REPORT ON THE 1999 SEASON AT KERKENES DAĞ
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The 1999 team

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INTRODUCTION

There were four major elements to the 1999 season at Kerkenes Dağ:

1. A short spring season which was designed to enhance experimentation with resistivity (geo-electric) survey while the ground was still wet. The specific aim of this survey was to attempt to locate stone column bases that do not always show up on geomagnetic images.
2. Geophysical and GPS survey of the city during the summer season.
3. Clearance of stone rubble from in front of the "Cappadocia Gate" and the "Palace Façade".
4. Trial geomophological drilling in the Eğri Öz Su valley and its tributaries in an attempt to understand the impact of the Iron Age city on the landscape.

The research was carried out under a permit issued to the Project Director by the General Directorate and a permit for clearance that was issued to Mr Musa Özcan, Director of the Yozgat Museum. We were extremely fortunate to have Mr Dursun Cağlar, of Eskişehir Museum, appointed as our temsilci. Mr Çağlar also acted on behalf of Mr Özcan during the clearance of the two monuments.

URBAN PLANNING

In the 1999 season the city plan was greatly extended **(Figs 1 & 2)**. Detailed kinematic GPS mapping of surface topography now covers the greater portion of the city and will be completed in the year 2000. Geomagnetic survey greatly extended Area A at the southern end of the site and now also covers all of the northern and much of the central areas. Each of these elements is reported on in detail below

Geophysics

Non-intrusive geophysical survey continues to be the major research tool at Kerkenes because it reveals sub-surface features in remarkable detail, with great efficiency and is very cost effective **(Figs 2-8)**.

Electrical Resistance Survey

Experiments with electrical resistance survey were carried out in the spring season and in the early part of the summer season. The aims were to see if this method would locate features not visible on the magnetometer images, particularly stone column bases. The columned hall in Area B was selected because excavation in 1996 had confirmed the existence of stone bases. It is also anticipated that resistivity survey will indicate different types of surface and flooring, and may make possible the construction of pseudo-sections. Equipment problems in the spring and exceptional dryness in the early summer meant that results were inconclusive. It is intended to make an application for a permit that will allow new trials in the spring of 2000.

Electrical resistance survey

Geomagnetic Survey

Geomagnetic survey with a GEOSCAN fluxgate gradiometer covered 20 x 20 m. grids, a total area of 52800 m^2 **(Fig. 2)**. Young men from Şahmuratlı Köy have been trained to collect and download data, undertake preliminary processing and print out daily results. By working 2 shifts per day it has been possible to collect data from up to 40 grids per day. The use of a pre-release version of GEPLOT has facilitated processing and printing of composite images despite initial teething problems of hardware incompatibility.

Geomagnetic survey

The acquisition of a new A colour printer in addition to the large format Epson printer has facilitated the regular production of images for ground-truthing. (Images need to be checked on the ground to distinguish later features, such as animal, as well as bedrock and shrubs from the images of Iron Age structures. Ground-truthing also enables the recognition of surface features, such as wall-lines that are sometimes obscured on the magnetic images by the proximity of outcropping bedrock.)

GPS Mapping

GPS mapping of surface topography with one base station and three roving receivers continued in 1999 **(Figs 1 & 8)**. The resulting image now covers some 80% of the city and is generated from a total of 1,286,767 data points of which 886,377 were collected in the 1999 season. Accuracy is to within 10 cm.

Geophysical images and balloon photographs are draped over the topographic maps and the vertical scales are increased in order to give a realistic impression of the topographic features. These electronic graphics can be manipulated and enhanced in a variety of ways **(Figs 10 & 11)**.

GPS mapping of surface topography

Urban Blocks at the Northern End of the City

Two geomagnetic images of typical urban blocks are presented here. The first **(Figs 4 & 5),** measuring some 60 x 60 m, contains several substantial, rectangular, structures that the high contrast would suggest have been heavily burnt. Fainter rectangular features within the same block might suggest the existence of greater overburden. The second block, illustrated at a larger scale, measures approximately 40 x 40 m with a 20 m wide complex adjoining its south-east side. The most prominent structure, a row of three small square rooms, is a form of building that frequently occurs at Kerkenes.

