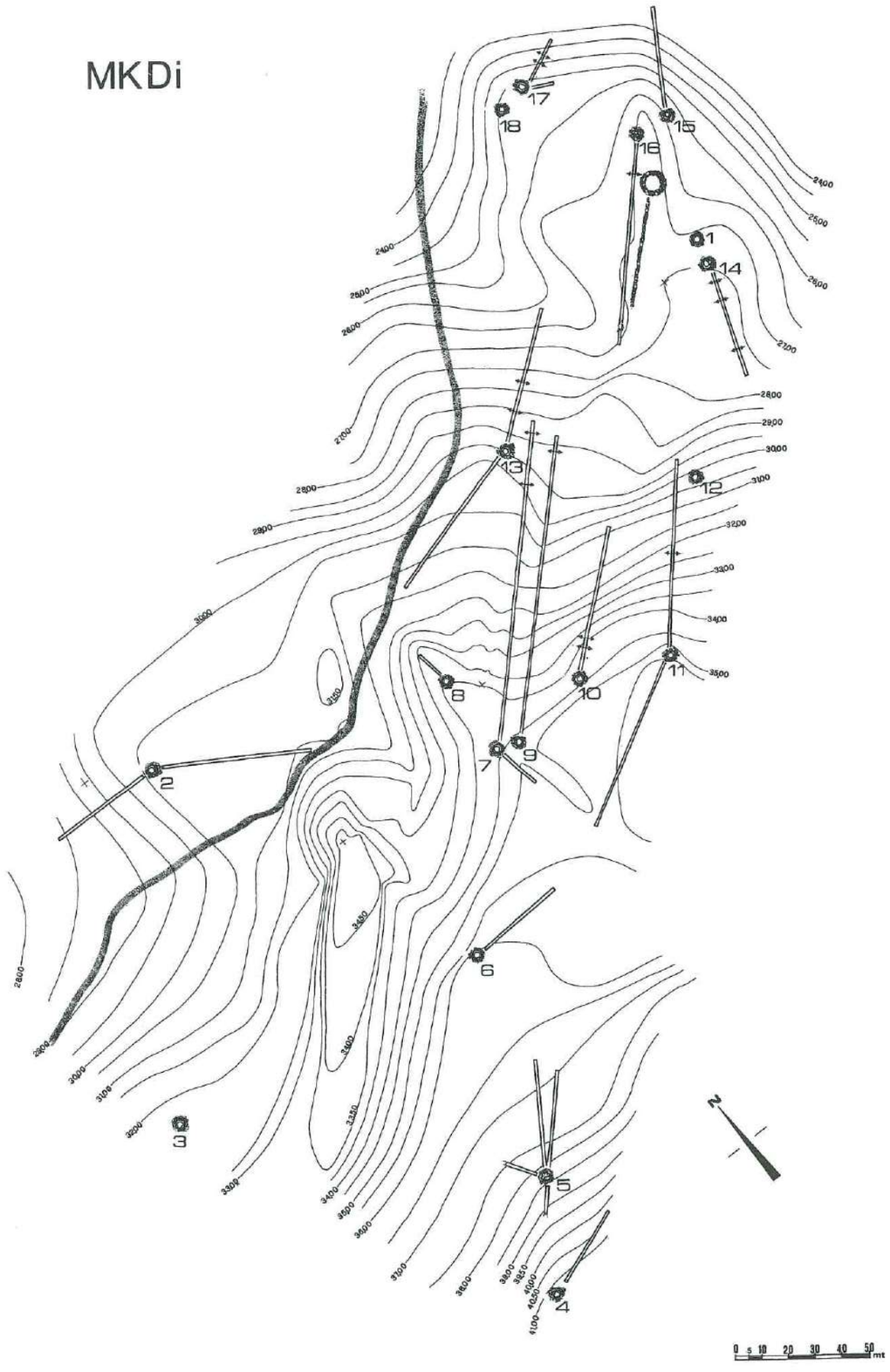


Fig. 4. Topographical survey of the MKDi necropolis.

The map shows the 18 best preserved tombs (Fig. 4), although the remains of slabs set in the soil attest the original presence of other burials in the south-east section of the necropolis, along the edge of the *wādī*. These tombs (Pl. 1) must be extremely ancient, not only in view of their advanced state of degradation, but also due to the extreme scattering of the collapsed material (in the vicinity of the slabs only a few of the larger stones remain) and to the ancient and static appearance of the patina (ruins that have long been immobile and exposed to the elements have a different — indeed more ancient — appearance than those in the towers that are still standing).

The tomb entrances all face westward and the axis of the entrances forms an obtuse angle with the rays that start from the towers and follow the NE orientation of the necropolises. These lines of dry stones, although very long (e.g. the 120 m of T7), vary in number for each tomb (4 for T5; 2 for T2, T7, T11, T13, T17; 1 for T4, T6, T8, T9, T10, T14, T15, T16; tombs T1, T12 and T18 have no rays) and sometimes, instead of descending in a NE direction, they rise towards the SW (T5, T11, T13, T14, T16). Often these low walls (today reduced to long stone mounds) have gaps in them, as shown on the map.

Not all the towers display the same state of conservation. Some, except for the small collapsed portions concentrated in the upper part opposite the entrance, are complete, displaying the typical truncated cone shape with slightly bulging walls; others, apparently older, have lost the front curtain of the wall and show the rough and irregular apparatus of the interior one (Pl. 2.*a*). This difference in the appearance of the towers certainly denotes the difference in the age of the monuments. The tombs range from the older ones, now reduced to simple burial chamber slabs, to intermediate ones still standing with only the single interior curtain wall and to more recent ones which are still intact (Pl. 2.*b*).

In the midst of the tombs, towards the NE boundary of the necropolis, there stands a circle of stones (*c*. 10 m in diameter) with a ray (43 m long) climbing the slope to the SW (Pl. 3.*a*). A second circle (not included in the survey) is situated to the SE, on the edge of the Wādī Makhdarah. The function of these structures is still unclear.

The environment is particularly dry. The only plants that grow on the rough porous dolomite tableland are sparse *Commiphera myrrha* trees and scattered *ar-ra'ah* bushes (*Aerva javanica*).

Tomb T1 was excavated in this necropolis.

Tomb MKDi/T1

This is a very large tomb situated near the end of the necropolis MKDi, sloping downward towards the NE (Pl. 3.*b*). It is over 3 m high with a base diameter of 3.60 m (Fig. 5). It is well conserved, except for the collapse of the upper portion of the outer curtain in the eastern sector. The burial chamber is rather narrow (diameter 1.70 m). Precisely because the large size of the tower demanded

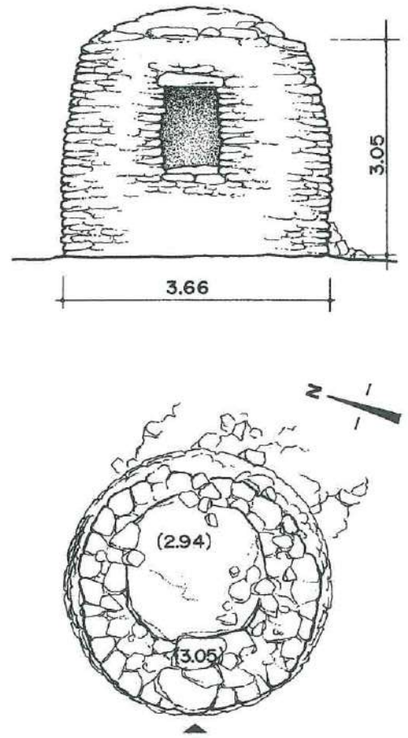


Fig. 5. Tomb MKDi/T1: plan and elevation.

an increase in the size of the bearing structures, the walls, formed by an inner curtain and an external curtain densely packed with loose stones, are over one metre thick (Fig. 6). The roof consists of a single huge slab some twenty cm thick (Pl. 4.*a*). The size of the entrance, as usual facing W (0.90 m high and 0.60 m wide) is not much different to that of the other tombs, although in this case the opening seems smaller and located higher up (it appears more as a window than a door) because of the larger size of the construction. Below the entrance lie stones disturbed by ancient raiding. The tomb was excavated on 10-11 October 1987.

The interior was filled with sand and stones up to about 30 cm below the entrance threshold (height 1.05 m). Descending to this level, a large number of untidily arranged slabs were found. They are probably what was left of paving on which the deceased were laid, which had been torn up and removed by early tomb raiders. The very small number of bones found (three of four fragments) shows that also the skeletons were removed. No other object was present in the burial chamber.

Even further down lay several other loose stones that, after removal, left a compact beige soil on the bottom (level -0.06 m). A few cm further down (level -0.14 m) in the SW half of the chamber bed rock was found (Pl. 4.*b*).

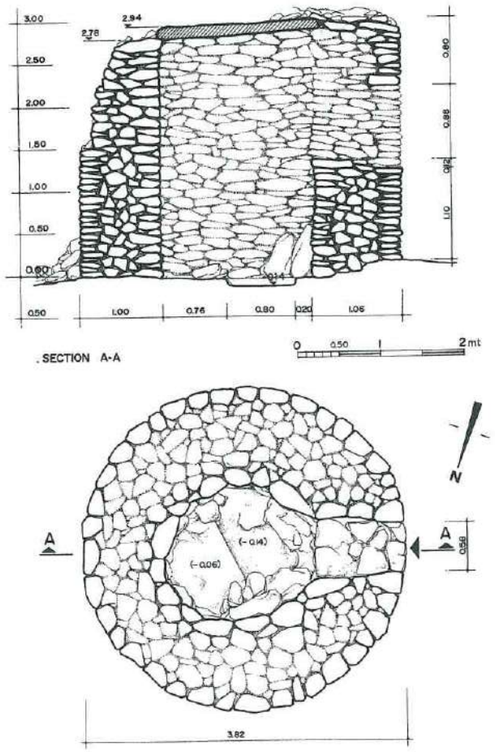


Fig. 6. Tomb MKDi/T1: section and base level plan.

The emptying of this tomb, although unfortunately not providing any archaeological evidence, allowed us to shed light on a peculiar architectonic characteristic, namely, the absence of vertical slabs, which are usually used to delimit the burial chamber. Here the inner curtain is not supported by such slabs but rests directly on the bed rock and rises sheer (for 2.78 m) up to the roof. It is difficult to establish whether this peculiarity is the result of a static phenomenon, in view of the large size of the structure, or to the tomb having a comparatively late chronology.

The 'MKDii' Necropolis

Coming from Ṣirwāḥ and continuing northward, that is, towards the Jawf, after passing the necropolis of MKDi on the right, you come across a second group of tombs (MKDii) (cf. Figs. 1-3), which slope downwards over a height of 22 m for about half a kilometre along the road (Pl. 5).

The necropolis comprises 32 tombs. The rays associated with the towers almost all run S-N (Fig. 7), forming angles of about 90° with the axes of the entrances, which all point westward. Along the necropolis, and running in the same direction, is a track used to reach the tarred Ṣan'ā-Mārib road at Kamb Bin Ka'lān.

Several of these rays are quite long (note the 190 m of T22) although there are some smaller ones (e.g. the 5 m long ray of T20). Their width, only occasionally exceeding 1 m, and their dry construction, militated against the good conservation of these walls (Pl. 6.*a*). As their upper face is no longer visible it is not possible to reconstruct their height accurately (Pl. 6.*b*). The best conserved points are the distal extremities, which are carefully squared off and vertical (Pl. 7.*a*).

In these necropolises, the rays leaving the tombs run downhill in a N direction (Pl. 7.*b*). However, several of these small walls run uphill (T13, T23, T31, T35, T38) or in anomalous directions (in which case they are very short: T13, T15A, T20, T22, T42). In most cases each tomb has only one ray (the length is always variable) and occasionally two (T15A, T22, T26) or three (T13). A few have no rays at all (T18, T19, T21, T27, T28, T29, T30, T36, T37, T39, T40).

Many of the latter tombs are among the worst conserved (T18, T19, T27, T28, T29, T36, T37, T39, T40). This would seem to indicate that the practice of adding rays to the tombs (although these were not completely absent in the earlier phases, and even though, conversely, intact tombs without rays are also found) was more widespread in a comparatively later period.

The excavation of this necropolis involved two tombs: T13 and T15.

Tomb MKDii/T13

This is the northernmost tomb of the necropolis MKDii and the first encountered on the plateau when approaching Al-Makhdarah from Kamb Bin Ka'lān (Fig. 8). It is characterized by three rays, one of which (the longest) runs NW while the other two (which is quite unusual) run up the slope in a SE and SW direction, respectively. Its overall state of conservation is quite good, except for a collapsed portion at the N end involving part of the outer curtain, but leaving the roof slabs intact (Pl. 8.*a*). The rectangular entrance aperture (height 1 m; width 0.70 m) faces W and has a threshold at a height of 1.50 m (Fig. 9). Under the doorway, on the outside, there is a heap of stones apparently originating from the dismantling of the closure by ancient tomb raiders. T13 was excavated in two steps: on 16-17 December 1986 and 5-6 October 1987.

On the inside, the filling surface (1.40 m level) was found to be covered with a layer of fine sand, several cm thick, of aeolian origin (Fig. 27). Immediately beneath this layer, at the 1.30 m level (i.e. 1.20 m from the tomb roof and 0.20 m from the base of the doorway) lay a comparatively even layer of variously sized slabs (locus La) (Pl. 8.*b*).

Removal of this layer of stones immediately revealed a large number of bones immersed in a layer of fine sifted

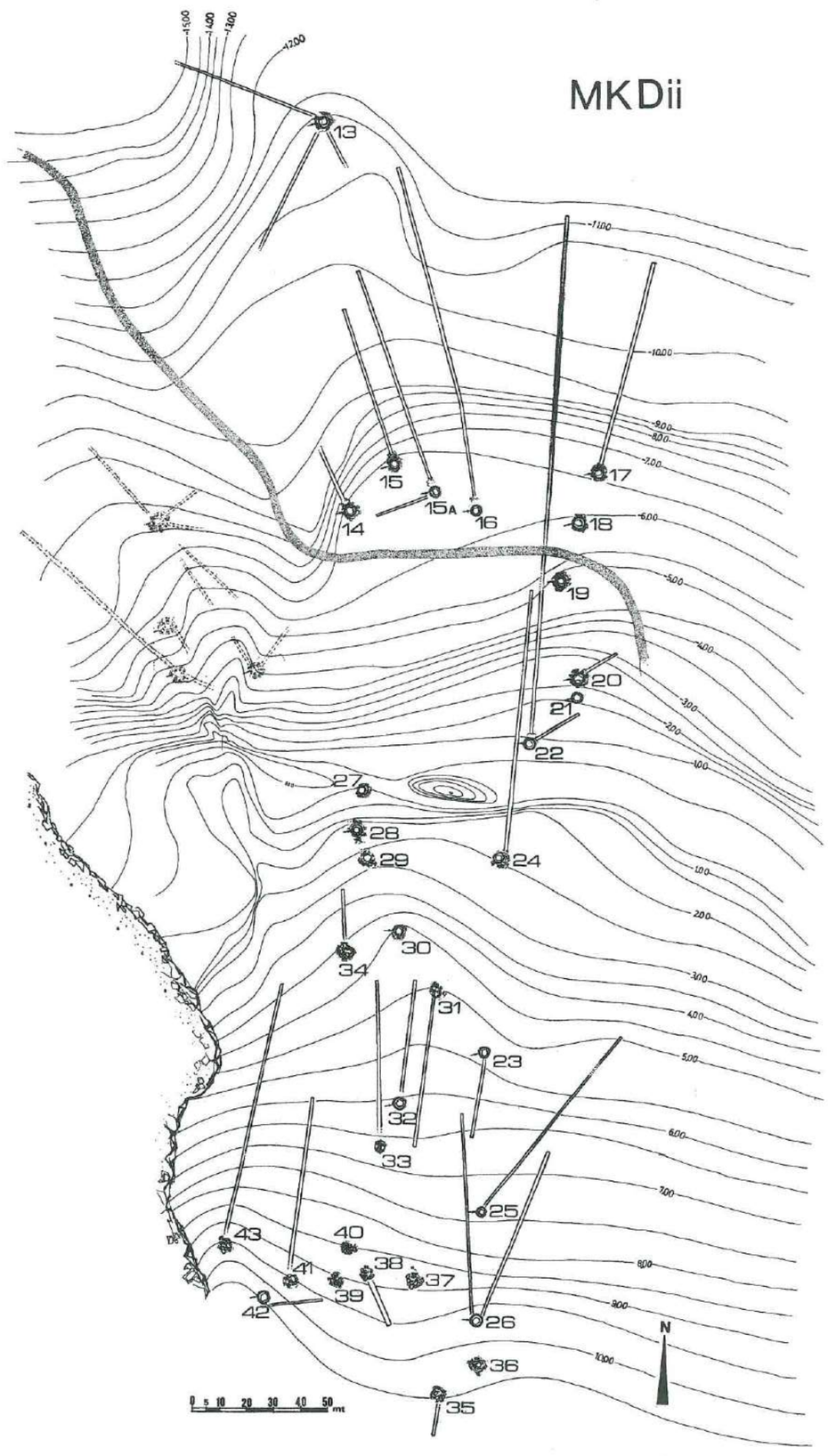


Fig. 7. Topographical survey of the MKDii necropolis.

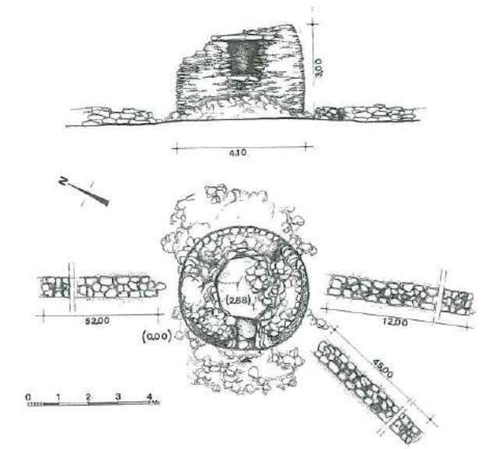


Fig. 8. Tomb MKDii/T13: plan and elevation.

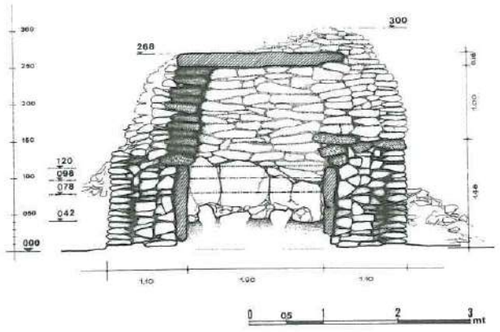


Fig. 9. Tomb MKDii/T13: East-West section.

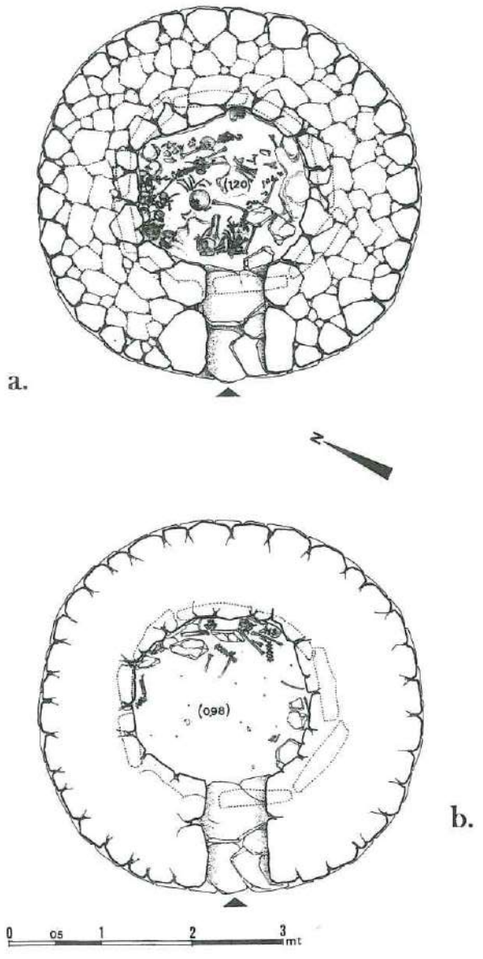


Fig. 10. Tomb MKDii/T13: a) lev. 1 burials; b) lev. 2 burials.

yellow sand (level 1) (Fig. 10*a*). Just under the doorway lay the head and trunk of a skeleton (Pl. 8.*c*) laid on the left side and facing eastwards ('Individual A'). One arm was bent towards the face. The bones of the pelvis and legs were disarticulated. In front of the face lay carnelian bracelet beads (Pl. 33.*c*) and a sea shell ring (Pl. 33.*e*). Near and behind the neck there were numerous other beads (made of carnelian, sea shell and two of gold) as well as a shell pendant studded with carnelian. These finds obviously came from a necklace (Pls. 32.*c, d, f*; 33.*a-b*).

Some forty cm from the head, towards the centre of the tomb, lay an alabaster grindstone (Pl. 34.*b*) with a spindle-shaped bronze rod (Pl. 35.*c*) and a small granite vessel (Pl. 34.*c*) beside it. Traces of kohl, still visible on the surface of the grindstone, indicate that these objects had a cosmetic function. Taken together with the personal ornaments seen previously these objects seem to suggest the buried body was a woman. However, examination of the skeletal remains seems to contradict this hypothesis: it was apparently a man aged 30-35 years. The pronounced signs of muscular stress on the femurs and the widespread periosteal reaction visible on the right tibia apparently suggest the individual spent long periods of riding a camel. Stress signs were also visible on the right collar bone (see A. Coppa & S. Damadio's report).

If the determination of this buried individual's sex was correct we would have to assume that the personal ornamentation and cosmetic objects were related to a preceding female burial, which had been shifted to make way for Individual A. Sex determination carried out on the other skeletal remains scattered over the chamber has actually allowed several female burials in this tomb to be identified.

Sieving the sand from the excavation of Individual A

also yielded numerous string (Pl. 38.*b-c*) and fabric fragments, including several of a finer type, with green, yellow and black colours, and others of a coarser type resembling sacking. There were also abundant fleecy seeds of a plant of the *Aerva javanica* species (or also of *Aerva lanosa*), referred to also today in this region of Yemen as *ar-ra'ah,* customarily used to pad cushions.

The alabaster grindstone stood on very hard reddish-brown soil, which contrasted strongly with the fine loose yellow sand found throughout the rest of the tomb (Pl. 9.*a*). The excavation revealed that this soil formed a rather deep, hard, compact circular mass, as if a liquified resinous substance had soaked into the sand. The fact that the bones of a hand, located in the vicinity of this dark mass, showed signs of burning actually indicates that it was the result of the melting of a particular substance (myrrh? incense?). Although no accurate analysis has been made of the nature of what was burned in this place, there is no doubt that it consists of significant remains of a burial rite.

Continuing the excavation it was found the burned and liquefied substance had percolated through the sand and ultimately discoloured and cemented several bones lying in the level below. These bones were obviously related to previous burials, which means that the ceremony of the offering of resins referred specifically to the last burial, that is, that of Individual A. At the time of this last burial, the larger bones from previous burials were removed and piled up on the NE side, near the rear wall of the tomb (Pl. 9.*b*). Some fine sifted sand was thrown in to fill up the gap created on the SW side so as to prepare a clean surface suitable for a fresh burial.

After removing the skeleton of the male subject and the central mass of dark hardened soil, together with the related sand bed, it was possible to isolate and clean the numerous disarticulated bones from the previous burials. The number of skulls showed that at least 14 deceased were involved. The sieve, together with the remains of a leather belt with sheet iron reinforcements, a bronze ring with a flattened mounting (Pl. 35.*f*), a bronze buckle (Pl. 35.*e*) and many obsidian flakes (Pl. 34.*a*), yielded beads and numerous fabric fragments.

In addition to what has been described for Individual A, the study of the skeletal remains confirmed the number of burials (all adults aged between 14 and 55) and revealed the large number of traumas (none lethal) visible in the skulls (in as many as 8 individuals, both males and females) as well as of periosteal reactions due to muscular stress in the tibias and fibulas. Also 8-9 ribs belonging to the same individual were identified, bearing the marks of the sharp instrument that caused the death.

The excavation showed that the sand level with all these buried bodies was contained by a floor of medium-small slabs (*locus* Lb) placed at the 1 m level (Fig. 27). Removal of this floor revealed another sand layer (level 2) containing bones and numerous fabric fragments, yellow and black in colour (Pl. 37.*b-c*), resting on a layer of gravel and crushed stone (Fig. 10*b*). These levels were

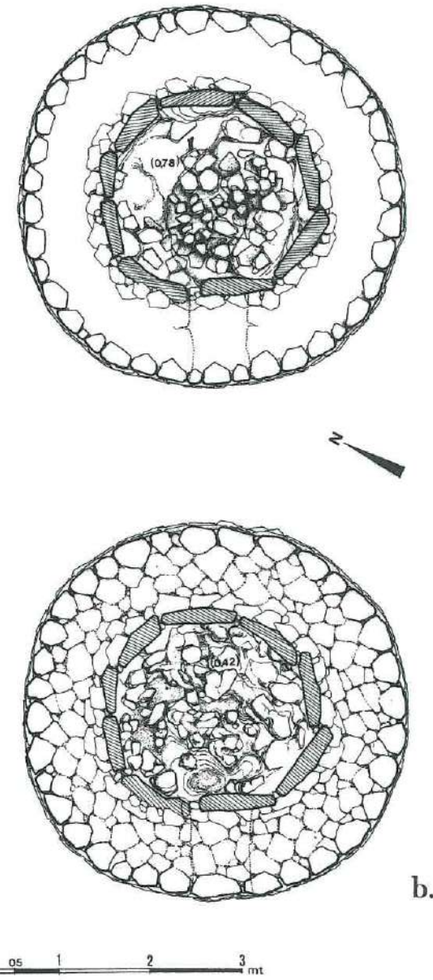


Fig. 11. Tomb MKDii/T13: a) Lc paving; b) basic loose stone filling.

supported, at a depth of 0.78 m, by a medium-large size slab paving (*locus* Lc) which was rather fragmentary at the northern end of the burial chamber (Fig. 11*a*). Beneath this layer another layer of sand mixed with crushed stone was found, in which only animal bones were however found. This level rested on a filling consisting of large, untidily arranged stones (Fig. 11*b*), which we removed only down to a depth of 0.40 m where natural rock began to outcrop.

The excavation made it possible to reconstruct, as well as the phases of tomb utilisation, also those of the tower's construction. The following is a short outline of this tomb MKDii/T13:

1. ground level setting up of a circle of limestone slabs laid edgewise (diameter: 2 m; height: 1.20 m);

2. construction, on the upper edge of the slabs of a curtain tapering upward made of stones laid flat (height: 1.30 m; internal upper diameter: 1.40 m); only the inside face of the tomb has been levelled; to the W, a gap in the curtain was made for the doorway;

3. laying of covering slabs (thickness: 18-20 cm) at the top of the curtain, which also act as an architrave for the doorway;

4. construction of a second curtain on the outside which, starting from ground level (diameter: 4.10 m), raised up to be higher of the upper level of the covering slabs (height: 3 m; upper diameter: 3.40 m); the technique is the same as that used for the inner curtain, but the levelled face is of course the one facing the exterior; the gap between the two curtains is packed with loose stones (overall wall thickness: 1.10 m); to the W, the curtain ends at the edges of doorway;

5. laying on the slab covering of a small stone and earth filling (thickness: 30 cm), retained by the raised crown of the outer curtain;

6. laying of large loose paving stones inside the tomb and evening up of the surface with crushed stone and sand; construction at the 0.78 m level, of a first pavement of medium sized slabs (Lc);

7. creation of a bed of crushed stone and sand and the deposition of the first bodies (level 2);

8. removal of the buried bodies and sealing of the levels by means of a second pavement made of small and medium sized slabs, at the 0.98 m level (Lb);

9. laying of a level of fine sand and deposition of other bodies (level 1); it cannot be ruled out that also the bones of the burials removed from level 2 were relaid here;

10. shifting and heaping of the larger bones in the NE sector of the burial chamber; filling of the space created in the SW area with fine, sifted yellow sand and the laying of Individual A at the 1.20 m level;

11. sealing of the entire chamber using a layer of small slabs (La) at the 1.30 m level; and possibly the introduction of other (non documentable) deceased;

12. natural accumulation of wind-borne sand.

In this sequence, it is not possible to establish when the three rays associated with the tomb were built, nor when the raiding actions took place (which, however, apparently, by sparing Individual A, must have been only cursory).

Several bones, taken from the piles of skeletons lining the walls (level 1) were sent to Beta Analytic Inc. for C14 analysis. The result (Fig. 12) showed a (2 sigma) calibrated dating lying between 900 and 410 B.C. The chronological evidence referring to the point where the line of the instrumental age intersects the calibration curve gives a dating of 790 B.C. This figure in any case only has an indicative value. We have no laboratory chronological evidence for the last burial (Individual A), but it would not be far out to set the time of burial around the era of Christ in consideration of the granulation embellishing the edges of the gold beads in the necklace, a widespread decorative element in South Arabia starting from that period (3). These chronological determinations suggest that the 15 individuals in level 1 were buried in the tomb over a long period of time. If we consider that this level was preceded by another burial phase (level 2), it would seem correct to assume that the construction of the tomb might be as early as the 2nd millennium B.C.

Tomb MKDii/T15

Tomb 15 is located amongst a thick group of well conserved towers that, in the N sector of the necropolis MKDii, all have long northward running rays. The single ray of this tomb is 55 m long (Pl. 10.*a*).

The upward tapering cylindrical structure is well conserved except for the crown around the roof, which has been damaged, and the right side of the doorway, where the door jamb formed by the outer curtain has been ruined. Clearly visible here is the doorway architrave consisting of a thin slab laid just higher than the base of the slabs covering the tower (Pl. 10.*b*). On the outside, in front of the doorway, lie piles of stone from an ancient violation. The excavation was shortlived (15 December 1986) owing to the small size of the deposit contained in the burial chamber.

Inside, below the customary wind-borne sand level, there emerged the slabs of a paved floor, most of which was removed. Under it, immersed in a fine sandy soil, the fragmented and disarticulated bones of several adult individuals lay. The skeletons were pushed up against the walls, leaving a heap of hardened dark brown earth free in the centre, very similar to that seen in T13. Two fragments of bronze sheet, one with two holes and a rivet (Pl. 36.*a*), were all that remained of the grave goods.

Palaeoanthropological analysis showed that the bone remains were from at least five adult individuals (nearly all males) and a 3-4 year-old child.

Under the buried bodies the soil was sterile. The excavation was abandoned at this stage owing to the danger of the structure collapsing.

Several bones, taken from the skeletons lining the walls and subjected by Beta Analytic Inc. to C14 analysis (Fig. 13) indicated a (2 sigma) calibrated dating lying between 1410 and 420 B.C. The point of intersection between the instrumental age and the calibration curve indicates a dating of 920 B.C. We have already seen that this figure is purely indicative, even though it seems to suggest a comparatively early dating for a tomb that, given its perfect state of conservation and the comparison with the datings obtained for the similar tomb MKDiii/T5 (see below), might seem later. However, the dating refers to the older skeletons, that is, those that were moved up against the walls apparently to make room for a later and final (unfortunately not conserved) burial. If we accept as possible for this final burial a period lying between

(3) Cf. for example, the silver earrings from the tomb KAHi of Kharibat al-Ahjur in the present report (Fig. 51.5).

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: est. C13/C12=-25:lab. mult=1)

Laboratory number: **Beta-23574**

Conventional radiocarbon age[1]: **2580±90 BP**

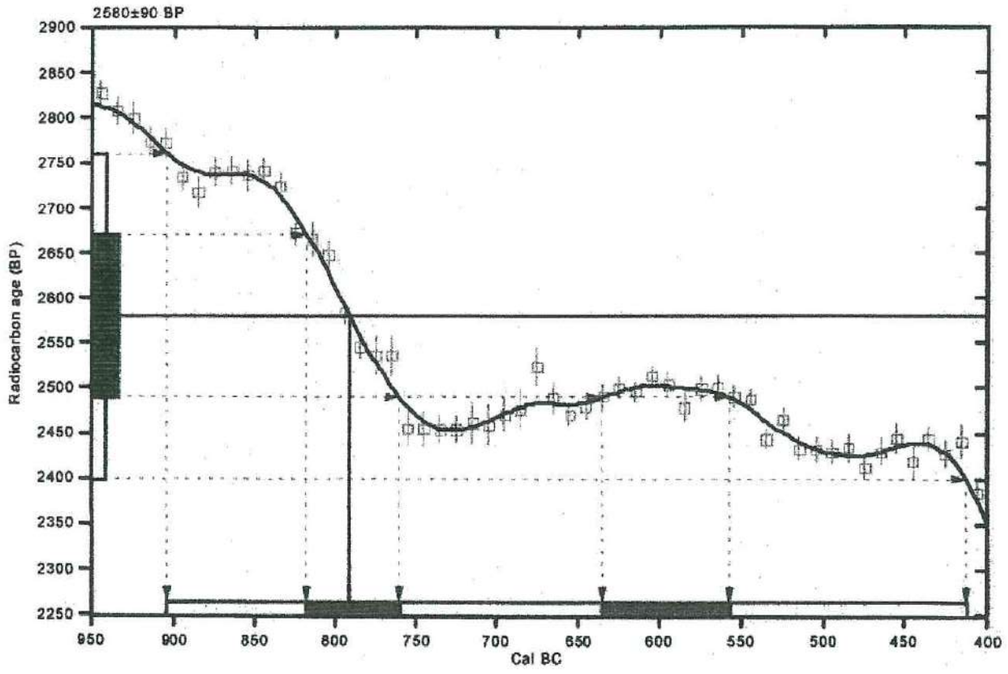
2 Sigma calibrated result: (95% probability) **Cal BC 900 to 410 (Cal BP 2850 to 2360)**

[1] C13/C12 ratio estimated

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 790 (Cal BP 2740)

1 Sigma calibrated results: (68% probability) Cal BC 820 to 760 (Cal BP 2770 to 2710) and Cal BC 640 to 560 (Cal BP 2580 to 2510)



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Mathematics
A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

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Fig. 12. Calibrated dating for tomb MKDii/T13.

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: est. C13/C12=-25:lab. mult=1)

Laboratory number: **Beta-23575**

Conventional radiocarbon age[1]: **2780±180 BP**

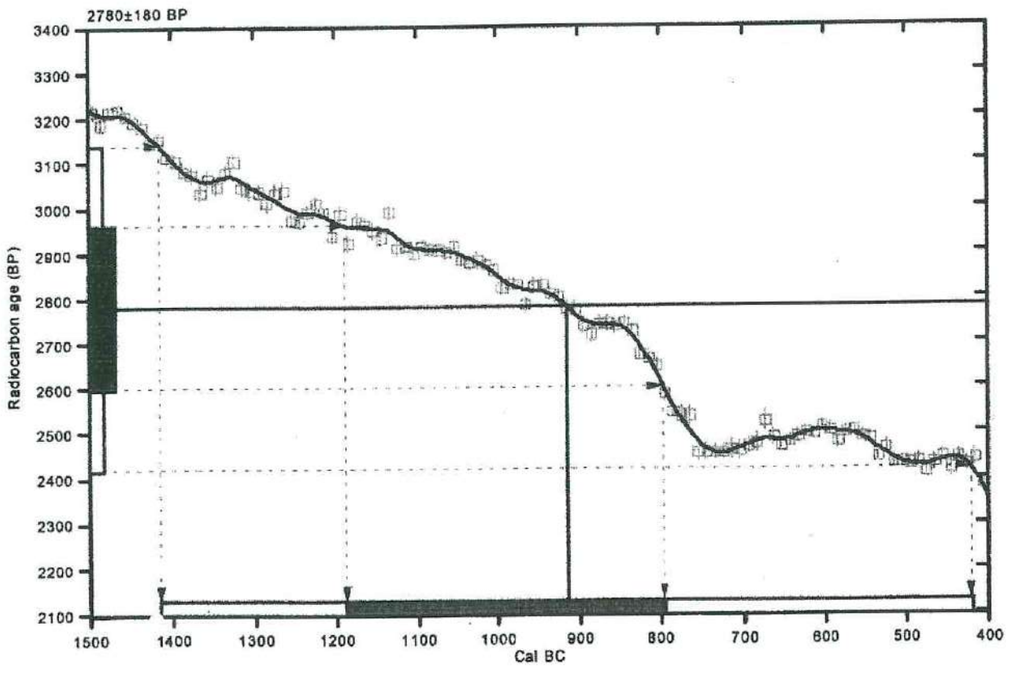
2 Sigma calibrated result: (95% probability) **Cal BC 1410 to 420 (Cal BP 3360 to 2370)**

[1] C13/C12 ratio estimated

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 920 (Cal BP 2870)

1 Sigma calibrated result: (68% probability) Cal BC 1190 to 800 (Cal BP 3140 to 2750)



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Stuiver, M., et. al., 1998, Radiocarbon 40(3), p1041-1083
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Fig. 13. Calibrated dating for tomb MKDii/T15.

MKDiii

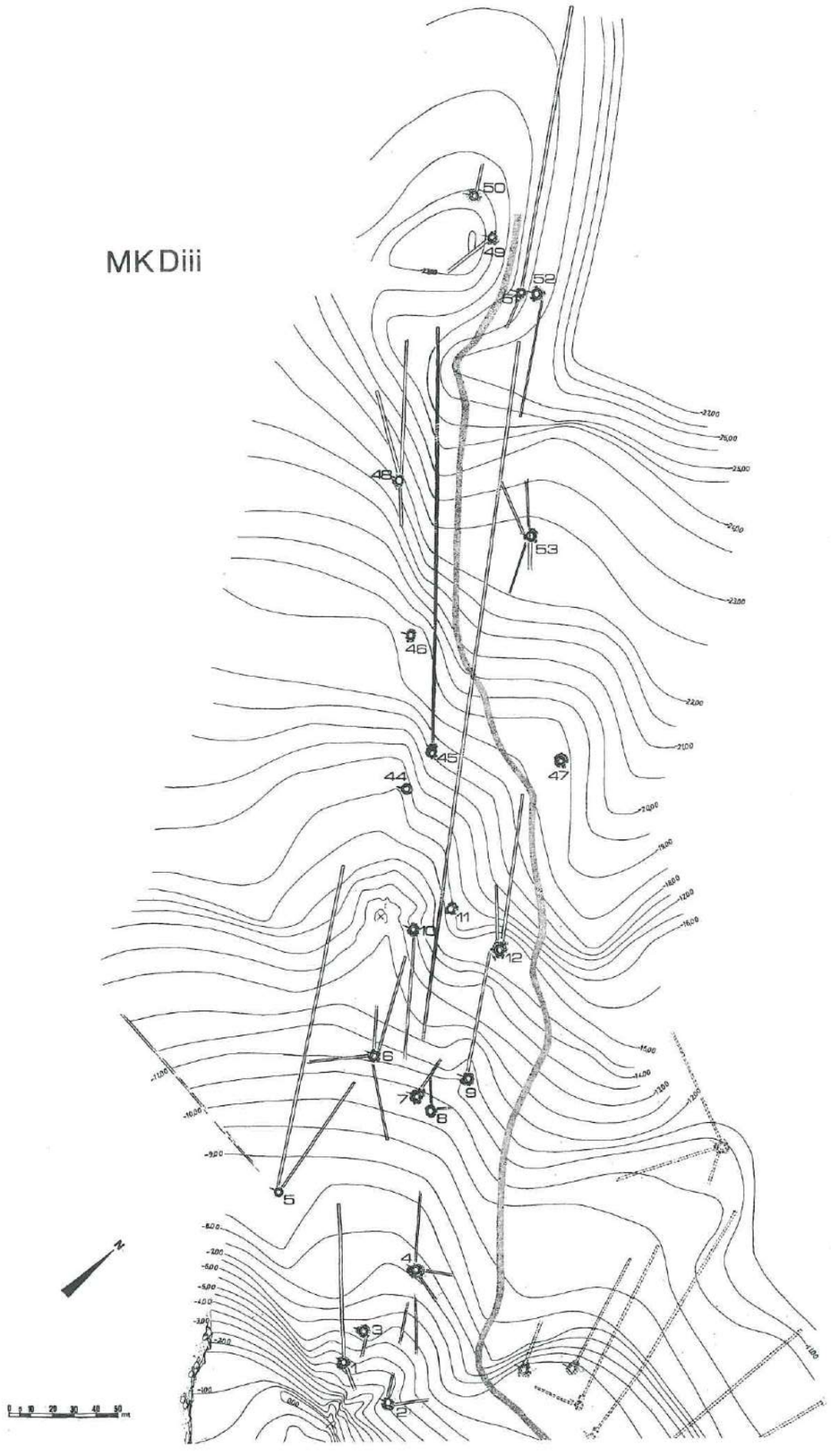


Fig. 14. Topographical survey of the MKDiii necropolis.

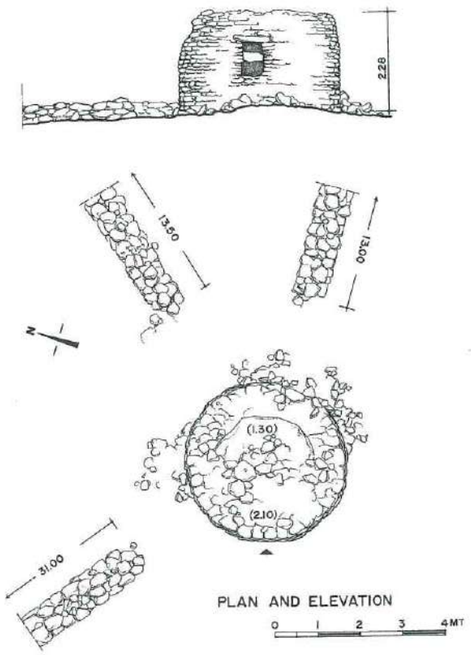


Fig. 15. Tomb MKDiii/T4: plan and elevation.

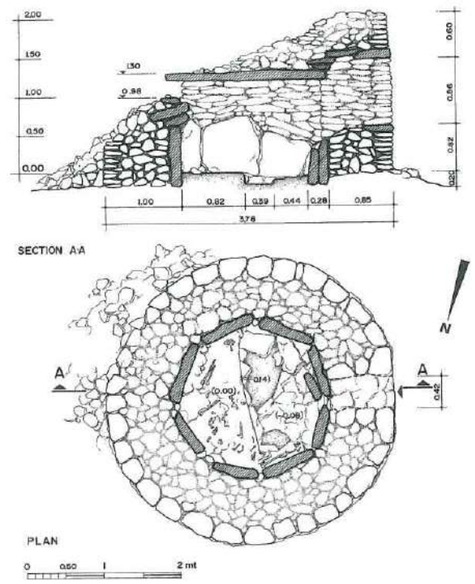


Fig. 16. Tomb MKDiii/T4: section and plan of level 1.

210 B.C. and 220 A.D. (based on the latest date of use of the similar tomb MKDiii/T5), we would have evidence of a lengthy period of use of this tomb.

The 'MKDiii' Necropolis

There is practically no gap in the spatial continuity between this necropolis and the MKDii described above (this is why the tombs in the two necropolises have been given a common numbering) (Pl. 11.*a*). The distinction was made only on the basis of their different distributive orientation. Indeed, instead of having a northern alignment, this necropolis seems to be oriented towards the NW. A modern track running along its length is still oriented in this direction (Fig. 14).

Long (670 m) and narrow (80 m at most) in shape it slopes longitudinally down the contours for a total drop of 25 m (Pl. 11.*b*). The distributive direction of the tombs is very clearly underlined by the numerous long rays departing from the towers, some of an impressive length, such as those of tombs T7 and T45, respectively 355 and 195 metres long. As the tower doorways continue to be oriented to the W, the angles formed between the doorway axes and the rays in this case become acute.

Observing the number of rays for each of the 22 tombs comprising the necropolis, the difference between MKDiii and the other two necropolises emerges immediately. Here, beside tombs with five (T4), four (T6, T53), three (T5, T48) rays and with one ray (T3, T9, T10, T45, T49, T50, T52), there are only four tombs that have no rays (T11, T44, T46, T47). This is only a comparatively small number and, while it is true that the rays (as was observed when describing the necropolis MKDii) are a comparatively recent feature, it should be considered that the whole necropolis is on the whole relatively later than the others. This hypothesis seems to be supported also by the absence throughout the necropolis of any tombs reduced to simple burial chamber slabs.

The excavation work here involved four tombs: T4, T5, T9 and T44.

Tomb MKDiii/T4

Tomb T4 is situated at the beginning of (i.e. uphill from) the necropolis MKDiii. Although most of the eastern sector of the tower has collapsed, the roof is still in place, together with the western half with the entrance (Pl. 12.*a*), and so it is still possible to see the whole of the base circumference (diam. 3.78 m) and the height (2.28 m) (Fig. 15). Compared with tombs T5 and T15 of MKDii, this one is lower, and also the entrance is smaller (height 0.86 m) (Pl. 12.*b*). The burial chamber is wide (diameter 1.93 m; height 1.30 m) and the roof, which is lower than the door architrave, is surmounted by a high crown (Fig. 16).

As many as five rays depart from the tomb, all

fragmentary: the longest (37 m), follows the slope in a NW direction, the second (in an anticlockwise direction) runs NE (14 m), the third towards the E (13 m), the fourth and fifth run towards the SE (35 and 32 m, respectively). Some large stones are heaped in front of the entrance, a sign that the door was opened in ancient times and part of the burial chamber emptied. The excavation was performed on 9-10 October 1987.

On the inside the wind-blown sand that filtered through the numerous apertures attained the height of the door threshold (level 0.60 m). It was found to be supported, at level 0.30 m) by a layer of large and medium sized limestone slabs (*locus* La). As soon as this layer was removed it became apparent that it sealed a layer of sandy soil containing scattered bone fragments (level 0.05 m), which occupied above all the E half of the tomb (Pl. 13.*b*). A bronze awl was found in this layer (Pl. 35.*a*).

Analysis of the skeletal remains shows that at least three individuals were buried in the tomb: a 35-45 year-old man, a 20-30 year-old woman (?) and a 6-12 month-old baby.

On descending into the W half, a layer of small thin slabs was found (at level -0.10 m) on top of a hard layer of broken stones mixed with earth, which was found to be the original base of the tomb.

Tomb MKDiii/T5

This tomb is located at the beginning of the MKDiii necropolis, on the left. It is characterised by three rays running respectively W (length: 110 m, poorly conserved), N-NW (150 m) and N (60 m). The state of conservation is quite good (Pl. 14), all the external curtain of the tower being conserved as well. The tomb, raided in ancient times, was excavated on 15 December 1986.

Inside, about 20 cm below the door step, there was a layer of fine, wind-blown sand that had filtered through the door and the numerous cracks in the two curtains which communicate with the exterior.

This layer, some tens of cm thick, overlays a paving of medium sized slabs (*locus* La). Removal of this paving revealed a level of sand containing several bones not in anatomical connection and a knife with an iron blade and bone handle (Pl. 36.*b*). Another knife blade was found here as well (Pl. 36.*c*). At the centre of the funeral chamber the sand had become hardened and darkened as a result of the absorption of a waxlike substance that was first liquefied and then set, which gave off a harsh and musty odour.

Osteological examination pointed to the presence of two adult individuals — a 30-50 year-old male and a 30-40 year-old female (?).

The small number and fragmentary nature of the bones found seem to indicate the tomb had been violated. Since the level containing the bones was apparently sealed on top by the layer of slabs La (perhaps laid to receive other burials, which have not been conserved), it seems certain that the violation must have taken place in ancient times, that is, during a period prior to the laying of La. Excavation was halted after the removal of the sand and all the bones when a layer of alabastrine rubble was reached.

Bone samples from the two skeletons, subjected to C14 determination by Beta Analytic Inc. (Fig. 17), gave two calibrated dates (to 2 sigma) lying respectively between 340 and 320 B.C., and between 210 B.C. and 220 A.D. The point at which the calibration curve intersects the instrumental age line corresponds to 10 B.C. The comparatively late datings given for this tomb, as well as showing that it was in use during the South Arabian period, support the hypothesis of similar chronological attributions for the last burials in tombs MKDii/T13 and T15.

Tomb MKDiii/T9

T9 is a complete tower rising on the right boundary of the necropolis MKDiii, near a modern track, half way up the slope. It is characterized by a single long ray running downhill in a NW direction (length 58 m). It is 2.50 high and 3.30 m wide and well conserved except for the collapse of the crown in the eastern sector (Fig. 18). The base is surrounded by a kind of foot pavement made of flat stones 33 cm wide (Figs. 19*a*, 20*b*). The door on the W side, 1.03 m high, had an architrave consisting of a slab that, supported by the roof slabs, is about 10 cm higher than the latter (Fig. 19*a*; Pl. 15.*a*). On the outside, under the door, lies an untidy heap of stones. The tomb was excavated on 5-7 October 1987.

The burial chamber filling was almost as high as the door step (at a height of 1.08 m, that is -1.05 m from the ceiling). In the surface level of fine sand two adult skeletons were found, which were identified by the trunk and arm bones, the only bones still anatomically connected (Fig. 19*b*). The first skeleton was laid out on the W side near the entrance; the second lay in the S half of the tomb (Pl. 15.*b*). The latter was distinguished by the fact that the bones were 'crowded together' as it were: ribs, shoulder blades and collar-bones were compressed together unnaturally, as though the corpse had been tightly wrapped. The fragmentary skulls had apparently been moved up against the walls, far from the respective bodies. During excavation of the burials a sharp, pungent, musty-like odour was noticed. A bronze chisel lay beside the wall to the E (Pl. 35.*b*), where other bones were piled up, all disarticulated, probably from earlier burials. Sieving yielded 6 blue vitreous paste beads and 4 quadrangular shell beads (Pl. 32.*b*).

Palaeoanthropological examination revealed two women aged between 40 and 50 years of age (cf. A. Coppa & S. Damadio: Individuals D and E).

The soil level containing the bodies was 35 cm thick and, at a level of 0.70 m, it overlay a floor of small broken slabs (La) (Fig. 28; Pl. 16.*a*). Below this another level of

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: est. C13/C12=-25:lab. mult=1)

Laboratory number: Beta-23573

Conventional radiocarbon age[1]: 2010±90 BP

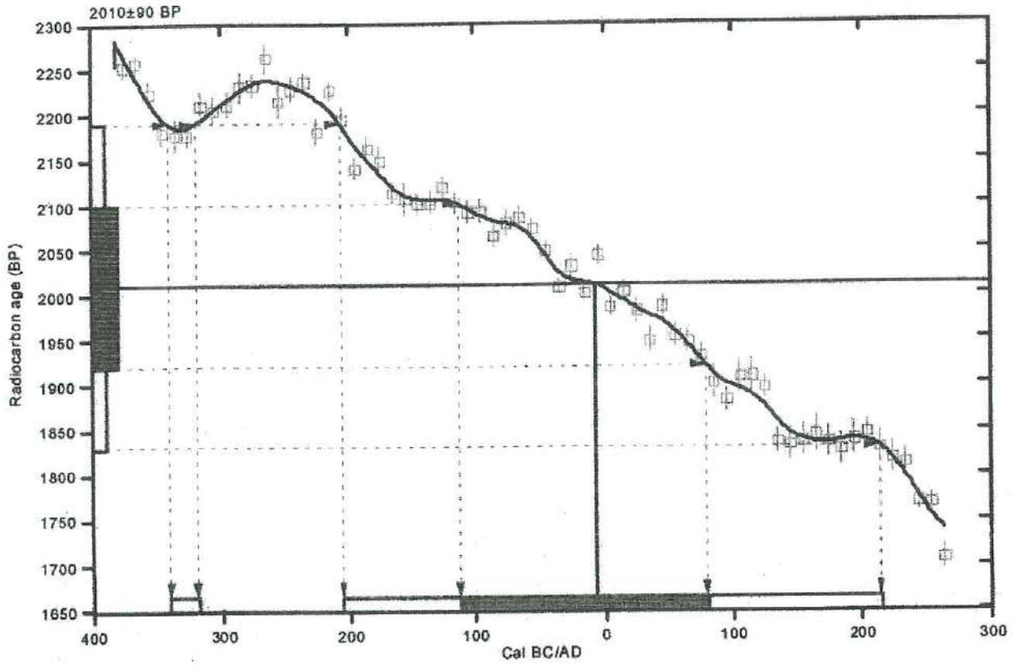
2 Sigma calibrated results: (95% probability) Cal BC 340 to 320 (Cal BP 2290 to 2270) and Cal BC 210 to Cal AD 220 (Cal BP 2160 to 1740)

[1] C13/C12 ratio estimated

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 10 (Cal BP 1960)

1 Sigma calibrated result: (68% probability) Cal BC 110 to Cal AD 80 (Cal BP 2060 to 1870)



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Talma, A. S., Vogel, J. C., 1993. Radiocarbon 35(2), p317-322

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Fig. 17. Calibrated dating for tomb MKDiii/T5.

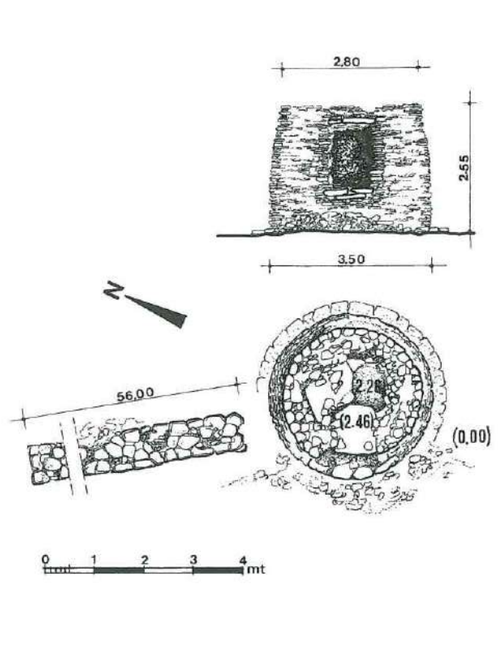

Fig. 18. Tomb MKDiii/T9: plan and elevation.

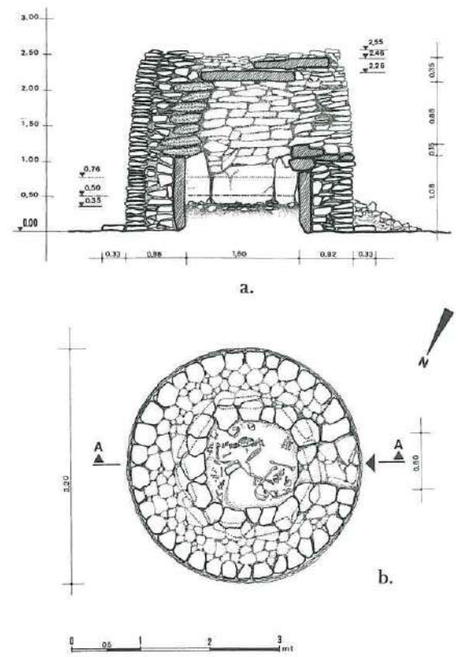

Fig. 19. Tomb MKDiii/T9: a) section A-A; b) plan of level 1.

fine sand was found (level 2) as well as other bones piled up in particular in the S part of the chamber (Fig. 20*a*). These older bones were whiter and cleaner than those found in level 1 and were completely odourless. However, they were very fragmentary and do not allow the position of the skeletons to be reconstructed. From these remains the anthropologists reconstructed four adult individuals and one child aged 2-3.

After removing these bones and the sand containing them, a second floor made of small slab-shaped stones was reached (Lb) which, lying at a level of 0.35 m, must have been the original base of the tomb (Fig. 20*b*; Pl. 16.*b*).

Underneath, as was found also in the other tombs, a layer of loose stones and broken stones was found which served the purpose of raising the first inhumation level (Lb) some thirty cm above the normal ground level in which the slabs of the burial chamber were embedded.

Tomb MKDiii/44

Tomb is located on the W boundary of the necropolis, roughly half way along its length (Pl. 17.*a*). It is characterized by the absence of rays and by the fact that it is lower and wider than the others (diameter: 5 m; height: 1.70 m) (Pl. 17.*b*). It is cylindrical in shape and conserved for its full original height (Fig. 21), as is

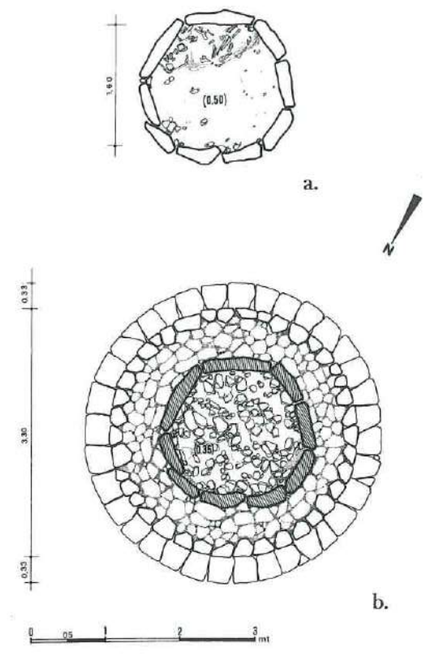

Fig. 20. Tomb MKDiii/T9: a) plan of level 2; b) plan of pavement Lb.

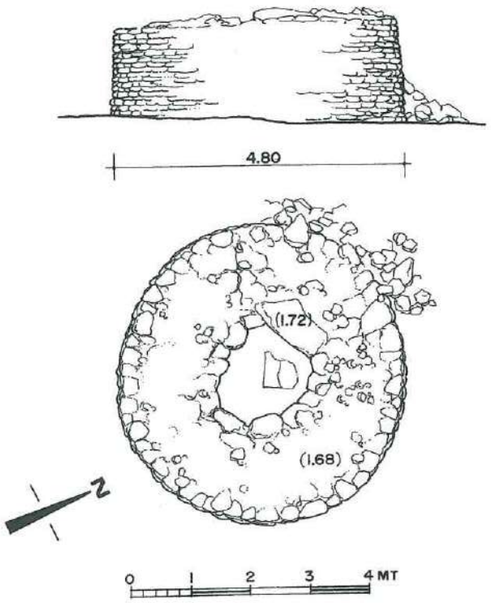

Fig. 21. Tomb MKDiii/T44: plan and elevation.

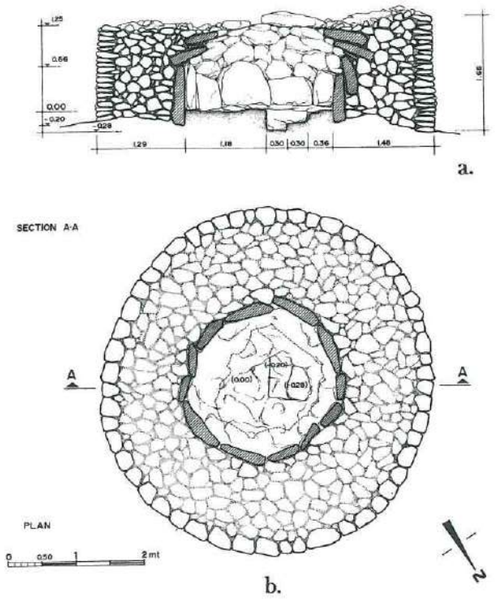

Fig. 22. Tomb MKDiii/T44: a section A-A; b) plan at the base level.

shown by the layer of small stones that, as in all Al-Makhdarah tombs, is still located above the roof slabs (Pl. 18.*a*). Collapse in one section had destroyed the outer curtain in the northwestern sector and had concealed the doorway (Pl. 18.*b*).

The tomb was the only one in the whole necropolis to have been broken into from the top, which revealed another structural peculiarity. The roofing was not made of the customary horizontally laid slabs but of partially overlapping and outwardly sloping slabs that, as they gradually approached the interior, closed off the top of the cylinder, forming a kind of dome-shaped roof (Fig. 22*a*). The slabs were kept in place by the weight of a layer of loose stones that, confined by the external curtain, attained its maximum thickness around the circumference and gradually got thinner as it approached the centre. This type of structure must have been rather delicate, which probably also explains why the tomb caved in.

The burial chamber is quite large (diameter 2.14 m) but low, also as a result of the roof covering system used, which begins rather low down (the vertical slabs are only 0.60 m high). This would certainly have complicated its excavation (carried out on 7-8 October 1987), if the tomb had not already been uncovered.

The clean-up of the caved in portion in the NW sector of the tower revealed the remains of a right-hand door post at the entrance which, in view of the relatively low height of the tomb, must itself have been particularly low. The doorway was still found to be packed with stones, indicating that the violation must have taken place exclusively through the collapsed roof.

Inside, the burial chamber was filled up to a height of 0.70 m. Removal of the layer of very fine wind-borne sand immediately revealed the first bones embedded in rather compact beige coloured soil in the E sector, at a depth of 0.45 m. On extending the excavation work the bones were found to be highly fragmentary and to have been arranged mainly at the sides of the chamber so as to leave the central portion free. It was possible to isolate only two jawbones on the E side (which had however been displaced with respect to several skull fragments) and several long bones (Pl. 18.*c*). This was too little to be able to establish the number of burials in the field. On the NE side the remains of another skull, several vertebrae and a bronze tool lay (Pl. 35.*d*). To the W, again in the vicinity of the wall, there was the cone-shaped bottom of a pottery vase (Pl. 39.*a*).

Anthropological analysis led to the identification in the tomb of the skeletons of four adults persons (of indeterminate sex) aged between 20 and 40 years, together with that of a boy aged 10-15.

The objects lay at a height of 0.15 m on a layer of limestone rubble (Pl. 19.*a*) which was replaced at a height of 0.0 m by a pavement of large thick undressed stone slabs (Fig. 22*b*; Pl. 19.*b*). This formed the base of

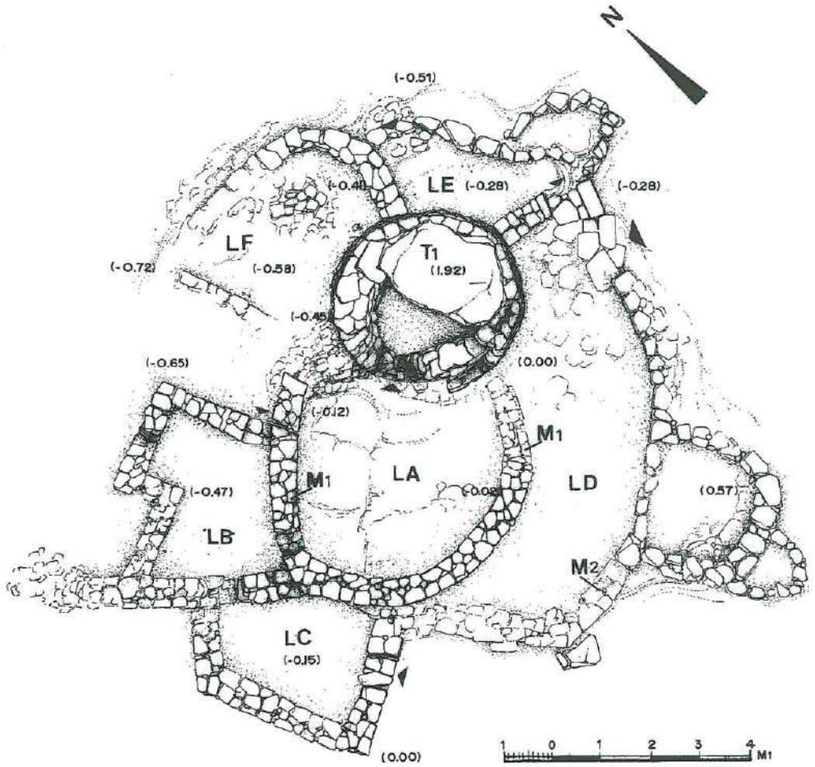

Fig. 23. Al-Manqaz: plan of the MNQ/T1 complex.

the tomb and was about 20 cm higher than the outside ground level.

The fragmentary nature and scattering of the bones and the grave inventory certainly bear witness to an ancient disturbance of the tomb, a hypothesis that seems to be borne out by the absence of finds in the central part of the chamber. It is here that, as we saw in tomb MKDiii/13, the last few burials must have been made.

The Al-Manqaz Quarry

Several quarries, still also called *manājim ar-rukhām* (alabaster quarries), are located in the area between the so-called Hill A and the slopes of Jabal Marthad. They are usually characterized by heaps of waste material (Pl. 20.*a*) that surround the hollows on the plain, which are sunken areas almost always filled with broken stone and sand; however, at least in one case, there is a true, large quarry (Al-Manqaz). This is a deep unencumbered quarry in which the vertical deeper section to the W is composed of solid reddish-yellow limestone.

In this quarry, some ten or so metres deep, only a few small rock fragments and wind-borne sand lie on the bottom, giving it a white colour that shows up clearly in the aerial photograph (Fig. 3). The waste materials have accumulated above all in the space above this section, and are retained by thick dry walls built sheer over the brow of the quarry (Pl. 20.*b*). On the opposite side, to the E and S, the ground surface is covered with the ruins of several ancient buildings, probably related to the work carried on at Al-Manqaz.

Observing the rock face left free by the ancient quarriers it is seen to be perfectly vertical and to have an average height of 7-8 m (Pl. 21.*a*). The section, which bears throughout oblique chisel marks descending from right to left, reveals the stratigraphic sequence of the last Mesozoic sedimentary deposits ('Amrān Series) consisting of a succession of thick banks of reddish-yellow limestone alternating with thin veins of alabastrine stone.

In the upper part, which has been made more uneven and fragmentary by weathering, the surface layer is clearly visible. In the lower part, beneath a thin, harder layer, there is an empty layer, through which it is possible to penetrate many meters inside the main body of the quarry (Pl. 21.*b*). Here the material was probably removed through the tunnel. The local people say that an initial cave is followed by several deep underground passages in which, from time to time, it is possible to find the characters of ancient inscriptions, graffiti or paintings on the walls and roofs. The lack of suitable equipment unfortunately prevented us from checking out these

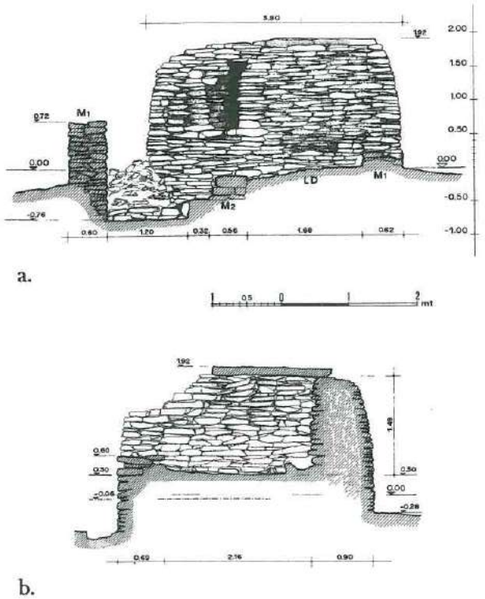

Fig. 24. Tomb MNQ/T1: a) section A-A; b) section B-B (see plan on Fig. 25).

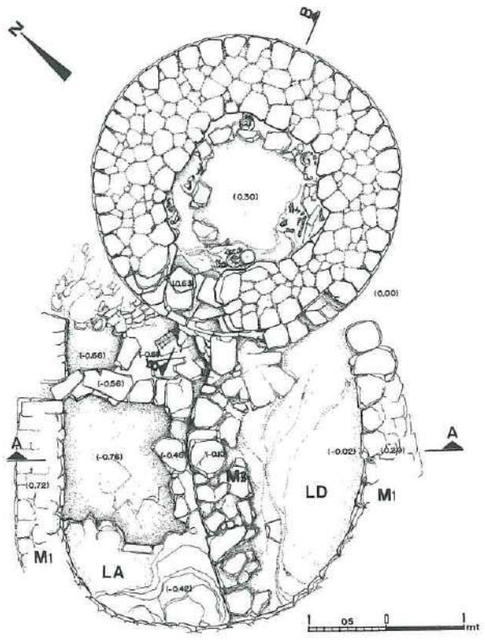

Fig. 25. Tomb MNQ/T1: tomb level 1 and rooms LA, LD (after excavation).

claims, although the fact of finding South Arabian inscriptions should not surprise us in view of the nature of the constructions located on the southeast edge of the quarry (Pl. 22.*a*): several rather complex dwellings, the structure and construction technique of which (Pl. 22.*b*) are very reminiscent of private homes of the type we observed on several occasions in Sabaean areas (e.g. at Al-Jafnah near Yalā, or at as-Sawālih near Al-Asāḥil). The chronological assignment seems however to be supported by the numerous Sabaean potsherds found near the ruins.

In the middle of these dwellings lies also a turret tomb surrounded by annexes (MNQ/T1), which was excavated by us between 11 and 15 October 1987.

Tomb MNQ/T1

The tomb lies in an isolated position on the N edge of the flat area that to the S bounds the Al-Manqaz quarry (Pl. 23.*a*). It is relatively larger than the MKD necropolis tombs, and stands out also because it is the only one to have annexed rooms (Fig. 23; Pl. 23.*b*). The materials and building techniques used in constructing the tomb and the curved walls of the annexes are the same and denote a relatively homogeneous construction technique (Pl. 24.*a*). Several alabastrine stones bear the same kind of chisel marks as those found on the walls of the nearby quarry, which seems to indicate that the ruin is contemporary with the period of utilisation of the quarry itself.

The tomb is 3.80 m wide and conserved as far as the roof slabs (Fig. 24). However the inside has been exposed by a cave-in affecting the western side of the roof and the door architrave (Pl. 24.*b*). The cylinder's height of about 2 m cannot be the original one, however, because all around the ground level has been raised by the collapse of the structures annexed to the tomb.

The overall plan view (Fig. 23) shows that the tomb is surrounded by semicircular rooms that adjoining other small rooms. The spaces in the doors (in LA, LB, LC, LD, LE), which ensured that each room had its own independent entrance, are clearly visible. The walls (now reduced to their bases) are directly supported by the curtain wall of the tomb but are not bonded to it. The western rooms (LA-LC) are probably somewhat later than the others. This seems to be indicated, as well as their comparatively better conservation, by the structural continuation (observed in a trial trench dug in LA) of the outer wall of LD (M2). The latter, as it passes under LA and its wall M1, abuts the tomb near the right door post of the entrance.

The excavation of the interior of the tomb, after removal of the customary surface level of wind-borne sand (10 cm thick) filling the chamber up to the threshold of the entrance, revealed the existence of a level of rather compact beige coloured soil (level 1), some twenty cm thick, ending on an alabastrine rubble plane (Fig. 29). This level included a circle of flat stones, slightly smaller than the circumference of the tomb's chamber, which

pushed against the walls a certain quantity of disarticulated bones (Fig. 25; Pl. 25.*a*). Four skulls were found here still in comparatively good condition, the best conserved of which lay on the immediate right of the entrance. Beside it lay a ring shaped vase bottom of typically Sabaean type (Fig. 31.5; Pl. 25.*b*).

Osteological analysis showed that the bones came from at least six individuals of different sexes, including a 3-6 year-old child.

On descending into the southeastern half of the tomb, the rubble floor was found to be about fifteen cm thick. Among other things, it included several medium sized stones bearing the same parallel chisel marks as are visible on the walls of the quarry nearby. Beneath this a second layer of fine sand (level 2) appeared which, on close examination, was found to contain loose charcoal fragments and numerous lumps of compact reddish earth. This layer was retained by a row of vertically arranged slablike stones (Fig. 26), against which the back of a complete adult skeleton was placed (Pl. 26.*a*). Facing SE the skeleton was arranged in a crouching position and protected the skeleton of a child between the knees and arms, which were folded so as to bring the hands towards the face (Pl. 26.*b*). Near the child a mosaic glass pendant was found (Pl. 40.*d*).

Anthropological analysis indicates an age of 41-45 years for the adult (probably a woman) and an age at death of 3-6 months for the child.

Removal of the inhumed bodies revealed the large stones forming the base of the tomb at a relative height of 0.0 m (Pl. 27.*a*).

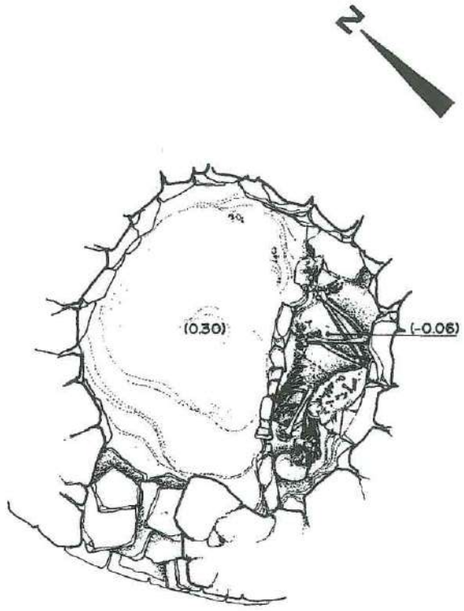

Fig. 26. Tomb MNQ/T1: tomb level 2.

The Sounding in LA

The same sequence of levels found inside the tomb was also visible on the outside in a trial trench dug in the north-western sector of the annexed room LA (Fig. 25; Pl. 27.*b*). Here, in a surface level of wind-borne sand some ten or so cm deep (starting from reference height 0.0 m), the structure M3 was found (Pl. 28.*a*). Apparently, the latter, which enters from the S under M1 in LA, must be viewed as a continuation towards the tomb of M2, a wall relative to the earlier LD (Fig. 23). This level, around the tomb entrance, contains several fragmentary human bones, which were probably scattered at the time the tomb was raided. Various stone objects were found in this place (Pls. 39.*c*, *d*-40).

Further digging in the soil NW of M3 revealed a level of medium-compact beige coloured soil (level 1) containing many displaced stones of the same type as those used to build M1. This layer was about 40 cm thick and originated out of the collapse of the wall M1 in LA (Fig. 29).

At level -0.50 m lay a somewhat irregular slab floor (Pl. 28.*b*) abutting M3, the tomb and M1. Between it and the underlying solid rock sloping slightly from NW to SE, at a mean height of -0.75 m (Pl. 29.*a*), lay a filling composed of reddish-brown clayey soil containing small scattered charcoal fragments (Pl. 29.*b*). This filling (level 2) was quite similar in type and composition to that found in level 2 of the tomb which contained the burial of the woman with the child.

The stratigraphic sequence revealed in the trial trench seems to indicate that the original construction of M3 (and thus of M2 in LD), in which clayey soil was used to fill in the adjoining external space, was followed by the construction of M1 (and thus of LA) and of the slab paving associated with it. During this phase M3 still remained uncovered and was perhaps used as an embankment wall to raise the height of the southeastern sector of the room. The collapse of M1 then filled in the internal space of LA, on which the sand forming the present surface level was deposited.

Archaeological observation allows us to relate the earlier phase of the stratigraphic sequence found in the sondage (level 2) to the two burials in level 2 of the tomb, and the more recent phase related to the use of LA (level 1) with the six burials in the upper level (level 1) in the same tomb.

The finding of several burnished red ware potsherds in level 2 of the trial trench (Figs. 30-31) allow the layer to be attributed to the Sabaean period. Its exact date cannot be determined, although the presence in the overlying level 1 of a wavy rim vase (Fig. 31.*1*) typical of the later Sabaean phase (1st century B.C.-1st century A.D.), allows a useful *terminus ante quem* to be fixed for its chronology.

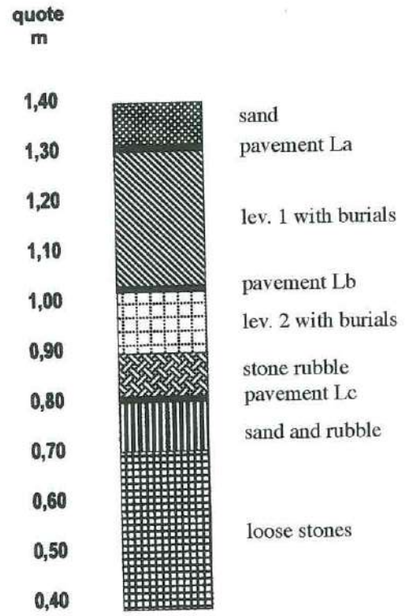

Fig. 27. Tomb MKDii/T13: stratigraphic sequence of burial chamber.

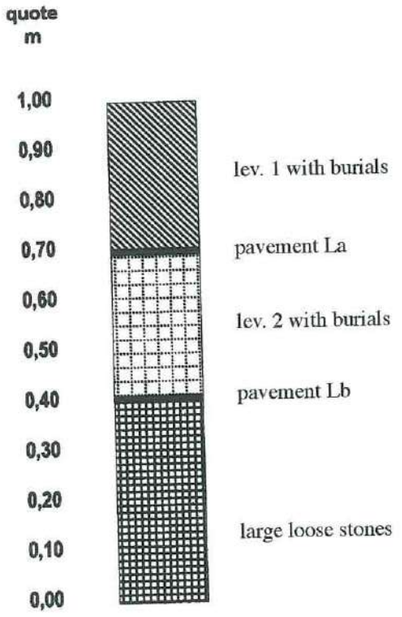

Fig. 28. Tomb MKDiii/T9: stratigraphic sequence of burial chamber.

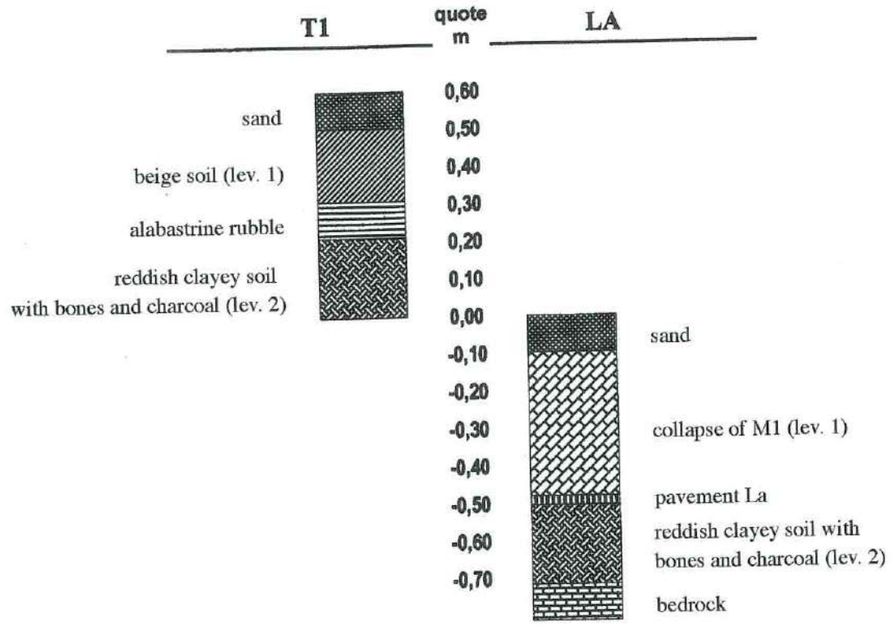

Fig. 29. Tomb MNQ/T1: stratigraphic sequence of burial chamber and adjoining annex LA.

Moving back up the necropolis in a S direction leads us towards the pass that, flanked to the W by the Jabal Marthad and to the E by the Jabal Makhdarah, crosses into Ṣirwāḥ territory (Fig. 1). Traversed by the first right hand tributary of the Wādī Makhdarah, this pass marks the boundary between two large catchment basins, the Jawf to the N and the Wādī Dhanah to the S. The pass is quite accessible and not very high (at an altitude of about 1700 m, it stands about 300 m above the necropolis). It provides the only possible passage through the mountain chain that on the S side borders the Jawf syncline and must have been extremely important in ancient times as it afforded a direct link (that is, avoiding to run along the Jabal Haylān) between the cities inside the Jawf and the Sabaean cities of Wādī Dhanah.

The use of this pass in ancient times is confirmed by the existence of a paved road running along the western flank of the Wādī Makhdarah that facilitates the navigation of the more difficult points of the passage and comes to an end on the limestone plain leading to Ṣirwāḥ. Here the road, now reduced once more to a simple track, followed the Wādī Ghudū which, after Ṣirwāḥ, runs first into the Wādī Wakifah and then into the Wādī Malaḥ. The latter then empties into the Wādī Dhanah some 30 km SW of Mārib, not far from the point of entry of the Wādī Yalā from the S.

The size of the blocks used to make the road (Pl. 30.*a*), the extension of the embankment work (Pl. 30.*b*), the width of the roadway (Pl. 30.*c*), the degree of levelling of the surface (Pl. 31.*a*) bear tribute to the efforts and resources needed to build it and thus to the importance that this ancient road must have had. The Al-Makhdarah road is so well built as to suggest that it may not have been used only for people to travel along it on foot or on camel back but also for carts. In this regard, also the alabastrine stone quarry of Manqaz may have played a role.

The paved road is highly reminiscent of those of Mablaqah and Najd Marqad in Qatabān, which linked the valleys of Wādī Ḥarīb and Wādī Bayḥān (Doe 1970: 70, 215, pls. 112-113). Another road of the same type was reported by R. Sarjeant to the South of Ḥuṣn al-'Urr which, after climbing up from the Wādī Ḥaḍramawt on the Jawl, then ran southward as far as the coast (Sarjeant 1970: 582).

It is also worth noting that the road is flanked by turret tombs, although the pass is too narrow to allow them to take on the form of a necropolis (Pl. 31.*b*).

THE GRAVE GOODS

The Al-Makhdarah Grave Goods

The objects found in the excavated tombs are not particularly abundant. As no tombs were found intact, it is hard to say whether this is the result of tomb raiders or to an actual paucity of goods accompanying the inhumation. As seen in the case of the last burial in tomb MKDii/T13, in which the grave goods seemed to be intact, it is conceivable that the deceased was accompanied only by clothing and ordinary ornaments. This would seem to be confirmed also by the remains of personal weapons found in other tombs. It cannot be ruled out, however, that these objects might have had some value in certain cases, which would explain, among other things, the large number of tombs violated. The absence of (even traces of) less personal objects, such as pottery, furniture, household objects, etc. may be accounted for less by tomb violation and more by the type of funeral ritual which must essentially have been rather simple.

Jewelry

The numerous multishaped necklace beads found in the tombs attest to the widespread use of necklaces and bracelets. In some cases it was possible to reconstruct the jewelry set (although the threading sequence of the beads was arbitrary) thanks to the concentration of bead finds (MKDii/T13).

Most of the beads were made of orange-coloured carnelian of varying shades and transparency. The most common shape is the cylinder and the cylindrical disk, although also biconical and barrel-shaped beads were found. A single example of a distinctive oblong drop-shaped pendant belonging to the necklace in tomb 13 was found. Workmanship is usually high quality, except for some cylindrical disk beads (Y.87.MKD.T4/4), which have irregular outlines and bear obvious marks of rough-hewing. There is only a small number of white chalcedony beads.

As far as amethyst is concerned beads elliptical in shape and perforated through their width (and not along the long axis) belonging to a necklace were found in tomb 13. Also part of this necklace are peculiar amethyst beads with two holes in them, used for threading a double row.

There are also numerous cylindrical disk shell beads used to space semi-precious stone beads; there are only 4 flat disk beads, squared off with rounded corners and a large central hole, obtained from a cone-shaped sea shell (Y.87.MKD.T9/5).

There is also a very interesting pinkish-orange coral clasp that is unique among the South Arabian grave goods found so far. Coral and the numerous beads obtained from different families of shells found in tombs located on the edge of the desert bear witness to the contacts between these peoples in the course of their caravan traffic with both the Red Sea and Indian Ocean coasts.

Only two gold beads have been found. Glass and vitreous paste beads are equally rare: the former have an opaque surface, while the second are badly corroded.

In the turret tombs we excavated at Al-Makhdarah no terracotta beads were found, nor any made of soapstone or of ostrich eggshells (cf. Shabwah and Ḥuraydah).

Necklace or bracelet (Y.87.MKD.T4/4) (Pl. 32.*a*)

Provenance: tomb MKDiii/T4, level 1, northern part of the tomb.

Material: carnelian, sea shell, vitreous paste.

Conservation: the beads are intact.

Size: 2 brownish-orange carnelian beads: diam. 0.5 cm; 3 light orange carnelian beads: diam. 0.4 cm; 11 sea shell beads: diam. 0.1 cm, mean height 0.2 cm; 4 vitreous paste beads: diam. 0.2 cm, h. 0.1 cm.

Description: of the 5 carnelian cylindrical disk beads, the two larger ones are brownish-orange in colour, and the three smaller ones light orange. The sea shell beads are mostly cylindrical, of variable size, while the light green vitreous paste beads are also cylindrical disk shaped.

Necklace or bracelet (Y.87.MKD.T9/5) (Pl. 32.*b*)

Provenance: tomb MKDiii/T9, in the north-east sector (from the lower burial level).

Material: sea shell, glass, amethyst.

Conservation: the beads are intact.

Size: one small cylindrical disk bead: diam. 0.3 cm; 5 glass beads: diam. 0.5 cm, h. 0.5 cm; 4 sea shell necklace elements: mean outer diam. 0.9 cm, hole diam. 0.5 cm.

Description: the small cylindrical disk necklace bead is probably made of amethyst; 5 barrel shape beads are made of bright blue translucid glass. Lastly, there are 4 necklace elements made of sea shells; they are flat and squared with rounded corners. The spiral structural pattern of the sea shell can be seen in each disk (cf. Morrison 1992: 384, fig. 1, nos. 28-34).

Necklace (Y.86.MKD.T13/1) (Pl. 32.*c*)

Provenance: tomb MKDii/T13, in the centre of the burial chamber.

Material: sea shell, coral, carnelian, chalcedony, amethyst, vitreous paste, gold.

The following is a description of the individual beads from this necklace, broken down by material:

Sea shell beads

- A disk pendant (Pl. 32.*d*): max. diam. 5.1 cm; min. diam. 4.3 cm; thickn. 0.4 cm. The disk bead is cut from a large cone shell (*Conus betulinus L.*), perforated in the centre. The hole is covered by a rough clear orange coloured carnelian spheroid. From the extremities of the pendant the disk has been perforated along the larger diameter to allow the pendant to be suspended. The presence of a double perforation on one side indicates that during the phase of perforation along the edge the shell broke and it became necessary to make another hole closer to the centre. For comparisons, see H.C. Beck 1944: 100, no. 25; J.W. Jackson 1944: 104, pl. XLI.2.
- There are 4 pendants made from shells *of Engina mendicaria Lamk.* and perforated along the long axis. This shell is common in both the Red Sea and the Indian Ocean. Cf. H.C. Beck 1944: 100, no. 26; J.W. Jackson 1944: 104, pl. XKI.*18-21*, *26*, *28*, *30*, *32*, *34*, *37*, *40*, *43*. One specimen was found also at Shabwah (Morrison 1992: 384, fig. 1.*37*).
- Disk shaped shell beads: diam. 0.4 cm, thickn. 0.1 cm; there are 94 cylindrical disk beads with a large central perforation (cf. Morrison 1992: 384, fig. 1.*30*).
- From the sifted soil of tomb MKDii/T13 comes a shell of *Oliva ispidula L.*, perforated at the top and a cowry rubbed down on the back (Pl. 32.*e*).

Coral

- A coral rod (Pl. 32.*f*): length 3 cm, thickn. 0.2 cm. Near the bracelet Y.86.MKD.T13/3 lay a small coral bar perforated at both ends, which may have been the necklace clasp.

