SURVEY AND TEST TRENCHES AT KERKENES DAĞ:

A PRELIMINARY REPORT ON THE 1996 SEASON

Goat from an ivory inlay found at Kerkenes Dağ in 1996.

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and
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ACKNOWLEDGEMENTS

The fourth field season of the Kerkenes project took place during August and September 1996 under the auspices of the British Institute of Archaeology at Ankara (BIAA). Mr M. Akif Işık and his staff at the General Directorate of Museums and Monuments provided help and encouragement at every stage and, in a new collaborative development, issued an excavation permit to Mr Musa Özcan, Director of the Yozgat Museum. We are exceptionally grateful to Mr Özcan and his staff for their enthusiastic contribution which we very much hope will continue in the future. We are indebted to Mr M. Dursun Çağlar, our Representative from Eskişehir Museum, who assisted beyond the call of duty.

The new Vali of Yozgat, Mr Nafiz Kayalı, the new Director of the Yozgat office of the Ministry of Culture, Mr Eyüp Kelebi Karaaslan and the new Kaymakam of Sorgun, Mr Ekrem Yaman, were every bit as supportive as their predecessors and their official visit was extensively covered by the local television and press.

Grants were awarded by the National Geographic Society, the British Academy, the BIAA and the Society of Antiquaries. Much valuable help in kind came from Aslan Çimento, Core Resources Management, MESA Inc., METU, MNG Inc., Sheraton Ankara, Yibitaş Lafarge and Yimpaş. Dr Ronald Gorny, Director of the Alişar Project, loaned equipment.

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Graphics and electronic data management are continuing to progress thanks to the efforts of Levent Topaktaş and Nilüfer Baturayoğlu at METU, John Haigh at the University of Bradford and Jakub Michalski at Bilkent University. Prof. Dr Gönül Tankut and Dr Murat Balamir (METU), and Prof. Dr Bülent Özgüç (Bilkent) offered support and co-operation. Yibitaş Lafarge sponsored a programme of electronic research and archiving at the METU Dept. of Architecture, to which Aslan Çimento made a donation.

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The 1996 season brought to a satisfactory conclusion a three year phase of the project and paved the way for a new initiative. The most important development was collaboration with the Yozgat Museum and its Director, Mr Musa Özcan, which enabled us to clean out some of the test trenches dug by Erich Schmidt in 1928 and to put in some carefully positioned test trenches of our own in order to answer a number of questions that had been raised by three seasons of survey.

SURVEY OF THE CITY DEFENCES

The city wall, together with its buttresses, towers and gates (Fig. 1), was surveyed with a total station. The wall, or more precisely the line of rubble, had been plotted from aerial stereo pairs by MNG Inc. and some details digitised from lower level balloon photographs. However, while checking the map on the ground and making written descriptions it became apparent that the rubble had obscured the corners of features such as towers, buttresses and elements of the gate, and in some cases covered them completely. The wall survey undertaken this season allowed us to generate a more detailed CAD drawing which will need to be checked on the ground in 1997.

The 1996 survey revealed the following features:

1. Many of the towers are unusually narrow and project far from the front face of the wall which they abut (e.g. along the north-west portion of the wall, Fig. 1). There do not seem to be standard sizes or units of measurement and the narrow, rectangular form of many of the towers appears to reflect the topography of the narrow out-cropping ridges of bed-rock on which they are constructed.
2. There are more buttresses than previously realised, many entirely covered by rubble. Buttresses appear to have been built where the terrain beyond the wall offered the possibility of attack, suggesting that the positioning of buttresses was determined by defensive requirements rather than by any structural necessity to support the outer face of the wall.
3. There appear to have been steps or ramps, about 0.80m wide, leading up to the top of the wall from the inside at points where the wall changes direction.
4. The present appearance of the defences is the result of later tumuli and modern shepherds seasonal huts, shelters and animal enclosures having been constructed on top of and adjacent to towers and gates. Traditional modification of the walls by shepherds is continuing and was documented by series of photographs.

Five of the seven city gates were studied in detail, the “Cappadocia Gate”, the “East Gate”, the “Northwest Gate”, the “Water Gate” and the “Göz Baba Gate”. A combination of balloon photographs, cadastral survey with a total station and measured sketches was used to create detailed plans. Drawn reconstructions are now being attempted. The sequence of construction is more complex and the architecture more sophisticated than previously realised. It was established that the Cappadocia Gate was constructed before the curtain wall which abuts the gate on either side, although the precise line of the wall must have been established and marked when building of the gate began.

It has been argued before that the city on the Kerkenes Dağ is to be identified with Pteria, and that it was a Median city founded to control and administer the newly gained western domains of the Median empire. The grand design of the city defences displays, on the one hand, a highly developed conception of city fortifications and, on the other, the confidence and ingenuity to adapt the architectural scheme and the building methods to the chosen location and the materials immediately available. Comparable city fortifications from the first half of the sixth century BC are scarcely known in Anatolia, although considerable progress is now being made at the rival imperial capital, Sardis. The situation in Iran is no better, although new work at Hamadan promises interesting results. Babylon was the most splendid power in the Near East, she had been an ally of the Medes in the overthrow of Assyria, had brokered a peace between the Medes and the Lydians and built an enormous wall in Mesopotamia from fear of Median (and other) aggression. The question thus arises as to what traditions of city fortifications the military architect(s) at Kerkenes drew on and were influenced by; Iranian, Mesopotamian, Anatolian, Aegean. A question of equal interest is the extent to which the vast defensive scheme at Kerkenes influenced the development of later Persian and Greek fortifications. There are, as yet, no firm answers. The influence of Mesopotamia might be dismissed as minimal, although the mighty walls and unrivalled size of Nineveh surely had some place in the Median sub-conscious. It is perfectly possible that influence came from Lydia or from the East Greek world bringing to the Medes western concepts which were fused with their own. The plan at Kerkenes, however, exhibits fundamental characteristics which were foreign to and took nothing from the west, and that are at odds with the ideals of urban fortifications in the Greek world, at least as they are known from the fifth century BC. Of these, the most striking are the absence of an acropolis and the lack of any defensive walls subdividing the city. The uniqueness of the Kerkenes defences is emerging, their influence on later development are tantalisingly obscure.