Public Buildings on the Southern Ridge

The Area A geomagnetic survey was extended westwards to cover the "palace complex" and adjacent areas and eastwards over the Sülük Göl, the "Polo Field", and the terraced structures above (tentatively identified as imperial stables of storehouses in previous campaigns) **(Figs 6-8)**. Some areas of the "Palace Complex" were surveyed at a higher sample density than is usual at Kerkenes (8 readings per m rather than 4) in an attempt to obtain images with greater clarity in areas where the terrain was difficult or where the fist images showed the existence complex structures with little detail.

"Palace Complex"

Clearance of the "Palace Complex Façade" (see below) revealed a blind re-entrant rather than a monumental entrance **(Figs 7, 17 & 18)**. The "Complex" itself appears to contain a number of independent monumental buildings that are not (yet) paralleled elsewhere within the city. A combination of magnetic survey and observation on the ground following an exceptionally dry spring has yielded a plan showing considerable detail and superseding the provisional plan drawn on the basis of ground observation in 1997.

The "Polo Field" and Terraces Above

Geophysical survey confirmed the plan drawn from surface observation in previous seasons and added little significant detail **(Fig. 8)**. In particular, no evidence was seen that could be interpreted as supporting roofs over the large units (although it is known that stone column bases do not necessarily show up on geomagnetic plans). An important and surprising addition to the plan was the very clear image of a gate-like entrance building to the largest of the terrace. This important

structure was heavily burnt during the destruction of the city (indicated by the strong polarities on the geomagnetic image). The building measures 40*40 m, and comprises three aisles divided by two rows of 3 columns. The plan and position of this structure provide corroborative evidence that these terraced structural units had some centralised public (military and/or administrative) function, almost certainly connected with the passage of materials and animals through the South or "Cappadocia" Gate. No trace of this aisled structure is visible on the surface.

Buildings to the north of the "Palace Complex"

Across the street from the "Palace Complex", within a prominent urban block, geomagnetic survey revealed the existence of a large hall with two rows of columns, measuring 30 m with a columned anteroom measuring 15 m **(Fig. 6)**.

CLEARANCE OF PUBLIC STRUCTURES

Glacis of the South-East Tower of the Cappadocia Gate.

One further element of the 1999 summer season consisted of the clearance of fallen stones from the vicinity of the "Cappadocia Gate" and from the tall eastern façade of a palatial complex **(Figs 12-18)**. Plans of the cleared structures were drawn and, wherever appropriate, sections through the stone debris and traces of burning in front of the various glacis were recorded. Scale drawings of the face of the façades were made and three-dimensions survey was conducted with an EDM. A complete photographic record was made: black and white negatives, colour slides and digital colour images. In addition, two technicians from the Department of Architecture at ODTÜ made a total record by means of stereo photography. Final drawings and graphic images will be produced in the autumn.

"The Cappadocia Gate"

In the area of the Cappadocia Gate clearance started on July 7th and ended on July 26th **(Figs 12-16)**. Thanks to the assistance of the Sorgun Belediye and Dedefakalı Belediye it proved possible to use two separate kepçe to move the fallen stone rubble to suitable locations well away from the surviving walls. (Eventually these locations may serve a flat parking areas suitable for the use of tourist buses outside the line of the city defences.)

To the west of the Gate the clearance revealed a continuous stone glacis face that enveloped the S.W. Tower of the Gate, a short (8 m) E-W stretch of wall, a long (24 m) N-S- stretch of wall, and exposed the north end of a protruding buttress (Buttress 1). To our surprise, the tall exposed glacis face of the two adjoining stretches of wall proved to have survived up to 5 to 6 m in height with an inclination of 60º. In places the glacis face appears to have survived to within a course or two of its original height.To the east of the Gate the glacis on the south face of the S.E. Tower was followed for a distance of at least 6 m. Here the glacis reached a maximum height of 4 m with a relatively steep inclination of *c.* 80º.

As far as the construction of these various stretches of glacis are concerned, they appear to have been erected on a natural bed of red gritty clay which may well have been levelled to form an even base. The facing stones of the glacis are unusually large (up to 1.5 m in height), but they are nevertheless skilfully arranged in a kind of cyclopean stonework. There are no separate true courses, and the facing stones retain a rubble core. Dry stone construction was used throughout and the interstices between the neatly fitted large stones are finely chinked with small to medium sized stones. It is also evident that the lowest facing stones were partly propped up at the required sloping angle by a series of smaller stones. At some stage further layers of gritty red clay were used to hide such supporting stones from view before the whole external area was covered by a whitish clay surface. At the topmost level it can be assumed that the glacis face would have extended for at least one more meter where it would have met the vertical face of the now missing superstructure.