Carnelian beads

- An elongated carnelian bead (Pl. 33.*a*): length 1.8 cm, thickn. 0.4 cm. The perforated end is slightly flattened. Similar oblong beads were found at Ḥuraydah made of soapstone and sea shells (cf. H.C. Beck 1944: 98 n. 7, pl. XLII.*27-28*).
- Two large truncated bicone carnelian beads: h 0.7 to 0.9 cm, max. diam. from 0.5 to 0.6 cm., similar to those found in Ḥuraydah (H.C. Beck 1944: 96-97, pl. XLII.*8-9*).
- Barrel-shaped or spheroid carnelian beads. Twenty-three in number: h 0.3/0.4 cm and diam. 0.2/0.3. Workmanship of these beads is not always perfect and the beads are often cylindrical in shape (H.C. Beck 1944: 96-97, pl. XLII.2, *4-6*, pl. XL.*l*).

White chalcedony beads

- There are 8 spheroid beads (h 0.4 cm, diam. 0.3 cm), while the most numerous, 27 in all, are the beads made of the same material and with the same shape but smaller in size: h 0.15 cm, diam. 0.3 cm.
- A white, translucid chalcedony bead, with a quasi biconical shape: h 0.4 cm, diam. 0.5 cm.

Amethyst

- There are 6 ellipsoid shaped beads with a perforation through the shorter axis: 0.6 × 0.4 × 0.3 cm.
- A single lentil-shaped bead (diam. 0.6 cm) has a perforation through one of the two faces.
- 8 beads of similar shape and size to the barrel-shaped or spheroidal carnelian beads.
- Lastly there are 5 barrel-shaped beads with two parallel perforations in the direction of the shorter axis. The two holes had the function of keeping the double row of the necklace together (see Pl. 33.*a*). This peculiar feature was not found in beads found in other grave goods in South Arabia.

Gold beads

- Only 2 gold beads (Pl. 33.*b*); the larger (0.5 × 0.5 cm) consists of a sheet folded into the shape of a bulging cylinder and capped at both ends by a series of 14 granules. The smaller bead is a simple banded ring that, like the numerous cylindrical disk beads made of sea shells was used to space the larger beads made of carnelian or some other semi-precious stone (cf. the gold wire beads found in tomb A6 at Ḥuraydah, in Caton Thompson 1944: 89, pl. XLV.*6*).

Beads made of material of uncertain identity

- Two blue beads, one tending toward turquoise and the other sky blue, are shaped like squat cylinders with bevelled edges (h 0.4 cm; diam. 0.5 cm).
- Another 9 barrel-shaped beads are bluish in colour, which looks like glass, but is probably made of chalcedony (h. from 0.1 cm to 0.4 cm, diam. 0.2/0.3 cm).
- One barrel-shaped bead of a whitish colour (h 0.15 cm, diam. 0.3 cm), seems to be made of vitreous paste, although it is probably stone.

Bracelet (Y.86.MKD.T13/3) (Pl. 33.*c*)

Provenance: from tomb MKDii/T13; the beads were close to the left arm of the deceased (Individual A), who had been laid before the tomb entrance.

Material: carnelian.

Conservation: intact.

Size: h. of small beads from 0.2 to 0.5 cm, diam. 0.25 cm; h. of the larger beads from 0.7 to 0.9 cm, diam. from 0.3 to 0.5 cm.

Description: the beads found in the above position were re-strung (fragments of ancient thread were taken and conserved), so as to form a line about 20 cm long. The small beads are cylindrical in shape and of variable length, and made of brownish-orange and light orange carnelian. The large beads are 3 in number (cylinder or tube), two of which are light coloured at the centre and brownish-orange at the ends.

Necklace beads (Y.87.MKD.T13/6) (Pl. 33.*d*)

Provenance: from tomb MKDii/T13, level 2.

Material: carnelian, sea shell, vitreous paste.

Conservation: the beads are intact.

Size: two carnelian beads: diam. 0.5 cm; one carnelian bead: diam. 0.3 cm; one yellow bead: diam. 0.3 cm; one sea shell bead: diam. 0.4 cm.

Description: these are 2 biconical carnelian beads, one light orange in colour and the other brownish orange (cf. H.C. Beck 1944: 96-99, pl. XLII.*7*); one cylindrical bead, brownish orange in colour; a lemon yellow bead of vitreous paste, globe-shaped and flattened at the poles; lastly, a cylindrical disk bead made of sea shell with a large through perforation.

Ring (Y.86.MKD.T13/2) (Pl. 33.*e*)

Provenance: from tomb MKDii/T13, near the bracelet Y.86.MKD.T13/3.

Material: obtained from a cone shell.

Conservation: intact.

Size: h 0.4 cm; int. diam. 1.5 cm, ext. diam. 2.1 cm; thickn. 0.2 cm.

Description: the ring, which has one flat face, grows thinner and is reduced in height; note the concentric streaks along the whole circle.

Stone Materials

The only stone objects found come from tomb 13 and belonged to the same set of female grave goods. They comprised an alabaster mortar and a granite vase, probably used for cosmetics. Residual traces of the eye shadow (kohl) ground up in it are still visible, as well as three fragments of the same material gathered from the soil near the skeleton (Pl. 33.*f*). From the same tomb come 6 obsidian tools and one of quartz, perhaps used as end scrapers (Pl. 34.*a*).

Grinding-stone (Y.86.MKD.T13/7) (Pl. 34.*b*)

Provenance: from tomb MKDii/T13, near Individual A.

Material: alabaster.

Conservation: intact.

Size: 15 × 16.5 cm.

Description: irregularly round shaped mortar, without feet, with a concave working surface. The surface is smoothed and polished and bears incrustations of kohl, a dark grey material used as eye shadow (cf. Pl. 33.*f*). Together with the mortar also the small bronze rod Y.86.MKD.T13/4 was found used to apply the product on the inner edge of the eyebrows.

Stone vessel (Y.86.MKD.T13/8) (Pl. 34.*c*)

Provenance: from tomb MKDii/T13.

Material: pink granite.

Conservation: intact.

Size: 7 × 7 cm.

Description: hemispheric shaped container, concave, without feet. This small vase was probably used to mix cosmetics. No traces of organic residue were found on the inside.

Metal Objects

The metal objects found during the excavation of the Al-Makhdarah necropolis are comparatively few in number and mostly come from tomb MKDii/T13. There are 3 well conserved bronze rods, perhaps used for the same purpose, together with a tool with a serrated edge. The only weapons found in the turret tombs were two knives or daggers with a rounded pointed blade with only one cutting edge, both from tomb MKDiii/T5. They probably belonged to the man buried in the tomb, as attested by the osteological analysis.

The only personal ornament is a small bronze ring, similar to another one found in the hypogean tomb T2 of Kharibat al-Ahjur. It was found during the cleaning of the surface layer and must have been part of the grave goods of a more recent burial.

The other metal objects consist of small accessories, the use of which is uncertain.

Rod (Y.87.MKD.T4/1) (Pl. 35.*a*)

Provenance: from tomb MKDiii/T4, level 1, in the western part of the tomb.

Material: bronze.

Conservation: intact.

Size: len. 5.8 cm, max. thickn. 0.2 cm, min. thickn. 0.1 cm.

Description: small bronze bar with a rectangular section over three-quarters of its length, and circular near the tip. The other extremity is flat and has a rounded edge. Probably used to apply kohl powder inside the eyelashes for medical (and perhaps also cosmetic) purposes, or else as a perforation tool.

Rod (Y.87.MKD.T9/3) (Pl. 35.*b*)

Provenance: from tomb MKDiii/T9, upper level.

Material: bronze.

Conservation: intact.

Size: len. 8.5 cm, max. thickn. 0.4 cm, min. thickn. 0.1 cm.

Description: small bronze rod with a rectangular section over three-quarters of its length, and circular near one extremity. Its thickness decreases gradually from the centre towards the extremities, one of which is flat and the other tapering gradually to a point. This rod with its extremities of different shape and length, although both sharp, actually seems to be a perforating tool.

Rod (Y.86.MKD.T13/4) (Pl. 35.*c*)

Provenance: from tomb MKDii/13, near Individual A.

Material: bronze.

Conservation: intact, although the surface is slightly porous as a result of oxidation of the metal.

Size: len. 6.9 cm, max. width. 0.6 cm, min. width. 0.1 cm; max. thickn. 0.4 cm, min. thickn. 0.1 cm.

Description: small bronze bar with a rectangular section, tapering to a rounded point at one end. The other extremity is wider, flat and with a rounded tip. It is thicker in the middle. As it was found near the grindstone Y.86.MKD.T13/7, it is assumed that this object was used to apply eyeshadow (cf. also Y.87.MKD.T4/1).

Tool (Y.87.MKD.T44/2) (Pl. 35.*d*)

Provenance: from tomb MKDiii/T44, NE side of the burial chamber.

Material: bronze.

Conservation: extremities chipped; metal oxidation has left the surface porous.

Size: len. 8 cm, width 0.4 cm, max. thickn. 0.3 cm, min. thickn. 0.2 cm.

Description: small bronze rod with a rectangular section, with a flat tang and a blade with a serrated edge. It could be a tool used as a rasp or file.

Buckle (Y.86.MKD.T13/5) (Pl. 35.*e*)

Provenance: from tomb MKDii/T13, along the wall to the left of the entrance.

Material: bronze.

Conservation: intact; oxidised.

Size: 1.8 × 1 cm, blade 0.2 cm.

Description: a bronze strap bent to form an open rectangle, without the extremities meeting. On the opposite side the strap expands and becomes thicker, forming a small decorative rectangle in the centre.

Ring (Y.87.MKD.T13/7) (Pl. 35.*f*)
Provenance: from tomb MKDii/T13, during cleaning of the surface.
Material: bronze.
Conservation: intact; oxidised.
Size: mounting 1.1 × 0.6 × 0.6 cm.
Description: the ring was carved out of a single piece and consisted of a thin flat mounting, oval in shape, with widely separated flat, pointed extremities (cf. Y.86.KAHi.T2/4 in the present volume).

Sheet (Y.86.MKD.T15/1) (Pl. 36.*a*)
Provenance: from tomb MKDii/T15.
Material: bronze.
Conservation: the surface of the sheet is highly oxidized, which has caused the object to break and become deformed.
Size: width 2.8 cm; h. 2 cm; thickn. 0.1 cm.
Description: a very thin semi-circular beaten bronze sheet, cut out at the top to obtain a right-angled recess between two short jutting parts. Two through perforations have been made in the latter, one of which contains a nail of the same material, folded down on the rear of the sheet. It might be part of the lining of a wooden box.

Hafted knife (Y.86.MKD.T5/1) (Pl. 36.*b*)
Provenance: from tomb MKDiii/T5, at the centre of the tomb, at -1.65 from the roof slab.
Material: iron and animal horn.
Conservation: the knife blade is bent towards the haft and has lost its point; surface corrosion is due to the pronounced oxidation of the metal. The horn handle is chipped in several places and the outer part of the grip has broken off. The surface layer of horn has been raised in places.
Size: haft: len. 9.7 cm, max. w. 2.1 cm, min. w. 1.4, av. thickn. 1.8 cm; blade: len. 16.3 cm, max. w. 2.1 cm, min. w. 1.4 cm, thickn. 0.3 cm.
Description: knife with blade sharpened on one edge, straight backed and blunted, wider at the haft end. The latter is hollow for just less than half its length and its upper and lower faces are slightly flattened. The haft was split in two lengthwise for a distance of 4.5 cm in order to house the tang of the blade, which is fixed with two iron nails 2.6 cm apart.

Knife blade (Y.86.MKD.T5/2) (Pl. 36.*c*)
Provenance: from tomb MKDiii/T5, at the centre of the tomb, at -1.65 from the roof slab.
Material: iron.
Conservation: the blade is slightly curved and the surface is covered with incrustations due to metal oxidation. The tang is missing.
Size: haft: len. 7.5 cm, max. w. 1.2 cm, min. w. 0.6 cm, thickn. 0.2 cm.
Description: pointed blade sharpened on one edge, straight backed and blunted.

Ribbon-shaped wire (Y.86.MKD.T13/6) (Pl. 36.*d*)
Provenance: from tomb MKDii/T13, along the wall to the left of the entrance.
Material: bronze.
Conservation: the metal is very slightly oxidised.
Size: approx. tot. len.18 cm, w. 0.2 cm, thickn. 0.5 mm.
Description: bronze bar, flat, thin and narrow, a rectangular section, bent in several places. Owing to its state of conservation, the shape and function of the object is unknown.

Organic Materials

Only in tomb MKDii/T13 were fabric and rope fragments found. In consideration of the varied nature of the weaving technique, it is assumed that they were used either to wrap the deceased's body or else belonged to actual clothing items. The leather remains may have belonged to a knapsack, or else have been dress accessories, such as a belt or shoes.

Leather fragments (Y.87.MKD.T13/9) (Pl. 37.*a*)
Provenance: from tomb MKDii/T13, from the layer beneath the central heap (level 1).
Material: leather and metal.
Conservation: fragmentary.
Size: thickn. 0.1 cm.
Description: the larger fragment consists of two pieces of leather, 5.4 × 4.6 cm, superimposed and attached at the centre by a piece of sheet iron. It might be the remains of a belt or a knapsack.

Fabric fragments (Y.87.MKD.T13/10) (Pl. 37.*b-c*)
Provenance: from tomb MKDii/T13, level 2.
Material: fabric.
Conservation: fragmentary.
Description: numerous fabric fragments found at the centre of the tomb under a layer of medium-sized flat stones. Several of the stones still retain concretions and fabric residues on the underneath surface. The weaving pattern is different, varying in mesh size, a different sized threads have been used. There are two fabric types: the more abundant type with thin brownish-yellow threads woven into a very close-knit but light fabric. The second, much thicker and heavier, has a dark green base into which yellow threads have been woven in parallel bands.

The same tomb MKDii/T13 yielded strips of leather and several cord fragments of different thickness and workmanship (some are merely twisted [Pl. 38.*a*], others woven [Pl. 38.*b*]). The predominant colour is brownish-yellow, although there is also a fragment of bordeaux red coloured cord.

Again in tomb MKDii/T13 also several seeds of jujube tree (*Ziziphus* cf. *Spina-Christi*) were found (Pl. 38.*c*).

Pottery

Only one potsherd was found in the turret tombs excavated by the Italian Mission, namely in tomb MKDiii/T44. This consisted of a vase base (Y.87.MKD.T44/1; Pl. 39.*a*), the clay of which differs from the local Sabaean variety. It is pinkish brown (or salmon) coloured, with small, relatively frequent micaceous and vegetal inclusions, and a natural surface; the pottery is fairly compact. The cone-shaped bottom with a thin, rounded base is small in size and might have come from an imported ointment jar.

The Al-Manqaz Grave Goods

The materials found during the excavation of tomb 1 at Al-Manqaz and the annexed room (Locus A) are comparatively few and of different kinds. They include several objects of everyday use, such as a limestone stopper, a grinding mill, two fragmentary alabaster objects and lastly a comparatively large number of potsherds. Only one personal ornament was found, lying beside the baby's skeleton in tomb 1.

The Objects

Stone stopper (Y.87.MNQ.T1/LA/12) (Pl. 39.*b*)
Provenance: sounding in LA; level 1.
Material: limestone.
Conservation: intact.
Size: diam. 9.5 cm, av. thickn. 2.5 cm.
Description: disk-shaped limestone stopper. The stone was dressed until it attained the desired shape and size; the object was then further processed on the sides and the lower surface by flaking off material to reduce the thickness. This was to allow the stopper to fit into the mouth of the recipient and not just be laid on top. The upper face is flat. Several quite similar stone stoppers were found by the Italian Mission at Barāqish both on the surface and on the upper levels of the Temple of Nakraḥ (1st century B.C.).

Grinder (Y.87.MNQ.T1/LA/13) (Pl. 39.*c*)
Provenance: from the W part of locus LA; level 1.
Material: granite pebble.
Conservation: intact.
Size: 13.5 × 11.7 × 8.1 cm.
Description: oval shaped grinder obtained from a granite river pebble. The working surface is smooth but displays a recess in the centre produced by the blows received, as the object must also have been used as a hammer stone. Other scars with a lighter patina seem more recent.

Incised limestone slab (Y.87.MNQ.T1/LA/14) (Pl. 40.*a*)
Provenance: from the W part of locus LA, beneath the tomb MNQ/T1 entrance.
Material: sandstone
Conservation: fragmentary.
Size: 17.8 × 19.5 × 4.9 cm.
Description: trapezoid-shaped sandstone slab. On one face, near the edge of one long side, it still bears an incised grid of 7 complete rectangles (4.2 × 2.6 cm) flanked by the same number of incomplete boxes. It might be some sort of game.

Alabaster object (Y.87.MNQ.T1/LA/15) (Pl. 40.*b*)
Provenance: from the W part of locus LA, near tomb MNQ/T1; level 1.
Material: alabaster.
Conservation: broken on both long sides.
Size: h. 7.4 cm, max. w. 5.3 cm, min. w. 3.1 cm, max. thickn. 3.2 cm, min. thickn. 2 cm.
Description: the object is rectangular in shape with one convex face, bearing obvious traces of working, and the other perfect flat and smooth. The short sides are intact, rounded and smoothed. Its hypothetical use as a grinder may be ruled out owing to the small size; it might be a polishing tool.

Alabaster object (Y.87.MNQ.T1/LA/16) (Pl. 40.*c*)
Provenance: from the W part of locus LA, near tomb MNQ/T1; level 1.
Material: alabaster
Conservation: fragmentary.
Size: h. 5.4 cm, max. w. 9.2 cm, min. w. 6.1 cm, thickn. at rim 2.9 cm.
Description: the object, perhaps a thick, miniature vase, was probably abandoning during its working stage. It displays dressing marks over the whole surface, except on the upper side around the rim, which is rounded and smoothed; processing marks are visible also on the inside.

Pendant (Y.87.MNQ.T1/8) (Pl. 40.*d*)
Provenance: from tomb MNQ/T1; level 1.
Material: mosaic glass
Conservation: intact.
Size: h. 1.4 cm, max. w. 1.1 cm, min. w. 0.2 cm, thickn. 0.3 cm.
Description: the pendant, discovered near the neck of the baby's skeleton, is triangular in shape with a rounded base; it is perforated to allow a cord to be inserted near the top. The two flat surfaces bear wide-banded blue decoration, alternating with white bands. Pendants like this Al-Manqaz specimen, with their long convex cone shape and coloured banded decoration imitating banded agates, were widespread during Roman times (1st-2nd centuries A.D.).

The Pottery

At Al-Manqaz the pottery was found mainly in room LA annexed to tomb 1; the latter yielded only a few vase wall fragments with burnished red slip and ring base. It is a very poor pottery: the typology is essentially reduced to 2 form types – bowls and plates, and the paste contains a high percentage of vegetal inclusions. The included tempering minerals are exclusively micaceous. The clay paste comes in two colours: pinkish-brown and greenish-yellow. The pottery is hand made, although the parallel horizontal lines suggest that at least some kind of slow turn-table may have been used.

The typology does not include closed forms, such as jugs and jars, or *dolia* for food storage. The walls are not decorated and there is no evidence of handles.

Bowls

A. Small-medium Bowls (Fig. 30.*1-4*, *6*)

The small-medium sized bowls (15/18 cm in diameter) all have a natural rim, oblique wall and a moderately deep. The clay is light brown in colour and also in section; temper is micaceous and/or vegetal. Straw, chopped into medium-large fragments, is relatively abundant in the paste from which this type of vase is made. Both surfaces of the bowls are covered with burnished reddish coloured slip. Bowl Y.87.MNQ.T1.LA/6 stands out with the yellowish colour of the clay and the surface treatment, natural inside and wash on the outside.

B. Large Bowls (Fig. 30.*7-8*)

This category is represented by two deep bowls, larger in size than those in group A (about 40 cm in diameter). The first bowl has an everted concave rim, probably to take a lid. The clay is pinkish brown in colour, with abundant medium-large straw temper. The pottery is thus highly porous and not very compact. The second bowl has a rim that is flattened at the top and has a wall of irregular thickness tapering towards the bottom. The paste consists of clay that is reddish on the outside and brown on the inside, with numerous large straw inclusions. The inner and outer surfaces of both bowls are natural.

Polylobate Bowl (Fig. 31.*1*)

This polylobate or wavy rim bowl is characterized by a yellowish-brown paste containing vegetal inclusions; the outer surface has a coating of the same colour. Wavy rim bowls date back to a period between 2nd century B.C. and 1st-2nd century A.D. (cf. bowls of this type in the KAH pottery typology in the present report).

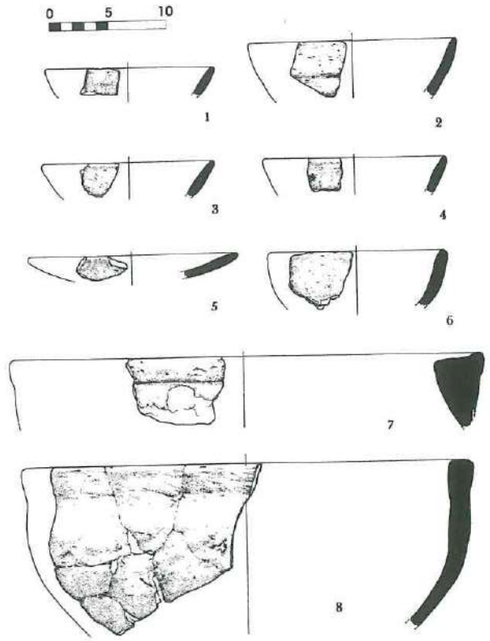

Fig. 30. Pottery from MNQ/T1, room LA.

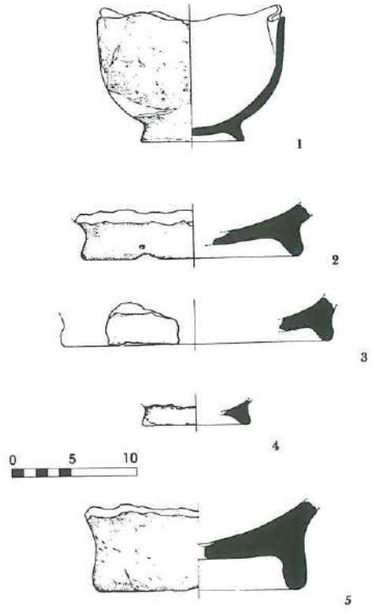

Fig. 31. Pottery from MNQ/T1, room LA (1-4) and tomb 1 (5).

Plates (Fig. 30.5)

Only one fragment belongs to this category; the paste is yellowish green with abundant medium-large straw temper. The inner surface is plain while a reddish wash is in the outer one.

Bases (Fig. 31.2-5)

The bases found during the excavation of Locus A at Al-Manqaz are all ring-shaped and probably belong to medium-small and large bowls (A and B). The paste displays the same characteristics and surface treatment, although the pottery is less compact. Only one base comes from tomb 1 and can be distinguished from the others by the yellowish green colour of the clay.

Conclusions

The analysis performed on the complex of ancient finds from Al-Makhdarah is the first that has focused specifically on the turret tombs, a category of monuments that, although widespread in Yemen, has so far been little investigated. In our opinion, the results reported on the grave goods, the burials, the tomb architecture and the distribution of the necropolises now allow us to draw some general conclusions concerning their nature and chronology, as well as to advance some hypotheses concerning the meaning they had in the historico-cultural context of ancient South Arabia.

The grave goods immediately reveal the peculiarity of these monuments. The general absence of pottery is the most significant fact (4). The only potsherds found, discovered in the rooms built around tomb MNQ/T1 in Al-Manqaz, which must have been used as dwellings and were related to the quarry activities, do not represent an exception to this peculiar state of affairs that apparently reflects the fact that the deceased did not in general lead a sedentary existence. The Al-Manqaz pottery, with its similarities to the finds made in levels B and C at Hajar Bin Ḥumayd and to that we are now finding in the more recent level of Tamna', is nevertheless useful from the chronological point of view, as it enables the vases to be attributed to a period lying between the 2nd century B.C. and the 1st century A.D.

The grave goods were thus found to be related principally to personal ornamentation: necklaces, bracelets, rings, cosmetic objects, etc. The presence of iron knives, bronze chisels, obsidian blades, strips of leather and coloured fabric, is in any case related to the sphere of the deceased's individual clothing and excludes the likelihood of funeral rituals implying the practice of including items referring to their everyday life in the tombs. These rituals, which were limited to simple inhumation of the body wearing its clothes and ornaments (or accompanied by its personal tools, in the case of men), seem to prevent us from a hypothesis of belief in a life after death. The presence of burnt resins (myrrh? incense?) in the burial chambers seems to indicate a link between death and the divine, a divine perhaps rendered abstract by a mysterious and perhaps terminal conception of death. We do not know whether the animal bones found at the base of the foundations of several burial chambers were associated with a ritual to inaugurate the tomb or whether they were simply part of the soil transported to the tomb to even up the rubble on the floor of the burial chamber.

(4) A complete set of pottery vases has been recently found by a French mission in one tomb (T81) at Jabal Jidrān in northern Ramlat as-Sab'atayn (Braemer et al. 2001: fig. 14). Unfortunately I had that publication only when the present work was already in press.

External influences on the objects found were rather strong. This is indicated both by allochthonous materials (shells, coral, vitreous paste, gold, obsidian) and imported items, such as the mosaic glass pendant in tomb MNQ/T1 (of Iranian origin?) and the cone-shaped vase base in tomb MKDiii/44 (of Hellenistic or Roman origin?). This evidence seems to point to a certain 'internationality' of the people who buried their dead in these towers. A specific indication of their relative mobility seems to come from the generally widespread distribution of these monuments that, as we shall see below, were apparently relegated to deserted places far from the urban areas, as well as from the traces of mummification characterizing several of the more intact skeletons (cf. MKDii/T13, MKDiii/T9). It almost seems as though the deceased had to be conserved during long journeys before reaching the designated tomb. Also the numerous periosteal reactions due to muscular stress observed on the individuals' tibias and fibulas, indicative of long periods on camel back, seem to confirm this impression of mobility.

The tombs actually seem to be family graves as multiple burials are found in each tower (for instance, 15 individuals in tomb MKDii/T13) and given that each of them seems to be characterized by clearly visible and distinctive elements such as 'rays'. When an individual was about to be inhumed in the tomb, the tower was reopened, the bones of the previous burial removed and arranged along the walls of the burial chamber. The central area was then cleaned and freshened up with a layer of fine soil before the new corpse was laid. The levels containing the inhumations, which in some tombs are separated by stone paving, are perhaps indicative of a re-use of the tomb by new social units, perhaps after a period of abandonment. This might indicate that the tomb, the construction of which required a considerable effort, had a certain value and had to be exploited until the burials attained its maximum capacity, that is, the level of the entrance threshold.

In view of their distinctive and highly visible shape, the towers must have been violated frequently although, as we have seen, the loot was limited to rather modest individual grave goods without any particular value. Moreover, it is conceivable that the observed simplicity of the grave goods was to some extent dictated by the predictability of the violations in view of the easy accessibility of this type of tomb.

However, the risk of violation was obviously the price that had to be paid to retain (practically) unaltered a tomb structure imposed by a strong ancient tradition. As seen in the hypothetical construction sequence proposed for tomb MKDii/T13, the first stage of the work consisted of laying a ring of large slabs laid edgewise on the ground. This technique has very ancient origins and was widespread in Yemen and throughout the whole of Arabia, in the prehistoric megalithic cultures that produced abundant constructions made of vertically arranged blocks, such as *menhir*s and *betil*s, in the cliff sanctuaries and even in Bronze Age dwellings. Moreover, the fact that such slabs originally existed on their own, with well visible faces, seems to be proved by the human figures ('warriors') carved on the exterior of a burial circle of large orthostats recently discovered by the German Archaeological Mission in Ḥaḍramawt (Vogt 2000: 58, photo on p. 54). The daggers with a half-moon shaped pommel carried by the warriors date the monument to around 2500-2000 B.C.

But it is actually in the Ḥaḍramite Jawl that we find also numerous 'barrow graves', with internal orthostats, dome-shaped roof (cf. our tomb MKDiii/T44) and rays which, dating to the 5th-3rd millennium B.C., were considered by the German archaeologists themselves as the direct ancestors of our turret tombs (Vogt 2000: 57, photo on p. 57, top). The ancient tradition behind this burial monuments is however visible also at the site of Al-Makhdarah itself. As was seen when describing the first necropolis (MKDi), the remains of slabs set in the ground attests to the presence here of tombs that are relatively much more ancient. The extremely degraded state of the ruins, the wide scattering of the cave-in materials and the ancient, static appearance of the patinas, in comparison with the still intact tombs we investigated, certainly attest to their greater antiquity: it might thus be imagined that the necropolis was already in use in the 2nd or 3rd millennium B.C., or even earlier.

The hope of finding grave goods led to the better conserved towers to be chosen. Although on the one hand this did not enable precise chronological evidence to be gathered concerning the earlier phases of the Al-Makhdarah necropolis, on the other it allowed us to obtain important information concerning the later stages of their use. The radiocarbon dating obtained for tombs MKDii/T13, MKDii/T15 and MKDiii/T5 actually show that the inhumations in the intermediate and upper levels generally took place within the 1st millennium B.C. In the case of tomb MKDiii/T5, the period concerned was even as late as the early centuries of the Christian era (and the imported objects found in some of the grave goods seem to confirm this). Survival of such ancient tombs until such a late period is surprising but also tells us something about the strength of a tradition and the cultural integrity of the people who perpetuated the use of this funeral ritual. Apparently the builders of these tombs lived side by side for many centuries with people of different origin and tradition (the South Arabians),

retaining their own way of life and cultural traits unchanged.

Other interesting data seem to come from the peculiar spatial layout taken on by the necropolises in the Al-Makhdarah area. As mentioned in the introduction, as you move northward, the necropolises gradually spread out in three different directions (Fig. 1). As these directions still today correspond to those followed by the tracks linking the Ṣirwāḥ basin to the Jawf, it is conceivable that this was not the result of chance (the tombs' distribution model is not in fact determined by any specific physiographic factors of the land) and that it followed an ancient road network.

The necropolises actually begin to diverge precisely at the point along the ancient paved road from Ṣirwāḥ where it splits into three different directions: eastward, in the direction of Mārib, northeastward, towards the desert, and northward, in the direction of the Wādī Raghwān. This observation is significant not only because it reveals an important stretch of the ancient route, but also because it shows that the turret tombs, because they were indeed built along the roads, can be used as precious indicators in a reconstruction of the ancient itineraries.

Lastly, what has been said above seems to cast light on a point that, in view of the many and often curious explanatory hypotheses advanced so far, has always appeared to be particularly enigmatic. This is, the interpretation to be given to the function of the 'rays' that, with variable numbers, directions and lengths, are associated with the majority of turret tombs.

As may be seen at Al-Makhdarah, the rays on the whole follow the alignment of the distributive direction of the necropolises. In other words, they retain a position that is generally parallel to that of the ancient roadways. This essentially means two things: one, that they were built in order to be easily visible, along their whole length, by those travelling along the roads; second, and reciprocally, the tombs and their rays 'could see' the road. On the one hand, therefore, the long stone alignments, by accompanying the travellers, perpetuated the presence of the deceased in their eyes; on the other, the deceased were enabled, somehow or other, to continue to travel the roads.

This feature of passive, but at the same time, active, visibility, is distinctive of all the turret tombs, wherever they are located, as is shown by their constantly elevated position on hilltops, on the crest of rocky outcrops or on clear-cut and open slopes. It actually seems to underline this idea of participation of life in death, and of death in life. The lines of stones are probably an indication of those who travelled and how much they travelled representing, moreover, with their variations in size and number, the attributes by which the monuments, which would otherwise have been indistinguishable, could be identified.

If our hypotheses are correct, this would be further evidence of the strong, basic significance of travellers for the turret tomb people as well as a confirmation of what was said earlier concerning their attitude towards death. Symbolic participation by the deceased in the itinerant activities of the living again seems to emphasise the persistence of the former among the living rather than their relegation to the world of the dead, just as was suggested by the absence of a specific viaticum among the grave goods in the tombs.

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2. DISTRIBUTION OF TURRET TOMBS IN YEMEN

Introduction

Since 1936, when H.St.J. Philby, during his journey from Ḥaḍramawt to Mārib, first observed (and then published) this type of monument in Yemen, a large number of turret tombs have been reported by travellers and archaeologists. However, these references are not always exhaustive or accurate. On the one hand, this is due to the approximate nature of the information reported by the observers and, on the other, to the objective uncertainty concerning the function of the monuments, as well as to their precarious state of conservation.

However, it seems worthwhile here to report the results of the complete abstracting of data from the literature we carried out for the purpose of writing a degree thesis. This will allow us at least to perform a preliminary mapping of this type of tomb in Yemeni territory (Fig. 32) which we hope will help expand the historical conclusions inferred from the Italian Mission excavations.

The information of bibliographic origin was enhanced with some data obtained directly in the field on the occasion of a reconnaissance I carried out together with A. de Maigret and S. Antonini, in the Jawf and in Ramlat Sab'atayn in 1987.

The turret tombs are located, isolated or in small groups, on the slopes and summits of the mountainous areas. They are generally circular or oval in plan view, and mostly made of flat stones laid in dry courses of variable evenness to form almost vertical walls, and covered with a stone slab roof. An opening, sometimes with an architrave, leads to a comparatively small internal cavity delimited by vertical stone slabs intended also to support the internal curtain wall of the tomb. The base of this internal room is slightly recessed into the soil.

The tombs are often associated with rows of smaller graves or with simple lines of stones. In the first case, a line of miscellaneous 'cairns' of small stones; in the second, the following two layouts were found:

- tombs from which a single line of flat-laid stones depart to form a kind of low wall (sometimes linking up with another tomb);
- tombs from which several lines of stones depart like rays (sometimes intersecting those from other tombs).

The size of the stone lines are as follows: length, from 1 m to about 1 km; width, from 1 m to 2.5 m (Gerig 1982: 44).

Their distribution may be examined according to the areas listed below.

Pre-Desert Area

Western Edge of the Rub' al-Khālī

Najrān

On the An-Najd plateau north of Najrān numerous turret tombs have been reported (Doe 1983: 61; de Maigret 1996a: 317).

Wādī Ḥabawnah

In the highlands between Najrān and Wādī Ḥabawnah, as well as in the neighbourhood of Khuṭnah and in the direction of Abhā, numerous tombs have been reported (Doe 1983: 62). The smaller ones, consisting of two curtain walls of undressed stones (the inner curtain is made of thinner flat stones) have a diameter of 2 m and an internal room, while the larger ones, made in the same way and lying on a stone slab basement, have a diameter of 5 m and a height of 2 m. The apparent similarity with the Omani beehive tombs should be noted.

Naḥūqah

Circular tombs built of flat stones were observed by the Ryckmans-Philby-Lippens Expedition in 1951-52 in the highlands near Naḥūqah and on the Jabal Tuwayq, on the edge of the desert area (Doe 1983: 62). These constructions, which have a diameter of 5-7 m and a height of 2 m, are characterized by thick flat stone walls and wide slabs in the inner chamber. Several tombs are smaller in size: diameter 4m, height 1.6 m.

These tombs are similar to those located on the hillside near Mārib, to those around Wādī Jawf and to those in the Najrān area. Other examples may be found also in Central Arabia (Doe 1983: 62).

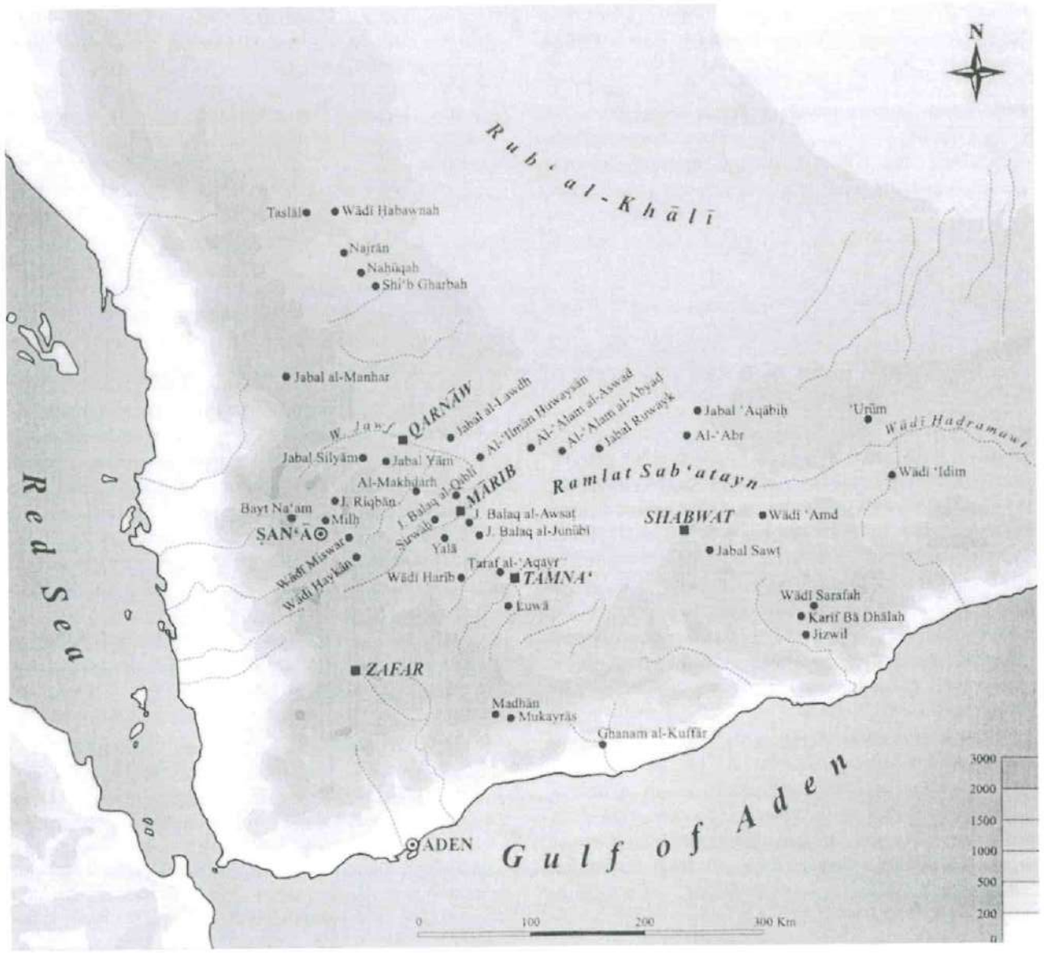

Fig. 32. Map of distribution of Yemeni turret tombs.

Shi'b Gharbah

In the neighbourhood of Shi'b Gharbah, near the Wādī Naḥūqah southwest of the 'Aqabah Naḥūqah pass lie five large well-built tombs belonging to a large necropolis known as 'Rudūm Sarū', spread over an area about 450 m long. The better constructed tombs are reminiscent of those of Maḥyāsh and Ruwayk, E of Mārib.

One in particular, 1.5 m high and with a diameter of about 3.6 m, circular in plan, is made of sandstone slabs surrounding a central cavity for burials. The inner chamber has been damaged, as has also the entrance.

In the eastern sector of the necropolis a large tomb has been reported, from the north side of which there departs a line of 'smaller graves' formed by superimposed undressed stones. A short distance away, from a second tomb in an eastward direction, there departs another line of 'small graves' about 45 m long, which form a kind of compact wall 90 cm high and wide.

Several tombs in this necropolis, of a type similar to those of Ruwayk, Maḥyāsh and Mayayn, have inscriptions in Thamudene, Hebrew and Himyarite on the sandstone slabs of which they are constructed. These epigraphs were apparently made by travellers to or from the 'Aqabah Naḥūqah pass and were thus not contemporary with the tombs themselves but more recent; the tombs may thus date to the Sabaean or Himyarite periods, or even earlier (Philby 1952: 304-05).

Taslāl

Near the southern end of the Taslāl chain, situated on the Jidhām plain running from the right bank of the Ḥabawnah towards the Aklab hills, lies a large necropolis containing about 30 tombs with a quasi oval plan, made of large undressed granite blocks (Philby 1952: 221-22).

The tombs have an orientation that varies from 225° to 75° with respect to the cliff face.

A short distance from this necropolis there is another comprising 50 tombs, similar in shape and orientation to the preceding ones.

The Jawf Area

Jabal Yām and Jabal Silyām

By means of a series of observations performed on aerial photographs of the Jawf region, it was possible to identify a group of large necropolises on the south side of the Jawf valley (Jabal Yām e Jabal Silyām), on the eastern edge of its northern flank (Jabal al-Lawdh) and in the desert stretch (Ramlat Sab'atayn) which, in alignment with the northern boundary of the Jawf, runs eastward towards the city of Shabwat, the ancient capital of Ḥaḍramawt.

From the South the Jabal Yām penetrates the sediments of the large Jawf syncline at a slight gradient, which gives rise to a long series of large limestone flats which run in a SE-NW direction from the area west of Barāqish as far as Jabal Silyām. The central flat areas, facing the village of Al-Ghayl, are occupied by very large necropolises containing turret tombs of the type observed and studied at Al-Makhdarah (Pl. 41.*a*).

Also the state of conservation of the tombs is comparable to that of the turrets in the Ṣirwāḥ area (Pl. 41.*b*). Although the building material is different (here the limestone is light coloured and more compact) and as a much smaller number of radial lines are found here, a similar attribution to the 1st millennium B.C. may be postulated for the period of use of these necropolises. It is interesting to note that several of the burial chambers have a rectangular plan (Pl. 42).

Large notches visible in several parts of the surface layers of the rocky flat areas indicate them as the place of provenance of the construction materials. Rather than being distributed uniformly over the whole area of the individual flat areas, the tombs seem to be grouped according to a comparatively tortuous alignment, as though they were following a kind of itinerary. On the plateaux the highest turrets are located at regular intervals along the tableland edge of the hills so as to be easily visible from the main graveyards (Pl. 43.*a*).

On moving away from the necropolises in front of the village of Al-Ghayl on the east side, you see that the tombs begin to peter out. However, on moving westward, they are observed to continue almost uninterruptedly as far as Jabal Silyām. Following the road below that runs along the course of the Wādī al-Khārid it is possible to observe numerous lines of turrets that link up regularly and rise on the edge of the high flat areas and stand out clearly against the sky (Pl. 43.*b*). It was not possible to verify whether the tombs extended also towards the south, that is, inside the tableland, to form large necropolises such as those observed in the more eastern parts of the Jabal Yām.

Jabal al-Lawdh

The mountain chain bordering the Jawf to the North (Jabal Harāb) is apparently free of tombs: the dark colour of the rock of which these mountains are formed prevents the shadow of any turrets from being observed in aerial photographs. The slope of the mountain barrier, much steeper than that of Jabal Yām, would not in any case appear suitable for accommodating large necropolises.

Moving eastward brings us to the eastern border of this northern anticline of the Jawf, marked by another isolated tall mountain known as Jabal al-Lawdh. Well known for the important cultural complex found by the French Archaeological Mission, the mountain, with its isolated bulk, represents an important point of reference for the entire area of the Jawf and Ramlat Sab'atayn.

On the wide colluvial strips supporting the huge shiny black granite mountain spurs necropolises packed with turret tombs rise, especially on the SE side. The intricate pattern created on the slopes by the long lines of stone accompanying the circular tombs makes it easy to pick out the necropolises even from a distance (Pl. 44.*a*). Here, no intact turrets remain. The granite blocks apparently meant it was impossible to build such stable structures as when limestone slabs are used, and all that is left of the tombs are ruined circles, inside which, however, it is often possible to find smaller ring of blocks delimiting the burial chamber (Pl. 44.*b*). However, it cannot be ruled out that the comparatively poor state of conservation is due also to a greater age of these Jabal al-Lawdh burials. One difference compared with the necropolises of Ṣirwāḥ and Jabal Yām, which perhaps reinforces this hypothesis, lies in the type of radial lines leaving the circular tomb structures: in addition to the long continuous walls, which tend to run down across the contours at right angles, here we find short lines of small regularly spaced domes arranged horizontally and following the level curves (Pl. 45.*a*).

Al-'Ilmān Ḥuwaysān

The group of rocky hills of Al-'Ilmān Ḥuwaysān, located in the desert SE of Jabal al-Lawdh, is covered with numerous turret tombs, of different sizes and orientations (Finster & Schmidt 1982: 173). On the top of one hill located in the central area numerous graves are found made of undressed dark stones, with flat tops, and low rectangular openings all facing in the same direction. A larger tomb is usually located beside a much smaller one. Along a hill ridge further W, stone 'cairns' arranged in parallel rows and with regular empty spaces between them, depart from the turrets, while two and sometimes only one line of stones departs at right angles from other turrets.

Numerous turret tombs have been reported also at the foot of the hills, which is something quite rare in flat desert areas. It may be observed that the large graves

are the better constructed ones, laid out with geometric accuracy, some associated with lines of stones, while others are characterized by a more haphazard lay-out.

Al-Makhdarah

These are the necropolises examined in the present report by A. de Maigret.

Watershed between Rub' al-Khālī and Ramlat Sab'atayn

Jabal Ruwayk; Al-'Alam al-Aswad; Al-'Alam al-Abyaḍ

Photointerpretation revealed the presence of no fewer than 3,000 turret tombs in the area of scattered low mountains and isolated hills that, starting from Jabal al-Lawdh and ending to the E in the Jabal ath-Thaniyyah, bound the Ramlat Sab'atayn desert to the North (Pl. 48.*a*).

The necropolises of Jabal Ruwayk, Al-'Alam al-Aswad and Al-'Alam al-Abyaḍ had already been visited in the '30s by H.St.J. Philby, who had been strongly impressed by the peculiar form of the turrets (improperly called by him 'pill-boxes') and their large number (Philby 1939: 371 ff.).

A brief reconnaissance was made by us of these necropolises in 1987. They were found to run E-W from the metasedimentary Jabal Ruwayk through the limestone mountain of 'Alam al-Abyaḍ and the granite one of 'Alam al-Aswad to the Calcarenitic tableland of Jabal Libnat as-Suflā, now located near the bed of the Wādī al-Jawf. The construction of the truly numerous tombs was adapted to the availability of the gradually changing rock of which the hills on which they stood were composed (Pl. 45.*b*). The flat areas are full of them, the ridges strewn and the slopes covered with them. Sparser lines of tombs often link the larger necropolises together, so as to create a long, almost uninterrupted funeral pathway (Pl. 46.*a*) (1).

Although present, the radial alignments seem to be rarer than at Al-Makhdarah and on Jabal al-Lawdh. However, the structure of the better conserved turrets is very similar to that of the tombs excavated near Ṣirwāḥ (Pl. 46.*b*). The presence of structures reduced to the upright slabs of the burial chamber alone standing beside almost intact turret indicates that the cemeteries were used for a long period of time, and certainly suggests that the origin of the custom dates back to before the 1st millennium B.C. (Pl. 46.*c*).

Al-'Abr

A very large number of tombs have been reported to the W of Al-'Abr, E of the modern road that leaves this town and runs in the direction of the Ramlat Sab'atayn. Turrets may be seen on the rocky outcrops of Tirbāq, 'Arayn and along the Wādī Shuqaiqāt, as far as Shabwah (Doe 1971: 237). They are probably tombs with radial alignments (Doe 1983: 71).

Jabal 'Aqābiḥ

This particularly interesting single tomb is situated on the flat top of the Jabal 'Aqābiḥ, N of Al-'Abr (Doe 1971: 235-37). This is a principal structure from which departs an alignment of 33 cairns of smaller stones. The tomb, situated on the NW extremity of the ridge, has a circular plan and an internal chamber. Built with undressed superimposed dry laid flat stones, it has been partially destroyed and filled with material from the roof cave-in. It is quite large: diameter 4.5 m, height 1.5 m. The smaller cairns, built in the same way and spaced 1.5 m apart, have a constant size and shape, with diameter and height of 1m (Doe 1983: 71).

W. Dostal excavated a tomb in this area (diameter: 5.5 m; height: 1.14 m) in which he found several bone fragments (Dostal 1968: 56).

It should be recalled that Jabal 'Aqābiḥ represents one of the main passes through the hills surrounding Al-'Abr, an oasis formerly in the middle of the trade road connecting the Wādī Ḥaḍramawt with Shabwah. The rocky cliff face on both sides of the pass is covered with hundreds of inscriptions consisting of names of persons, occasionally of families, or drawings (for instance, the hands with extended fingers, which B. Doe [1971: 236] linked to the number of camels of a particular caravan or to a given distance).

The cairns, clearly visible on both sides of the jabal, were apparently built deliberately so as to be seen by travellers coming from the desert or travelling northwards. W. Dostal (1968: 56) claims they could be tombs belonging to particularly important persons.

Western Boundary of the Ramlat Sab'atayn

Jabal Balaq al-Awsaṭ

This is a necropolis with an unknown number of isolated or group structures, which are occasionally arranged also in regular rows, situated on the lower part of the slope and on the summit of the Jabal Balaq al-Awsaṭ (Gerig 1982: 43-44; Finster & Schmidt 1982: 172). These tombs have a circular plan and vertical dry walls composed of flat superimposed stones. An opening leads to a comparatively small internal chamber with a dome-shaped roof.

The turrets are also accompanied by radial alignments (one or more rows of unordered stones) that sometimes intersect to form a 'Y' shape. Several tombs instead display a single row of small stone cairns spaced several metres apart. The average length of all these stone alignments ranges from 1 m to about 100 m (several about 1 km) and from 1m to 2.5 m in width.

(1) A systematic survey on the necropolises of this area has been recently performed by a French archaeological mission (Braemer et al. 2001).

Whereas on the top of the jabal the turrets have only one row of stones, on the slope running down towards the oasis of Mārib, the tombs (which are larger) are linked by intersecting lines of stone. Many of these cairns have been plundered or destroyed over the centuries.

Jabal Balaq al-Junūbī

A large necropolis, comprising 300-400 tombs divided into several groups, is situated on the first eastern buttresses of the Jabal Balaq al-Janūbī, about 10 km SW of Mārib (de Bayle des Hermens & Grebenart 1980: 565, 573-76). The cairns vary in plan (rectangular or square, circular or oval), but all display the same construction technique, internal structure and size. The undressed stones, dry laid in irregular rows, form constructions having a truncated cone or parallelepiped shape and having the following average size: height between 1.5 m and 1.8 m; length (for square plan), about 2 m length (for rectangular plan), 1.7 m; width (for rectangular plan), 1.3 m; diameter (for circular plan), about 2 m.

On the inside, the inhumed body, covered with soil and stones, is buried slightly below ground level (although this is complicated by the outcropping rock beneath) or laid directly on the rock itself. Several partially destroyed tombs allow the circle of internal vertical slabs delimiting the burial chamber to be viewed.

Sometimes these structures, because of their extremely poor state of conservation, look like simple cysts in which several slabs delimit a circular or square space where the body was laid in a contracted position (de Bayle des Hermens & Grebenart 1980: 575). It may be postulated in any case that as they have the same size (diameter: about 2 m) and because of their internal structure, as well as of their proximity to other better conserved tombs, they are particularly badly degraded turret type structures. It is interesting to note that the surface area of the necropolis is covered with numerous small potsherds, for which it is however difficult to give an accurate chronology (de Bayle des Hermens & Grebenart 1980: 581). The presence of flat bottomed forms seems to point to Bronze Age typologies.

Jabal Balaq al-Qiblī

A large number of turret tombs are situated as well on the slopes of the Jabal Balaq al-Qiblī, W of Mārib (Finster & Schmidt 1982: 171). The tombs, circular in plan, are made of superimposed flat stones dry laid in circles that narrow slightly towards the summit. A rectangular opening, sometimes with an architrave, leads to an empty internal space where the body of the deceased is found partly buried in the soil. The interior of these structures has often been lost, while the external ring wall is left intact. Also here, several tombs are associated with lines of stones.

Situated on a volcano NW of Jabal Balaq al-Qiblī, stands a turret tomb with several chambers, that is, with rooms laid out in an irregular fashion. This is a rare example and is reminiscent of tomb 1 of Al-Manqaz, examined in the present report.

Ṣirwāḥ; Mārib

On the mountain ridges flanking the track leading from Ṣirwāḥ to Mārib, as well as the one running from Mārib to Yalā a large number of turret tombs have been reported (de Maigret 1996a: 317) (Pl. 47.*a*).

Also along the track running from Wādī Ḥarīb up towards Ṣirwāḥ, on the rocky plateaux overlooking the valleys, numerous burial monuments, isolated or in groups, have been reported (de Bayle des Hermens & Grebenart 1980: 565).

Wādī Ḥarīb

On both sides of the track, about 3 km from the village of Al-Khurays, many dozens of tombs have been found in a good state of conservation (de Bayle des Hermens & Grebenart 1980: 565, 576). The turrets have a circular plan and were built using undressed stones laid in rows to form vertical walls with a flattened top having a height of 1.2-1.5 m. In the same area, a dozen or so 'open-corridor' structures have also been reported (de Bayle des Hermens & Grebenart 1980: 570). They have a circular basement (diameter: 7 m; height: 50 cm), built of undressed, but carefully laid stones. On this platform, about half way along its length and in an E-W axis, there is a 'corridor' 3-4 m long and 1 m wide, consisting of flat stones about 80 cm tall supporting two large stone roof slabs. The corridor must originally have been empty, although it is now filled with material from cave-ins.

Wādī Bayḥān Area

Luwā

A dozen or so tombs were observed by N. Groom in the vicinity of the Luwā pass leading to the Jamaliyah plateau, S of Al-Harajah in the upper Bayḥān (Bowen 1958a: 136). These constructions are made of flat stones, roughly dressed and laid dry on top of each other in a circle (diameter: 2.4 m; height: 1.2 m). These tombs clearly resemble those found by H.St.J. Philby in the Jawf.

Ṭaraf al-'Aqayr

This is a necropolis with about 24 tombs, some of which situated on a rocky spur S of Ṭaraf al-'Aqayr near the Mablaqah pass, in the Bayḥān. Others, smaller in size but having the same structure, are located, in groups of two or three, on the rocky ridges surrounding the same locality (Bowen 1958b: 10). The turrets, mostly square in plan, were almost all plundered in ancient times. The structure consists of undressed slabs of stone laid dry and originally covered with stones laid on top, most of which have caved in. The height and length are 2.5-3 m, while the internal chamber measures 1m in length. The smaller cairns are instead 2 m long and 1m high. The latter are the most seriously damaged, to the extent that several that they reveal the internal curtain of slabs.

Mountain Area

Ṣan'ā Basin

Bayt Na'am

The village of Bayt Na'am, situated in a mountainous region about 20 km W of Ṣan'ā, is overlooked to the N by a hill that, covering an area of about 800 m, is delimited to the W by a ravine. On the higher part of the hill there are structures made of dry laid stones, probably the remains of badly damaged ancient turret tombs (de Bayle des Hermens 1976: 12-15). In the same area also numerous flint, basalt and volcanic stone flakes and tools are found.

Jabal al-Manhar

About 150 km N of Ṣan'ā, along the Ṣan'ā-Ṣa'dah road lies a stretch of desert 30 km long with dozens of turrets (de Bayle des Hermens 1976: 26-27). Isolated or in groups, these turrets, situated along the edges of the slopes and in the flatter zones, are circular in plan with an average diameter of 3-4 m and vertical dry stone walls. R. de Bayle des Hermens observed on the inside a 'caisson ou pierre plate, qui, à l'origine, devait être recouvert d'une dalle' (1976: 27). The description of the internal structure is based on the examination of a single cairn violated in ancient times, although it can probably be extended also to the others. Sometimes these tombs are associated with lines of stones or small dry wall stone domes.

Milḥ

About 50 km NE of Ṣan'ā, and 3 km N of the village of Milḥ, there are lines of stones, circular and rectangular structures and numerous funeral monuments, both isolated and in groups (de Bayle des Hermens & Grebenart 1980: 564-66). The latter may be divided into two types:

- cone-shaped cairns made of volcanic rocks, stone rubble and large quartz fragments with two or three stones erected in the centre. (Other examples of this type were observed about 1 km NE of Jabal Milḥ: ten or so, all badly damaged by erosion, made of small stones, volcanic rocks and large quartz fragments. In one, French researchers found a skeleton in a crouching position, together with bone fragments from a second inhumation);
- cylindrical cairns about 1.5 m high and built mainly on the edge of rocky gullies.

In the same area, also some potsherds were found, together with quartz flakes and a flint tool, probably an end-scraper with bifacial retouch.

Wādī as-Sirr; Jabal Riqbān

On the slopes of the Jabal Riqbān, in particular on two rocky plateaux facing the village of Qā' aṣ-Ṣālaḥī, there are many ruins, including several circular and rectangular structures delimited by erect stones or cairns 'avec petit caisson de pierre dressées au centre' (de Bayle des Hermens & Grebenart 1980: 564), as well as cisterns or silos. Surface collection yielded numerous potsherds and a Neolithic stone industry.

Khawlān aṭ-Ṭiyāl; Al-Ḥadā

Wādī Miswar; Wādī Ḥaykān

In the area lying between the Wādī Miswar and the Wādī Ḥaykān (Silbām ar-Radā'i, Jaddānat al-'Umarah, Jabal Sha'īr, Jabal 'Amās, Sabbalat Banī Bukhayt) a number of circular structures with a diameter of 4.5 m were identified (de Maigret 1983: 343). They usually consist of an inner circle of slabs laid edgewise (diameter: about 2 m) and a series of lines of flat stones of varying size and number. A detailed examination was made of two of these circles located near the site of Silbām ar-Radā'i (de Maigret 1983: 343, pl. 14), from which it emerged that the structures must once have been included inside truncated cone shaped turrets which no longer exist. Inside one of the chambers built of slabs fragments of human and animal bones were found.

Al-Bayḍā Region

Madhān

This is a group of about 10 tombs situated on the northern edge of the mountain chain near Madhān, on the Mukayrās-Al-Bayḍā road (Doe 1971: 48; 1983: 60). Oval or circular in plan and made of slabs of local rock, the structures are all practically the same size: height 1.5 m; diameter 4.6 m; diameter of the inner chamber 1.5 m.

Mukayrās

In the area of Mukayrās several turret tombs similar to those of Madhān have been reported (Doe 1983: 60). Inside one of them some bone fragments have been found.

Ḥaḍramawt

Area of the Southern Tributaries

Wādī 'Idim

On the flat areas on both sides of the Wādī, starting about 3 km S of Sāh and continuing for over 8-10 km, hundreds of cairns, probably all of the turret type, have been identified, although R. le B. Bowen subdivided them into 'pill-boxes' and simple stone cairns (Bowen 1958a: 135-36). In all likelihood they are typologically similar tombs that have been interpreted differently owing to their different state of conservation. The cairns, which are sometimes isolated, are often arranged in groups of two or three, about 20-40 cm apart. With an almost circular plan, vertical walls sometimes sloping slightly outwards, they display an inner cavity with an opening formed by slabs, above which small stones have been piled. Several of the structures measure 4.5-5 m in diameter and between 90 cm and 1.2 m in height, other, larger one, 6 m in diameter and 1.5 m in height. Between two large tombs 20 small stone 'cairns' 20 to 50 cm high have been found, 2 to 3 m apart. One of the tombs examined displays 'two projections set at 90° to each other': they are probably two entrances similar to those found by H.St.J. Philby (Bowen 1958a: 135).

Wādī 'Amd

Several cairns have been identified on the stony slopes along the Wādī 'Amd (Stark 1939: 3). The structure are circular in plan, with an inner cavity, and are made of dry laid superimposed stones; from them depart lines of stones that are not always parallel, following the direction of the slope.

Jizwil

In the vicinity of the Jizwil settlement, along the Wādī Ḥajir, in the Ḥaḍramawt, there are large stone and earth cairns on the top of which lie stones delimiting a small rectangular area 90 cm high filled with pebbles (Ingrams 1941: 132). These few indications are sufficient to show that they are probably deteriorated turret tombs partially covered with material from a cave-in of the upper part of the structures. Similar monuments have been found also at Ḥajarayn, Māshid and Ḥurayḍah. In the same area there are also Himyarite remains and inscriptions, as well as circular pits previously used to house incense trees or more probably myrrh trees (Bowen 1958a: 134).

Karīf Bā Dhālah

In the mountains region of the Jabal Kisā'i E of the Wādī Ḥajir, in the Ḥaḍramawt, there are numerous cairns consisting of 'heaps of stones set in circles with large upright ones in the midst of them' (Ingrams 1941: 124). It is perhaps possible to recognize in this description the internal structure of a turret tomb.

In the vicinity several Himyarite inscriptions were found (Bowen 1958a: 134).

Jabal Sawṭ

Along the slopes and on the top of the hills of the Jabal Sawṭ and, in particular, throughout the region, which extends from 'Ayāḍ in the Wādī Jirdān at Mukhayyah in the Wādī 'Amd, numerous burial structures have been reported (Bowen 1958a: 133-34, pl. 35). These constructions have a square plan (van der Meulen 1947: 119), and are built of undressed stones, some of which are of a large size; from them smaller cairns depart in at least two directions (1 m high, long and wide), situated at regular intervals and all of the same size and shape. To get an idea of the density of these structures it is worth citing D. van der Meulen: 'wherever we looked, we observed these cubes standing out sharply against the unchanging, empty horizon' (1947: 119). The same researcher postulated that the structures represented evidence of an ancient trade route.

Again along the Jabal Sawṭ, just before the village of ar-Rawḍah, there are other small heaps of stone, some circular in shape, others oval (van der Meulen 1947: 122). Other larger cairns, with a square plan and composed of large blocks (all that is left of some is an internal circle of slabs) are situated in the vicinity of a small village near the Wādī 'Amd (van der Meulen 1947: 127).

Wādī Sarafah

On the mountain chain known as Ras Shirārah, in the vicinity of Wādī Sarafah, a large number of poorly finished large stone cairns are located which were considered by H. Ingrams as being chronologically very early (Ingrams 1941: 124).

Area of the Northern Tributaries

'Urūm

In the vicinity of the Wādī Qubḥūdh spring, near Qā' al-Fādal on the Jawl Nājah, N of the Wādī Sarr, several structures were identified on four hills, each covering about a quarter of a mile (Ingrams 1936: 538; Bowen 1958a: 134; Doe 1983: 59). The first three hills have structures with a circular plan; between the third and fourth hill there are fifteen 'heaps' of stones that follow the contour of the hill ridge. In the lower part, about 500 m further on, there are other lines of standing stones. In the whole area numerous chalcedony flakes were found, which probably points to an *in situ* industry of tools made of this material.

Coastal Zone

Ghanam al-Kuffār I

South of the junction between the two main tributaries of the Wādī Aḥwar, there are two localities, 1.5 km apart, on the road some 30 km from the village of Al-Maḥfid (Doe 1965: 1-2; 1971: 177-80; 1983: 71-72). In this area the soil consists of a conglomerate of pebbles formed at the level of the main *Wādī*. Lines of stones depart from cairns, the shape of which 'may be linked with the cairn systems found in the Ḥaḍramawt areas' (Doe 1965: 1, pl. 30). The stone lines, which run in directions varying from 115° to 155°, and about 5° apart, are generally about 1.8 m wide, although the longest line (28 m) is about 3 m wide.

Ghanam al-Kuffār II

Also this locality, situated 1.5 km further S of Ghanam al-Kuffār I, is characterized by a cairn system with lines of stones, although the radial pattern is slightly different (Doe 1965: 1, fig. 13).

Cairn 1 has six vertical slabs *in situ* (max. h. 1.5 m) delimited by a circle about 2 m in diameter. A line of stones departs from the tomb in the direction 38°. The inner face of one slab bears a graffiti of a mounted camel bearing the South Arabian letter 'w' on its back.

Cairn 2 has a circular plan and a diameter of about 3.6 m and a height of 60 cm (Doe 1965: 2, pl. 33). Composed of five rows of stone slabs laid horizontally, it has a 'ray' running almost parallel with that of cairn 1 (direction 35°), in this case consisting of small heaps of stone varying in height between 45 and 60 cm.

Cairn 3, situated W of the first and about 51 m from the second, has the same structure as the latter, with a diameter of about 3 m and a height of 60 cm. The 'ray', which proceeds in a completely different direction to that of the other cairns (direction 230°), here is formed by 45 small heaps of stone supported in the centre by a larger slab, laid vertically and 60-90 cm high.

Cairn 4, placed parallel to the first and the second, also has a line of stones.

Further E, along the road to Aḥwar, there is a fifth cairn with two stone rays laid out at 45° and 55°, each about 90 m long (Doe 1965: 2).

It is highly likely that all these structures are linked to the typology of the turret tombs and the apparent difference is due to their overall poor state of conservation. However, while these cairns are normally situated on the top and along the slopes of hilly areas so as to be visible from a distance, in the case of Ghanam al-Kuffār we are dealing with a completely flat site.

Conclusions

The above list in no way claims to be complete or exhaustive, above all because, as we have seen, the 'multiple' external appearance displayed by these monuments and resulting from their varying level of degradation could not always be correctly related back to the turret tombs by travellers. The inaccurate identifications were the cause on one hand of shortcomings in the data collected, on the other it also led to improper excesses in their inclusion. Only a future direct verification of the structures described in archaeological literature will be able to dispel these doubts.

With regard to their distributive model, it should be noted that the turret tombs are characterized by 1) heavy concentration in large necropolises, 2) sporadic presence in small groups (or even in isolation). While the second case is found above all in the highlands and the coastal slopes, the first is limited to deserts and inland slopes.

The necropolises are always located away from the large Sabaean, Minaean, Qatabanite or Hadramite cities. This, in addition to the fact the tombs have been found to be contemporary with the cities, would seem to suggest that non South Arabian people may have been involved.

Their presence extends also to other areas of the Arabian Peninsula: in Oman: Jabal al-Ḥammah (Doe 1977: 54), Bāt (Frifelt 1975: 67 ff.), Fath (de Cardi, Collier & Doe 1976: 157); in Saudi Arabia: Ar-Riyāḍ (Pl. 47.*b*), 'Ayn al-Dilah (de Gaury 1945: 152 ff.), Dhahrān (Cornwall 1946: 36), Wādī Turbah (Doughty 1888: 494 ff.); in Jordan: Ḥarrat ar-Rajlā (Rees 1929: 389 ff.). And these are but a few examples. This is therefore a very widespread distribution, which is oriented for example among those sites situated on the ancient caravan route from Najrān, across Arabia, to Gerrha or else, moving northward, as far as the Mediterranean. This seems to confirm the hypothesis that it was ancient merchants who had these monument built (Doe 1983: 71; Vogt, de Maigret & Roux 2000: 185).

The turret tombs are usually located on the gentler slopes of the mountain ranges, such as on the northeastern slopes of the Jabal Balaq al-Qiblī and the Jabal Balaq al-Awsaṭ, but also on their summits. On the other hand, only rarely were flat regions selected (at the foot of the hill groups of Al-'Ilmān Ḥuwaysān and at Ghanam al-Kuffār). The turrets almost always have a circular-oval plan, although there are also square plan structures (Jabal Balaq al-Junūbī, Ḥaraf al-'Aqayr, Jabal Sawṭ), or occasionally also rectangular ones (Jabal Balaq al-Junūbi). Their typical truncated cone shape is achieved using local material, almost always consisting of flat dry laid superimposed stones, although also some rough undressed blocks (Taslāl, Wādī Ḥarīb, Wādī Sarafah) and some roughly heaped together (Wādī 'Idim) may be found.

Practically all the constructions have some kind of entrance; one specimen (Wādī 'Idim) seems to have two, while in only one case (Jabal Balaq al-Qiblī) was a tomb with several lateral rooms found. B. Finster and J. Schmidt have postulated that this tomb shape was not designed for the whole population, that the basic nature of the constructions is related to the Neolithic, that their archaic appearance and the perceptible symbolic character of the undressed stone may be considered signs of a highly consolidated tradition of worship, perhaps related to the small shrines resembling temples found in the vicinity of Jabal Balaq al-Awsaṭ (Finster & Schmidt 1982: 173-74).

The cairns are often associated with lines of stones. This aspect is widespread throughout the whole Yemeni region, but also in Saudi Arabia, while it is absent in other parts of the Arabian Peninsula. It has been observed that from a cairn a single line of flat laid stones, or else two or even many may depart, like spokes in a wheel (Finster & Schmidt 1982: 171). Sometimes the lines intersect or else a single line may link up several tombs (Jabal Balaq al-Awsaṭ).

What meaning the rays may have is not yet clear. It is certain that they were arranged in such a way as to be easily visible to anyone passing through the area, although they could also reflect either a subdivision having a religious character or else represent a kind of boundary of a holy area, or else have some mysterious astronomical function (Doe 1971: 180).

We also observed structures associated with lines of 'little cairns'. These are located mainly in the western region of the Wādī Ḥaḍramawt and are visible on the hilltops even at great distances. They are known also in Saudi Arabia and Jordan, and seem to have been built where the ancient caravan routes passed through the Ramlat as-Sab'atayn. Mention should be made of those around Najrān, in the Jawf area, on the hills of the Jabal Sawṭ, on the peaks along the Wādī Jirdān and, above all, those on top of the rocky outcrops around Al-'Abr. The actual number of these small constructions is not always stated. However, just to give a few examples, some 33 were counted on the Jabal 'Aqābiḥ, 45 for cairn no. 3 of Ghanam al-Kuffār II and 20 for a turret in Wādī 'Idim. It has been postulated (Doe 1983: 71) that the number of these 'lesser cairns', perhaps having a commemorative function, had something to do with the deceased's rank. The fact that they were located in such a way as to be seen also from a great distance, seems to suggest that they may have been used as 'a form of sign posting above the caravan routes' (Doe 1965: 2).

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PART 2

1. THE HYPOGEAN TOMBS OF KHARIBAT AL-AHJUR

Introduction

The area around Dhamār, and more exactly the zone east of the city, between this and the Jabal al-Lisī (Fig. 33), was explored by the Italian Archaeological Mission during a campaign carried out in 1986. The research addressed both the study of the archaeological context in which the hypogean tombs KAHi/T1 and KAHi/T2 were found, and the identification of other tombs of the same type. For this purpose a team of geophysicists from the Lerici Foundation of Rome carried out systematic electromagnetic and magnetometric sondages in two areas adjacent to the tombs already known. Unfortunately, the anomalies observed in the volcanic soil of the area did not indicate the presence of other tombs (Cucarzi 1986: 465-70).

Conversely, the archaeological surveys carried out in the Waraqah area (about 10 km E of Dhamār) led to the discovery of numerous Himyarite period ruins (Fig. 34). Particularly striking owing to its size is the site of Kharibat al-Ahjur (KAHii), the remains of a city with roads and squares surrounded by groups of dwellings and a city gate on the eastern side. A paved roadway starting from this gate leads southward through the necropolis area and the farmlands, where extensive paved areas have been identified as farmyards. A systematic collection of the pottery allowed us to reconstruct a relatively complete typology of the vase forms of KAHii.

Another road formerly linked Kharibat al-Ahjur with a contemporary site, Qā' Swayd (KQS), just NE of the modern village of 'Allānah. On the southern slopes of the Jabal al-Lisī lie the remains of another ancient settlement, called Al-Maḥaṭṭah, which are contemporary with KAHii and KQS.

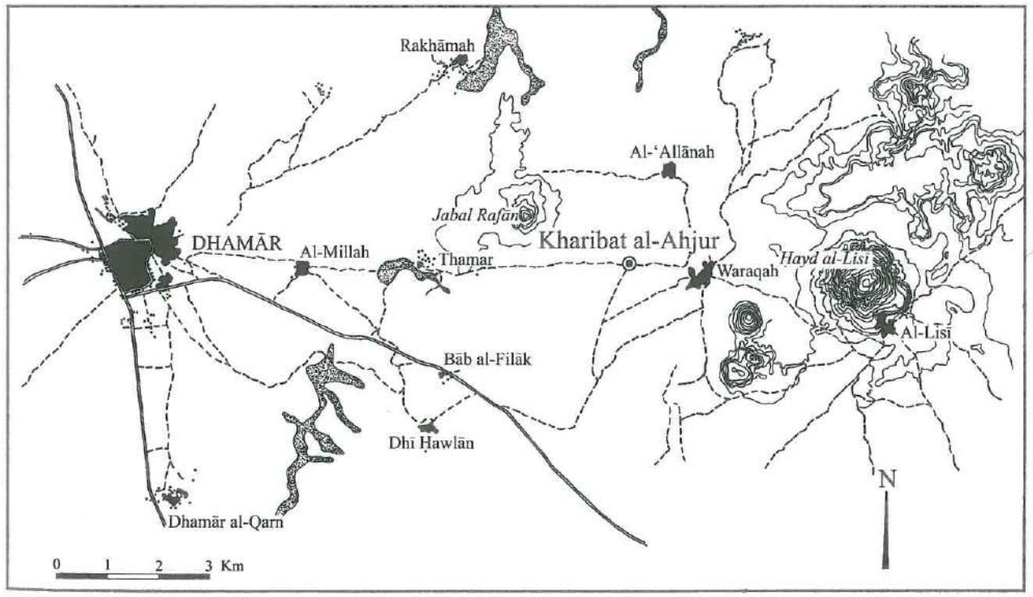

Fig. 33. Territory near Dhamār where Kharibat al-Ahjur is located.

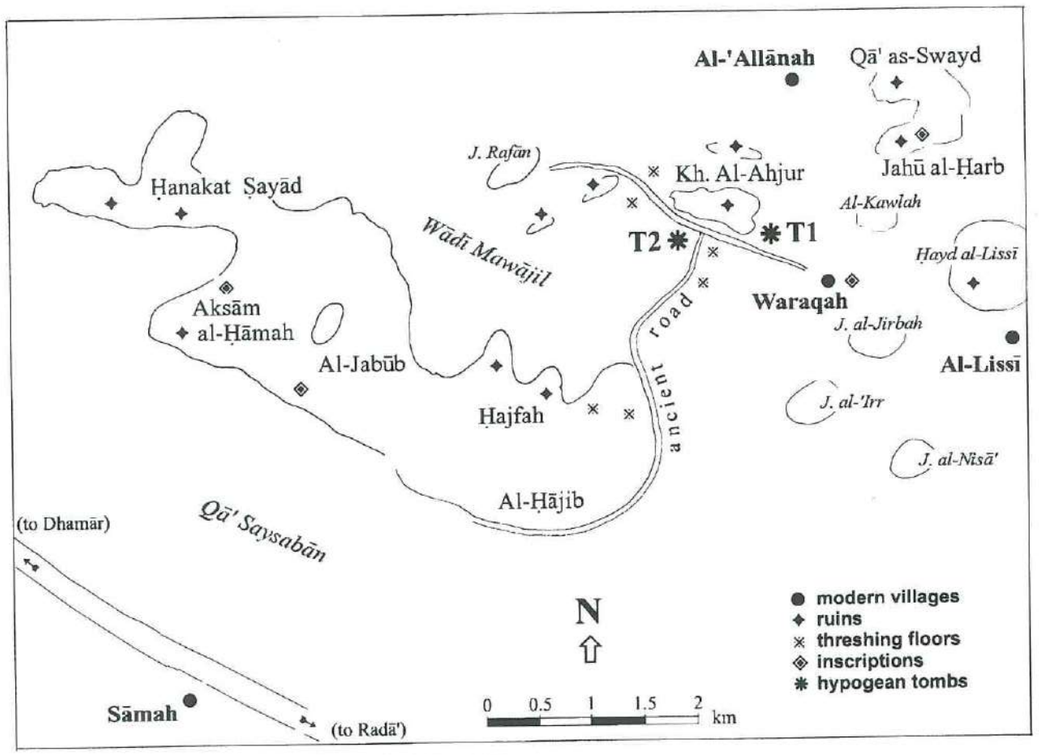

Fig. 34. Map showing location of ancient ruins around Kharibat al-Ahjur.

Several rock engravings were discovered at Al-Hājib, near Waraqah (Pl. 48.*b*).

West of Kharibat al-Ahjur rise the ruins of Ḥajfah, Ḥanakat Ṣayād (HNS) which, together with the site of Ḥajfah, gathered here actually displays several characteristics reminiscent of that of the Bronze Age of the highlands, although several of the forms recur in the Himyarite pottery repertoire. Furthermore, the technique used to build the HNS and HG constructions appears objectively to be earlier than that of the Himyarite period.

An ancient road apparently leads from Kharibat al-Ahjur towards Ḥajfah. Here two more complete constructions may be identified: a small 'building' (HGi, Fig. 35) and a 'dwelling' (HGii, Fig. 36). The two structures have a base consisting of rather thick double curtain walls, alternating with large basalt blocks (Pl. 49); the entrances consist of heavy monolithic doorposts set in an upright position (Pl. 50.*a*). In the spaces between the constructions some paved farmyards have been built (de Maigret 1986: 377-81).

The sites and monuments found in this area have nevertheless been found to refer to different periods and it is to be hoped that the area will in future be subjected to a specific detailed investigation.

Tomb 'KAHi/T1'

Excavation

At the end of October 1985 several peasants in the village of Waraqah, while working in the fields in the zone of Kharibat al-Ahjur, accidentally came across a hypogean tomb (KAHi/T1), into which their tractor fell. The Qādī Ismā'īl al-Aqwā', then head of GOAL (General Organization for Antiquities and Libraries, today known as GOAMM, i.e. General Organization for Antiquities, Manuscripts and Museums), requested the intervention of the Italian Archaeological Mission to excavate the funeral monument. In early November, the Italian team directed by Alessandro de Maigret and composed of the architect Vincenzo Labianca, the draughtswoman Patricia Smith and myself, set off for Dhamār. Also participating in the excavations were the Yemeni functionaries 'Abd al-Razāq Na'mān, the then Director of the Antiquities Section of GOAL and the archaeologists Sayf Ḥusayn Mas'ād and Muḥammad al-Ḥalabī. At Dhamār we were met by the governor (*muḥafaẓ*) Yaḥyah Musliḥ, in whose company we visited the tomb and the nearby dwelling settlement, which

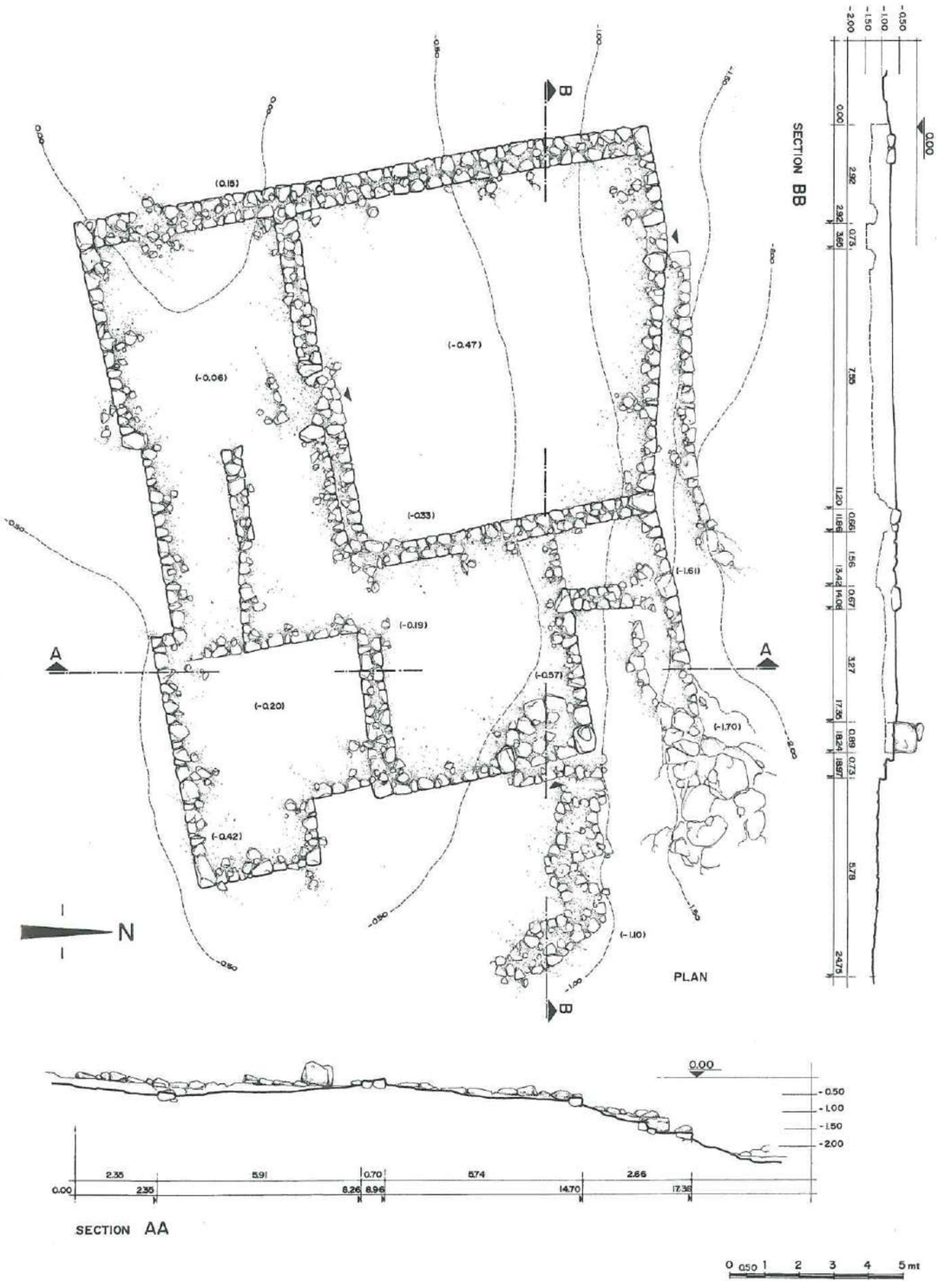

Fig. 35. Al-Ḥajfah (Dhamār). Plan and sections of building HGi.

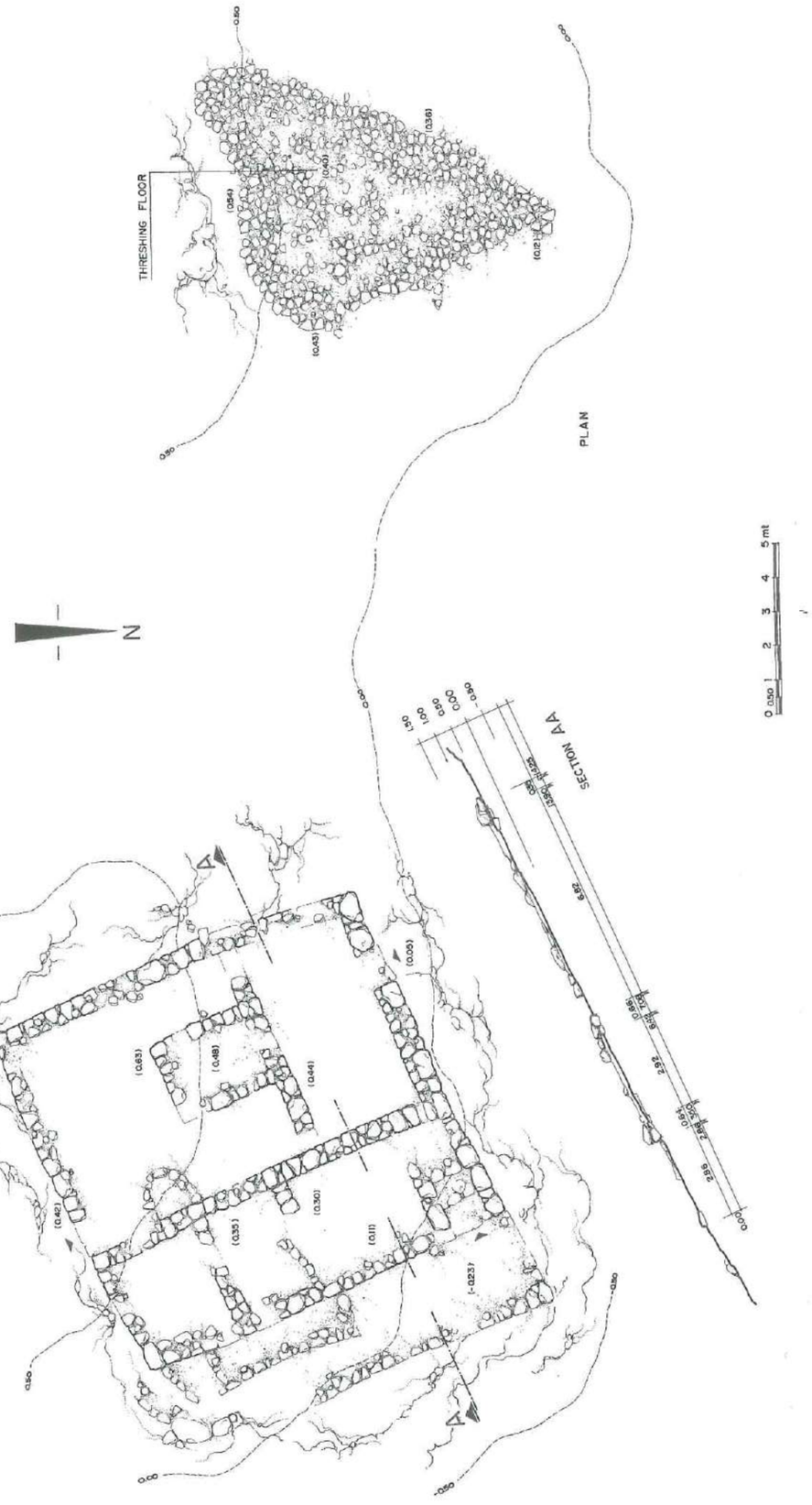

Fig. 36. Al-Ḥajfah (Dhamār). Plan and sections of building HGii.

extends between the Jabal al-Lisī and the Jabal Rafān. It consists of the previously mentioned extensive ruins of Kharibat al-Ahjur (comparable in size and appearance to that of Madinat al-Ahjur) (Antonini 1989), exploited by part of the neighbouring village of Waraqah as a quarry for dressed volcanic stones (Pls. 50.*b*-51.*c*).

The tomb was badly damaged by the collapse caused by the tractor. During the work to recover the vehicle, a bulldozer first filled the cave-in hole with soil from the field and then excavated a long trench as far as the entrance to the tomb, to the point where two entrance pillars and an architrave stood (Pl. 51.*b*).

The Entrance

The entrance consists of a *dromos* or corridor that gradually descends from ground level towards the interior of the hypogean tomb, down to a depth of -1.75 m, that is, to the level at which the deceased were laid. It was not possible to make an exact assessment of the length of the corridor owing to the destruction caused by the bulldozer during the work of enlarging the entrance and flattening the land.

The entrance is about 70 cm wide (Fig. 37), although at the level of the second step (at level -1.60 below the ground level) the space is greater (1.20 m) in order to house the monolithic door-posts which supported the door leading into the large burial chamber (Figs. 38-39). The break-up of the layer of tuff to take the rectangular bases of the door-posts is clearly visible in Pl. 51.*c*. After passing through the door-way, a narrow step leads down to the tomb floor, or rather, at this point to the slabs that must originally have sealed the burial pit dug below the tomb floor level.