SURVEY OF THE URBAN INFRASTRUCTURE

Survey of the urban blocks, streets, major extant building complexes and other prominent features, using balloon photographs and a total station, was largely completed. The data is now being used to rectify the balloon photographs and to generate a more complete base map of the city. Levent Topaktaş and John Haigh have further developed the computer rectification programme AERIAL in conjunction with the Kerkenes Project, resulting in the production of mosaics from scanned photographs which have been rectified over the digital base map (Fig. 2). These scanned images are now being used in the digitisation of more of the urban infrastructure from which it will eventually be possible to produce 3D models using state of the art graphics programmes. During the next few months we hope to begin to design and build a Geographic Information System (GIS) data base for the city that will become a powerful research tool, and one to which it will be easy to add more data from future ground observations, geophysical survey and excavations.

The results of the test excavation, briefly summarised below, have essentially confirmed our earlier understanding and allow us to make some important new generalisations about the dynamics of the city. These are:

1. If we are correct in thinking that the original city plan included a military road running around the inside of the defences, it is now clear that it was neither levelled nor paved, further confirmation that the city defences were incomplete at the time of destruction and that construction of the defences and other military installations was probably abandoned some time before the fall of the city. Abandonment of the hugely ambitious design should perhaps be seen against the wider political and military concerns of the Median Empire.
2. The high southern part of the city was set apart for public buildings, including what have tentatively been identified as a palace and a complex of imperial stables.
3. The enclosure walls of the urban blocks were constructed before the structures within the blocks, at least where it has been possible to establish the sequence of building by ground observation and test trenching.
4. There was continual construction within the blocks throughout the (relatively) brief life of the city. Construction methods, especially types of building foundation, evolved in response to the nature of the sub-soil and to availability of stone in the immediate vicinity of new constructions. For example, early walls are of constant thickness from top to bottom with a base course of very large stones set on edge, whereas some later walls have deep and wide foundations generally built of smaller stones. One surprise was the very widespread use of timber framed mud-brick superstructure, another was the very extensive stone paving of external and unroofed areas within the urban blocks. There is also evidence, in the form of burnt debris used in the construction of secondary structures, of a fire or fires before the final torching of the city.
5. The blocks along the north-west and north-east sides of the city contain complexes with large and impressive residential and other structures that contain “high status” objects, suggesting aristocratic inhabitants. There is considerable variation in the size of blocks within different zones of the city. It would seem that there is a strong relationship between the size of blocks and the availability of water, suggesting that it will be possible to determine the relative desirability, wealth and status of different residential areas.
6. The population numbered thousands rather than tens of thousands. Large area geophysical survey will enable more precise estimates to be made.
7. Commercial and industrial areas have not yet been identified, another goal for future geophysical survey combined with test trenching.

TEST EXCAVATIONS

Some of the test trenches by Erich Schmidt in 1928 were cleaned out. Trenches along the western side of the city and which appeared to be free of later levels were selected (numbers 4, 5, 6, 8, 10 and 11). By beginning in this way it was possible to obtain an understanding of the nature of the archaeological and geomorphological deposits with the minimum of disturbance. It also enabled us to familiarise the workmen with the basic requirements of excavation.

We then excavated a number of new test trenches (TT15-19 following on from Schmidt’s numbering) which were each carefully sited to answer particular problems and to test hypotheses. The approach was to maximise the amount of information recovered with as little disturbance to the site as possible. Trenches were excavated in several parts of the site, all but one where geomagnetic maps had raised questions.

At the end of the excavations new courses of stone were added to the wall tops with broken glass between the ancient and modern work, strips of plastic were laid along the bases and up the sides of the trenches and the earth was put back (Fig. 7). In this way, and following the precedent set at Boğazkale, the lines of the buildings are made visible while the original structures and the sides of the trenches are preserved.

Aims

The aims of the excavation were:

1. To help understand the geomagnetic maps made in earlier seasons.
2. To obtain excavated profiles in order to test the applicability of Ground Penetrating Radar to future research design at Kerkenes.
3. To test the hypotheses that the site was short lived and was destroyed by fire.
4. To obtain samples for dendrochronology so as to confirm the proposed date of construction.
5. To obtain samples for micromorphological study in order to determine the function of particular surfaces and their associated structures.
6. To examine particular architectural problems.

Results

1. Geophysical

Test excavations showed that the geomagnetic maps were highly accurate. The results have greatly helped in the interpretation of existing maps, and in the formulation of research design for further seasons of geophysical survey. Large area geomagnetic survey at Kerkenes will provide an exceptionally clear and almost complete city plan.

Detailed comparison of geomagnetic maps and excavated structures is continuing. It has become clear that the geomagnetic maps contain more information than we have heretofore been able to extract from them and that much is to be gained by careful comparison of geomagnetic maps and balloon photographs with features visible on the ground. Exactly what the geomagnetic maps show is now better understood, allowing for greater confidence in their interpretation; but the reasons for the strength and weakness of particular signals, the relationship between signal strength and burning, and for a constant north-south discrepancy between the position of buildings on the maps and their actual position on the ground are all matters for future research. Another area for experiment is geophysical determination of differing surface material, especially identification of stone paving and burnt clay floors.

2. Ground Penetrating Radar

GPR (Fig. 6) was tested against the excavated profiles while the trenches were still open. Despite great effort and considerable ingenuity the results were disappointing. Theoretically GPR has great potential at Kerkenes and, conversely, the site ought to aid the development of GPR interpretation. The reasons for the poor results are not at all clear.

3. Destruction

The intensity and uniformity of the burning confirms that the city was put to the torch (e.g. the burnt floors in Fig. 3).

4. Dendrochronology

The catastrophic fire that destroyed the city was of such intensity that beams and timbers used in the construction of buildings had burnt completely away. Some pieces of charcoal have been recovered but it is doubtful that they contain sufficient annual growth rings. The potential for confirming the date of Kerkenes through dendrochronology remains extremely high and the increased understanding of the geophysical maps obtained in 1996 will make it

easier to pinpoint potential locations for test trenches where less intense burning might yield charred beams.