One notable surprise was the huge amount of stone that had fallen from the top of the walls in the vicinity of the Cappadocia Gate. This almost certainly confirms that an upper stone wall must have once existed above the sloping glacis and hence completed the city's defensive system. Burning is also attested at several locations, not least near the exposed north face of Buttress 1. Here overhanging timber structures are likely to have burnt and fallen during the conflagration that destroyed the Iron Age city.

Preliminary clearing within the Gate itself indicates that each of the Cappadocia Gate's flanking glacis extended the limits of the gate passage. The passage has only been begun to be examined, but it is clear that the entrance was 2.20 m in width.

While a number of sherds of Iron Age date were found on a grey surface in a test pit near the west wall of the Gate, fragments of Byzantine pottery were also recovered at almost the same depth. A late secondary use of this gate in Byzantine times is also confirmed by other evidence. That is to say that part of the top of the east wall of the passage appears to have been reopened in the Byzantine period. At the time of the reopening at least two distinctive soft sandstone blocks were introduce near the present top of the wall. Each bears a series of etched designs, those on the upper block possibly representing a church and a number of adjacent tombstones.

The "Palace Complex Façade"

Clearance of the façade on the east side of the "Palace Complex" also progressed well, thus, although the original surface at the base of the stone glacis was only reached at certain selected points, it is clear that the glacis originally stood to a height of at least 4 m **(Figs 12, 17 & 18)**. Burning was again in evidence and small areas of exposed external surface yielded sherds of Iron Age date. The one registered find was a small, perforated and polished stone object of Iron Age date.

Future work will be needed to establish the position of the main entrance to the Palace Complex, even if it can now be stated that it did not lie in the deep central niche of the glacis façade on the east side.

Conservation

As stated above, the rubble cleared from in front of the glacis was always stockpiled in the tidiest manner possible at a substantial distance from the monuments, so as not to detract in any way from their visual impact, and selected fallen face stones from the glacis were carefully set aside for future restoration. Next, the stability of individual facing stones *in situ* was examined; and in almost

all cases was found to be admirable. Nevertheless, as a sensible conservation measure, we added extra stone chinking wherever this appeared to be advisable.

Following the clearance down to the original surfaces at the base of the glacis in the vicinity of the Cappadocia Gate and the "Palace Complex" façade, it was decided that the ancient surfaces ought to receive careful protection. Accordingly, several tractor-loads of sand, earth and pebbles were spread over the original surfaces to a uniform depth of 15 cm. For drainage purposes at the Cappadocia Gate, a top layer of sand was then used to cap the whole protective covering.

The entrance to the passage of the Cappadocia Gate, which it expected we will be able to clear completely and consolidate over the next two seasons, was lined with polythene sheeting on which a layer of earth and sand was placed. Added to this was a sufficient quantity of stone rubble to protect the exposed walls of the passage from damage until further work can resume next season.

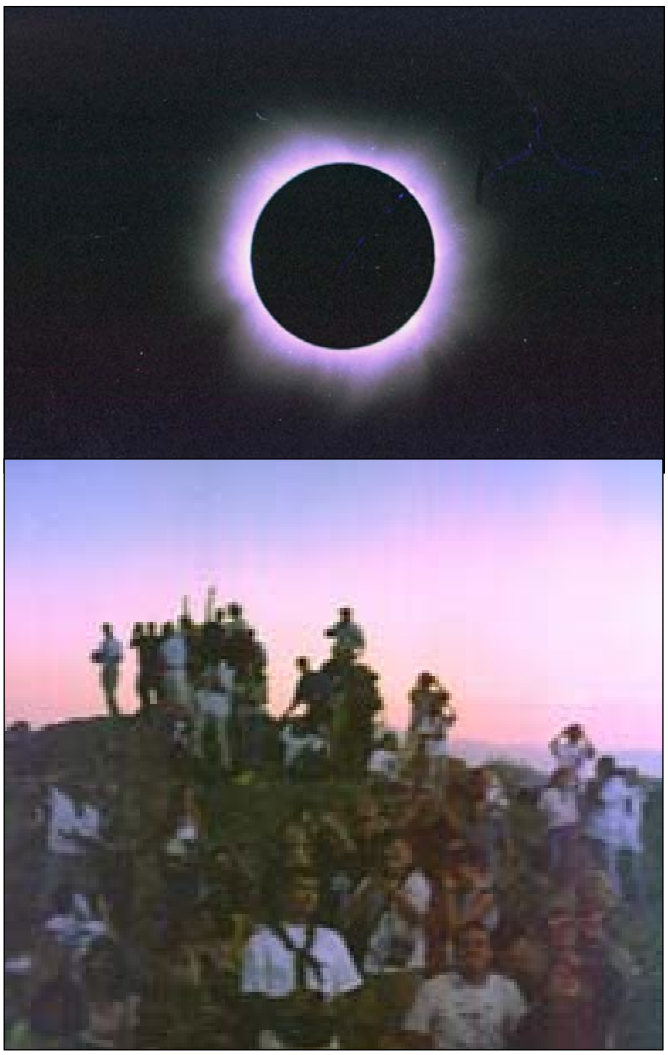
A terrace wall exposed at the southern extremity of the "Palace Complex" façade was protected from potential collapse, that might be caused by the build up of rain water behind it, by the construction of a new retaining wall against the exposed face. This seen as a temporary solution pending further elucidation of the architecture.