The Hypogean Chamber

The first excavation job was to free the anterior sector of the tomb from the caved-in material from part of the roof and from the earth piled up by the earthmoving vehicle (Pl. 51.*d*). From this point on intact terracotta vases begin to appear and the same point apparently yielded an iron dagger and the stone lamps handed to us by the local inhabitants.

After freeing the entrance to the underground portion, it became clear that the tomb had been dug out of layers of different composition, all of volcanic origin (Fig. 40). Under a layer of humus some twenty cm thick lies a thick layer of lapilli and pumice, both loose and conglomerate. This compact pumice layer, some seventy cm thick, represents the tomb's ceiling (Pl. 52.*a*). The walls of the hypogean chamber are instead dug out of a more compact layer of tufaceous stone supported by another layer of tuff and separated from the former by a thin layer of wind-borne soil in which the tomb base is defined (Figs. 40-41). Vertical marks are visible on the inner wall of the tomb, spaced at regular levels, made by a stone engraving tool.

The comparatively regular circular-shaped burial chamber measures 4.86 × 4.70 m (Fig. 38). The tomb ceiling is of the low-pitched vault type and is about 1.50

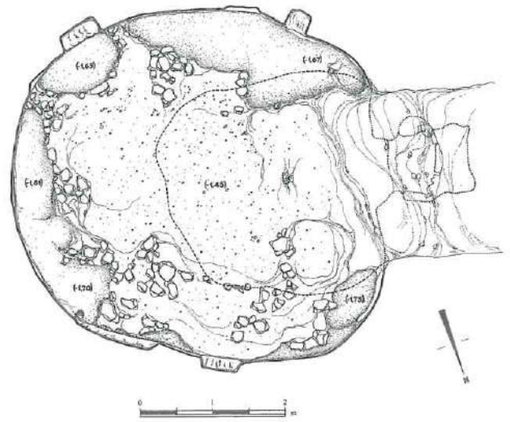

Fig. 37. Kharibat al-Ahjur, tomb KAHi/T1. Plan of tomb at beginning of excavations. Dashed line indicates roof collapse.

m high (Fig. 40). On the inner wall two rectangular niches have been carved out on the South side (Pl. 52.*b*), and a niche with an upper arch-shaped ceiling on the North side (Pl. 53.*a*). A fourth, blind, window was marked out and a start made on carving it out slightly lower down the South wall, although it was never completed (Pl. 53.*b*).

After removing the filling material, at a depth of -1.45 m below ground level, the layer of pumice resulting from the cave-in of the tomb ceiling was reached (Fig. 37). The cave-in, which corresponds to the missing part of the roof, occupied the front and central portions of the burial chamber.

Numerous small and medium sized tufaceous stones were heaped close behind the wall at various points of the chamber (Fig. 37; Pl. 54.*a*). These stone heaps, which at first sight seemed to indicate the location of the burials, proved simply to be tuff fragments produced by the break-up of the walls and roof of the tomb. These stones actually lay on the blackish-coloured layer representing that of the ancient burials.

The Burials

The blackish-coloured layer, about 4-5 cm thick, lies on the tomb floor (at level -1.75 m below the ground level). In this layer human bones and different kind of goods were found. The outline of a pit-grave dug below the floor appeared in the middle of the chamber (Fig. 38). Small fragments of charcoal and wood testified the presence of perishable objects.

The break-up of the ceiling had damaged seriously the burials. In fact, the human bones discovered in this layer were in a very bad shape: from the dimension of skull and small teeth it was possible to recognise an infant skeleton in the northern sector; in the southern one

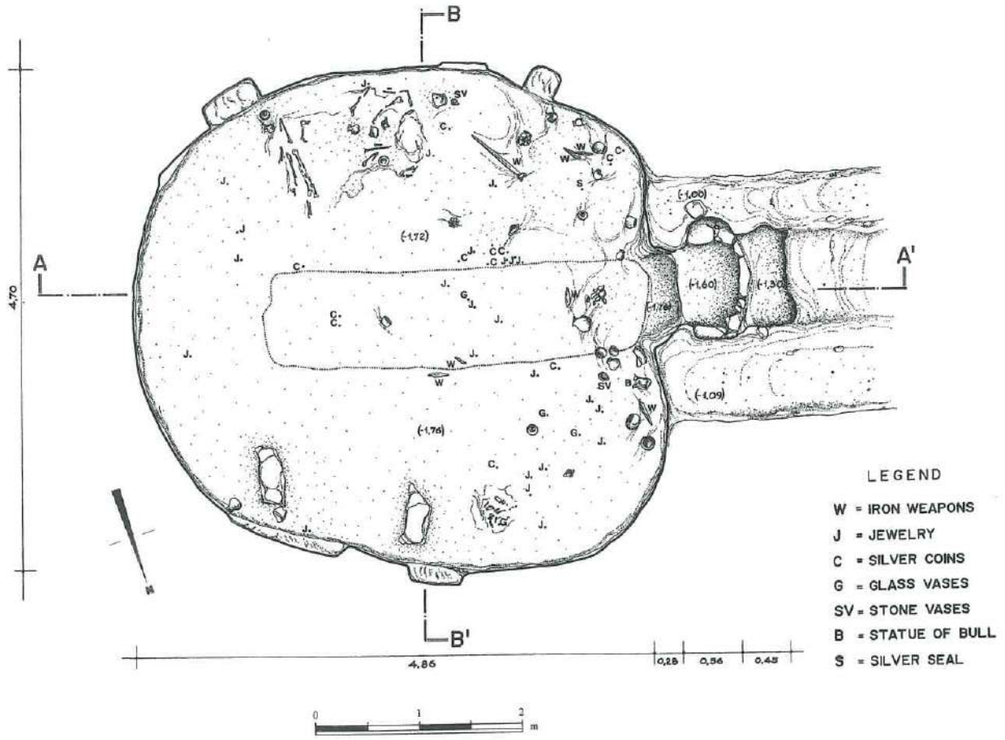

Fig. 38. Kharibat al-Ahjur, tomb KAHi/T1. Pavement level with remains of burials and grave goods *in situ*.

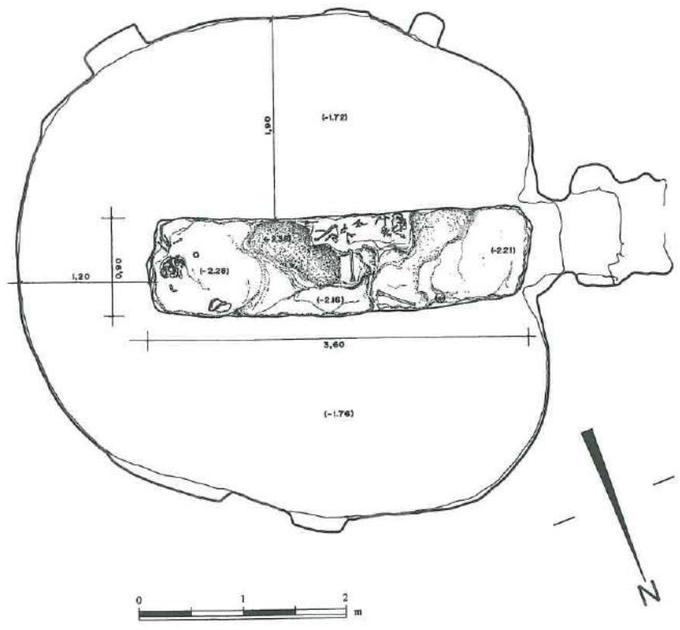

Fig. 39. Kharibat al-Ahjur, tomb KAHi/T1. Plan of burial chamber showing grave dug out of floor.

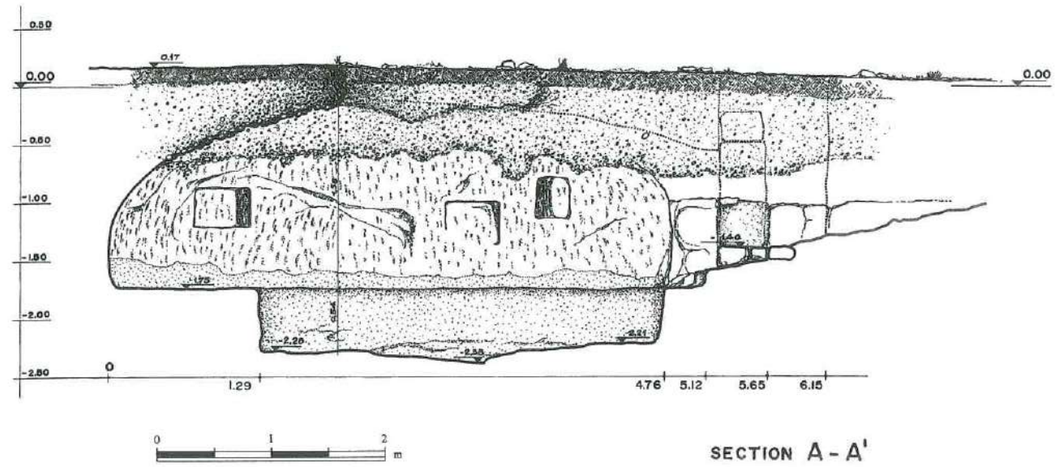

Fig. 40. Kharibat al-Ahjur, tomb KAHi/T1. Longitudinal section (E-W) of tomb.

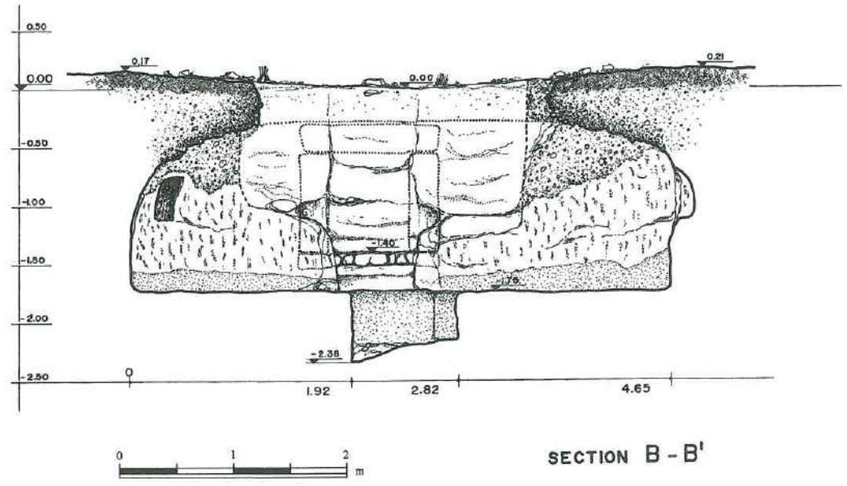

Fig. 41. Kharibat al-Ahjur, tomb KAHi/T1. Transverse section (N-S) of tomb.

lay an adult skeleton, crushed by the break-up of the wall (Pl. 54.*b*). The tuff fragments, which covered the skeleton, showed ancient marks on the inferior side made by engraving tools. This is the evidence of the natural flaking of the tomb wall.

Close behind the south-west wall pottery was found included both complete vases and shards (Pl. 55); some bronze weapons, among which a very beautiful bone-handled sword, were also found (inv. no. Y.85.KAHi.T1/1; Pl. 56.*a*). Just in front of the entrance other pottery vessels, both complete and fragmentary, a terracotta lamp (inv. no. Y.85.KAHi.T1/49; Pl. 56.*b*) and an iron dagger lying on a stone (inv. no. Y.85.KAHi.T1/45; Pl. 57.*a*) were found. In the north-western and eastern side of the tomb, beside the pottery (Pl. 57.*b*), jewels and coins were scattered over the floor (Pl. 57.*c*). Some coins were found in the central area of the tomb as well. The position of the goods, scattered all over the floor (Fig. 38), seems to indicate that the tomb had been raided in ancient times. The concentration of similar objects in several parts of the floor nevertheless remained, as is demonstrated by the jewellery and coins situated in the centre of the tomb, the jewellery and glassware in the north-west sector, more jewellery in the

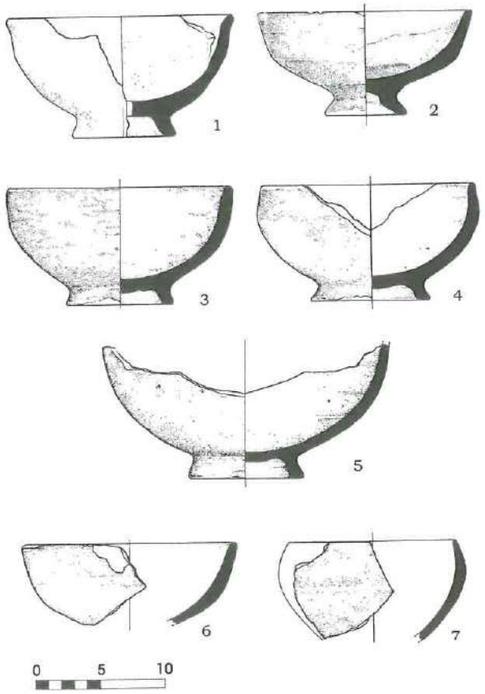

Fig. 42. Kharibat al-Ahjur, tomb KAHi/T1. Pottery: open bowls with ring foot.

south-east part, and the weapons in the south-west section. The pottery is scattered around and mingled with all the objects.

Right up against the entrance and with an East-West alignment, a rectangular grave (3.60 × 0.90 m) had been dug out of the rock to a depth of about 60 cm (Pl. 58.*a*). It lies about -2.38 cm (the lowest point) below the ground level. It extended as far as the third and last step leading into the hypogean chamber (Fig. 39).

The cyst grave had certainly been violated in ancient times, as is apparently indicated by the broken squared slabs that must originally have sealed the grave (Pl. 58.*b*), as well as by the position and condition of the bones of the skeleton it contained. In the eastern part of the cyst grave a few broken bones and a skull lying upside down were found; it was possible to identify the jaw bone, which lay directly on the rock bottom (Pl. 59.*a*). Beside the skull lay a bronze bracelet (inv. no. Y.85.KAHi.T1/6), which pointed to an original female inhumation. At the centre of the grave another skull and many disarticulated bones were found (Pl. 59.*b*).

This cyst grave is the only one dug out of the floor of tomb KAHi/T1 (Pl. 59.*c-d*), while, as we shall see in the following, in tomb KAHi/T2 the graves are more numerous, thus exploiting the whole floor surface. Osteological analyses show that only 4 individuals were buried in tomb KAHi/T1, one of whom was a female aged 25-35 years, one a male aged 20-30 years and two children aged 7-8 and 3-4 years, respectively (cf. A. Coppa & S. Damadio in the present volume, p. 94).

The Grave Goods

The Pottery

Although relatively few in number, but fortunately mostly intact, the pottery items found in tomb KAHi/T1 provide us with a typology that essentially comprises 3 types: bowls, jars and hole-mouth jars (Pl. 64.*d*). We preferred to classify the pottery using a purely formal criterion — from the open forms to the closed ones — instead of a stratigraphic one, as the pottery finds, and the grave goods as a whole, refer exclusively to the single level of human burial overlying the tomb floor. Several variants present inside each category, which have been identified by the form of the rim (natural, everted, flattened, expanded, etc.), of the bases (ring base, flat bottom, dimpled bottom, rounded bottom), and of surface treatment (incisions, decorations, slip, etc.) form subgroups that are important for a functional rather than chronological definition.

The pottery seems to be hand made, although horizontal striations, and above all the regular parallel lines produced by stick burnishing point to the use of at least some kind of slow turn-table.

The pottery from both tombs is generally of medium compactness. There are only rare fairly compact paste vases and equally few vases with poorly compact paste. Of course, these values assigned to the quality of the Kharibat al-Ahjur pottery are only to be understood in terms internal to the repertoire taken into consideration.

Bowls

A.1 Open Bowls with Ring Base (Fig. 42)

The first type in our classification comprises six bowls with a natural rim, which in bowl 1 is slightly everted and in bowl 3 is slightly inverted. The walls are rounded, except in bowl 2, in which a slight carination is observed (Pl. 60.*a*). The diameter of the bowls varies from 17 to 22 cm, and the depth varies from 5 to 10 cm. The ring base is splayed and 1 cm high on average.

The clay is generally reddish-orange or reddish-brown in colour, and comparatively light grey in cross-section; with very few exceptions, the degreasing inclusions in the clay (temper) are of vegetal origin. Straw, chopped into small-medium pieces, is abundant in the clay used to make these vases, as well as all the other Kharibat al-Ahjur pottery, while the presence of mineral temper is sporadic. Both surfaces of these open bowls are covered with reddish slip, stick burnished in a horizontal direction, covering the entire surface.

Bowl 5, which is also the largest in this typology, is dark grey in colour and bears traces of slip burnished only on the outer surface.

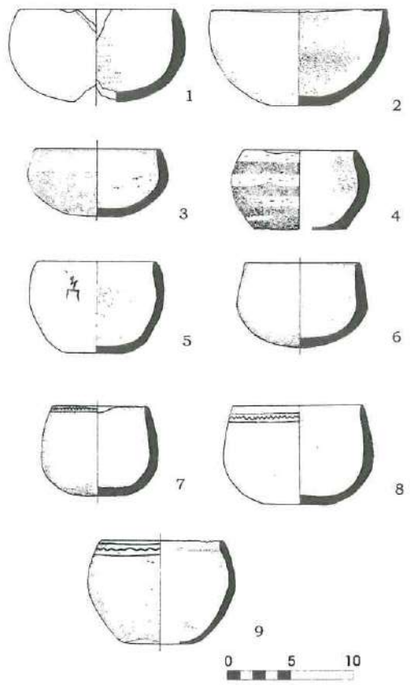

Fig. 43. Kharibat al-Ahjur, tomb KAHi/T1. Pottery: small bowls with flat bottom.

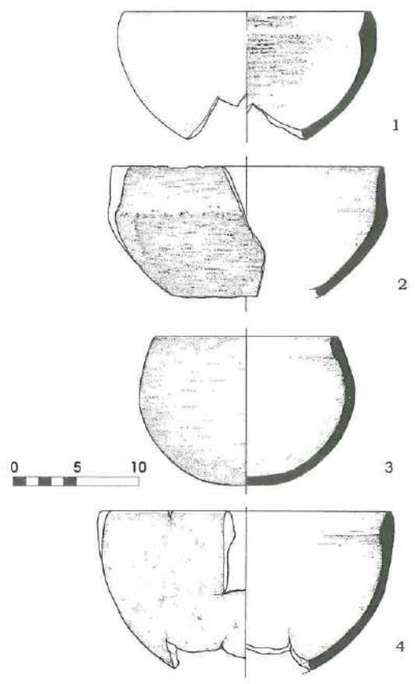

Fig. 44. Kharibat al-Ahjur, tomb KAHi/T1. Pottery: large bowls with rounded bottom.

The profile trend displayed by the wall of potsherd no. 7 points to a bowl with a ring base rather than a flat-bottomed bowl belonging to the following category, despite the pronounced inverted rim.

A.2 Small Flat-bottomed Bowls (Fig. 43)

This category comprises nine small bowls (varying in diameter from the 7.5 cm of no. 7 and 14 cm of no. 2, average depth 7 cm), with a naturally inverted rim (Pl. 60). The bottom is usually flat; in bowl 6 it is rounded and in bowl 8 slightly concave.

In this second group the clay is of two different colours: reddish-orange and beige. The bowls made of reddish-orange clay are of more compact paste and better finished. Their inner and outer surfaces are covered with burnished red slip and they have incised decoration along the rim (Pls. 60.*c*, 61.*a-b*). In the beige clay bowls the slip has been almost entirely abraded, baring the abundant finely chopped straw used in the paste. Bowls nos. 2, 4 and 5 display traces of burning. Bowl no. 5 bears a monogram (*'nby*) incised after firing, or rather a single letter (' = *alef*), probably the initial of a name (Fig. 43.*5*; Pl. 60.*d*).

This typology is present at the site of Kharibat al-Ahjur (KAHii), where several bowls are characterised by typical zigzag decoration incised below the rim.

Some similar small deep bowls are present also in tomb A5 at Ḥurayḍah, although most of them have a characteristic concave bottom; several bowls are decorated with an incised line below the rim (Caton Thompson 1944: 122, pl. VIII.*1-6*) (1).

A.3 Large Round-bottomed Bowls (Fig. 44)

This category comprises four different deep bowls, larger in size than those of group A.2 (from 15 to 23 cm in diameter, with a depth of about 10/15 cm). The first bowl has an internally concave rim, probably to take a lid; this must have been present also in bowl no. 4, which has a flat internal rim. The second bowl has a natural, straight rim tapering at the mouth, and bowl no. 3, intact, has an inwardly bulging rim (Pl. 61.*c*). The paste is composed of a brownish-red clay with numerous straw inclusions. The inner and outer surfaces of these bowls are covered with stick burnished slip. Bowl no. 2 is of shoddy workmanship and bears traces of burning.

A.4 Small Bowl with Wavy Rim (Fig. 45.*1*; Pl. 61.*d*)

The small polylobate bowls, given this name because of the typical wavy rim, are characterised by a pale

(1) To be included in the 'Deep bowls with dimpled bottoms' category of G. Caton Thompson are the cups found in cave-tomb 1 at Shabwah ('type A urns'; Roux 1991: 352, fig. 18.*60-63*).

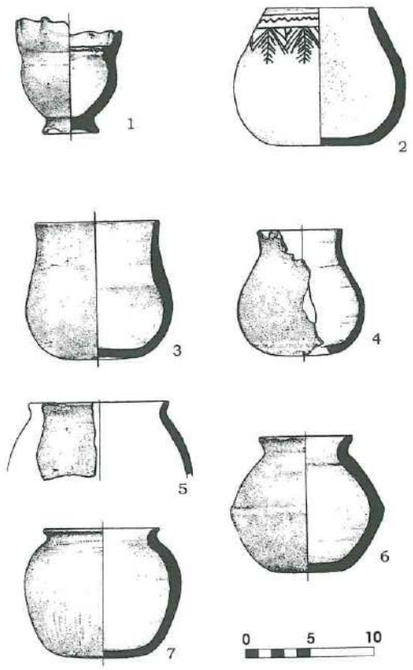

Fig. 45. Kharibat al-Ahjur, tomb KAHi/T1. Pottery: 1) bowl with wavy rim; 2) decorated bowl; 3-4) jars with wide neck; 5, 7) jars with everted rim; 6) jar with carinated body.

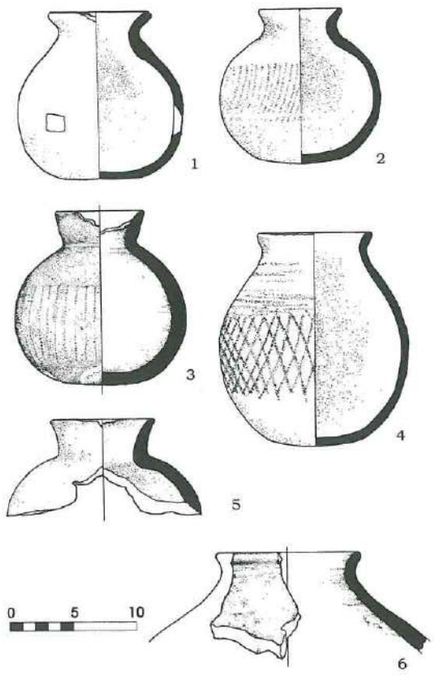

Fig. 46. Kharibat al-Ahjur, tomb KAHi/T1. Pottery: 1-6) jars with globular body.

yellow paste, with tiny vegetal inclusions. The outer surface has a coating of the same colour. In the bowl from tomb KAHi/T1, the rim, bearing conspicuous finger-prints, was applied to the body later; the clay added to cover the joint is visible on the shoulder.

Polylobate bowls are present in other South Arabian burial contexts, such as the cave-tomb 1 Shabwah ('yellow paste pottery', Type A, from layer 6b; Roux 1991: 354, fig. 20.*99*), as well as in the Wādī Ḍura' tombs, where two bowls of good workmanship were found outside the stratigraphic sequence (Breton & Bāfaqīh 1993: 40, pl. 20, figs. 59-60 and pl. 36, figs. 120-121). Although little is known about the pottery found in the excavation of the Ḥayd Ibn 'Aqīl tombs, a very large number of polylobate bowl shards of various sizes belonging to the grave goods were found in the necropolis and discarded by the tomb raiders. It is certain that two hand-modelled miniature polylobate bowls, perfect reproductions of the full size ones, come from this necropolis (IMA Exhib. 1997: 359-60, nos. 372, 374).

This pottery type is not however exclusively funereal in nature as is was found also in the stratigraphic sondage performed in the city of Shabwah, and more precisely in the levels lying between VI A and X, the chronological sequence of which has been accurately determined (2nd century B.C.-1st century A.D., Type II C1a; cf. Badre 1993: 277 and 279, table on p. 292 and fig. 27.*134-138*).

Few numbers of small bowls with wavy rim are found also at Hajar Ibn Ḥumayd, mainly concentrated in layers C2-A (van Beek 1969b: 117) [2], as well as in the temple of Nakraḥ at Barāqish (final phase of use of the temple, Minaean A, 2nd century B.C.-1st century A.D.). A bowl of this type comes from the Al-Manqaz excavations (cf. de Maigret in the present volume, Fig. 31.*1*). Lastly, numerous polylobate bowls of various sizes and shades of colour (from pinkish-beige to greenish-yellow) were found in stratigraphic sequence in the recent Italian-French excavations at Tamna'.

Conversely, no polylobate bowls were found at Ḥurayḍah (the tombs date to the 5-4th centuries B.C.), nor have any been found in the turret tombs of the Al-Makhdarah necropolis, or any shards collected on the surface of the Madīnat al-Ahjur settlement (3rd-2nd centuries B.C.).

On the basis of dating obtained using coins found in tomb KAHi/T1, as well as of imported objects found in the same tomb, the wavy rimmed bowl probably dates to

[2] From the table showing the distribution of pottery forms at Hajar Ibn Ḥumayd it may be seen that the polylobate bowls are present also in the earliest layers (from layer R, Q and P; cf. van Beek 1969b: fig. 23, after p. 100).

the 1st century A.D., although this typology was widespread as early as the 1st century B.C. on.

A.5 Decorated Bowl (Fig. 45.2; Pl. 61.*e*)

This category is represented by a single bowl specimen, rather closed with a natural rim and globular body. The decoration, incised on the edge and shoulder, is composed of irregular triangles with vertex pointing downwards, alternating with chevron motifs. Above this, two straight lines are separated by a wavy line. The bottom is flat.

Jars

B.1 Wide-necked Jars (Fig. 45.*3-4*; Pl. 61.*f*)

This category is represented by two jars with natural, slightly flaring rims, with an almost pear-shaped body and concave bottom. The surfaces of jar no. 3 are covered with thick evenly burnished reddish-orange slip; the second jar is of shoddier workmanship and displays traces of burning.

Conspicuous among the abundant surface pottery gathered in the Kharibat al-Ahjur settlement is a group of rims that, in view of their shape and surface treatment (thick burnished red slip), may be included in this bowl category.

B.2 Everted Rim Jars (Fig. 45.*5*, *7*; Pl. 62.*a*)

This characteristic is visible above all in the complete jar, where the jutting rim emphasises the low neck. It has a flat bottom. The surface is slipped and has horizontal stick burnishing on the neck and shoulder, and vertical burnishing on the body.

B.3 Carinated Body Jar (Fig. 45.*6*; Pl. 62.*b*)

The rather unusual shape of the jar makes it a single isolated specimen. The body, divided into two by the carination, has an almost biconical shape. The clay is brown in colour and the surface is covered with a layer of unburnished slip of the same colour. Thick lime incrustations cover the surface.

B.4 Globular Body Jar (Figs. 46 and 47.*1-4*)

The jars in this category, the most numerous in the whole typology (10 in all, 7 of which intact), have a natural everted rim and globular body. The height varies from a maximum of 16 cm (Fig. 46.*4*; Pl. 62.*f*) to a minimum of 7 cm (Fig. 47.1; Pl. 63.*a*). The clay consists of two main colours, reddish-brown and reddish-orange, with numerous finely chopped straw inclusions. The outer surface of the vessel and the inner part of the rim is generally covered with burnished slip; the stick burnishing is horizontal and closely spaced on the rim, neck and shoulder, and widely spaced and vertical or crossed on the body (Pls. 62.*d-f*, 63.*c*). One exception is the small jar Y.85.KAHi/23 (Fig. 47.*3*; Pl. 63.*b*), with stick burnishing consisting of thick horizontal bands. Three specimens have an unburnished outer surface (Figs. 46.*1*, *6*, 47.*1*; Pls. 62.*c*, 63.*a*).

Quite similar to those from tomb KAHi/T1 are the small jars from the Wādī Ḍura' tombs (Breton & Bāfaqīh 1993: 30-40, nos. 86-88, pl. 20, fig. 57 and pl. 36, figs. 118-119).

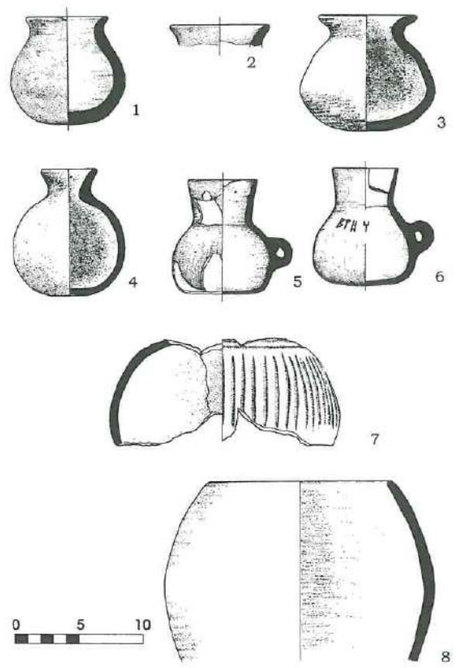

Fig. 47. Kharibat al-Ahjur, tomb KAHi/T1. Pottery: 1-4) jars with globular body; 5-6) single handed high necked jars; 7) decorated pot; 8) hole-mouth jar.

B.5 Single-handled High-necked Jars (Fig. 47.*5-6*; Pl. 63.*d-e*)

A pair of small jars of identical shape and size is characterised by rather thin walls, natural, slightly tapering rim, high neck and flat bottom; a lug projects from the widest point of the body. The mouth diameter measures 5 cm, with a height of 9 cm. The clay is brown in colour, with vegetal inclusions, the outer surface is slipped and the burnishing is vertical on the neck and body, and horizontal on the shoulder. One of these small jars bears a name (*Hdym*, with the final letter reversed), incised under the shoulder after firing (Pl. 63.*e*).

Hole-mouth Jars

C.1 Decorated Hole-mouth Jar (Fig. 47.*7*; Pl. 64.*a*)

This consists of a single fragmentary specimen, characterised by decoration consisting of parallel, equidistant vertical lines, probably incised with a toothed tool with wide pointed teeth. Two concentric depressions are visible on the shoulder. Both surfaces are covered with a burnished reddish-orange coloured slip.

C.2 Natural Rimmed Hole-mouth Jar (Fig. 47.*8*)

The category is represented by a single incomplete specimen. Numerous fragmentary rims of natural-

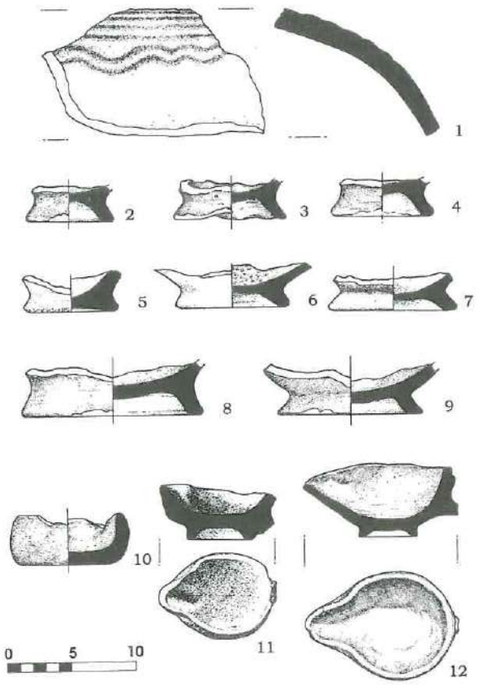

Fig. 48. Kharibat al-Ahjur, tomb KAHi/T1. Pottery: 1) decorated wall; 2-9) ring bottoms; 10) flat-bottomed lamp; 11-12) lamps with spout and ring bottom.

rimmed pots, with burnished red slip, are included in the surface collection made in the ancient town of Kharibat al-Ahjur.

Walls (Fig. 48.*1*)

The pottery from KAHi/T1 includes only one wall fragment. It is rather thick and probably belongs to a *dolium*. The external surface, decorated at the level of the shoulder, has been given a simple coating.

Bottoms and Bases (Fig. 48.*2-9*)

The bottoms found in tomb KAHi/T1 are all ring-shaped, and probably belong to our A.1 typology (open bowls with ring base, Fig. 32). Indeed, they display the same type of paste and surface treatment, although are less compact and bear traces of burning. It cannot be ruled out that some of these bases were re-used as lamps, as in tomb KAHi/T2.

Lamps

F.1 Flat-based Lamp (Fig. 48.*10*)

The state of conservation of this small terracotta vase seems to indicate that it is a lamp, although with no handle. The rim is complete, although chipped. The lamp is 9 cm wide and stands 4 cm high.

F.2 Ring-based Lamps (Fig. 48.*11-12*; Pl. 64.*b-c*)

The two lamps comprising this category are oval shaped, have a spout and a ring-shaped foot. The vertical lug, missing in both lamps, had been applied later. The clay paste and surface treatment of these lamps is no different to that of the common pottery found in the tomb; the external surface is covered with reddish-brown slip.

Lamp Y.85.KAHi/6 (Pl. 64.*c*) was found in front of the entrance, on the western edge of the central pit-grave, precisely at the point of maximum concentration of coins and jewellery; lamp Y.85.KAHi/19 (Pl. 64.*b*) comes from the northern sector of the tomb, i.e. on the left of the entrance. These lamps, like the other two stone ones, were probably used by raiders for illumination while selecting the objects to plunder and those to be rejected and left on the spot.

The Objects

Although tomb KAHi/T1 was badly damaged in modern times, as well as during ancient raids, the grave goods that have come down to us are quite varied in quality and quantity, which demonstrates that this small rural township in the Yemeni highlands enjoyed relative prosperity.

The objects accompanying the male inhumations are apparently fewer in number and less valuable than the material assumed to be of female origin. Given the conditions in which the skeletons were found and, as already mentioned, the random arrangement of the finds, we are certainly not in a position to attribute several of the objects to one or the other sex with any accuracy. I refer, for instance, to the coins or to the rings with mountings, perhaps used exclusively by men, as would seem to be indicated by classical South Arabian statuary (cf. the statue of the king of Awsān, Yaṣduq'il Fari'um, son of Ma'ad'īl, ostentatiously wearing a ring with mounting on the ring finger of his left hand).

While on the one hand there is no doubt that the small number of weapons found belonged to male individuals, on the other we can attribute to women several jewellery items, such as the tubular bracelets frequently found represented on statues or reliefs of female figures. As far as the jewellery is concerned, for the first time we have an interesting collection of South Arabian specimens that, since they come from a definite, scientifically investigated archaeological context, allow us to date material discovered accidentally or sold on the clandestine market.

Rings (Fig. 49.*1-5*; Pl. 65.*a-e*)

These are mostly made of bronze, except for one silver specimen (Y.85.KAHi.T1/37) and another made of iron with a mother of pearl mounting (Y.85.KAHi.T1/41). Of all the rings found, two are very simple, that is, consist of a smooth flat band (Y.85.KAHi.T1/7) or are semi-circular in cross-section (Y.85.KAHi.T1/33), while the remainder are characterised by a flat oval mounting. The convex decorated ring with a double external groove Y.85.KAHi.T1/33 and the rings Y.85.KAHi.T1/36 and Y.85.KAHi.T1/41 form a closed circle. The incrustations due to metal oxidation present on the surface do not allow it to be determined whether the closed rings were made in a die or whether the ends were later welded together, after the metal bar had been bent into a ring shape. The other rings were obtained from a strip beaten and folded to form an open circle, with widely separated extremities.

The ring Y.85.KAHi.T1/41 has a mother of pearly mounting. It is decorated with incisions which are unfortunately not identifiable. This model is known in South Arabia through the specimens made of gold with onyx mountings (Doe 1971: 132, pl. VIII; these jewellery items are of unknown provenance, although they might come from Wādī Bayḥān or Wādī Markha).

Ring (Y.85.KAHi.T1/7) (Fig. 49.*1*; Pl. 65.*a*)
Provenance: from A: 1.05 m; from B: 2.15 m.
Material: bronze.
Conservation: intact.
Size: diam. 1.9 cm; strip h. 0.4 cm; strip thickn. 0.1 cm.
Description: the ring consists of a thin narrow bronze strip bent to form a circle; the extremities, clean cut, do not meet, but remain 0.3 cm apart.

Ring (Y.85.KAHi.T1/33) (Fig. 49.*2*; Pl. 65.*b*)
Provenance: from A: 4.90 m; from B: 4.90 m.
Material: bronze.
Conservation: intact.
Size: diam. 1.8 cm; thickn. 0.4 cm.
Description: ring with a convex external surface and double groove.

Ring with flat oval mounting (Y.85.KAHi.T1/36) (Fig. 49.*3*; Pl. 65.*c*)
Provenance: from A: 2.25 m; from B: 2.40 m.
Material: bronze.
Conservation: intact, with incrustations due to metal oxidation.
Size: max. diam. 2.4 cm; min. diam. 2 cm; mounting 2.2 × 1.2 cm.
Description: the external part of the stem is rounded and thin in its lower part. The poor state of conservation, due to metal oxidation, prevents any incisions being identified.

Ring (Y.85.KAHi.T1/37) (Fig. 49.*4*; Pl. 65.*d*)
Provenance: from the cyst grave; from A: 2.10 m; from B: 2.03 m.
Material: silver.
Conservation: mounting fragmentary.
Size: diam. 1.8 cm; longer arm 1.8 cm; shorter arm 0.9 cm; mounting 1.4 × 0.9 cm.
Description: the ring consists of a small bent strip with pointed extremities of unequal length; the mounting is very thin and elliptical in shape. No depictions or incisions have been observed.

Ring (Y.85.KAHi.T1/41) (Fig. 49.*5*; Pl. 65.*e*).
Provenance: from A: 4.66 m; from B 4.25 m; depth from B: -48 cm.
Material: iron and mother of pearl.
Conservation: highly oxidised.
Size: diam. 2.9 × 2.2 cm; mounting 1 × 2 × 0.6 cm.
Description: the ring has a flat oval mother of pearl mounting. The frame holding the semi-precious material is visible.

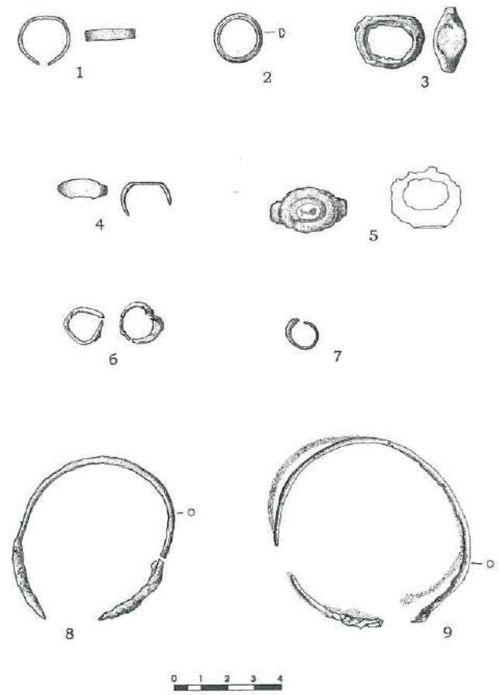

Fig. 49. Kharibat al-Ahjur, tomb KAHi/T1: 1-3) bronze rings: Y.85.KAHiT1/7, Y.85.KAHiT1/33, Y.85.KAHiT1/36; 4) silver ring: Y.85.KAHiT1/37; 5) iron and mother of pearl ring: Y.85.KAHiT1/41; 6-7) bronze earrings: Y.85.KAHiT1/24, Y.85.KAHiT1/17; 8-9) bronze bracelets: Y.85.KAHiT1/10, Y.85.KAHiT1/27.

Earrings (Fig. 49.*6-7*; Pl. 65.*f-g*)

A pair of small rings, one twisted and the other characterised by a thicker central portion, were found together; they have the same size, both have pointed extremities and are not closed (Y.85.KAHi.T1/24). They might be earrings but also two separate rings. Also of uncertain attribution is a small isolated ring (Y.85.KAHi.T1/17), with a thick round head and sharp point, similar to 10 bow-shaped elements of the pin Y.85.KAHi.T1/9 (Pls. 69.*a-b*). Finally, also two small twisted bronze earrings (Y.85.KAHi.T1/11; fig. 51: 4) were found in the tomb.

Pair of earrings (or rings) (Y.85.KAHi.T1/24) (Fig. 49.*6*; Pl. 65.*f*)
Provenance: from A: 2.65 m; from B: 2.15 m.
Material: bronze.
Conservation: one is broken.
Size: mean diam. 1.4 cm.
Description: small rings made of bronze strips folded to form a circle, with separated extremities. The first one is twisted with thin extremities; the second one is thicker in the central portion.

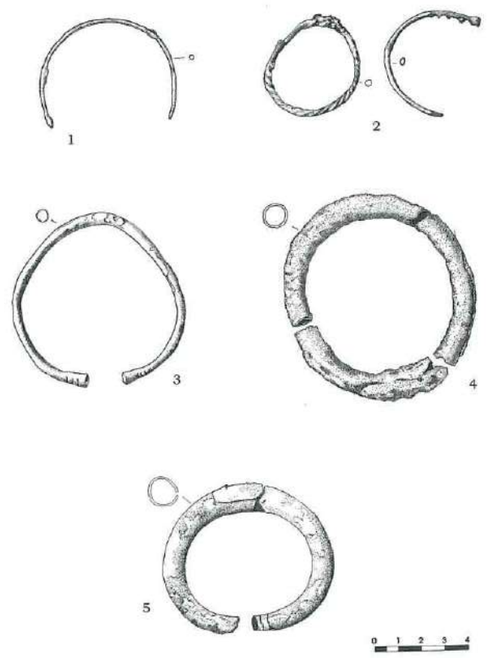

Fig. 50. Kharibat al-Ahjur, tomb KAHi/T1: 1-5) bronze bracelets: Y.85.KAHiT1/35, Y.85.KAHiT1/38, Y.85.KAHiT1/6, Y.85.KAHiT1/22, Y.85.KAHiT1/16.

Earring (Y.85.KAHi.T1/17) (Fig. 49.7; Pl. 65.*g*)
Provenance: from A: 2.45 m; from B: 1.65 m.
Material: bronze.
Conservation: intact.
Size: diam. 1.2 cm.
Description: circular shaped rod bent to form a ring, with round head and thinner ends.

Bracelets (Figs. 49.*8-9*, 50; Pls. 65.*h-i*, 66, 67.*a-c*)

In tomb KAHi/T1 three different types of bracelet were found, all made of bronze. The first type, which comprises several specimens (Y.85.KAHi.T1/10, Y.85.KAHi.T1/27, Y.85.KAHi.T1/34, Y.85.KAHi.T1/35 and the pair Y.85.KAHi.T1/38), is made of a very thin rod (0.2 cm) with a round section, bent into the shape of an open circle. The bracelets are flat, except for one in the pair Y.85.KAHi.T1/38, which is twisted. Owing to the thick oxide incrustations on the metal on both extremities of the bracelet Y.85.KAHi.T1/10, it was not possible to determine whether this thickening conceals a relief decoration (animal protomes).

The second type is represented by a bronze bracelet (Y.85.KAHi.T1/6), with flat, tapering ends, decorated with incised lines (Fig. 50.*3*; Pl. 66.*d*). The object was found inside the only cyst grave dug close to the entrance of the hypogean tomb. This specimen displays definite similarities with one of the silver bracelets found outside the stratigraphic sequence in a Wādī Ḍura' tomb (Breton & Bāfaqīh 1993: 25-26, nos. 10-12, pl. 12, figs. 29-31). Resembling our specimen, although thicker and with a wider gap between the extremities, is a bracelet found at Hajar Ibn Ḥumayd (van Beek 1969b: 284, HI 33, pl. 53.*g*, from layer A).

The third type of bracelet is made from a metal sheet beaten into the shape of a hollow tubular rod, bent into the shape of circle (Y.85.KAHi.T1/15, Y.85.KAHi.T1/16). The best conserved item (Y.85.KAHi.T1/16; fig. 50.*5*; Pl. 67.*c*) is thicker at the middle and thinner at the extremities, which are decorated with a double incised line. Conversely, as far as the item Y.85.KAHi.T1/22 (Fig. 50.*4*; Pl. 67.*a*) is concerned, the tubular rod is of uniform thickness and forms a round, probably closed, ring.

As mentioned earlier, the bracelets of the third type are extensively and conspicuously depicted (individual or paired) in sculpted female figures, especially on the wrists of standing relief figures (worshippers) and in the steles consisting of busts depicting a female figure in relief, identified by J. Pirenne as the goddess Dhāt Ḥamīm. Several finely engraved tubular silver bracelets are now conserved in the National Museum of Ṣan'ā (Daum 1987: 92).

Bracelet (Y.85.KAHi.T1/10) (Fig. 49.*8*; Pl. 65.*h*)
Provenance: from the cyst grave; from A: 1.95 m; from B: 2.15 m.
Material: bronze.
Conservation: one extremity broken off.
Size: diam. 5.8 cm, thickn. rod 0.2 cm, thickn. ends 0.4 cm.
Description: the bracelet is made of a round bronze rod bent to form a circle; the rod tapers and is thicker at the extremities, between which a gap remains.

Bracelet (Y.85.KAHi.T1/27) (Fig. 49.*9*; Pl. 65.*i*)
Provenance: from A: 2.40 m; from B: 2.20 m.
Material: bronze.
Conservation: broken and distorted.
Size: diam. 7.5 cm.
Description: the bracelet is made of a very thin round bronze rod bent to form a circle. The rod, of irregular thickness, is slightly distorted and the ends do not meet.

Pair of bracelets (Y.85.KAHi.T1/34) (Pl. 66.*a*)
Provenance: from A: 1.87 m; from B 2.88 m; depth from B: -60 cm.
Material: bronze.
Conservation: broken into several parts.
Size: mean diam. 5 cm.
Description: each bracelet is made of bronze wire bent to form a circle, with pointed extremities.

Bracelet (Y.85.KAHi.T1/35) (Fig. 50.*1*; Pl. 66.*b*)
Provenance: from A: 3.50 m; from B: 2.60 m.
Material: bronze.
Conservation: broken into two parts.
Size: diam. 5.5 cm.
Description: the bracelet is made of bronze wire bent to form a semi-circle with pointed extremities.

Pair of bracelets (Y.85.KAHi.T1/38) (Fig. 50.*2*; Pl. 66.*c*)
Provenance: from A: 2.70 m; from B: 2.40 m; depth from B: -63 cm.
Material: bronze.
Conservation: the first is complete and the second fragmentary.
Size: complete bracelet: diam. 4 cm, thickn. 0.3 cm; fragmentary bracelet: diam. 4.5 cm, thickn. 0.2 cm.
Description: the first bracelet is made from a twisted flat bronze rod bent to form a circle, the extremities of which meet but do not merge; the second is made from a flat, untwisted rod bent to form a semi-circle.

Bracelet (Y.85.KAHi.T1/6) (Fig. 50.3; pl. 66.*d*)
Provenance: from the cyst grave (east side), near skull A.
Material: bronze.
Conservation: intact but with incrustations due to metal oxidation.
Size: diam. 7.3 cm, rod thickn. 0.5 cm, ends thickn. 0.6 cm.
Description: the bracelet consists of a rigid round rod bent into the shape of a circle. The clean-cut extremities are characterised by a thickening of the rod and display three parallel lines incised across the width.

Bracelet (Y.85.KAHi.T1/15) (Pl. 67.*b*)
Provenance: from A: 5.00 m; from B: 4.45 m; depth from B: -56 cm.
Material: bronze.
Conservation: fragmentary.
Size: diam. 0.9 cm.
Description: the bracelet consists of a sheet beaten into a tube with the edges joined on the inside and bent into the shape of a circle.

Bracelet (Y.85.KAHi.T1/16) (Fig. 50.*5*; Pl. 67.*c*)
Provenance: from A: 4.40 m; from B: 3.40 m.
Material: bronze.
Conservation: a small triangular fragment is missing from the central part of the bracelet; one of the extremities has broken off.
Size: len. 7.5 cm, w. 6.3 cm, max. thickn. 1.1 cm, ends thickn. 0.7 cm.
Description: large tubular bracelet with circular cross section. The bracelet is oval in shape, with a thicker central part that gradually tapers towards the extremities. The latter are decorated with two parallel lines incised across the width.

Bracelet (Y.85.KAHi.T1/22) (Fig. 50.*4*; Pl. 67.*a*)
Provenance: from A: 1.66 m; from B: 2.63 m; depth from B: -51 cm.
Material: bronze.
Conservation: fragmentary.
Size: diam. 8.5 cm, thickn. 0.9 cm, fork 1.3 × 1.5 × 0.6 cm.
Description: the bracelet consists of a sheet beaten to form a tube and bent into a circular shape.

Sets of Jewels

A first original set of jewellery was found stuck together in the hypogean tomb (Pl. 68.*a-b*). It consists of an iron ring with a flat, highly oxidised mounting of the same type as ring Y.85.KAHi.T1/36 (Fig. 49.*3*); 6 silver earrings, 4 of which linked together and 2 separate; 2 small earrings; several different necklace beads.

The earrings, of rare and refined workmanship, are chalice-shaped, hollow on the inside, decorated along the edge by a narrow band with medium-large granules, and a thin, pointed, curved hook (Fig. 51.*5*). These earrings are similar to other gold ones originating from the antiquarian market (Maraqten 1999: 150); several specimens are conserved at the Aden Museum (NAM 729, NAM 850), together with some double chalice variants (NAM 710, NAM 712). The granular decoration is widely used in the small number of South Arabian jewellery form familiar to us, and is applied to the gold elements of necklaces and bracelets, in the finishing of semi-precious stones and in various kinds of pendants (cf. Doe 1971: 132, pls. VII-VIII; Phillips 1955: 111; Aqīl 1993; Simpson 2002: 120-22).

The small number of necklace beads found together with the group of metal jewellery are made of glass (Pl. 68.*a*: longer thread of beads). We thus have numerous very small, round, discoid-shaped beads (max. diam. 0.3 cm), iridescent pearl-coloured, very similar to those of the jewellery item Y.85.KAHi.T1/9 (Pl. 69.*a*). The globular gilt glass beads are even smaller (diam. 0.2 cm), while others, with the same shape but larger in size (diam. 0.4 cm), are pearl-coloured. Lastly, there are two blue glass cylindrically shaped beads (0.5 cm long), quite similar to those found at Shabwah (Morrison 1992: 380, fig. 1.*4*).

Also part of the same personal female grave goods are another 5 beads, larger than the preceding ones (Pl. 68.*a*: shorter thread of beads), which might belong to the same necklace as the one described above. Beginning the description from the left, we have a spherical pearl-coloured glass bead (diam. 0.5 cm); a lenticular bead made of greenish-blue glass (l. 0.8 cm); a dark blue flattened biconical shaped bead (diam. 0.7 cm), which is paralleled by another from Shabwah (Morrison 1992: fig. 1.*1*); lastly two black spherical beads. Except for the second, which is shiny, all the beads have an opaque surface covered with a slight earthen incrustation, which has also caused the glass to flake.

There is some doubt about the function of a small silver sheet sphere composed of two hemispheres (Pl. 68.*a*: centre).

A silver coin (not legible) was found stuck together with this jewel set.

A second small group of objects was found together and has been classified as Y.85.KAHi.T1/11 (Fig. 51.*1-4*; Pl. 67.*d*). It consists of a small number of elements of different materials, all well preserved, except for the two small twisted earrings, which are fragmentary (Fig. 51.*4*; Pl. 67.*d*: left). This tiny pair of earrings are made of bronze (diam. 0.2 cm), and have their surface covered with a greenish coloured oxidation layer which has not however affected their shape. Together with these an elliptically shaped iridescent glass collared bead was found (Fig. 51.*3*; Pl. 67.*d*: second from left). This is a gold-in-glass bead, like the vitreous beads of item Y.85.KAHi.T1/14 and contemporary with them, and thus datable to around 1st century B.C.-1st century A.D. The third element consists of a carnelian bead, lenticular in shape with an eccentric hole drilled not through its centre but through one side (Fig. 51.*1*; Pl. 67.*d*: third from left). The last of this small series is a banded agate bead, ellipsoid shaped and round in cross section (Fig. 51.*2*; Pl. 67.*d*: right). From Shabwah come 4 specimens similar to ours (Morrison 1992: 387) and one from layer G at Hajar Ibn Ḥumayd (van Beek 1969: 319a, H1199, fig. 128*b*).

Set of jewels found together with a coin (Y.85.KAHi.T1/14 a-g) (Pl. 68.*a-b*; Fig. 51.5)

Provenance: from A: 2.40 m; from B: 1.90 m; depth below B: -62 cm.

Material: a) iron; b-e) silver; f-g) glass.

Conservation: the iron of the ring, badly oxidised, has incrusted the other elements of the trinket.

Size: a) 3 × 2.2 cm; mounting 2.5 × 1.7 cm; b) diam. body 0.8 cm; l. 1.5 cm; c) diam. 1.5 cm; d) diam. 1.2 cm; e) diam. 1 cm; f) l. of wire 10 cm; g) l. of wire 3.2 cm.

Description: a) ring with oval mounting, although details obliterated by oxidation; b) coin, perhaps silver, illegible; c) six small identical chalice-shaped silver earrings with appliqué rim, decorated with medium-large granules; the suspension hook is thin and bent to touch the mouth of the chalice; d) small sphere made of silver foil divided into two hemispheres; e) two small silver rings made of a thin bar, containing the remains of a fibre thread; f) row of small glass beads, of which 37 are pearl-coloured disk shaped beads, 9 gilt barrel beads, two dark blue cylindrical beads, two larger pearl-coloured beads; g) 5 necklace beads: one of spherical shape made of pearl-coloured glass, one dark blue flattened biconical shaped bead, one lenticular shaped bead of glass and lastly two spherical beads made of dark blue or black glass. Many of these elements were found to be cemented together.

Set of jewels (Y.85.KAHi.T1/11) (Fig. 51.*1-4*; Pl. 67.*d*)

Provenance: from A: 1.80 m; from B: 2.75 m.

Material: a) bronze; b) glass; c) carnelian; d) agate.

Conservation: all almost intact, even the bronze earrings.

Size: a) thickn. fragm. 0.5 cm; b) 0.8 × 0.6 cm; c) 1.5 × 0.3 cm; d) 2.5 × 1.5 cm.

Description: the fragmentary bronze earrings are twisted and bent to form a semi-circle; the glass element is elliptical in shape with a bulging edge on the extremities (fragmentary on one side); the carnelian necklace bead is lenticular in shape, with a hole drilled diametrically through one face; the agate bead is elliptical in shape with flattened extremities.

Brooches

The material composing item Y.85.KAHi.T1/9 (Pls. 68.*c*, 69.*a-b*), which is complex and composed of several elements, probably represents a single jewellery item, that is, a brooch, or at least belong to the same grave goods, as all the elements were found grouped together. At the time of the discovery the 10 arch shaped objects, with a thick round head and sharply pointed end, were threaded around the tubular bow (Pl. 68.*c*). It is a hard task to recompose the entire trinket in view of its fragmentary nature and the complete absence of any terms of comparison. Only a rhomboidal shaped pendant (Pl. 69.*b*) has anything in common with another pendant found at Hajar Ibn Ḥumayd (van Beek 1969b: 314, pl. 53*i*). It may be assumed that also the cup with a chalice stem (Pl. 69.*a*: upper left) is a pendant and that the small isolated ring (Pl. 69.*a*: lower left) was used in some way to close the pin. We therefore know nothing about the purpose in this item of jewellery, of the disk-shaped glass beads (Pl. 69.*a*: right) and of the small bronze hollow dome (Pl. 69.*b*: left). The beads may have belonged to a necklace or bracelet.

Somewhat similar to the above item is find Y.85.KAHi.T1/39 (Pl. 69.*c*), which is made of bronze and consists of one fragment of tubular ring and 7 bow elements, two of which (the third and sixth in the photo, and probably also the first, which is fragmentary) still have one extremity bent into the form of a ring and attached by three turns of thin bronze wire. These elements may not belong to the brooch and may be earrings.

The fragment Y.85.KAHi.T1/42 (Pl. 69.*d*) closely resembles the pin of the brooch Y.85.KAHi.T1/9 with its round flat head.

Brooch (Y.85.KAHi.T1/9) (Pls. 68.*c*, 69.*a-b*)

Provenance: from A: 1.65 m; from B: 2.00 m.

Material: bronze and vitreous paste beads.

Conservation: intact, but disarticulated or incorrectly arranged.

Size: diam. of the bow *c.* 5 cm; l. of brooch 5 cm; h. of cup (or bell) 1.5 cm.

Description: the brooch is composed of a bow made of a sheet metal beaten into the shape of a tube with an oval section; a pin with a round flat head; a chalice-shaped pendant with catch-plate; a small dome, probably as a lid of the chalice; a series of 10 small bows; a horn with a rhomboid-shaped pendant trinket; a row of 40 glass disc beads and a small bronze ring (diam. *c.* 0.5 cm).

Brooch (Y.85.KAHi.T1/39) (Pl. 69.*c*)

Provenance: from A: 2.85 m; from B: 1.95 m; depth below B: -61 cm.

Material: bronze.

Conservation: fragmentary.

Size: conserved length 4 cm, thickn. 0.8 cm; small bows (or small open rings): diam. 1.5 cm.

Description: one tubular bronze fragment, bent to form a bow, found together with 7 bow elements, three of which having an extremity bent into the shape of a ring.

Pin? (Y.85.KAHi.T1/42) (Pl. 69.*d*)

Provenance: from A: 2.80 m; from B: 2.70 m.

Material: iron.

Conservation: broken point and incrustations due to metal oxidation.

Size: l. 5.3 cm; w. 2.1 cm; l. of body 3.5 cm.

Description: fragment of pin with round flat head.

Beads (Fig. 51)

During the excavation of tomb KAHi/T1 numerous beads were found, several of which found together with metal jewellery items, others scattered and isolated in the inhumation layer. The beads are made of glass and semi-precious stones; there is a complete absence of beads made of sea shell, terracotta or metal. There is some doubt over the identification of several vitreous paste beads.

All the semi-precious stone beads seem to be made of different varieties of chalcedony: most of the beads are made of carnelian, but also agate and onyx are present ([3]). Carnelian is used mainly to made round

([3]) The Arab historian Al-Hamdānī (10th century A.D.) tells us that onyx is found in various parts of Yemen. The Nuqūmī variety (from Jabal Nuqūm) is the most precious. It is found in Ḍahr, Sa'wān and As-Sirr, as well as in the provinces of Khawlān, in 'Uḍayqah and Ash-Shazb. Blue onyx, which is known as 'Ishārī, comes from the 'Ishār valley, near Ṣan'ā (Faris 1938: 26). It cannot be ruled out, however, that some of onyx quarries cited by Al-Hamdānī are rather quarries of alabaster, with which onyx is easily confused.

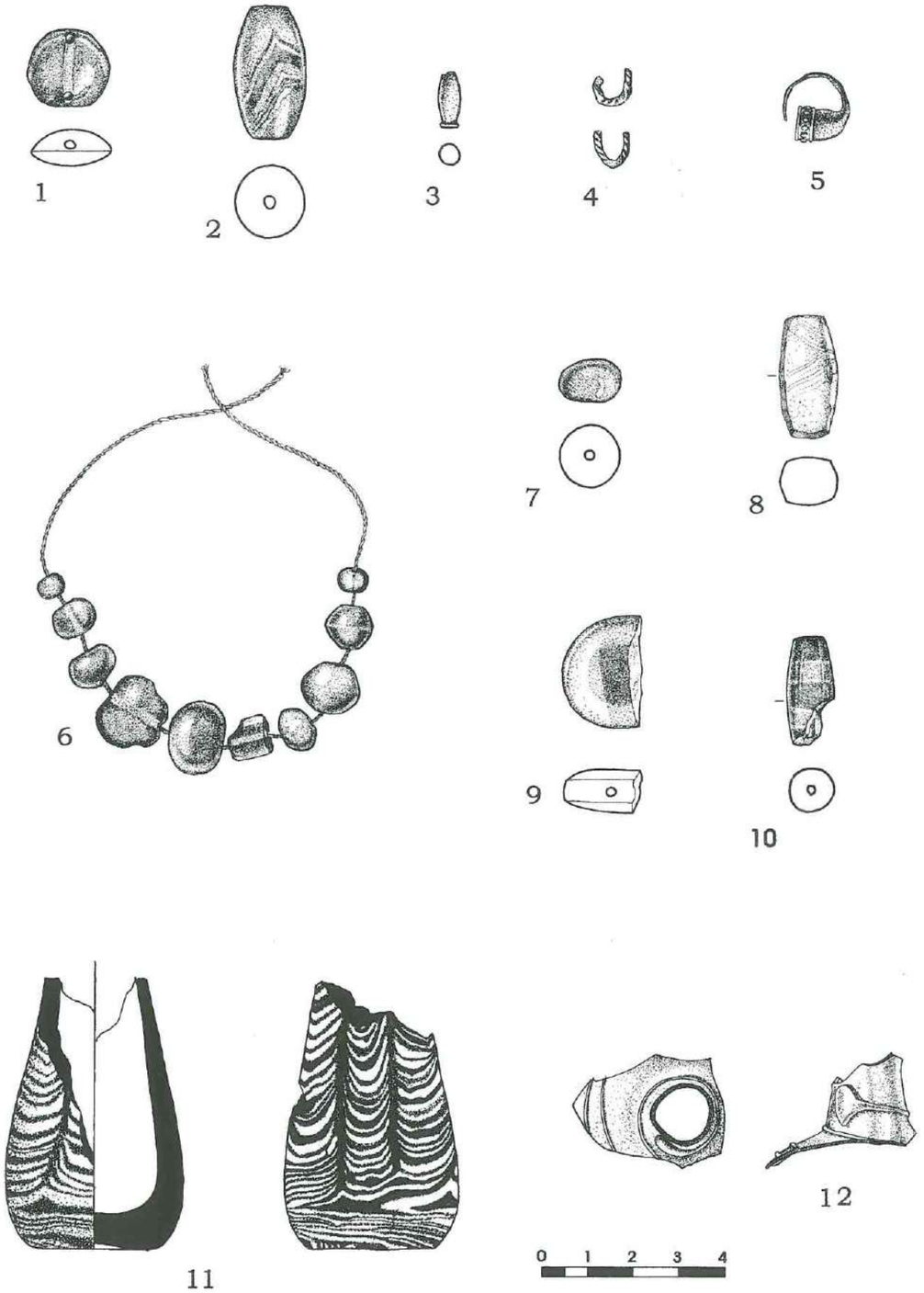

Fig. 51. Kharibat al-Ahjur, tomb KAHI/T1: 1-4) necklace beads and pair of earrings: Y.85.KAHiT1/11, Y.85.KAHiT1/35; 5) silver earrings: Y.85.KAHiT1/14; 6) semi-precious stone necklace: Y.85.KAHiT1/3; 7, 9-10) carnelian, onyx and agate beads: Y.85.KAHiT1/28, Y.85.KAHiT1/30, Y.85.KAHiT1/31; 8) chalcedony weight: Y.85.KAHiT1/29; 11) *alàbastron*: Y.85.KAHiT1/8; 12) fragment of glass vase: Y.85.KAHiT1/21.

beads, lenticular or oblate; conversely, agate, precisely because of its zonate structure (concentric or parallel horizontal zones), is more suitable for making oblong beads, with a cylindrical, elliptical or convex rectangular shape.

Banded agate beads were often imitated by ancient glassmakers so perfectly that it is sometimes difficult by direct inspection to distinguish stone beads from faience ones. The majority of the banded agate beads came from Iran during the Parthian and Roman period (249 B.C.-300 A.D.). The need to satisfy the needs of an increasingly numerous and demanding clientele, above all during the Roman period (100 B.C.-300 A.D.) meant that the stone beads were imitated using glass and vitreous paste, which were cheaper and thus accessible to more people. During this period there was a vast production of glass beads, which were mass produced in various shapes, colours and using different techniques, and were certainly less expensive than stone or metal beads.

Several glass beads from the jewellery item Y.85.KAHi.T1/14 (Pl. 68.*a*) and the glass specimen from group Y.85.KAHi.T1/11 (collared bead: Pl. 67.*d*) seem to be identifiable as 'sandwich' gold-glass beads (two layers of transparent glass enclosing gold leaf). They derive from late Egyptian and Early Roman production (2nd-1st century B.C.).

The find Y.85.KAHi.T1/3 (Fig. 51.*6*; Pl. 70.*a*) is composed of 10 semi-precious stone beads. The majority are made of reddish-orange carnelian. The first bead (from the right) is made of white chalcedony and has a translucid surface and a spherical shape flattened at the poles (diam. 0.7 cm); the second is made of carnelian, is globular (although tending towards a biconical shape), flat around the holes (diam. 1.1 cm); the third bead, also made of shiny carnelian, has the same shape as the preceding one but is larger (diam. 1.4 cm); the following bead is globular in shape and is made of chalcedony (diam. 0.9 cm); this is followed by a chipped bead of an irregular cylindrical shape (length *c.* 1 cm; diam. 0.7 cm), slightly faceted so as to produce a nearly hexagonal shape. The sixth bead is apparently made of blackish-grey stone, with an irregular spheroidal shape, and flattened around the holes (max. diam. 1.6 cm). The seventh bead is made of carnelian, is lenticular in shape, chipped along the edges and flattened around the hole drilled through it (max. diam. 1.6 cm.). This is followed by another bead made of blackish-grey stone, irregularly spheroidal in shape, with a flat side face (diam. 1.2 cm); the last element but one is a white chalcedony bead, spherical in shape, flattened at the poles (diam. 1 cm), similar in shape to a garnet bead found at Shabwah (Morrison 1992: fig. 2.*52*), although with a horizontal, not a vertical, hole drilled through it. In conclusion, the last bead, the smallest (diam. 0.6 cm), is made of carnelian and is globular in shape.

One isolated specimen is the carnelian necklace bead Y.85.KAHi.T1/28 (Fig. 51.*7*; Pl. 70.*b*), globular in shape and flattened at the poles. Also the bead Y.85.KAHi.T1/31 (Fig. 51.*10*; Pl. 70.*e*) is an isolated specimen, made of banded agate, elliptical in shape and with a round cross section, as well as the agate object Y.85.KAHi.T1/29 (Fig. 51.*8*; Pl. 70.*c*), rectangular-convex in shape (roughly hexagonal in cross section) without any transversal hole drilled through it: this last detail, together with the irregularity of the surface indicate that the bead was unfinished, although comparison with an identical object found at Raybūn (from the surface, cf. Caton Thompson 1944: pl. XLII.*29*) seems to point to some other use, as a weight, for example.

Of considerable interest is the fragmentary onyx eye bead, in the shape of a bi-convex cylinder disk (Fig. 51.*9*; Pl. 70.*d*). This stone is generally used in jewellery manufacture, mounted in a gold setting and finished with a single or double row of golden granules, as seen in the splendid rich and refined necklace and in the extraordinary precious bracelet from a probably royal South Arabian tomb (Doe 1971: 132, pl. VII). This jewellery probably dates to the early centuries of the Christian era. In particular, the onyx eye bead has a parallel in the British Museum (Marshall 1969: 317, no. 2734, pl. LVIII [dated 1st-2nd centuries A.D.]).

Necklace beads (Y.85.KAHi.T1/3) (Fig. 51.*6*; Pl. 70.*a*)
Provenance: from A: 4.62 m; from B: 4.30 m.
Material: carnelian, onyx, chalcedony.
Conservation: intact.
Size: from 1.6 cm (larger) to 0.7 cm (smaller); diam. of lenticular bead 1.5 cm.
Description: the necklace is composed of 10 beads, 2 of which made of chalcedony and 5 of carnelian, 2 of dark onyx and 1 of translucid whitish stone. All the beads are globular in shape, except two (one is broken), one being lenticular and the other cylindrical.

Necklace bead (Y.85.KAHi.T1/28) (Fig. 51.*7*; Pl. 70.*b*)
Provenance: from A: 4.00 m; from B: 4.65 m.
Material: carnelian.
Conservation: intact.
Size: diam. 1.4 cm.
Description: the necklace bead is oblate with a hole drilled through the centre.

Necklace bead or weight (Y.85.KAHi.T1/29) (Fig. 51.*8*; Pl. 70.*c*)
Provenance: from A: 1.15 m; from B: 1.90 m; depth below A: -60 cm.
Material: chalcedony.
Conservation: intact.
Size: 2.6 × 1.2 × 1.1 cm.
Description: necklace bead or weight in a convex rectangular shape.

Necklace bead or pendant (Y.85.KAHi.T1/30) (Fig. 51.*9*; Pl. 70.*d*)
Provenance: from A: 1.03 m; from B: 1.90 m; depth below B: -60 cm.
Material: beige onyx with central brown eye.
Conservation: broken three quarters along the length and chipped.
Size: diam. 2.5 cm; thickn. 0.9 cm.
Description: biconvex cylindrical disk necklace bead with hole drilled through the diameter.

Necklace bead (Y.85.KAHi.T1/31) (Fig. 51.*10*; Pl. 70.*e*)
Provenance: from A: 1.97 m; from B: 3.13 m.
Material: agate.
Conservation: broken three quarters along the length.
Size: length of conserved part 2.4 cm; diam. 1 cm.
Description: elliptical bead with hole drilled through it longitudinally.

Glassware (Figs. 51.*11-12*, 52.*1*; Pl. 71)

The various different grave goods accompanying the bodies buried in tomb KAHi/T1 included also blown glass balsamaria, one of which perfectly conserved (Y.85.KAHi.T1/5; Fig. 52.*1*; Pl. 71.*d*), and a vitreous paste *alàbastron*, i.e. a vessel designed to contain ointments and perfumed oils (Antonini 1992: 3-8). The exclusive glass-blowing technique was the most important and revolutionary discovery in the history of glass-making and was probably made in the late 1st century B.C. in the Syro-Palestinian area. This technique, initially applied to freehand blown objects and later also to artefacts blown in moulds, made it possible to produce large quantities of glass objects very quickly. At the time of the empire the output achieved very high artistic levels and spread also beyond the confines of the empire. The presence of these luxury items in tombs on the Yemeni highlands, together with glass bead necklaces, is evidence that they had spread also as far as countries like South Arabia, which were distant from the production centres, but at the same time also large trading centres.

Balsamarium (Y.85.KAHi.T1/5) (Fig. 52.*1*; Pl. 71.*d*)
Provenance: from A: 1.30 m; from B: 2.20 m; level: -60 cm (from A).
Material: glass.
Conservation: fragment of rim missing; surface flaking off.
Size: h. 13.5 cm; diam. of neck 1.8 cm; base diam. 3.8 cm.
Description: the balsamarium is made of light blue blown glass. It has a pear-shaped body with footless flat bottom, tubular neck, with a height only slightly less than that of the body, with a pronounced narrowing at the base; it has a slightly flared flat rim. Ointment jars with these characteristics are grouped together in Form 8 in the typology of C. Isings (1957: 24), and were made during the Claudius-Nero period (mid 1st century A.D.).

Balsamarium (Y.85.KAHi.T1/21) (Fig. 51.*12*; Pl. 71.*a*)
Provenance: from A: 2.50 m; from B: 2.25 m; level: -58 cm (from B).
Material: glass.
Conservation: only the neck and part of the shoulder remain.
Size: h. of conserved part 2.0 cm; wall thickn. 0.2 cm.
Description: vase with narrow neck and globular body. A filament is wound spirally around the neck starting half way up, and probably also the body. This type could be classified as Isings Form 26a, that is, among ointment jars with a globular body, short neck and folded rim, greenish-blue in colour, also manufactured around the mid 1st century A.D.

Balsamarium (Y.85.KAHi.T1/40) (Pl. 71.*b*)
Provenance: from A: 1.55 m; from B: 2.25 m.
Material: glass.
Conservation: only a fragment of rim has been conserved.
Size: h. of conserved part (of the fragment) 2.5 cm; wall thickn. 0.2 cm.
Description: fragment of rim.

Alàbastron (Y.85.KAHi.T1/8) (Fig. 51.*11*; Pl. 71.*c*).
Provenance: from A: 2.23 m; from B: 3.26 m.
Material: vitreous paste.
Conservation: fragmentary.
Size: diam. of base 3.8 cm.
Description: *alàbastron* with flat bottom, opaque green colour, with white filaments festooned near the bottom and on the wall, and wound spirally around the base. The Qaryat al-Fāw excavations yielded several fragments of *alàbastra* similar to our specimen, on which may be identified the festoon motif in two/three colours, and concentric lines on the bottom (al-Ansary 1982: 80, figs. 2, 4). Other items similar to the Kharibat al-Ahjur specimen come from the Dura Europos (Clairmont 1963: pl. XIX.*36-37*, *39*).

Seal

Stamp seal (Y.85.KAHi.T1/4) (Fig. 52.*2*; Pl. 74.*a*)
Provenance: from A: 2.40 m; from B: 1.20 m.
Material: silver.
Conservation: intact.
Size: stamp diam. 1.3 cm; thickn. with ring 1.3 cm.
Description: impression seal obtained by casting; provided with a small ring for suspending, which is cast on at right angles to the disk which bears an incised monogram. At the sides of the monogram 4 stylised stars are incised. In the monogram it is possible to read the family name *slymm*, attested in a Qatabanite environment in Ja 310 (from Ḥayd Ibn 'Aqīl, dated to the early Christian era) and in RES 3902; the name in a Sabaean framework is known from the CIH 755 and RES 3956 inscriptions (the latter is a bronze table from Haram, dated to the early Christian era) (4).

Weapons (Fig. 53.*1-4*; Pls. 72-73)

Also weapons, like the other objects belonging to the tomb KAHi/T1 grave goods, were apparently found out of any particular order in the burial (Fig. 38). We found three daggers and one sword lying on the western side of the tomb, that is, facing the wall on the right of the entrance, together with intact and fragmentary pottery. Two knives were found in the middle of the tomb, near the northern limit of the cyst grave; lastly one isolated weapon was found against the north-western wall to the left of the entrance, near the bull statuette and scattered jewellery. Inside the tomb there were thus a total of 5 knives, several of which possibly short-bladed weapons or daggers in view of their size (from 17 to 24 cm in length) and the residual traces of organic material on the blade from their sheathes. Three of these knives have one cutting edge, with a straight back and the other edge rounded, while apparently only one (Y.85.KAHi.T1/46; Fig. 53.*3*; Pl. 73.*c-d*) has a pointed blade with two cutting edges. Generally speaking the haft, made of wood or bone, was secured to the tang by means of two or three rivets. The knives from our tomb closely resemble well conserved specimens with a still intact haft found in a tomb at Wādī Ḍura' (Kazanski 1993: 57-58, pl. 17, fig. 46.*50-52*).

The weapon Y.85.KAHi.T1/44 (Fig. 53.*4*; Pl. 72.*e-f*) is particularly interesting, including as it does, in addition to the knife, two other objects, namely, an iron punch,

(4) We wish to thank Dr Mounir Arbach for his kind information.

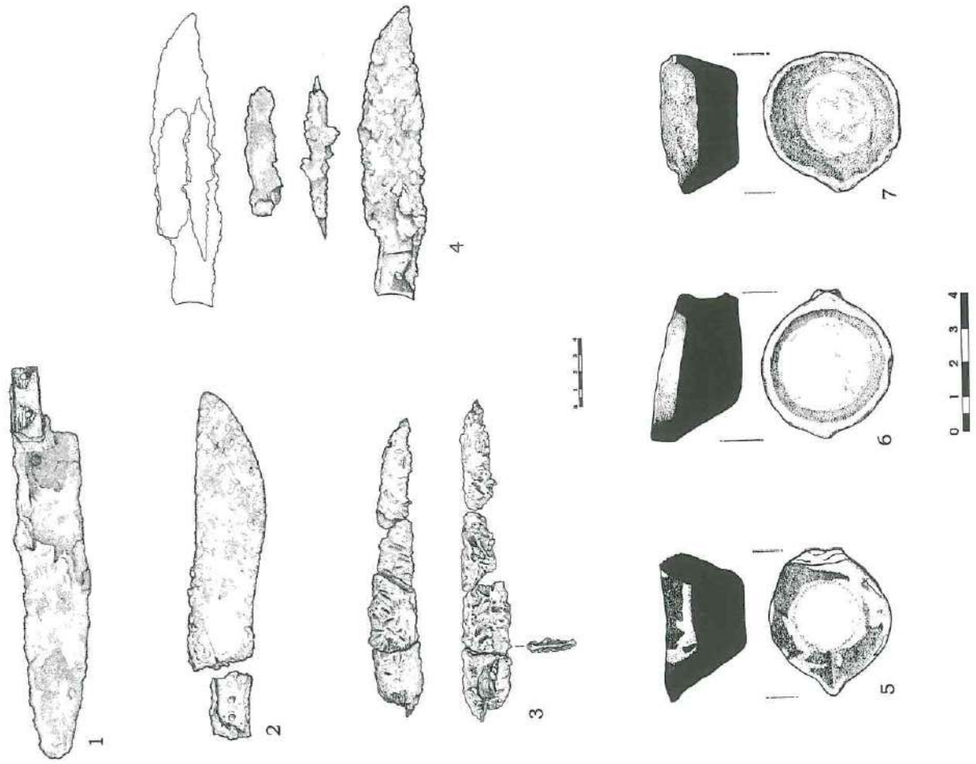

Fig. 53. Kharibat al-Ahjur, tomb KAHi/T1: 1-3) knives or daggers: Y.85.KAHiT1/43, Y.85.KAHiT1/45, Y.85.KAHiT1/46; 4) knife, cloth scabbard with wooden tool and iron point: Y.85.KAHiT1/44; 5-7) stone lamps: Y.85.KAHiT1/49, Y.85.KAHiT1/50, Y.85.KAHiT1/52.

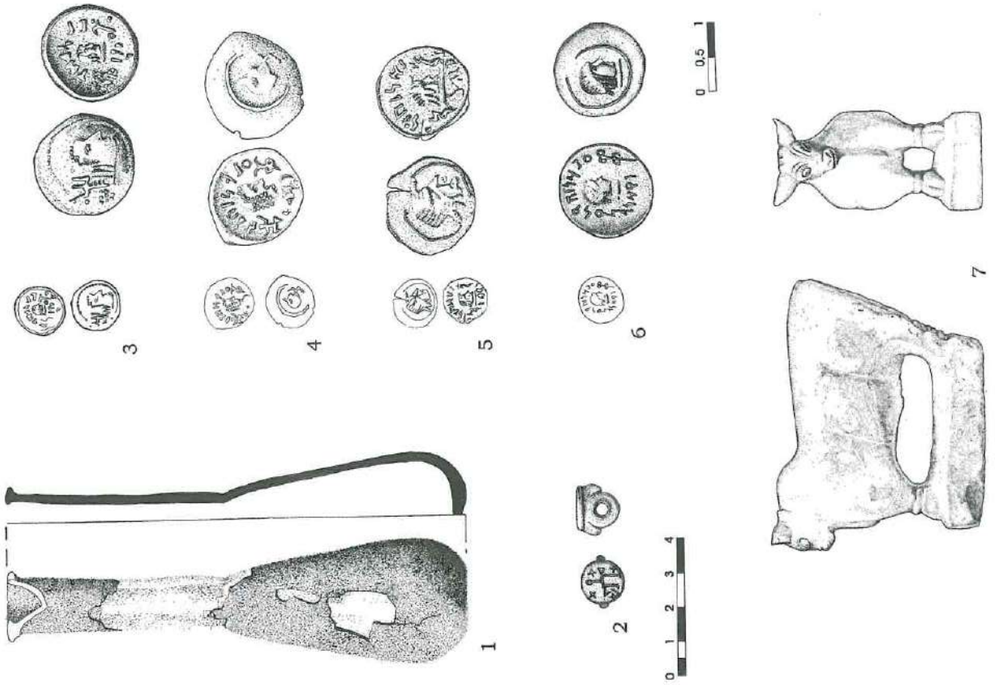

Fig. 52. Kharibat al-Ahjur, tomb KAHi/T1: 1) glass balsamarium: Y.85.KAHiT1/5; 2) seal: Y.85.KAHiT1/4; 3-6) silver coins; 7) limestone bull: Y.85.KAHiT1/51.

possibly originally hafted, and a small fabric sheath containing a wooden tool. In this case it may not have been a dagger for hand to hand fighting but part of a set of work tools.

However, the most valuable and unique item among the weapons found in tomb KAHi/T1 is a sword about 70 cm long with a straight back and one cutting edge (Pl. 72.*a-c*). The bone grip is bow shaped, concave towards the exterior. No such grips have ever been found in the South Arabian area, and so this find remains unique.

All the weapons come from the inhumation layer (level between -1.72 and -1.76 m), although at the time of their discovery they were scattered around at quite some distance from the disarticulated human bones.

Analysis of the skeletal remains found in tomb KAHi/T1 revealed a single male individual aged between 20 and 30 years, a woman of the same age and two small children (cf. A. Coppa & S. Damadio in the present volume, p. 94). Of course, the discrepancy between the presence of numerous weapons and, at the same time, the identification, based on the skeletal remains conserved, of only one man is due to the fragmentary condition in which the inhumations were found, and they must originally have comprised several different adult male individuals.

From 2nd and 3rd century A.D. epigraphic sources we know that the South Arabian warriors, in addition to spears, used also swords and daggers (Beeston 1976: 12); the dagger were certainly of the type found in the tombs of Kharibat al-Ahjur and Wādī Ḍura' and not, as Beeston believed, a curved-blade dagger similar to the modern *jambiyah*. This is clearly shown in relief YM 69 in the National Museum of Ṣan'ā (IMA Exhib. 1997: 206), in which the male figure is depicted carrying two weapons: a dagger like our specimens in his belt and a sword held in his left hand. This warrior's equipment follows a longstanding tradition that goes back in time, as is shown by the bronze statue of Ma'dīkarib (5th century B.C.?), where a dagger and sheath is worn on the belt and the right hand was probably holding a spear.

Sword with bone grip (Y.85.KAHi.T1/1) (Pl. 72.*a-c*)
Provenance: from A: 2.95 m; from B: 1.90 m.
Material: iron and bone.
Conservation: intact but oxidised.
Size: l. 60.5 cm; w. 4 cm; thickn. 1 cm; l. conserved haft 10 cm; w. conserved haft 6 cm; thickn. 3 cm.
Description: sword with straight back and one cutting edge; the haft (by bone or horn) has a lunate shape with the concave part facing outwards. Note the recess for the blade tang. Traces of sheath on the blade are visible.

Knife (Y.85.KAHi.T1/43) (Fig. 53.*1*; Pl. 72.*d*)
Provenance: found by unauthorised diggers near the northern entrance.
Material: iron.
Conservation: broken into three pieces; the tang does not fit the blade exactly.
Size: l. *c.* 24 cm; tang: 5.5 cm; w. of blade 4 cm; w. of tang: 1.7 cm.
Description: knife with single cutting edge, with back that continues along the tang. The back on the tang displays short fins to take at least three rivets. Traces of sheath remain on the blade.

Knife (Y.85.KAHi.T1/44) (Fig. 53.*4*; Pl. 72.*e-f*)
Provenance: from A: 2.65 m; from B: 1.35 m.
Material: iron and fibre remains.
Conservation: intact but oxidised.
Size: total l. 17.2 cm; l. of blade 13 cm; w. of blade 3.5 cm; w. of tang: 2 cm; l. of iron tip: 9.5 cm; l. of sheath: 7.5 cm.
Description: knife with single cutting edge, with a tang with two rivets, beaten so as to cover the haft. It was associated with an iron point, probably hafted on a tang that has been lost. The fabric sheath contains a wooden tool. Also on the blade and the iron point the remains of a cover made of perishable materials are visible.

Knife (Y.85.KAHi.T1/45) (Fig. 53.*2*; Pls. 73.*a-b*)
Provenance: from A: 1.65 m; from B: 1.35 m.
Material: iron.
Conservation: intact; tang broken.
Size: total l. 19.5 cm; l. of blade 16 cm; w. of blade 4 cm; thickn. of back: 0.4 cm; w. of tang: 2 cm.
Description: knife with single cutting edge, straight back and rounded cutting edge, with a greater thickness 2/3 the way along the length. Tang with three rivets with a upper and lower edge beaten to form a flange.

Knife (Y.85.KAHi.T1/46) (Fig. 53.*3*; Pls. 73.*c-d*)
Provenance: from A: 2.55 m; from B: 2.77 m.
Material: iron.
Conservation: fragmentary: broken into four pieces.
Size: l. 19 cm; max. w. 3 cm.
Description: pointed blade with double cutting edge. Surface highly oxidised and displaying incrustations of seeds.

Knife (Y.85.KAHi.T1/47) (Pl. 73.*e*)
Provenance: from A: 2.35 m; from B: 2.50 m.
Material: iron.
Conservation: fragmentary, with thick incrustations due to oxidation.
Size: 10.5 × 3.5 cm.
Description: fragment of knife tang with 2 rivets, highly oxidised.

Stone Lamps

At the inhumation level, above all in the area of greatest concentration of objects, namely, in the southern sector of the tomb, in the central area (beside the jewellery and coins) and, lastly, near the entrance to the burial chamber, 5 lamps were found, three of which of stone and two of terracotta. The latter have been treated in the chapter on pottery. In view of the position in which the lamps were found, it may be assumed that they were used by the tomb raiders at the time they plundered the tombs.

The three lamps made of whitish stone have a very thick circular base with thinner flared walls, with a natural rim and spout. The side opposite the spout had a vertical handle. The stone is highly corroded and bears traces of black incrustations of the fat used as fuel.

Lamp (Y.85.KAHi.T1/49) (Fig. 53.*5*; Pl. 74.*b*)
Provenance: from A: 1.00 m; from B: 1.60 m; depth below B: -66 cm.
Material: soft chalky white stone, soapstone (?).
Conservation: rim chipped, handle missing.
Size: upper diam. 5 cm; lower diam. 4.3 cm; bottom thickn. 2.5 cm.
Description: truncated cone shaped lamp with a thick flat bottom; along the wall is the spout for the wick.

Lamp (Y.85.KAHi.T1/50) (Fig. 53.*6*; Pl. 74.*c*)
Provenance: from A: 3.68 m; from B: 2.55 m.
Material: soft chalky white stone, soapstone (?).
Conservation: the stone is very friable, and so the rim is highly deteriorated; handle fragmentary.
Size: max. upper diam. 7.5 cm; max. lower diam. 4.8 cm; max. h. 5 cm; bottom thickn. 3.5 cm.
Description: truncated cone shaped lamp with a thick low bottom; the rim is raised at one point, which there must have been a spout for the wick. The impression of the handle is on the side opposite the spout.

