ISTITUTO ITALIANO PER L'AFRICA E L' ORIENTE
CENTRO SCAVI E RICERCHE ARCHEOLOGICHE

THE ARCHAEOLOGICAL MAP OF THE MURGHAB DELTA PRELIMINARY REPORTS 1990-95

edited by
A. GUBAEV, G. KOSHELENKO and M. TOSI

TEXT AND FIGURES

IsIAO – ROMA 1998

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CENTRO SCAVI E RICERCHE ARCHEOLOGICHE

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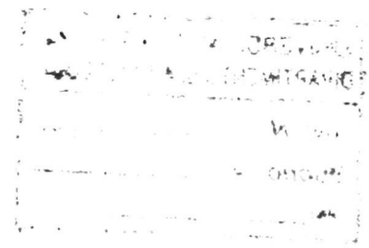

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PRESENTATION

BY G. GNOLI AND R.M. MUNCHAEV

This volume is mainly the result of a long term co-operation scheme developed between the Institute of Archaeology of the USSR Academy of Sciences (IARAN) and the Italian Institute of Middle and Far East (IsMEO), with a grant of the Italian National Research Council. The co-operation initiated on March 14 1989, with the signature of the first Protocol for Scientific Co-operation at the Capitolium of Rome. Almost eight years later, in spite of many dramatic events occurred in between, while both Institutions have changed their own names, the spirit that brought us together is still very much alive and looking forward to new directions. We feel very appropriate to remember at this point the figure and the work of the late Academician Valeryj P. Alexeev, Director of the Institute of Archaeology in 1988-91, who greatly believed in the value of international co-operation for the benefit of Russian science and accordingly pursued the establishment of a solid web of relationships around the Institute of Archaeology.

The Archaeological Map of Merv Oasis was originally conceived by Gennadyj A. Koshelenko, Head of the Section for Classical Archaeology of IARAN and a great specialist of Central Asia in antiquity. Koshelenko had already begun to set up the archaeological map by assembling old and new survey work to design the territorial layout around the great urban pivot of Merv. The history of any city can be read from the structural transformation of its territorial surroundings as much as from those occurring within its walls. After many years of excavations at Gyaur-Kala, IARAN in association with the Turkmenistan State University (TGU) had initiated in 1981(?) the exploration of fortresses and other settlements that marked the northern borders of the oasis since Seleucid times. The survey would have to be extended to include a vast section of the Murghab delta, between the Dzhar marshes and the easternmost reaches of the alluvial fan, beyond the wells of Takirbaj, to the South of the great Bronze Age centres discovered in the seventies by V.I. Sarianidi and Emil' Masimov. The area had been extensively occupied in Iron Age times, as already indicated by the seminal work of V.M. Masson in the fifties. During the first preparatory meeting for the IARAN-IsMEO agreement on October 24, 1988, G.A. Koshelenko surprised the Italian delegation by proposing an immediate joint action to carry out the exploration of this area in a new project to be named "the Archaeological Map of the Northern Limits of Merv Oasis". Quite expectedly, the response from the Italian side was enthusiastic and the project became the main target of the Protocol for Co-operation.

The joint field work was planned out in early October 1989 during a short visit to the area of an Italian team of specialists headed by Maurizio Tosi. The Turkmenistan State University (TGU) became an equal partner in the project represented by Prof. A.G. Gubaev who shared the scientific directionship with G.A. Koshelenko and M. Tosi.

This volume is a preliminary report, but it is produced at a mature stage of the work, with the aim to provide already a large and detailed base of data than can be meaningful use for further research and conservation plans. Access to the CAD maps and to the computer archives will be available to everybody on a CD-ROM that will be issued very shortly.