GEOMORPHOLOGICAL RESEARCH

Catherine Kuzucuoglu photographing the geomorphologic samples.

A program of geomorphological research that aims at understanding the evolution of the Kanak Su basin in the Holocene period, with particular emphasis on the impact that the foundation of the Iron **(Fig 19)** Age city on the Kerkenes Dağ had on the surrounding landscape and environment, was begun in 1999. The goal of the 1999 research was to test the possibility of gaining useful results from a series of cores through the sediments in the Eğri Öz Su valley which lies immediately north of the Kerkenes Dağ and into which most of the rain water and snow-melt for Kerkenes drains. Three cores were made from samples of the sediments will be analysed during the coming months. Initial results suggest that, as predicted, there are several meters of recent sediment filling the valley and that a more extensive program of geomorphological and sedimentological research will be extremely worthwhile. This scheme of research, however, falls largely outside the realm of archaeology in both its geographic scope and in its chronological range. Thus some other mechanism for continuing this stimulating study in future years will be sought.

THE ECLIPSE PARTY



The Eclipse at Yildizeli.

The Eclipse

On the morning of August 11 a large party of team members and visitors drove eastwards towards Yıldızeli and then northwards on the Tokat road to the high Çamlık pass. From an excellent series of vantage points in the immediate vicinity of the relay station we had an excellent view of the total eclipse of the sun. At 99% totality it was still impossible to view the sun with the naked eye, although gathering gloom, eerie purplish light and a cold breeze signalled that an extraordinary event was imminent and added to the rising anticipation. At the moment of totality there a spontaneous burst of applause broke out. The suddenness of the totality underlined the dramatic and awe inspiring effect that a total eclipse of the sun would have had in ancient times, underscoring the phrase used by Herodotus that "the day suddenly turned into night". Neither our modern knowledge of the cause of total eclipses nor research into what we might expect to see had prepared us for the drama and beauty of see this rare event from such wonderful surroundings.

The Party

At Kerkenes itself infrastructure for the "eclipse party" was put in place by various local authorities and many stalls selling refreshments and local crafts were set up. The local council laid on a bus shuttle from Sorgun and raised banners publicising the event in Sorgun itself. We were overwhelmed by the local interest and amazed at the huge number of people who came for the event. Visitors numbered thousands, the largest gathering of people within the ancient city walls since its destruction by Croesus around 547 B.C. A 3 km traffic jam built up on the greatly improved road between the village and the site. Souvenir T-shirts and mugs were distributed by the Ministry of Culture. Live music and folk dancing were much appreciated, as was the provision of food and beverages.

The Eclipse Party at Kerkenes.

CONCLUSIONS

Completion of non-intrusive survey through a combination of remote sensing techniques in the next few seasons of field work will reveal a plan of the Iron Age city in remarkable detail. Analyses of the plan will lead towards a greater understanding of the urban dynamics of this important site and will make possible some assessment of its role in the development of urban design in Anatolia and beyond.

Clearance of monumental structures both provides important architectural and cultural information and also greatly enhances the potential that the site affords for tourism.

Fuller understanding of the city and its significance will, however, only be revealed by a precise program of excavation that will elucidate questions concerning the functions of various architectural forms, reveal aspects of the rich cultural and artistic background, provide evidence relevant to study of trade and the ancient economy and, finally, yield evidence pertinent to research on the environmental impact that the foundation of the city had on the surrounding landscape.