Lamp (Y.85.KAHi.T1/52) (Fig. 53.*7*; Pl. 74.*d*)
Provenance: from A: 1.35 m; from B: 1.35 m.
Material: soft chalky white stone, soapstone (?).
Conservation: surface displays blackish incrustations of the fat burned for illumination purposes.
Size: h. 5.3 cm; l. 8.5 cm; w. 7 cm; base w. 4 cm; rim thickn. 1.5 cm.
Description: truncated cone shaped lamp with a thick short bottom, with well conserved spout. On the opposite side to the spout the handle had been situated; the signs of the latter's fracture are still visible.

Statuette (Fig. 52.*7*; Pl. 75)

Bull (Y.85.KAHi.T1/51)
Provenance: found by discoverers to the immediate left of the tomb entrance.
Material: white limestone.
Conservation: intact; scratches on the lower right part of the base.
Size: l. 16 cm; h.: 12.6 cm; w. of bull at the shoulders 5.7 cm, at the horns 5.1 cm; base 11.5 × 6 × 3.1 cm.
Description: the bull and the thick rectangular base on which it stands are sculpted from the same stone block. The fore paws are in full relief, while the hind paws are joined together and only the outer part is sculpted. The workmanship is accurate, without skimping on details. The round and tensed muscle masses of the fore- and hindquarters are emphasised, together with the powerful neck, the strong and aggressive chest, the squat, massive legs standing firmly on the hoofs. The head, on the contrary, is small and triangular, and the muzzle seems more docile and tractable. The large well-moulded eyes stand out, surrounded by long incised eyelashes; on the muzzle, the soft folds of the skin are visible. On the rear part, the tail, long and straight down to its base, is sculpted in relief. The taste for detail, evident not only in the execution of the powerful muscle masses, but above all in the way the animal's head is treated, and the plasticity of the eyes with the detail of the long eyelashes, are the dominant characteristics of late South Arabian style. If we compare this full relief bull with another one in ancient South Arabian style (IMA Exhib. 1997: no. 331), we observe a deep contrast: in a block of dressed stone only the highly angular head appears, with only a hint of the small round horns and the globular eyes, without the slightest surface detail. This sharp stylistic difference is visible also in the other animal, the ibex, which, like the bull, is widely represented in South Arabian figurative production.

Coins (Fig. 52.*3-6*)

Ten silver coins were found on the hypogeum. Apart from a group of four which was found together with some jewellery items near the southern edge of the pit grave, the other coins were scattered all around the floor of the tomb (Fig. 38). The numismatic study, carried out some years ago by B. Davidde (1992), proved the coins are to be attributed to the reign of 'Amdan Bayyin Yuhaqbid (second half of the 1st century A.D.).

Tomb 'KAHi/T2'

Excavation

The second tomb of Kharibat al-Ahjur was discovered, about 1 km E of KAHi/T1 (Fig. 34), in December 1985 by the inhabitants of the village of Waraqah, and was promptly closed and buried by the local authorities. Regular excavation work, begun in August 1986, was undertaken by the Italian Archaeological Mission led by Alessandro de Maigret, with the collaboration of the General Organization for Antiquities and Libraries of Yemen (GOAL). Participating in the excavations, in addition to the same Italian and Yemeni archaeologists who had excavated tomb KAHi/T1 the year before, were the archaeologists Madīhah Rashād and Fiorella Rispoli and the students Riccardo Berriola and Angela Luppino from the Istituto Universitario Orientale of Naples. The technical team was composed of the architect Vincenzo Labianca, the topographer Mario Mascellani, the draughtswoman Patricia Smith, the photographer Antonio Solazzi and by the geophysicists Benedetto Zapicchi and Franco Brancaleoni of the Lerici Foundation of Rome.

The Entrance

Excavation work began on the 27 August (Pl. 76.*a*). Having identified the position of the door, a long rectangular trench (4.20 × 1.90 m) was opened up in front of it. Beneath a small layer of humus about 20 cm thick, the profile of a short narrow *dròmos* with a NE-SW alignment began to appear (Pl. 76.*b*). The *dròmos* grew wider at the tomb entrance, forming a kind of circular pit that led to the vertical opening of the hypogean tomb (Pl. 77.*a*). The *dròmos* was partially filled with medium sized stones that formed irregular steps, cemented along the western wall (Pl. 77.*b*). This seems to indicate that the access corridor to the tomb was used only during the operations of excavating the burial chamber, after which it was closed. After emptying the shallow well of its more recent filling, it was possible to see inside the tomb, which seemed to be filled in almost completely.

From ordinary ground level, therefore, the *dròmos* led downward to the interior of the tomb, and from level -0.38 m (the level has been surveyed at the initial part of the *dròmos*), descended a further 50 cm (level -0.88), ultimately reaching level -1.42 in the pit. The entrance corridor leading into the tomb was about 2.80 m long (Fig. 58).

The Hypogean Tomb

The surface level found inside the tomb was of alluvial origin and was practically as high as the roof. Right from the top, it contained bones of wild and domestic animals. This layer, called level 1, had been dug into deeply just beyond the entrance by the inhabitants of Waraqah, apparently in the search for grave goods.

Level 1 (60-70 cm thick) overlay a shallow whitish colour layer (level 2: 5 to 10 cm thick), composed of pumice fragments having fallen from the ceiling as well as soil of alluvial origin washed in from outside the tomb, probably when the entrance was opened. The whitish layer separated the first level from an underlying one (level 3). This represented the archaeological level and it was here that the bones from the burials were found. Level 3 was apparently less disturbed by modern raiders than the upper levels, although from wall E and in front of the doorway the plunderers had removed several small vases, later recovered by the Yemeni authorities.

Removal of the surface layer of natural deposit (level 1) and the whitish coloured layer (level 2) revealed the inhumation layer (level 3) which, extending down as far as the floor, contained the remains of numerous burials.

The tomb roof, which was gradually freed from the filling, had a very low pitch and was made of a rather loose conglomerate of pumice, just like that of tomb KAHi/T1. It was thus necessary to prop it up with a system of wooden pillars. The pumice level was deeper here than in the first tomb and the walls were made of it entirely.

The Burials

The work of cleaning the burials in level 3 proved to be complicated and laborious owing to the strong humidity that had glued the bones to the soil (Pl. 78.*a*). The skeletons were disarticulated and the bones scattered all around the tomb (Fig. 54). We shall now examine the layout of the finds in greater detail.

To the right of the door only one intact and one fragmentary vase were found (at a level of -1.35 m). In the eastern half of the tomb a skull was found and nearby another, smaller, one (Pl. 78.*b*) (level -1.56). Numerous long bones (femurs), as well as pelvises, ribs and sections of spinal column were uncovered in this eastern sector (Pl. 79) (level -1.40). Included among the human bones there were also animal remains (bovines and sheep).

In the western sector, towards the centre of the tomb, several jaws were discovered, together with some long bones, vertebrae and ribs (Pl. 80.*a*) (level -1.31). Again in this sector, but up against the wall, two small separated groups of bones were found (level -1.50), as well as an isolated bone at the back of the tomb (level -1.35).

After completing the cleaning of the whole floor level along the walls, some human remains were found also in the centre of the tomb. The bones were disarticulated, fragmentary, damp and very fragile. The conditions in which the osteological finds were made thus confirm the hypothesis that the tomb was raided in early times. It should be noted that the inhumed bodies were numerous and did not all lie on exactly the same plane: some were laid on a layer of yellowish fine sand, which apparently separated the more recent burials from earlier inhumations. In fact, removal of the upper layer revealed inhumations made directly on the tomb floor. The floor, which coincides with the bed of white tuff (cinerite) on which the pumice level was deposited, and out of which the burial chamber had been dug, sloped towards the tomb entrance (from -1.60 to -1.80 m). On the floor, as in tomb KAHi/T1, the outline of an oblong grave with a NE-SW alignment began to appear, with another on the W side and parallel to it (Fig. 55).

At the bottom of the tomb, at right angles to the entrance, a complete skeleton was found with the head facing westward, the face turned towards the entrance and the body lying on the right side. The legs were slightly bent and the arms clasped to the chest (Pl. 80.*b*). In the eastern sector, towards the bottom of the tomb, the skeleton of a young child was found (Pl. 81.*a*).

On the floor, above the central grave and at its sides, but above all concentrated in the eastern sector of the hypogeum, numerous objects from the grave goods were found scattered at different depths. Also this burial layer, although the two human bodies were spared, seems to have been turned upside down by raiders searching for more valuable items than those left on the spot.

To conclude the description of the natural and man-made deposits in the tomb let us now summarise their stratigraphy.

Level 1 was produced by the gradual washout of the surface soil at normal ground level into the tomb, which obviously remained open after its violation. The soil, dark and compact, was deposited above the thin level 2 which, because of its composition (fragments of pumice similar to those of the burial chamber ceiling), must be due to the material flaking off the ceiling and accumulating on the inhumation floor over a certain number of years (before, during and/or after the violation). This level 2 thus uniformly covered level 3, a compact, nut-brown coloured soil containing numerous inhumations and relative grave goods down to the floor level. The thickness of this level (as of level 2 covering it) was somewhat uneven, attaining 30-40 cm on average. The numerous bones found throughout the tomb were incorporated in a fine, compact soil, rendered plastic by the strong humidity. The skeletons were found to be relevant to at least 22 individuals, including 10 adults, 1 adolescent and 11 young children (Fig. 54; cf. A. Coppa & S. Damadio in this volume, pp. 94-96). Except for the two individuals found undisturbed in the innermost part of the chamber (Fig. 55), all the skeletons were disarticulated. However, since the bones were scattered, as we have seen, all over the chamber surface area, this is to be ascribed more to the work of the raiders than to the need to displace bones to make room for new burials. The rather homogeneous spatial distribution of the grave goods (or rather, what is left of them) actually seems to confirm this hypothesis.

Removal of the layer containing the burials lying on the burial chamber floor gradually revealed the graves (7 in all) dug out of the underlying tufaceous rock (Fig. 56).

The central grave (Grave no. 1; Figs. 56-57) was closed with dressed stone slabs that were apparently shifted in ancient times (Pl. 81.*b-c*); the short side of the grave (to the NE) was bounded by a vertical stone laid edgewise (Pl. 82), which separated it from another perfectly aligned grave (Grave no. 7; Fig. 56; and the section on Fig. 58), which extended towards the back

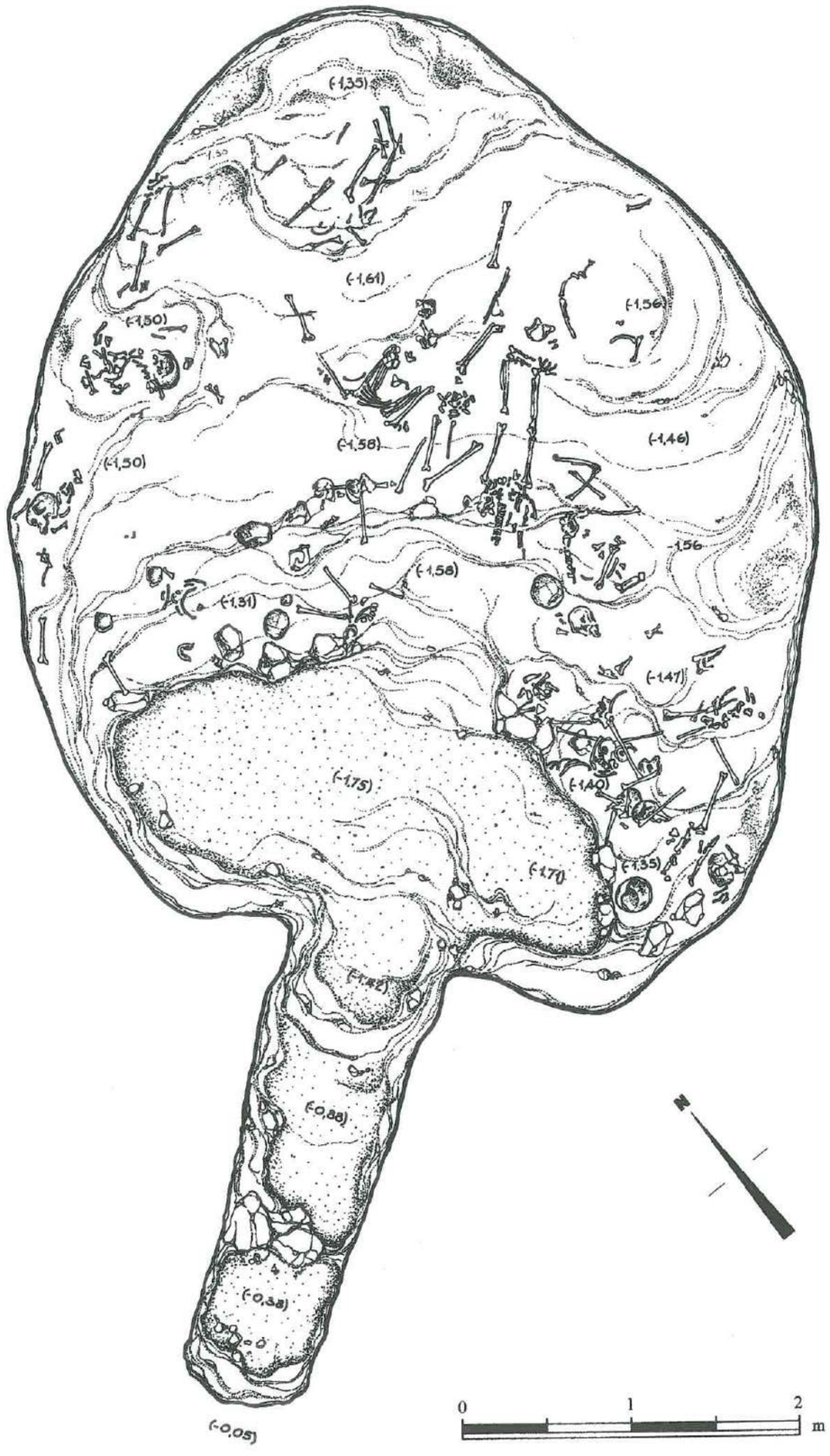

Fig. 54. Kharibat al-Ahjur, tomb KAHi/T2. Distribution of burials in level 3.

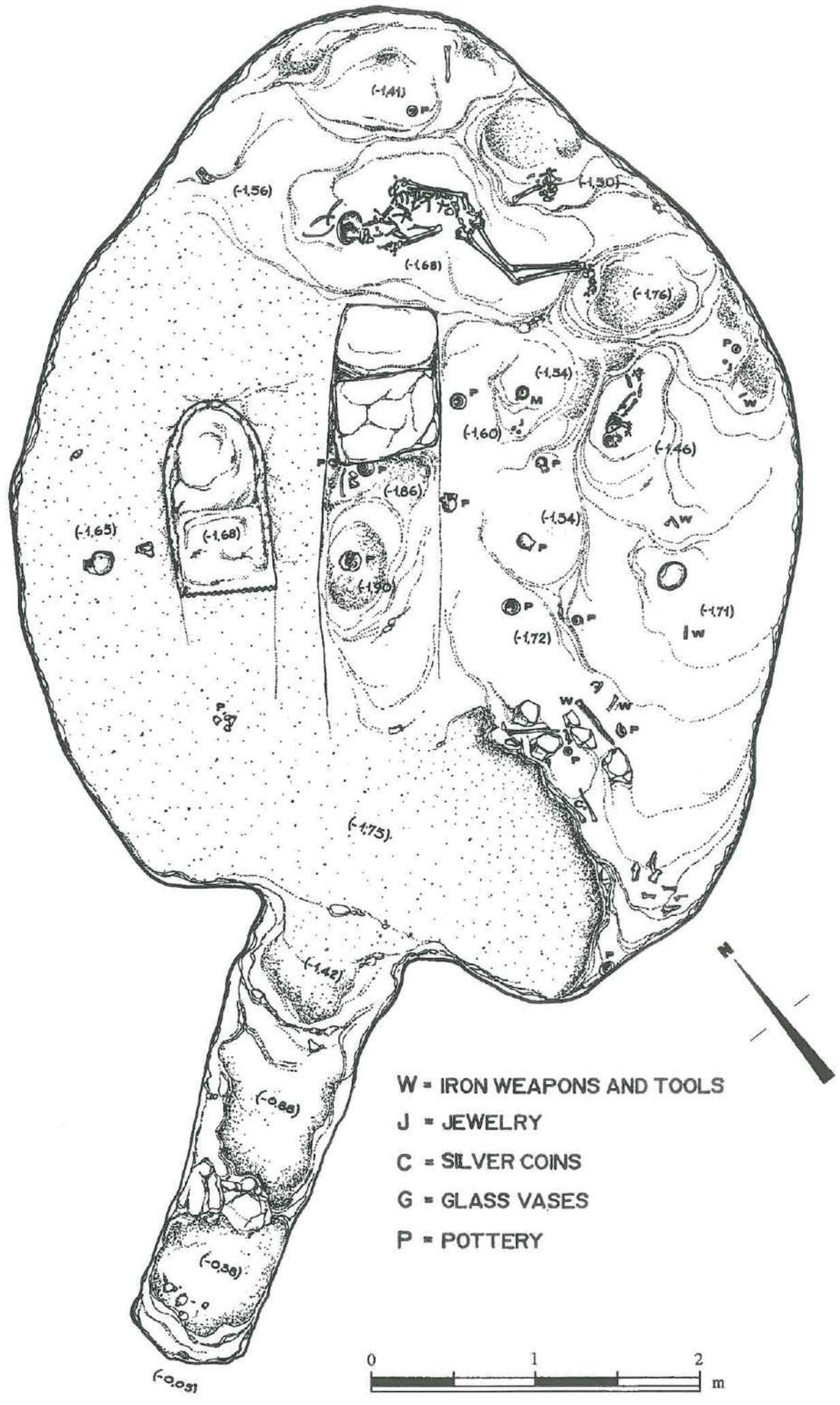

Fig. 55. Kharibat al-Ahjur, tomb KAHi/T2. Burials and grave goods on the pavement floor. Graves 1 and 2 are visible in the centre.

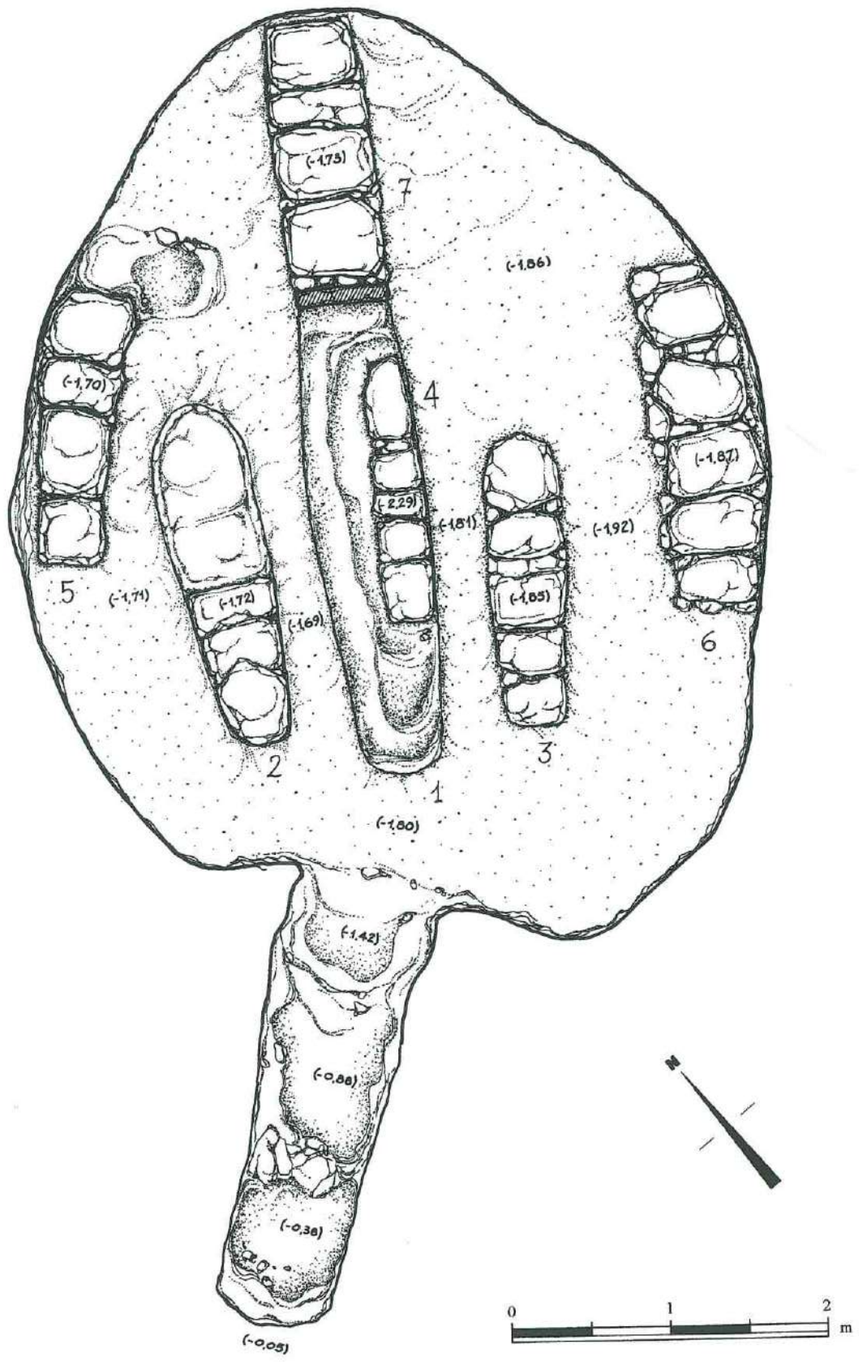

Fig. 56. Kharibat al-Ahjur, tomb KAHi/T2. Plan of pavement with sealed graves.

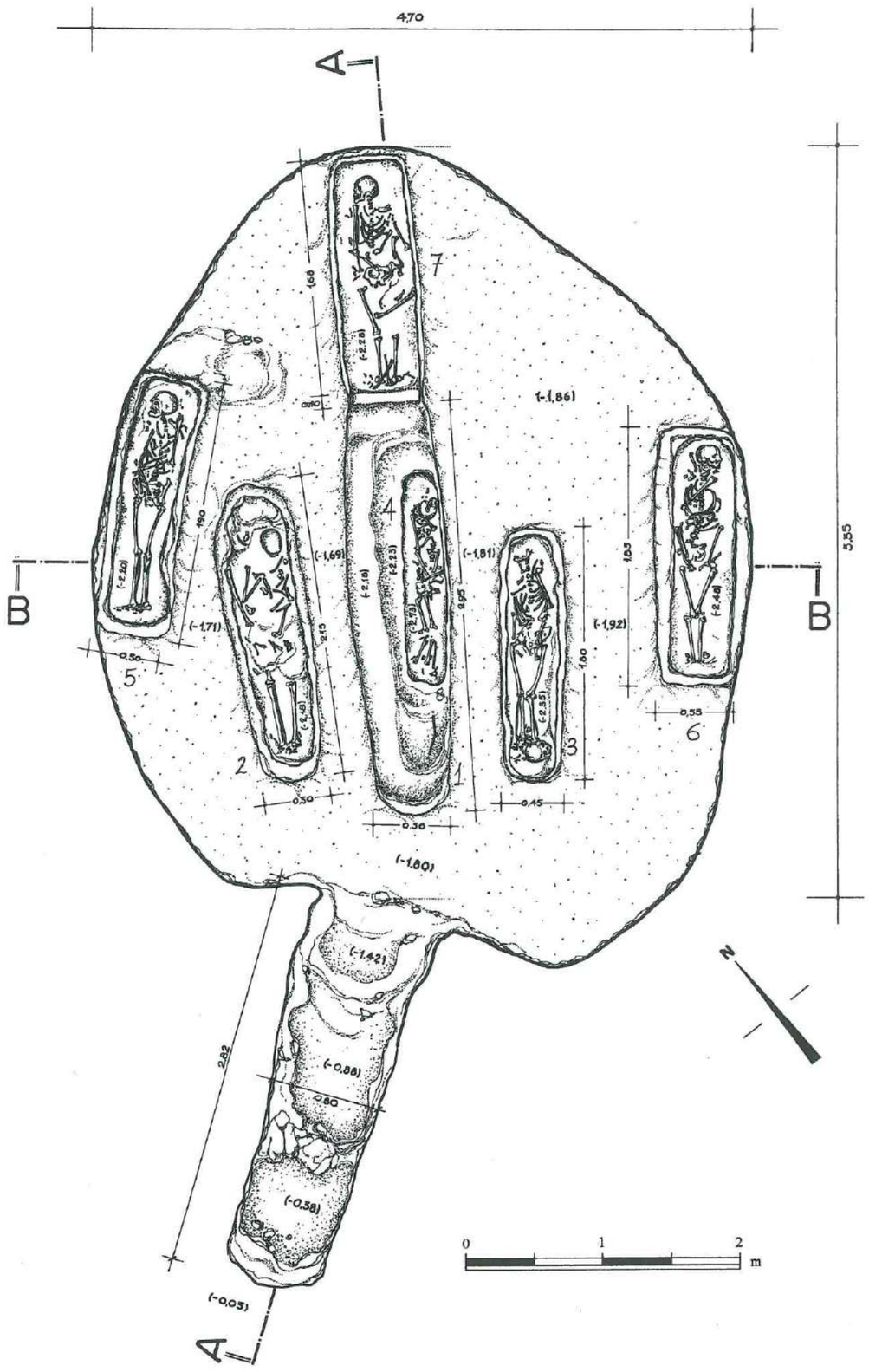

Fig. 57. Kharibat al-Ahjur, tomb KAHi/T2. Survey of opened graves with burials *in situ*.

wall of the tomb. Inside Grave no. 1 the remains of human bones lay, concentrated in the northern half (Pl. 83.*a*) and belonging to several individuals (cf. A. Coppa & S. Damadio in this volume, pp. 94-95). After removing the bones and digging to the bottom of the grave, another smaller grave was found inside it (Grave no. 4; Figs. 56-57; Pl. 83.*b*). This grave lay on the E side and was sealed with dressed stones and contained the body of a little girl aged 7-8 years (Pls. 83.*b*, 84.*a*; cf. A. Coppa & S. Damadio, p. 95).

Removal of the dressed slab that divided the long central grave-pit into two tombs (nos. 1 and 7) (Pl. 84.*a*) revealed the skeleton inhumed in Grave no. 7 (Individual A, female aged 40-45 years; cf. A. Coppa & S. Damadio, p. 95; Pl. 85.*a*). The grave roof was well conserved and consisted of perfectly fitting well dressed stone slabs (Pl. 85.*b*). The surface of the slabs could not be detected as they were covered with pressed cinerite which was similar in compactness and colour to the remaining floor of the burial chamber. The surface of the funerary chamber floor, corresponding to the Grave no. 7 roof, was actually slightly convex, thereby indicating the presence of the underlying grave. The marks of the ancient excavation work were visible on the walls inside. Here a body had been buried, which was accompanied only by a lamp obtained from the ring base of a vase. We do not believe that this inhumation was violated in ancient times as the vertically laid slab closing the vault was still *in situ* at the time of its discovery.

West of the central grave another cyst grave (Grave no. 2) was discovered. The latter was sealed by dressed stones fitting into a recess dug around the entire edge of the grave (Pl. 84.*b*). The analyses performed by the anthropologist on the bone remains discovered inside Grave 2 revealed the presence of 4 individuals, including a man aged about 43-49 years, two women aged 40-55 and 20-24, respectively, a small child aged 4-5. The grave thus seems to have been used several times, perhaps by members of the same family. There was no sign of grave goods, perhaps because they were replaced or stolen at each new burial, or else, as in the case of other non violated tombs, simply because the deceased did not possess any.

Another grave (Grave no. 3, Pl. 86) was situated in the eastern half of the tomb, immediately East of the long central grave. Also the latter was covered by tufaceous stone slabs that were laid across the grave and were supported by recesses dug out of the edges. The spaces between the slabs, which were cut into different sizes, were sealed by means of small wedges of yellowish coloured fumarolites. Grave no. 3 contained the complete skeleton of a woman aged 60-65 years (cf. A. Coppa & S. Damadio, p. 95), whose skull lay near the ankles (Pl. 87). It is assumed that the skull rolled down to the southern end of the grave, which slopes gently, during an earthquake, to which the area is prone. This burial differs from the others in the fact that the bones are burned over their entire surface, as well as the sides of the grave and the stones used to cover it. Also resin residues, perhaps incense, were observed.

On the basis of what was found for Graves 2 and 3, to the E and W of them, another two graves (nos. 5 and 6) were discovered, covered by slabs sealed using small and medium size blocks of fumarolite as wedges, and cemented using a kind of mortar containing straw inclusions. The grave located near the W side of the tomb (Pl. 88) is known as Grave no. 5 and that near the E wall (Pl. 89.*a*) Grave no. 6. Grave 5, narrow and slightly arc-shaped, contained the skeleton of an adult male individual (42-47 years old; cf. A. Coppa & S. Damadio, p. 96) with face turned westward, accompanied by somewhat varied grave goods (bronze finger ring and beads). Grave 6 contained the body of a woman aged 55-65 (cf. A. Coppa & S. Damadio, p. 96), laid supine like all the deceased found in the graves, with the face turned eastward and with no grave goods.

In the floor of the hypogeum a total of 7 graves were dug (Fig. 57; Pl. 89.*b*), each of which contained one body, except Grave 1, which contained the bones of 4 individuals. Here the skeletons were incomplete, indicating that at least in this case the grave had been re-used.

The Grave Goods

The Pottery

Only 24 pottery finds were made in tomb 2, although almost all of them were intact and the small number of rim fragments may be related to specific pottery forms. The typology coincides largely with the classification given for the KAHi/T1 tomb pottery, although it differs from it as a result of the presence of several forms representing different subgroups. Absent from this typology are polylobate bowls and small globular-body jars which are instead abundant in the first tomb.

Bowls

A.1 Open Bowls with Ring Base (Fig. 60.*1*)

As far as this first category is concerned, we have only one specimen of an open bowl with ring base, 24 cm wide and 6 cm deep. Both the internal and the external surfaces are covered with a thick burnished reddish slip. The bowl comes from the inhumation levels and not from the graves.

This category (A.1) and the following one (A.2) coincide with the first two in the tomb KAHi/T1 typology.

A.2 Small and Medium Flat-bottomed Bowls (Fig. 60.*2-5*)

The flat bottomed bowls are small and medium sized and have the typical inverted rim. The diameter varies from 8 to 17 cm and are about 7 cm deep. Also these bowls have burnished with red slip but no decoration.

The bowls Y.86.KAHi.T2/4 and Y.86.KAHi.T2/10 (Pl. 90.*a-b*) come from the inhumation level, on the floor of the hypogean chamber; the bowls Y.86.KAHi.T2/16 (Pl. 90.*c*) and Y.86.KAHi.T2/18 were found in Grave no. 1.

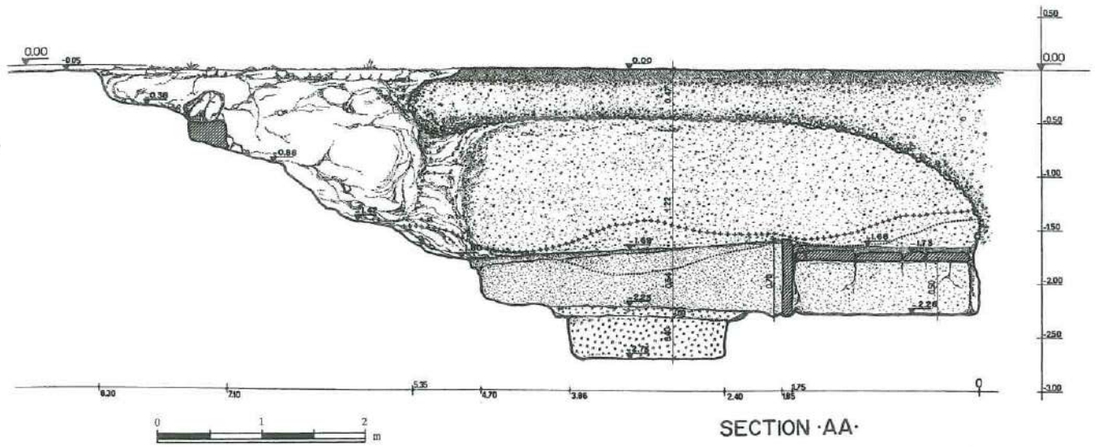

Fig. 58. Kharibat al-Ahjur, tomb KAHi/T2. Longitudinal section (NE-SW) of the tomb.

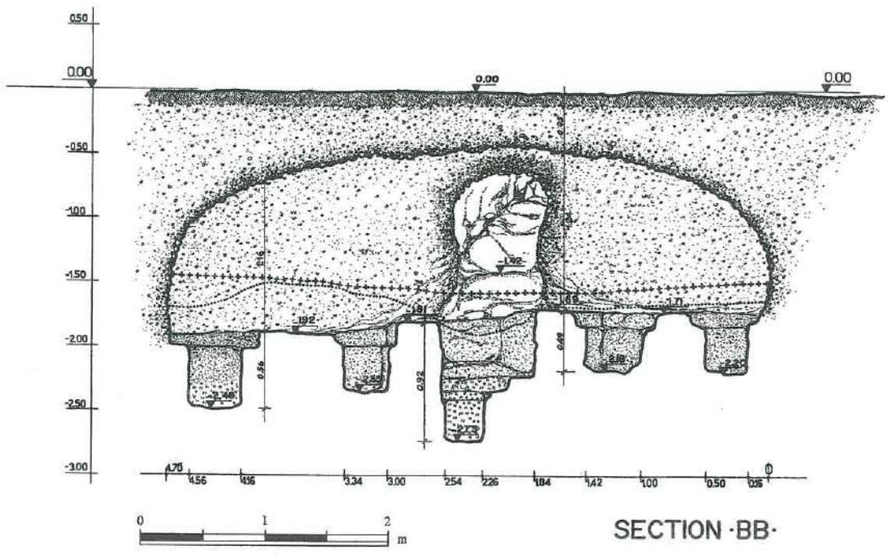

Fig. 59. Kharibat al-Ahjur, tomb KAHi/T2. Transverse section (NW-SE) of the tomb.

A.3 Deep Bowl with Low Ring Base (Fig. 60.*6*; Pl. 90.*d*)

This is a unique specimen of a deep bowl with a low base; it is 13 cm wide and 11 cm deep. The clay is beige in colour, with abundant vegetal inclusions; the red slip covering the surfaces has mostly worn off.

A.4 Large Bowls with Lid (Fig. 61.*1-3*)

This category is represented by two large bowls which differ in the shape of their rims: the first is flat and has rough outer edges and the second is thickened on the outside. Both types are present in the ceramic repertoire gathered in the dwelling settlement of Kharibat al-Ahjur (KAHii). The only lid found seems likely to belong to one of the two vessels. The three potsherds come from the inhumation level, and the items Y.86.KAHi.T2/3 and Y.86.KAHi.T2/14 lay directly on the tomb floor.

The Jars

B.1 Wide-necked Jars (Fig. 61.*4-6*; Pl. 90.*e*)

Three jars with a natural rim, slightly flared, and flat bottom are exactly the same type as that found in tomb KAHi/T1. Both surfaces are covered with thick reddish burnished slip; the jar Y.86.KAHi.T2/21 is of shoddier

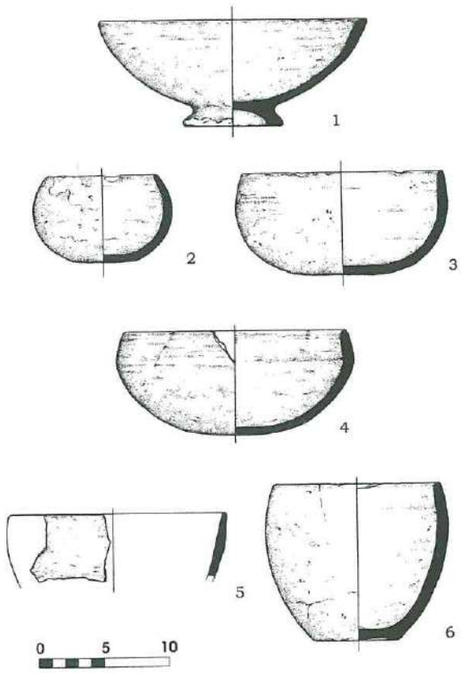

Fig. 60. Kharibat al-Ahjur, tomb KAHi/T2. Pottery: 1) open bowl with ring foot; 2-5) small and medium sized bowls with flat bottom; 6) deep bowl with low foot.

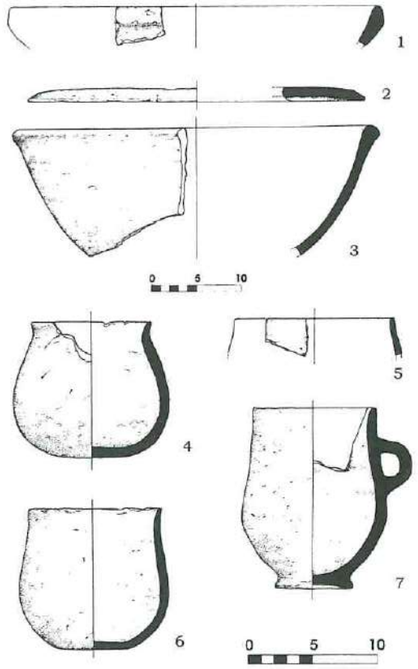

Fig. 61. Kharibat al-Ahjur, tomb KAHi/T2. Pottery: 1, 3) large bowls; 2) lid; 4-6) wide-necked jars; 7) single-handled mug with ring bottom.

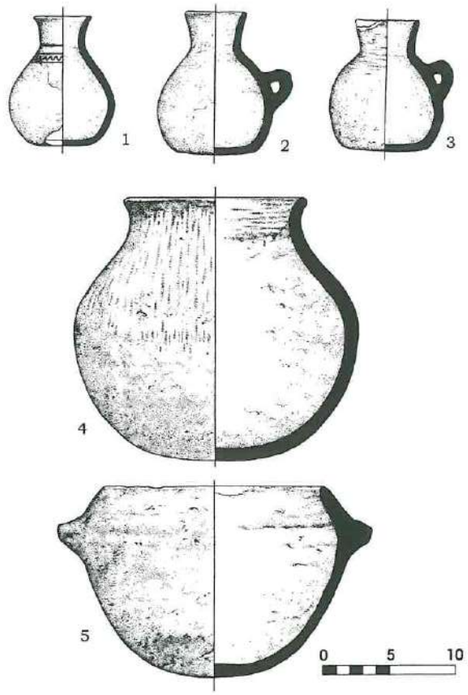

Fig. 62. Kharibat al-Ahjur, tomb KAHi/T2. Pottery: 1) decorated high necked jar; 2-3) single-handled high necked jars; 4) jar with globular body; 5) hole-mouth jar with handles.

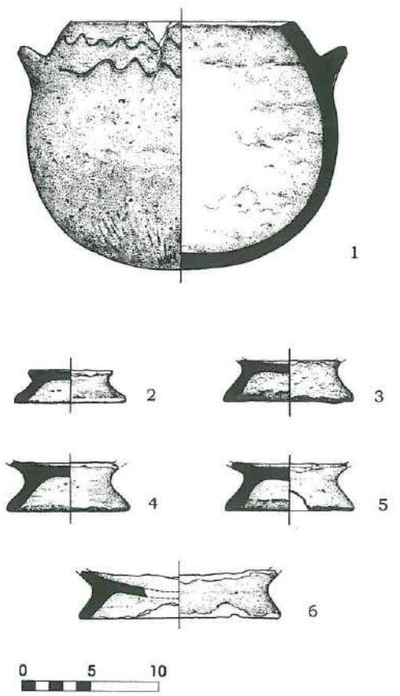

Fig. 63. Kharibat al-Ahjur, tomb KAHi/T2. Pottery: 1) decorated hole-mouth jar with handles; 2-6) ring bottoms used as lamps.

workmanship. They all come from the inhumation level and no. Y.86.KAHi.T2/22 lay on the floor of the burial chamber.

B.2 Single-handled Jar with Ring Base (Fig. 61.*7*; Pl. 91.*a*)

This sort of jar has no other parallels for the time being. It is characterised by the vertical ring handle and low ring base. The diameter of the mouth is 9 cm and its depth 13 cm. The thick reddish slip covering the outer surface is stick burnished in a horizontal direction on the upper part of the vase and in a vertical direction on the body. Inside, the burnishing is restricted to the rim.

B.3 Decorated High-necked Jar (Fig. 62.*1*; Pl. 91.*b-c*)

This small pear-shaped jar differs from those found in tomb KAHi/T1 in the presence of decoration on the shoulder; this consists of an incised festoon motif lying between two flat lines. The small jar is similar to another one found by J. Pirenne during a survey of the ruins of Khazinet ad-Darb, which she identified as the royal Awsanite necropolis (Pirenne 1980: 236-38, 242-49; 1981: 234, pl. III.*b*).

B.4 Single-handled High-necked Jar (Fig. 62.*2-3*; Pl. 91.*d-e*)

As in tomb KAHi/T1, also here we have a pair of small jars, 10/11 cm high, with high neck and natural flared rim, flat bottom and vertical ring handle applied between the shoulder and the body. The outer surface is covered with a thick brown slip; the stick burnishing is vertical on the neck and body and horizontal on the shoulder.

B.5 Jar with Globular Body (Fig. 62.*4*; Pl. 92.*a*)

This category comprises a single jar (compared with the 10 found in tomb KAHi/T1), medium-large in size (mouth diameter *c.* 14 cm, height 20 cm). It has a natural everted rim, globular body and round bottom. The stick burnishing is vertical, irregularly spaced and confined to the upper part of the vase.

B.6 Hole-mouth Jars with Handles (Figs. 62.*5* and 63.*1*; Pl. 92.*b-c*)

The two hole-mouth jars differ above all in their surface treatment. Jar no. Y.85.KAHi.T2/1 is less carefully finished; the outer surface has received a simple coating while the inner surface has been left in a natural state; the handles are horizontal. The second (Y.85.KAHi.T2/12) is externally slipped and has vertically spaced burnishing. Continuous irregular wavy decoration runs beneath the rim; further wavy decoration is incised between the handles; the latter are of the oblique type with 'digitation' on the lower side. A very similar jar comes from the site of 'Earn 'Umar (DS82) (Wilkinson et al. 1997: 122 ff., fig. 16.*1*).

This type of hole-mouth jar with double handle was not present in tomb KAHi/T1.

Lamp Bases (Fig. 63.*2-6*; Pl. 92.*d-e*)

The five bases found in tomb KAHi/T2, probably related to the open bowls with ring foot, were turned upside down and used as lamps. Two bottoms come from Grave no. 1 (Y.85.KAHi.T2/13, Y.85.KAHi.T2/15), and the other three from the inhumation level. The clay displays two colours — beige and reddish-orange, with mainly straw inclusions; the red slip has been conserved on the outer surface of all the lamp bases.

The Objects

Although the numerous graves dug out of the bed rock in tomb KAHi/T2 were almost intact at the time of the excavations, the grave goods and the personal ornaments in particular were found to be rather scanty and mediocre (Pl. 95.*g*).

In the category of jewellery we have a series of finger rings, some of which made of bronze and others of silver, but bracelets are completely absent, together with brooches, earrings and necklaces, which were instead abundant in the KAHi/T1 tomb goods. Luxury items are limited to a nice mirror and a fragmentary balsamarium. No coins were found in the tomb. The presence of iron knives and tools seem to indicate a comparatively low social level for the people who were buried in this tomb.

Rings

From Grave 4 comes a very small (diam. 0.8 cm) closed bronze ring (Y.86.KAHi.T2/8) together with another fragmentary bronze ring (Y.86.KAHi.T2/7), which must have been open, as indicated by the thinness of one of the two ends. The anthropological analysis of the rather disarticulated skeleton found in Grave 4 indicates that the inhumed body was that of a little girl aged 7-8 years.

Item no. Y.86.KAHi.T2/6 consists of a silver finger ring made out of a round bar of variable thickness, bent into a circle with the extremities rounded and arranged side by side. Beside it another fragment of a silver ring was found, of the band type decorated with small protuberances framed in a square (Y.86.KAHi.T2/11).

One of the two rings with a setting is made of bronze (Y.86.KAHi.T2/4), while the second is made of silver (Y.86.KAHi.T2/5); both have the shank closed, semi-

circular in cross section, an oval shaped flat setting, no incisions, and are similar to those found in tomb 1.

In Grave 5 the remains of grave goods comprising jewellery were found. The first group (Y.86.KAHi.T2/9) consisted of a fragment of silver-clad bronze finger ring and three beads; two of the latter are disk-shaped, obtained from a conus shell, similar to those found at Shabwah (Morrison 1991: 384, fig. 1.*28-34*). The third, cylindrical disk, bead is made of dark green glass. The second group comprises a fragment of an iron object, a fragmentary bronze ring and lastly an oblate carnelian bead. In all likelihood both finds were originally part of the same object. The skeleton found here is perfectly conserved and corresponds to a male aged 42-47 years.

Finger ring (Y.86.KAHi.T2/4) (Fig. 64.*1*; Pl. 93.*a*)
Provenance: level 3; from A: 4.30 m; from B: 4.15 m; depth below B: -52 cm.
Material: bronze.
Conservation: intact; incrustations due to metal oxidation.
Size: int. diam. 1.5/1.6 cm; setting 1 × 1.2 × 0.2 cm.
Description: ring with flat setting, oval shaped with the shank thinner in the lower portion. Incrustations on the setting surface prevent any incisions possibly present from being identified.

Finger ring (Y.86.KAHi.T2/5) (Fig. 64.2; Pl. 93.*b*)
Provenance: level 3; from A: 3.30 m; from B: 3.35 m; depth below B: -75 cm.
Material: silver.
Conservation: complete, but shank fractured in several places.
Size: int. diam. 1.9; thickn. of shaft 0.2 cm; setting 0.8 × 1 × 0.2 cm.
Description: ring with flat setting, oval shaped, very thin, with shank slightly grooved on the inside. The setting displays straight parallel longitudinal incisions that are hard to interpret owing to oxidation.

Finger ring (Y.86.KAHi.T2/6) (Fig. 64.*3*; Pl. 93.*c*)
Provenance: level 3; from A: 3.30 m; from B: 3.25 m; depth below B: -75 cm.
Material: silver.
Conservation: intact with slight incrustations on the surface.
Size: approx. diam. 2.1; thickn. 0.3 cm.
Description: bar bent to form an irregular circle; the extremities close the circle without meeting but running side by side for about 1.5 cm.

Finger ring (Y.86.KAHi.T2/7) (Fig. 64.*4*; Pl. 93.*d*)
Provenance: from Grave no. 4.
Material: bronze.
Conservation: half of it has been conserved with pronounced incrustations due to metal oxidation.
Size: diam.1.9; max. thickn. 0.4 cm.
Description: the semi-circular shaped fragment is represented by a circular section bar tapering towards one.

Small ring (Y.86.KAHi.T2/8) (Fig. 64.5; Pl. 93.*e*)
Provenance: from Grave no. 4.
Material: bronze.
Conservation: intact but oxidized.
Size: ext. diam. 1.1; thickn. 0.3 cm.
Description: small circular shaped ring with a round cross-section. The irregular shape is due to the presence of large incrustations covering the surface.

Ring or earring (Y.86.KAHi.T2/9) (Fig. 64.*8*; Pl. 93.*f*)
Provenance: from Grave no. 5.
Material: silver-clad bronze with two sea shell beads and one of glass.
Conservation: fragmentary with highly corroded surface.
Size: l. of conserved part 1.8 cm; thickn. 0.5 cm; diam. of sea shell beads 0.6 and 0.3 cm, respectively; diam. of glass bead 0.4 cm.
Description: bronze fragment, probably related to a finger ring, consisting of a bronze core with a roughly circular section, covered with a thin layer of silver. Three beads are soldered on the highly corroded surface, two of which on the outer face and on one on the inner face.

Jewelry item (Y.86.KAHi.T2/10) (Fig. 64.9; Pl. 93.*g*)
Provenance: from Grave no. 5.
Material: bronze, iron and carnelian.
Conservation: this iron object is highly corroded; two bronze fragments with highly corroded surface are soldered on to it, and a carnelian bead, also incrusted all over.
Size: iron: length of conserved part 2.5 cm; thickn. 1.7 cm; bronze: diam. of conserved portion 1.7 cm; thickn. 0.5 cm; bead: diam. 0.9 cm.
Description: the iron object cannot be identified. The two bronze fragments are probably part of a single finger ring. The bead is spherical in shape with a hole drilled through it.

Finger ring (Y.86.KAHi.T2/11) (Fig. 64.6)
Provenance: level 3; from A: 3.30 m; from B: 3.35 cm; depth below B: -75 cm.
Material: silver.
Conservation: fragmentary, half of which conserved.
Size: diam. 1.1 cm; thickn. 0.2 cm.
Description: small band ring. The outer surface displays decoration (barely perceptible owing to the degree of oxidation) with small barred and delimited by two incisions running along the edge of the ring.

Beads

Together with the small skeleton from Grave 4 there was a set of beads of different kinds, the majority made of glass. The beads are of an iridescent pearly colour and are variously shaped: two beads (the fifth and tenth from the left in the Pl. 94.*b*) are short convex-bicone and were moulded (cf. Morrison 1991: fig. 1.*1* from Shabwa); the fourth element is a globular green glass bead flattened at the ends; this is a single specimen of a concave cylindrical shape, while there are three short cylinder beads decorated with small granules arranged at regular intervals. Of the three remaining barrel beads (the seventh, eighth and ninth) one is made of carnelian and the other two seem, on the face of it, to be made of coral.

An isolated bead from the inhumation level is made of coloured glass, is spherical in shape, and shares many features with the glass beads found at Shabwah (Morrison 1991: 383).

Necklace bead (Y.86.KAHi.T2/2) (Fig. 64.7; Pl. 94.*a*)
Provenance: level 3; from A: 3.25 m; from B: 3.80 cm.
Material: glass.
Conservation: intact, highly abraded.
Size: diam. 0.5 cm; h. 0.8 cm; hole diam. 0.2 cm.
Description: barrel shaped necklace bead, light green in colour with yellow reflections, and hole drilled through it longitudinally.

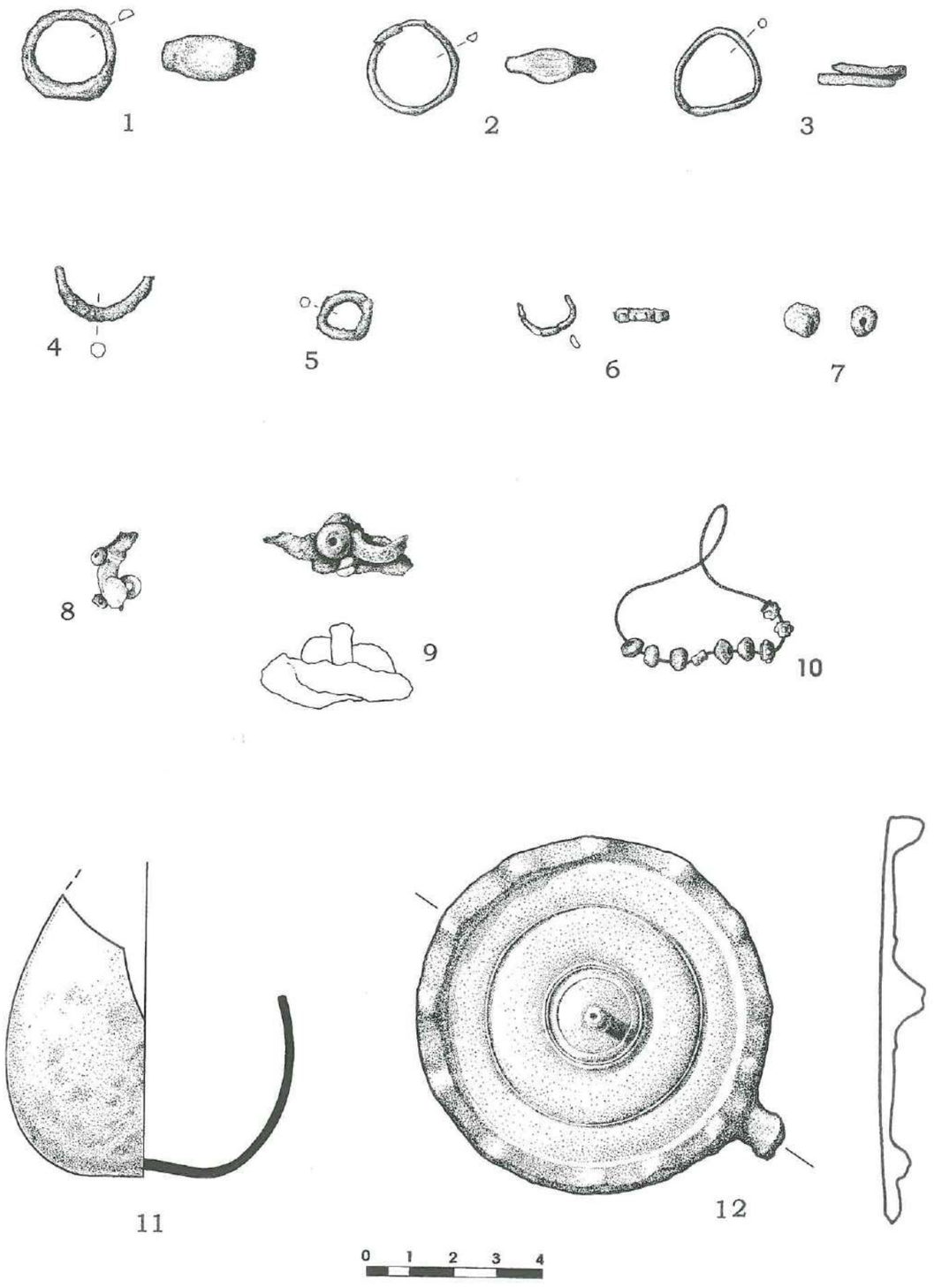

Fig. 64. Kharibat al-Ahjur, tomb KAHi/T2: 1, 4-5) bronze rings: Y.85.KAHiT2/4, Y.85.KAHiT2/7, Y.85.KAHiT2/8; 2-3, 6) silver rings: Y.85.KAHiT2/5, Y.85.KAHiT2/6, Y.85.KAHiT2/11; 7) glass bead: Y.85.KAHiT2/2; 8-9) fragmentary rings with encrusted beads: Y.85.KAHiT2/9, Y.85.KAHiT2/10; 10) carnelian and glass beads: Y.85.KAHiT2/3; 11) glass balsamarium: Y.85.KAHiT2/13; 12) bronze mirror: Y.85.KAHiT2/12.

Necklace beads (Y.86.KAHi.T2/3) (Fig. 64.*10*; Pl. 94.*b*)
Provenance: Grave no. 4.
Material: glass, carnelian and coral (?).
Conservation: 9 intact beads and 2 fragmentary ones.
Size:
- 1 carnelian bead diam. 0.5 cm; thickn. 0.3 cm.
- 1 coral (?) bead diam. 0.5 cm; thickn. 0.3 cm.
- 1 coral bead diam. 0.5 cm; thickn. 0.4 cm.
- 4 glass beads diam. 0.5 cm; thickn. 0.3 cm.
- 1 glass bead diam. 0.6 cm; thickn. 0.4 cm.
- 1 glass concave cylinder bead diam. 0.3 cm; length 0.4 cm.

Description: three necklace beads (two of red coral (?) and one of carnelian) are spheroidal in shape with flattened ends; two pearl-coloured glass beads are biconical in shape. One pearl-coloured glass bead is concave cylindrical in shape; three beads made of pearl-coloured glass have an external surface with granule decoration. Of the two fragments, both of pearl-coloured glass, one is globular in shape and the other cylindrical.

Glassware

Balsamarium (Y.86.KAHi.T2/13) (Fig. 64.*11*)
Provenance: level 3; from A: 2.20 m; from B: 1.75 m; depth below A: -60 m.
Material: glass.
Conservation: fragmentary; neck and rim missing.
Size: max. h. of conserved portion 7 cm; base diam. 6.7 cm; max. thickn. 0.3 cm; min. thickn. 0.1 cm.
Description: glass balsamarium, greenish-yellow in colour, with iridescent purple reflections; globular shape and slightly convex bottom. The specimen can be considered to belong to type 26a in Isings' typology (Isings 1957).

Mirror

Also the mirror, like the glass balsamaria, is included among the luxury items used for care of the body and cosmetic purposes, and is perhaps the most precious (Antonini 1992: 8-10). In Roman times the manufacture of bronze mirrors as an expression of sophisticated craftsmanship was replaced by mass production and the simple mirror with the reverse side decorated with concentric rings and festooned edges became a common item over a wide distribution area. Glass mirrors, like this one from Kharibat al-Ahjur, were obtained by superimposing a layer of blown glass over one of metal and during the Late Empire completely replaced the metal ones.

Mirror (Y.86.KAHi.T2/12) (Fig. 64.*12*; Pl. 94.*c-d*)
Provenance: level 3; from A: 3.57 m; from B: 3.50 m; depth below A: -54 m.
Material: bronze.
Conservation: intact, but with slight incrustations due to metal oxidation.
Size: diam. 8.1 cm; thickn. at centre 1 cm; thickn. in middle section 0.3 cm; thickn. at edge varying from 0.5 to 0.8 cm; weight 120 gr.
Description: bronze mirror in the form of an umbonated disk, with relief rim crowned by regularly spaced projections. On the back side the cone-shaped, slightly depressed, central umbo is delimited by three concentric rings; another ring runs round the rim. The tang fitting into the handle is flat and rectangular; at the time of the find, residues of wood, the material of which the handle was made, were attached to it. Minute class fragments were still attached to the flat smooth surface of the mirror, which was polished to obtain the reflecting effect.

The excavations of the tomb in the Ḥayd Ibn 'Aqīl necropolis yielded a mirror decorated with concentric rings and denticulate edge, closely resembling our specimen (Cleveland 1965: 124, pl. 91.*TC 1289*); a further two mirrors were found in the same necropolis, one of which still with its wooden handle (*ibid.*: p. 122, pl. 91.*TC 1142*, p. 128, pl. 92.*TC 2226*).

Weapons and Tools

Tomb KAHi/T2 yielded two knives, one of which broken in two, with the blade and the handle lying some 50 cm apart (Y.86.KAHi.T2/15-16; Fig. 65.*1*; Pl. 95.*a*). This knife is quite different from those found in tomb KAHi/T1 as the handle is not made of bone or wood but of iron. The handle is circular in cross section, with a thick round end; the blade has a single cutting edge and also differs from the daggers found in tomb 1, as well as being slightly smaller.

The other knife found in tomb KAHi/T2 is very similar to those found in tomb 1. The blade with its single cutting edge and part of the tang bearing traces of wooden handle have been conserved (Y.86.KAHi.T2/19; Fig. 65.*2*; Pl. 95.*b*); like the tomb KAHi/T1 daggers, also this specimen had a sheath probably made of leather.

The other three iron objects are apparently related to work tools as, although hard to identify, they are different in shape and size from ordinary weapons. The knives and work tools, all found in the eastern sector of the hypogean chamber, come from level 3 which, according to a study performed on the skeletal remains, included skeletons of at least three men aged between 30 and 40 years of age.

Knife (Y.86.KAHi.T2/15+16) (Fig. 65.*1*; Pl. 95.*a*)
A. Blade (Y.86.KAHi.T2/15):
Provenance: level 3; from A: 2.40 m; from B: 2.05 m; depth below A: -68 cm.
Material: iron.
Conservation: the surface is highly corroded by oxidation of the metal, which does not however alter its shape. The point is missing.
Size: l. 10 cm; max. w. 3.2 cm; min. w. 1.8 cm; thickn. 0.8 cm.
Description: knife blade with a flat upper edge and rounded at the bottom. The cutting edge is slightly curved and closes towards the upper edge to form the point. On one face, near the point, there is a cone-shaped projection that cannot be further defined. The part where the blade is attached to the handle has a recess at the centre which coincides with the item Y.86.KAHi.T2/16.
B. Handle (Y.86.KAHi.T2/16):
Provenance: level 3; from A: 3 m; from B: 2.65 m; depth below A: -77 cm.
Material: iron.
Conservation: the handle covered with deep incrustations. Large longitudinal grooves due to the flaking of the metal are visible.
Size: l. 9.8 cm; base thickn. 1.5 cm; thickn. at top 2 cm; w. at point of blade attachment 3 cm.
Description: the knife handle is made from an iron bar with a circular cross section, which gradually increases in thickness

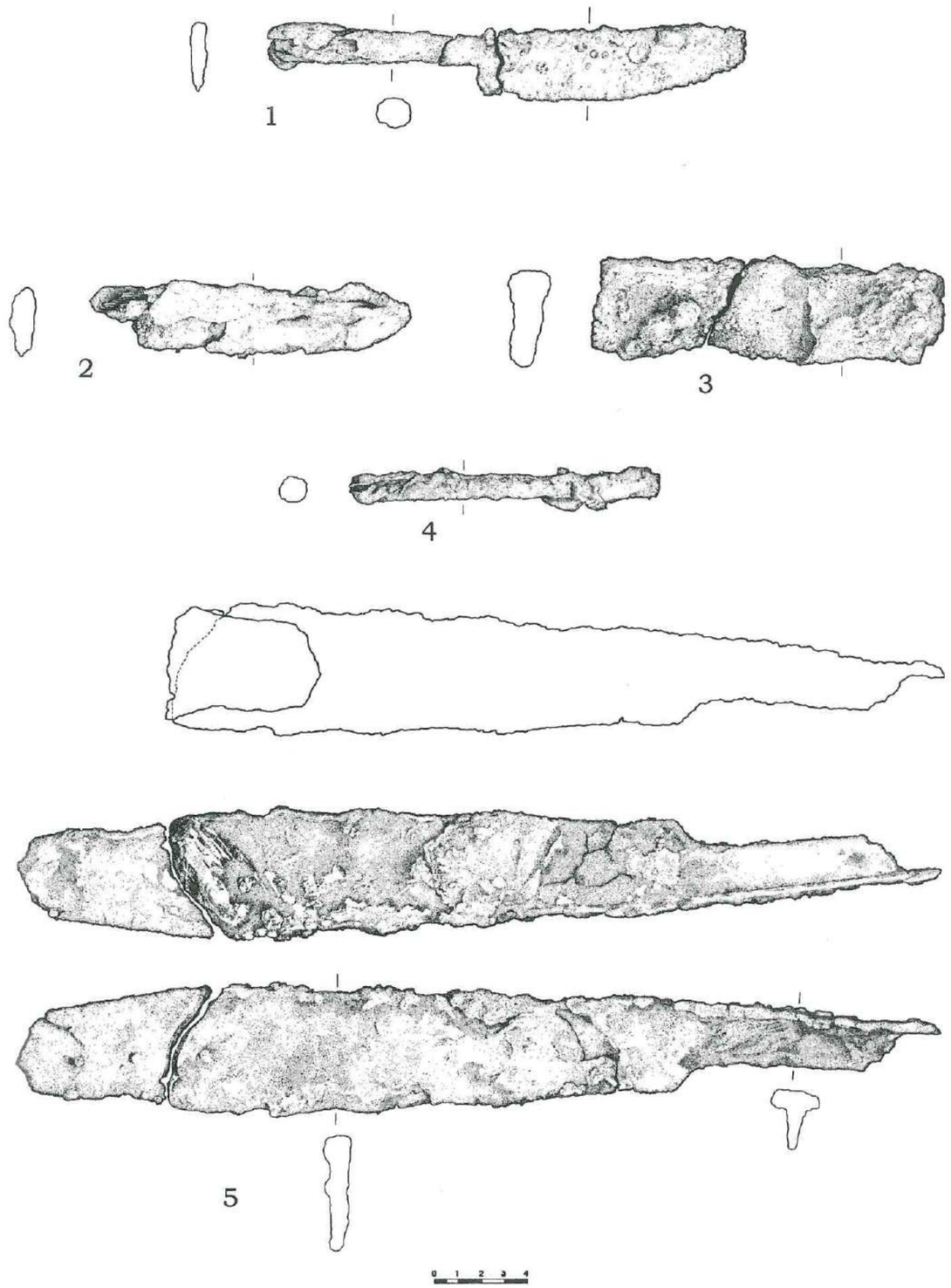

Fig. 65. Kharibat al-Ahjur, tomb KAHi/T2: 1) knife or dagger: Y.85.KAHiT2/15 + Y.85.KAHiT2/16; 2) knife or dagger blade: Y.85.KAHiT2/19; 3-5) tools: Y.85.KAHiT2/17, Y.85.KAHiT2/18, Y.85.KAHiT2/20.

from the point of attachment of the blade to the extremity. The latter is represented by a kind of pommel. The part associated with the attachment of the blade is characterised by a half-moon shaped upper projection that fits the upper at edge of the blade described previously (Y.86.KAHi.T2/15).

Knife blade (Y.86.KAHi.T2/19) (Fig. 65.*2*; Pl. 95.*b*)

Provenance: level 3; from A: 4.20 m; from B: 4.05 m; depth below B: -58 cm.

Material: iron.

Conservation: intact; the incrustations due to metal oxidation are scattered all over the surface. Traces of wood and other organic material (leather?) are visible.

Size: tot. l. 13.9 cm; max. w. of blade 2.8 cm; min. w. 1.3 cm; thickn. 0.9 cm; tang: 2 × 1.1 × 0.5 cm.

Description: knife blade with a straight upper edge and rounded lower edge. Both flat faces still retain traces of the sheath, probably made of skin or leather. The traces of wood visible on the tang point to the presence of a wooden handle secured to the blade by means of small rivets, one of which has been conserved.

Tool (Y.86.KAHi.T2/17) (Fig. 65.*3*; Pl. 95.*c*)

Provenance: level 3; frag. 1: from entrance pit; frag. 2: from A: 1.80 m; from B: 1.60 m; depth below A: -50 cm.

Material: iron.

Conservation: the poor state of conservation evident in both fragments is due to the thick incrustation due to iron oxidation.

Size: frag. 1: 6.3 × 4 × 2 cm; min. thickn. 0.7 cm; frag. 2: 9.9 × 3.9 × 1.6 cm; min. thickn. 0.8 cm.

Description: the two fragments, which fit together perfectly, are probably part of a tool or agricultural implement, or in any case for the purpose of breaking in view of its 'T' shaped section. The upper part of the 'T', which is very pronounced in the first fragment, tends gradually to be reduced and less protruding in fragment no. 2. The blade is rectangular in cross section, as is the upper protruding part. It could be part of a plough, like item Y.86.KAHi.T2/20.

Tool (Y.86.KAHi.T2/18) (Fig. 65.*4*; Pl. 95.*d*)

Provenance: level 3; from A: 3.40 m; from B: 3.20 m; depth below A: -60 cm.

Material: iron.

Conservation: the conspicuous incrustations on the surface do not prevent identification of the form. The thicker end is apparently cracked.

Size: tot. l. 13.6 cm; max. thickn. 1.8 cm; min. thickn. 0.9 cm.

Description: iron bar with circular cross-section, tending to grow thinner in the upper part, rounded off to form a cap towards the non conserved end portion. The lower half conserves traces of two sheets of organic material that formerly covered the object, joining at the side a small angular metal object (case?). Also occasional traces of wood are present on the upper half.

Tool (Y.86.KAHi.T2/20) (Fig. 65.*5*; Pl. 95.*e-f*)

Provenance: level 3; from A: 2.25 m; from B: 1.95 m.

Material: iron.

Conservation: intact; the incrustations on the surface do not alter the shape.

Size: tot. l. 33.2 cm; w. at extremity 5 cm; mean w. 4 cm; w. at tip 2.3 cm; thickn. 0.6 cm.

Description: the object seems to have been cast. It consists of a strong ribbed blade, the cutting edge of which is not particularly sharp with a notch near the point of the tool. The rib, which has the same size as the body of the blade near the tang, gradually grows thicker as it approaches the point, forming an increasingly large plane with respect to the body of the blade. This 'rib' plane terminates at the broadened lowered duck-billed tip. At the point it extends several cm beyond the tip of the blade. The blade joins the 'rib plane' at the tip and forms an oblique cutting edge. The tang is flat and narrower than the blade. Three variously conserved rivets still remain in it.

The possible interpretation of this object is that it is a ploughshare. The large rib probably had the function of 'cutting' and opening up the straight line. Once the object was no longer used for this purpose, the tang was bent on one side to touch the blade with its rivets. As is shown by the notches and thickening due to striking the blade at the point at which the tang is bent over it, the tool, now held by the tip, must have been used as a heavy blunt object (perhaps to dig the pumice out of the tomb?). The notches and thickening suggest that this part of the object was made of soft iron; the point must instead have been tempered.

Conclusions

The architecture of the tombs of Kharibat al-Ahjur and the grave goods contained in the their burial chambers may be used both to understand the relationship between the world of the dead and the world of the living (expressed, the latter, through the urban archaeological context — even if little or nothing is known about this relationship except at the level of similarities among pottery types) and to identify the funeral customs through the production of the artefacts and their use in the funeral rites.

The graves lie outside the urban centres, although not distant from them, as is the custom in South Arabian funeral practice (Vogt, de Maigret & Roux 2000; an exception to this rule are the turret tombs, built far away from the cities, cf. de Maigret in the present volume).

The internal subdivision of the tombs might reflect the layout of private dwellings, that is, with an entrance and an access corridor leading to a large main room, as at Ḥurayḍah and Raybūn XV. The niches in the walls conceivably reproduce the windows in imitation of the interior of a private dwelling. This architectural equivalence is evident in particular at Tamna', where the layout of the tombs in its necropolis Ḥayd Ibn 'Aqīl seems to copy that of private dwellings. The layout of the houses at Tamna' (at least those of the 1st century B.C.-1st century A.D.) is known thanks to the recent excavations (September-October 2000 and February-March 2002) carried out by the Italo-French Mission in the so-called 'market square': at the sides of the central passage, to which access is provided through a main entrance, lie the *loci*, which in the case of the funeral monuments of Ḥayd Ibn 'Aqīl, consist of superimposed grave niches.

Nevertheless, the main difference between tombs T1 and T2 of Kharibat al-Ahjur and the necropolises of Tamna' and Mārib, is the absence of a sanctuary or a temple linked to the place of burial. At Kharibat al-Ahjur the funeral ritual, if any, probably took place in a temple building in the city; also the length of time for which the hypogean tombs were used, which appears to be rather short, underlines the difference in the funeral customs among the peoples who inhabited the pre-desert city-states and the inhabitants of the strongholds in the Central Yemen highlands.

The first burials in tombs T1 and T2 took place in graves dug out of the soil, that is, in the floor of the hypogean chamber. The inhumations, sealed with covering slabs, were individuals, accompanied by grave goods placed inside the cyst grave. Several of these graves were later re-used — perhaps within the same family — as seems to be demonstrated by the bones of 4 individuals contained in Grave 1 and of 5 individuals in Grave 2 in tomb T2. These burials in sealed graves are very similar to the contemporary ones recently excavated at Ṣan'ā by archaeologists from the German Archaeological Institute in the vicinity of the North gate of the city, Bāb ash-Shu'ūb (communication by Dr B. Vogt on the occasion of the 4th Rencontre Sabéenne held in Naples on 3-4 April 2000, at the Istituto Universitario Orientale).

Although it may seem somewhat trite to relate the data concerning the quantity and quality of the grave goods to the comparative wealth or poverty of the deceased, I believe that in this case the comparison between the two tombs inevitably leads to this. The weapons, jewellery, the seal, the imported artefacts on the one hand, and the tools on the other, actually seem to indicate the different conditions and roles of the deceased (the owners of the objects) in society when they were alive. The social references are based on the symbolic value these objects had in accompanying the deceased on their long journey into the next world. This journey is suggested also by the food placed in terracotta vessels to ensure survival in the next world. In this connection, we emphasize that, unlike the Sabaean and Qatabanite necropolises, the grave goods in tombs T1 and T2 do not include miniature pottery, but only vessels of everyday use such as pots, bowls, glasses, tableware and kitchenware.

The absence of human or animal terracotta figurines is in contrast with the presence of a stone bull that would seem to imply reference to a fertility rite or in any case to the divine sphere. The presence of the pottery on the one hand and of this statuette of a bull on the other seems essentially to underline people's belief in the next life and the will of the living to guarantee ideal conditions for the deceased to enter it.

A generally homogeneous socio-cultural system — reflected in these tombs, and also in the architecture, in the use made in both tomb contexts of specific grave goods elements, such as pottery, jewellery, daggers and imported objects — seems to be differentiated, as we already had mentioned, in the varied nature of the grave goods in the two tombs. Although both tombs seem to have been plundered in relatively ancient times (and perhaps also at the time of their discovery in 1985) on the basis of the evidence available to us today there are some obvious differences.

Tomb T2, which contained as many as 35 burials (22 in level 3, 4 in Graves 1, 5 in Grave 2 and 4 in each of the other four Graves) displays an exceptionally scanty array of grave goods (the jewellery is sporadic, the pottery is limited to 24 vases, the imported objects are only 2 in number and there are some work tools).

The opposite may be said of tomb T1, in which the bones of only 4 individuals (two adults and two children) have been found. Here the pottery comprises as many as 53 vases, with an evident variety of shapes and sophisticated models (as is shown by the wavy rimmed bowl most probably originating from the Qatabanite or Sabaean pre-desert area). The jewellery displays a wide range of materials used (silver, bronze, different types of semi-precious stones used as beads) and of categories of artefact (bracelets, necklaces, finger rings, pendants, etc.). Here we find several silver coins. And then the presence of swords and daggers — the weapons par excellence of the warrior and of the heroic duel — as well as of a seal, is evidence that this tomb belonged to individuals of high social status.

In conclusion, it appears clear that a comparison of the two tombs reveals the presence of an elite (perhaps warriors) among the mainly rural community of Kharibat al-Ahjur.

As far as the chronology is concerned, it is above all the silver coins of 'Amdan Bayyin Yuhaqbiḍ (Davidde 1992) and the imported glass balsamaria that set the time of use of tomb T1 in a period lying between the middle and the end of the 1st century A.D.

As far as tomb T2 is concerned, several points in common in the pottery typology with tomb T1 (classes A.1-A.2, A.4) found both in level 3 (Figs. 60.*1-3, 6*, 61.*1-6*) and in Grave no. 1 (Fig. 60.*4-5*), or in the jewellery (Fig. 64.*1-2*) and the imported objects (the glass balsamarium and the bronze mirror) seem to suggest that at least some of the inhumations in this tomb are contemporary with those in tomb T1. However, it cannot be ruled out that this tomb continued to be used until the first few decades of the 2nd century A.D.

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APPENDIX

PALAEOBIOLOGY OF THE POPULATIONS OF YEMEN

by Alfredo Coppa and Stephanie Damadio

Introduction

The aim of this contribution is to reconstruct the pattern of the peopling of the South Arabian area by means of an analysis of the human skeletal material from the necropolises of Al-Makhdarah/Al-Manqaz and Kharibat al-Ahjur, discovered between 1985 and 1987 by the Italian Archaeological Mission of IsMEO in Yemen. The investigation will thus involve a comparative analysis of other skeletal and dental material from the Arabian Peninsula (Frohlich 1980, 1982, 1983a, 1983b, 1986; Højgaard 1980a, 1980b, 1980c, 1981, 1982, 1983a, 1983b, 1983c, 1985, 1986; Coppa et al. 1985, 1990; Damadio et al. 1989; Macchiarelli 1989), in order to attempt a more general analysis of the peopling of the entire Arabian Sub-Continent.

Yemen's key geographic position, which has represented the point of contact between the Horn of Africa and Arabia, and the fact that one part of this area was characterized by a high degree of geographic isolation, due to the peculiar combination of rugged mountains and desert zones, and on the other was subjected to a constant flow of populations owing to the typical trade system involving the caravan routes ever since the dawn of time, make the study of the biological history of these populations extremely interesting.

Yemen is geographically isolated from the rest of the Arabian Peninsula by the Rub' al-Khālī desert to the North and East, while it is surrounded by the Red Sea to the West and South. Trade with Africa has been attested ever since very ancient times, and this may have produced a gene flow from the area of the Horn of Africa over a very long period of time. There is also historical evidence of invasions in various periods by Caucasian populations from the northern areas.

Owing to the geographic and cultural isolation of the last two centuries, very little research has been carried out on human skeletal material from Yemen. The little work actually done comprises the study of 20 skeletons (England 1940), 14 skeletons (Morant 1944) and a single skeleton (Toplyn 1988). Conversely, some research has been carried out on the genetic variability and the dental anthropology of living populations (Lehmann et al. 1963; Maranjian et al. 1966; Rosenzweig & Zilberman 1967; Marengo-Rowe, Beale & Lehamnn 1968, Marengo-Rowe et al. 1968, 1974; Godber et al. 1973; Koyoumdjisky-Kaye et al. 1976; Tills et al. 1977).

Materials

The present work refers to the skeletal and dental remains from 6 tombs at Al-Makhdarah (MKDii/T13, T15; MKDiii/T4, T5, T9, T44), from 1 tomb at Al-Manqaz (MNQ/T1) and 2 tombs at Kharibat al-Ahjur (KAHi/T1, T2).

The turret tombs excavated at Al-Makhdarah and Al-Manqaz, all of which may be dated to some time during the 1st millennium B.C., are characterized by multiple burials, almost all of which were violated in ancient times. The more recent skeletons were laid in the centre, while the earlier ones were disarticulated and had been placed along the walls to make room for the new inhumations. For those of Al-Makhdarah, except for MKDii/T13, which contained the remains of at least 15 individuals, the tombs are characterized by a number of burials varying from a minimum of 2 (MKDiii/T5) to a maximum of 7 (MKDiii/T9). At least 8 individuals come from the only turret in Al-Manqaz (MNQ/T1).

Of the two large hypogean tombs of Kharibat al-Ahjur, KAHi/T1, which had been violated also in recent times, did not contain any bone remains. From the upper level of KAHi/T2 come bone remains of at least 22 individuals, 10 adults, an adolescent and 11 children, including a foetus. The 6 pit-graves dug out of the floor of the hypogean chamber each contained a single individual (except for the first two in which more than one individual had been buried).

The following is an inventory of the remains found in each individual necropolis. For each individual tomb and each individual level it was possible to identify primary burials that have generally been indicated with the early letters of the alphabet, with later letters being given to the further individuals that it was possible to identify in the mixed material at that level. For further levels a fresh start was made from the letter 'A'. The mixed material was first divided into adults and sub-adults and the

inventory was detailed only for the adults. Identification was generally carried out using the skull, wherever possible complete with lower jaw, and performing a cross check with the data obtained from hip bones and femurs. For each individual it is indicated whether it is a primary burial or whether the indication of individuals refers to an entire skeleton.

Necropolis of MNQ

Only one grave (tomb MNQ/T1) on two levels.
Level 1 contains:
- Individual A - Skull with lower jaw, male aged 18-22 years.
- Individual B - Skull, 7-14 years old.
- Individual C - Skull and lower jaw preserved, together with bones of right and left hip, probably female aged 20-25 years.
- Individual D - Skull with jaw, female, aged 20-30 years.
- Individual E - Individual, fragmentary, with skull, vertebrae, ribs and hand and foot joints, 3- 6 years of age.
- Individual F - Individual, fragmentary, with lower jaw, breastbone, left femur, fragments of diaphysis (humerus, radius, tibia, fibula), fragments of hip and feet bones, male, aged 17-19 years. Also present are mixed adult bones, as in the annexed table, showing that the 'minimum number' of adults is 6 as there are 6 right astragals and 6 left calcanei; considering that the fusion of the tuberosity can occur also around the age of 16 and taking into consideration also individuals A and F, two further individuals must be counted, one of which male, as 3 male femurs are present.

Level 2 contains:
- Individual A - Almost complete skeleton, probably of female sex, aged 41-45 years.
- Individual B - Skeleton in good state of preservation, 3-6 months old.

Necropolis of MKD

Tomb 4 (MKDiii/T4)

Tomb 4 contains two fragmentary adult individuals and one small child. Also mixed bones belonging to adults A and B are present.
- Individual A - Individual with preserved skull and jaw, humeri and right hip bone, male aged 35-45 years.
- Individual B - Individual with preserved jaw bone, humeri, left hip bone, probably female sex aged 20-30 years.
- Individual C - Individual in poor state of preservation, of which a portion of ulna diaphysis, fragments of long bone diaphyses and fragments of vertebrae and ribs have been preserved, aged 6-12 months.

The tomb also contains mixed adult bones, as shown in the annexed record, which confirm that the 'minimum number' of adults is 2.

Tomb 5 (MKDiii/T5)

Tomb 5 contains only two fragmentary adult individuals; mixed bones belonging to the two individuals are present.
- Individual A - Individual in good state of preservation but fragmentary, of which there remain the left upper jaw, the left collarbone, the left shoulder blade, the left hip bone, vertebrae and bones of the foot, male sex aged 30-50 years.
- Individual B - Individual in good state of preservation but fragmentary, of which only the teeth, the right kneecap and bones of the hand and foot remain, perhaps female, aged 30-40 years.

The tomb also contains mixed bones, as shown in the annexed table, that confirm that the 'minimum number' of adults is 2.

Tomb 9 (MKDiii/T9)

Tomb 9 consists of two levels:
Level 1 contains two individuals (A and B); three other individuals (C, D and E) were represented mainly by spinal columns with hip bones and ribs. To these further three individuals, all females, belonged three jawbones and several cranial and post-cranial bones; on the basis of age, the three jawbones were attributed to individuals C, D and E, and the summary table of mixed bones refers exclusively to these individuals.
- Individual A - Male adult individual in very poor state of preservation and highly fragmentary, of which there remain the proximal epiphysis of the right humerus, the right ulna, the right femur and the diaphysary portion of a tibia.
- Individual B - Individual in good state of preservation but very fragmentary, of which portions of the skull, jawbone, right shoulder blade, left humerus, right radius and ulna, left tibia and several cervical vertebrae remain, aged 2-3 years.
- Individual C - Highly fragmentary individual, of which two hip bones, a portion of the spinal column and several ribs remain, and to which also a jawbone has been attributed, female, aged 50-60 years.
- Individual D - Highly fragmentary individual, of which the left hip bone, the sacrum, portions of the spinal column and several ribs have been preserved, and to which a jawbone has been attributed, female, aged 40-50 years.
- Individual E - Highly fragmentary individual, of which the right hip bone, the sacrum, portions of the spinal column and several rib have been preserved, and to which also a jawbone has been attributed, female, aged 40-50 years.

The tomb also contains mixed adult bones referable to individuals C, D and E, as in the annexed table, which confirm that the 'minimum number' of adults is 4.

Level 2 contains:
- Individual A - Individual in a good state of preservation of which the fragmentary skull with left hemi-mandible, two collar bones, complete sternum, right humerus, left radius, a portion of femoral diaphysis, the two tibias, the left kneecap, several vertebrae and ribs, a third metacarpal, the two astragals and various metatarsals have been preserved, indeterminable sex, aged 16-19 years.
- Individual B - Individual in good state of preservation, of which the fragmentary skull, the collarbone and right shoulder blade, the two radii, the left ulna, a portion of femoral diaphysis, the two tibias, a fragmented diaphysis of a fibula, portions of sacrum and pelvis, several ribs, bones of the hand and foot have been preserved, perhaps female, aged more than 30 years.

Tomb 13 (MKDii/T13)

Tomb 13 contains 15 individuals among which individuals A, B and C are complete adults, while D to J were determined on the basis of the skulls, sometimes with jawbone, found in the mixed material. The individuals N and O are complete sub-adults.
- Individual A - Individual in good state of preservation of which the skull and jawbone, collarbones, shoulder blades, complete sternum, humeri, left radius and ulna, the femurs, the right tibia, the left kneecap, the pelvis, the almost complete spinal column, several ribs, several bones of the hand and foot have been preserved, male, aged 30-35 years.
- Individual B - Individual in good state of preservation of which the skull and jawbone, collarbones, shoulder blades, body of the sternum, humeri, radii, ulnas, femurs, left hip bone, almost complete spinal column, several ribs, several bones of the hand and foot, have been preserved, female, aged 20-26 years.
- Individual C - Individual in good state of preservation, by fragmentary, of which the skull with jawbone, the collarbones, the manubrium of the sternum, complete pelvis, several vertebrae and ribs, the two calcanei, the right scaphoid and the left third cuneiform have been preserved, adult male, aged over 50 years.
- Individual D - Skull with jawbone, probably male, aged 30-35 years.
- Individual E - Skull, probably male aged 40-50 years.
- Individual F - Skull with jawbone, male, aged 40-45 years.
- Individual G - Skull with jawbone, probably female, aged 30-35 years.
- Individual H - Skull with jawbone, female, aged 35-40 years.
- Individual I - Skull with jawbone, male, aged 45-55 years.
- Individual J - Skull with jawbone, male, aged 40-50 years.
- Individual K - Skull, probably female, adult aged over 40 years.
- Individual L - Skull with jawbone, male, aged 45-55 years.
- Individual M - Skull, probably male, adult aged over 50 years.
- Individual N - Individual in good state of preservation, of which the skull with jawbone, the collarbones, the shoulder blades, the manubrium of the sternum, the humeri, the left radius and ulna, incomplete femurs, the right fibula, the right kneecap, the complete pelvis, almost complete spinal column, several ribs, the two calcanei and fragments of bones of the hand and the foot have been preserved, aged 14-16 years.
- Individual O - Individual in good state of preservation, of which the skull with jawbone, the right collarbone, the shoulder blades, the complete sternum, the right humerus and radius, the femurs, the tibias, the fibulas, the incomplete pelvis, portions of the spinal column, the two calcanei, the first, second and third right metatarsals have been preserved, indeterminable sex, aged 17-20 years.

Also present are mixed adult bones, as in the annexed table. Also presented is a table summarizing all the bones present, both in complete individuals (A, B, C, N and O), of the skulls attributed to other individuals (D-M), and of the mixed bones. These data confirm that the 'minimum number' of individuals present is 15, as this is the maximum number present in the individual skull bones, in the first cervical vertebra and in the right collarbones. For the thirteen adult individuals, verification of the mixed material substantially confirmed the sex determination data referring to skulls alone, on the basis of which four female and nine male individuals were identified. Indeed, only three pelvises were sexualized in the female sense and five in the male sense. Among the left humeri four are female, one of which is doubtful, while only two have been identified as male, one of which is doubtful. Among the right humeri, four have been identified as female, two of which doubtful, and six as male, of which three are doubtful. Of the left femurs only two are female, while there are seven males, one of which doubtful, and among the right femurs, two are female and eight male, of which one is doubtful.

Tomb 15 (MKDii/T15)

Tomb 15 contains four adults identified by means of the hip bones, if possible connected also to the respective sacrum, and two sub-adults.
- Individual A - Individual comprising the left hip bone and sacrum, male, aged 30-35 years.
- Individual B - Individual comprising the left hip bone, male, aged 35-40 years.
- Individual C - Individual comprising left hip bone, male, aged over 25 years.
- Individual D - Individual comprising very fragmentary hip bones and first three sacral vertebrae, probably male, aged over 20 years.