5. Micromorphology

Samples for micromorphological study were taken by Wendy Matthews. Slides will be made in Cambridge and these will be studied over the winter. Phosphate analysis will be done at Swansea. The immediate aim is to see whether the archaeological deposits, soils and geology at Kerkenes are such that this relatively new technique will be of help in answering questions relating to the sorts of activities that went on in particular types of buildings and open areas. The results will enable us to evaluate the potential of the techniques for future research at Kerkenes. In addition, it is expected that they will answer specific questions about some of the structures revealed in 1996. This particular aspect of the project fits into Dr Matthews' wider programme of research in the Near East.

6. Architecture

A long 2m wide trench was put through a large complex at the north-west side of the site (Fig. 1 Area B, TT15, Figs 3-6) which did, as anticipated on the basis of the geophysical map, contain a columned hall (Fig. 3 between the two scales).

Two-roomed structures, prominent on the geomagnetic maps (Fig. 8) in several areas of the site, are not "megarons"; rather, they comprise a smaller roofed unit, with wide central doorways, leading to a walled but unroofed unit (Fig. 1 Area D, TT16 & TT18; Figs 9-11).

The large complex to the north of the "Cappadocia Gate" (Fig.1, Area A, TT19) has the characteristic plan and paving associated with animals (Kroll, 1992) and were perhaps the imperial stables.

In general, many structures had timber frames filled with mud-brick on top of stone footings, although some walls appear to have been built of stone to roof height. Internal surfaces were laid clay floors, many external surfaces were stone paved. There seems to have been a development in building methods during the short life of the city. The architectural forms are strongly reminiscent of an Eastern tradition. The construction techniques, devoid of embellishment, also echo pre-Achaemenid Iran and show no discernible influence, e.g. drafted masonry, from Lydia or Ionia (see the comments by Stronach, 1978, 10-11).

7. Objects

A number of objects were found during the excavation. Most important is an exquisitely carved ivory plaque, perhaps an inlay from a couch (Figs 12-15). The design echoes East Greek art and the piece may have been made in a Lydian workshop. The total length is preserved and holes for attachment survive at the right side. There is an animal frieze with traces of applied gold leaf on the horns, a meander pattern along the base and an applied line of bead and reel comprising amber beads and gold covered ivory reels along the top. The luminosity of the beads was increased by small reflecting plates of silver, or perhaps tin, set behind them. At the left end is a deer facing right whose body was once adorned with enamel or paste set into double drill holes. Facing left is a procession of four domestic animals, a billy-goat followed by a she goat, a ewe and a ram respectively. The leading billy has its head lowered in front of the opposing deer. The sheep have carefully depicted fleeces.

Other objects of note include a composite object comprising a (?boars) tusk, preserved wood, copper (?alloy) sheet and pins (perhaps a cheek piece for a horse, Fig. 16), an ivory "handle" (Fig. 17), a large quantity of very well preserved iron (e.g. Fig. 18), a large piece of lead (probably an ingot) and a plain gold "strap end".

The pottery, although not prolific, mirrors that found by Schmidt in 1928. There are a few sherds with coarse white slip panels and polychrome paint, some small fine black polished bowls with flat or disc bases and a very few incised or impressed grey ware sherds.

The great majority of pottery is plain, table ware being predominantly red, kitchen ware grey. There is a small repertoire of forms. The complete and closely dated ceramic corpus is distinctive. It is not yet possible to ascertain changes in the ceramics during the short life of the city. The only recognisable import is a thumb-nail sized rim sherd from what appears to be a Lyconian cup.

CONCLUSION

The combination of geophysical survey and test excavations opens up possibilities for understanding many aspects of the city on a scale rarely achieved in the archaeology of the 1990s. The proximity of remains to the modern ground surface, the destruction by fire and the short life of the city make it feasible to conduct further significant research within realistic budgetary constraints.

The 1996 test excavations have confirmed that the city had a short life, perhaps less than a generation, and that it was destroyed by an intense fire. There is only a single level although there are a complicated number of building phases within it. The city appears to have been a continuous building site for as long as it existed. There were aristocratic residences, imperial stables and other structures that imply a fully developed and thriving city. Analysis of the survey data and the geophysical plots is continuing in the light of the more precise information afforded by excavation and the details expected from micromorphology. Our current thinking on the development of the defences has been outlined above, progress is being made in understanding the far more complex internal dynamics of the city but more information will be needed in order to realise the full potential of the site, and to define its place in the development of urban planning in the formative period when eastern and western empires met in the centre of Anatolia.

Although no concrete proof was found, e.g. writing, the identification of the city with the Pteria of Herodotus and its status as a royal Median capital seems ever more likely.

THE FUTURE

In 1997 we will have a study season during which odds and ends of survey and checking on the site will be carried out, the pottery from the test trenches will be processed and any outstanding conservation of objects from 1996 will be completed. The aim is to produce a book with dual English and Turkish text and high quality colour illustrations which will have both scholarly and wider public appeal. Detailed academic research reports will continue to be published in internationally recognised journals.

In the years 1998-2001 we hope to conduct large area geomagnetic survey, perhaps combined with other geophysical methods, over some 2km^2 of the ancient city (total area 2.5km^2). It would be advantageous to put in further test trenches in order to fully understand the geophysical maps and to ascertain the functions of different types of structure and the use of urban spaces.

PUBLICATIONS

A substantial report on the Iron Age city appears in *Anatolian Studies* XLVI for 1996 and a paper on the identification of the city with ancient Pteria will be in the 1997 spring issue of the *Journal of Near Eastern Studies.* Short annual notices can be found in *Anatolian Archaeology* and in M-H Gates summaries in the *Journal of American Archaeology.* Reports in Turkish appear annually in the *Sonuçlar*. B. Ergenekon has discussed her work, with photographs by F. Özenbaş, in *Atlas* 44 (1996) 136-42, 182.