INTRODUCTION

BY L. BONDIOLI AND M. TOSI

The great irrigation scheme of the Karakum Canal was built after World War II with titanic efforts by the Soviet Union to open new agricultural lands in the piedmont plains between the northern borders of the Hindu Kush-Kopet Dagh and the desert. It is a man-made river of impressive magnitude, cutting across the many northward flowing streams that for millennia had been draining across the desert sands all precipitation from thousands of square kilometres of highlands and mountains into the desert sands. These piedmont river courses have always been far less extended than the sedimentary fans they built up over the millennia. The Karakum Canal, by transecting the fine silt alluvial formations deposited by the erratic streams, is progressively reclaiming from the desert all the lands that at one time or another had been irrigated throughout the Holocene. Since these rivers were also the life lines of ancient settlement systems, the modern irrigation works are not only the source of great economic amelioration, but also the cause of the destruction of several archaeological sites and the ancient landscapes preserved to the present day. Salvage operations have been organised since the 1950s, most remarkably with the survey and excavations of the Chalcolithic territory around the oasis of Geoksyur in the Tedjen delta, which have produced significant steps forward in our understanding of prehistoric Turkmenistan (Trudy YuTAKE 1960).

The largest riverine systems breaking through the southern Karakum basin are those of the Murghab and the Tedjen. Within the fans of their ancient riverbeds can be seen hundreds of sites, covering thousand of acres. Most of them rise only few centimetres above ground level, while many more are buried under the silt or covered by the windblown sands. Their identification is a very complex task and it will be possible only with long term investments of resources, energy and time. The project we have initiated with the joint contributions of Russian, Turkmen and Italian Institutions is only a preparatory effort, planned and executed to lay down the bases of future strategies. In our systematic survey we have been able to document so far about a thousand sites, from the Early Bronze Age to the Islamic period. Undoubtedly they represent only part of the still existing ones. On the other hand what is important in such an endeavour is the internal consistency and precision of the available data. From a technical point of view the aim of the project has been to establish a network of basic data that would have made possible on one hand the reconstruction of settlement systems in the various ages and on the other the establishment of a framework for future explorations of the buried remains. We expect that new techniques and more sophisticated tools for remote sensing might soon become available, as already promised by radar scanners or high resolution satellite imagery. In the thirty years between V.M. Masson's seminal work (Masson 1956) in the late fifties and our joint commitment in 1989 the archaeological exploration of the Murghab Delta had produced a vast and uneven array of new evidence. It was time to bring it together within the coherent frame of a computer-based retrieval system incorporating both maps and archives. This report concerns only the first stage of this construction, where the existing knowledge has been gathered to make possible more advanced investigations for the next generation of studies.

ORGANISATION OF THE PROJECT

The complexity and work load required for the preparation of a digitised sites' inventory of the highest detail for such a vast region grew with each new season of work. Quite expectedly, the environmental setting and the recent geological history of the delta basin emerged immediately as the critical factors in understanding the dynamics of settlement history. The tasks required the participation of geologists, geo-morphologists and other technical skills, while more archaeologists became involved with the progress of time. From 1990 to the present, eight field seasons have taken place, usually between September and October of each year, for periods varying between two and five weeks. The extremes of continental climate in a hyperarid environment made it difficult to extend the relatively short time period available for fieldwork. Time constraints have been faced with major investments in equipment and larger teams involving contemporary activities of many operators. Up to twenty-five specialists from several institutions of five different

nations have worked at the same time in the camp at Sovkhoz "Bayram Ali" (known before 1991 as "50-let SSSR"), employing state-of-the-art technology to locate, map and register the sites discovered. In order to detail their terms participation a chart has been designed (Chart 1).

Our work was technically facilitated by the availability of small scale maps and aerial photographs generously supplied by local and central authorities. Moreover several maps were redrawn from series out of print, to allow the recovery of essential data like the location of wells or the absolute altitude of trigonometric points. For the preparation of these maps as well as the supply of the full coverage of the Murghab delta in aerial photographs, we are particularly indebted to the *Turkmenskoe Aerogeodzicheskoe Predpriyatie* of Ashkhabad and its Director at the time, Dr. A.G. Larin.