- Individual E - Highly fragmentary individual, of which only a few sacral and lumbar vertebrae and several ribs remain, indeterminable sex, aged 14-18 years.
- Individual F - Highly fragmentary individual, of which only a portion of the right frontal, the right shoulder blade, the left femur, a portion of tibial diaphysis, several sacral vertebrae, a portion of ischium, three ribs and the right fifth metatarsal have been preserved, aged 3-4 years.

Also present are mixed adult bones referable to individuals A, B, C and D, as shown in the annexed table, which confirm that the 'minimum number' of adults is 4, as is shown by the presence of 4 sternum manubria and four right first metatarsals.

Tomb 44 (MKDiii/T44)

Tomb 44 contains four highly fragmentary adult individuals and one sub-adult; also present are mixed adult bones belonging to individuals A, B, C and D.

- Individual A - Fragmentary individual of which portions of the skull with the jawbone, the left humerus and tibia have been preserved, probably female, aged 30-35 years.
- Individual B - Fragmentary individual of which the right temporal, the right humerus a portion of diaphysis of a fibula, a thoracic vertebra, have been preserved, perhaps male, aged 20-24 years.
- Individual C - Very fragmentary individual of which a portion of parietal, the jawbone, the left collarbone, several vertebrae and ribs have been preserved, perhaps male, aged 30-40 years.
- Individual D - Highly fragmentary individual of which a portion of right upper jawbone, a portion of humeral diaphysis, a kneecap have been preserved, sex indeterminable, aged 20-24 years.
- Individual E - Highly fragmentary individual of which a portion of tibial diaphysis and two thoracic vertebrae have been preserved, aged 10-15 years.

Also present are mixed adult bones referable to individuals A, B, C and D, as in the annexed table, from which it may be inferred that the 'minimum number' of adults is no greater than the four previously determined as the most frequently represented segment is the right humerus, which totals 3.

Necropolis of KAH

Two tombs were excavated, T1 and T2.

Tomb 1 (KAHi/T1)

Tomb 1 contains two fragmentary adult individuals and two small children, identified solely by means of the teeth; also present is a small number of mixed bones belonging to the adult individuals A and B.

- Individual A - Highly fragmentary individual of which only the skull with jawbone and the left femur and tibia have been preserved, probably male, aged 20-30 years.
- Individual B - Highly fragmentary individual of which only the skull with jawbone and the two humeri have been preserved, female, aged 25-35 years.
- Individual C - Individual identified only by means of the teeth, aged 7-8 years.
- Individual D - Individual identified only by means of the teeth, aged 3-4 years.

Also present is a small number of mixed adult bones referable to individuals A and B, as shown in the annexed table, from which it may be inferred that the 'minimum number' of adults is not greater than the two already determined.

Tomb 2 (KAHi/T2)

Three levels have been identified in Tomb 2. Levels 1 and 2 yielded no remains, while abundant mixed skeletal material was found in level 3. Below level 3 seven graves were found, the first and second of which yielded several remains, while the others displays single burials (cf. S. Antonini's report in this volume).

Level 3

In level 3 ten adults were identified (Individuals A-J) by means of their skulls. The sub-adults included two complete skeletons (Individuals K and L), the scattered bones of a foetus (Individual M), a further three little children (Individuals N, O and P) aged only a few months, identified by the presence of three left femurs, the scattered bones of a youngish individual (Individual Q), and a further 5 young children aged 3 to 7 years, identified mainly on the basis of their teeth.

- Individual A - Skull, left part missing, with jawbone, female, aged 20-30 years.
- Individual B - Skull, right part fragmentary, with left hemi-jawbone, female, aged 20-30 years.
- Individual C - Skull, right part fragmentary, with right hemi-jawbone, female, adult aged over 40 years.
- Individual D - Skull with jawbone, male, aged 30-40 years.
- Individual E - Skull with jawbone, male, aged 30-40 years.
- Individual F - Skull with jawbone, female, aged 30-45 years.
- Individual G - Skull with jawbone, male, aged 30-40 years.
- Individual H - Highly fragmentary skull with jawbone, probably male, aged 30-35 years.
- Individual I - Fragments of skull, perhaps male, aged 45-55 years.
- Individual J - Fragments of skull, perhaps female, aged 20-30 years.
- Individual K - Individual of which the skull with jawbone, the left collarbone, the left humerus, the left radius, the left ulna, the two femurs, the two tibias, the two fibulas, the hip bones, the cervical and thoracic vertebrae, all the ribs, the five left metacarpals and several joints of the hand, have been preserved, aged 3-6 months.

- Individual L - Individual of which the skull with jawbone, the collarbones, the humeri, the right radius and ulna, the two femurs, the two tibias, the two fibulas, the left hip bone, several cervical and thoracic vertebrae, practically all the ribs have been preserved, a newborn.
- Individual M - Highly fragmentary individual of which a portion of parietal, the left hemi-jawbone, the right humerus and a fragment of tibia have been preserved, 5-7 month-old foetus.
- Individuals N/O/P - Mixed skeletal material of newborns, as shown in the annexed table, in which, on the basis of the measures of the long bones and the presences, three individuals have been identified, aged respectively 0 months, 3-6 months and 0-3 months.
- Individual Q - Individual of which the jawbone, the two shoulder blades, the humeri, the radii, the ulnas, the femurs, the tibias, a portion of diaphysis of fibula, the two hip bones, the left calcaneus, the left first four metatarsals have been preserved, aged 14-16 years.
- Individual R - Skull with jawbone, aged 5-6 years.
- Individual S - Skull, aged 6-7 years.
- Individual T - Jawbone, aged 5-6 years.
- Individual U - Skull, aged 2-3 years.
- Individual V - Teeth belonging to an individual aged 3-4 years.

Also present are mixed adult bones referable to ten adult individuals, as shown in the annexed table, from which it may be inferred that the 'minimum number' of adults is no greater than this number as the more representative segments are the left femur and the right tibia is 10.

Grave 1+7

In Grave 7 a complete adult individual was identified (Individual A); in grave 1 a further three adults were identified on the basis of the skull; lastly also a sub-adult in fragmentary conditions was present.

- Individual A - Complete individual, lacking only a few bones of the carpus, metacarpus, tarsus, several joints of the hand and all those of the foot, female, aged 40-45 years.
- Individual B - Jawbone, probably female, aged 30-35 years.
- Individual C - Fragmentary individual, of which the skull, portions of the diaphysis of the humerus, of the radius and the fibula, several thoracic vertebrae, the left kneecap and the right astragal have been preserved, aged 8-10 years.
- Individual D - Skull, female, aged 24-30 years.
- Individual E - Fragmentary skull with jawbone, probably female, and of adult age over 50 years.

Also present are mixed adult bones referable to adult individuals B, D and E, and as shown in the annexed table, from which it may be inferred that the 'minimum number' of adults is 5 as the most frequent number of representations is the right astragal, 5 in number.

Grave 2

In Grave 2 three adult individuals were identified (Individuals A, B and C) and a small child (Individual D) in fragmentary conditions.

- Individual A - Individual in good state of preservation except for the skull, of which the left temporal and a portion of jawbone have been preserved; also present is the right collarbone, the two shoulder blades, the sternum, all the bones of the upper and lower limb, fragmentary hip bones, the sacrum, a practically intact spinal column, the kneecaps, several ribs, the left scaphoid, the left large bone, the right unciform, several metacarpal bones, all the tarsal bones except the right second cuneiforms, all the metatarsal bones, male, aged 43-49 years.
- Individual B - Individual in reasonably good state of preservation, except for the fragmentary skull with jawbone; also present are the left collarbone, the two shoulder blades, all the bones of the upper and lower limb, complete pelvis, portions of spinal column, one kneecap, several ribs, bones of the tarsus except for the second and third right cuneiforms, bones of the metatarsus except for the right fourth metatarsal, one proximal phalanx of the hand and several phalanxes of the foot, female, aged 40-55 years.
- Individual C - Individual in fragmentary state of preservation, of which the skull with jawbone, the collarbones, the right shoulder blade, the two humeri, the right radius, the left ulna, the two femurs, the right hip bone and the second cervical vertebra have been preserved, female, aged 20-24 years.
- Individual D - Individual in a fragmentary state of preservation, of which a portion of shoulder blade, the left humerus, the right radius, a portion of diaphysis of an ulna, the two femurs, the two hip bones, portions of the spinal column, several ribs and several metatarsal bones have been preserved, aged 4-5 years.

Grave 3

Grave 3 contains a single burial consisting of

- an almost complete individual lacking only the two collarbones, the right kneecap, the carpal bones, except for the right semi-lunar bone, the second and third cuneiforms, as well as several phalanxes of the hand and foot. The individual is a female aged 60-65 years.

Grave 4

Grave 4 contains a single burial consisting of

- an almost complete individual lacking only the body of the sternum, the two kneecaps, the carpal bones, the left calcaneum, the scaphoids, the right cuneiform, the second cuneiforms, the right third cuneiform, as well as several phalanxes of the hand and all those of the foot, except for one. The individual is a female aged 7-8 years.

Grave 5

Grave 5 contains a single burial consisting of

- an almost complete individual lacking only the right kneecap, the pyramidals, the pisiforms, the trapezia, the trapezoids, as well as several phalanxes of the hand and foot. The individual is a male aged 42-47 years.

Grave 6

Grave 6 contains a single burial consisting of

- an almost complete individual lacking only the left scaphoid, the right semilunar, the pyramidals, the pisiforms, the trapezia, the trapezoids, the left second and third cuneiforms, as well as several phalanxes of the hand and foot. The individual is a female aged 55-65 years.

Methods

Since in all three necropolises, except for a few primary burials, most of the material came from secondary burials, the first action was to determine the minimum number of individuals. In practically all cases, the most representative skeletal element was the skull, which allowed the sex and age at death to be determined with good approximation. This was backed up by determinations on the hip bones and femurs.

The determination of the sex of adult individuals was performed according to the indications of Acsádi & Nemeskéri (1970) and extended by Ferembach et al. (1977-79). Wherever possible the coefficient of sexualization 'M' was computed for the skeleton. This coefficient represents the quotient of the sum of the products of the value of each morphological character by the degree of importance and of the sum of these degrees. The morphological features used in the computation were those of the neurocranium, the splanchnocranium, the jawbones and the hip bone.

The age of death of adult individuals was performed by the 'combined method' which takes 4 characters into account: degree of synostosis of the endocranial sutures, surveying of the symphysary surfaces, degree of trabecular reabsorption of the *caput humeri* and *caput femori* (Nemeskéri et al. 1960; Acsádi & Nemeskéri 1970; Ferembach et al. 1977-79). In the latter investigation radiographic methods were used as described by Acsádi and Nemeskéri (1970). Moreover, wherever possible, a comparison was made between the data obtained using the above methods and the analysis of the degree of wear of molar teeth according to Miles (1963a, 1963b), taking into account also Lovejoy's method (1985).

Assignment of age at death of sub-adult and young individuals was performed by studying the stage of development of the synostoses between the epiphyses and the diaphyses of the long bones (Ferembach et al. 1977-79). Furthermore, consideration was given to the degree of eruption of permanent teeth according to Wheeler's chronological tables (1977).

Determination of the age at death of the children was performed by analysis of deciduous and mixed dentition (Wheeler 1977) and by using the standards developed by Stloukal and Hanakova (1978) regarding the mean length of the long bones.

The method of Acsádi and Nemeskéri (1970) was used for the construction of mortality tables.

The morphometric variables of the cranial and postcranial skeleton, expressed in millimetres, were measured in accordance with Martin and Saller (1957), to whom reference is made also for the morphological classes of the indices listed in the text. In order to gauge variability within the population and compared with other populations in the same area, the (F) ANOVA test was applied.

An analysis was also made of the non-metrical features of the cranial and post-cranial skeleton according to the indications of Berry and Berry (1967) and Finnegan (1978), respectively. The chi-square test was applied in order to evaluate the significance of the differences in the frequency of the characters, applying Yates' correction. In the case of samples with a number of cases of less than 5, Fisher's exact method was used.

The metric variables referring to dentition (M-D mesio-distal diameter and B-L buccal-lingual diameter) were measured by Goose's (1963) technique involving the use of a Vernier calliper with an approximation of 0,1 mm as the precision of repeated measures on teeth does not seem to exceed this threshold (Brace & Mahler 1971; Goose 1963). In agreement with Calcagno (1986) whenever the dimensions of both the right side and the left side were taken, the mean value was computed in order to obtain a single value for each character. Teeth affected by 3rd and 4th degree caries and all those showing pronounced wear were excluded from the sample (Goose 1963).

The morphological variants used in the present investigation were analysed using dental plates and following the ASU (Arizona State University) system detection procedures described in Turner et al. (1991). More specifically, the following morphological variants were used: I1 and I2 shovel-shaped maxillary incisors (Hrdlickâ 1920); tubercle of canines and incisors (Nichol & Turner 1986); Carabelli's cusp, morphology of Hypocone (cusp 4) of maxillary molars (Dahlberg 1963; Larson 1978); presence of Metaconule (cusp 5) on the maxillary molars (Harris 1977; Harris & Bailit 1980); presence of Parastyle on maxillary molars (Bolk 1916); variations of lingual cuspid of the mandibular premolars (Scott 1973); Cusp number of the mandibular molars (Gregory 1916; Turner 1967); Groove pattern of the mandibular molars (Jorgensen 1955); presence of Protostylid on the lingual surface of the mandibular molars (Dahlberg 1956); presence of Cusp 7 on the mandibular molars (Turner 1970).

Except for the number of maxillary molar cusps, where Dahlberg's (1963) classification was followed, the non metrical characters were considered as dichotomous variants (Palomino et al. 1977).

Incisor shovel-shape presence was assigned if the ASU system returned a value of at least 3 (Turner et al. 1991); for the Dental Tubercle the presence was assigned for any corrugation of the labial surface, with values of at least 1; for Hypocone the value of 4 takes in the values of 4 and 5 of the ASU system, the value 4- takes in the values of 3.5 and 3 in the ASU system, the value 3+ corresponds to the value of 2 in the ASU system, the value 3 corresponds to the values of 0 and 1 in the ASU system; for Carabelli's cusp the presence was assigned if a value of at least 2 on the ASU was returned; for the Metaconule and the Parastyle the presence was assigned for a value of 1 and above on the ASU scale, while the value of 3 was assigned for values of from 3 to 9 in the ASU system; the Cusp Number of the mandibular molars is 4 for a value of 4 in the ASU system and of >4 for the values of 5 and 6 in the ASU system; for the model of the grooves the '+' and 'x' values in the ASU system are combined in the value of '+'; for the Protostylid and the Cusp 7 the presence was assigned for a value of 1 or more in the ASU system.

Agenesia was observed only for the third molars, both maxillary and mandibular. In agreement with Turner et al. (1991) only individuals aged over 17-20 years were taken into consideration, without using radiographic techniques.

As already pointed out by Calcagno (1986), as a result of teeth loss *intra vitam* and *post mortem*, of dental attrition and the chipping of several teeth, it was a rare occurrence to have a complete and fully measurable dentition. For this reason it was impossible to use multivariate statistical analysis to analyse the metrical data. Analysis of variance (ANOVA) was thus used to evaluate the significance of differences among the various groups examined.

Differences in frequencies of non metrical characters of dentition were chi-square tested, with correction for continuity; in the case of absolute frequencies less than or equal to 5 Fisher's exact method was applied.

Dental decay was evaluated according to Metress and Conway (1975) and Marafon (1979). Dental pathologies were classified according to Brothwell (1963a, 1963b).

Results and Discussion

Table 1 shows the data relevant to the determination of sex and age at death of all the individuals identified. In the case of sex determination the indices of sexualization are also listed in Table 2.

In view of the small numerosity of the MNQ sample, as well as in consideration of the fact that this necropolis belonged to the same cultural horizon as MKD, the data referring to the two necropolises were combined and have been reported under the single denomination of MKD. Tables 3-8 give the descriptive statistics for the cranial and post-cranial measures for MKD (Tables 3, 4 and 5) and KAH (Tables 6, 7 and 8), respectively.

Table 9 shows the values of F and the significance of comparisons among the skeletal measures of MKD and KAH. Because of the low numerosity of the samples, the bilateral measures were combined. The comparisons were performed among all those measures that had at least 5 observations. For the skull only 9 comparisons could be made as far as the female subsample was concerned and 5 for the male subsample. Six comparisons were found to be statistically significant, of which 4 had a significance of less than 5% (nose width, mandible length at the mental foramina in the female subsample and mandible thickness at the mental foramina in both subsamples) and only two (minimum ramus breadth in the female subsample and height of the mandibular body at the mental foramina in the male subsample) less than 1%.

For the arm some 33 comparisons were made, 18 of which for the female subsample and 15 for the male. Of these, 4 were found to be statistically significant, the physiological length of the radius and the transverse diameter of the ulna in the female subsample (95%), the anterior-posterior (sagittal) diameter at midshaft of the radius and the upper transverse diameter of the male ulna (99%).

For the leg, 50 comparisons were made, 25 of which for the female subsample and 25 for the male. Of these 13 displayed statistically significant differences, 6 had a significance of less than 5% and the other 7 less than 1%. The female subsample afforded a larger number of comparisons (9) with statistically significant differences with respect to the male one (4). For the female subsample 4 had a significance of less than 5% (maximum and physiological trochanteric length; transversal head diameter and maximum proximal nepiphyseal breadth) and 3 had a significance of less than 1% (maximum and physiological length of femur; total length, maximum length, medial length of tibia), which are always found to be greater in the MKD group. Also the male subsample of MKD displays femur and tibia lengths that are always greater than those for KAH, although the differences are not so pronounced as to be statistically significant, while 2 of the 4 measures had a statistical significance of 95% (anterior-posterior, sagittal, diameter at midshaft and maximum diameter at the nutrient foramen of the tibia) and 2 have a significance of 1% (anterior-posterior, sagittal, diameter at midshaft and epicondylar breadth of the femur).

Tables 10 and 11 show the percentage and absolute frequencies and the statistical comparisons of the non metrical characters examined for the cranium and post-cranium, respectively. For the cranium four characters were found to be absent in both populations (the Ossicle at Bregma, the Asterionic Bone, the Auditory Torus and the Mandibular Torus). Of the other seven characters examined, only one, the Lambdoid Ossicles, displays a 95% statistically significant difference in the two populations. More specifically, the Highest Nuchal Line displays a high frequency (50-60%) as well as the Ossicle at Lambda (30-40%), the Lambdoid Ossicles display a high frequency only in the MKD group (60%), while the

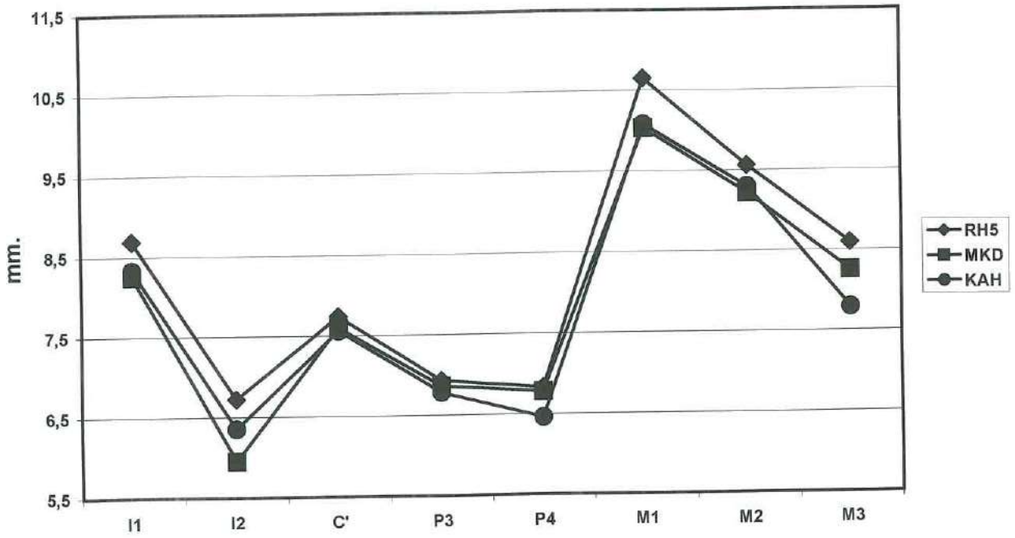


Fig. 66. Necropolis of RH5, MKD and KAH: dental metric traits, maxillary M-D diameters.

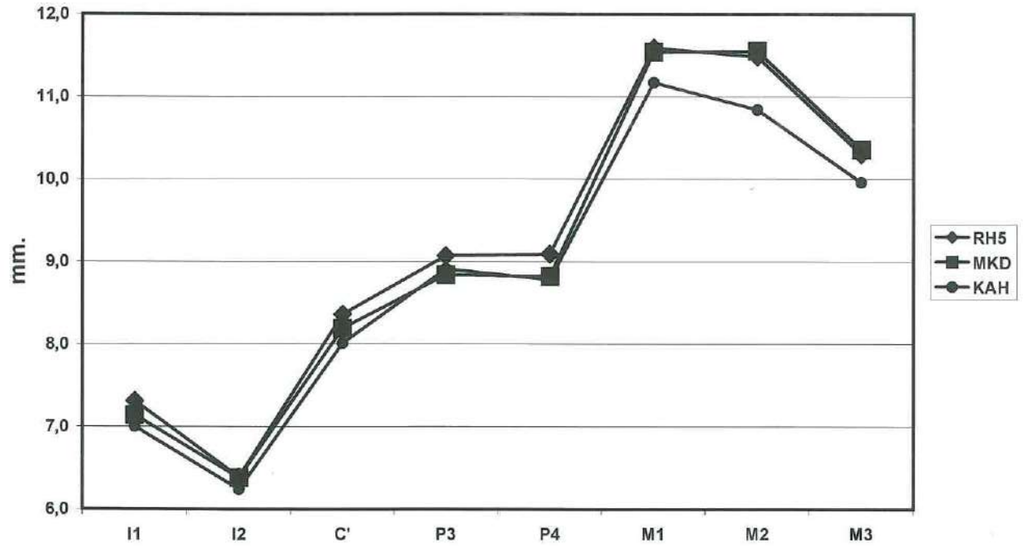


Fig. 67. Necropolis of RH5, MKD and KAH: dental metric traits, maxillary B-L diameters.

Metopic Suture displays a higher frequency in the KAH group (28.6%); the Coronal Ossicles, the Palatine Torus and the Maxillary Torus are present only in MKD with a frequency of about 10%.

For the post-cranium three characters were found to be absent in both populations (Allen's Fossa, the Supracondyloid Process and the Anterior Calcaneal Facet Absent) while in the other 12 characters examined two display 95% statistically significant differences, the Femoral Plaque and Vastus Notch. More generally in both populations there is observed to be a low frequency of the Hypotrochanteric Fossa and of the Third Trochanter (frequencies of less than 8%), while the Femoral Plaque and Poirier's Facet display greater frequencies in MKD, the Exostosis in Trochanteric Fossa is attested in both groups at around 20%; Medial Tibial Squatting Facet is absent in practice, while the Lateral Tibial Squatting Facet one displays a frequency of between 60-70%; the Septal Aperture is present in about 15-25% of the sample; Inferior Talar Articular Surface and the Anterior Calcaneal Facet Double are well represented (30-50%); Vastus Notch is present in 90% of KAH and in 45% of MKD and also the Scapular Notch displays a high frequency in both groups (80%).

Tables 12 and 13 list the descriptive statistics, grouped by sex, of the teeth measures for MKD and KAH, respectively, while Table 14 sets out F values and the significance of the comparisons between MKD and KAH values. These comparisons were possible for the B-L diameters of all teeth, while in the case of M-D the low numerosity of the MKD sample prevented comparison between the anterior maxillary dentition and the I1 mandibular teeth. Of the 28 comparisons carried out, 7 were found to be statistically significant, 4 at 95% and 3 at 99%, and all, except the one referring to the M-D diameter of the M3 maxillary teeth, refer to the B-L diameters of the posterior mandibular dentition and of the M2 maxillary teeth. The differences are due to a marked reduction of the posterior dentition in both diameters but more pronounced in the B-L diameter in the KAH group. This proves to be much more evident when Figs. 66 to 69 are observed, where the values of M-D and B-L diameters for the upper and lower dentition are represented. These figures show also the data referring to the necropolis of RH5 (Sultanate of Oman) from the 4th millennium B.C.

It is clear that the curves referring to the M-D diameters, both upper and lower, of MKD and KAH tend to be identical and are found to be considerably below those of RH5, while the B-L diameters, mainly referring to posterior dentition, of MKD, are identical to those of RH5 and are far lower than those of KAH. If we observe the occlusal areas Figs. 70 and 71 it is evident that the MKD curve is intermediate between that of RH5 and that of KAH, revealing a clear trend towards dental reduction from the 4th millennium B.C. and the 2nd century A.D. The comparison performed via ANOVA between the data referring to the RH5 necropolis (Oman) and the two Yemeni necropolises (Tables 28 and 29) shows how the MKD necropolis is characterized by values intermediate between the other two, presenting a number of statistically significant differences with KAH (4 to 95% and 3 to 99%) slightly greater with respect to RH5 (2 to 95% and 3 to 99%). The differences between KAH and RH5 are instead much greater and uniformly distributed between anterior dentition and posterior dentition,

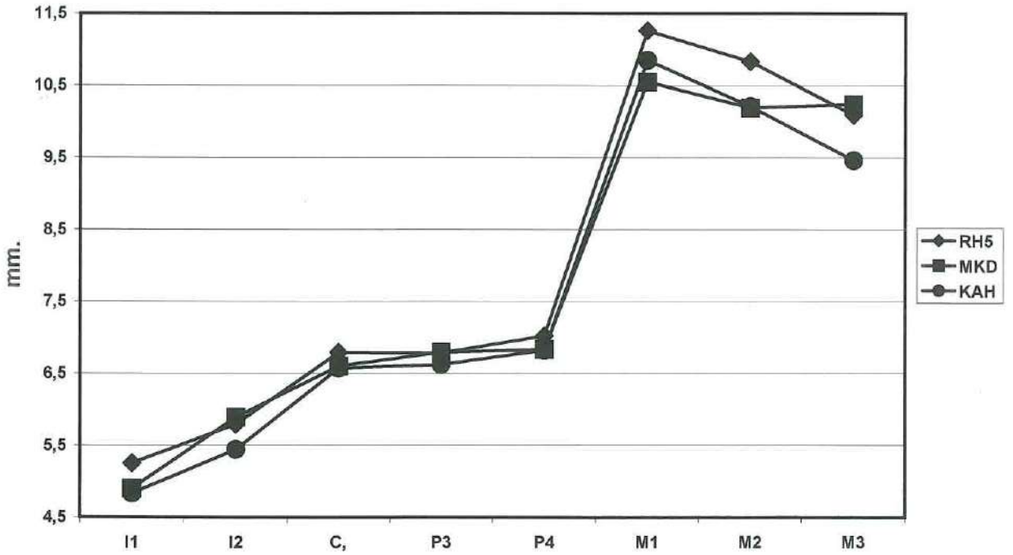


Fig. 68. Necropolis of RH5, MKD and KAH: dental metric traits, mandibular M-D diameters.

between the upper and the latter, between the M-D and the B-L diameters, with 4 characters displaying significance starting from 0.05% and 12 from 0.01%.

Tables 15 and 16 show the percentage and absolute frequencies and statistical comparisons of the non metric characters examined for the upper and lower jaw, respectively. For the upper maxillary only one of the fifteen comparisons carried out showed any difference with a statistical significance of 95%, the Dental Tubercle of Canine. More specifically, the Shovel-shape of the incisors was found to be absent in group MKD and to have a frequency of 8.3% in the group KAH, both central and lateral. The Dental Tubercles are present in the incisors of the group MKD (22.2% in the central and

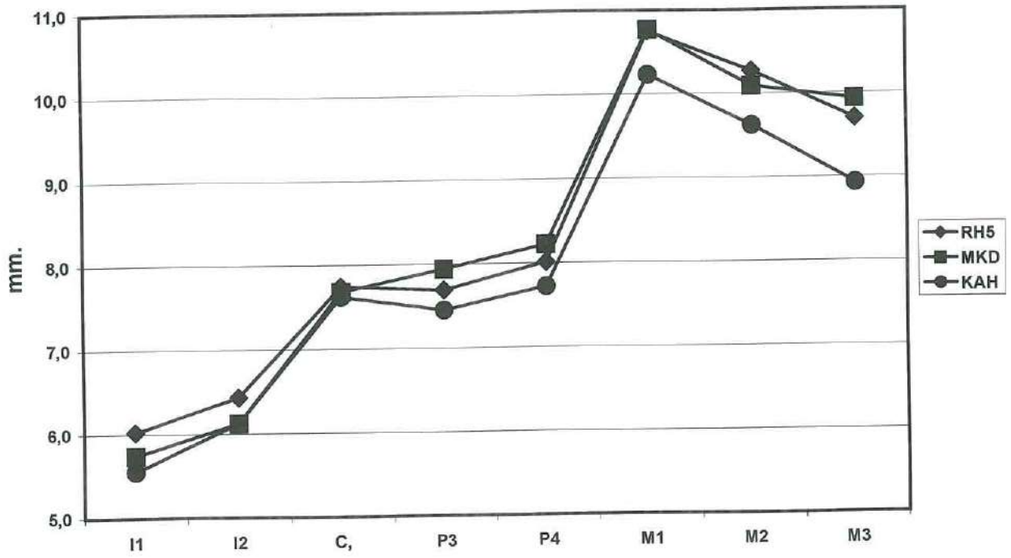


Fig. 69. Necropolis of RH5, MKD and KAH: dental metric traits, mandibular B-L diameters.

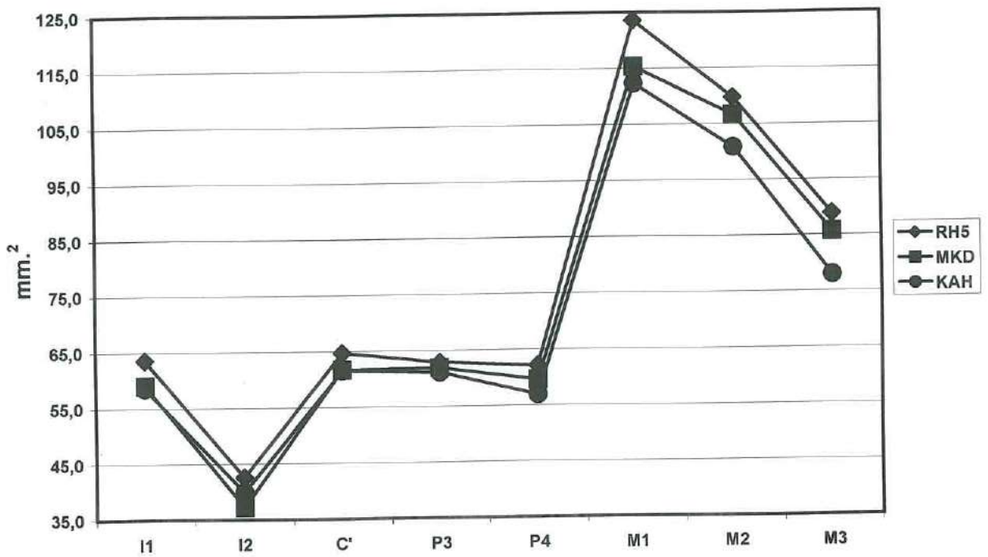


Fig. 70. Necropolis of RH5, MKD and KAH: dental metric traits, maxillary occlusal surface.

16.7% in the lateral) and absent in the canine. In the group KAH they are much more frequent (33.3% in the central incisor, 53.8% in the lateral incisor and 66.7% in the canine). As far as molars are concerned, M1 display no reduction of the Hypocone; the M2 display a reduced type '4' frequency at MKD (about 21%), which is even higher at KAH (6.6%), while type '4-' displays higher frequencies (28.6% at MKD and 46.7% at KAH), type '3+' is poorly represented at MKD (7.7%) and absent at KAH; lastly, the total absence of the Hypocone (type '3') displays very high values in both necropolises (46.7% at MKD and 53.9% at KAH); lastly, in the M3 in both necropolises type '4' is found to be absent, those from MKD display a certain frequency of '4-' (25%), while

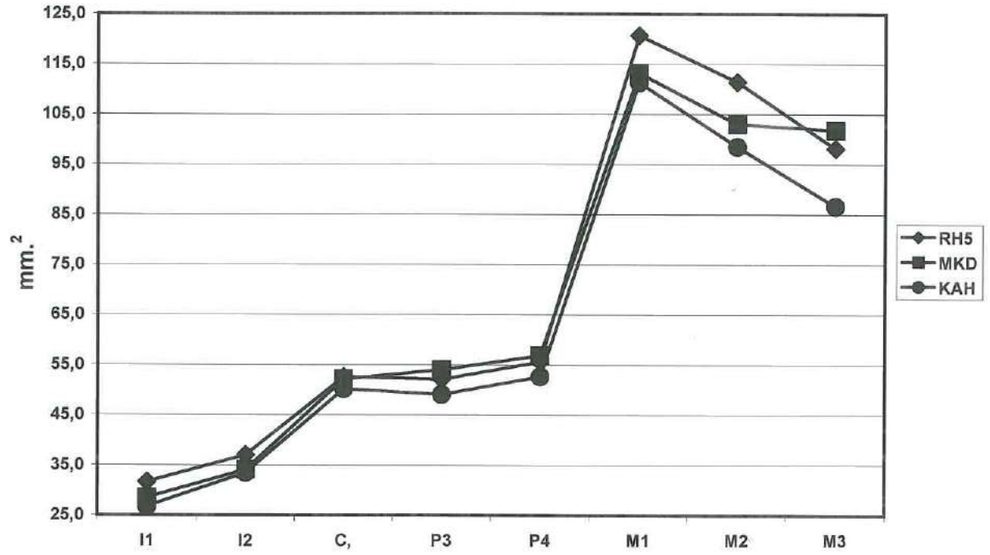


Fig. 71. Necropolis of RH5, MKD and KAH: dental metric traits, mandibular occlusal surface.

those of KAH do not display this type and types 3+ and 3 display relatively higher frequencies at KAH (37.5% compared with 44.5% for type '3+' and 37.5% compared with 55.5% for type '3'. The Carabelli's cusp displays high frequencies in all three molars at MKD (62.5% in M1, 18.7% in M2 and 33.3% in M3), while at KAH only the first molar has such a high frequency of this character (46.2%); indeed in the second molar the character is 5.0% and absent in the third; the low numerosity of the two samples means that such a marked difference is actually not statistically significant. The Metaconule (Cusp 5) is absent on the first molars at MKD and comparatively infrequent at KAH (7.1%); the frequency is much higher on the second molar (20% at MKD and 44.4% at KAH) and remains high on the third (circa 30% in both necropolises). The Parastyle is absent on the M1 of both necropolises, on the second molar of MKD and on the third of KAH; it displays a low frequency on the second at KAH (5.3%) and is instead relatively frequent on the third molars of MKD (23.1%).

For the lower maxillary of the 11 comparisons performed, 95% statistical significance was achieved only for the Cusp Number of M2. More specifically, in the case of the Cusp Number of premolars a double lingual cusp is always found to display very high frequencies, in P3 54.5% at MKD and 41.7% at KAH. In P4 the frequency remains the same for P3 at MKD while it increases substantially at KAH (76.9%). In the molars high frequencies are observed for M1 with more than 4 cusps (70% at MKD and 90.6% at KAH), while M2 with more than 4 cusps are present only at KAH (26.9%) and in the M3 they display the same frequency (about 40%) in both groups. As far as the Groove Pattern is concerned, type 'Y' displays high frequencies in M1 at MKD (71.4%) while at KAH it displays a frequency equal to that of type '+' (50%); in the M2 the 'Y' frequency is 23.5% at MKD and drops to 13.8% at KAH, in M3 the 'Y' type is absent at MKD and displays a 14.3% frequency at KAH. The protostyle is absent on M1 and M2 at MKD, while at KAH it displays a frequency of 27.3% and 10.5%, respectively; in M3 this character displays a high frequency (40%) at MKD and a lower one at KAH (22.2%). The Metaconulide (Cusp 7) is practically absent in both groups; only in one case is it present on a first molar at KAH with a frequency of 3.6%.

Marked differences emerge from a comparison with the data referring to the Omani necropolis of RH5 for MKD, and a little less for KAH. In the comparison with MKD for the 31 characters examined (Table 30 for the upper teeth and Table 31 for the lower ones); eight (25.8%) display statistically significant differences, one with 95% significance, the Tubercles of the cingulum of the lateral incisor, and 7 with 99%, the Tubercles of the cingulum of the canine and the Cusp Number of the second molar, for the upper teeth, the Cusp Number of P3, M1 and M2 and the Groove Pattern in the second and third molar, for the lower teeth. In the comparison with KAH for the 31 characters examined (Table 32 for the upper teeth and Table 33 for the lower ones) those that display statistically significant differences number only 3 (9.7%) all at 99%, the Cusp Number of the second upper molar and the Groove Pattern of the first and second mandibular molar. These differences, although they sometimes do not emerge in the course of statistical analysis owing to the limited range of the Yemeni samples, are principally due to the upper teeth have a

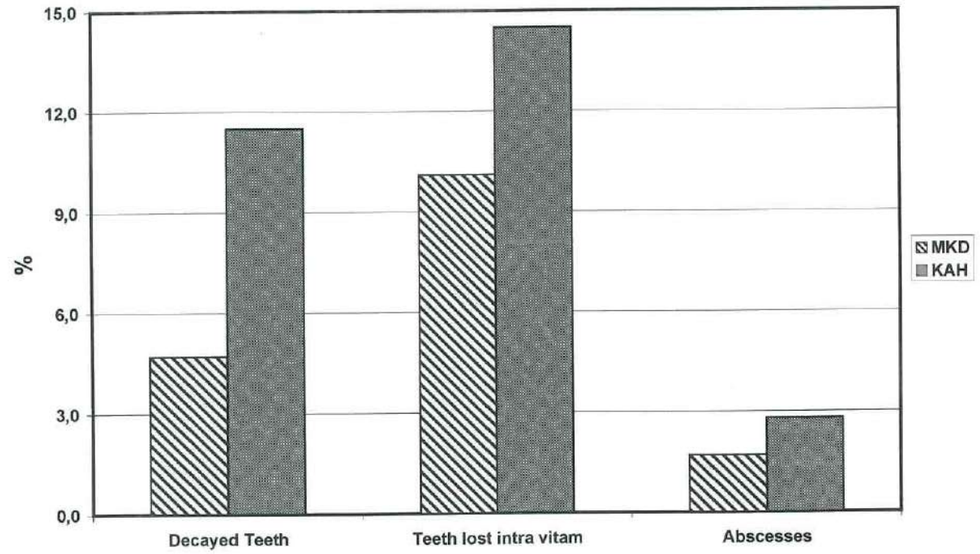


Fig. 72. Necropolis of MKD and KAH: oral pathologies.

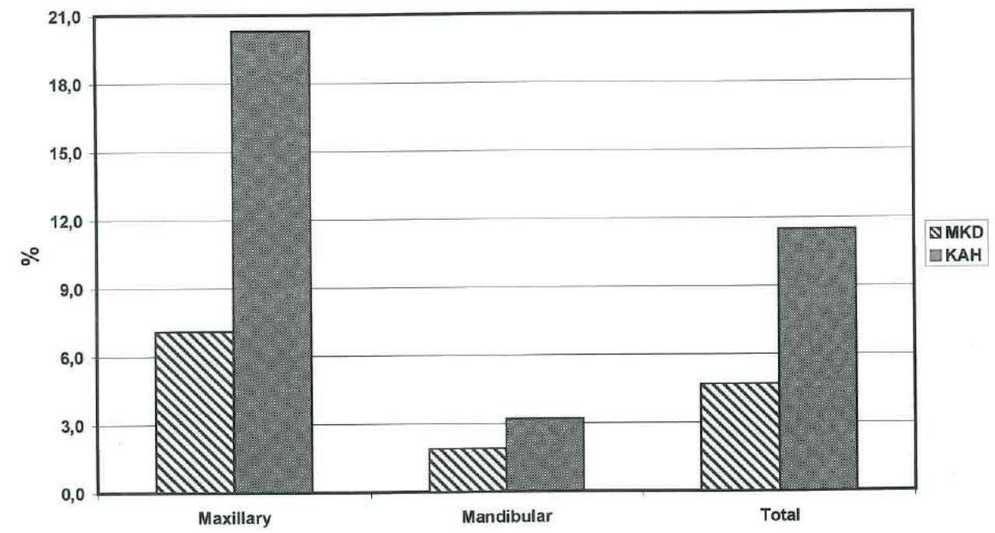


Fig. 73. Necropolis of MKD and KAH: decayed teeth.

higher incidence at RH5, than at MKD and KAH, of the Shovel-shaped of lateral maxillary incisors, the Dental Tubercle of the incisors and canines, of M2 and M3 that display no reduction of the Hypocone, of the Carabelli's cusp on all three molars or of the Metaconule (Cusp 5) on the molars, except for the second in the case of the KAH necropolis. For the lower teeth the differences are instead due to the Cusp Number of the premolars that in P3 display a surplus of the 2 cusp type at RH5 compared with the Yemeni necropolises, while the exact opposite is true for P4, with a higher frequency of all three molars displaying more than 4 cusps, with a greater frequency of the 'Y' type in the Groove Pattern of the three molars, with a greater frequency of the Protostylid in all three

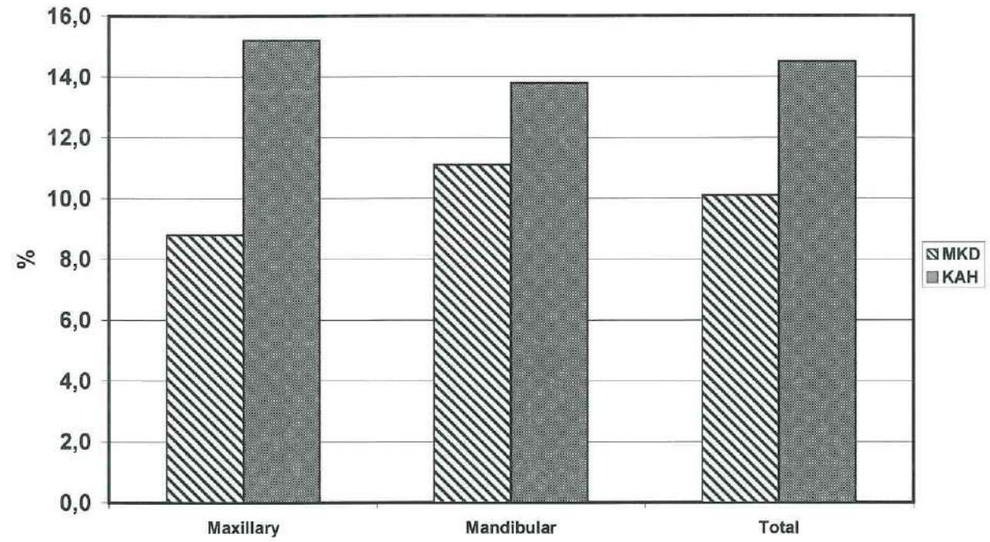


Fig. 74. Necropolis of MKD and KAH: teeth lost intra-vitam (AMTL).

molars with the exception of the first for the necropolis of KAH alone and in the presence of the Metaconulide (Cusp 7) in RH5 alone in all three molars, with the exception of a single case in a first molar at KAH.

Table 17 shows the frequencies of M3 agenesia, broken down by arch and as aggregate values. The KAH group displays much higher frequencies (40-45%) than MKD (5-15%). These differences are statistically significant, 95% for maxillary teeth and 99% for both mandibular teeth and if the two arches are combined.

Tables 18-23 show the frequency of decay damage, teeth lost *intra vitam* and abscesses present in the permanent dentition or visible in the alveoli (Fig. 72), in aggregate form and broken down by arch and by tooth. More specifically, in tables 18 and 19, for the aggregate of all teeth and broken down by separate teeth, respectively, we find the decay frequencies. The frequency of the KAH group (Fig. 73) is more than double (11.5%) that of MKD (4.7%) and the difference proved to be 95% statistically significant when subjected to chi-square testing. In both groups and for both arches the worst affected teeth were found to be the M3s and in any case the worse affected arch is the maxillary arch. For the MKD group only the molars were affected, while in the KAH group, as far as the maxillary dentition is concerned all the teeth have been affected and except for the central incisors (9.1%), the lateral incisors, the canines and premolars are found to be more strongly affected (20-25%) compared with the M1s and M2s (15.8%). In the mandibular teeth only the Cs (11.1%) and M1s (7.1%) are found to be affected. Tables 20 and 21, for aggregated and single teeth, respectively, show the frequency of teeth lost *intra vitam*. The KAH group (Fig. 74) displays a slightly higher frequency (14.5%) than that of the MKD (10.1%), and the difference proved to be 95% statistically significant when subjected to chi-square testing. In maxillary dentition, except for the M3s lost at low frequencies at KAH (7.1%) and never at MKD, the frequencies are generally comparable for the other teeth and twice as high at KAH (15-20%) as at MKD (6-13%), with the sole exception of P3s, which display comparable frequencies (about 15%) in both groups. In the mandibular arch, in which higher frequencies are found than in the maxillary arch, it is on the contrary the molars that display the highest frequencies. In Tables 22 and 23, for all the alveoli either aggregated or broken down by tooth type, the frequencies of abscesses or apical granulomas are listed. The abscesses are present with rather lower frequencies (Fig. 75); in the KAH group they almost double (2.8%) the MKD value (1.7%), even though this difference, which has been chi-square tested, is not statistically significant. The greatest frequency found in all groups is displayed by the M1s, although while in the KAH group abscesses are located only on the maxillary arch, in the MKD group they are subdivided evenly between the two arches into I1s, premolars and M1s.

Tables 24 to 27 show the abridged mortality tables, both relative to the whole population and to the adult population segment, for MKD and KAH, respectively. In view of the low numerosity of the sample, palaeodemographic processing was carried out only for indicative purposes. In both populations it is possible to observe the customary phenomenon of the sub-numbering of the children's portion, even though at KAH, and limited to individuals dying in the first year of

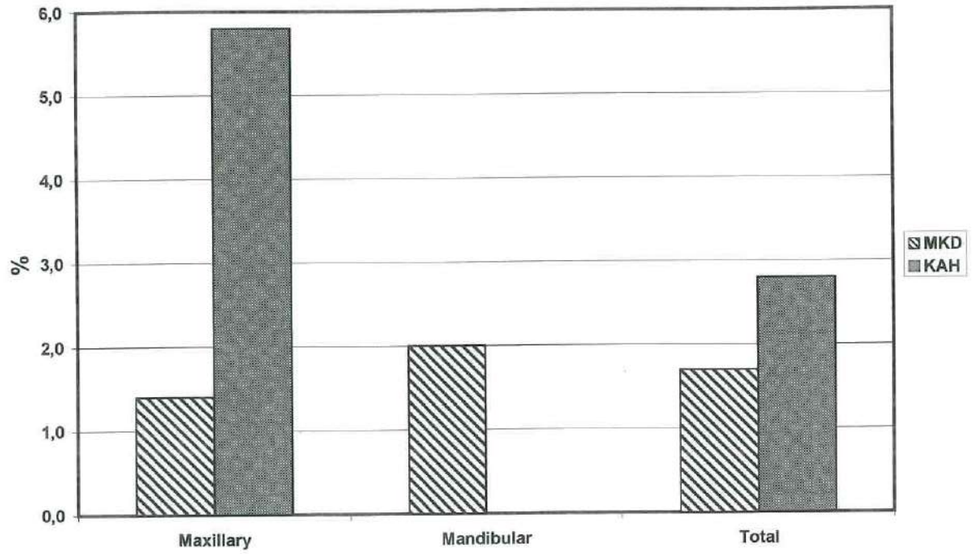


Fig. 75. Necropolis of MKD and KAH: alveoli with abscesses.

life, this phenomenon is less conspicuous (Fig. 76). If we analyse only the adult segment of the population (Tables 25 and 27), we find that the life expectancies (ex) are practically the same in the two necropolises up to the age of 35 years (Fig. 77), where also the values for the Omani necropolis of RH5 from the 4th millennium B.C. are given, but after this age an improvement is observed, if not a very pronounced one, at KAH. This improvement is due to the excess of deaths aged 45 years or more (Fig. 78) for both the Yemeni necropolises.

Palaeopathology

The main pathological characteristics, signs of trauma, defects of ossification and stress signs are outlined in the following, broken down by anatomical segment.

Necropolis of MNQ

Tomb 1 (MNQ/T1)

Level 1 - Mixed adults:
- Sacrum: #1 S1-S3 not present.
  S4-S5 bifid.
  #2 S1-S3 normal.
  S4-S5 bifid.

Level 2 - Individual A (F? 41-45):
- Skull with depressed fracture on the sagittal suture about 40 mm from the bregma (Pl. 96.*a*).
- Right clavicle with profound inferior medial muscle attachment.
- 3 fractured rigs.
- 3 swollen right metatarsals.
- Sacrum: S1 defect of joining.
  S2-S3 normal.
  S4-S5 bifid.
- Right tibia with widespread periosteal reaction on the lateral surface.
- Right fibula with widespread periosteal reaction on the distal portion.

Necropolis of MKD

Tomb 9 (MKDiii/T9)

Individual D (F 40-50):
- Collapsed lumbar vertebrae (Pl. 96.*b*).
- Sacrum: S1-S5 normal.

Individual E (F 40-50):
- Sacrum: S1-S2 normal.
  S3-S5 not present.

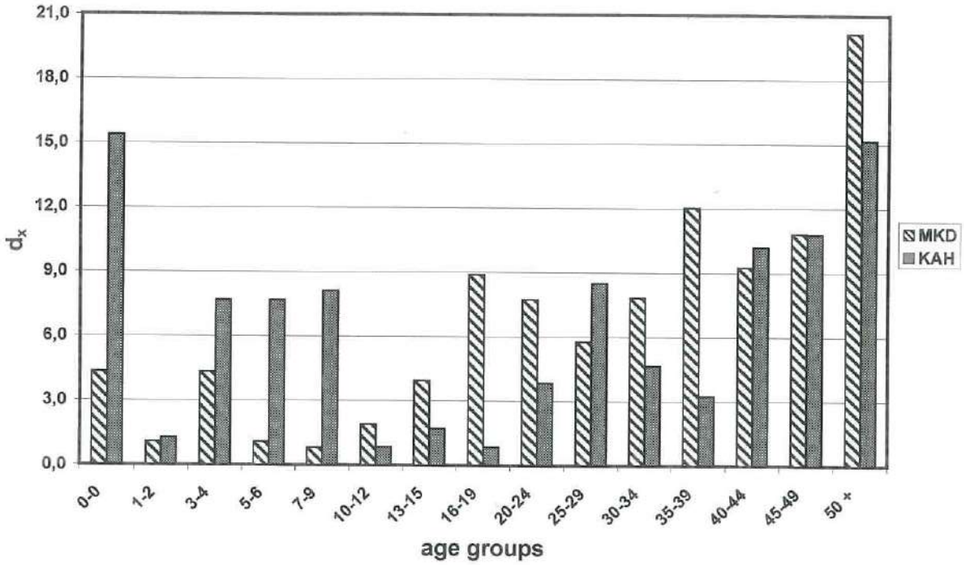
Mixed C, D, E (F 40-60):
- Collapsed L1 (trauma?), degenerative alterations in T12 and L2.
- Left tibia with slight periosteal reaction on distal epiphysis.

Tomb 13 (MKDii/T13)

Individual A (M 30-35):
- Left clavicle with signs of muscular stress (fossettes) in the inferior portion.
- Left rib, distal, displaying pseudoarthrosis.
- Left ileum and sacrum fused together (Pl. 97.*a*).
- Sacrum: S1-S5 normal.
- Left and right femurs displaying two very pronounced fossettes for muscle attachment in the posterior portion of the medial condyle, perhaps a modification due to the great length of time spent on horseback.
- Right tibia displaying widespread periosteal reaction.

Individual B (F 20-26):
- Skull with 2 well healed depressed fractures, one on the left parietal and the other on the left frontal, both very close to the median sagittal axis (Pl. 97.*b*).

Individual C (M >50):
- Skull with well healed depressed fracture on the left parietal, perhaps a further trauma near the first (Pl. 98).
- Sacrum: S1-S5 normal.



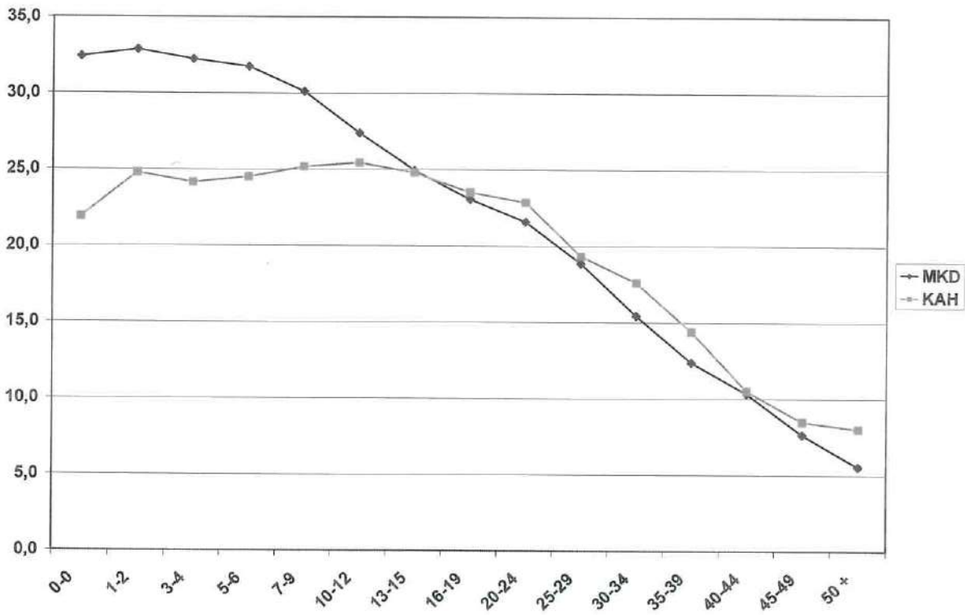


Fig. 76. Necropolis of MKD and KAH: number of deaths in each class (dx).

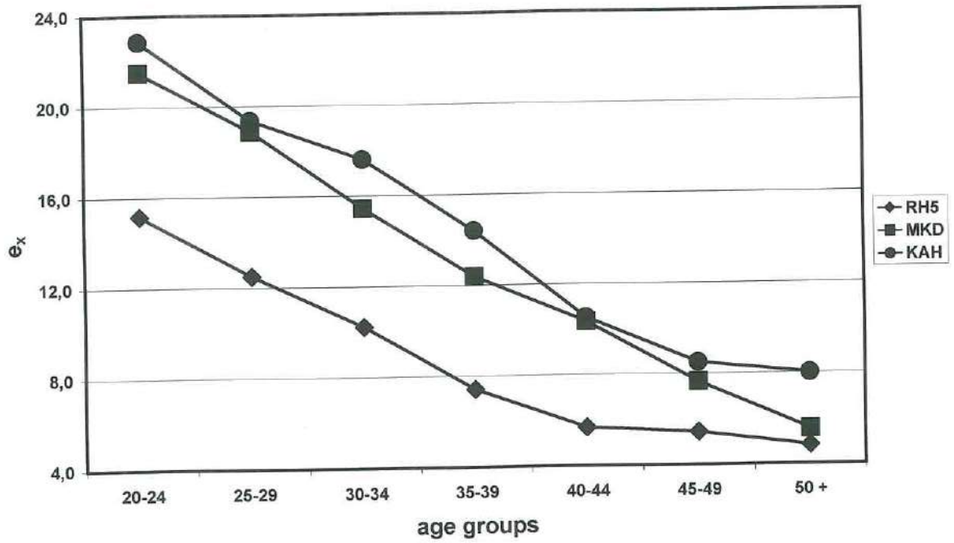


Fig. 77. Necropolis of RH5, MKD and KAH: life expectancy in each age class (ex).

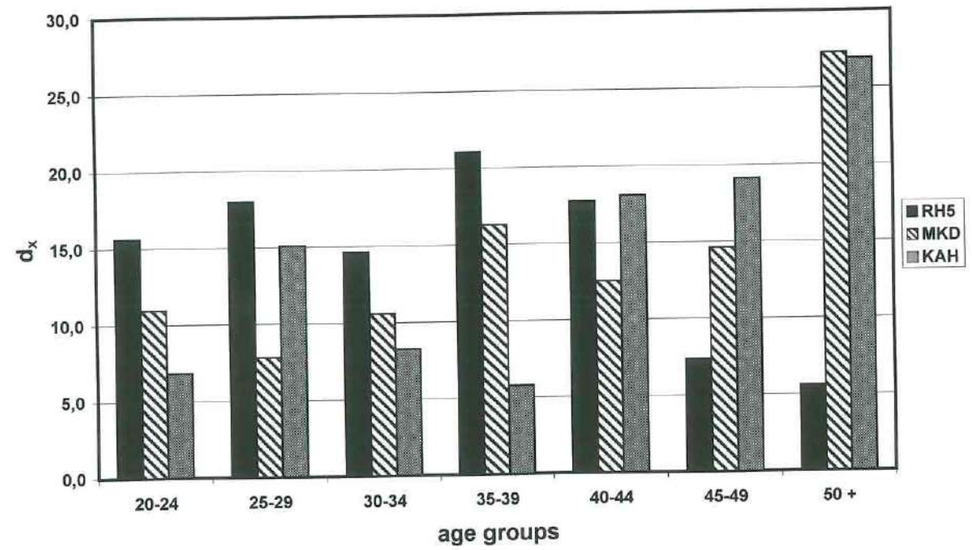


Fig. 78. Necropolis of RH5, MKD and KAH: number of deaths in each class (dx).

Individual D (M? 30-35):
- Skull with depressed fracture on the right parietal near the coronal suture (Pl. 99.*a*).

Individual G (F? 30-35):
- Skull with depressed fracture on the right frontal near the coronal suture (Pl. 99.*b*).

Individual H (F 35-40):
- Skull with two well reabsorbed depressed fractures on the coronal suture, one to the left and the other to the right of the sagittal suture (Pl. 99.*c*).

Individual I (M 45-55):
- Skull with three small depressed fractures on the

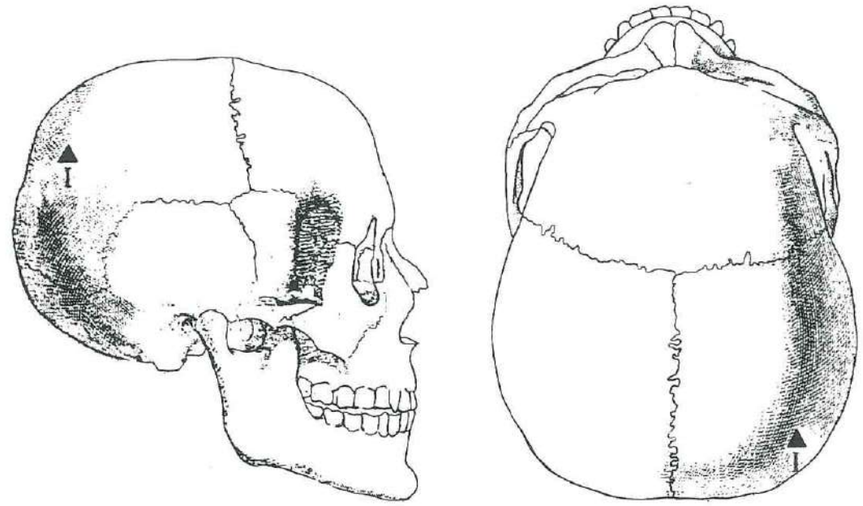


Fig. 79. MKDii/T13. Ind. I: Skull with three small depressed fractures on the right parietal near the sagittal suture and in rear position.

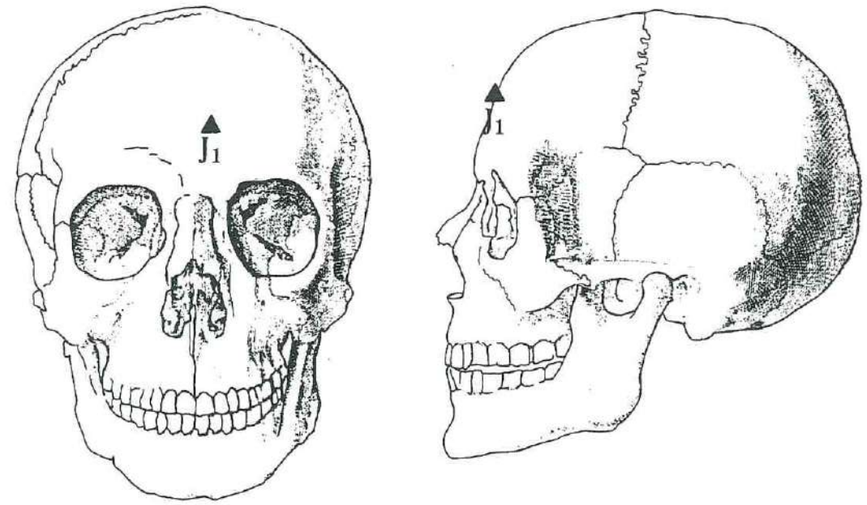


Fig. 80. MKDii/T13. Ind. J: Skull with shallow well-absorbed depressed fracture at the centre of the frontal.

right parietal near the sagittal suture and in rear position (Fig. 79).

Individual J (M 40-50):
- Skull with shallow well-absorbed depressed fracture at the centre of the frontal (Fig. 80) and traces of an old reabsorbed fracture of the nose (Pl. 100.*a*).

Individual L (M 45-55):
- Skull with two reabsorbed depressed fracture, one on the right parietal, in an extremely rear position, and the other on the left frontal (Pl. 100.*b*).

Individual N (14-16):
- L5 sacralized.
- Sacrum: S1-S5 bifid.

Individual O (17-20):
- Left and right femurs displaying two wide depressions (muscular stress) on the medial and posterior portion of the condyles (Pl. 101.*a*).

Mixed adult:
- 4 right clavicles (2 males and 2 probable females) showing signs of muscular stress (fossettes) in the medial and inferior portion (Pl. 102).
- 3 sterna displaying ossification of the cartilages at the level of the first rib.
- 6 ribs displaying fractures, eburnation on the articulation surface (Pl. 101.*b*) and 8-9 right ribs, almost certainly from the same individual, display cut marks (Pls. 101.*c*, 103-104).
- C5 and C7 with extreme signs of arthritis, as well as three thoracic ribs
- L4 and L5 corresponding to sacrum #3 display spondylolysis (Pl. 105.*a*).
- Sacrum: # 1 S1-S5 normal.
  # 2 S1-S3 not present.
  S4-S5 bifid.
  # 3 S1-S3 not present.
  S4-S5 bifid.
  # 4 S1-S5 normal.
  # 5 S1-S3 not present.
  # 6 S1-S3 normal.
  S4-S5 bifid.
  # 7 S1 joining defect.
  S2-S5 not present.
  # 8 S1-S3 normal.
  S4-S5 bifid.
  #10 S1 not observable.
  S2 normal.
  S3 $^1/_2$ bifid.
  S4-S5 bifid.
- Humerus (d8 male?) which displays ossification of the medial distal ligament, in any case in all males and also in the females the deltoid tuberosity is strongly pronounced with depressions due to muscular stress (very strong in d7 male). No fracture of radii, ulnas or humeri.
- Femurs: d5 (male) ossification half way along the linea aspera.
  d6 (male?) wide fossette on the distal medial condyle due to muscular stress.
  d10 (male?) pronounced fossette due to antero medial stress at the level of the III trochanter (Pl. 105.*b*).
- Tibias: s1 slight extensive periosteal reaction.
  s2 slight extensive periosteal reaction.
  s3 medial fibrous periosteal reaction.
  s4 slight extensive periosteal reaction.
  s5 slight medial periosteal reaction.
  s6 slight extensive periosteal reaction.
  s7 proximal epiphysis of the fibula (s8) joined to the tibia at the level of the articulation with only a small non fused area, no trace of fractures or reactions (Pl. 106.*a*).
  s10 proximal articular surface displays eburnation, osteophytes and reaction area half way along diaphysis with periosteal reaction (trauma?), generalized fibrous periosteal reaction (Pl. 106.*b*).
  s12 distal articular surface, area of contact with astralagus, displays slight eburnation, osteophytes between tibia and fibula, generalized fibrous periosteal reaction.
  d1 periosteal reaction on the distal half of the epiphysis on the medial and lateral surface.
  d2 generalized fibrous periosteal reaction on the distal third of the epiphysis (Pl. 106.*c*).
  d4 generalized fibrous periosteal reaction on the entire medial part of the epiphysis.
  d5 slight extensive periosteal reaction.
  d8 proximal epiphysis of the fibula (d12) was found to be joined to the tibia at the level of the articulation with on one small unfused area, a trace of bony callus at the point of contact, this tibia is probably linked to tibia s7 (Pl. 107.*a*).
  d10 extensive periosteal reaction in the distal quarter of the epiphysis, osteophytes near the zones of contact with the fibula.
- Fibulas: s1 extensive periosteal reaction on the proximal third and the distal third of the diaphysis and the distal area at the point of contact with the tibia.
  s2 generalized slight periosteal reaction, several osteophytes in the distal fourth of the diaphysis.
  s3 strong anterior periosteal reaction and in the distal third of the diaphysis.
  s4 generalized slight periosteal reaction with several swellings along the entire length of the diaphysis.
  s5 generalized slight periosteal reaction in the proximal third of the diaphysis, extensive periosteal reaction and several swellings in the distal fourth.
  s6 generalized slight fibrous periosteal reaction with several comparatively slight swellings.
  s7 generalized slight periosteal reaction, mainly on distal third of the diaphysis.
  s8 proximal epiphysis fused with that of the tibia (s7), with a small unfused portion, also displaying a wide bony callus; generalized slight periosteal reaction over the entire diaphysis which tends to increase in size and displays also several swellings in the distal third (Pl. 106.*a*).
  s9 generalized periosteal reaction in several points of the diaphysis on the medial surface.
  d1 strong generalized periosteal reaction with several swellings along the entire diaphysis.
  d2 generalized fibrous periosteal reaction with several swellings along the entire diaphysis.
  d3 medium periosteal reaction on the distal third of the diaphysis.
  d4 extensive ossification extending laterally from the head, slight to medium periosteal reaction in the distal half of the diaphysis with several swellings.
  d5 slight periosteal reaction along the entire diaphysis.
  d6 strong periosteal reaction along the entire diaphysis, more pronounced in the distal half.
  d7 extremely slight periosteal reaction along the entire diaphysis.
  d8 medium periosteal reaction on the distal half of the diaphysis.
  d9 medium periosteal reaction over the entire diaphysis, several swellings, osteophytes in the distal area at the point of contact with the tibia.
  d10 slight periosteal reaction on the entire portion of the diaphysis present, corresponding to the proximal three quarters.
  d11 medium-strong periosteal reaction over the entire portion of the diaphysis present, corresponding to the distal third.
  d12 slight periosteal reaction over the entire diaphysis, stronger on the distal third, the proximal epiphysis is fused with the tibia (d9) with a large bony callus and a small unfused portion (Pl. 107.*a*).
- Carpus displaying two bones fused together.
- 2 right navicular bones with osteophytes (trauma?) and a left one with deformed tubercle (trauma?).
- Cuboid with pronounced osteophytes on the superior surface (arthritis).
- Deformed right II metatarsal with lateral extension below the head (arthritis or trauma) (Pl. 107.*b*).
- Right III metatarsal displaying eburnation, deformation of the head and pronounced edges (Pl. 107.*c*).

Tomb 15 (MKDii/T15)

Individual A (M 30-35):
- Sacrum: S1-S5 normal.

Individual D (M? adult):
- Sacrum: S1-S3 normal.
  S4-S5 not visible.

Mixed adult (A + B + C + D)
- proximal phalanx of foot displaying signs of trauma.

Necropolis of KAH

Tomb 2 (KAHi/T2)

Level 3 - Mixed adults:
- Right clavicle with traces of muscular stress (fossettes).
- Left ulna with swelling in proximal third.
- Phalanxes of foot (trauma?).
- Sacrum: #1 S1 join defect.
  S2-S3 normal.
  S4-S5 bifid.
  #2 S1-S5 normal.
  #3 S1-S5 normal.
  #4 S1-S3 normal.
  S4 bifid for $^1/_2$.
  S5 bifid.

Level 3 - Individual Q (14-16 years):
- Ulna with distal portion swollen.

Grave 1 - Individual A (F 40-45):
- Right scapula displaying unfused acromion.
- L5 with unfused arch (spondylolysis).
- Sacrum: S1 join defect.
  S2-S3 normal.
  S4-S5 bifid.
- Right femur with highly pronounced muscular attachment at the level of the third trochanter.
- Right tibia with ossification of a posterior ligament.

Grave 1 - Mixed adults:
- Sacrum: #1 S1-S3 normal.
  S4-S5 bifid.

Grave 2 - Individual A (M 43-49):
- Right clavicle showing signs of muscular stress (fossettes).
- Sacrum: S1-S5 normal.
- Left IV metatarsal with trauma.

Grave 2 - Individual B (F 40-55):
- Sacrum: S1-S3 normal.
  S4-S5 bifid.
- Left IV metatarsal with trauma.

Grave 3 (F 60-65):
- Humerus with highly pronounced muscular attachment of deltoid tuberosity.
- Sacrum: S1-S5 normal.
- Tibias and fibulas with generalized periosteal reaction.
- Left IV metatarsal with trauma.

Grave 4 (7-8):
- Slight bilateral cribra orbitalia.

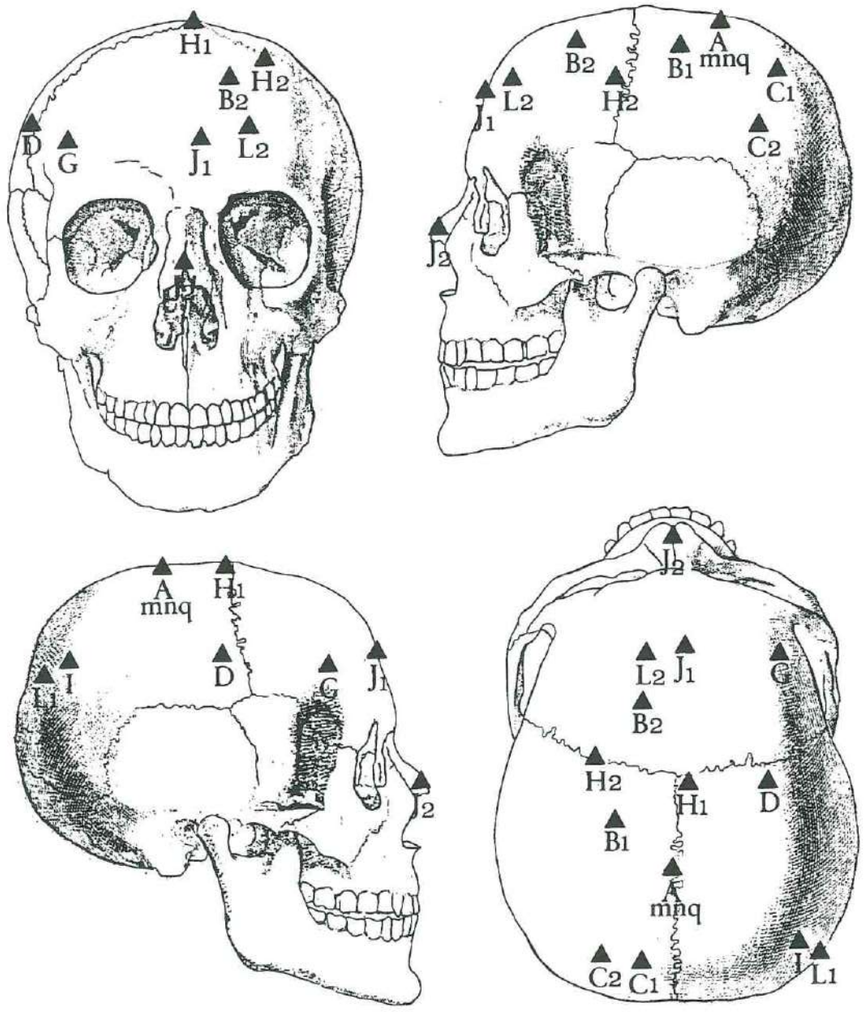


Fig. 81. MNQ/T1. Lev. 2 Ind. A and MKDii/T13: Localization of all cranial fractures.

- C2 fused with C3 (Pl. 108.*a*).
- Sacrum: S1-S5 bifid (Pl. 108.*b*).

Grave 5 (M 42-47):
- 2 right ribs displaying fractures (Pl. 109.*a-b*).
- Sacrum: S1-S3 normal.
  S4 bifid for $^1/_2$.
  S5 bifid.
- Right femur with widespread ossification, not due to fracture, present near the linea aspera (Pl. 108.*c*).

Grave 6 (F 55-65):
- Right clavicle displaying fracture at midshaft (Pl. 110.*a*).
- Left rib (7 or 8) displaying fracture.
- L5 with unfused arch (spondylolysis) (Pl. 110.*b*).
- Sacrum: S1-S3 normal.
  S4-S5 bifid.
- Right femur with highly pronounced muscular attachment at the level of the third trochanter.
- Right tibia with ossification of a posterior ligament.

In the group of necropolises formed by MNQ and MKD, two main pathological types can be observed: traumas and lower limbs long bones periosteal reactions.

Traumas mainly affect the skull, and also few ribs display fractures. Nine skulls display depressed fractures, five males and four females. The depressed fractures are

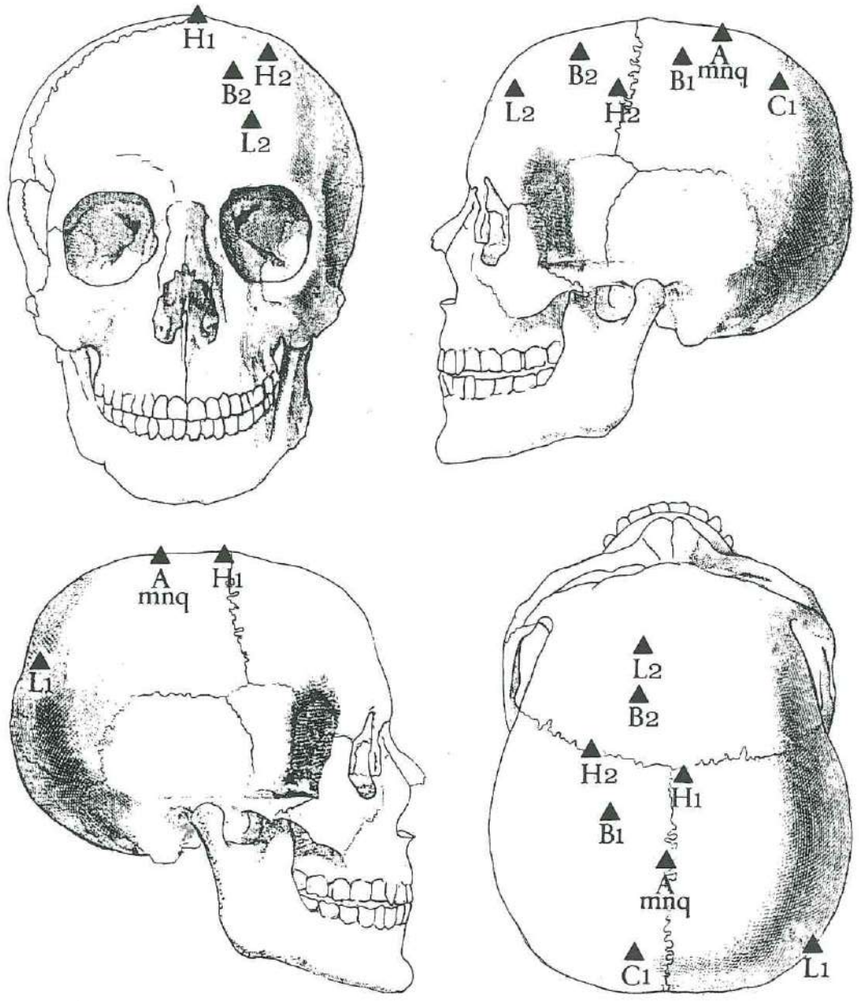


Fig. 82. MNQ/T1. Lev. 2 Ind. A and MKDii/T13: Localization of cranial main fracture.

evenly distributed throughout all the adult age classes (between 18 and 60 years), and vary in size (from 7 mm long and 4 mm wide to 36 mm long and 29 mm wide) as well as in shape (elliptic, circular, elongated). No major sex differences can be noted, as instead reported by some scholars (Stewart & Quade 1969; Angel 1974; Van Wagenen & Wilkinson 1990), for the two larger traumas are encountered on a male and female respectively. If we relocate all the traumas from the nine skulls on a single one, we can observe that fractures are located in various places with no side predominating over the other. They are present on both parietals and on the frontal (Fig. 81), and are all well absorbed and healed and none of them led to the individual's death. In one case in particular, the same individual bearing skull fractures also showed traces of an old healed nose fracture.

Nonetheless, when only the main fractures are considered, taking aside the likely accidental ones, the very little, linear ones of unknown origin, the small and highly concentrated ones and the nodules, then a clear location pattern emerges (Fig. 82). The remaining lesions in fact share very many similarities. They represent healed fractures, all circular or ovoid in shape, in which only the outer table is depressed without affecting the inner one, thus the brain.

An infective ethiology can be ruled out because

lesions are all well defines, because of the absence of reactive bone, and because no evidence of multiple lesions could be encountered in the postcranial skeleton. The depressed fractures can be the results of traumas provoked accidentally (falls), intentionally (fighting), or be the consequence of cultural practices like self-mutilation or punishment.

Accidental traumas occur in many situations, thus lesions can be very heterogeneous in terms of location, shape and size. Lesions in Yemen are very similar in these parameters, and were likely caused by tools or weapons that were standardized in shape and size. If the traumas were the result of unsuccessful attacks, with the intent to kill during intertribal conflicts, then we would expect to find some skulls, from those who died during the attacks, showing unhealed fractures. Instead, there is no trace of such skulls, which indicates that traumas were likely inflicted to wound but not to kill. Mutilations for cultural practices, such as self-mutilation performed during ritual ceremonies, are practiced by many societies. They are inflicted with bats, stones, knives, but few of them leave marks on the bones (Walker 1989). The Yemenite fractures located on the neurocranium require strong power to depress the skull's outer table, which makes self-mutilation very unlikely. Rather it may indicate that they were inflicted by somebody else. Cultures can inflict traumas as punishment for what is considered a behavior not socially accepted. Such traumas do range from death punishment to mutilations (cut of the a hand of thieves) and physical damage (beating). The last form of punishment is usually done with the intent to cause pain without leaving permanent marks on the individual, and without permanently impairing him and his usefulness in the society. Clinically speaking, the traumas encountered at MNQ and MKD could have left the individual unconscious, with the possibility of a sub-dural hemorrhagic, without permanently damaging him or her (Youmans 1990).

The skull preserves evidence of any traumatic injury from tools hitting with enough strength to cause a fracture (Fisher & Spitz 1973; Stewart 1979; Krogman & Iscan 1986). The likelihood among the cranial fractures suggests that they were caused within a culturally regulated pattern of 'violence', which required the use of specific tools or weapons, likely bats or hard wood clubs.

The location of fractures, the top of the head, supports a further hypothesis. Someone hitting somebody else from the same height likely inflicts a trauma on the side of the head or on the face, commonly the zygomatic bones. It would be much more difficult to cause an injury on the top of the head, without being on an upper level. Moreover, when attacked frontally, the spontaneous reaction is to protect the vital organs (in this case the head) by raising the arms, which causes fractures on the forearm. This is one of the most common fractures in prehistoric populations, which involves the radius and the ulna at the same time (sometimes also the carpal bones) and is known as 'parry fracture' (Angel 1974). In our sample there are no fractures from 'defense', which could indicate that the victim was hold with the hands tied behind the back. In such position, when the stroke is inevitable, the victim tries anyway to protect himself by bending the head foreward, which hides the more bridle facial bones and exposes the posterior, thicker part of the skull. This is the location where the majority of the fractures were encountered on the skulls from Yemen.

Although the fractures were from skulls of different sex and age, thus different thickness and robusticity, the practical result was always the same. Size was different, but in no case the impact penetrated the skull's inner table. This suggests that the practice was not new and not accidentally performed. It seems that those who performed the practice were enough experienced to produce the expected effect without killing the person, which may witness ritual or punitive practices performed for long time.

All these sets of evidence (lack of ethiology, location, shape, similarity in the pattern and lack of parry fractures) support the idea of a ritual or punitive reason for the fractures encountered in the skulls from MNQ and MKD. The victim was likely kept bent on his/her knees in front of the punisher and hit with a rounded edges tool or weapon.

Bone marks caused by a cut, stab or penetration of sharp cutting edges are called 'cut marks' (Fisher & Spitz 1973; Stewart 1979; Krogman & Iscan 1986). Among the mixed skeletal remains from MKD T. 13 (Mixed adults), some 8 or 9 right ribs showed evidence of traumas caused by a cutting edge (Pls. 101.*c*, 103-104). Similarity in size, morphology, degree of development, degradation of the articular surfaces, color and external gross preservation all indicate that the ribs belong to the same individual They all showed defects located in the right inferior-posterior area of the rib cage (Fig. 83). The defects were clearly delimited, narrow and V shaped.

Stabs in this body part can hit the liver, the right kidney, the intestines, several major blood vessels as the aorta and the *vena cava* (Williams 1989). The anatomical location and, in particular the lack of any healing on the bones around the cut marks, indicate that this individual dies right after being stab or in a short time after. Based on the shape and location of the marks, we can infer that the tool used likely was a thin-bladed knife, like the 'Jumbia' bent-blade knife still in use in Yemen, or something similar.

As far as the periosteal reactions are concerned, practically all the individuals display such lesions on the tibias and fibulas, often accompanied by swellings and osteophytes near the articulations between the two bones. The tibias generally display a generalized reaction (8 cases) or else, which involves the distal portion (4 cases), while the medial surface (3 cases) is more frequently affected than the lateral one (1 case). The fibulas display extensive reaction with some predominance on the distal epiphysis. Clear signs of stress due to muscular activity are quite visible on numerous right clavicles, both in male and female individuals, as well as on femurs of males and of one sub-adult (17-20 years). Moreover, we

encountered one case of spondylolysis of L4 and L5 linked to sacrum displaying spina bifida occulta, and a sacralized L5 fused to a sacrum with total spina bifida. The spina bifida occulta is present in 56.3% of cases (9 out of a total of 16 observable sacra) and is generally present on S4 and S5, although also S1 may be found to be bifid. There is only one case in which the channel is totally open, that of a sub-adult aged 14-16 years of age.

In the necropolis of KAH several defects of ossification have been found: two cases of spondylolysis of L5, a non fused acromion in a right scapula and 50% of spina bifida occulta (6 cases out of 12 observable sacra), in one total case involving an child aged 7-8 years, which also displays a join defect also on a thoracic bone. Nevertheless a number of traumas on ribs, a right clavicle and several metatarsals do not seem to indicate any particularly high degree of conflictuality in the group. Several signs of stress due to muscular activity on two right clavicles, on the deltoid tuberosities and on a right femur at the height of the third trochanter are found in both male and female individuals. Widespread ossification not due to fracture is also present near the linea aspera of a femur.

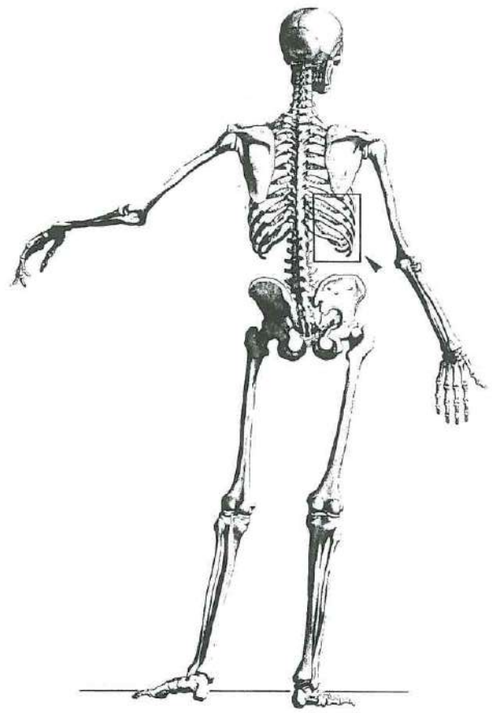


Fig. 83. MNQ/T1. Lev. 2 Ind. A and MKDii/T13: Localization of 'cut marks' in stabbed individual.

Conclusions

At the present state of the research the comparative analysis of both metric and non metric characters of the skeleton and dentition seems to indicate the existence of two different population types in Yemen between the 1st millennium B.C. and the first half of the 2nd millennium A.D. The observed differences apparently cannot be accounted for in terms of microevolutionary factors linked to the chronological and geographic distances between the two population groups. Apart from the statistical observations, which are often non significant owing to the low numerosity of samples, the earliest group displays greater limb lengths and larger teeth, with a lower degree of M3 agenesia, but less complex. Furthermore, the earlier type is characterized by skulls that tend to be narrower, with less obvious frontal eminences, less rounded orbits, slightly narrower noses, longer and less flat faces (Pls. 107-111).

Differences in the metric characters of the teeth were found between the MKD necropolis and the Omani RH5 necropolis, although less noticeable than those of the more recent necropolis of KAH. On the other hand, the differences between KAH and RH5 are extremely pronounced. In the case of non metric characters, the differences with the Omani necropolis run deep and are highly pronounced for both the Yemeni necropolises, with a slight predominance of MKD. A tendential tooth reduction is clearly visible and the RH5 teeth are much more complex (greater incidence of Shovel-shaped incisors, greater number of Tuberculum and Carabelli's cusp, larger number of cusps and greater frequency of 'Y' groove pattern with the more recent necropolis of KAH in any case displaying slightly more complex teeth than the more archaic one of MKD.

A comparison will later be made also of the metric and non metric characters of the skeleton in order to define more clearly the relationships between the earlier populations of Yemen and those of Oman.

The more ancient MKD group also displays a much smaller percentage decay, probably as a result of different nutritional models compared with the more recent group, and a higher degree of wear, which is currently undergoing more detailed investigation.

The percentage of teeth lost *intra vitam* and of abscesses is comparable in the two groups, although in MKD these pathologies seem to be due more to wear, while they are more closely linked to decay in the more recent KAH.

Analyses are under way to determine the trace elements and to investigate dental micro-wear, in order to obtain a more accurate picture of the subsistence models characterizing the two communities.

An improvement in the living conditions of the KAH population for the over 35 age group emerges from an analysis of the life expectancy curves and is part of a trend towards improvement compared with the earlier Omani necropolis of RH5.