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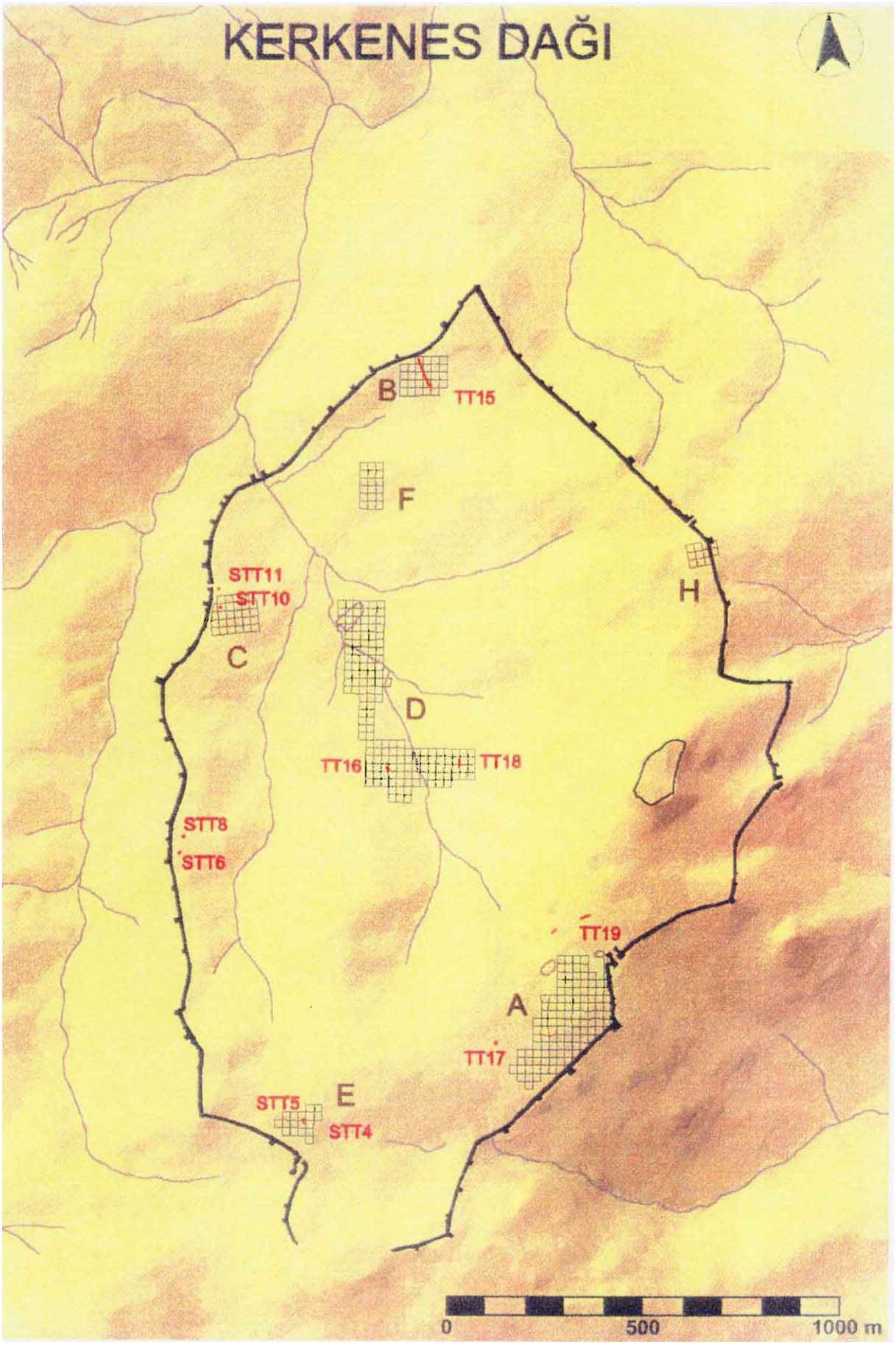

Figure 1. Rendered topographic map of Kerkenes Dağ showing the areas of geophysical survey and test trenches.

Figure 2. Composite map showing results of photo rectification superimposed on a digitised base map.

Figure 3. TT 15, Area B, measured 2 x 72m. Designed to test the geomagnetic map and ascertain functions, it was laid out at a slight angle to the complex in order to maximise the probability of locating column bases. The columned hall lies between the scales, the paved passage and room seen in Fig. 4 are on a higher level at the far end. Note the heavily burnt clay floors of the hall and the room in front and stone column bases (left foreground and tilted at centre right).

Figure 4. Northern part of TT15. The scale lies on a paved passage. A stone step and doorway provided access to the room in which the ivory furniture inlay was lying face down on the floor.

Figure 5. Southern part of TT15 showing part of the extensive external paving.