Permissions were also granted at any opportunity to use helicopters and AN-2 double-decked aeroplanes for wide range-reconnaissance flights at low altitude. Between 1991 and 1996 a total of some 150 hours were flown over the whole of the Murghab Delta and the Unguz fossil river system to the north.

However, in spite of the many new technical means employed, the information for the construction of the archaeological map was mainly gathered on foot. The flat delta region was divided into sectors that have been explored by walking teams, averaging three to five people. The initial area in 1990 was located just north of the modern settlement of Karakul, on the western side of the Ashkhabad Canal, around what will later be called "site complex 1". In the initial seasons sites were first pinpointed on the 1:10.000 map series owned by the IARAN team and then connected by theodolite transects. The system was very time-consuming, while absolute positioning remained increasingly questionable as we extended the network of polygonals on a wider space. Given the very large size of the area to survey we soon realised that following this procedure we would have ended up lumping together poorly connected clusters of sites.

The introduction of the GPS in 1992 and the availability of the full coverage of aerial photographs the year later, greatly improved our capacity to integrate all records in a single consistent system. Once located and positioned, each site was sampled by gathering a collection of surface artefacts. All items other than potsherds were collected and positioned by total station in an independent inventory of stray finds labelled as spot. Potsherds, being the standard dating mean available, were collected randomly but the entire surface of the site was generally inspected. Systematic collections were carried out on critical sites using transects segmented in 2 by 2 m squares (e.g. site 38).

All elevated sites, as well as the largest and the more complex ones, were mapped in detail by a second team equipped with total stations. The topographers used on the field the printout of the sketch map produced by the first team (1).

Although the general principles of surface survey have remained unaltered during our fieldwork, the nature of the work carried out varied considerably among the different teams. The first team completed the work begun in 1992 through the detailed mapping of already discovered sites, and through extensive surface collections; aerial reconnaissance was not employed except to gain a quick visual appreciation of some of the (possibly) Achaemenid fortresses recorded near the end of that season. The other team, by contrast, followed the procedures of the 1992 season, focusing rather on the discovery and positioning of sites, than on surface collections and detailed mapping, which will have to be carried out in the following season. In spite of the fact that the two-phased nature of the work evolved rather under force of circumstances than through design, it has proved at the end to be quite profitable. The broad picture gained in this initial reconnaissance helps the design of future work by pinpointing areas of particular interest. At the same time, concurrent work by different teams in different phases gave us a flexibility that maximised the limited resources.

Sistan and Margiana: a Preliminary Comparison of Experiences

From the first fieldwork season in the Murghab, it became evident that almost every space between the elevated mounds across the still uncultivated alluvial plains was filled with vast spreads of ceramic artefacts, less than a meter high. When comparing our previous experiences in Sistan, the main character of the Murghab Delta became its physical stability. Indeed the delta system of the Hilmand stands at one extreme of the continuos among the land-locked Inner Asian river basins, while the Murghab will be at the other end. The fan of the Murghab Delta widens across the levelled flatness of the Karakum depression, facing no other obstacles to the courses of its water other than its own sediments and the sands blown from the north. Terminal waters collect in the Dzhar, the elongated lake that runs parallel to the last water courses, configured like another river. Stability is impressive considering how little changes are evident when flying at low altitude over the northern portions of the Delta. The only visible change is the southward regression of the Delta. The new waters introduced again into the system by the Karakum Canal are evidently directed along the same dry river beds of the past, evidencing the prehistoric system would be largely adequate to be reactivated.

(1) Sites extending up to two hectares. were mapped from a single base point, always located on the highest point of elevation, that often corresponded to a trigonometric point of the Soviet Geodetic Network. For this reason the computer-generated plans published here indicate elevation on contour lines as negative numbers beginning from the zero point established at the highest elevation.