Substantial differences in the pathology models exist

in the two necropolises. The more ancient group of MKD actually displays a high incidence of traumas, depressed skull fractures, which were found in a very high percentage of the skulls examined and of extensive and often pronounced periosteal reactions on tibias and fibulas. Conversely, no fractures of the main long bones has been observed, while a number of ribs in both necropolises displays signs of traumas. Furthermore, in the group of MKD T. 13 8-9 right ribs belonging to the same individual were identified bearing signs of a sharp body that caused the death. The frequency of spina bifida occulta is very high in both necropolises, about 50%, as previously found in the Omani necropolis of RH5 (Coppa et al. 1990), although there are only two total cases. The two cases in which the defect affects all five sacral vertebrae refer to two sub-adults; this aspect, like that of the very high frequencies of spina bifida in the RH5 necropolis, are currently being subjected to more detailed analysis.

Further analyses of the Yemeni skeletal materials (trace elements, dental wear and micro-wear, analysis of nutritional stress using skeletal and dental indicators, analyses of the microscopic structure using thin ground sections), a more detailed comparison with other skeletal and dental materials of the Arabian Peninsula, both ancient and recent, and lastly a comparison with unpublished anthropometric data collected by Coon during the '30s (Coon 1933-34, 1935), will, in the subsequent phases of the investigation, allow a more complete clarification of both the subsistence models that characterized the two populations, MKD and KAH, and the biological relationships that exist between the two groups, and the more general picture of the population of the Arabian Peninsula over the last five millennia.

Acknowledgements

We wish to thank all the members of the Italian Archaeological Mission of IsMEO (now IsIAO) in Yemen for their help, particularly Prof. Alessandro de Maigret, Director of the Mission, and Prof. Gherardo Gnoli, President of IsIAO. We also thank Mr Antonio Solazzi, Mission photographer, for making the photographic documentation as well as the Ṣan'ā' Hospital Authority for the radiographic examinations performed.

Tables

Table 1 – List of skeletal remains from the necropolises of Al-Makhdarah (MKD), Al-Manqaz (MNQ) (1st millennium B.C.) and Kharibat al-Ahjur (KAH) (2nd-3rd century A.D.)

Necropolis	Burial	Sex	Age at death (years)
MNQ	T. 1 Lev. 1 Ind. B	-	7-14
MNQ	T. 1 Lev. 1 Ind. C	F ?	20-30
MNQ	T. 1 Lev. 1 Ind. D	F	20-30
MNQ	T. 1 Lev. 1 Ind. E	-	3-6
MNQ	T. 1 Lev. 1 Ind. F	M ?	17-19
MNQ	T. 1 Lev. 2 Ind. A	F ?	41-45
MNQ	T. 1 Lev. 2 Ind. B	-	3-6 months
MKD	T. 4 Ind. A	M	40-50
MKD	T. 4 Ind. B	F ?	30-40
MKD	T. 4 Ind. C	-	6-12 months
MKD	T. 5 Ind. A	M	30-50
MKD	T. 5 Ind. B	F ?	40-50
MKD	T. 9 Lev. 1 Ind. A	M	35-45
MKD	T. 9 Lev. 1 Ind. B	-	2-3
MKD	T. 9 Lev. 1 Ind. C	F	50-60
MKD	T. 9 Lev. 1 Ind. D	F	45-55
MKD	T. 9 Lev. 1 Ind. E	F	45-55
MKD	T. 9 Lev. 2 Ind. A	-	16-19
MKD	T. 9 Lev. 2 Ind. B	F ?	30-65
MKD	T. 13 Ind. A	M	30-40
MKD	T. 13 Ind. B	F	20-30
MKD	T. 13 Ind. C	M	> 50
MKD	T. 13 Ind. D	M ?	30-40
MKD	T. 13 Ind. E	M ?	45-55
MKD	T. 13 Ind. F	M	45-55
MKD	T. 13 Ind. G	F ?	35-45
MKD	T. 13 Ind. H	F	40-50
MKD	T. 13 Ind. I	M	50-60
MKD	T. 13 Ind. J	M	45-55
MKD	T. 13 Ind. K	F ?	> 50
MKD	T. 13 Ind. L	M	45-55
MKD	T. 13 Ind. M	M ?	> 50
MKD	T. 13 Ind. N	-	14-16
MKD	T. 13 Ind. O	-	17-20
MKD	T. 15 Ind. A	M	30-40
MKD	T. 15 Ind. B	M	35-45
MKD	T. 15 Ind. C	M	> 25
MKD	T. 15 Ind. D	M ?	adult
MKD	T. 15 Ind. E	-	14-18
MKD	T. 15 Ind. F	-	3-4
MKD	T. 44 Ind. A	F ?	35-45
MKD	T. 44 Ind. B	M ?	20-30
MKD	T. 44 Ind. C	M ?	30-40
MKD	T. 44 Ind. D	-	20-30
MKD	T. 44 Ind. E	-	10-15
KAH	T. 1 Ind. A	M ?	25-35
KAH	T. 1 Ind. B	F	25-35
KAH	T. 1 Ind. C	-	7-8
KAH	T. 1 Ind. D	-	3-4
KAH	T. 2 Lev. 2 Ind. A	F	20-30
KAH	T. 2 Lev. 2 Ind. B	F	25-35
KAH	T. 2 Lev. 2 Ind. C	F	> 50
KAH	T. 2 Lev. 2 Ind. D	M	40-50
KAH	T. 2 Lev. 2 Ind. E	M	40-50
KAH	T. 2 Lev. 2 Ind. F	F	35-45
KAH	T. 2 Lev. 2 Ind. G	M	43-53
KAH	T. 2 Lev. 2 Ind. H	M ?	40-50
KAH	T. 2 Lev. 2 Ind. I	M ?	50-60
KAH	T. 2 Lev. 2 Ind. J	F	20-30

Necropolis	Burial	Sex	Age at death (years)
KAH	T. 2 Lev. 2 Ind. K	-	3-6 months
KAH	T. 2 Lev. 2 Ind. L	-	0 months
KAH	T. 2 Lev. 2 Ind. M	-	foetus
KAH	T. 2 Lev. 2 Ind. N	-	0 months
KAH	T. 2 Lev. 2 Ind. O	-	3-6 months
KAH	T. 2 Lev. 2 Ind. P	-	0-3 months
KAH	T. 2 Lev. 2 Ind. Q	-	14-16
KAH	T. 2 Lev. 2 Ind. R	-	5-6
KAH	T. 2 Lev. 2 Ind. S	-	6-7
KAH	T. 2 Lev. 2 Ind. T	-	5-6
KAH	T. 2 Lev. 2 Ind. U	-	2-3
KAH	T. 2 Lev. 2 Ind. V	-	3-4
KAH	T. 2 Grave 1 Ind. A	F	42-46
KAH	T. 2 Grave 1 Ind. B	F ?	35-45
KAH	T. 2 Grave 1 Ind. C	-	8-10
KAH	T. 2 Grave 1 Ind. D	F	25-35
KAH	T. 2 Grave 1 Ind. E	F ?	> 50
KAH	T. 2 Grave 2 Ind. A	M	43-49
KAH	T. 2 Grave 2 Ind. B	F	45-55
KAH	T. 2 Grave 2 Ind. C	F	20-30
KAH	T. 2 Grave 2 Ind. D	-	4-5
KAH	T. 2 Grave 3	F	60-65
KAH	T. 2 Grave 4	-	7-8
KAH	T. 2 Grave 5	M	42-47
KAH	T. 2 Grave 6	F	55-65

Table 2 – Necropolises of: MNQ, MKD and KAH. Index of sexualization and number of characters used

Necropolis	Burial	Degree of sexualization	Number of characters
MNQ	T. 1 Lev. 1 Ind. A	1.20	7
MNQ	T. 1 Lev. 1 Ind. C	-0.83	3
MNQ	T. 1 Lev. 1 Ind. D	-1.26	11
MNQ	T. 1 Lev. 2 Ind. A	-0.12	21
MKD	T. 4 Ind. A	0.79	15
MKD	T. 4 Ind. B	-1.21	7
MKD	T. 9 Lev. 1 Ind. C	-1.41	8
MKD	T. 9 Lev. 1 Ind. D	-0.92	13
MKD	T. 9 Lev. 1 Ind. E	-1.71	10
MKD	T. 13 Ind. A	1.21	21
MKD	T. 13 Ind. B	-1.19	18
MKD	T. 13 Ind. C	0.63	19
MKD	T. 13 Ind. D	0.38	13
MKD	T. 13 Ind. E	0.65	13
MKD	T. 13 Ind. F	0.58	13
MKD	T. 13 Ind. F	0.00	13
MKD	T. 13 Ind. H	-0.77	13
MKD	T. 13 Ind. I	0.77	13
MKD	T. 13 Ind. J	0.77	13
MKD	T. 13 Ind. K	-0.56	8
MKD	T. 13 Ind. L	0.67	12
MKD	T. 13 Ind. M	0.82	5
MKD	T. 15 Ind. A	1.35	8
MKD	T. 15 Ind. B	0.78	9
MKD	T. 15 Ind. C	1.50	7
MKD	T. 15 Ind. D	1.00	1
MKD	T. 44 Ind. A	-1.26	9
KAH	T. 1 Ind. A	0.30	5
KAH	T. 1 Ind. B	-1.00	5
KAH	T. 2 Liv. 2 Ind. A	-1.42	9
KAH	T. 2 Liv. 2 Ind. B	-1.47	7
KAH	T. 2 Liv. 2 Ind. C	-1.80	5

Necropolis	Burial	Degree of sexualization	Number of characters
KAH	T. 2 Liv. 2 Ind. D	1.27	6
KAH	T. 2 Liv. 2 Ind. E	0.27	6
KAH	T. 2 Liv. 2 Ind. F	-1.20	10
KAH	T. 2 Liv. 2 Ind. G	0.88	9
KAH	T. 2 Liv. 2 Ind. H	0.18	8
KAH	T. 2 Liv. 2 Ind. J	-1.88	4
KAH	T. 2 Grave 1 Ind. A	-1.60	21
KAH	T. 2 Grave 1 Ind. B	-0.71	4
KAH	T. 2 Grave 1 Ind. D	-1.00	6
KAH	T. 2 Grave 1 Ind. E	-1.20	6
KAH	T. 2 Grave 2 Ind. A	0.93	7
KAH	T. 2 Grave 2 Ind. B	-1.37	12
KAH	T. 2 Grave 2 Ind. C	-0.87	7
KAH	T. 2 Grave 3	-1.60	21
KAH	T. 2 Grave 5	0.95	20
KAH	T. 2 Grave 6	-1.39	22

Tab. 3 – Necropolis of MKD: Descriptive statistics of skull measures

Necropolis	Character (1)	Sex	Tot. No.	Mean	Stand. Dev.	Var. Coeff.	Min. Val.	Max. Val.
MKD	n1	M	7	185.24	5.83	3.15	176.30	192.70
MKD	n1	F	4	185.18	4.79	2.59	178.00	188.00
MKD	n5	M	6	102.97	8.15	7.91	95.50	97.90
MKD	n5	F	3	101.73	7.85	7.72	94.00	109.70
MKD	n8	M	7	136.86	5.33	3.89	127.50	143.00
MKD	n8	F	3	133.33	2.15	1.61	131.50	135.70
MKD	n9	M	5	93.08	2.81	3.01	90.70	97.90
MKD	n9	F	4	91.70	4.18	4.56	88.20	97.70
MKD	n10	M	6	117.85	3.74	3.17	113.00	123.00
MKD	n10	F	4	110.97	5.47	4.93	104.00	116.00
MKD	n17	M	6	131.97	3.89	2.95	128.70	137.80
MKD	n17	F	3	132.60	5.53	4.17	126.50	137.30
MKD	n29	M	7	113.33	1.92	1.69	110.00	115.30
MKD	n29	F	4	111.90	5.29	4.73	106.50	117.80
MKD	n30	M	7	114.09	4.26	3.74	106.00	120.50
MKD	n30	F	4	117.12	1.91	1.63	115.10	119.70
MKD	n31	M	5	97.16	2.42	2.49	94.40	99.80
MKD	n31	F	3	94.57	3.12	3.30	91.00	96.80
MKD	s40	M	5	93.94	5.70	6.06	87.70	100.90
MKD	s40	F	3	98.27	6.45	6.57	94.10	105.70
MKD	s43	M	5	101.44	3.06	3.01	97.60	105.30
MKD	s43	F	3	98.10	4.45	4.54	94.30	103.00
MKD	s45	M	4	127.08	3.28	2.58	123.00	131.00
MKD	s45	F	2	122.05			120.00	124.10
MKD	s46	M	5	89.16	3.39	3.81	85.80	93.60
MKD	s46	F	4	89.58	2.99	3.33	86.00	93.30
MKD	s48	M	6	71.18	3.51	4.93	67.10	75.50
MKD	s48	F	3	70.57	1.72	2.44	69.20	72.50
MKD	s51 s	M	5	37.30	1.76	4.72	35.50	40.00
MKD	s51 s	F	3	37.57	1.94	5.16	36.30	39.80
MKD	s51 d	M	5	37.74	2.21	5.86	35.50	40.50
MKD	s51 d	F	3	37.33	2.12	5.68	35.60	39.70
MKD	s52 s	M	5	31.42	1.86	5.93	29.30	34.10
MKD	s52 s	F	3	32.47	1.65	5.08	30.80	34.10
MKD	s52 d	M	5	31.74	1.56	4.91	30.00	33.70
MKD	s52 d	F	2	32.30			30.80	33.80
MKD	s54	M	7	24.67	2.35	9.53	21.80	29.30
MKD	s54	F	4	23.88	0.33	1.38	23.50	24.30
MKD	s55	M	7	51.96	2.50	4.81	47.70	55.00
MKD	s55	F	3	49.93	2.39	4.78	47.20	51.60
MKD	s62	M	6	44.60	2.10	4.70	42.50	47.50

Necropolis	Character (1)	Sex	Tot. No.	Mean	Stand. Dev.	Var. Coeff.	Min. Val.	Max. Val.
MKD	s62	F	4	46.40	3.26	7.02	42.50	50.20
MKD	s63	M	6	37.83	1.90	5.02	35.50	40.20
MKD	s63	F	3	37.10	2.82	7.59	34.00	39.50
MKD	m65	M	4	111.00	7.91	7.13	103.00	120.00
MKD	m65	F	2	109.30			107.00	111.60
MKD	m66	M	7	94.59	3.94	4.16	87.80	98.00
MKD	m66	F	4	91.10	5.76	6.32	84.00	98.10
MKD	m67	M	9	44.38	2.30	5.18	40.20	47.20
MKD	m67	F	11	41.95	2.35	5.60	38.40	45.40
MKD	m68	M	8	81.44	3.99	4.90	74.70	86.80
MKD	m68	F	3	79.37	5.89	7.43	73.10	84.80
MKD	m69	M	10	33.80	2.22	6.57	30.50	37.40
MKD	m69	F	10	32.72	3.80	11.61	27.50	39.00
MKD	m69(1) s	M	11	32.13	1.75	5.45	29.20	35.70
MKD	m69(1) s	F	9	31.06	2.29	7.36	27.50	34.20
MKD	m69(1) d	M	8	32.56	1.96	6.01	29.00	35.50
MKD	m69(1) d	F	8	31.04	2.65	8.54	27.80	34.20
MKD	m69(2) s	M	8	28.55	1.78	6.24	25.60	30.30
MKD	m69(2) s	F	3	26.67	1.67	6.25	24.80	28.00
MKD	m69(2) d	M	6	29.67	0.97	3.27	28.40	31.20
MKD	m69(2) d	F	3	27.53	1.36	4.94	26.00	28.60
MKD	m69(3) s	M	11	12.19	1.04	8.55	10.00	13.70
MKD	m69(3) s	F	11	10.61	1.55	14.64	8.20	14.00
MKD	m69(3) d	M	9	12.23	1.25	10.22	10.20	14.00
MKD	m69(3) d	F	11	10.20	1.32	12.96	7.30	11.50
MKD	m70	M	8	63.08	3.35	5.31	57.00	67.40
MKD	m70	F	4	56.75	1.04	1.83	55.80	58.00

(1) - Legend of abbreviations of metric variables

Reference number according to Martin & Saller (1957) - NEUROCRANIUM (n): 1 maximum length, 5 length of base, 8 maximum width, 9 minimum frontal width, 10 maximum frontal width, 10b stephanial width, 12 biasteric diameter, 17 basiobregmatic height, 20 auricular height, 23 horizontal circumference at the glabella, 25 total sagittal arch, 26 frontal sagittal arch, 27 parietal sagittal arch, 28 occipital sagittal arch, 29 median sagittal frontal cord, 30 median sagittal parietal cord, 31 median sagittal occipital cord. SPLANCHNOCRANIUM (s): 40 length of face, 43 superior facial width, 45 bizygomatic width, 46 maximum bimascellary width, 47 total height of face, 48 superior height of face, 51 orbital width, 52 orbital height, 54 nasal width, 55 nasal height, 60 maxillo-alveolar length, 61 maxillo-alveolar width, 62 length of palate, 63 width of palate. MANDIBLE (m): 65 intercondyloid width, 66 bigonial width, 67 width at mental foramina, 68 total length, 69 height at symphysis, 69(1) height of body at mental foramen, 69(2) height of body at second molar, 69(3) thickness of body at mental foramen, 70 height of ramus, 71 maximum width of ramus, 71a minimum width of ramus.

Table 4 – Necropolis of MKD: Descriptive statistics of arm measures

Necropolis	Character (1)	Sex	Tot. No.	Mean	Stand. Dev.	Var. Coeff.	Min. Val.	Max. Val.
MKD	o1 s	M	5	329.00	5.23	1.59	323.50	337.00
MKD	o1 s	F	7	298.64	12.47	4.17	279.00	316.50
MKD	o1 d	M	6	330.93	6.39	1.93	323.80	340.00
MKD	o1 d	F	7	308.76	13.38	4.33	292.50	334.30
MKD	o2 s	M	5	325.70	5.43	1.67	321.00	333.00
MKD	o2 s	F	6	296.68	12.60	4.25	277.80	312.50
MKD	o2 d	M	6	327.43	6.03	1.84	322.00	336.00
MKD	o2 d	F	6	306.13	12.77	4.17	289.00	327.00
MKD	o3 s	M	6	46.33	2.64	5.69	43.50	51.20
MKD	o3 s	F	7	40.94	3.07	7.51	37.50	46.30
MKD	o3 d	M	7	47.84	2.01	4.20	45.30	51.00
MKD	o3 d	F	6	42.67	2.96	6.95	39.50	47.00
MKD	o4 s	M	8	61.42	3.33	5.42	57.60	68.10
MKD	o4 s	F	7	57.90	5.77	9.96	51.40	65.30
MKD	o4 d	M	7	63.61	3.69	5.80	57.60	69.60
MKD	o4 d	F	5	58.30	5.67	9.73	51.60	66.40
MKD	o5 s	M	7	21.16	1.65	7.79	19.00	23.60
MKD	o5 s	F	10	19.54	1.78	9.11	17.20	22.00
MKD	o5 d	M	7	22.51	1.46	6.49	21.00	24.60

Necropolis	Character (1)	Sex	Tot. No.	Mean	Stand. Dev.	Var. Coeff.	Min. Val.	Max. Val.
MKD	o5 d	F	6	19.75	2.07	10.49	17.40	22.10
MKD	o6 s	M	7	16.56	0.64	3.85	15.80	17.40
MKD	o6 s	F	10	15.26	1.94	12.71	13.10	18.90
MKD	o6 d	M	7	16.93	1.21	7.14	15.90	19.00
MKD	o6 d	F	6	14.78	1.75	11.83	13.00	17.00
MKD	o9 s	M	4	41.50	2.92	7.04	38.00	44.50
MKD	o9 s	F	6	35.62	2.94	8.26	32.00	40.10
MKD	o9 d	M	7	42.19	1.99	4.72	39.00	44.40
MKD	o9 d	F	7	37.57	3.17	8.43	33.00	42.00
MKD	o10 s	M	7	45.23	2.32	5.13	42.40	48.50
MKD	o10 s	F	8	39.10	2.66	6.80	36.40	42.80
MKD	o10 d	M	7	45.04	1.50	3.33	43.00	47.60
MKD	o10 d	F	7	39.96	3.15	7.87	36.00	44.80
MKD	r1 s	M	7	261.03	9.76	3.74	246.00	272.60
MKD	r1 s	F	4	240.75	20.63	8.57	215.00	265.00
MKD	r1 d	M	4	268.75	4.57	1.70	263.00	274.00
MKD	r1 d	F	3	243.00	25.47	10.48	218.70	269.50
MKD	r2 s	M	7	247.33	8.85	3.58	233.50	257.20
MKD	r2 s	F	4	229.75	18.45	8.03	206.00	250.00
MKD	r2 d	M	5	253.16	3.46	1.37	249.70	258.00
MKD	r2 d	F	3	230.50	23.29	10.10	208.00	254.50
MKD	r3 s	F	1	10.00			10.00	10.00
MKD	r4 s	M	8	14.85	0.92	6.16	13.90	16.50
MKD	r4 s	F	6	13.07	1.43	10.97	11.00	15.20
MKD	r4 d	M	5	15.04	1.09	7.23	13.80	16.30
MKD	r4 d	F	4	14.35	1.90	13.20	12.50	17.00
MKD	r5 s	M	8	11.79	1.04	8.81	10.40	13.20
MKD	r5 s	F	5	10.56	1.31	12.39	9.30	12.70
MKD	r5 d	M	5	12.16	0.75	6.17	11.20	13.20
MKD	r5 d	F	4	11.15	1.29	11.54	9.90	12.80
MKD	u1 s	M	8	276.00	7.73	2.80	267.50	288.70
MKD	u1 s	F	4	258.38	20.07	7.77	234.50	283.00
MKD	u1 d	M	6	280.57	8.54	3.04	272.00	294.00
MKD	u1 d	F	2	246.50	13.44	5.45	237.00	256.00
MKD	u2 s	M	9	246.79	8.46	3.43	234.80	258.80
MKD	u2 s	F	4	229.03	17.61	7.69	208.10	250.40
MKD	u2 d	M	6	249.97	6.87	2.75	243.70	258.80
MKD	u2 d	F	2	219.40			210.20	228.60
MKD	u11 s	M	11	13.20	0.74	5.61	11.70	14.00
MKD	u11 s	F	7	12.43	1.11	8.92	11.10	14.20
MKD	u11 d	M	10	14.70	1.05	7.11	13.00	16.00
MKD	u11 d	F	5	12.30	1.89	15.34	10.80	15.40
MKD	u12 s	M	11	16.49	1.49	9.04	14.30	18.60
MKD	u12 s	F	7	14.03	1.90	13.57	10.50	16.60
MKD	u12 d	M	10	16.78	1.26	7.50	14.40	18.50
MKD	u12 d	F	5	14.52	0.75	5.14	14.00	15.80
MKD	u13 s	M	11	20.82	2.91	13.96	15.10	25.40
MKD	u13 s	F	8	18.43	3.03	16.47	15.60	24.70
MKD	u13 d	M	11	22.45	2.58	11.47	18.50	27.00
MKD	u13 d	F	5	18.62	2.17	11.63	15.10	21.00
MKD	u14 s	M	11	23.05	1.76	7.65	20.20	25.40
MKD	u14 s	F	9	21.21	2.53	11.93	18.20	26.40
MKD	u14 d	M	11	24.19	1.97	8.13	20.20	27.20
MKD	u14 d	F	5	20.24	2.18	10.75	18.00	23.70

(1) - Legend of abbreviations of metric variables

Reference number according to Martin & Saller (1957) - HUMERUS (o): 1 maximum length, 2 physiological length, 3 width of superior epiphysis, 4 width of inferior epiphysis, 5 maximum diameter at mid diaphysis, 6 minimum diameter of diaphysis, 7 minimum perimeter of diaphysis, 7a perimeter of diaphysis in the middle, 8 perimeter of the head, 9 transversal diameter of the head, 10 vertical diameter of the head. RADIUS (r): 1 maximum length, 1b parallel length, 2 physiological length, 3 minimum perimeter, 4 transversal diameter of diaphysis, 5 sagittal diameter of diaphysis. ULNA (u): 1 maximum length, 2 physiological length, 3 minimum perimeter of diaphysis, 8 height of olecranon, 13 superior transversal diameter, 14 superior dorso-volar diameter.

Table 5 – Necropolis of MKD: Descriptive statistics of leg measures

Necropolis	Character (1)	Sex	Tot. No.	Mean	Stand. Dev.	Var. Coeff.	Min. Val.	Max. Val.
MKD	f1 s	M	8	474.91	13.50	2.84	463.70	500.80
MKD	f1 s	F	3	440.90	30.51	6.92	416.20	475.00
MKD	f1 d	M	8	475.02	12.56	2.64	460.40	495.00
MKD	f1 d	F	2	461.15			453.30	469.00
MKD	f2 s	M	8	472.48	13.25	2.80	460.50	496.50
MKD	f2 s	F	3	437.17	28.64	6.55	413.50	469.00
MKD	f2 d	M	8	471.86	12.31	2.61	458.10	491.00
MKD	f2 d	F	2	458.65			452.00	465.30
MKD	f3 s	M	8	460.64	10.61	2.30	448.00	477.00
MKD	f3 s	F	3	424.10	24.58	5.79	404.00	451.50
MKD	f3 d	M	8	460.41	10.33	2.24	446.50	475.80
MKD	f3 d	F	2	445.10			443.00	447.20
MKD	f4 s	M	8	451.49	11.52	2.55	437.00	467.00
MKD	f4 s	F	3	414.17	22.54	5.44	395.00	439.00
MKD	f4 d	M	8	448.66	9.97	2.22	437.00	462.50
MKD	f4 d	F	2	436.90			436.00	437.80
MKD	f6 s	M	7	31.53	1.97	6.25	30.00	35.30
MKD	f6 s	F	5	26.50	1.77	6.68	24.00	28.10
MKD	f6 d	M	10	31.84	1.66	5.22	28.80	34.50
MKD	f6 d	F	4	28.48	2.64	9.27	24.60	30.50
MKD	f7 s	M	7	26.73	1.09	4.10	25.00	28.60
MKD	f7 s	F	5	24.88	2.08	8.34	22.00	27.00
MKD	f7 d	M	10	26.43	1.37	5.20	23.80	28.60
MKD	f7 d	F	4	25.35	2.67	10.54	21.50	27.30
MKD	f8 s	M	7	90.29	3.72	4.12	85.00	96.00
MKD	f8 s	F	5	80.00	6.83	8.54	70.50	85.50
MKD	f8 d	M	10	90.20	4.35	4.82	80.00	95.00
MKD	f8 d	F	4	83.50	1.78	2.13	82.00	85.50
MKD	f9 s	M	8	35.59	1.46	4.12	33.50	38.50
MKD	f9 s	F	4	32.02	3.00	9.36	29.70	36.20
MKD	f9 d	M	9	35.99	1.75	4.85	34.00	40.10
MKD	f9 d	F	4	32.02	5.40	16.86	25.20	38.40
MKD	f10 s	M	8	28.49	1.69	5.93	26.00	31.00
MKD	f10 s	F	4	26.18	3.21	12.27	23.40	30.80
MKD	f10 d	M	9	27.90	1.90	6.82	24.60	31.50
MKD	f10 d	F	3	26.60	1.91	7.16	25.50	28.80
MKD	f15 s	M	8	32.67	2.31	7.07	30.00	36.50
MKD	f15 s	F	4	27.43	3.30	12.04	24.40	31.60
MKD	f15 d	M	10	33.71	1.80	5.35	31.50	37.00
MKD	f15 d	F	4	28.40	3.52	12.41	24.20	32.20
MKD	f16 s	M	8	26.90	1.95	7.25	24.90	30.00
MKD	f16 s	F	4	23.25	3.30	14.20	19.00	26.90
MKD	f16 d	M	10	27.23	1.63	5.99	24.60	29.50
MKD	f16 d	F	4	23.25	2.81	12.07	19.90	25.90
MKD	f18 s	M	8	46.55	1.66	3.56	44.70	50.00
MKD	f18 s	F	5	40.28	2.86	7.10	36.10	44.10
MKD	f18 d	M	9	46.17	2.23	4.83	43.40	50.70
MKD	f18 d	F	4	40.38	3.35	8.29	35.90	44.00
MKD	f19 s	M	8	46.42	1.44	3.09	44.40	48.80
MKD	f19 s	F	4	41.42	1.59	3.83	40.50	43.80
MKD	f19 d	M	9	45.98	1.57	3.42	43.20	49.00
MKD	f19 d	F	4	40.62	3.09	7.61	36.50	44.00
MKD	f21 s	M	9	81.64	3.86	4.73	76.00	88.00
MKD	f21 s	F	6	72.92	4.59	6.29	65.00	78.00
MKD	f21 d	M	8	82.15	3.63	4.42	77.50	89.50
MKD	f21 d	F	3	73.00	2.77	3.80	69.80	74.70
MKD	t1 s	M	4	401.45	16.00	3.99	378.00	414.00
MKD	t1 s	F	3	387.03	12.25	3.17	373.00	395.60
MKD	t1 d	M	7	401.11	10.67	2.66	381.00	414.80
MKD	t1 d	F	3	383.17	9.36	2.44	372.50	390.00
MKD	t1a s	M	4	400.80	15.26	3.81	378.00	410.20
MKD	t1a s	F	3	390.10	10.57	2.71	378.00	397.50
MKD	t1a d	M	7	400.69	10.27	2.56	383.50	415.00
MKD	t1a d	F	3	387.50	9.10	2.35	377.00	393.00
MKD	t1b s	M	4	387.95	16.20	4.17	365.00	401.30
MKD	t1b s	F	3	377.17	11.03	2.92	365.00	386.50
MKD	t1b d	M	6	390.37	13.71	3.51	366.00	405.20
MKD	t1b d	F	3	376.60	10.92	2.90	364.00	383.30
MKD	t3 s	M	4	79.53	2.43	3.06	76.70	81.70
MKD	t3 s	F	4	69.40	2.44	3.52	67.10	71.80
MKD	t3 d	M	4	77.72	4.18	5.38	74.00	83.70
MKD	t3 d	F	4	70.10	2.77	3.96	66.00	71.90
MKD	t4 s	M	3	47.83	1.27	2.65	46.70	49.20
MKD	t4 s	F	4	40.50	1.81	4.48	38.40	42.50
MKD	t4 d	M	6	46.15	1.80	3.90	43.20	48.20
MKD	t4 d	F	4	42.17	3.54	8.39	38.80	47.00
MKD	t5 d	M	3	39.67	1.26	3.17	38.50	41.00
MKD	t5 d	F	4	39.75	3.78	9.52	36.10	44.80
MKD	t5 d	M	6	43.05	2.92	6.79	39.50	46.20
MKD	t5 d	F	4	40.17	4.68	11.65	36.80	47.00
MKD	t6 s	M	6	45.10	3.19	7.07	39.80	47.60
MKD	t6 s	F	5	39.98	1.98	4.96	37.20	42.50
MKD	t6 d	M	9	46.23	2.36	5.10	42.00	49.00
MKD	t6 d	F	3	41.33	1.85	4.48	39.50	43.20
MKD	t8 s	M	4	33.73	1.19	3.54	32.60	35.40
MKD	t8 s	F	6	27.68	3.79	13.67	24.00	32.40
MKD	t8 d	M	8	33.34	1.77	5.30	30.00	35.30
MKD	t8 d	F	5	29.18	2.66	9.11	24.60	31.00
MKD	t8a s	M	4	38.70	3.88	10.02	34.30	42.30
MKD	t8a s	F	4	33.23	3.65	10.99	29.00	37.90
MKD	t8a d	M	8	38.00	2.15	5.64	35.40	41.00
MKD	t8a d	F	4	33.12	3.45	10.43	28.40	36.70
MKD	t9 s	M	4	22.65	1.60	7.08	20.40	24.20
MKD	t9 s	F	6	20.78	2.12	10.18	18.30	24.00
MKD	t9 d	M	8	22.84	2.06	9.00	20.50	25.30
MKD	t9 d	F	5	21.54	2.49	11.57	18.30	24.80
MKD	t9a s	M	4	23.55	1.31	5.56	21.90	24.70
MKD	t9a s	F	4	21.68	2.03	9.37	19.30	24.10
MKD	t9a d	M	8	23.93	1.47	6.15	22.10	26.00
MKD	t9a d	F	4	21.88	2.99	13.66	18.90	25.30
MKD	p1 s	F	1	356.00			356.00	356.00
MKD	p2 s	F	1	12.30			12.30	12.30
MKD	p2 d	F	1	14.60			14.60	14.60
MKD	p3 s	F	1	9.80			9.80	9.80
MKD	p3 d	F	1	10.70			10.70	10.70

(1) - Legend of abbreviations of metric variables

Reference number according to Martin & Saller (1957) - FEMUR (f): 1 maximum length, 2 oblique length, 3 trocanteric maximum length, 4 trocanteric oblique length, 6 anterior-posterior diameter of the midshaft, 7 mediolateral diameter of the midshaft, 8 circumference of the midshaft, 9 sub-trocanteric mediolateral diameter, 10 sub-trocanteric anterior-posterior diameter, 15 vertical diameter of the neck, 16 anterior-posterior diameter diameter of the neck, 18 maximum (vertical) diameter of the head, 19 mediolateral diameter of the head, 21 bicondylar width. TIBIA (t): 1 total length (condilo-malleolar), 1a maximum length (spino-malleolar), 1b medial length, 3 maximum width superior epiphysis, 4 tuberosity anterior-posterior diameter, 5 tuberosity mediolateral diameter, 6 width of inferior epiphysis, 8 anterior-posterior diameter of the midshaft, 8a anterior-posterior diameter at the nutrient foramen, 9 mediolateral diameter of the midshaft, 9a mediolateral diameter at the nutrient foramen, 10 circumference of the midshaft, 10b minimal diaphysis circumference. FIBULA (p): 1 maximum length, 2 maximum diameter of the midshaft, 3 minimal diameter of the midshaft, 4a minimal diaphysis circumference.

Table 6 – Necropolis of KAH: Descriptive statistics of skull measures

Necropolis	Character (1)	Sex	Tot. No.	Mean	Stand. Dev.	Var. Coeff.	Min. Val.	Max. Val.
KAH	n1	M	1	171.00			171.00	171.00
KAH	n1	F	3	173.33	5.23	3.02	167.80	178.20
KAH	n5	M	1	96.50			96.50	96.50
KAH	n5	F	3	96.00	1.00	1.04	95.00	97.00
KAH	n8	M	1	136.00			136.00	136.00
KAH	n8	F	3	130.63	0.55	0.42	130.00	131.00
KAH	n9	M	1	87.40			87.40	87.40
KAH	n9	F	3	87.53	0.93	1.06	86.50	88.30
KAH	n10	M	1	112.40			112.40	112.40
KAH	n10	F	3	111.27	4.02	3.61	107.50	115.50
KAH	n17	M	1	134.50			134.50	134.50
KAH	n17	F	3	124.90	1.01	0.81	124.00	126.00
KAH	n29	M	1	110.80			110.80	110.80
KAH	n29	F	3	105.63	1.79	1.70	103.60	107.00
KAH	n30	M	1	113.40			113.40	113.40
KAH	n30	F	3	110.00	2.49	2.26	107.30	112.20
KAH	n31	M	1	92.90			92.90	92.90
KAH	n31	F	3	93.70	2.74	2.92	91.60	96.80
KAH	s40	M	1	88.70			88.70	88.70
KAH	s40	F	3	90.57	0.93	1.03	89.50	91.20
KAH	s43	F	3	96.17	1.00	1.04	95.20	97.20
KAH	s45	F	3	122.07	0.95	0.78	121.10	123.00
KAH	s46	M	1	99.20			99.20	99.20
KAH	s46	F	3	96.87	3.85	3.98	94.30	101.30
KAH	s47	F	1	64.60			64.60	64.60
KAH	s48	M	1	68.20			68.20	68.20
KAH	s48	F	4	67.78	5.78	8.53	61.00	75.10
KAH	s51 s	M	1	36.30			36.30	36.30
KAH	s51 s	F	6	36.63	1.53	4.19	35.60	39.70
KAH	s51 d	M	1	36.20			36.20	36.20
KAH	s51 d	F	4	35.65	0.30	0.84	35.30	35.90
KAH	s52 s	M	1	29.40			29.40	29.40
KAH	s52 s	F	5	33.34	2.28	6.83	30.60	36.40
KAH	s52 d	M	1	30.50			30.50	30.50
KAH	s52 d	F	4	34.30	2.25	6.57	31.80	36.90
KAH	s54	M	1	25.10			25.10	25.10
KAH	s54	F	6	26.32	1.82	6.91	23.80	28.20
KAH	s55	M	1	48.80			48.80	48.80
KAH	s55	F	5	50.18	2.83	5.64	46.10	53.50
KAH	s62	M	1	42.00			42.00	42.00
KAH	s62	F	5	43.12	3.11	7.21	38.00	45.20
KAH	s63	M	1	41.00			41.00	41.00
KAH	s63	F	4	41.40	3.94	9.52	35.50	43.60
KAH	m65	M	1	122.00			122.00	122.00
KAH	m65	F	2	115.30			112.50	118.10
KAH	m66	M	2	90.10			84.10	96.10
KAH	m66	F	3	90.47	2.97	3.28	87.20	93.00
KAH	m67	M	4	43.73	0.98	2.25	42.60	45.00
KAH	m67	F	7	44.21	1.69	3.83	42.20	47.20
KAH	m68	M	2	77.50			77.00	78.00
KAH	m68	F	3	74.07	2.72	3.68	71.00	76.20
KAH	m69	M	2	33.75			33.00	34.50
KAH	m69	F	3	31.90	1.54	4.83	30.60	33.60
KAH	m69(1) s	M	3	26.90	2.62	9.74	24.00	29.10
KAH	m69(1) s	F	5	29.88	2.67	8.94	26.00	33.50
KAH	m69(1) d	M	1	31.40			31.40	31.40
KAH	m69(1) d	F	2	30.60			30.40	30.80
KAH	m69(2) s	M	1	27.70			27.70	27.70
KAH	m69(2) s	F	2	26.45			25.90	27.00
KAH	m69(2) d	M	1	27.50			27.50	27.50
KAH	m69(2) d	F	1	26.70			26.70	26.70
KAH	m69(3) s	M	5	11.36	1.19	10.50	9.50	12.40
KAH	m69(3) s	F	9	11.71	1.13	9.62	10.10	13.20
KAH	m69(3) d	M	4	11.30	0.91	8.08	10.00	12.10
KAH	m69(3) d	F	7	11.17	1.17	10.46	9.60	12.50
KAH	m70	M	3	60.30	4.33	7.17	55.50	63.90
KAH	m70	F	5	54.74	4.31	7.87	50.00	60.30
KAH	m71 s	M	2	44.05			39.70	48.40
KAH	m71 s	F	4	47.23	3.01	6.38	43.10	50.00
KAH	m71 d	M	3	46.47	3.70	7.96	42.20	48.70
KAH	m71 d	F	5	47.62	2.42	5.08	43.60	49.50
KAH	m71a s	M	3	29.37	2.87	9.78	26.10	31.50
KAH	m71a s	F	4	32.80	1.76	5.36	31.20	35.30
KAH	m71a d	M	3	32.07	4.55	14.19	27.50	36.60
KAH	m71a d	F	6	32.65	2.87	8.78	28.90	37.70

(1) - Legend of abbreviations of metric variables

Reference number according to Martin & Saller (1957) - NEUROCRANIUM (n): 1 maximum length, 5 length of base, 8 maximum width, 9 minimum frontal width, 10 maximum frontal width, 10b stephanial width, 12 biasteric diameter, 17 basiobregmatic height, 20 auricular height, 23 horizontal circumference at the glabella, 25 total sagittal arch, 26 frontal sagittal arch, 27 parietal sagittal arch, 28 occipital sagittal arch, 29 median sagittal frontal cord, 30 median sagittal parietal cord, 31 median sagittal occipital cord. SPLANCHNOCRANIUM (s): 40 length of face, 43 superior facial width, 45 bizygomatic width, 46 maximum bimascellary width, 47 total height of face, 48 superior height of face, 51 orbital width, 52 orbital height, 54 nasal width, 55 nasal height, 60 maxillo-alveolar length, 61 maxillo-alveolar width, 62 length of palate, 63 width of palate. MANDIBLE (m): 65 intercondyloid width, 66 bigonial width, 67 width at mental foramina, 68 total length, 69 height at symphysis, 69(1) height of body at mental foramen, 69(2) height of body at second molar, 69(3) thickness of body at mental foramen, 70 height of ramus, 71 maximum width of ramus, 71a minimum width of ramus.

Table 7 – Necropolis of KAH: Descriptive statistics of arm measures

Necropolis	Character (1)	Sex	Tot. No.	Mean	Stand. Dev.	Var. Coeff.	Min. Val.	Max. Val.
KAH	o1 s	M	1	335.20			335.20	335.20
KAH	o1 s	F	4	304.55	10.36	3.40	295.00	315.70
KAH	o1 d	M	2	328.50			322.10	334.90
KAH	o1 d	F	3	309.57	7.91	2.56	305.00	318.70
KAH	o2 s	M	1	334.00			334.00	334.00
KAH	o2 s	F	4	301.93	9.99	3.31	292.70	312.00
KAH	o2 d	M	2	324.30			318.00	330.60
KAH	o2 d	F	3	305.80	8.16	2.67	300.50	315.20
KAH	o3 s	M	1	46.00			46.00	46.00
KAH	o3 s	F	4	42.70	2.25	5.27	40.00	45.50
KAH	o3 d	M	3	48.67	2.22	4.56	46.30	50.70
KAH	o3 d	F	3	43.67	1.16	2.64	43.00	45.00
KAH	o4 s	M	2	64.05			61.80	66.30
KAH	o4 s	F	6	55.78	2.70	4.84	52.70	60.50
KAH	o4 d	M	3	62.53	1.76	2.82	61.10	64.50
KAH	o4 d	F	5	56.44	3.39	6.01	52.80	62.00
KAH	o5 s	M	2	21.85			21.50	22.20
KAH	o5 s	F	10	19.78	1.10	5.54	18.10	21.50
KAH	o5 d	M	3	23.27	1.63	7.00	21.40	24.40
KAH	o5 d	F	6	20.47	1.27	6.19	18.40	22.00
KAH	o6 s	M	2	17.40			16.70	18.10
KAH	o6 s	F	10	15.25	0.99	6.51	13.50	16.70
KAH	o6 d	M	3	17.20	0.79	4.62	16.60	18.10
KAH	o6 d	F	6	15.65	0.91	5.81	14.30	17.10
KAH	o9 s	M	1	42.60			42.60	42.60
KAH	o9 s	F	6	36.22	1.46	4.03	33.40	37.70
KAH	o9 d	M	2	41.70			40.40	43.00
KAH	o9 d	F	4	36.40	1.50	4.13	35.10	38.40
KAH	o10 s	M	1	44.50			44.50	44.50
KAH	o10 s	F	4	40.10	1.29	3.23	39.00	41.50
KAH	o10 d	M	3	45.73	0.87	1.91	45.00	46.70
KAH	o10 d	F	3	41.13	1.21	2.93	40.00	42.40
KAH	r1 s	M	2	264.25			262.50	266.00
KAH	r1 s	F	4	219.88	9.11	4.14	206.50	227.00
KAH	r1 d	M	2	266.75			266.50	267.00

Necropolis	Character (1)	Sex	Tot. No.	Mean	Stand. Dev.	Var. Coeff.	Min. Val.	Max. Val.
KAH	r1 d	F	3	231.23	4.63	2.00	225.90	234.20
KAH	r2 s	M	2	251.85			250.50	253.20
KAH	r2 s	F	5	205.10	11.84	5.78	188.80	215.00
KAH	r2 d	M	2	254.00			254.00	254.00
KAH	r2 d	F	3	218.87	2.38	1.09	216.30	221.00
KAH	r3 s	M	1	12.70			12.70	12.70
KAH	r3 s	F	1	10.40			10.40	10.40
KAH	r3 d	M	1	12.30			12.30	12.30
KAH	r4 s	M	3	15.10	0.95	6.32	14.20	16.10
KAH	r4 s	F	5	12.34	1.51	12.24	10.10	13.70
KAH	r4 d	M	3	15.77	1.45	9.20	14.30	17.20
KAH	r4 d	F	3	13.30	0.87	6.51	12.80	14.30
KAH	r5 s	M	2	13.35		0.53	13.30	13.40
KAH	r5 s	F	4	11.97	0.56	4.69	11.50	12.60
KAH	r5 d	M	2	13.30		3.19	13.00	13.60
KAH	r5 d	F	3	10.77	1.14	10.56	9.50	11.70
KAH	u1 s	M	2	285.00			285.00	285.00
KAH	u1 s	F	4	249.20	9.14	3.67	240.80	261.50
KAH	u1 d	M	2	287.35			284.70	290.00
KAH	u1 d	F	3	250.80	7.01	2.80	245.70	258.80
KAH	u2 s	M	2	253.60			250.80	256.40
KAH	u2 s	F	4	219.78	11.14	5.07	211.80	236.10
KAH	u2 d	M	2	253.50			253.10	253.90
KAH	u2 d	F	3	218.33	3.70	1.70	216.00	222.60
KAH	u8 d	F	1	10.80			10.80	10.80
KAH	u11 s	M	3	14.43	0.67	4.61	13.70	15.00
KAH	u11 s	F	6	13.37	1.24	9.29	12.20	15.70
KAH	u11 d	M	3	13.57	1.76	12.98	11.70	15.20
KAH	u11 d	F	5	13.16	1.14	8.69	12.10	14.50
KAH	u12 s	M	3	16.80	1.15	6.87	15.50	17.70
KAH	u12 s	F	6	15.62	1.57	10.03	13.60	18.10
KAH	u12 d	M	3	16.93	1.53	9.04	16.00	18.70
KAH	u12 d	F	5	16.50	2.05	12.41	13.70	19.00
KAH	u13 s	M	4	24.70	0.53	2.14	24.00	25.20
KAH	u13 s	F	5	19.60	1.01	5.15	18.30	20.70
KAH	u13 d	M	5	24.12	1.22	5.06	22.00	25.10
KAH	u13 d	F	6	19.10	2.88	15.07	16.20	22.20
KAH	u14 s	M	4	25.45	2.28	8.96	22.50	27.30
KAH	u14 s	F	6	22.87	1.67	7.29	20.70	25.00
KAH	u14 d	M	5	24.46	1.83	7.46	22.30	26.50
KAH	u14 d	F	5	22.10	3.36	15.21	18.20	26.60

(1) - Legend of abbreviations of metric variables

Reference number according to Martin & Saller (1957) - HUMERUS (o): 1 maximum length, 2 physiological length, 3 width of superior epiphysis, 4 width of inferior epiphysis, 5 maximum diameter at mid diaphysis, 6 minimum diameter of diaphysis, 7 minimum perimeter of diaphysis, 7a perimeter of diaphysis in the middle, 8 perimeter of the head, 9 transversal diameter of the head, 10 vertical diameter of the head. RADIUS (r): 1 maximum length, 1b parallel length, 2 physiological length, 3 minimum perimeter, 4 transversal diameter of diaphysis, 5 sagittal diameter of diaphysis. ULNA (u): 1 maximum length, 2 physiological length, 3 minimum perimeter of diaphysis, 8 height of olecranon, 13 superior transversal diameter, 14 superior dorso-volar diameter.

Table 8 – Necropolis of KAH: Descriptive statistics of leg measures

Necropolis	Character (1)	Sex	Tot. No.	Mean	Stand. Dev.	Var. Coeff.	Min. Val.	Max. Val.
KAH	f1 s	M	2	466.10			452.00	480.30
KAH	f1 s	F	5	419.18	8.04	1.92	409.50	427.00
KAH	f1 d	M	3	468.10	13.12	2.80	458.30	483.00
KAH	f1 d	F	3	421.27	6.99	1.66	413.20	425.60
KAH	f2 s	M	2	462.90			449.80	476.00
KAH	f2 s	F	5	416.50	8.08	1.94	407.00	424.00
KAH	f2 d	M	3	464.50	13.08	2.82	454.50	479.30
KAH	f2 d	F	3	418.10	7.89	1.89	409.00	423.00
KAH	f3 s	M	2	457.25			443.00	471.50
KAH	f3 s	F	5	409.30	11.16	2.73	397.20	422.00
KAH	f3 d	M	3	455.03	15.19	3.34	443.00	472.10
KAH	f3 d	F	3	411.83	13.29	3.23	396.50	420.00
KAH	f4 s	M	2	444.85			432.70	457.00
KAH	f4 s	F	5	399.58	11.55	2.89	387.90	412.00
KAH	f4 d	M	3	445.37	15.32	3.44	428.90	459.20
KAH	f4 d	F	3	401.73	12.77	3.18	387.00	409.70
KAH	f6 s	M	6	29.68	1.77	5.97	27.20	32.30
KAH	f6 s	F	8	26.06	1.77	6.81	22.80	28.90
KAH	f6 d	M	4	30.07	1.55	5.17	28.30	31.70
KAH	f6 d	F	5	25.92	1.71	6.58	24.50	28.70
KAH	f7 s	M	6	28.08	2.90	10.31	24.70	33.00
KAH	f7 s	F	8	25.44	2.97	11.68	20.90	29.80
KAH	f7 d	M	4	27.32	2.73	9.99	25.20	31.30
KAH	f7 d	F	5	25.26	2.28	9.02	22.00	27.80
KAH	f8 s	M	6	89.42	4.65	5.20	84.00	94.50
KAH	f8 s	F	8	78.75	6.31	8.01	68.50	87.50
KAH	f8 d	M	4	89.12	2.84	3.19	86.00	92.00
KAH	f8 d	F	5	79.20	4.83	6.10	72.50	85.50
KAH	f9 s	M	6	34.75	1.04	2.98	33.50	36.50
KAH	f9 s	F	8	31.79	3.39	10.66	26.80	36.00
KAH	f9 d	M	4	34.62	2.57	7.42	31.60	37.00
KAH	f9 d	F	6	32.68	3.98	12.17	28.30	38.70
KAH	f10 s	M	6	29.58	2.76	9.33	27.00	34.60
KAH	f10 s	F	8	25.93	2.49	9.61	22.70	29.80
KAH	f10 d	M	4	28.70	2.60	9.05	26.10	32.30
KAH	f10 d	F	6	25.77	2.34	9.09	22.60	29.30
KAH	f15 s	M	8	32.17	1.95	6.06	28.20	34.30
KAH	f15 s	F	9	27.62	1.91	6.92	23.80	30.00
KAH	f15 d	M	4	32.67	1.42	4.35	30.60	33.80
KAH	f15 d	F	7	28.47	1.24	4.34	26.40	29.90
KAH	f16 s	M	7	27.70	1.68	6.05	25.70	30.70
KAH	f16 s	F	9	23.92	2.05	8.58	21.20	26.70
KAH	f16 d	M	4	26.82	1.13	4.21	25.50	28.20
KAH	f16 d	F	8	24.19	1.11	4.57	22.60	25.70
KAH	f18 s	M	6	46.92	0.96	2.04	46.00	48.50
KAH	f18 s	F	7	39.47	2.43	6.15	36.00	43.20
KAH	f18 d	M	4	47.58	0.99	2.08	46.20	48.50
KAH	f18 d	F	8	40.19	2.10	5.23	37.20	43.20
KAH	f19 s	M	5	46.60	1.66	3.55	44.60	48.60
KAH	f19 s	F	7	38.79	2.19	5.66	36.00	41.60
KAH	f19 d	M	3	47.17	1.01	2.15	46.00	47.80
KAH	f19 d	F	9	39.26	2.10	5.35	36.00	41.70
KAH	f21 s	M	2	75.65			73.80	77.50
KAH	f21 s	F	3	72.87	1.63	2.23	71.00	74.00
KAH	f21 d	M	2	76.10			73.50	78.70
KAH	f21 d	F	3	73.10	2.51	3.44	70.20	74.60
KAH	t1 s	M	2	407.00			404.00	410.00
KAH	t1 s	F	5	347.66	14.50	4.17	326.00	363.50
KAH	t1 d	M	4	387.00	25.56	6.61	349.00	403.00
KAH	t1 d	F	3	354.00	8.00	2.26	346.00	362.00
KAH	t1a s	M	3	402.47	16.03	3.98	384.40	415.00
KAH	t1a s	F	5	351.70	13.24	3.77	332.00	366.20
KAH	t1a d	M	5	389.40	23.20	5.96	351.00	406.70
KAH	t1a d	F	3	358.57	7.71	2.15	350.60	366.00

Necropolis	Character (1)	Sex	Tot. No.	Mean	Stand. Dev.	Var. Coeff.	Min. Val.	Max. Val.
KAH	t1b s	M	3	392.57	15.67	3.99	374.70	404.00
KAH	t1b s	F	4	347.70	6.04	1.74	340.00	353.00
KAH	t1b d	M	5	378.66	20.34	5.37	345.00	394.00
KAH	t1b d	F	3	349.57	6.15	1.76	343.00	355.20
KAH	t3 s	M	3	76.57	1.53	2.00	75.40	78.30
KAH	t3 s	F	4	67.03	1.74	2.59	64.70	68.50
KAH	t3 d	M	3	77.33	1.53	1.98	76.00	79.00
KAH	t3 d	F	4	67.88	2.00	2.94	65.10	69.80
KAH	t4 s	M	4	44.83	2.22	4.94	43.00	48.00
KAH	t4 s	F	6	39.13	2.79	7.12	35.30	42.00
KAH	t4 d	M	4	45.70	2.49	5.45	42.00	47.30
KAH	t4 d	F	3	39.57	3.87	9.78	35.50	43.20
KAH	t5 d	M	3	45.90	3.65	7.95	42.20	49.50
KAH	t5 d	F	6	37.92	3.97	10.47	33.00	45.00
KAH	t5 d	M	4	44.00	3.58	8.14	40.50	49.00
KAH	t5 d	F	3	39.77	2.93	7.36	37.30	43.00
KAH	t6 s	M	4	46.12	3.58	7.76	42.20	49.50
KAH	t6 s	F	7	39.07	2.11	5.39	37.50	42.70
KAH	t6 d	M	5	46.60	2.03	4.35	43.60	48.50
KAH	t6 d	F	5	40.64	2.08	5.13	38.20	43.80
KAH	t8 s	M	5	29.82	5.14	17.24	21.50	35.00
KAH	t8 s	F	7	27.44	2.98	10.84	23.70	32.40
KAH	t8 d	M	5	31.84	1.97	6.18	30.00	34.60
KAH	t8 d	F	5	28.00	1.45	5.19	26.40	30.30
KAH	t8a s	M	4	36.73	1.84	5.00	34.00	38.00
KAH	t8a s	F	6	30.82	2.72	8.82	27.30	34.70
KAH	t8a d	M	6	35.67	2.47	6.92	31.40	38.20
KAH	t8a d	F	3	33.03	1.29	3.89	32.10	34.50
KAH	t9 s	M	5	23.50	2.94	12.49	20.50	27.80
KAH	t9 s	F	7	19.73	1.53	7.74	17.80	22.00
KAH	t9 d	M	6	24.10	1.37	5.68	21.60	25.50
KAH	t9 d	F	4	21.68	1.81	8.38	19.10	23.00
KAH	t9a s	M	4	24.95	2.49	9.99	21.30	26.90
KAH	t9a s	F	6	20.85	1.62	7.77	19.00	23.40
KAH	t9a d	M	4	25.40	2.54	9.99	22.50	28.60
KAH	t9a d	F	4	22.32	1.58	7.07	20.20	23.90
KAH	p1 s	M	1	387.50			387.50	387.50
KAH	p1 s	F	4	341.95	13.86	4.05	322.00	354.00
KAH	p1 d	M	1	385.20			385.20	385.20
KAH	p1 d	F	3	345.17	2.47	0.71	343.50	348.00
KAH	p2 s	M	5	15.18	1.82	11.97	13.20	17.80
KAH	p2 s	F	4	13.18	2.00	15.19	10.20	14.40
KAH	p2 d	M	2	14.40			13.00	15.80
KAH	p2 d	F	3	15.03	0.55	3.66	14.50	15.60
KAH	p3 s	M	5	12.10	1.12	9.29	10.60	13.10
KAH	p3 s	F	4	10.78	1.67	15.54	8.80	12.40
KAH	p3 d	M	2	11.20			10.10	12.30
KAH	p3 d	F	3	11.67	1.59	13.67	9.90	13.00

(1) - Legend of abbreviations of metric variables

Reference number according to Martin & Saller (1957) - FEMUR (f): 1 maximum length, 2 oblique length, 3 trocanteric maximum length, 4 trocanteric oblique length, 6 anterior-posterior diameter of the midshaft, 7 mediolateral diameter of the midshaft, 8 circumference of the midshaft, 9 sub-trocanteric mediolateral diameter, 10 sub-trocanteric anterior-posterior diameter, 15 vertical diameter of the neck, 16 anterior-posterior diameter diameter of the neck, 18 maximum (vertical) diameter of the head, 19 mediolateral diameter of the head, 21 bicondylar width. TIBIA (t): 1 total length (condilo-malleolar), 1a maximum length (spino-malleolar), 1b medial length, 3 maximum width superior epiphysis, 4 tuberosity anterior-posterior diameter, 5 tuberosity mediolateral diameter, 6 width of inferior epiphysis, 8 anterior-posterior diameter of the midshaft, 8a anterior-posterior diameter at the nutrient foramen, 9 mediolateral diameter of the midshaft, 9a mediolateral diameter at the nutrient foramen, 10 circumference of the midshaft, 10b minimal diaphysis circumference. FIBULA (p): 1 maximum length, 2 maximum diameter of the midshaft, 3 minimal diameter of the midshaft, 4a minimal diaphysis circumference.

Table 9 – ANOVA of measures of the skeleton between the necropolises of MKD and KAH

Char.	Sex	N	MKD Mean	S.D.	N	KAH Mean	S.D.	F	P
s51	F	6	37.45	1.82	10	36.24	1.26	2.49	0.137
s52	F	5	32.40	1.58	9	33.77	2.18	1.51	0.243
s54	F	4	23.88	0.33	6	26.32	1.82	6.77	0.032 *
s62	F	4	46.40	3.26	5	43.12	3.11	2.37	0.167
m67	M	8	44.05	2.22	4	43.73	0.98	0.07	0.792
m67	F	11	41.96	2.35	7	44.21	1.69	4.79	0.044 *
m69(1)	M	19	32.31	1.80	4	28.02	3.10	14.65	0.001 **
m69(1)	F	19	32.31	1.80	7	30.09	2.21	0.83	0.371
m69(3)	M	20	12.21	1.11	9	11.33	1.01	4.11	0.053 *
m69(3)	F	22	10.41	1.42	16	11.46	1.14	5.95	0.020 *
m70	F	4	56.75	1.04	5	54.74	4.31	0.81	0.398
m71	M	10	44.04	4.35	5	45.50	4.25	0.38	0.548
m71a	M	13	35.02	2.52	6	30.72	3.71	8.90	0.008 **
m71a	F	10	31.68	3.67	10	32.71	2.37	0.56	0.466
o1	F	14	303.70	13.49	7	306.70	9.04	0.28	0.603
o2	F	12	301.41	13.06	7	303.59	8.74	0.15	0.701
o3	M	13	47.15	2.35	4	48.00	2.25	0.41	0.533
o3	F	13	41.74	3.03	7	43.11	1.80	1.19	0.291
o4	M	15	62.45	3.56	5	63.14	2.19	0.16	0.691
o4	F	12	58.07	5.47	11	56.08	2.89	1.16	0.294
o5	M	14	21.84	1.65	5	22.70	1.41	1.07	0.316
o5	F	16	19.62	1.83	16	20.04	1.17	0.60	0.445
o6	M	14	16.74	0.95	5	17.28	0.76	1.30	0.270
o6	F	16	15.08	1.83	16	15.40	0.95	0.39	0.539
o9	F	13	36.67	3.11	10	36.29	1.39	0.13	0.724
o10	M	14	45.14	1.88	4	45.42	0.94	0.08	0.781
o10	F	15	39.50	2.82	7	40.54	1.28	0.85	0.367
r1	M	11	263.84	8.86	4	265.50	2.04	0.13	0.722
r1	F	7	241.71	20.75	7	224.74	9.25	3.91	0.072
r2	M	12	249.76	7.49	4	252.93	1.66	0.67	0.425
r2	F	7	230.07	18.74	8	210.26	11.51	6.28	0.026 *
r4	M	13	14.92	0.94	6	15.43	1.16	1.05	0.320
r4	F	10	13.58	1.67	8	12.70	1.33	1.47	0.243
r5	M	13	11.93	0.92	4	13.32	0.25	8.57	0.010 **
r5	F	9	10.82	1.26	7	11.46	1.00	1.21	0.290
u1	M	14	277.96	8.11	4	286.18	2.55	3.85	0.068
u1	F	6	254.42	17.76	7	249.89	7.68	0.38	0.551
u2	M	15	248.06	7.77	4	253.55	2.31	1.88	0.188
u2	F	6	225.82	15.64	7	219.16	8.20	0.97	0.346
u11	M	21	13.91	1.16	6	14.00	1.28	0.03	0.871
u11	F	12	12.38	1.40	11	13.27	1.14	2.76	0.111
u12	M	21	16.63	1.36	6	16.87	1.21	0.15	0.700
u12	F	12	14.23	1.50	11	16.02	1.77	6.89	0.016 *
u13	M	22	21.63	2.81	9	24.38	0.97	8.08	0.008 **
u13	F	13	18.50	2.64	11	19.33	2.15	0.70	0.413
u14	M	22	23.62	1.92	9	24.90	1.97	2.80	0.105
u14	F	14	20.86	2.37	11	22.52	2.46	2.92	0.101
f1	M	16	474.97	12.60	5	467.32	13.69	1.35	0.259
f1	F	5	449.00	24.88	8	419.96	7.22	10.05	0.009 **
f2	M	16	472.17	12.36	5	463.86	13.12	1.68	0.211
f2	F	5	445.76	23.89	8	417.10	7.47	10.40	0.008 **
f3	M	16	460.53	10.12	5	455.92	14.78	0.64	0.434
f3	F	5	432.50	20.89	8	410.25	11.11	6.42	0.028 *
f4	M	16	450.08	10.51	5	445.16	13.83	0.72	0.406
f4	F	5	423.26	20.24	8	400.39	11.14	7.06	0.022 *
f6	M	17	31.71	1.74	10	29.84	1.61	7.67	0.010 **
f6	F	9	27.38	2.29	13	26.01	1.68	2.63	0.120
f7	M	17	26.55	1.24	10	27.78	2.70	2.64	0.117
f7	F	9	25.09	2.21	13	25.37	2.62	0.07	0.796
f8	M	17	90.24	3.98	10	89.30	3.84	0.36	0.554
f8	F	9	81.56	5.28	13	78.92	5.57	1.25	0.278
f9	M	17	35.80	1.58	10	34.70	1.67	2.93	0.099

Char.	Sex	N	MKD Mean	S.D.	N	KAH Mean	S.D.	F	P
f9	F	8	32.03	4.04	14	32.17	3.53	0.01	0.933
f10	M	17	28.18	1.78	10	29.23	2.59	1.56	0.223
f10	F	7	26.36	2.53	14	25.86	2.34	0.20	0.658
f15	M	18	33.25	2.05	12	32.34	1.74	1.59	0.217
f15	F	8	27.91	3.20	16	27.99	1.66	0.01	0.936
f16	M	18	27.08	1.73	11	27.38	1.51	0.23	0.639
f16	F	8	23.25	2.84	17	24.05	1.63	0.81	0.378
f18	M	17	46.35	1.93	10	47.18	0.98	1.59	0.219
f18	F	9	40.32	2.88	15	39.85	2.21	0.20	0.657
f19	M	17	46.19	1.48	8	46.81	1.39	0.99	0.330
f19	F	8	41.03	2.32	16	39.05	2.08	4.48	0.046 *
f21	M	17	81.88	3.65	4	75.88	2.62	9.48	0.006 **
f21	F	9	72.94	3.88	6	72.98	1.90	0.00	0.982
t1	M	11	401.24	12.05	6	393.67	22.41	0.84	0.373
t1	F	6	385.10	9.98	8	350.04	12.22	32.77	0.001 **
t1a	M	11	400.73	11.54	8	394.30	20.66	0.75	0.397
t1a	F	6	388.80	8.93	8	354.28	11.40	37.47	0.001 **
t1b	M	10	389.40	13.91	8	383.88	18.89	0.51	0.485
t1b	F	6	376.88	9.82	7	348.50	5.65	42.49	0.001 **
t3	M	8	78.63	3.31	6	76.95	1.43	1.34	0.270
t3	F	8	69.75	2.45	8	67.45	1.79	4.60	0.050 *
t4	M	9	46.71	1.77	8	45.26	2.23	2.23	0.156
t4	F	8	41.34	2.75	9	39.28	2.94	2.21	0.158
t5	M	9	41.92	2.93	7	44.81	3.45	3.29	0.091
t5	F	8	39.96	3.95	9	38.53	3.59	0.61	0.446
t6	M	15	45.78	2.67	9	46.39	2.63	0.30	0.591
t6	F	8	40.49	1.93	12	39.73	2.16	0.64	0.432
t8	M	12	33.47	1.55	10	30.83	3.82	4.82	0.040 *
t8	F	11	28.36	3.26	12	27.68	2.38	0.33	0.571
t8a	M	12	38.23	2.67	10	36.09	2.19	4.11	0.056 *
t8a	F	8	33.18	3.29	9	31.56	2.50	1.33	0.268
t9	M	12	22.78	1.84	11	23.83	2.12	1.62	0.217
t9	F	11	21.13	2.21	11	20.44	1.83	0.64	0.434
t9a	M	12	23.80	1.37	8	25.18	2.34	2.79	0.112
t9a	F	8	21.78	2.37	10	21.44	1.69	0.13	0.727

* $p \leq 0.05$; ** $p \leq 0.01$

Table 10 – Frequency, percentage and chi-square of non metric features of the cranial skeleton in the MKD and KAH necropolises

Character	N	MKD Freq.	%	N	KAH Freq.	%	X^2 (1)
Highest Nuchal Line	22	14	63.6	4	2	50.0	0.002
Ossicle at Lambda	13	5	38.5	7	2	28.6	0.002
Lambdoid Ossicles	25	15	60.0	8	1	12.5	3.738 *
Ossicle at Bregma	15	0	0.0	5	0	0.0	-
Metopic Suture	19	1	5.3	14	4	28.6	1.835
Coronal Ossicles	23	2	8.7	10	0	0.0	0.028
Asterionic Bone	18	0	0.0	11	0	0.0	-
Auditory Torus	28	0	0.0	13	0	0.0	-
Palatine Torus	10	1	10.0	15	0	0.0	0.043
Maxillary Torus	23	2	8.7	21	0	0.0	0.434
Mandibular Torus	27	0	0.0	16	0	0.0	-

(1) G.L = 1

* $p \leq 0.05$

Table 11 – Frequency, percentage and chi-square of non metric features of the postcranial skeleton in the MKD and KAH necropolises

Character	N	MKD Freq.	%	N	KAH Freq.	%	X^2 (1)
Allen's Fossa	26	0	0.0	28	0	0.0	-
Poirier's Facet	23	5	21.7	25	1	4.0	2.015
Femoral Plaque	23	10	43.5	25	3	12.0	4.522 *
Hypotrochanteric Fossa	26	2	7.7	25	1	4.0	0.001
Exostosis in Trochanteric Fossa	25	5	20.0	24	5	20.8	0.080
Third Trochanter	26	2	7.7	25	1	4.0	0.001
Medial Tibial Squatting Facet	27	0	0.0	29	1	3.4	0.001
Lateral Tibial Squatting Facet	27	20	74.1	29	17	58.6	0.880
Supracondyloid Process	21	0	0.0	25	0	0.0	-
Septal Aperture	40	10	25.0	25	4	16.0	0.301
Inferior Talar Articular Surface	49	15	30.6	27	15	55.5	3.549
Anterior Calcaneal Facet Double	48	20	41.7	27	14	51.9	0.371
Anterior Calcaneal Facet Absent	47	0	0.0	25	0	0.0	-
Vastus Notch	20	9	45.0	10	9	90.0	3.906 *
Scapular Notch	18	15	83.3	10	8	80.0	0.087

(1) G.L = 1

* $p \leq 0.05$

Table 12a – Necropolis of MKD: Descriptive statistics of teeth measures (Diameters M-D and B-L)

Character	Tot. No.	Mean	Stand. Dev.	Var. Coeff.	Min. Val.	Max. Val.
I^1 M-D	2	8.25			7.90	8.60
I^2 M-D	2	5.95			5.80	6.10
C′ M-D	2	7.60			7.30	7.90
P^3 M-D	6	6.86	0.48	7.03	6.20	7.30
P^4 M-D	7	6.78	0.54	7.94	5.80	7.25
M^1 M-D	8	10.03	0.65	6.47	9.00	10.80
M^2 M-D	14	9.22	0.61	6.64	7.85	10.20
M^3 M-D	10	8.25	0.51	6.23	7.55	9.10
I^1 B-L	5	7.14	0.46	6.45	6.55	7.75
I^2 B-L	4	6.38	0.15	2.35	6.20	6.50
C′ B-L	5	8.19	0.34	4.10	7.80	8.50
P^3 B-L	5	8.84	0.76	8.63	7.70	9.75
P^4 B-L	7	8.82	0.92	10.39	7.40	9.75
M^1 B-L	7	11.54	0.48	4.19	10.60	12.00
M^2 B-L	14	11.55	0.68	5.87	10.15	12.40
M^3 B-L	10	10.36	1.10	10.64	8.20	11.60
I_1 M-D	3	4.90			4.75	5.00
I_2 M-D	4	5.89	0.50	8.45	5.50	6.60
C_1 M-D	4	6.60	0.22	3.27	6.30	6.80
P_3 M-D	11	6.79	0.50	7.40	6.05	7.60
P_4 M-D	13	6.83	0.53	7.79	6.00	7.75
M_1 M-D	9	10.55	0.74	7.04	9.15	11.25
M_2 M-D	12	10.19	0.53	5.24	9.30	10.90
M_3 M-D	10	10.24	0.73	7.14	9.10	11.25
I_1 B-L	9	5.74	0.50	8.78	4.80	6.50
I_2 B-L	10	6.12	0.45	7.37	5.00	6.70
C_1 B-L	7	7.68	0.58	7.61	6.70	8.60
P_3 B-L	11	7.94	0.57	7.14	7.00	8.80
P_4 B-L	12	8.22	0.58	7.06	7.50	9.50
M_1 B-L	10	10.77	0.38	3.50	10.00	11.30
M_2 B-L	13	10.09	0.46	4.55	9.30	10.80
M_3 B-L	11	9.93	0.57	5.78	8.80	10.60

Table 12b – Necropolis of MKD: Descriptive statistics of teeth measures (Area occlusal surfice)

Character	Tot. No.	Mean	Stand. Dev.	Var. Coeff.	Min. Val.	Max. Val.
I^1 area	2	59.08			54.51	63.64
I^2 area	2	37.20			35.96	38.43
C′ area	2	61.67			61.32	62.02
P^3 area	5	61.88	7.39	11.95	53.90	69.71
P^4 area	6	59.58	10.29	17.28	46.40	69.60
M^1 area	7	115.36	12.12	10.50	96.46	128.52
M^2 area	14	106.66	11.21	10.51	79.68	122.40
M^3 area	10	85.71	12.65	14.76	68.06	101.20
I_1 area	3	28.52			26.84	31.50
I_2 area	4	34.12	4.64	13.59	28.00	38.94
C, area	4	52.17	4.25	8.15	49.50	58.48
P_3 area	11	54.00	6.33	11.73	45.38	62.78
P_4 area	12	56.87	6.82	11.99	46.50	68.20
M_1 area	9	113.21	11.16	9.86	94.00	124.88
M_2 area	12	103.00	9.59	9.31	86.49	115.02
M_3 area	10	101.83	10.67	10.48	86.40	115.31

Table 13a – Necropolis of KAH: Descriptive statistics of teeth measures (Diameters M-D and B-L)

Character	Tot. No.	Mean	Stand. Dev.	Var. Coeff.	Min. Val.	Max. Val.
I^1 M-D	7	8.33	0.62	7.40	7.80	9.20
I^2 M-D	12	6.35	0.49	7.70	5.50	6.90
C′ M-D	8	7.56	0.33	4.34	7.10	8.10
P^3 M-D	10	6.78	0.33	4.89	6.25	7.30
P^4 M-D	12	6.46	0.27	4.24	5.95	6.90
M^1 M-D	17	10.08	0.60	5.92	9.10	11.40
M^2 M-D	12	9.30	0.65	6.99	8.00	10.40
M^3 M-D	10	7.79	0.82	10.51	7.00	9.70
I^1 B-L	10	7.00	0.41	5.91	6.70	7.80
I^2 B-L	12	6.24	0.38	6.06	5.70	7.20
C′ B-L	11	8.01	0.36	4.54	7.50	8.80
P^3 B-L	13	8.91	0.37	4.13	8.30	9.45
P^4 B-L	14	8.78	0.38	4.37	8.10	9.40
M^1 B-L	17	11.17	0.63	5.61	9.50	12.00
M^2 B-L	12	10.84	0.59	5.43	9.90	11.80
M^3 B-L	10	9.96	0.90	9.02	8.20	11.00
I_1 M-D	6	4.83	0.24	5.07	4.50	5.20
I_2 M-D	9	5.44	0.34	6.20	5.00	6.10
C, M-D	16	6.57	0.55	8.40	5.60	7.70
P_3 M-D	12	6.62	0.49	7.40	5.90	7.30
P_4 M-D	13	6.82	0.29	4.24	6.15	7.20
M_1 M-D	24	10.85	0.68	6.30	9.30	12.10
M_2 M-D	19	10.21	0.84	8.19	8.70	12.10
M_3 M-D	4	9.46	0.43	4.51	9.10	10.05
I_1 B-L	6	5.55	0.26	4.70	5.10	5.80
I_2 B-L	9	6.12	0.37	5.98	5.50	6.70
C, B-L	15	7.62	0.64	8.40	6.80	9.30
P_3 B-L	13	7.45	0.40	5.36	7.00	8.20
P_4 B-L	12	7.72	0.41	5.34	6.90	8.15
M_1 B-L	24	10.23	0.69	6.72	8.40	11.40
M_2 B-L	18	9.62	0.46	4.74	8.90	10.60
M_3 B-L	4	8.93	0.25	2.84	8.60	9.15

Table 13b – Necropolis of KAH: Descriptive statistics of teeth measures (Area occlusal surfice)

Character	Tot. No.	Mean	Stand. Dev.	Var. Coeff.	Min. Val.	Max. Val.
I^1 area	7	58.55	7.25	12.38	52.26	71.76
I^2 area	10	39.89	4.58	11.48	33.55	48.96
C′ area	8	61.51	4.70	7.63	55.02	71.28
P^3 area	10	61.07	4.50	7.37	53.75	68.98
P^4 area	12	56.90	3.97	6.98	48.20	62.98
M^1 area	16	112.37	11.37	10.12	88.83	136.80
M^2 area	12	100.86	10.12	10.04	81.60	115.05
M^3 area	10	77.95	12.78	16.40	58.22	97.97
I_1 area	6	26.77	1.73	6.46	23.97	29.12
I_2 area	8	33.48	3.19	9.53	28.60	38.19
C, area	15	50.20	8.13	16.19	38.08	70.68
P_3 area	12	49.07	4.95	10.08	41.30	58.22
P_4 area	12	52.65	3.92	7.44	46.43	58.68
M_1 area	24	111.32	13.11	11.78	78.12	137.94
M_2 area	18	98.51	12.39	12.58	81.78	128.26
M_3 area	3	86.59			83.72	91.96

Table 14 – ANOVA of measures of teeth between the necropolises of MKD and KAH

Character	N	MKD Mean	S.D.	N	KAH Mean	S.D.	F	P
I^1 M-D	2	8.25		7	8.33	0.62		
I^2 M-D	2	5.95		12	6.35	0.49		
C′ M-D	2	7.60		8	7.56	0.33		
P^3 M-D	6	6.86	0.48	10	6.87	0.32	0.01	0.961
P^4 M-D	7	6.78	0.54	12	6.46	0.27	3.02	0.101
M^1 M-D	8	10.03	0.65	17	10.08	0.60	0.04	0.851
M^2 M-D	14	9.22	0.61	12	9.30	0.65	0.10	0.749
M^3 M-D	10	8.25	0.51	9	7.69	0.64	4.50	0.049 *
I^1 B-L	5	7.14	0.46	10	7.01	0.41	0.36	0.559
I^2 B-L	4	6.38	0.15	12	6.24	0.38	0.50	0.492
C′ B-L	5	8.19	0.34	11	8.01	0.36	0.89	0.362
P^3 B-L	5	8.84	0.76	13	8.91	0.38	0.07	0.795
P^4 B-L	7	8.82	0.92	14	8.87	0.35	0.03	0.857
M^1 B-L	7	11.54	0.48	17	11.17	0.63	1.93	0.179
M^2 B-L	14	11.55	0.68	12	10.84	0.59	7.94	0.010 **
M^2 B-L	10	10.36	1.13	10	9.96	0.93	0.75	0.399
I_1 M-D	3	4.90	0.13	6	4.83	0.24		
I_2 M-D	4	5.89	0.50	9	5.44	0.34	3.68	0.081
C, M-D	4	6.60	0.22	16	6.57	0.50	0.01	0.909
P_3 M-D	11	6.79	0.50	12	6.62	0.49	0.68	0.420
P_4 M-D	13	6.83	0.53	13	6.82	0.29	0.01	0.953
M_1 M-D	9	10.55	0.74	24	10.85	0.65	1.30	0.264
M_2 M-D	12	10.19	0.53	19	10.21	0.84	0.01	0.942
M_3 M-D	10	10.24	0.72	4	9.46	0.43	4.00	0.069
I_1 B-L	9	5.74	0.50	6	5.55	0.26	0.72	0.411
I_2 B-L	10	6.12	0.45	9	6.12	0.37	0.00	1.000
C, B-L	7	7.68	0.58	15	7.62	0.64	0.04	0.835
P_3 B-L	11	7.94	0.57	13	7.45	0.40	6.09	0.022 *
P_4 B-L	12	8.22	0.58	12	7.72	0.41	5.95	0.023 *
M_1 B-L	10	10.77	0.38	24	10.23	0.67	5.67	0.023 *
M_2 B-L	13	10.09	0.46	18	9.62	0.46	7.88	0.009 **
M_3 B-L	11	9.93	0.58	4	8.93	0.25	10.74	0.006 **

* $p \leq 0.05$; ** $p \leq 0.01$

Table 15 – Necropolises of Yemen. Frequency, percentage and chi-square of non metric dental characters. Upper jaw

	MKD		KAH			
	No.	%	No.	%	X^2	P
Shovel-shaped						
I1 +	0	0.0	1	8.3		
-	5	100.0	11	91.7	0.22	0.641
Tot.	5	100.0	12	100.0		
I2 +	0	0.0	1	8.3		
-	3	100.0	11	91.7	0.60	0.438
Tot.	3	100.0	12	100.0		
Tubercle						
I1 +	2	22.8	3	33.3		
-	7	77.8	6	66.7	0.14	0.712
Tot.	9	100.0	9	100.0		
I2 +	1	16.7	7	53.8		
-	5	83.3	6	46.2	1.05	0.305
Tot.	6	100.0	13	100.0		
C′ +	0	0.0	8	66.7		
-	5	100.0	4	33.3	3.90	0.048 *
Tot.	5	100.0	12	100.0		
Hypocone (cusp 4)						
M1 4	12	100.0	18	100.0		
4-	0	0.0	0	0.0		
Tot.	12	100.0	18	100.0		
M2 4	3	21.4	1	6.6		
4-	4	28.6	7	46.7		
3+	1	7.1	0	0.0		
3	6	42.9	7	46.7	2.86	0.561
Tot.	14	100.0	15	100.0		
M3 4						
4-	4	25.0	0	0.0		
3+	6	37.5	4	44.5		
3	6	37.5	5	55.5	2.75	0.253
Tot.	16	100.0	9	100.0		
Carabelli's cusp						
M1 +	5	62.5	6	46.2		
-	3	37.5	7	53.8	0.08	0.781
Tot.	8	100.0	13	100.0		
M2 +	3	18.7	1	5.0		
-	13	81.3	17	95.0	0.59	0.441
Tot.	16	100.0	18	100.0		
M3 +	4	33.3	0	0.0		
-	8	66.7	9	100.0	1.86	0.173
Tot.	12	100.0	9	100.0		
Metaconule (Cusp 5)						
M1 +	0	0.0	1	7.1		
-	6	100.0	13	92.9	0.20	0.654
Tot.	6	100.0	14	100.0		
M2 +	2	20.0	8	44.4		
-	8	80.0	10	55.6	0.78	0.387
Tot.	10	100.0	18	100.0		
M3 +	3	30.0	2	28.6		
-	7	70.0	5	71.4	0.23	0.633
Tot.	10	100.0	7	100.0		

	MKD		KAH			
	No.	%	No.	%	X^2	P
Parastyle						
M1+	0	0.0	0	0.0		
-	6	100.0	13	100.0		
Tot.	6	100.0	13	100.0		
M2 +	0	0.0	1	5.3		
-	10	100.0	18	94.7	0.11	0.740
Tot.	10	100.0	19	100.0		
M3 +	3	23.1	0	0.0		
-	10	76.9	7	100.0	0.52	0.470
Tot.	13	100.0	7	100.0		

* $p \leq 0.05$

Table 16 – Necropolises of Yemen. Frequency, percentage and chi-square of non metric dental characters. Lower jaw

	MKD		KAH			
	No.	%	No.	%	X^2	P
Cusp Number						
P3 2	5	45.5	7	58.3		
3	6	54.5	5	41.7	0.04	0.842
Tot.	11	100.0	12	100.0		
P4 2	5	45.5	3	23.1		
3	6	54.5	10	76.9	0.52	0.469
Tot.	11	100.0	13	100.0		
M1 4	3	30.0	3	9.4		
>4	7	70.0	29	90.6	1.23	0.267
Tot.	10	100.0	32	100.0		
M2 4	17	100.0	19	73.1		
>4	0	0.0	7	26.9	3.67	0.055 *
Tot.	17	100.0	26	100.0		
M3 4	7	53.8	6	60.0		
>4	6	46.2	4	40.0	0.02	0.897
Tot.	13	100.0	10	100.0		
Groove pattern						
M1 Y	5	71.4	12	50.0		
+	2	28.6	12	50.0	0.33	0.568
Tot.	7	100.0	24	100.0		
M2 Y	4	18.8	4	13.8		
+	13	81.2	25	86.2	0.19	0.661
Tot.	17	100.0	29	100.0		
M3 Y	0	0.0	1	14.3		
	11	100.0	6	85.7	0.05	0.815
Tot.	11	100.0	7	100.0		
Protostylid						
M1 +	0	0.0	6	27.3		
-	4	100.0	16	72.7	0.30	0.585
Tot.	4	100.0	22	100.0		
M2 +	0	0.0	2	10.5		
-	11	100.0	17	89.5	0.13	0.723
Tot.	11	100.0	19	100.0		
M3 +	6		2	22.2		
-	9		7	77.8	0.20	0.655
Tot.	15	100.0	9	100.0		

	MKD		KAH			
	No.	%	No.	%	X^2	P
Cusp 7						
M1 +	0	0.0	1	3.6		
-	6	100.0	27	96.4	0.74	0.398
Tot.	6	100.0	28	100.0		
M2 +	0	0.0	0	0.0		
-	9	100.0	25	100.0		
Tot.	9	100.0	25	100.0		
M3 +	0	0.0	0	0.0		
-	7	100.0	8	100.0		
Tot.	7	100.0	8	100.0		

* $p \leq 0.05$

Table 17 – Agenesia of M3

	MKD			KAH			X^2	P
	Observ. total	Presence	%	Observ. total	Presence	%		
M^3	33	1	3.0	21	8	38.1	8.977	0.003 **
M_3	46	7	15.2	25	11	44.0	5.651	0.017 *
M^3+M_3	79	8	10.1	46	19	41.3	14.897	0.000 **

* $p \leq 0.05$; ** $p \leq 0.01$

Table 18 – Frequency of decay in the permanent dentition

	MKD	KAH	X^2	P
Teeth examined	193	243		
Decayed teeth	9	28	5.664	0.017 *
% decayed teeth	4.7	11.5		

* $p \leq 0.05$; ** $p \leq 0.01$

Table 19 – Percentage decay in individual teeth for separate arches

	Maxillary				Mandibular			
	MKD		KAH		MKD		KAH	
	T. E.	% D. T.	T. E.	% D. T.	T. E.	% D. T.	T. E.	% D. T.
I1	7	0.0	11	9.1	6	0.0	9	0.0
I2	4	0.0	10	20.0	9	0.0	11	0.0
C	4	0.0	14	21.4	4	0.0	18	11.1
P3	8	0.0	16	25.0	13	0.0	13	0.0
P4	15	0.0	17	23.5	18	0.0	15	0.0
M1	8	12.5	19	15.8	17	0.0	28	7.1
M2	22	9.1	19	15.8	29	6.9	24	0.0
M3	17	17.6	11	27.3	12	8.3	7	0.0
TOT.	85	7.1	118	20.3	108	1.9	125	3.2

T.E. = teeth examined
% D.T. = percentage of decayed teeth

Table 20 – Frequency of teeth lost *intra vitam* (AMTL)

	MKD	KAH	X^2	P
Alveoli examined	675	476		
Alveoli with reabsorption	68	69		
% teeth lost *intra vitam*	10.1	14.5	4.792	0.029 *

* $p \leq 0.05$

Table 21 – Percentage of teeth lost *intra vitam* (AMTL) for separate arches

	Sup.				Inf.			
	MKD		KAH		MKD		KAH	
	A. E.	% L.	A. E.	% L.	A. E.	% L.	A. E.	% L.
I1	39	10.3	29	17.2	48	8.3	35	17.1
I2	38	10.5	30	16.7	49	4.1	34	5.9
C	38	10.5	31	16.1	50	4.0	34	2.9
P3	39	12.8	28	14.3	48	4.8	33	6.1
P4	36	5.6	29	10.3	49	10.2	32	21.9
M1	36	11.1	32	15.6	50	22.0	36	25.0
M2	36	8.3	30	20.0	48	22.9	34	14.2
M3	34	0.0	14	7.1	37	13.5	15	20.0
TOT.	296	8.8	223	15.2	330	11.1	253	13.8

A.E. = alveoli examined; % L. = percentage of teeth lost *intra vitam*

Table 22 – Frequency of alveoli with abscesses

	MKD	KAH	X^2	P
Alveoli examined	582	389		
Alveoli with abscesses	10	11		
% abscesses	1.7	2.8	0.883	0.347

* $p \leq 0.05$; ** $p \leq 0.01$

Table 23 – Percentage of abscesses for separate arches

	Maxillary				Mandibular			
	MKD		KAH		MKD		KAH	
	A. E.	% G.	A. E.	% G.	A. E.	% G.	A. E.	% G.
I1	35	2.9	23	4.3	42	2.4	25	0.0
I2	36	0.0	24	4.2	41	0.0	28	0.0
C	36	0.0	24	0.0	44	0.0	30	0.0
P3	35	2.9	23	4.3	41	2.4	27	0.0
P4	33	0.0	26	11.5	42	2.4	23	0.0
M1	30	6.3	26	15.4	36	8.3	24	0.0
M2	33	0.0	24	4.2	32	0.0	24	0.0
M3	34	0.0	20	0.0	28	0.0	18	0.0
TOT.	276	1.4	190	5.8	306	2.0	199	0.0