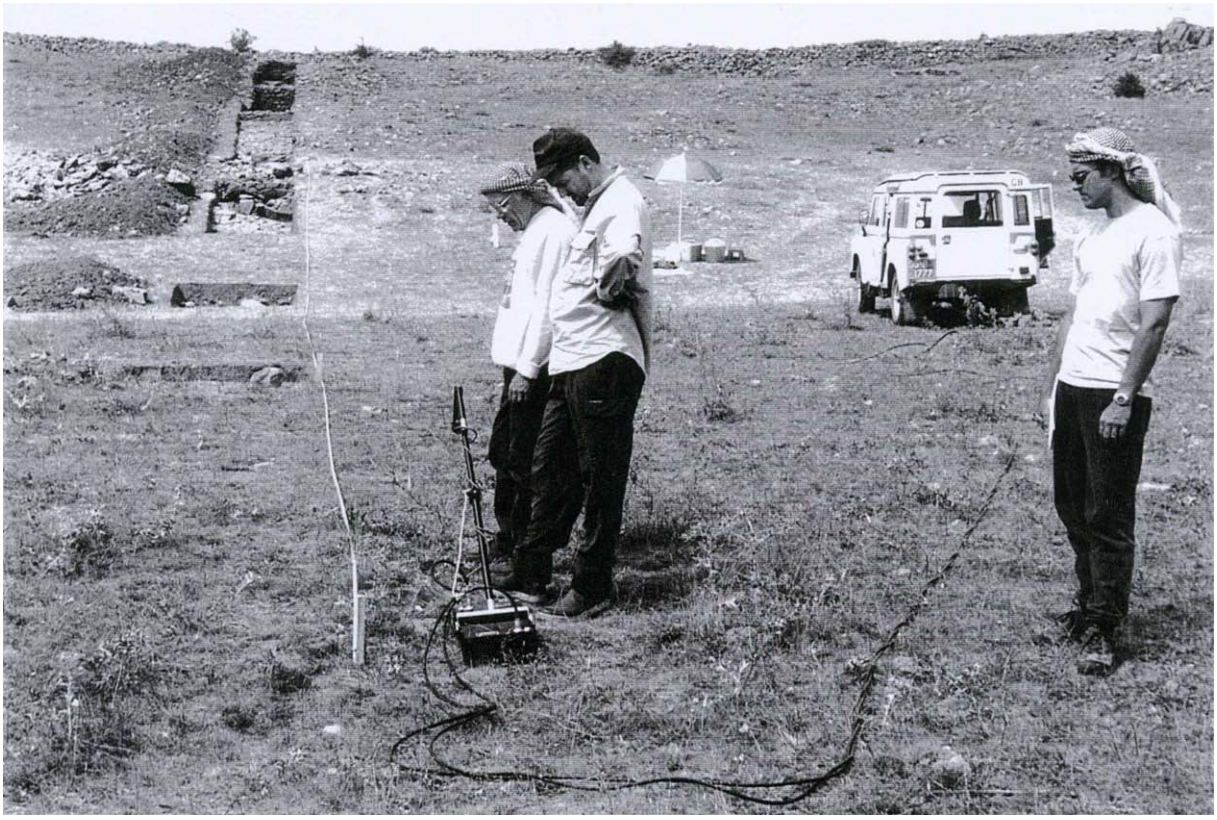

Figure 6. Running the Ground Penetrating Radar along the edge trench TT15 was a disappointing experience!

Figure 7. Back-filling TT17: the base and sides of the trench were marked with nylon rope and strips of plastic. Broken glass was placed on original wall tops which were then capped with new stone.

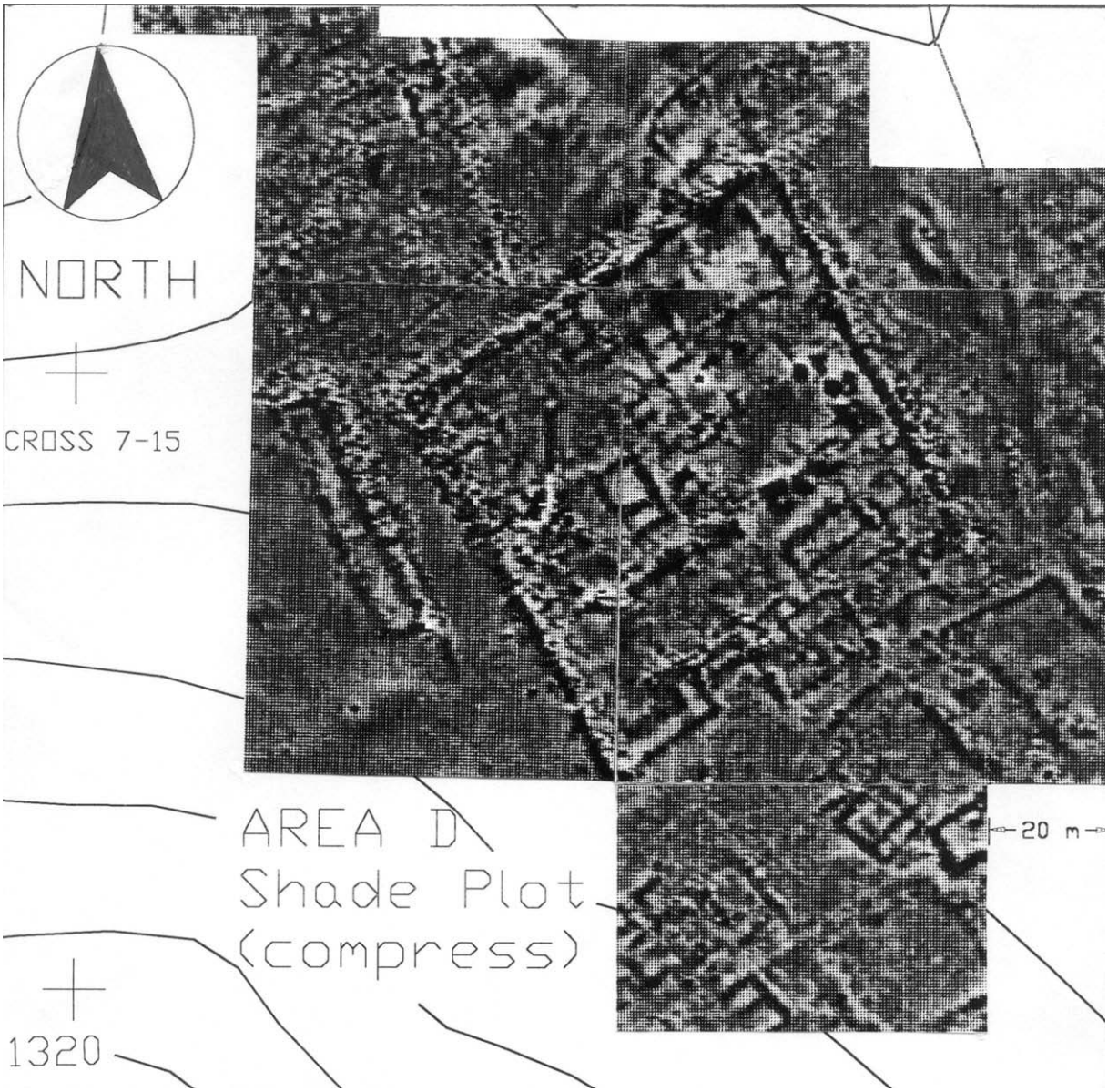

Figure 8. Geophysical plan of Area D2 showing the urban block, some 70 x 70m. The two-roomed structure near the centre was digitised onto the base map and marked on the ground. The trench was then positioned to test the accuracy of the geomagnetic map and to provide a section through the centre of the structure. Superficial resemblance to a "megaron" was, as expected, totally misleading.