A.E. = alveoli examined
% G = percentage abscesses

Table 24 – Abbreviated mortality table for Al-Makhdarah (MKD) and Al Manqaz (MNQ) necropolises (1st millennium B.C.) (Total)

Age groups	D_x	d_x	l_x	q_x	L_x	T_x	e_x
0-0	2.00	4.35	100.00	43.48	97.83	3240.59	32.41
1-2	0.50	1.09	95.65	11.36	95.11	3142.77	32.86
3-4	2.00	4.35	94.57	45.98	184.24	3047.66	32.23
5-6	0.50	1.09	90.22	12.05	179.35	2863.42	31.74
7-9	0.38	0.82	89.13	9.14	266.17	2684.07	30.11
10-12	0.88	1.90	88.32	21.54	262.09	2417.90	27.38
13-15	1.82	3.95	86.41	45.70	254.20	2155.81	24.95
16-19	4.08	8.88	82.46	107.64	313.13	1901.61	23.06
20-24	3.56	7.74	73.59	105.18	346.04	1588.47	21.59
25-29	2.66	5.78	65.85	87.72	314.80	1242.43	18.87
30-34	3.60	7.83	60.07	130.35	280.78	927.63	15.44
35-39	5.53	12.03	52.24	230.29	231.13	646.86	12.38
40-44	4.26	9.26	40.21	230.23	178.83	415.73	10.34
45-49	4.97	10.81	30.95	349.31	125.13	236.90	7.65
50 +	9.26	20.14	20.14	1000.00	111.77	111.77	5.55
TOTAL	46.00	100.00			3240.59		

Table 25 – Abbreviated mortality table for Al-Makhdarah (MKD) and Al Manqaz (MNQ) necropolises (1st millennium B.C.) (Adults)

Age groups	D_x	d_x	l_x	q_x	L_x	T_x	e_x
20-24	3.50	10.94	100.00	109.37	469.53	2150.00	21.50
25-29	2.50	7.81	89.06	87.72	425.78	1680.47	18.87
30-34	3.39	10.59	81.25	130.35	379.77	1254.69	15.44
35-39	5.21	16.27	70.66	230.29	312.62	874.91	12.38
40-44	4.01	12.52	54.39	230.24	241.88	562.30	10.34
45-49	4.68	14.62	41.87	349.31	169.24	320.42	7.65
50 +	8.72	27.24	27.24	1000.00	151.17	151.17	5.55
TOTAL	32.00	100.00			2150.00		

Table 26 – Abbreviated mortality table for Kharabat al Aghar (KAH) necropolises (2nd-3rd century A.D.) (Totals)

Age groups	D_x	d_x	l_x	q_x	L_x	T_x	e_x
0-0	6.00	15.38	100.00	153.85	92.31	2189.75	21.90
1-2	0.50	1.28	84.62	15.15	83.97	2097.45	24.79
3-4	3.00	7.69	83.33	92.31	158.97	2013.47	24.16
5-6	3.00	7.69	75.64	101.70	143.59	1854.50	24.52
7-9	3.17	8.12	67.95	119.50	188.67	1710.91	25.18
10-12	0.33	0.85	59.83	14.28	59.40	1522.24	25.44
13-15	0.67	1.71	58.97	28.98	116.24	1462.83	24.80
16-19	0.33	0.85	57.26	14.92	56.84	1346.60	23.52
20-24	1.50	3.85	56.41	68.18	272.44	1289.76	22.86
25-29	3.32	8.51	52.56	161.86	241.55	1017.32	19.35
30-34	1.82	4.66	44.06	105.81	208.63	775.77	17.61
35-39	1.27	3.26	39.39	82.84	186.95	567.14	14.40
40-44	3.98	10.20	36.13	282.22	159.78	380.19	10.52
45-49	4.21	10.78	25.93	415.78	98.96	220.41	8.50
50 +	5.91	15.15	15.15	1000.00	121.44	121.44	8.02
TOTAL	39.00	100.00			2189.75		

Table 27 – Abbreviated mortality table for Kharabat al Aghar (KAH) necropolises (2nd-3rd century A.D.) (Adults)

Age groups	D_x	d_x	l_x	q_x	L_x	T_x	e_x
20-24	1.50	6.82	100.00	68.19	482.95	2286.39	22.86
25-29	3.32	15.08	93.18	161.86	428.20	1803.43	19.35
30-34	1.82	8.26	78.10	105.81	369.84	1375.23	17.61
35-39	1.27	5.78	69.84	82.83	331.41	1005.39	14.40
40-44	3.98	18.08	64.05	282.21	283.26	673.98	10.52
45-49	4.21	19.12	45.98	415.78	175.43	390.73	8.50
50 +	5.91	26.86	26.86	1000.00	215.29	215.29	8.02
TOTAL	22.00	100.00			2286.39		

Table 28 – ANOVA of measures of teeth among the necropolises of RH5, MKD

Character	N	MKD Mean	S.D.	N	KAH Mean	S.D.	F	P
I^1 M-D	2	8.25		60	8.70	0.59		
I^2 M-D	2	5.95		59	6.72	0.55		
C' M-D	2	7.60		72	7.75	0.45		
P^3 M-D	6	6.86	0.48	65	6.94	0.42	0.19	0.660
P^4 M-D	7	6.78	0.54	58	6.84	0.40	0.13	0.719
M^1 M-D	8	10.03	0.65	63	10.64	0.50	9.87	0.002 **
M^2 M-D	14	9.22	0.61	67	9.54	0.74	2.29	0.135
M^3 M-D	10	8.25	0.51	58	8.52	0.70	1.36	0.248
I^1 B-L	5	7.14	0.46	63	7.31	0.41	0.78	0.379
I^2 B-L	4	6.38	0.15	61	6.38	0.46	0.01	1.000
C' B-L	5	8.19	0.34	67	8.35	0.56	0.39	0.532
P^3 B-L	5	8.84	0.76	63	9.08	0.47	1.10	0.298
P^4 B-L	7	8.82	0.92	57	9.09	0.57	1.21	0.275
M^1 B-L	7	11.54	0.48	61	11.59	0.54	0.05	0.815
M^2 B-L	14	11.55	0.68	69	11.49	0.68	0.09	0.764
M^3 B-L	10	10.36	1.13	57	10.26	0.81	0.11	0.736
I_1 M-D	3	4.90			60	5.26	0.39	
I_2 M-D	4	5.89	0.50	65	5.79	0.40	0.23	0.633
C, M-D	4	6.60	0.22	63	6.79	0.44	0.73	0.397
P_3 M-D	11	6.79	0.50	70	6.78	0.39	0.01	0.940
P_4 M-D	13	6.83	0.53	67	7.03	0.43	2.18	0.144
M_1 M-D	9	10.55	0.74	68	11.26	0.56	11.83	0.001 **
M_2 M-D	12	10.19	0.53	70	10.82	0.71	8.59	0.004 **
M_3 M-D	10	10.24	0.72	61	10.07	0.74	0.46	0.501
I_1 B-L	9	5.74	0.50	61	6.01	0.31	5.01	0.029 *
I_2 B-L	10	6.12	0.45	62	6.42	0.35	5.84	0.018 *
C, B-L	7	7.68	0.58	59	7.73	0.56	0.05	0.825
P_3 B-L	11	7.94	0.57	66	7.69	0.49	2.34	0.130
P_4 B-L	12	8.22	0.58	64	8.02	0.62	1.07	0.304
M_1 B-L	10	10.77	0.38	68	10.74	0.52	0.03	0.861
M_2 B-L	13	10.09	0.46	66	10.27	0.65	0.90	0.345
M_3 B-L	11	9.93	0.58	63	9.62	0.67	2.08	0.154

* $p \leq 0.05$; ** $p \leq 0.01$

Table 29 – ANOVA of measures of teeth among the necropolises of RH5, KAH

Character	N	MKD Mean	S.D.	N	KAH Mean	S.D.	F	P
I^1 M-D		8.33	0.62	60	8.70	0.59	2.44	0.123
I^2 M-D	12	6.35	0.49	59	6.72	0.55	4.67	0.034 *
C' M-D	8	7.56	0.33	72	7.75	0.45	1.34	0.251
P^3 M-D	10	6.87	0.32	65	6.94	0.42	0.25	0.616
P^4 M-D	12	6.46	0.27	58	6.84	0.40	9.84	0.003 **
M^1 M-D	17	10.08	0.60	63	10.64	0.50	15.40	0.001 **
M^2 M-D	12	9.30	0.65	67	9.54	0.74	1.11	0.296
M^3 M-D	9	7.69	0.64	58	8.52	0.70	11.18	0.001 **
I^1 B-L	10	7.01	0.41	63	7.31	0.41	4.62	0.035 *
I^2 B-L	12	6.24	0.38	61	6.38	0.46	0.98	0.326
C' B-L	11	8.01	0.36	67	8.35	0.56	3.77	0.056
P^3 B-L	13	8.91	0.38	63	9.08	0.47	1.49	0.226
P^4 B-L	14	8.87	0.35	57	9.09	0.57	1.90	0.173
M^1 B-L	17	11.1	0.63	61	11.59	0.54	7.47	0.008 **
M^2 B-L	12	10.84	0.59	69	11.49	0.68	9.67	0.003 **
M^3 B-L	10	9.96	0.93	57	10.26	0.81	1.12	0.294
I_1 M-D	6	4.83	0.24	60	5.26	0.39	6.97	0.010 **
I_2 M-D	9	5.44	0.34	65	5.79	0.40	6.25	0.015 **
C_1 M-D	16	6.57	0.50	63	6.79	0.44	3.02	0.086
P_3 M-D	12	6.62	0.49	70	6.78	0.39	1.60	0.210
P_4 M-D	13	6.82	0.29	67	7.03	0.43	2.83	0.096
M_1 M-D	24	10.85	0.65	68	11.26	0.56	8.73	0.004 **
M_2 M-D	19	10.21	0.84	70	10.82	0.71	10.19	0.002 **
M_3 M-D	4	9.46	0.43	61	10.07	0.74	2.63	0.110
I_1 B-L	6	5.55	0.26	61	6.01	0.31	12.31	0.001 **
I_2 B-L	9	6.12	0.37	62	6.42	0.35	5.70	0.020 *
C_1 B-L	15	7.62	0.64	59	7.73	0.56	0.44	0.511
P_3 B-L	13	7.45	0.40	66	7.69	0.49	2.75	0.101
P_4 B-L	12	7.72	0.41	64	8.02	0.62	2.58	0.112
M_1 B-L	24	10.23	0.67	68	10.74	0.52	14.60	0.001 **
M_2 B-L	18	9.62	0.46	66	10.27	0.65	15.78	0.001 **
M_3 B-L	4	8.93	0.25	63	9.62	0.67	4.15	0.046 *

* $p \leq 0.05$; ** $p \leq 0.01$

Table 30 – Necropolises of MKD (Yemen) and RH5 (Oman). Frequency, percentage and chi-square of non metric dental characters. Upper jaw

	MKD No.	MKD %	KAH No.	KAH %	X^2	P
Shovel-shaped						
I1 +	0	0.0	0	0.0		
-	5	100.0	36	100.0		
Tot.	5	100.0	36	100.0		
I2 +	0	0.0	7	15.2		
-	3	100.0	39	84.8	0.01	0.903
Tot.	3	100.0	46	100.0		
Tubercle						
I1 +	2	22.2	35	58.3		
-	7	77.8	25	41.7	2.78	0.095
Tot.	9	100.0	60	100.0		
I2 +	1	16.7	42	70.0		
-	5	83.3	18	30.0	4.69	0.030 *
Tot.	6	100.0	60	100.0		
C' +	0	0.0	54	83.1		
-	5	100.0	11	16.9	13.77	0.001 **
Tot.	5	100.0	65	100.0		
Hypocone (cusp 4)						
M1 4	12	100.0	58	100.0		
4-	0	0.0	0	0.0		
Tot.	12	100.0	58	100.0		
M2 4	3	21.4	55	79.7		
4-	4	28.6	12	17.3		
3+	1	7.1	1	1.5		
3	6	42.9	1	1.5	31.64	0.001 **
Tot.	14	100.0	69	100.0		
M3 4	0	0.0	12	20.7		
4-	4	25.0	9	15.5		
3+	6	37.5	23	39.7		
3	6	37.5	14	24.1	4.80	0.250
Tot.	16	100.0	58	100.0		
Carabelli's cusp						
M1 +	5	62.5	30	73.2		
-	3	37.5	11	26.8	0.03	0.855
Tot.	8	100.0	41	100.0		
M2 +	3	18.8	13	28.9		
-	13	81.2	32	71.1	0.21	0.645
Tot.	16	100.0	45	100.0		
M3 +	4	33.3	12	26.7		
-	8	66.7	33	73.3	0.01	0.924
Tot.	12	100.0	45	100.0		
Metaconule (cusp 5)						
M1 +	0	0.0	14	35.0		
-	6	100.0	26	65.0	1.59	0.207
Tot.	6	100.0	40	100.0		
M2 +	2	20.0	18	36.7		
-	8	80.0	31	63.3	0.42	0.514
Tot.	10	100.0	49	100.0		
M3 +	3	30.0	14	31.8		
-	7	70.0	30	68.2	0.07	0.791
Tot.	10	100.0	44	100.0		
Parastyle						
M1+	0	0.0	3	7.3		
-	6	100.0	38	92.7	0.04	0.834
Tot.	6	100.0	41	100.0		
M2 +	0	0.0	0	0.0		
-	10	100.0	61	100.0		
Tot.	10	100.0	61	100.0		
M3 +	3	23.1	4	8.2		
-	10	76.9	45	91.8	1.04	0.309
Tot.	13	100.0	49	100.0		

* $p \leq 0.05$; ** $p \leq 0.01$

Table 31 – Necropolises of MKD (Yemen) and RH5 (Oman). Frequency, percentage and chi-square of non metric dental characters. Lower jaw

	MKD		KAH			
	No.	%	No.	%	X^2	P
Cusp Number						
P3 2	5	45.5	49	71.1		
3	6	54.5	20	28.9	1.78	0.182
Tot.	11	100.0	69	100.0		
P4 2	5	45.5	4	6.8		
3	6	54.5	55	93.2	9.17	0.002 **
Tot.	11	100.0	59	100.0		
M1 4	3	30.0	1	2.0		
>4	7	70.0	48	98.0	6.32	0.012 **
Tot.	10	100.0	49	100.0		
M2 4	17	100.0	33	56.9		
>4	0	0.0	25	43.1	9.14	0.003 **
Tot.	17	100.0	58	100.0		
M3 4	7	53.8	27	43.5		
>4	6	46.2	35	56.5		
Tot.	13	100.0	62	100.0	0.14	0.710
Groove Pattern						
M1 Y	5	71.4	38	86.4		
+	2	28.6	6	13.6	0.20	0.653
Tot.	7	100.0	44	100.0		
M2 Y	4	23.5	41	64.1		
+	13	76.5	23	35.9	7.37	0.007**
Tot.	17	100.0	64	100.0		
M3 Y	0	0.0	29	54.7		
+	11	100.0	24	45.3	8.91	0.003 **
Tot.	11	100.0	53	100.0		
Protostylid						
M1 +	0	0.0	8	19.5		
-	4	100.0	33	80.5	0.08	0.772
Tot.	4	100.0	41	100.0		
M2 +	0	0.0	12	28.6		
-	11	100.0	30	71.4	2.59	0.107
Tot.	11	100.0	42	100.0		
M3 +	6	40.0	27	52.9		
-	9	60.0	24	47.1	0.34	0.557
Tot.	15	100.0	51	100.0		
Cusp 7						
M1 +	0	0.0	9	13.4		
-	6	100.0	58	86.6	0.10	0.756
Tot.	6	100.0	67	100.0		
M2 +	0	0.0	2	2.9		
-	9	100.0	66	97.1	0.35	0.553
Tot.	9	100.0	68	100.0		
M3 +	0	0.0	9	15.3		
-	7	100.0	50	84.7	0.28	0.596
Tot.	7	100.0	59	100.0		

* $p \leq 0.05$; ** $p \leq 0.01$

Table 32 – Necropolises of KAH (Yemen) and RH5 (Oman). Frequency, percentage and chi-square of non metric dental characters. Upper jaw

	MKD		KAH			
	No.	%	No.	%	X^2	P
Shovel-shaped						
I1 +	1	8.3	0	0.0		
-	11	91.7	36	100.0	0.34	0.560
Tot.	12	100.0	36	100.0		
I2 +	1	8.3	7	15.2		
-	11	91.7	39	84.8	0.02	0.884
Tot.	12	100.0	46	100.0		
Tubercle						
I1 +	3	33.3	35	58.3		
-	6	66.7	25	41.7	1.10	0.295
Tot.	9	100.0	60	100.0		
I2 +	7	53.8	42	70.0		
-	6	46.2	18	30.0	0.64	0.425
Tot.	13	100.0	60	100.0		
C' +	8	66.7	54	83.1		
-	4	33.3	11	16.9	0.85	0.356
Tot.	12	100.0	65	100.0		
Cusp Number						
M1 4	18	100.0	58	100.0		
4-	0	0.0	0	0.0		
Tot.	18	100.0	58	100.0		
M2 4	1	6.6	55	79.7		
4-	7	46.7	12	17.3		
3+	0	0.0	1	1.5		
3	7	46.7	1	1.5	41.20	0.000 **
Tot.	13	100.0	69	100.0		
M3 4	0	0.0	12	20.7		
4-	2	22.2	9	15.5		
3+	2	22.2	23	39.7		
3	5	55.6	14	24.1	5.42	0.190
Tot.	9	100.0	58	100.0		
Carabelli's tubercle						
M1 +	6	46.2	30	73.2		
-	7	53.8	11	26.8	2.14	0.143
Tot.	13	100.0	41	100.0		
M2 +	1	5.0	13	28.9		
-	19	95.0	32	71.1	3.37	0.066
Tot.	20	100.0	45	100.0		
M3 +	0	0.0	12	26.7		
-	9	100.0	33	73.3	1.74	0.188
Tot.	9	100.0	45	100.0		
Metaconule (cusp 5)						
M1 +	1	7.1	14	35.0		
-	13	92.9	26	65.0	2.74	0.098
Tot.	14	100.0	40	100.0		
M2 +	8	44.4	18	36.7		
-	10	55.6	31	63.3	0.08	0.771
Tot.	18	100.0	49	100.0		
M3 +	2	28.6	14	31.8		
-	5	71.4	30	68.2	0.07	0.790
Tot.	7	100.0	44	100.0		

	MKD		KAH			
	No.	%	No.	%	X^2	P
Parastyle						
M1+	0	0.0	3	7.3		
-	13	100.0	38	92.7	0.09	0.757
Tot.	13	100.0	41	100.0		
M2 +	1	5.3	0	0.0		
-	18	94.7	61	100.0	0.38	0.535
Tot.	19	100.0	61	100.0		
M3 +	0	0.0	4	8.2		
-	7	100.0	45	91.8	0.01	0.999
Tot.	7	100.0	49	100.0		

* $p \leq 0.05$; ** $p \leq 0.01$

Table 33 – Necropolises of KAH (Yemen) and RH5 (Oman). Frequency, percentage and chi-square of non metric dental characters. Lower jaw

	MKD		KAH			
	No.	%	No.	%	X^2	P
Cusp Number						
P3	2	7	58.3	49	71.1	
3	5	41.7	20	28.9	0.291	0.590
Tot.	12	100.0	69	100.0		
P4 2	3	23.1	4	6.8		
3	10	76.9	55	93.2	1.63	0.201
Tot.	13	100.0	59	100.0		
M1 4	3	9.4	1	2.0		
>4	29	90.6	48	98.0	0.93	0.335
Tot.	32	100.0	49	100.0		
M2 4	19	73.1	33	56.9		
>4	7	26.9	25	43.1	1.37	0.243
Tot.	26	100.0	58	100.0		
M3 4	6	60.0	27	43.5		
>4	4	40.0	35	56.5	0.39	0.531
Tot.	10	100.0	62	100.0		
Groove Pattern						
M1 Y	12	50.0	38	86.4		
+	12	50.0	6	13.6	8.76	0.003 **
Tot.	24	100.0	44	100.0		
M2 Y	4	13.8	41	64.1		
+	25	86.2	23	35.9	18.23	0.001 **
Tot.	29	100.0	64	100.0		
M3 Y	1	14.3	29	54.7	2.59	0.188
+	6	85.7	24	45.3		
Tot.	7	100.0	53	100.0		
Protostylid						
M1 +	6	27.3	8	19.5		
-	16	72.7	33	80.5	0.15	0.698
Tot.	22	100.0	41	100.0		
M2 +	2	10.5	12	28.6		
-	17	89.5	30	71.4	1.50	0.221
Tot.	19	100.0	42	100.0		

	MKD		KAH			
	No.	%	No.	%	X^2	P
M3 +	2	22.2	27	52.9		
-	7	77.8	24	47.1	1.79	0.181
Tot.	9	100.0	51	100.0		
Cusp 7						
M1 +	1	3.6	9	13.4		
-	27	96.4	58	86.6	1.113	0.289
Tot.	28	100.0	67	100.0		
M2 +	0	0.0	2	2.9		
-	25	100.0	66	97.1	0.01	0.952
Tot.	25	100.0	68	100.0		
M3 +	0	0.0	9	15.3		
-	8	100.0	50	84.7	0.40	0.526
Tot.	8	100.0	59	100.0		

** $p \leq 0.01$

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GENERAL CONCLUSIONS

In this volume we present the results of the excavations of two necropolises characterized by completely different types of tomb, the turret tomb and the hypogean tomb. It must be said however that in Yemen the tombs are not restricted to these two categories. A complete typology should indeed include also *pit graves* (that is, dug out of the ground), like those found, for example, near the Himyarite city of Madinat al-Ahjur (Al-Ḥadā), where the graves are marked on the ground by simple oval patterns of large juxtaposed stones, or those of Wādī Ḍurā near the Hajar Dhaybiyyah tell; the *mausoleum tombs* encountered in the necropolises of Ḥayd Ibn 'Aqīl and Mārib (Awwām); as well as the *rock chamber tombs* with side loculi, such as those visible on the sides of Jabal Marmar overlooking the site of Shibām Sukhaym, near Al-Ghirās, or again those explored by the French Mission at Shabwah and the Soviet Mission near Raybūn in Wādī Du'ān (Ḥaḍramawt).

Nevertheless, although the variety is very wide from the formal point of view, it seems to be drastically reduced when we observe other attributes of the tombs such, for example, as the position of the grave goods in comparison with ancient settlements or their typology. Indeed from this standpoint the Yemeni tombs would seem to belong to only two groups: a 'group A' (including hypogean tombs, pit graves, mausoleum or rock chamber graves) characterized by the concentration of the tombs in the surroundings of an ancient city and by grave goods all from the South Arabian area; then there is a 'group B' (comprising only turret tombs) characterized by decentralized tombs and by particular grave goods (for example, pottery is rare). These two groups are then also apparently characterized, rather than by architectonic variations pure and simple, by more profound differences of a cultural nature. If such a subdivision is correct, the formal differences displayed by the group A tombs must be ascribed to extra-cultural causes. Above all, it obliges us to make a further effort to interpret this cultural difference reflected in the two groups.

As far as the formal differences of the group A tombs are concerned, it seems certain that, as they mostly do not depend either on geographic reasons (similar tombs are in fact found in different areas), nor on chronological reasons (similar tombs exist in different periods), they were essentially the result of variations in the lithopedological conditions prevailing in the area in which they were constructed. The differences would thus be technical rather than conceptual. This fact, when compared with the morphological persistence in the group B tombs in different lithological environments, strengthens the traditional value of the turrets as well as emphasizing the cultural differences between the two groups of tombs.

The present volume provides significant evidence on which to base a more detailed examination of the differences between group A tombs (necropolises of Kharibat al-Ahjur [KAH]) and group B tombs (necropolises of Al-Makhdarah [MKD]). For this purpose, let us review the salient data expressed in the conclusions of the two respective excavation reports and verify the hypotheses of cultural divergence on the basis of the results of the osteological results.

There are considerable differences in the grave goods. At KAH there is a vast array of objects: numerous different pottery forms, precious and sophisticated jewelry, glass balsamaria and imported bronze mirrors, weapons, silver coins, stone statuettes (bull). At MKD a more sober picture is found: there is not much pottery, no coins or precious imported objects; conversely, there are abundant shells, small bronze and iron tools; objects of personal ornamentation are much simpler and more modest on the whole. The distribution of items in the grave goods of the two KAH tombs reveal differences in personal wealth and the existence of social elites, differences in social status that certainly cannot emerge in the homogeneous and overall meagre composition of the MKD necropolises. Essentially a significant difference is perceived in the way the two communities treated their dead: on the one hand (KAH), the individuals seem to retain the right to display the symbols of the individual condition they enjoyed in life; on the other, (MKD), they seem to have been annihilated by the event of their decease, retaining only the strict minimum of items of their personal attire.

This situation of conceptual difference reflected in the grave goods appears even more pronounced as we observe the burial modes used in the two necropolises. The large burial chambers in KAH seem to have been

custom built for the individuals that occupy the small number of cyst graves (one only in KAH/T1) dug out of their floors. These represent a kind of 'house' in the world beyond, complete with walls, windows (niches) and door, of which the deceased buried in the cysts were the sole and exclusive owners and in which they would dwell undisturbed for ever. The MKD turrets, on the other hand, consist of actual 'containers of the dead', in which the most recent burial had only temporary significance, ultimately ending up being pushed up against the walls and becoming part of the anonymous mass of disarticulated skeletons from other burials. This is a profound difference that, by revealing to us an alternative in the functional purpose of ancient Arabian funeral monuments, seems actually to show up a different way of conceiving of death. On the one hand, there is belief in life after death, in which the deceased goes to 'live' with his accompanying goods in his house; on the other the opposite concept of a death unassociated with journeys or other worlds: an objective and separate feeling about death at KAH and a subjective and actualized feeling about death at MKD.

Discussion of burial modes leads, as we have seen, to the architecture of the tombs. And also in this case we find confirmation of the hypotheses regarding the different ways of conceiving of death in the two communities. The hypogean chambers of KAH, after being closed, remain underground and are invisible. They belong to the dead and their world; relations with the living are interrupted. The MKD turrets on the other hand remain quite visible, not only because of the way they are built but also because of their position, always on hills and rocky crests: here the relations between living and dead seem to continue. The contrast is symbolic. If we take ground level as the limit between the ctonian and the catactonian world, we see that the former is for the KAH dead and the second for the MKD dead.

The differences between the two categories of tomb are seen to be more substantial than formal. And this justifies the subdivision of the Yemeni tombs into a group A (including all the different types of South Arabian tombs) and a group B (comprising only the turret tombs), which we had proposed at the beginning on the sole basis of the centralized or decentralized position vis-à-vis the South Arabian cities. However, it is one thing to propose a typology a priori and another to verify the discriminants and examine their significance in detail. The comparative study of the two necropolises, selected according to a generic but significant hypothetical difference, has been seen to lead not only to the need to verify the correctness of the selection but also and above all, in the mutual comparison, to obtain a sharper and more complete cultural image of each of them.

The obvious differences found in the grave goods, in the burial mode and in the architecture, as well as revealing to us two spiritually different worlds, brings us, if we consider also the parameter of tomb distribution, also to consider another alternative aspect of the two communities, this time of a social nature.

The numerous allochthonous materials contained in the grave goods, the absence of pottery, the custom of preserving the deceased before burial, the absence of nearby inhabited areas, the arrangement of the necropolises to form a road network, the alignment of the 'rays' with the ancient roads, are all features that conjure up an image of 'mobility' regarding the MKD people. This idea is further fleshed out by comparison with the parallel attributes of KAH. Here the necropolis is located inside a city area, the tombs take on the form of a house, the deceased are buried immediately after death, everyday objects typical of a sedentary population (especially pottery) appear among the grave goods, no specific relationships are observed between the road network and the distributive pattern of the tombs — here everything suggests a 'static' image that itself is blown up by comparison with MKD. The MKD tombs seem to point to nomadic populations; the KAH ones to sedentary populations.

The idea of nomads is apparently confirmed by two further important facts. The first of these refers to the general pattern of distribution of the Yemeni turret tombs (cf. contribution by A. Luppino). With their concentration in lines extending over desert zones not only in Yemen but also throughout the Arabian Peninsula (Oman, Saudi Arabia, Jordan and the Sinai) they bear witness to a supranational traffic that would be possible only for nomadic populations. The second fact consists of the particularly ancient tradition of the turret tombs (cf. the conclusions from the MKD excavations) which, having remained practically unchanged for three or four millennia, indicate that they belong to people who had remained long outside the political, social and cultural events characterizing sedentary populations.

The comparative analysis of the bones found in the tombs confirms the presence of the social dimorphism in the two necropolises and, going even further, points to membership of the respective communities of two different ethnic groups. The metric and non metric features of the skeleton and the teeth actually show up such differences between KAH and MKD individuals which, 'inexplicable in terms of microevolutionary factors linked to the chronological and geographical distances between the two groups, must reflect the existence of two different population types in the Yemen of the 1st millennium B.C.' (cf. A. Coppa's Appendix).

Compared with KAH, the MKD group is characterized by stronger limb length, narrower skull, less conspicuous frontal eminences, less rounded orbits and narrower nose; the faces are longer and less flat and the teeth larger. This somatic contrast is actually quite similar to the present-day differences between the desert bedouins and the highland Yemenis. It is interesting to note how from the osteological point of view the MKD skeletons are closer to those of the Omani necropolis of RH5 (4th millennium B.C.) than to those of KAH, which further confirms the strong tradition and the widespread distribution of the Arabian Peninsula nomads.

The palaeopathological study, by revealing a much lower number of decayed teeth and greater wear in the MKD group, points to a possible difference in food patterns in the two populations. Moreover, an improvement in the living conditions at KAH seems to emerge from an analysis of the life expectancy curves. The frequent exclusive periosteal reactions on tibias and fibulas could be accounted for by long periods spent in the saddle by the MKD individuals. This would confirm the hypothesis of their nomadic conditions, already formulated on the basis of the archaeological evidence. Less explicable is the high incidence of depressed fractures found in MKD skulls. These traumas, none of which was mortal, must have been the result rather than of armed clashes and battles of a specific working activity. If the proximity of the Manqaz quarry could help us in the definition of this activity (mining) we could claim that the nomads may sometimes have been involved in work lying outside their exclusive travelling occupation.

A parallel study of the two necropolises which, in any case, as we have seen, coexisted in the early centuries of the modern era, seems to provide amply evidence to sustain the existence of a social and ethnic dimorphism among the ancient Yemeni populations: on the one side, the South Arabian sedentary populations, on the other the desert nomads. One group were by tradition farmers and traders, the other, by even longer tradition, travellers and caravaneers. The former are comparatively familiar to us thanks to their cities, their dams, their pottery, their art and inscriptions; the latter are practically completely unknown. And yet it was due to their interaction that Arabia Felix flourished. Without trade they would not have prospered and trade would not have been materially possible without the role of the nomadic caravaneers.

The tombs of Al-Makhdarah now enable us to learn a little more about these voiceless actors in South Arabian history, something more direct about these population often mentioned in written sources and in South Arabian history, but about whom they tell us nothing. For the first time we encounter the *'arab* mentioned in the South Arabian texts from the 6th century B.C. on, the nomads that, by increasing their pressure from the East, in the 2nd century B.C., succeeded in permanently occupying several cities in the Jawf (Haram, Yathil) and overthrew the kingdom of Ma'īn, the kinsmen of the desert tribes (Kinda, Madhḥij, Al-Azd) who, fighting against the Sabaeans from the 2nd century A.D. on, gradually managed to infiltrate the territory of Ḥashid, the nomads that at last (4th century A.D.) were recognized and admitted by the kingdom of Ḥimyar.

We trust this will be considered a first fruitful encounter leading to the positive involvement of other researchers, although in full awareness of the difficulties involved in studying peoples that, possessing no houses or cities, left us tangible traces of themselves only after their death.

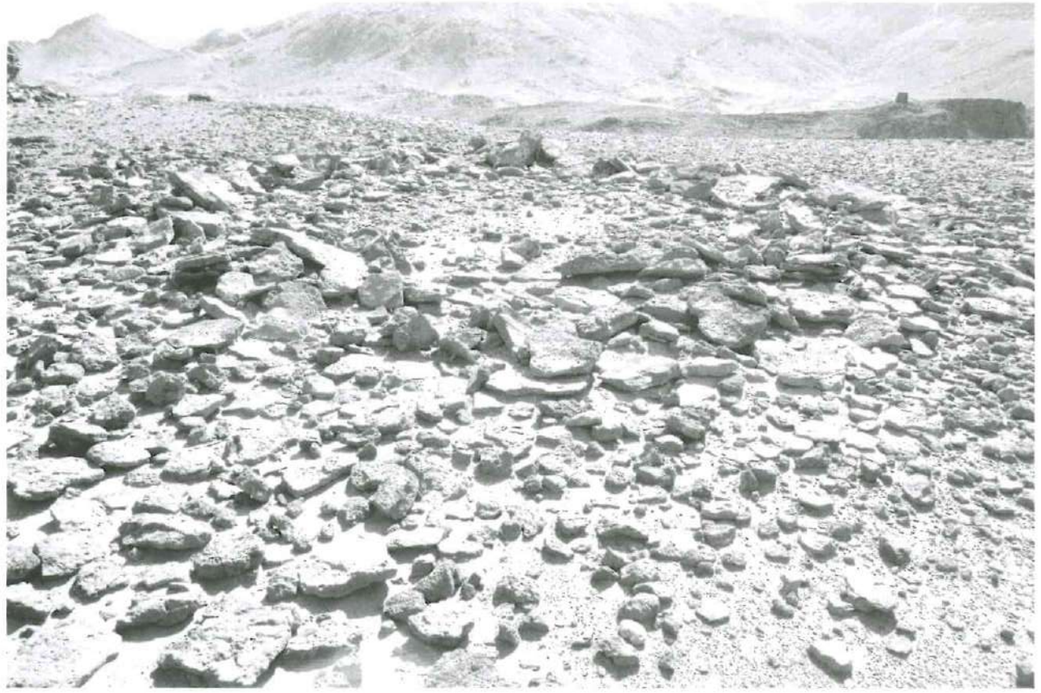
PLATES

a. Necropolis MKDi. Remains of ancient tomb on SW boundary of necropolis.

b. Necropolis MKDi. Remains of ancient tomb.

a. Necropolis MKDi. In this view of two tombs, a more advanced level of degradation is visible in the left hand one, where only the internal curtain of the turret has been conserved.

b. Necropolis MKDi. Rear view of complete tomb.



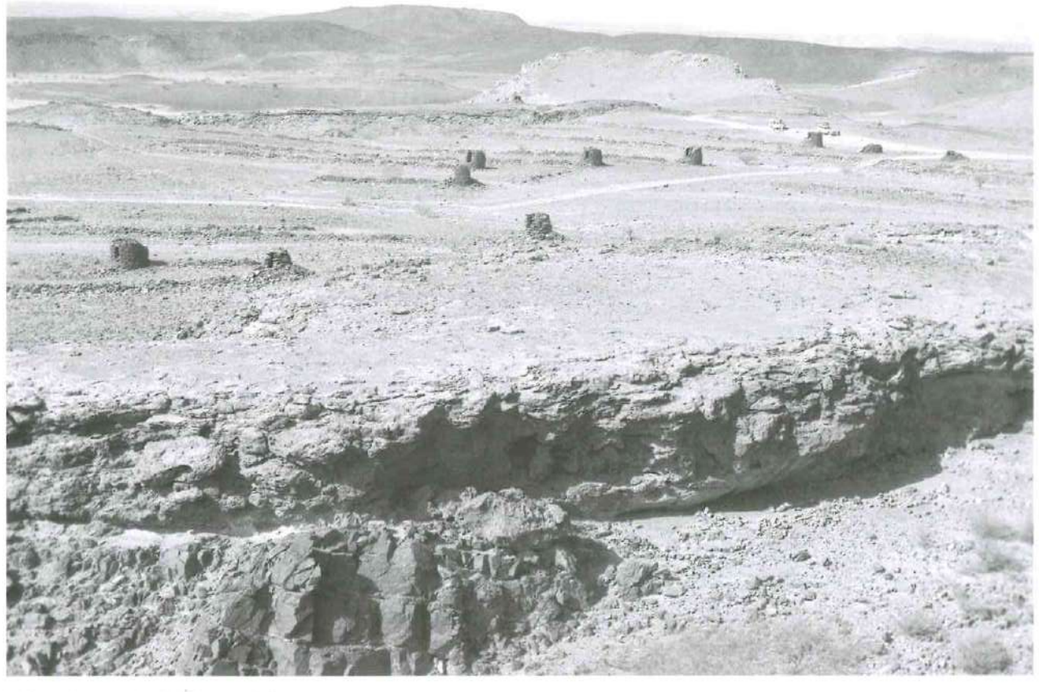
a. Necropolis MKDi. View of stone circle near tomb T16.

b. Necropolis MKDi. Tomb T1 from SW (centre). In the foreground tomb T14 and, in the background, tomb T15.

a. Necropolis MKDi. Tomb T1. Interior view of roof slab.

b. Necropolis MKDi. Tomb T1. View of bottom level. The base of the burial chamber is cut out of bedrock (ground level).

a. View of necropolis MKDii from West.



b. View of necropolis MKDii from Hill A.

a. Necropolis MKDii. Detail of 'rays'.

b. Necropolis MKDii. Detail of ray in tomb T24.

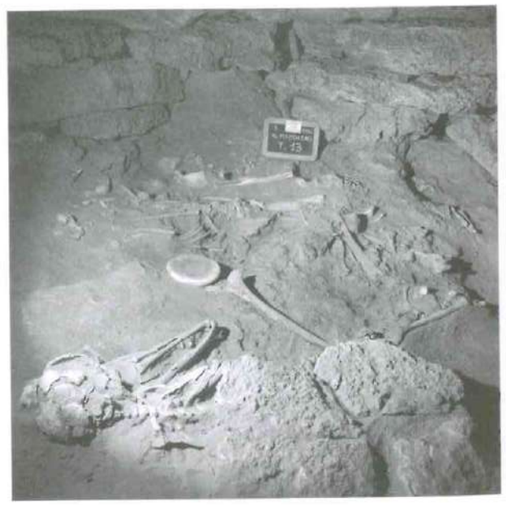
a. Necropolis MKDii. Detail of terminal head of ray of tomb T22.

a. Necropolis MKDii. Detail of terminal head of ray of tomb T22.

b. Necropolis MKDii. Global northward alignment of rays (from SW).

a. Necropolis MKDii. Tomb 13. Viewed from W.

b. Necropolis MKDii. Tomb 13. The pavement La.



c. Necropolis MKDii. Tomb 13. Level 1 burial.

a. Necropolis MKDii. Tomb 13. Detail of centre of burial chamber (lev. 1) showing the mass of cemented dark earth.

b. Necropolis MKDii. Tomb 13. Disarticulated bones piled up against the NE wall of the tomb.

a. Necropolis MKDii. Tomb 15, flanked on the right by the ray of tomb T15A (from S). Tomb T13 in the background.

b. Necropolis MKDii. Tomb T15. Detail of entrance.

a. View of necropolis MKDiii from W. The Italian Mission camp is set up among the tombs T3, T4 and T5. Background, right, the tombs of the necropolis MKDii are visible.

b. View of several tombs of necropolis MKDiii. Background, right, Hill A.

a. Necropolis MKDiii. Front view of tomb T4.

b. Necropolis MKDiii. Tomb T4. Detail of entrance.

a. Necropolis MKDiii. Tomb T4. Detail of pavement La.

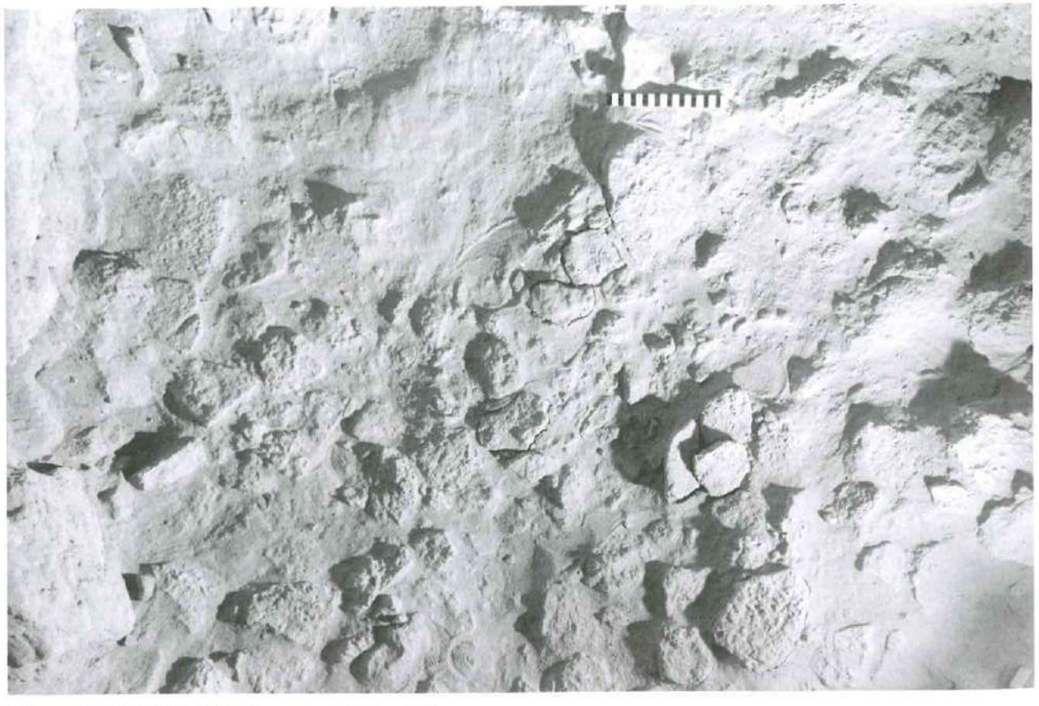
b. Necropolis MKDiii. Tomb T4. Bone fragments found in the sand layer sealed by pavement La.

Necropolis MKDiii. Front view of tomb T5 (viewed from W).

a. Necropolis MKDiii. Tomb T9. Tomb viewed from W.

b. Necropolis MKDiii. Tomb T9. Detail of level 1 burials.

a. Necropolis MKDiii. Tomb T9. Pavement La.



b. Necropolis MKDiii. Tomb T9. Floor on tomb bottom (Lb).

a. Necropolis MKDiii. The tomb T44 (left) and tomb T47 (right). Viewed from SE.

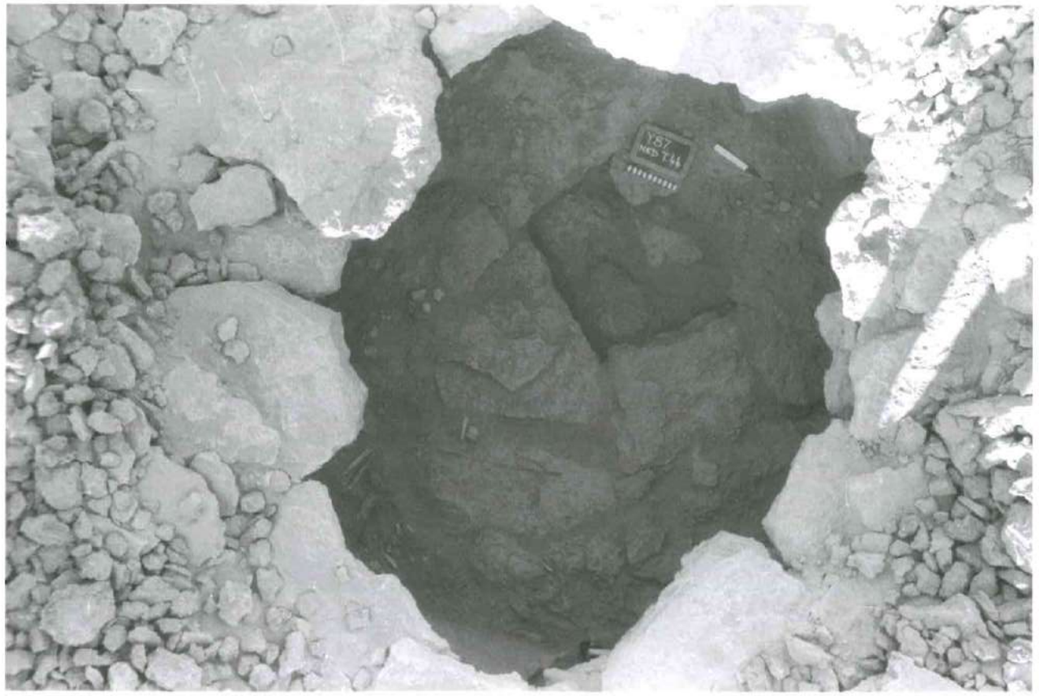
b. Necropolis MKDiii. Tomb T44 viewed from E.

a. Necropolis MKDiii. Tomb T44. Detail of roof.

b. Necropolis MKDiii. Tomb T44. Tomb viewed from NW.

c. Necropolis MKDiii. Tomb T44. Bones against E wall.

a. Necropolis MKDiii. Tomb T44. Remains of bones laid on a level rubble floor.



b. Necropolis MKDiii. Tomb T44. Pavement at bottom of burial chamber.

PL. 20

a. Overview of Al-Manqaz Quarry.

b. Al-Manqaz Quarry. A retainment wall for the excavation debris was built on the edge of the quarry.

PL. 21

a. Al-Manqaz Quarry. One of the vertical sections of the quarry.

b. Al-Manqaz Quarry. Entrance to the quarry from the cave.

PL. 22

a. Al-Manqaz Quarry. Remains of ancient dwellings around the quarry.

b. Al-Manqaz Quarry. Detail of one of the dwellings near the quarry.

PL. 23

a. View of tomb MNQ/T1.

b. Tomb MNQ/T1. General view from S.

a. Tomb MNQ/T1. Some of the adjacent rooms on the south (photographed from the top of the tomb).

b. Tomb MNQ/T1. Viewed from W.

a. Tomb MNQ/T1. Level 1 floor.

b. Tomb MNQ/T1. Detail of skull near a ring based vase in level 1.

a. Tomb MNQ/T1. Skeleton of adult with young child in level 2.

b. Tomb MNQ/T1. Detail of adult head in level 2.

a. Tomb MNQ/T1. In the cavity left after the removal of the level 2 burials (right) the stones of the base of the burial chamber are visible.

b. Tomb MNQ/T1. Excavation of annex LA. Removal of surface level of windborne deposits.

a. Tomb MNQ/T1. Excavation of annex LA. Structure M3 in LA (from E).

b. Tomb MNQ/T1. Excavation of annex LA. Zone of further excavation to NW of M3. Background. A slab layer resting on the bedrock.

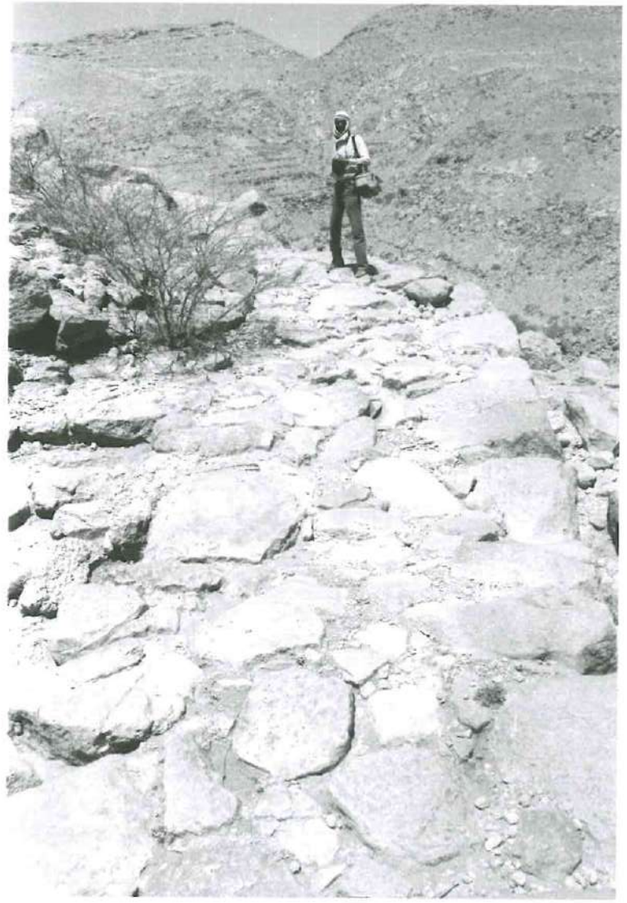
a. Tomb MNQ/T1. Excavation of annex LA. Rock outcrop between M1 and M3.

b. Tomb MNQ/T1. Excavation of annex LA. Level 2 made of reddish-brown clay soil conserved between M1 and M3.

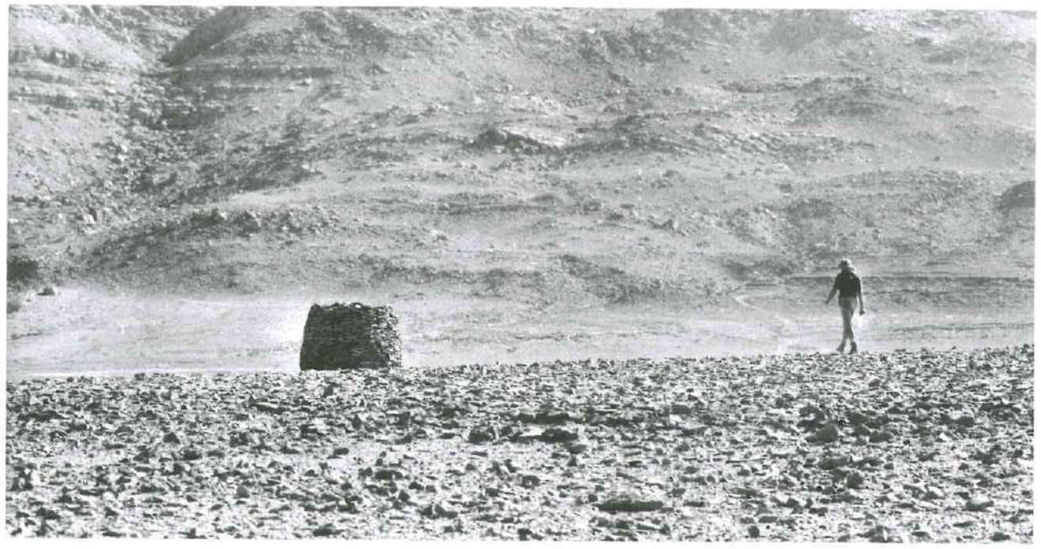
b. Ancient road to Ṣirwāḥ. Substructure works.

c. Ancient road to Ṣirwāḥ. Terrace work.

a. Ancient road to Ṣirwāḥ. View of a paved section.

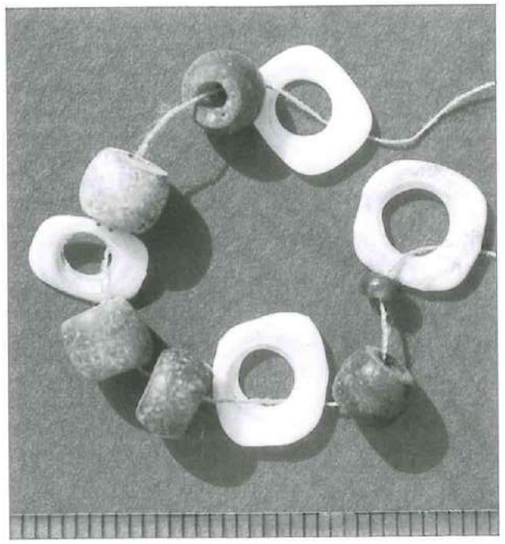


a. Ancient road to Ṣirwāḥ. Surface.

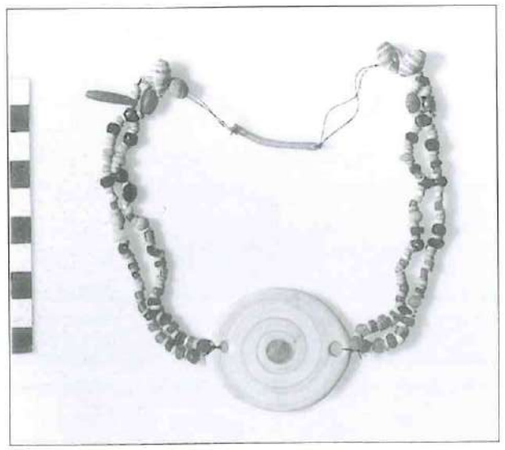


b. Turret tomb along the ancient road to Ṣirwāḥ.

a. Necklace or bracelet (Y.87.MKD.T4/4).



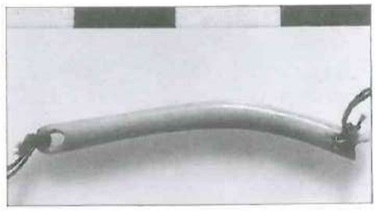
b. Necklace or bracelet (Y.87.MKD.T9/5).



c. Necklace (Y.86.MKD.T13/1).

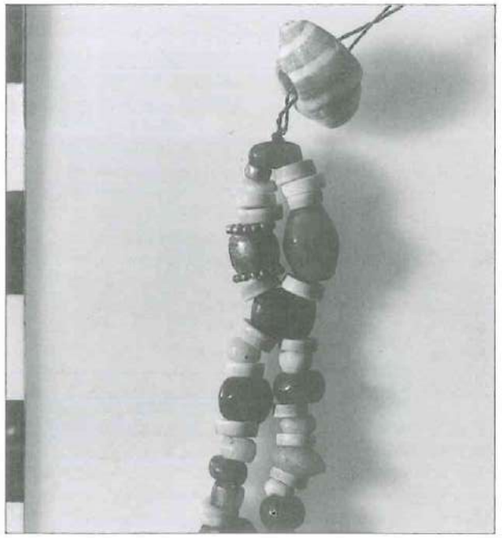
d. Disk pendant made of sea shell (from necklace Y.86.MKD.T13/1).

e. Cowrie from tomb MKDii/T13.



f. Coral rod (from necklace Y.86.MKD.T13/1).

a. Oblong carnelian drop-shaped bead (from necklace Y.86.MKD.T13/1).



b. Detail with gold beads (from necklace Y.86.MKD.T13/1).

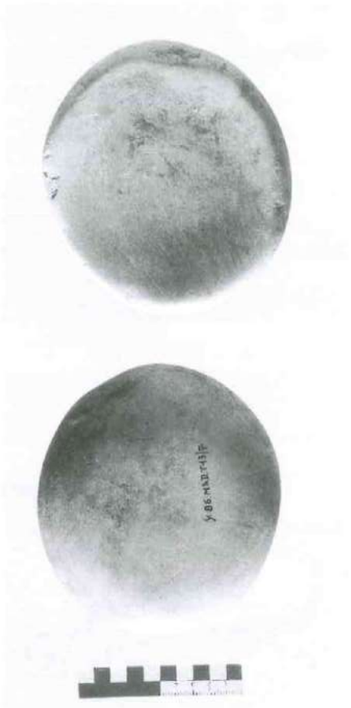
c. Carnelian bracelet (Y.86.MKD.T13/3).

d. Necklace beads (Y.86.MKD.T13/6).

e. Sea shell finger ring (Y.86.MKD.T13/2).

f. Kohl fragments from tomb MKDii/T13.

a. Obsidian flakes from tomb MKDii/T13.



b. Alabaster grinder (Y.86.MKD.T13/7).

c. Pink granite mortar (Y.86.MKD.T13/8).

a. Bronze rod (Y.87.MKD.T4/1).

b. Bronze rod (Y.87.MKD.T9/3).

c. Bronze rod (Y.86.MKD.T13/4).

d. Bronze tool (Y.87.MKD.T44/2).

e. Bronze buckle (Y.86.MKD.T13/5).

f. Bronze finger ring (Y.87.MKD.T13/7).

a. Bronze sheet (Y.86.MKD.T15/1).

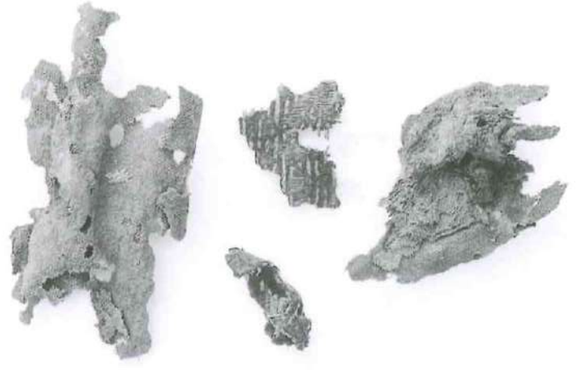
b. Iron knife with bone handle (Y.86.MKD.T5/1).

c. Iron knife blade (Y.86.MKD.T5/2).

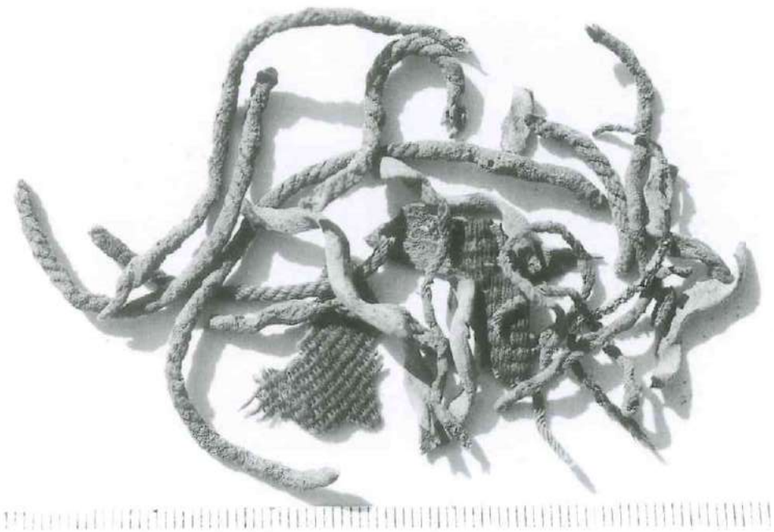
d. Ribbon shaped bronze wire (Y.86.MKD.T13/6).

a. Leather fragments (Y.87.MKD.T13/9).

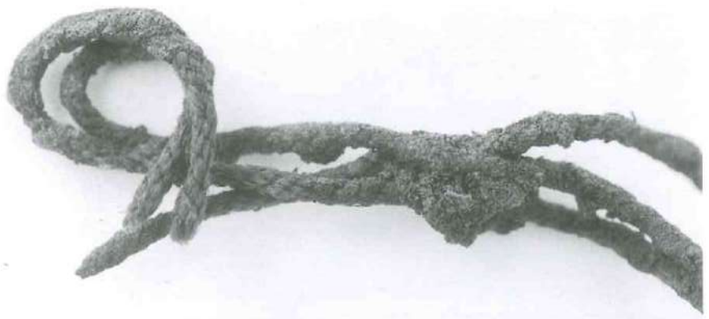
b. Cloth fragments (Y.87.MKD.T13/10).



c. Cloth fragments (Y.87.MKD.T13/10).

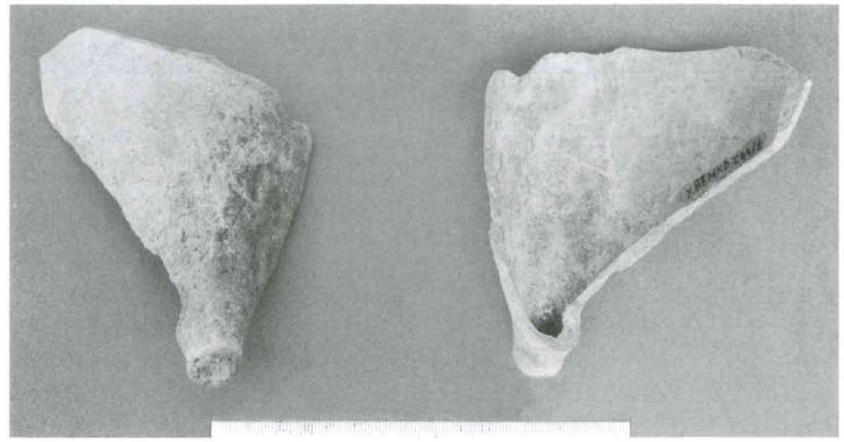


a. Leather strips and rope fragments from tomb MKDii/T13.



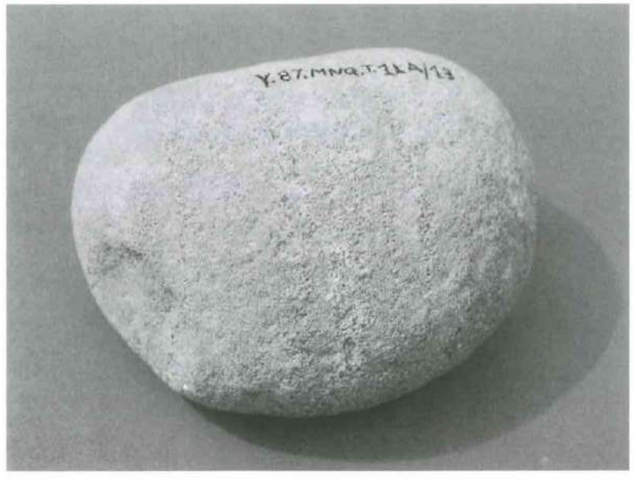
b. Fragments of woven cord fragments from tomb MKDii/T13.

c. Seeds from tomb MKDii/T13.

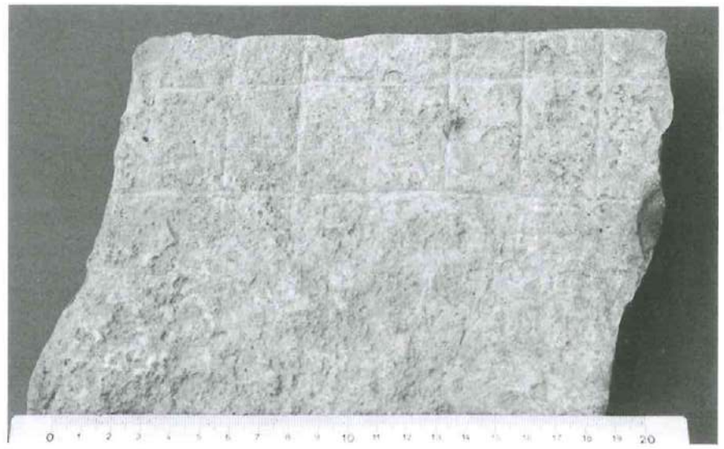


a. Cone-shaped bottom of a pottery vessel (Y.87.MKD.T44/1).

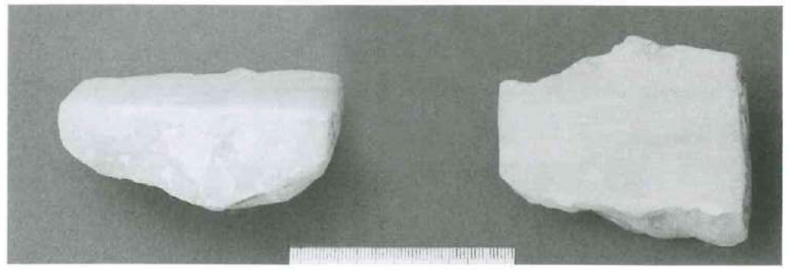
b. Stone stopper (Y.87.MNQ.T1.LA/12).



c. Granite grindstone (Y.87.MNQ.T1.LA/13).



a. Incised sandstone slab (Y.87.MNQ.T1.LA/14).



b. Alabaster object (Y.87.MNQ.T1.LA/15).

c. Alabaster object (Y.87.MNQ.T1.LA/16).

d. Vitreous paste pendant (Y.87.MNQ.T1/8).

a. Turret tomb in Jabal Yām.

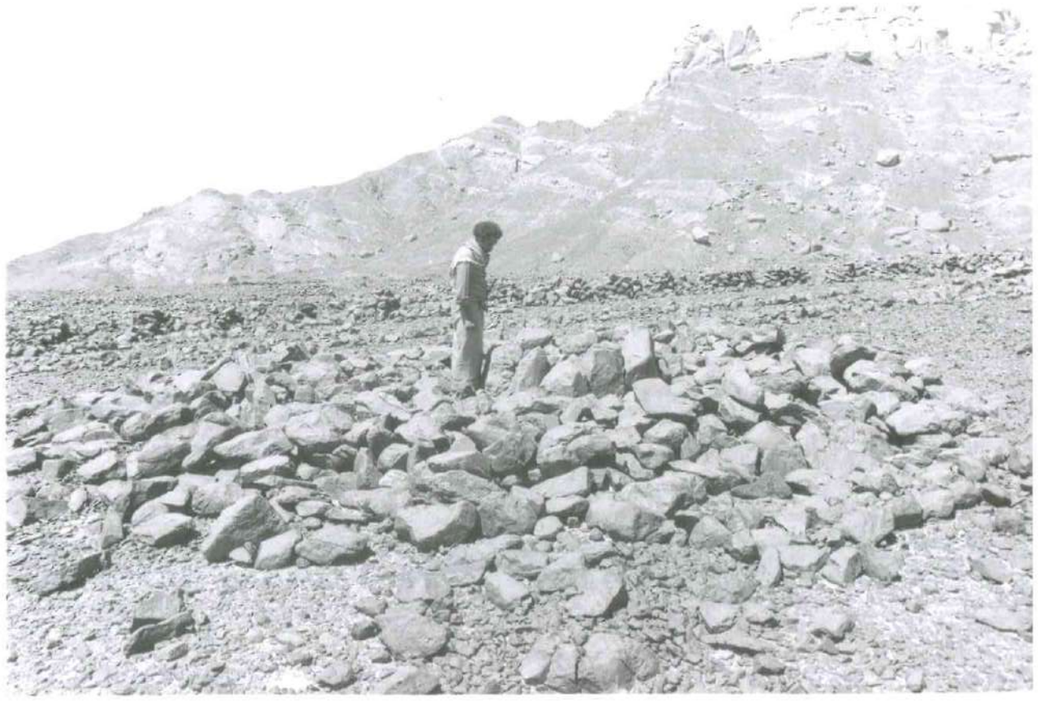
b. Tombs on the northern slopes of Jabal Yām.

Burial chamber with rectangular plan in Jabal Yām.

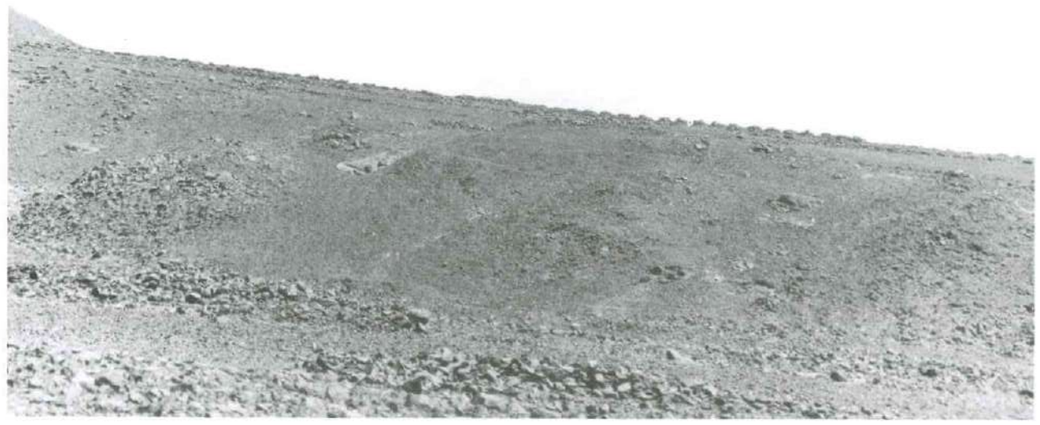
a. Necropolis in Jabal Yām.

b. Turret tombs on the Jabal Silyām (top, right), viewed from Wādī al-Khārid.

a. Necropolis on the southeastern slopes of the Jabal al-Lawdh.



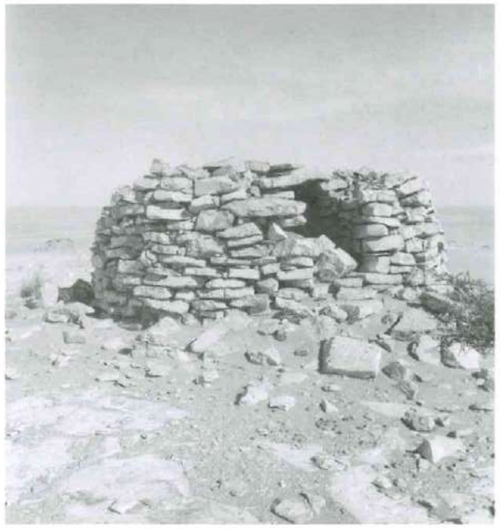
b. Tomb in the Jabal al-Lawdh.



a. Cairn alignment in the Jabal al-Lawdh.

b. Necropolis in the Al-'Alam al-Abyaḍ hills.

a. Alignment of tombs at Al-'Alam al-Abyaḍ.

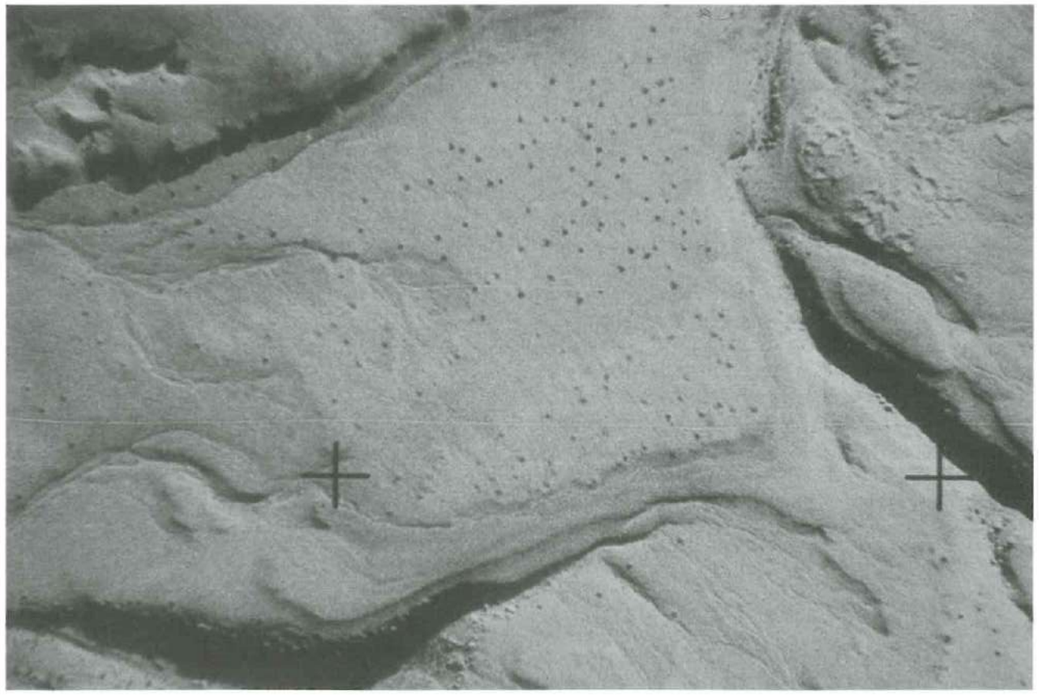


b. Turret tombs at Al-'Alam al-Abyaḍ.

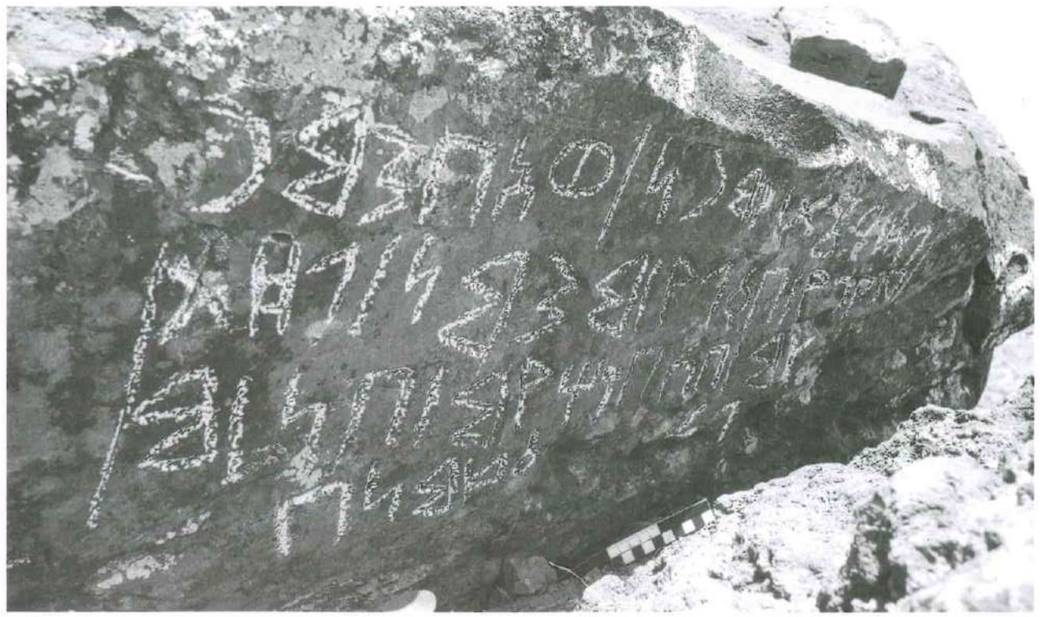
c. Different state of conservation between two turret tombs at Al-'Alam al-Abyaḍ.

a. Turret tombs north of Yalā/Ad-Durayb.

b. Tomb in the escarpment SW of Ar-Riyāḍ (Saudi Arabia).

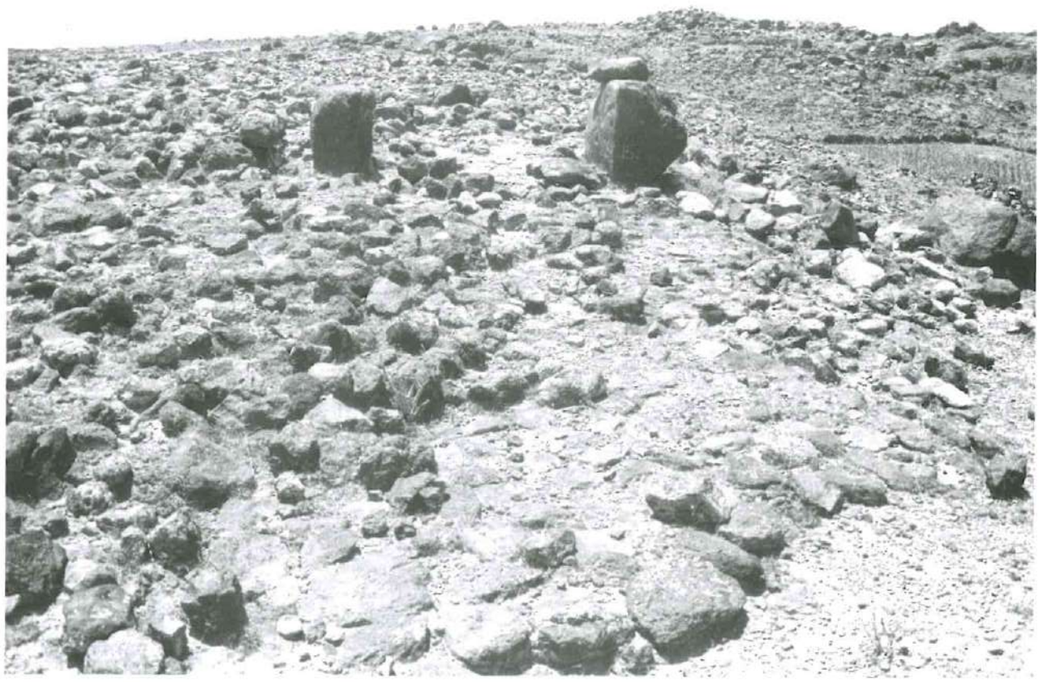


a. Aerial view of turret tombs in the zone between Jabal al-Lawdh and the Al-'Alam al-Abyaḍ hills.



b. Al-Hājib, near Waraqah (Dhamār), rock inscription.

Al-Ḥajfah (Dhamār). Building HGi: Base of a double curtain wall.



a. Al- Ḥajfah (Dhamār). Building HGii: Entrance with monolithic doorposts.

b. Waraqah castle (Dhamār).

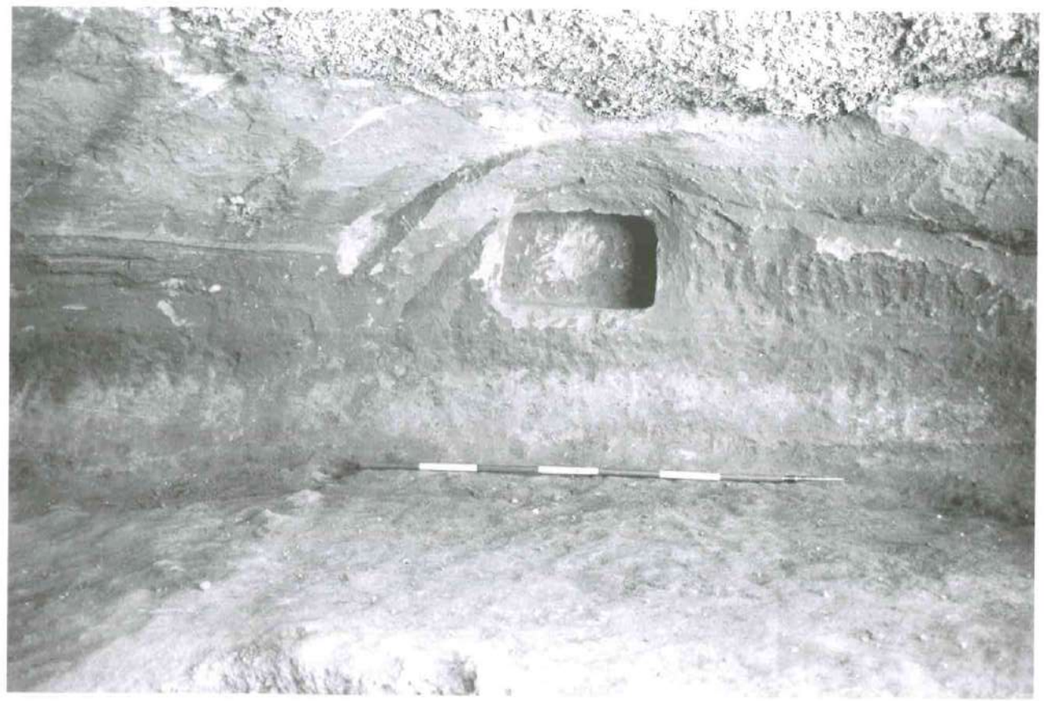
a. Block with inscription reused in a wall of Waraqah castle.

b. Tomb KAHi/T1. Hole into which the earthmoving vehicle fell.

c. Tomb KAHi/T1. Entrance to burial chamber: bases of the doorposts supporting the architrave.

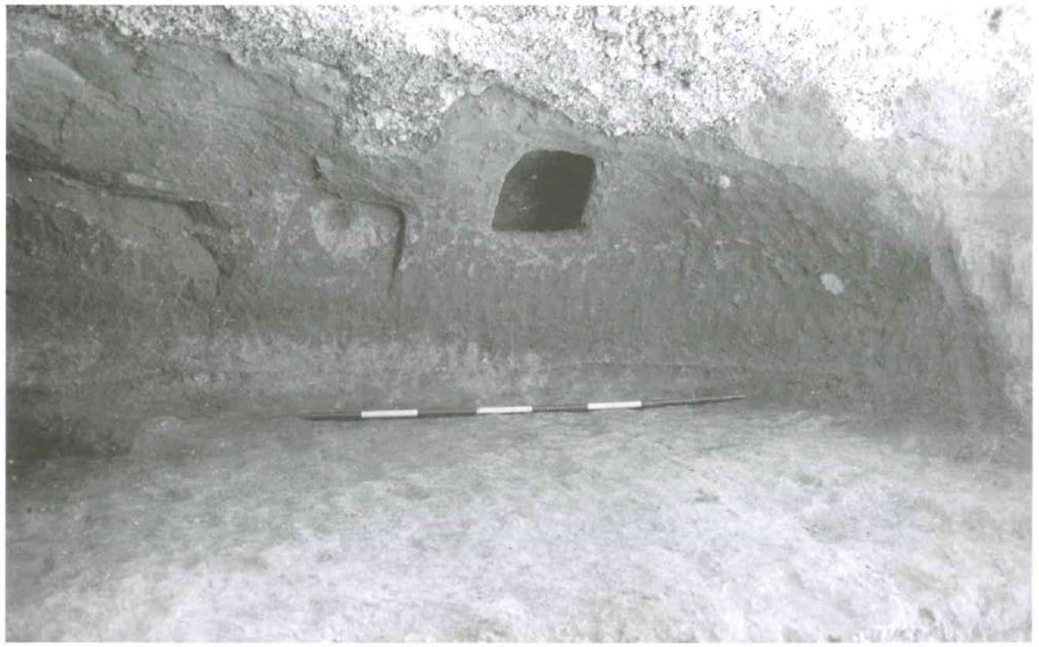
d. Tomb KAHi/T1. Beginning of excavation in the anterior section of the tomb.

a. Tomb KAHi/T1. Ceiling consisting of a compact layer of pumice; the walls have been dug out of the tufaceous rock.



b. Tomb KAHi/T1. Rectangular niche and square blind window in the southern wall.

a. Tomb KAHi/T1. Arch niche dug out of the north wall.



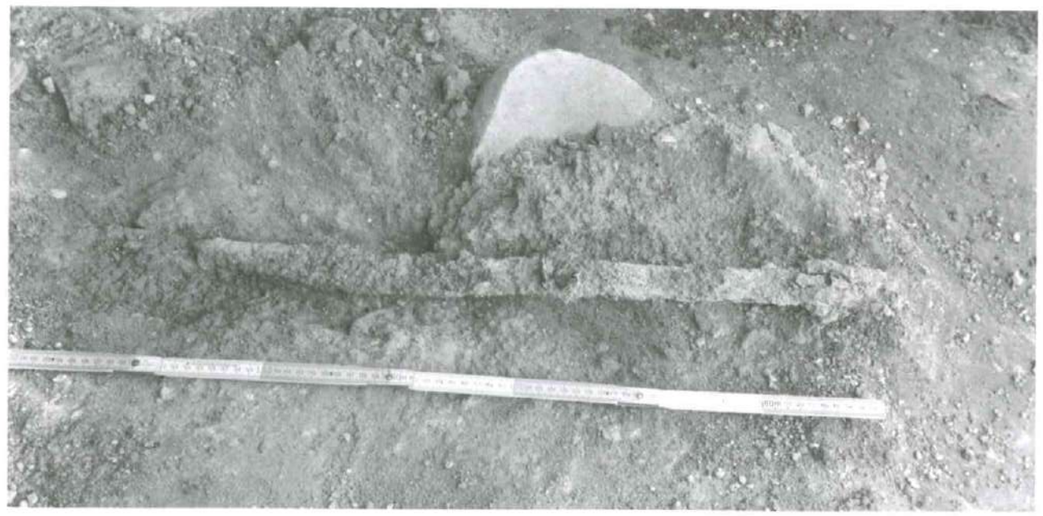
b. Tomb KAHi/T1. Rectangular niche and square blind window in the southern wall.

Tomb KAHi/T1. Heaps of tufaceous stone on the floor having flaked off the walls and ceiling of the tomb.

b. Tomb KAHi/T1. Bone fragments found under the collapsed ceiling.

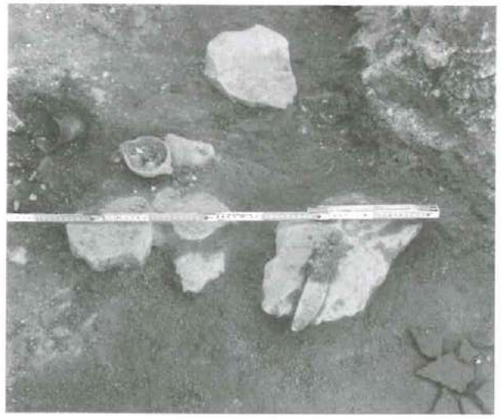
a. Tomb KAHi/T1. Grave goods scattered over the floor and along the southwestern wall of the tomb.

b. Tomb KAHi/T1. Pottery scattered over the floor.



a. Tomb KAHi/T1. Sword with bone handle found *in situ*.

b. Tomb KAHi/T1. Detail of pottery and terracotta lamp.



a. Tomb KAHi/T1. Dagger found on tufaceous stone having detached itself from the wall.

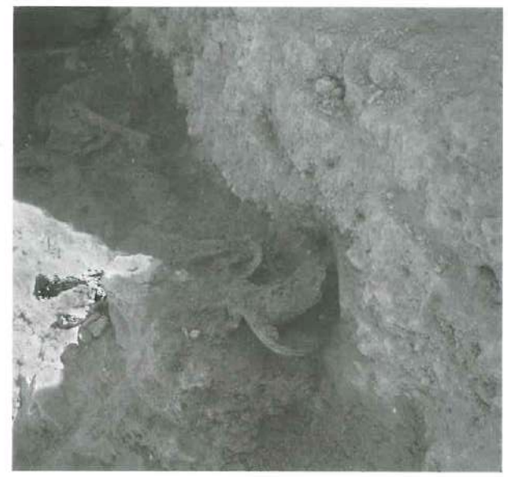
b. Tomb KAHi/T1. Terracotta pots found in the northern sector of the tomb.

c. Tomb KAHi/T1. Beads found near the eastern wall of the tomb.

a. Tomb KAHi/T1. The tomb from the west, and the excavation of the cyst grave.

b. Tomb KAHi/T1. The cyst grave with the broken roof slabs inside it.

a. Tomb KAHi/T1. Remains of the skull and long bones and bracelet on the eastern boundary of the cyst grave.



b. Tomb KAHi/T1. Fragmentary bones in the centre of the cyst grave.

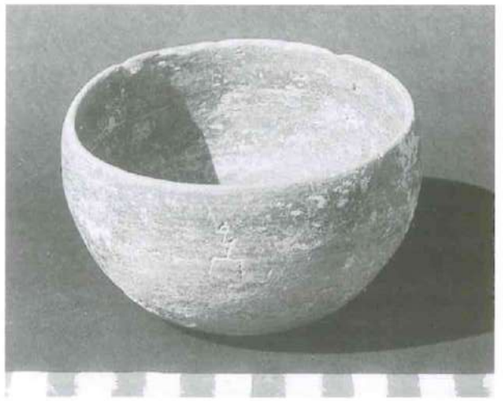
c. Tomb KAHi/T1. The grave at the end of the excavations.

d. Tomb KAHi/T1. The hypogean tomb at the end of the excavations (from the West).

a. Tomb KAHi/T1. Carinated bowl Y.85.KAHi/8.

b. Tomb KAHi/T1. Bowl Y.85.KAHi/12.

c. Tomb KAHi/T1. Bowl Y.85.KAHi/16.