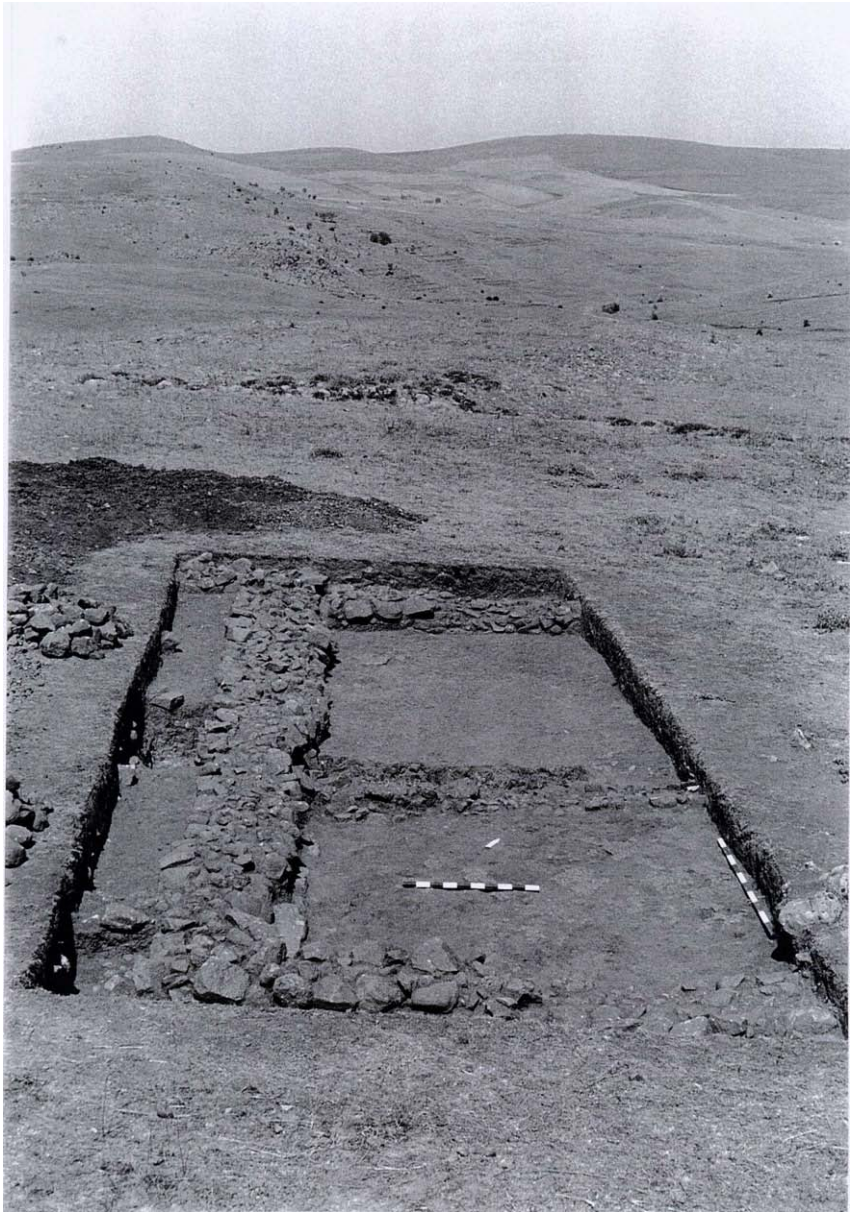

Figure 9. The excavated NW ha1f of the two-roomed structure in Area D2, TT16. The clay floor of the smaller room (in the foreground) was heavily burnt when the flaming roof collapsed onto it. The larger space behind was unroofed, dispelling any suggestion that the structure was of the "megaron" type. The photo shows clearly that the walls were not visible on the surface.

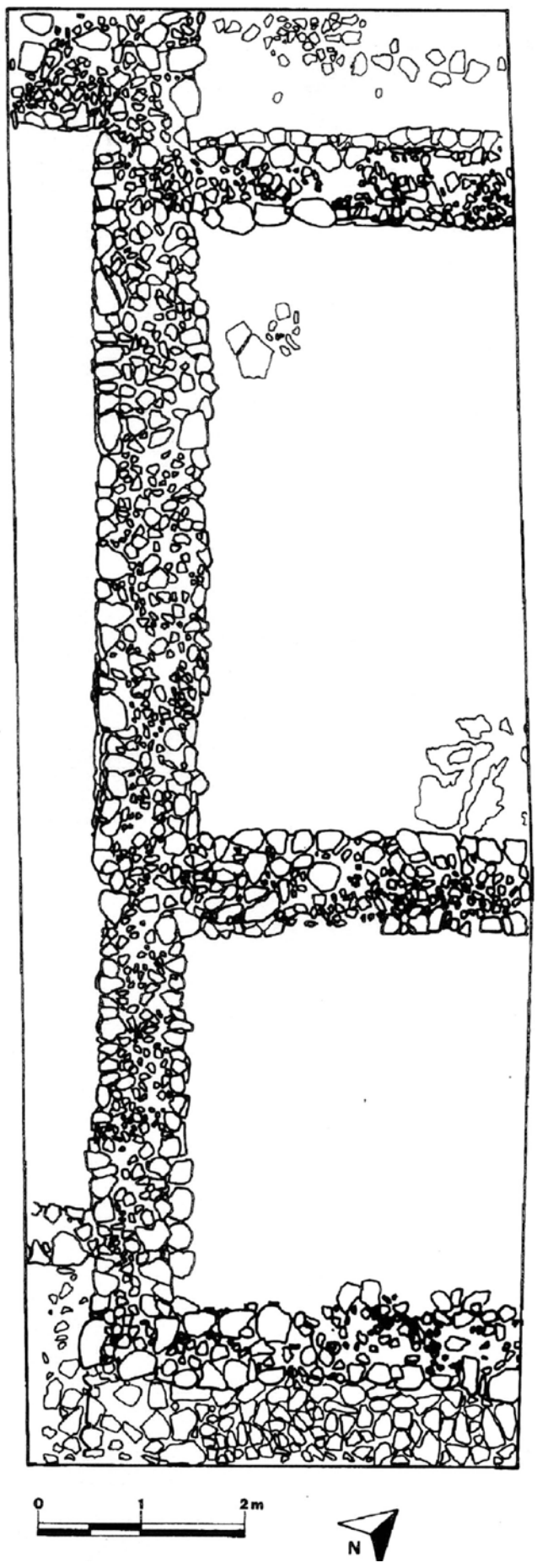

Figure 10. Plan of the two-roomed structure in TT16. There were wide central doorways in the south-west and the central walls, the width of the latter is indicated by the extent of trampled and burnt surface.