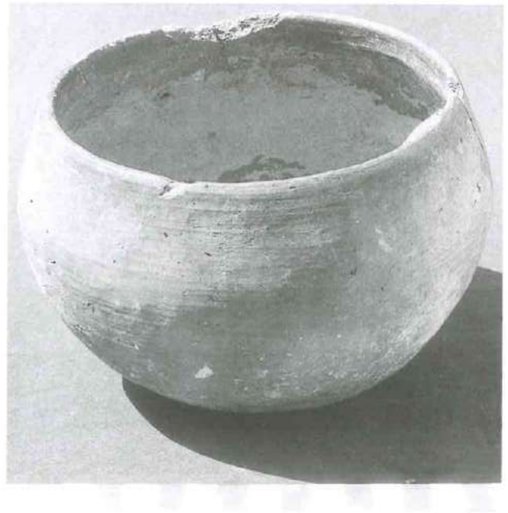
d. Tomb KAHi/T1. Bowl Y.85.KAHi/22.

e. Tomb KAHi/T1. Bowl Y.85.KAHi/4.

f. Tomb KAHi/T1. Bowl Y.85.KAHi/3.

a. Tomb KAHi/T1. Bowl Y.85.KAHi/18.

b. Tomb KAHi/T1. Bowl Y.85.KAHi/2.



c. Tomb KAHi/T1. Bowl Y.85.KAHi/14.

d. Tomb KAHi/T1. Bowl Y.85.KAHi/5.

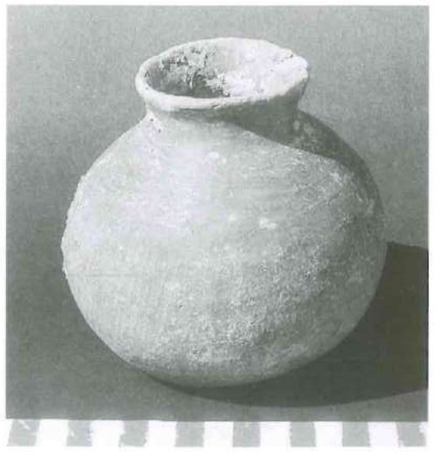
e. Tomb KAHi/T1. Bowl Y.85.KAHi/24.

f. Tomb KAHi/T1. Jar Y.85.KAHi/7.

a. Tomb KAHi/T1. Jar Y.85.KAHi/11.

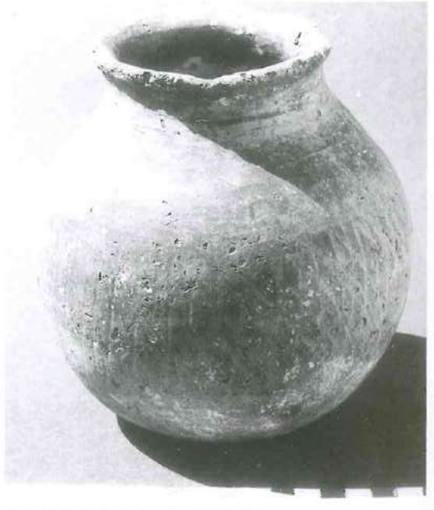
b. Tomb KAHi/T1. Carinated jar Y.85.KAHi/10.

c. Tomb KAHi/T1. Jar Y.85.KAHi/20.

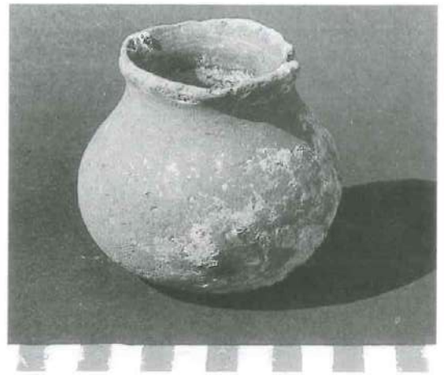


d. Tomb KAHi/T1. Jar Y.85.KAHi/17.

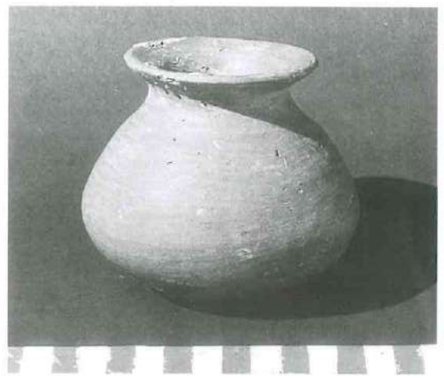
e. Tomb KAHi/T1. Jar Y.85.KAHi/13.



f. Tomb KAHi/T1. Jar Y.85.KAHi/21.



a. Tomb KAHi/T1. Jar Y.85.KAHi/9.

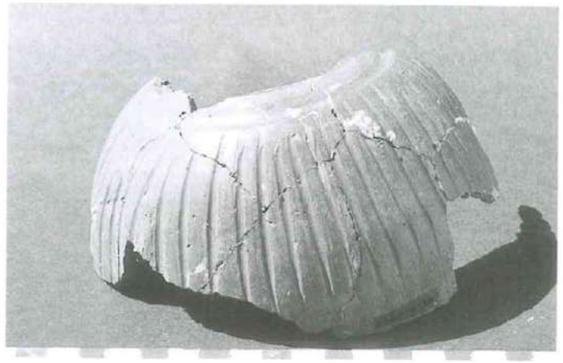


b. Tomb KAHi/T1. Jar Y.85.KAHi/23.

c. Tomb KAHi/T1. Jar Y.85.KAHi/14.

d. Tomb KAHi/T1. Jar Y.85.KAHi/1.

e. Tomb KAHi/T1. Jar Y.85.KAHi/1, detail of the inscription.



a. Tomb KAHi/T1. Hole-mouth jar Y.85.KAHi/27.

b. Tomb KAHi/T1. Lamp Y.85.KAHi/19.

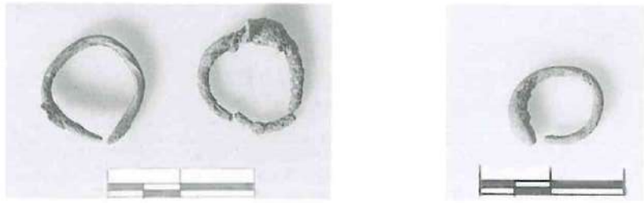
c. Tomb KAHi/T1. Lamp Y.85.KAHi/6.

d. Tomb KAHi/T1. Set of grave goods pottery.

a-c. Tomb KAHi/T1. Bronze finger rings: Y.85.KAHi.T1/7, Y.85.KAHi.T1/33, Y.85.KAHi.T1/36.

d. Tomb KAHi/T1. Silver finger ring: Y.85.KAHi.T1/37.

e. Tomb KAHi/T1. Iron and mother of pearl finer ring: Y.85.KAHi.T1/41.



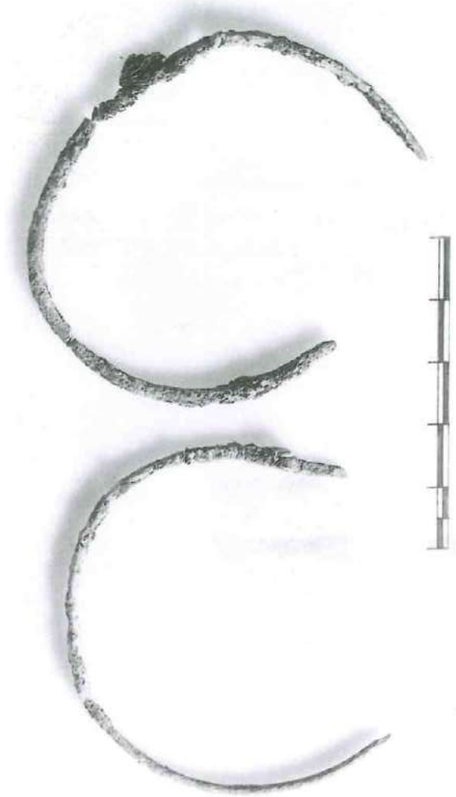
f-g. Tomb KAHi/T1. Bronze earrings: Y.85.KAHi.T1/24, Y.85.KAHi.T1/17.

h. Tomb KAHi/T1. Bronze bracelet: Y.85.KAHi.T1/10.

i. Tomb KAHi/T1. Bronze bracelet: Y.85.KAHi.T1/27.

b. Tomb KAHi/T1. Bronze bracelet: Y.85.KAHi.T1/35.

d. Tomb KAHi/T1. Bronze bracelet: Y.85.KAHi.T1/6.



a. Tomb KAHi/T1. Bronze bracelet: Y.85.KAHi.T1/34.

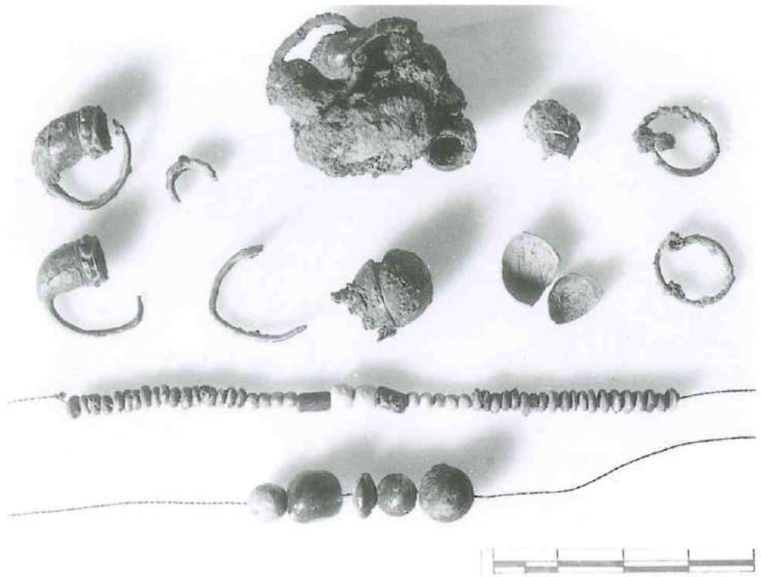
c. Tomb KAHi/T1. Bronze bracelet: Y.85.KAHi.T1/38.

a. Tomb KAHi/T1. Bronze bracelet: Y.85.KAHi.T1/22.

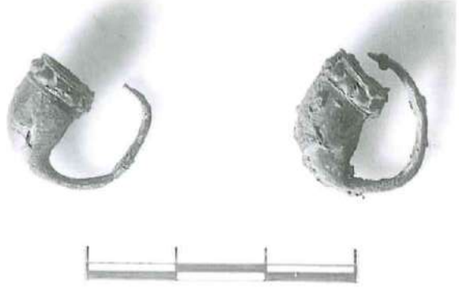
b. Tomb KAHi/T1. Bronze bracelet: Y.85.KAHi.T1/15.

c. Tomb KAHi/T1. Bronze bracelet: Y.85.KAHi.T1/16.

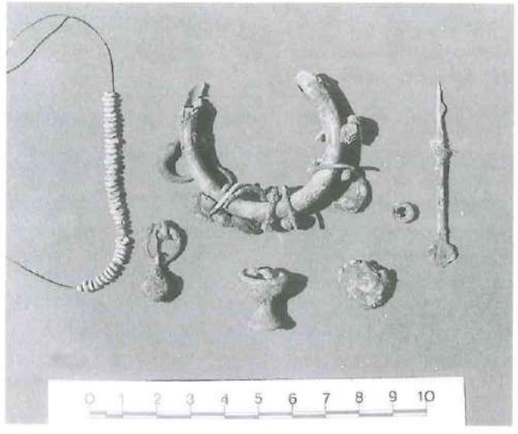
d. Tomb KAHi/T1. Grave goods consisting of 2 spiral bronze rings and glass, carnelian and agate beads: Y.85.KAHi.T1/11.



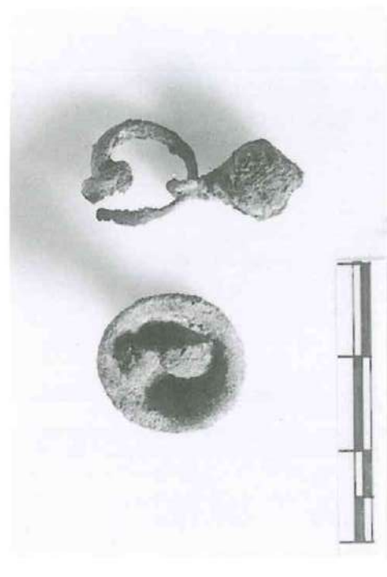
a. Tomb KAHi/T1. Grave goods consisting of silver earrings and glass necklace beads: Y.85.KAHi.T1/14.



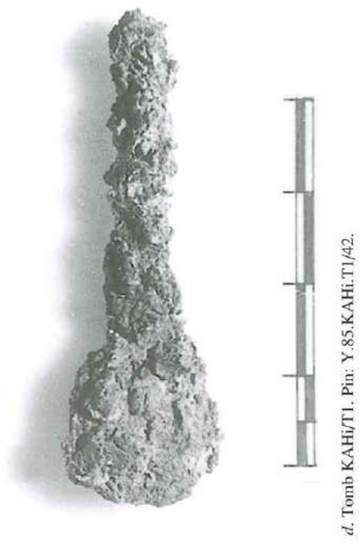
b. Tomb KAHi/T1. Detail of the silver earrings of Y.85.KAHi.T1/14.



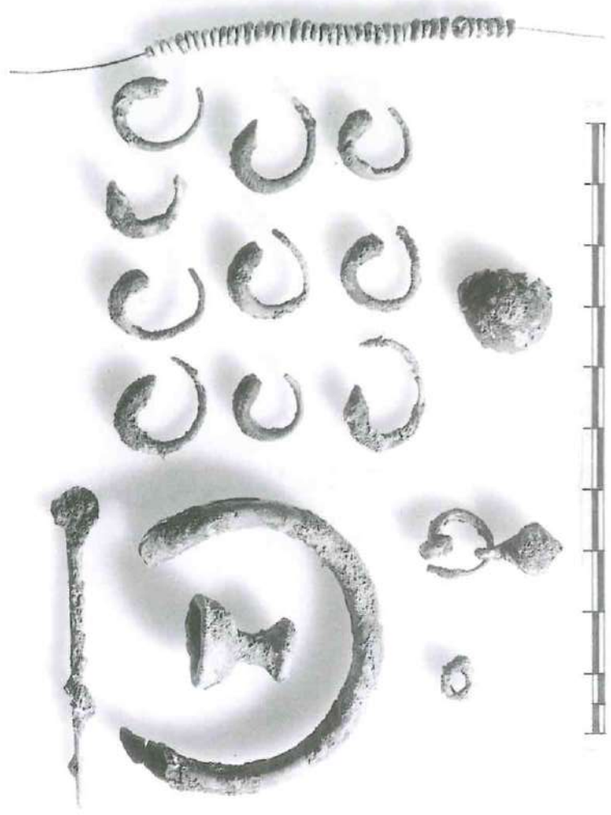
c. Tomb KAHi/T1. Brooch and bronze accessories (as it was found), and vitreous paste beads (threaded by us): Y.85.KAHi.T1/9.



b. Tomb KAHi/T1. Detail of the pendants of Y.85.KAHi.T1/9.

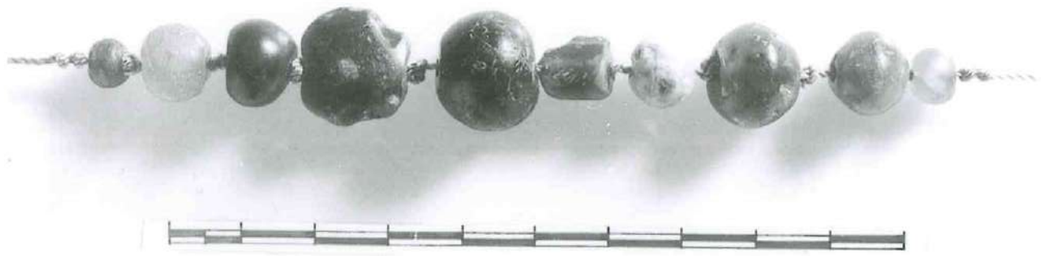


d. Tomb KAHi/T1. Pin: Y.85.KAHi.T1/42.

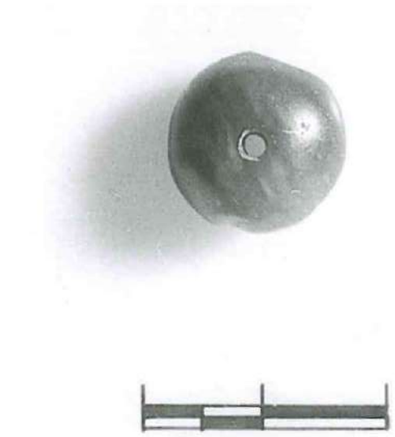


a. Tomb KAHi/T1. Brooch and bronze accessories and vitreous paste beads: Y.85.KAHi.T1/9.

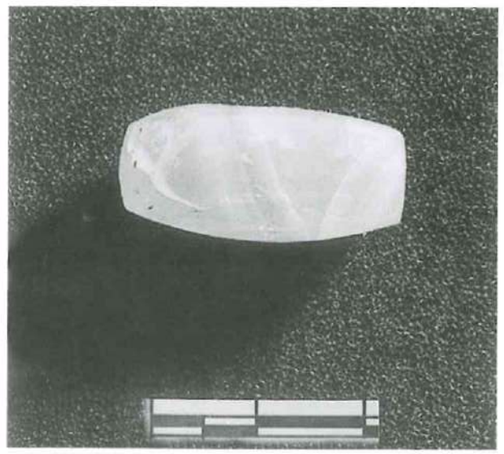
c. Tomb KAHi/T1. Fragment of brooch and earrings. Y.85.KAHi.T1/39.



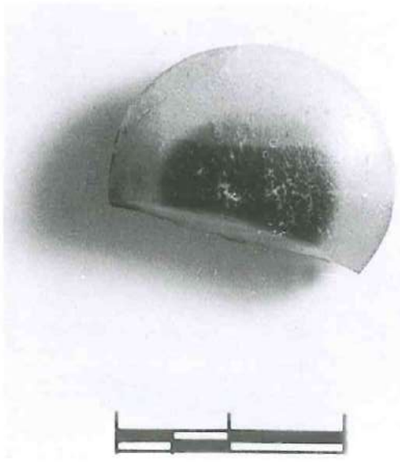
a. Tomb KAHi/T1. Necklace beads: Y.85.KAHi.T1/3.



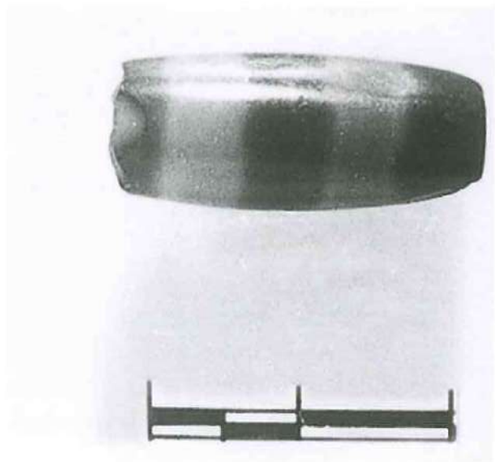
b. Tomb KAHi/T1. Necklace bead: Y.85.KAHi.T1/28.



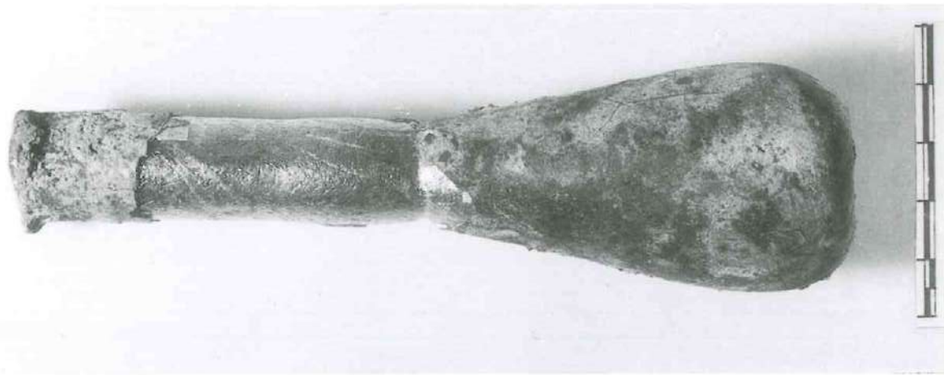
c. Tomb KAHi/T1. Necklace bead or weight: Y.85.KAHi.T1/29.



d. Tomb KAHi/T1. Onyx eye bead: Y.85.KAHi.T1/30.



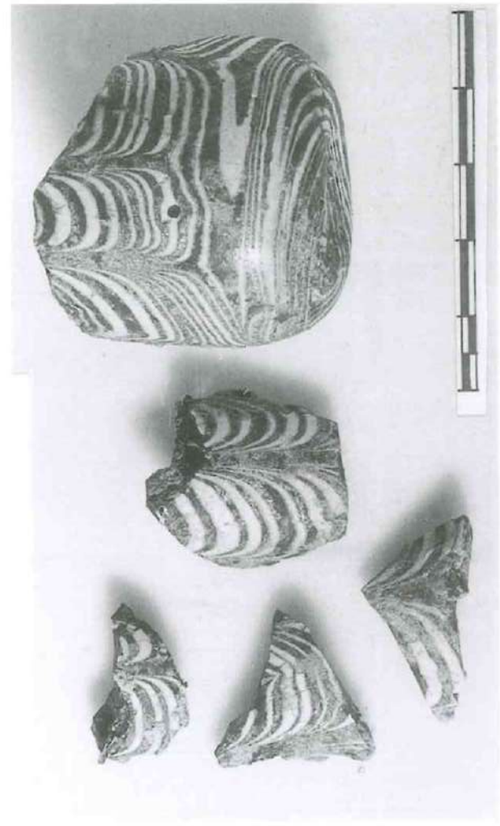
e. Tomb KAHi/T1. Elliptical agate necklace bead: Y.85.KAHi.T1/31.



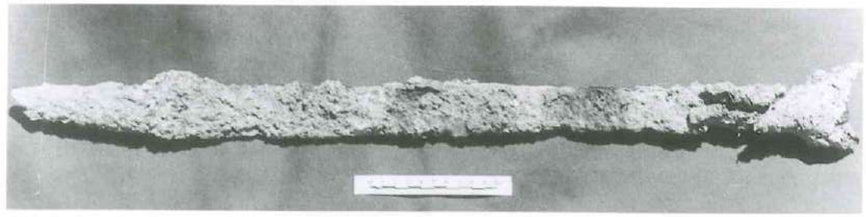
d. Tomb KAHi/T1. Balsamarium: Y.85.KAHi.T1/5.

b. Tomb KAHi/T1. Fragment of glass vase rim: Y.85.KAHi.T1/40.

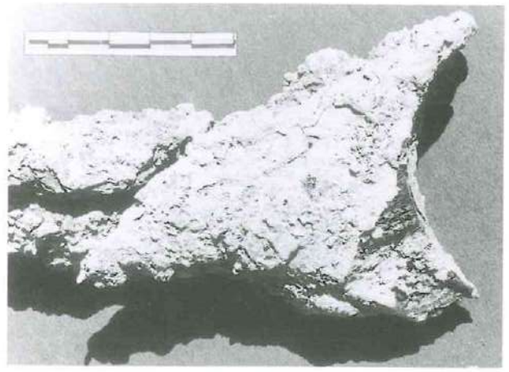
a. Tomb KAHi/T1. Balsamarium: Y.85.KAHi.T1/21.



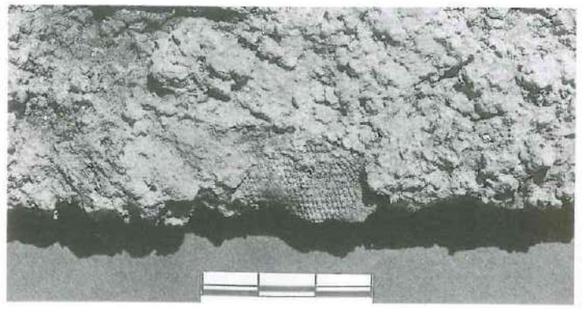
c. Tomb KAHi/T1. Alabastron: Y.85.KAHi.T1/8.



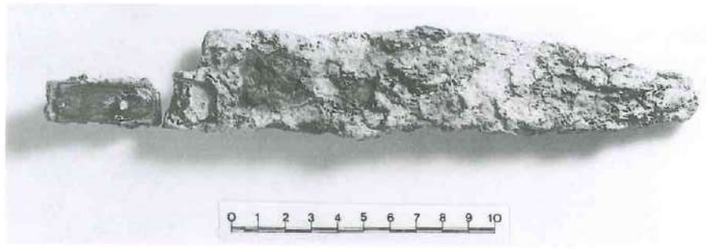
a. Tomb KAHi/T1. Sword: Y.85.KAHi.T1/1.



b. Tomb KAHi/T1. Sword: Y.85.KAHi.T1/1 (detail of grip).

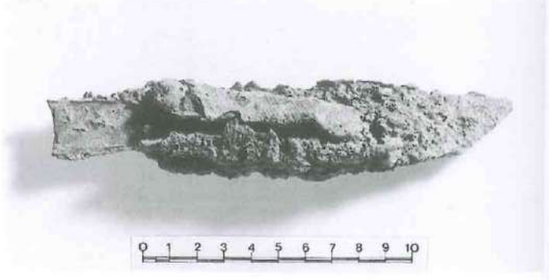


c. Tomb KAHi/T1. Sword: Y.85.KAHi.T1/1 (remains of fabric of sword sheath).

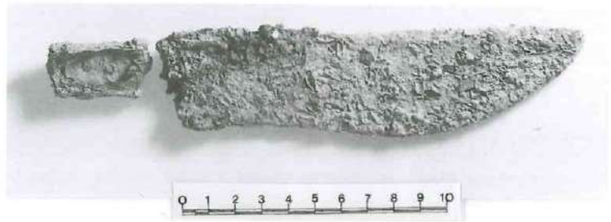


d. Tomb KAHi/T1. Knife or dagger: Y.85.KAHi.T1/43.

e. Tomb KAHi/T1. Knife or dagger with iron point and wooden tool contained in a fabric sheath: Y.85.KAHi.T1/44.

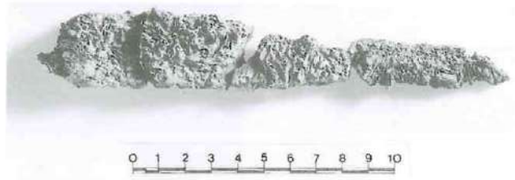


f. Tomb KAHi/T1. The reverse of dagger: Y.85.KAHi.T1/44.

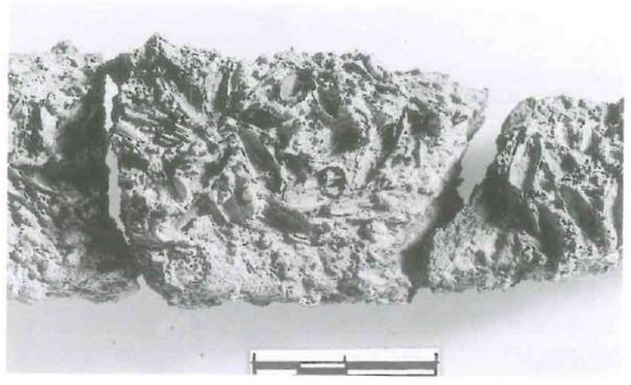


a. Tomb KAHi/T1. Knife or dagger: Y.85.KAHi.T1/45.

b. Tomb KAHi/T1. The reverse of dagger: Y.85.KAHi.T1/45.

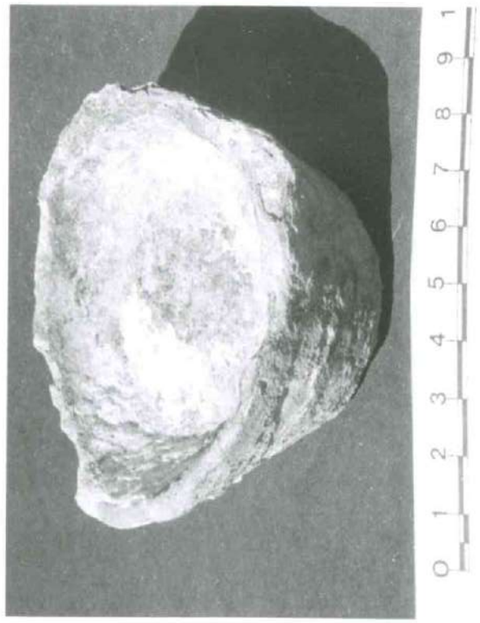


c. Tomb KAHi/T1. Dagger with pointed blade and two cutting edges: Y.85.KAHi.T1/46.

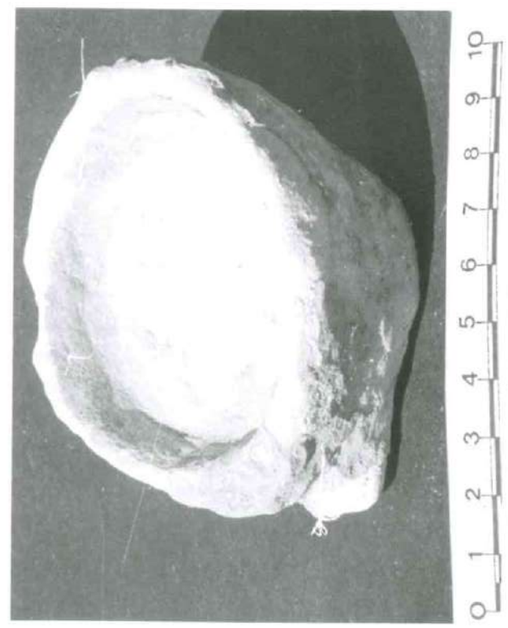


d. Tomb KAHi/T1. Detail of vegetal impressions of sheath on dagger: Y.85.KAHi.T1/46.

e. Tomb KAHi/T1. Fragment of knife or dagger tang: Y.85.KAHi.T1/47.



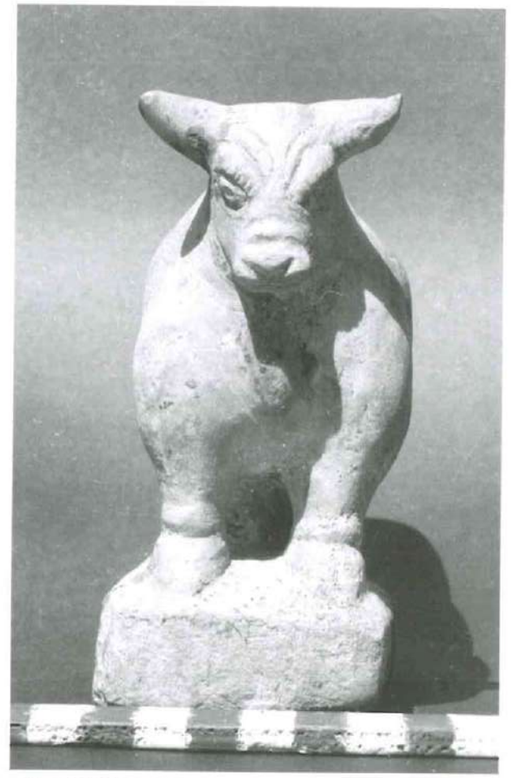
a. Tomb KAHi/T1. Silver seal: Y.85.KAHi.T1/4.



b. Tomb KAHi/T1. Stone lamp: Y.85.KAHi.T1/49.

c. Tomb KAHi/T1. Stone lamp: Y.85.KAHi.T1/50.

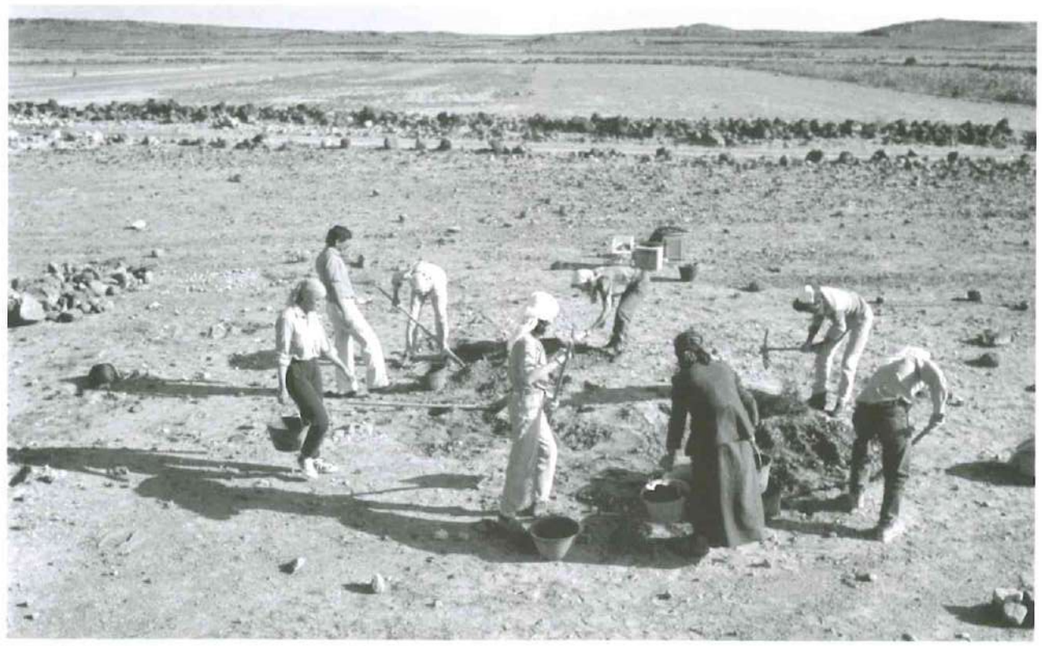
d. Tomb KAHi/T1. Stone lamp: Y.85.KAHi.T1/52.



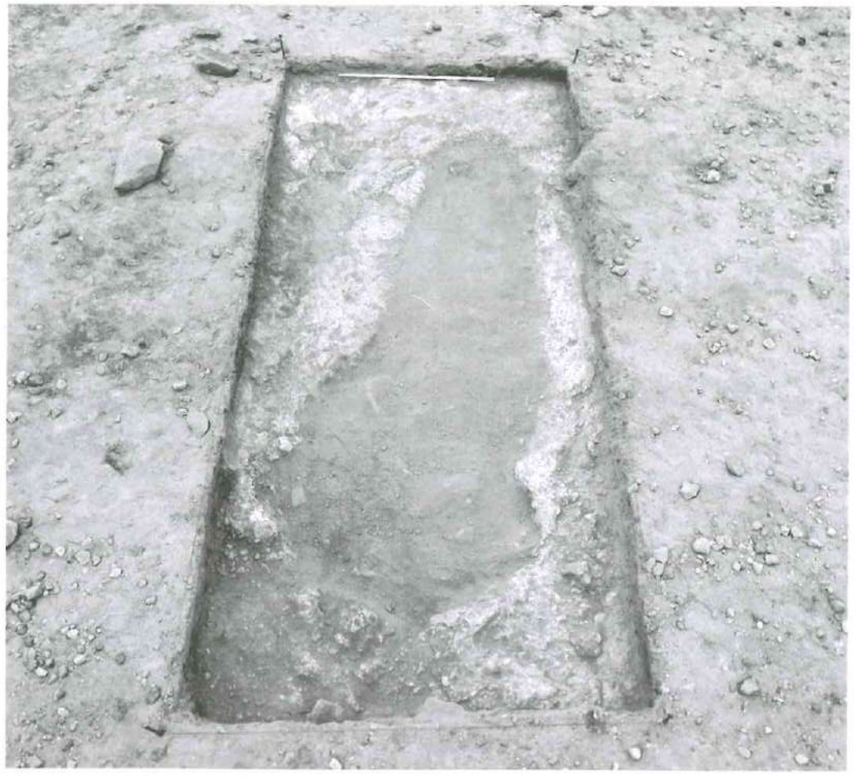
a. Tomb KAHi/T1. Limestone bull: Y.85.KAHi.T1/51 (front view).

b. Tomb KAHi/T1. Limestone bull: Y.85.KAHi.T1/51 (rear view).

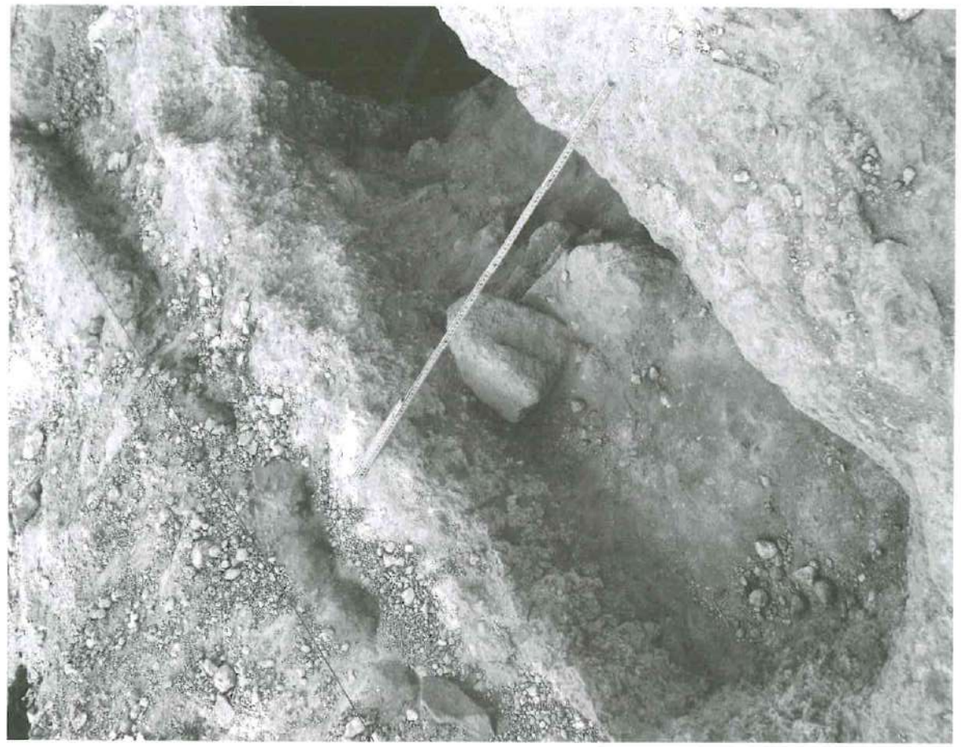
c. Tomb KAHi/T1. Limestone bull: Y.85.KAHi.T1/51 (lateral view).



a. Tomb KAHi/T2. Identification of the tomb and beginning of work.



b. Tomb KAHi/T2. Profile of the dromos and entrance to the hypogean tomb.



b. Tomb KAHi/T2. Corridor partially occupied by stones forming irregular steps for descending into the hypogean tomb.

a. Tomb KAHi/T2. The corridor and entrance to the hypogean tomb from the S.

a. Tomb KAHi/T2. Excavations inside the tomb: the level 3 burials.

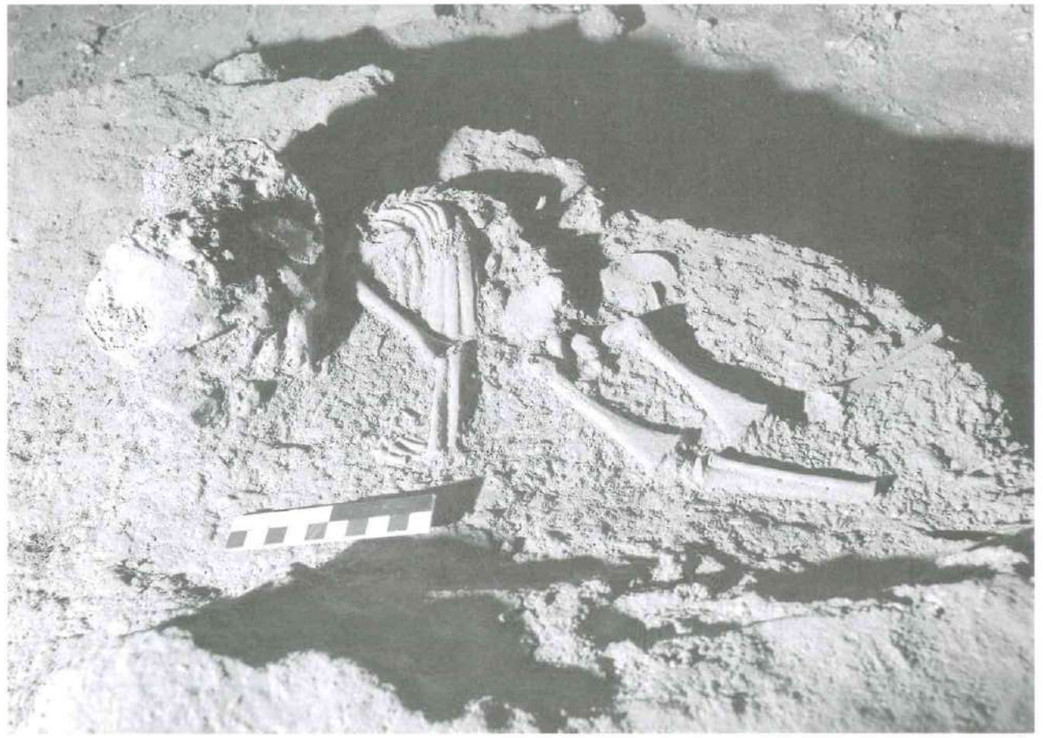
b. Tomb KAHi/T2. Isolated skulls in level 3, discovered in the eastern half of the tomb.

a. Tomb KAHi/T2. Level 3: scattered bones from disarticulated skeletons in the eastern sector.

b. Tomb KAHi/T2. Level 3: pelvis and spinal column and long bones in the eastern sector.

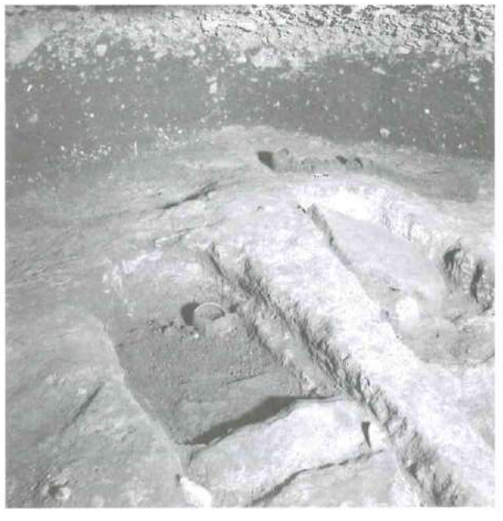
a. Tomb KAHi/T2. Level 3: scattered bones (skulls and jawbones) in the western sector of the tomb.

b. Tomb KAHi/T2. Complete skeleton found on the pavement to the rear of the burial chamber.

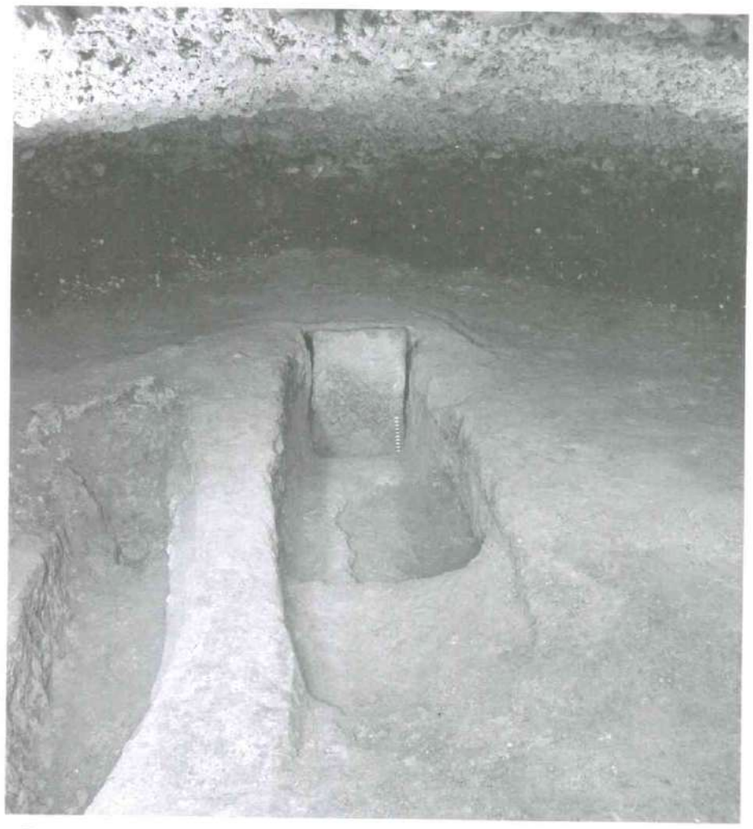


a. Tomb KAHi/T2. Beside the adult body in the eastern sector lies the complete skeleton of a young child.

b. Tomb KAHi/T2. Grave no. 1 with a roof slab removed in ancient times.



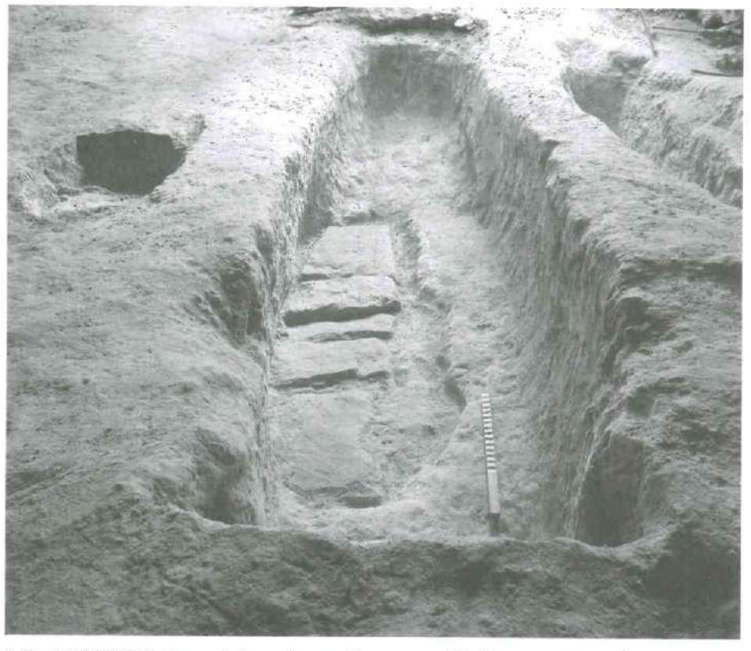
c. Tomb KAHi/T2. Graves 1 and 2 in the foreground and, in the background, lying at right angles, the complete skeleton laid on the right flank.



a. Tomb KAHi/T2. The central grave delimited to the rear by a vertical slab which separated cyst grave 1 from no. 7.

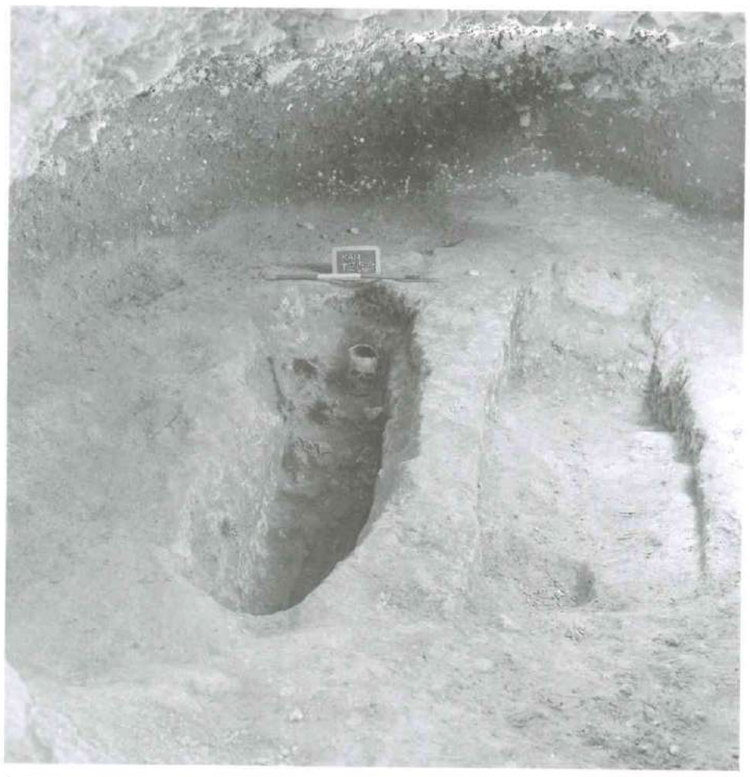
b. Tomb KAHi/T2. Detail of slab set edgewise to close cyst grave 7.

a. Tomb KAHi/T2. Fragmentary bones found in the northern half of cyst grave 1.



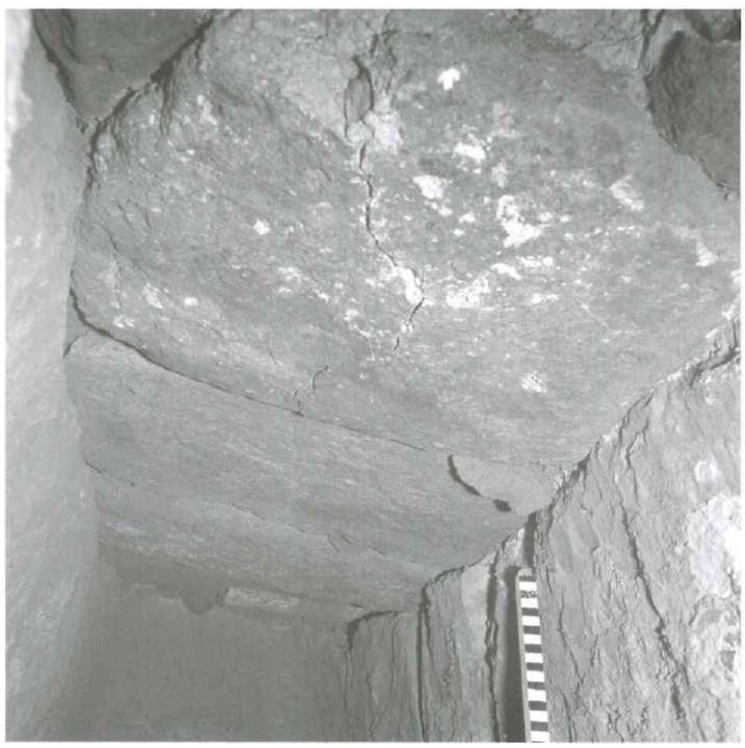
b. Tomb KAHi/T2. Cyst grave 4, intact, dug near the eastern wall inside grave 1 (viewed from N).

a. Tomb KAHi/T2. Cyst grave 4, with roof removed and skeleton *in situ* (viewed from S). In the background, grave no. 7.



b. Tomb KAHi/T2. Cyst grave 2 (west of grave 1) with the buried body (viewed from S).

a. Tomb KAHi/T2. Skeleton *in situ* in grave 7.



b. Tomb KAHi/T2. Dressed, perfectly fitting, tufaceous stone slabs of the roof of cyst grave 7.

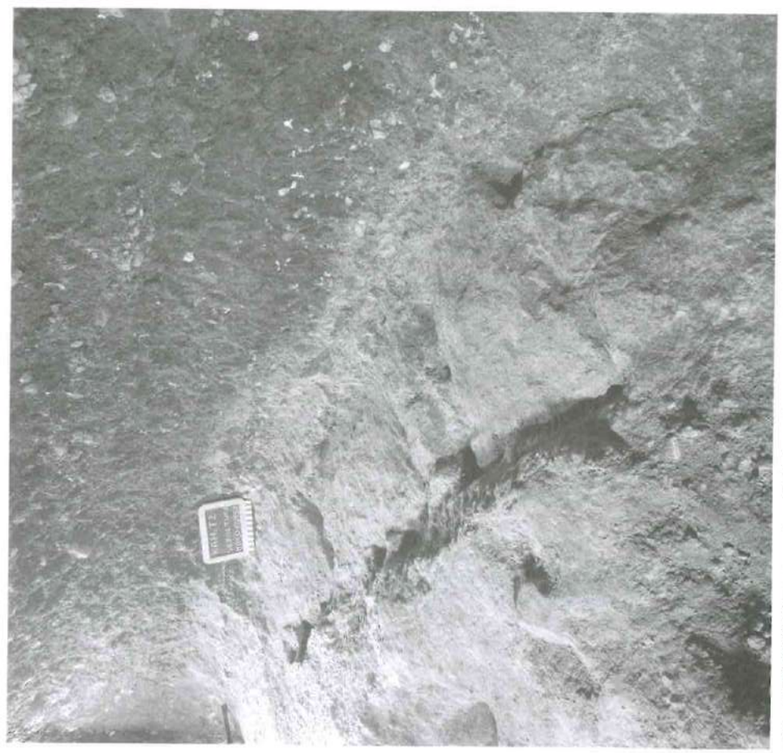
a. Tomb KAHi/T2. Grave 3 (east of cyst grave 4) covered with tufaceous stones and sealed by fumarolite wedges.

b. Tomb KAHi/T2. Detail of the roof of grave 3.

a. Tomb KAHi/T2. Skeleton of a woman aged 60-65 years laid in the grave (viewed from S).

b. Tomb KAHi/T2. Detail of skeleton in grave 3, with skull rolled on to the feet.

b. Tomb KAHi/T2. Cyst grave 5, opened, and the skeleton of an adult male individual *in situ*.



a. Tomb KAHi/T2. Cyst grave 5, sealed, along the western wall of the tomb.

a. Tomb KAHi/T2. Cyst grave 6, excavated along the eastern wall, with the skeleton of a woman *in situ*.

b. Tomb KAHi/T2. Overall view of hypogean tomb with graves for the burials dug out of the floor.

a. Tomb KAHi/T2. Medium-small flat-bottomed bowl: Y.86.KAHi.T2/4.

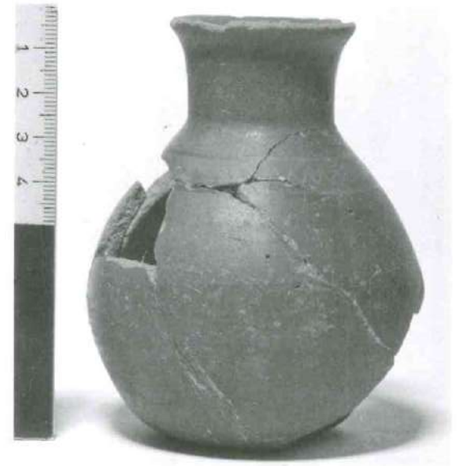
b. Tomb KAHi/T2. Medium-small flat-bottomed bowl: Y.86.KAHi.T2/10.

c. Tomb KAHi/T2. Medium-small flat-bottomed bowl: Y.86.KAHi.T2/16.

d. Tomb KAHi/T2. Deep bowl with low foot: Y.86.KAHi.T2/19.

e. Tomb KAHi/T2. Wide-necked jar: Y.86.KAHi.T2/6.

a. Tomb KAHi/T2. Single-handled jar with ring bottom: Y.86.KAHi.T2/5.

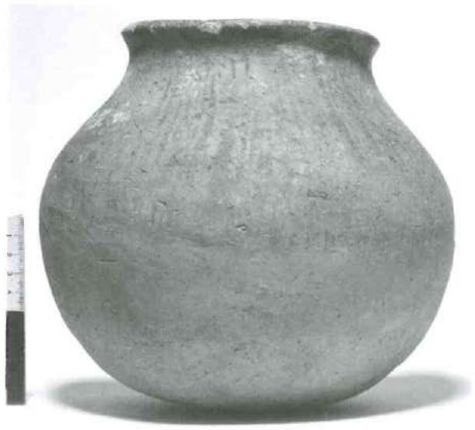


b. Tomb KAHi/T2. High-necked decorated jar: Y.86.KAHi.T2/9.

c. Tomb KAHi/T2. High-necked decorated jar, detail of incised decoration: Y.86.KAHi.T2/9.

d. Tomb KAHi/T2. Small high-necked single-handled jar: Y.86.KAHi.T2/8.

e. Tomb KAHi/T2. Small high-necked single-handled jar: Y.86.KAHi.T2/25.



a. Tomb KAHi/T2. Jar with globular body: Y.85.KAHi.T2/2.

b. Tomb KAHi/T2. Hole-mouth jar with handles: Y.85.KAHi.T2/1.

c. Tomb KAHi/T2. Hole-mouth jar with handles: Y.85.KAHi.T2/12.

d. Tomb KAHi/T2. Ring bottoms: Y.85.KAHi.T2/7, Y.85.KAHi.T2/15, ~~Y.85.KAHi.T2/15,~~ Y.85.KAHi.T2/11. Y.85.KAHi.T2/17, Y.85.KAHi.T2/13.

e. Tomb KAHi/T2. The same ring bottoms used as lamps: Y.85.KAHi.T2/7, Y.85.KAHi.T2/15, Y.85.KAHi.T2/11. Y.85.KAHi.T2/17, Y.85.KAHi.T2/13.

a. Tomb KAHi/T2. Bronze ring: Y.86.KAHi.T2/4.

b. Tomb KAHi/T2. Silver ring: Y.86.KAHi.T2/5.

c. Tomb KAHi/T2. Silver ring: Y.86.KAHi.T2/6.

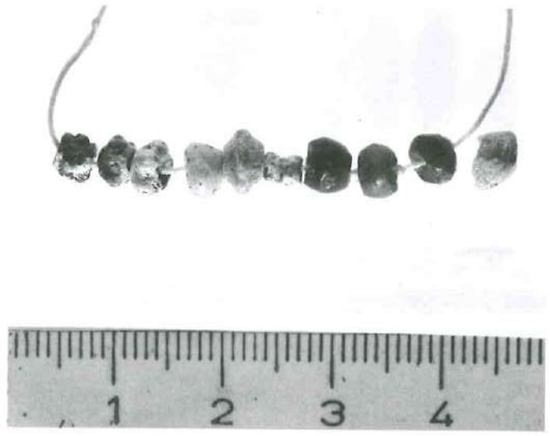
d. Tomb KAHi/T2. Bronze ring: Y.86.KAHi.T2/7.

e. Tomb KAHi/T2. Bronze ring: Y.86.KAHi.T2/8.

f. Tomb KAHi/T2. Fragmentary ring with beads: Y.86.KAHi.T2/9.

g. Tomb KAHi/T2. Fragment of jewelry: Y.86.KAHi.T2/10.

a. Tomb KAHi/T2. Vitreous paste necklace bead: Y.86.KAHi.T2/2.



b. Tomb KAHi/T2. Glass and carnelian necklace beads: Y.86.KAHi.T2/3.

c. Tomb KAHi/T2. Reverse side of bronze mirror: Y.86.KAHi.T2/12.

d. Tomb KAHi/T2. Mirror side of bronze mirror: Y.86.KAHi.T2/12.

a. Tomb KAHi/T2. Knife or dagger: Y.86.KAHi.T2/15-16.

b. Tomb KAHi/T2. Knife blade: Y.86.KAHi.T2/19.

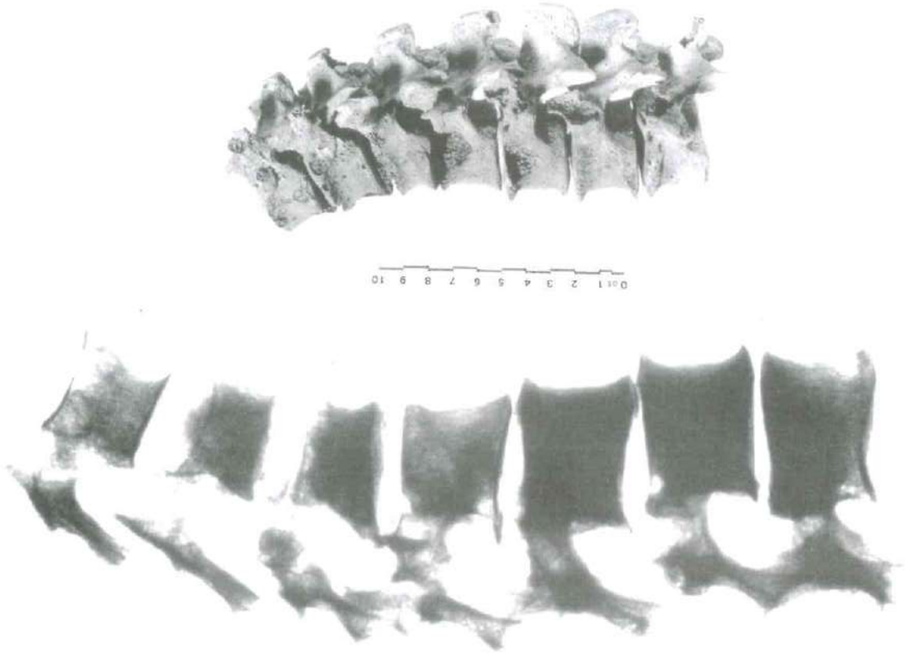
c. Tomb KAHi/T2. Fragmentary tool: Y.86.KAHi.T2/17.

d. Tomb KAHi/T2. Fragmentary tool: Y.86.KAHi.T2/18.

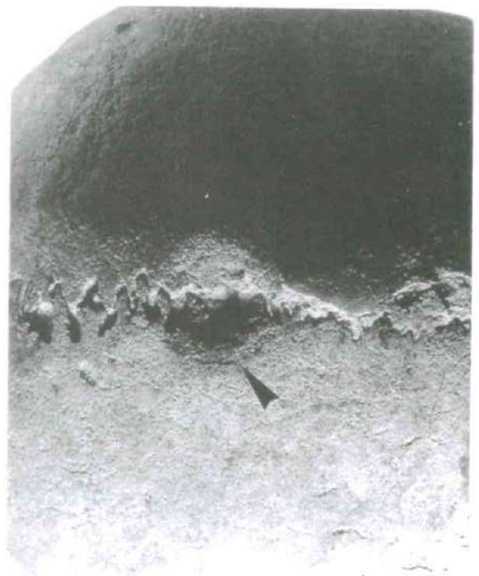
e. Tomb KAHi/T2. Iron tool (profile): Y.86.KAHi.T2/20.

f. Tomb KAHi/T2. Iron tool (perspective): Y.86.KAHi.T2/20.

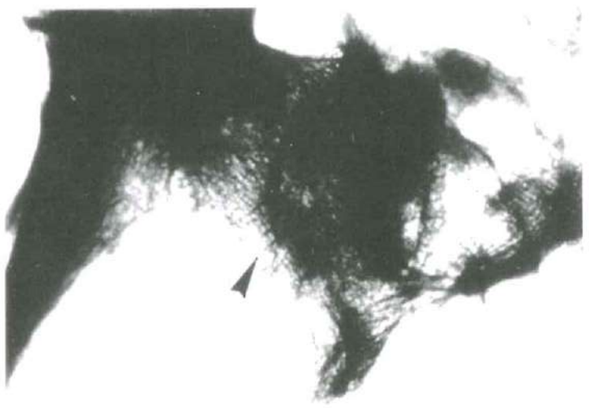
g. Tomb KAHi/T2. Set of pottery and other objects found in the hypogean tomb.



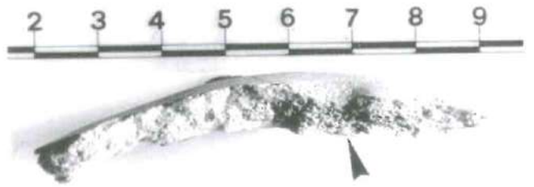
b. MKDiii/T9. Lev. 1 Ind. D: Collapsed lumbar vertebrae.



a. MNQ/T1. Lev. 2 Ind. A: Skull with depressed fracture on the sagittal suture about 40 mm from the bregma.



a. MKDii/T13. Ind. A: Left ileum and sacrum fused together.



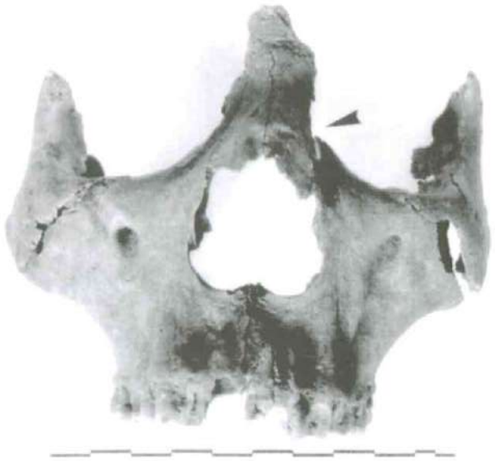
b. MKDii/T13. Ind. B: Skull with 2 well healed depressed fractures, one on the left parietal and the other on the left frontal, both very close to the median sagittal axis.

MKDii/T13. Ind. C: Skull with well healed depressed fracture on the left parietal, perhaps a further trauma near the first.

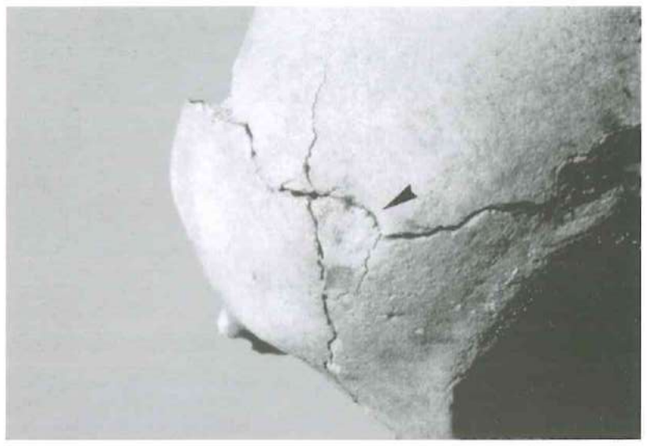
a. MKDii/T13. Ind. D: Skull with depressed fracture on the right parietal near the coronal suture.

b. MKDii/T13. Ind. G: Skull with depressed fracture on the right frontal near the coronal suture.

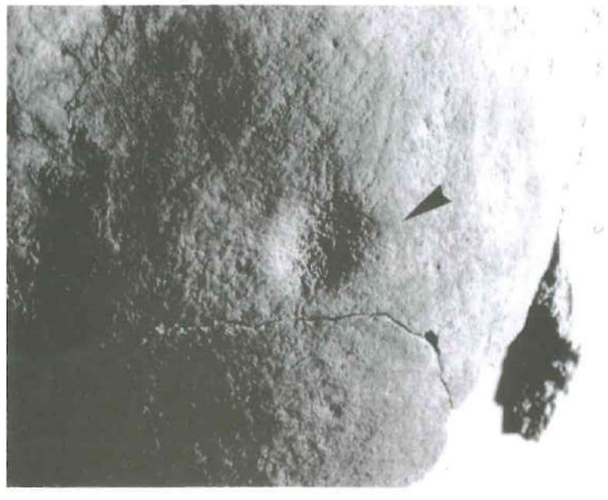
c. MKDii/T13. Ind. H: Skull with two well reabsorbed depressed fractures on the coronal suture, one to the left and the other to the right of the sagittal suture.



a. MKDii/T13. Ind. J: Traces of an old reabsorbed fracture of the nose.



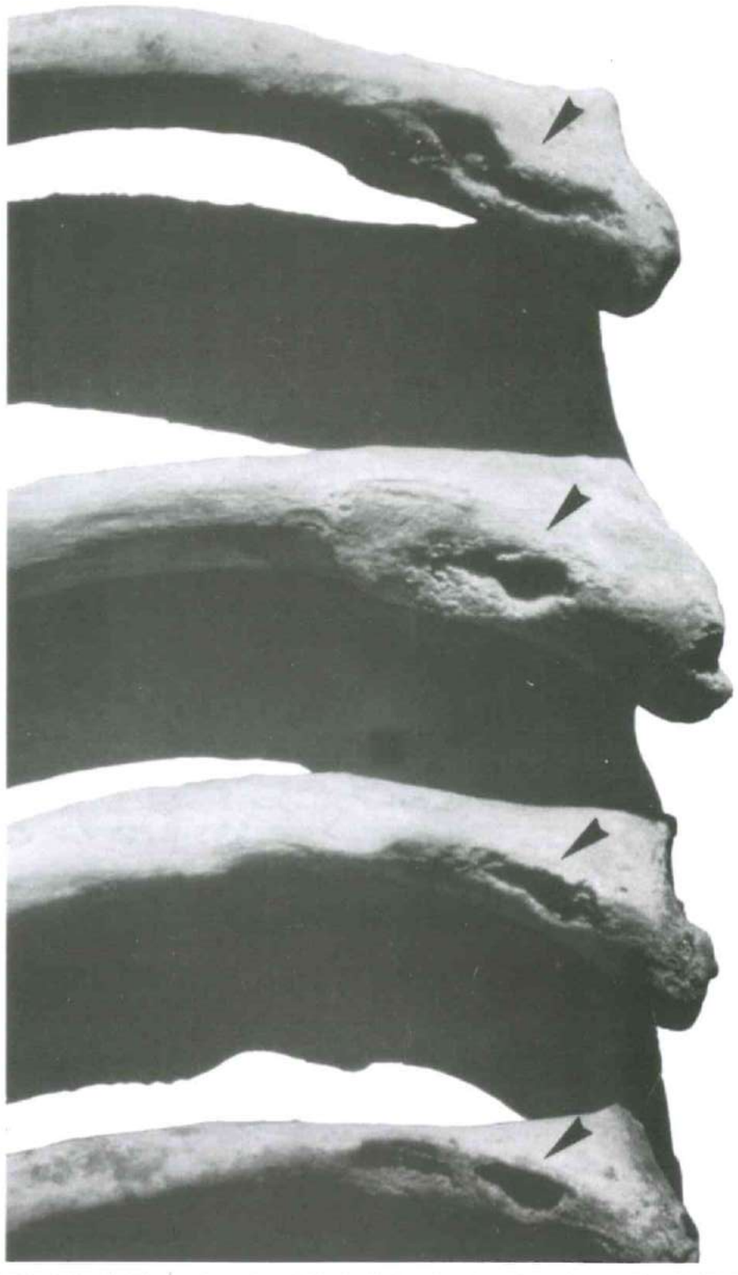
b. MKDii/T13. Ind. L: Skull with two reabsorbed depressed fracture, one on the right parietal, in an extremely rear position, and the other on the left frontal.



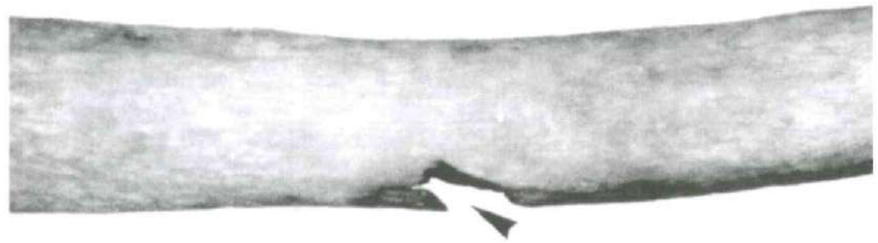
a. MKDii/T13. Ind. O: Left and right femurs displaying two wide depressions (muscular stress) on the medial and posterior portion of the condyles.

b. MKDii/T13. Mixed adult: Rib displaying eburnation on the articulation surface.

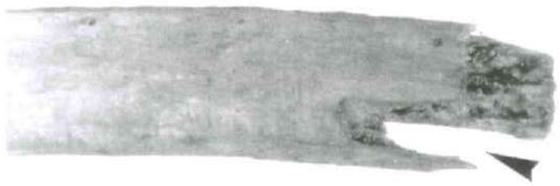
c. MKDii/T13. Mixed adult: Right rib display cut marks.



MKDii/T13. Mixed adult: 4 right clavicles (2 males and 2 probable females) showing signs of muscular stress (fossettes) in the medial and inferior portion.



a. MKDii/T13. Mixed adult: Right rib display cut marks.

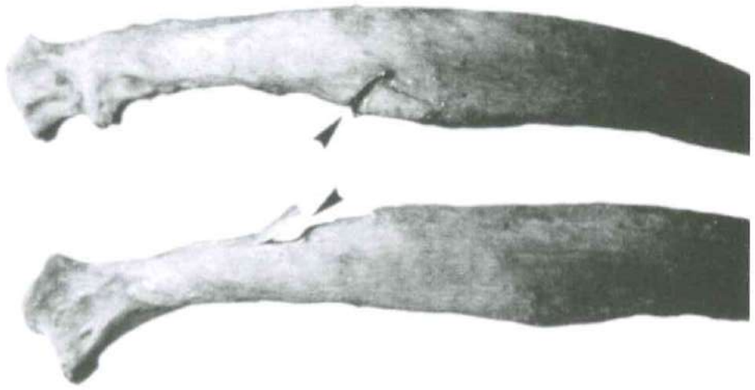


b. MKDii/T13. Mixed adult: Right rib display cut marks.

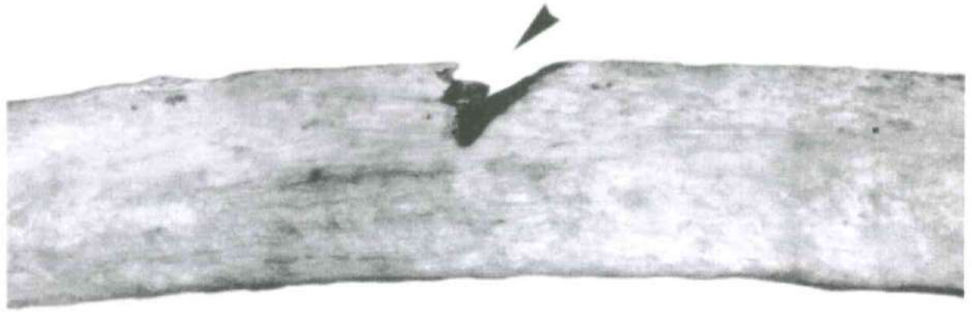
c. MKDii/T13. Mixed adult: Right rib display cut marks.

d. MKDii/T13. Mixed adult: Right rib display cut marks.

a. MKDii/T13. Mixed adult: Right rib display cut marks.



b. MKDii/T13. Mixed adult: Right rib display cut marks.

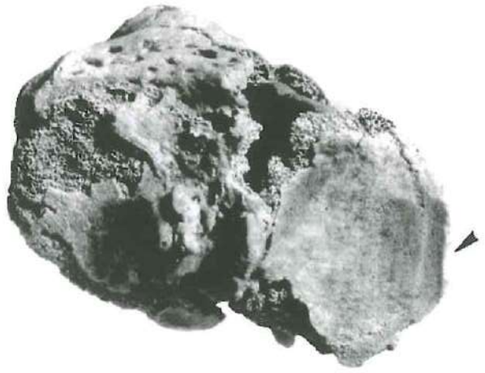


c. MKDii/T13. Mixed adult: Right rib display cut marks.

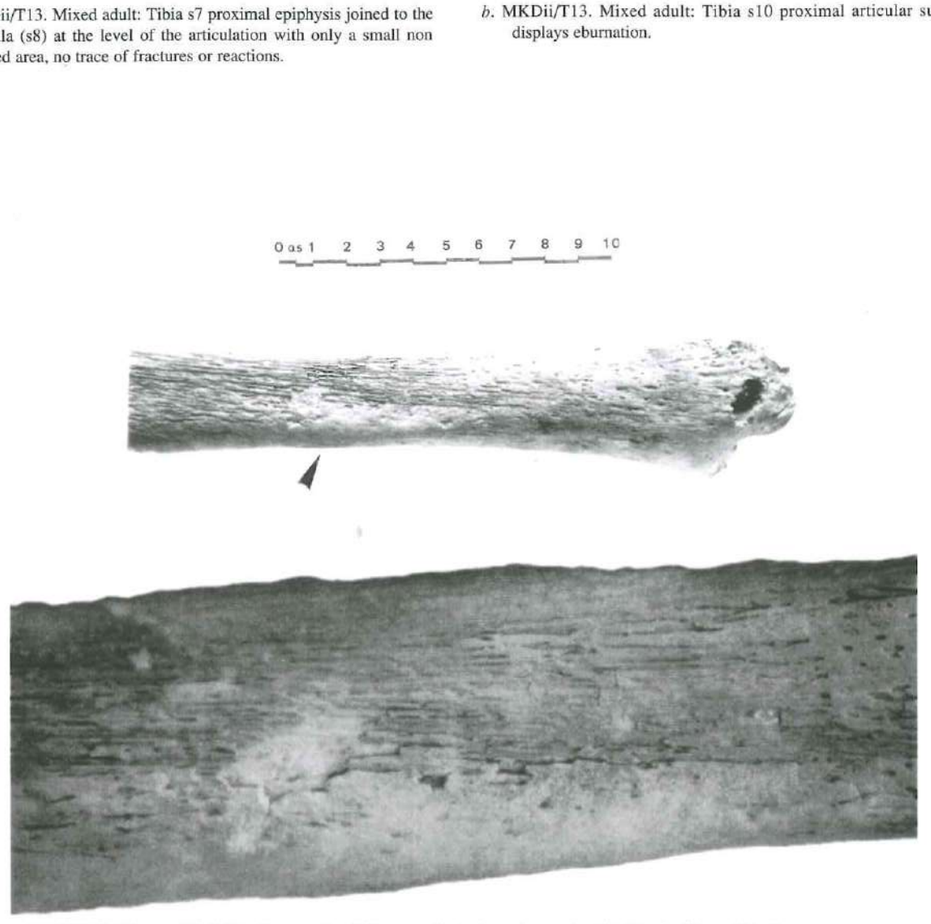
b. MKDii/T13. Mixed adult: Femur d10 (male?) with pronounced fossette due to antero-medial stress at the level of the III trochanter.

a. MKDii/T13. Mixed adult: L4 and L5 corresponding to sacrum #3 display spondylolysis.

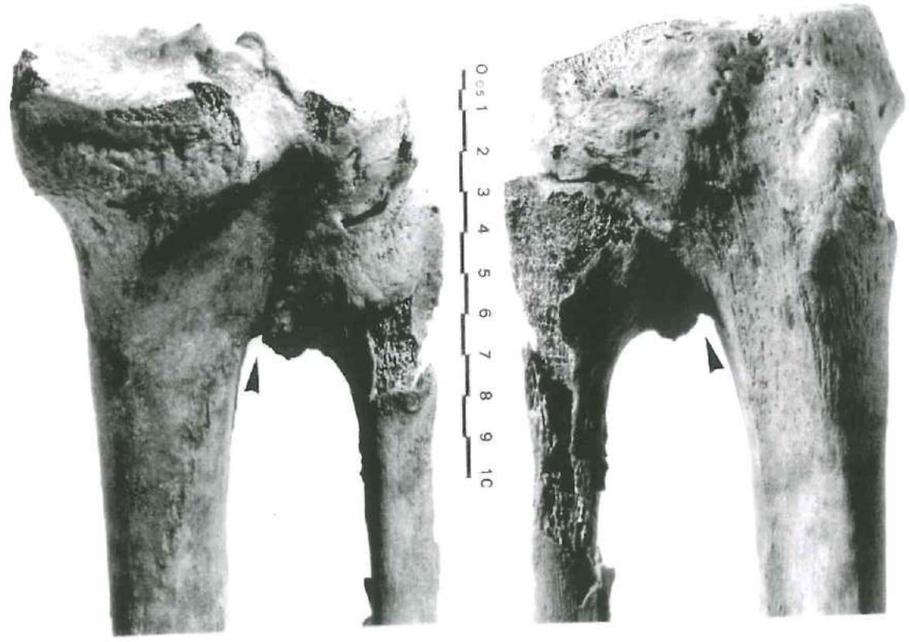
a. MKDii/T13. Mixed adult: Tibia s7 proximal epiphysis joined to the fibula (s8) at the level of the articulation with only a small non fused area, no trace of fractures or reactions.



b. MKDii/T13. Mixed adult: Tibia s10 proximal articular surface displays eburnation.



c. MKDii/T13. Mixed adult: Tibia d2 generalized fibrous periosteal reaction on the distal third of the epiphysis.

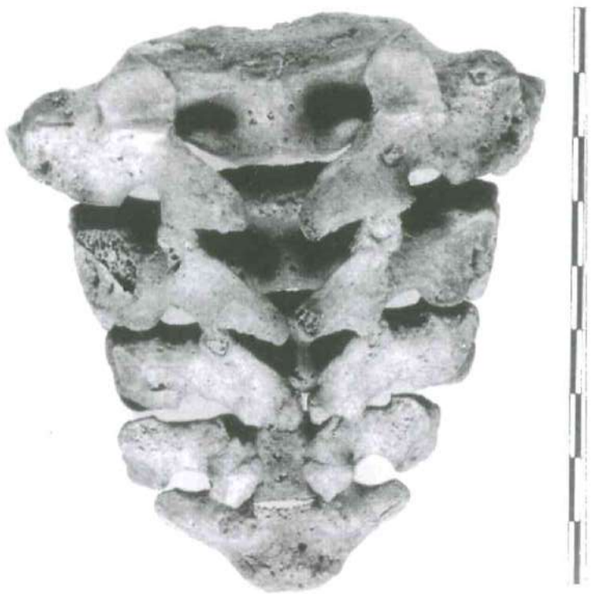


a. MKDii/T13. Mixed adult: Tibia d8 proximal epiphysis joined to the fibula (d12) at the level of the articulation with on one small unfused area, a trace of bony callus at the point of contact.

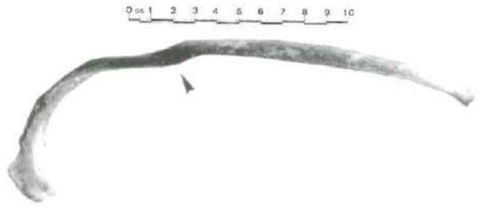
b. MKDii/T13. Mixed adult: Deformed right II metatarsal with lateral extension below the head (arthritis or trauma).

c. MKDii/T13. Mixed adult: Right III metatarsal displaying eburnation, deformation of the head and pronounced edges.

a. KAHi/T2. Grave 4: C2 fused with C3.

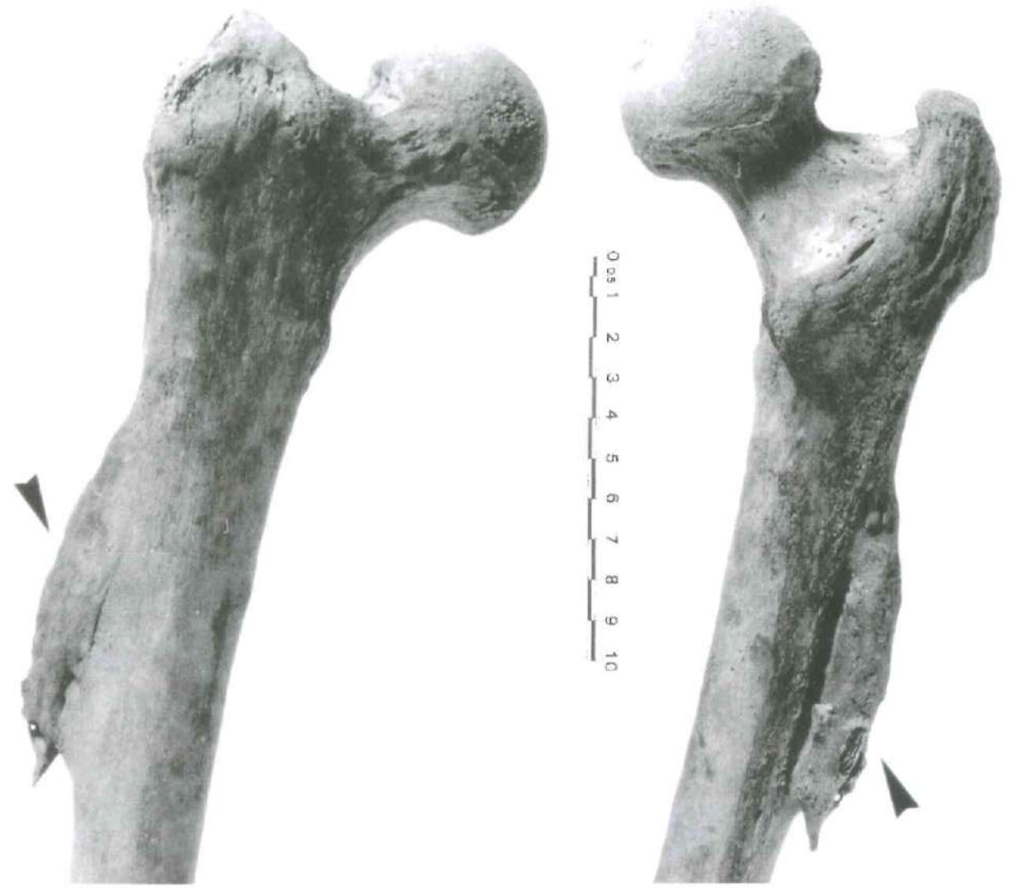


b. KAHi/T2. Grave 4: Sacrum with spina bifida.

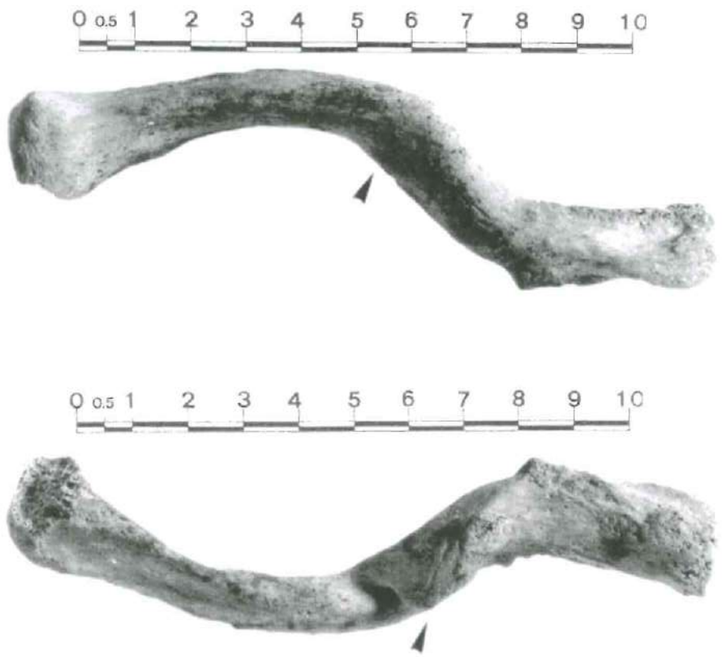


a. KAHi/T2. Grave 5: 2 right ribs displaying fractures.

b. Detail of fig. *a*.



c. KAHi/T2. Grave 5: Right femur with widespread ossification, not due to fracture, present near the linea aspera.



a. KAHi/T2. Grade 6: Right clavicle displaying fracture at midshaft.

b. KAHi/T2. Grade 6: L5 with unfused arch (spondylolysis).

a. MNQ/T1. Lev. 2: Ind. A and MKDii/T13: Ind. G: Frontal view.

b. MNQ/T1. Lev. 2: Ind. A and MKDii/T13: Ind. G: Lateral view.