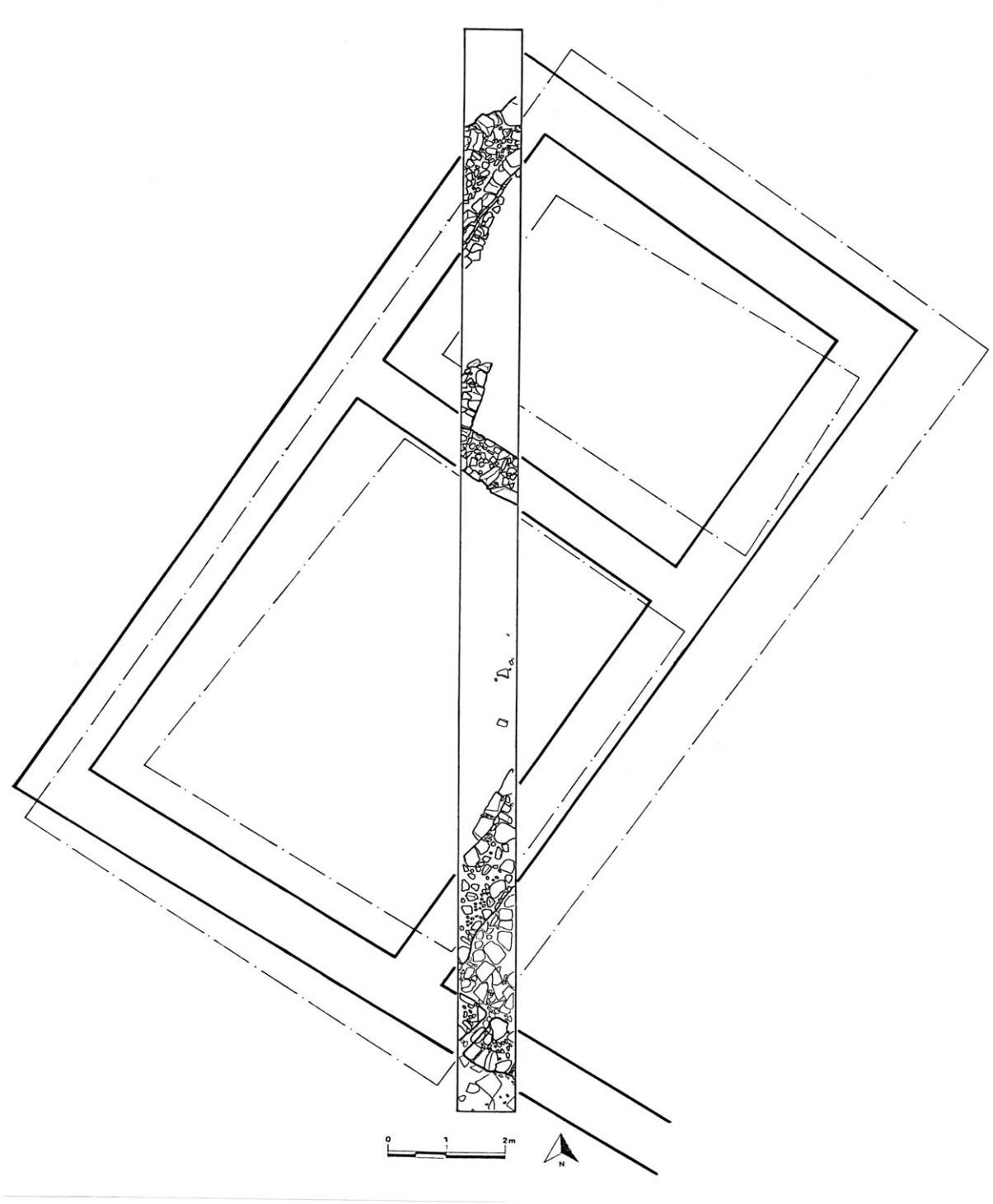

Figure 11. The two-roomed structure in TT18, in the eastern part of Area D. A 1m wide trench was dug along a grid line to test the correctness and accuracy of the interpreted geophysical map.

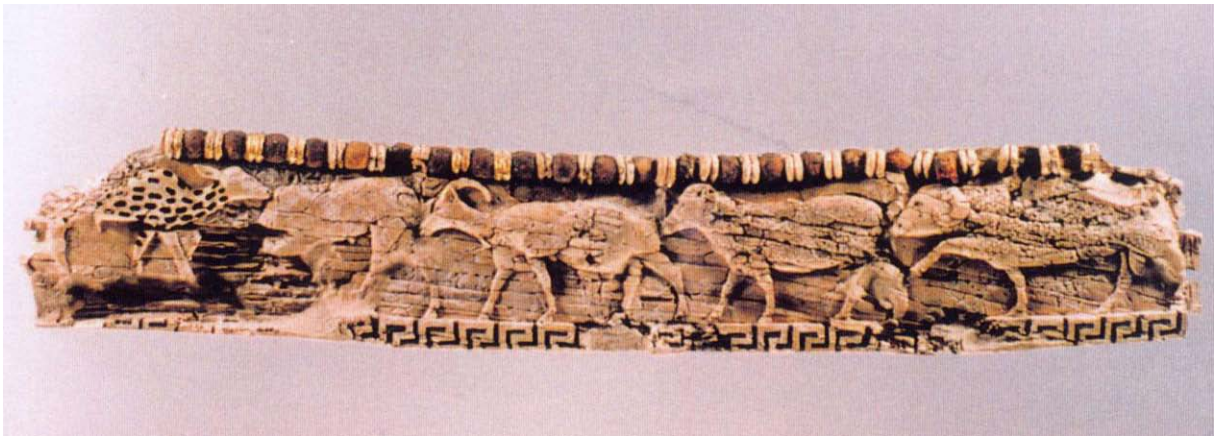

Figure 12. An ivory inlay, perhaps from a couch, found on the floor of a room in the NW sector of the city. A deer facing right opposes four domestic animals, a billy followed in turn by a she-goat, ewe and ram, all standing on a meander. The top band comprises applied amber beads backed with metal (?silver) and ivory reels coated with gold leaf. Some gold leaf remains on animal heads and horns, the deer was once inlayed. The complete length, 29cm, is preserved. The style bears strong western influence, perhaps that of a Lydian workshop.

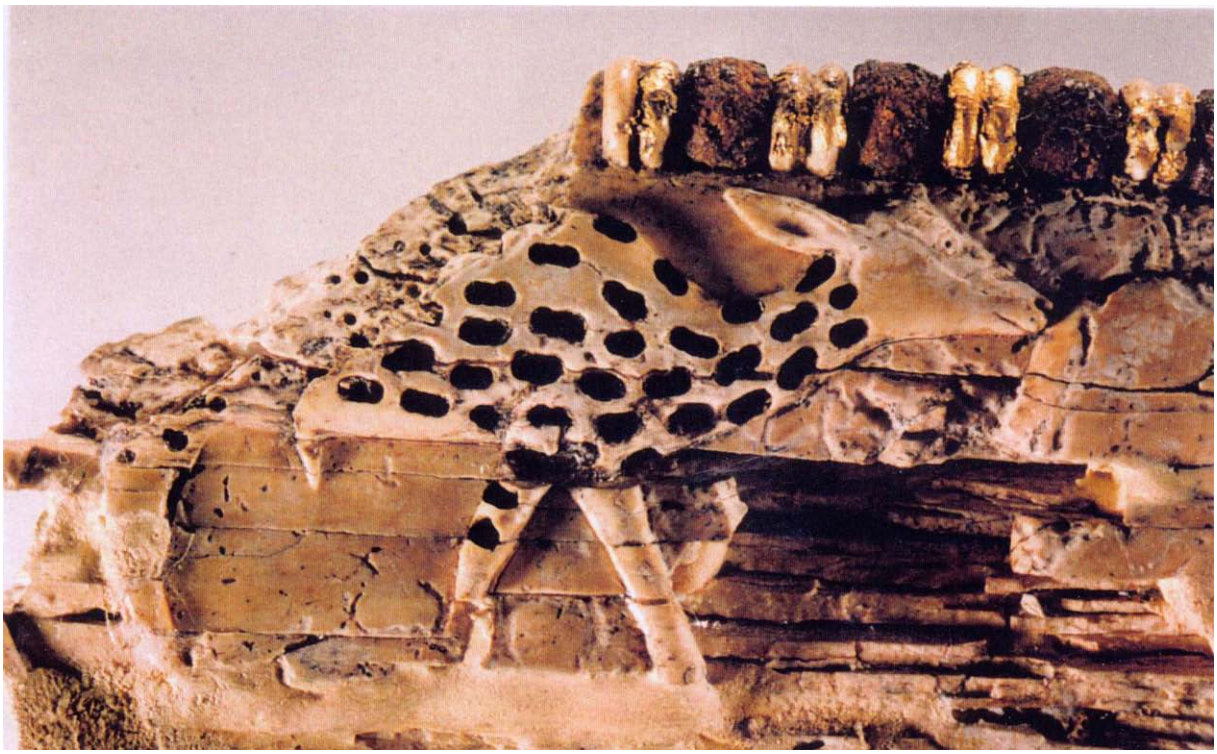

Figure 13. Detail of the deer showing the delicate carving of the features and the double drill holes that once contained brightly coloured paste or glass.

Figure 14. Left half of the ivory inlay.

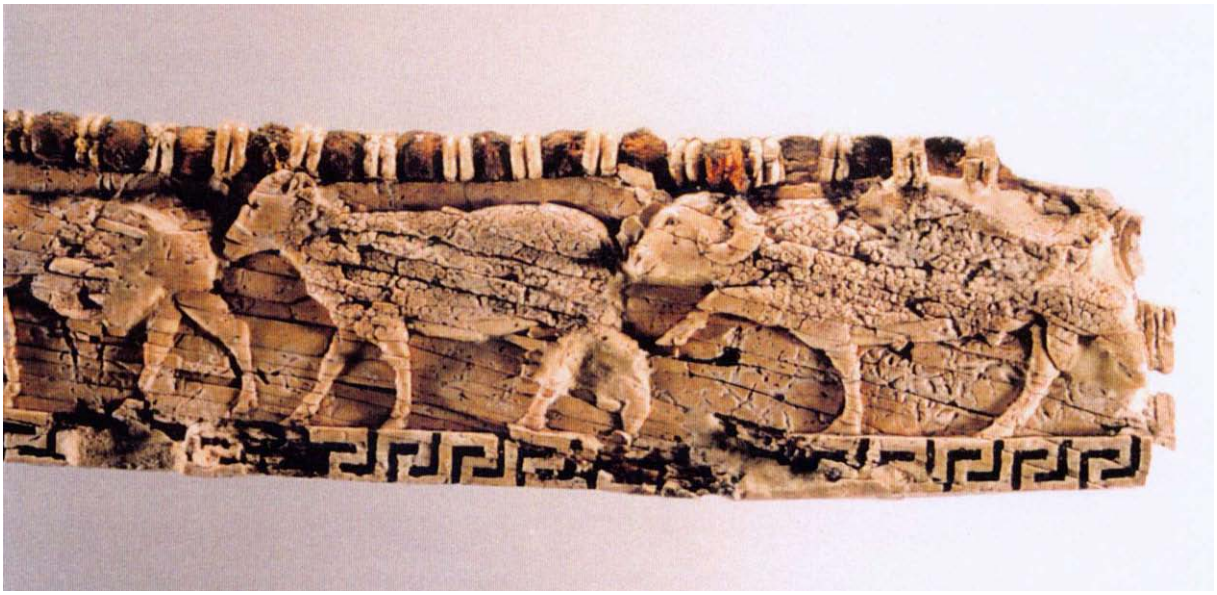

Figure 15. Right half of the ivory inlay.

Figure 16. Composite curved object comprising a boar's tusk with wood inserted into the pulp cavity and copper (?alloy) sheathing. There are three (two complete) neatly drilled holes. Max. length 11.5cm.

Figure 17. An ivory ornament with bead and reel motif.

Figure 18. Iron object, possibly to hold a door post.