Name	Nationality	Specialization	1990	1991	1992	1993	1994	1995	1996
Angelucci Diego	Italian	Geo-archaeologist				■			
Annaev A.A	Turkmenian	Archaeologist				■	■	■	
Bader A.N.	Russian	Archaeologist	■	■	■	■	■	■	
Berry Thomas	French	Archaeologist				■	■		
Biscione Raffaele	Italian	Archaeologist	■	■					
Bizzarro Angela	Italian	Topographer	■	■					
Bondioli Luca	Italian	Computer Specialist	■	■	■	■	■		
Callieri Pierfrancesco	Italian	Archaeologist				■	■		
Castelli Roberto	Italian	Geologist					■		
Cattani Maurizio	Italian	Archaeologist	■	■	■	■	■	■	■
Cerasetti Barbara	Italian	Archaeologist							■
Cleuzou Serge	French	Archaeologist				■	■		
Cremaschi-Mauro	Italian	Geologist				■	■		
Erdosy-George	Canadian	Archaeologist			■	■			
Gaibov V.A.	Russian	Archaeologist	■	■	■	■	■		
Genito Bruno	Italian	Archaeologist	■	■	■	■	■		
Gogte Vishawas	Indian	Geo-chemist		■	■				
Gubaev A.G.	Turkmenian	Co-director	■	■	■	■	■	■	■
Hodzjanyazov T.	Turkmenian	Archaeologist			■	■	■		
Joglekar P.P.	Indian	Archaeozoologist				■			
Koshelenko G.A.V	Russian	Co-director	■	■	■	■	■		
Lamotta Raimondo	Italian	Archaeologist			■				
Laurenza Sabatino	Italian	Archaeologist		■	■				
Lazzari Alessandra	Italian	Archaeologist				■			
Marcolongo Bruno	Italian	Geologist	■	■	■	■	■		
Mascellani Mario	Italian	Topographer				■	■		
Masimov Emil	Turkmenian	Archaeologist				■	■	■	■
Mozzi Paolo	Italian	Geologist			■		■		
Naumov A.	Russian	Draftman			■	■	■		
Novikov S.	Russian	Historian	■						
P'iankova L.T.	Russian	Archaeologist				■			
Pracchia Stefano	Italian	Archaeologist	■						
Ruiz Rodriguez Arturo	Spanish	Archaeologist			■				
Sagamonov A.Ju.	Russian	Archaeologist			■	■			
Sajjadi S.M.S.	Italian	Archaeologist	■						
Salvatori-Sandro	Italian	Archaeologist						■	■
Shepitov A.V.	Russian	Archaeologist			■	■			
Tilia Giuseppe	Italian	Topographer	■	■					
Tosi Maurizio	Italian	Co-director	■	■	■	■	■	■	■
Trafkina N.A.	Russian	Restaurer		■	■				
Tuzzato Stefano	Italian	Archaeologist							■
Udeŭmuradov B.N.	Turkmenian	Archaeologist				■	■	■	■
Uvarov P.Ju.	Russian	Archaeologist			■	■			
Verdozzi Claudio	Italian	Computer Specialist				■			

Chart 1 - Partecipation of specialists to the Project "Archaeological Map of the Merv Oasis", according to year (1990-1996).

The work by M. Cremaschi, reported in this volume, highlights in particular that the main factor of change in the physical configuration of the alluvial landscape has been fluctuation in the water supplies, while water courses have been affected probably more by human action since the introduction of irrigation than by natural shifting. By consequence of the stability silting has been very consistent in the southern portion of the Delta as measured by Cremaschi already as far north as Takhirbaj Bronze Age sites of lesser elevation may be buried under two meters of silt below the Iron Age living floors. Quite evidently in areas further south, closer to the origin of the Delta, they would be buried much below present ground level. Not surprisingly the surface survey has detected no Bronze Age sites around Uch depe or Yaz depe and no Early Iron Age sites or Achaemenid sites are visible around Merv.

In such a configuration neo-tectonic movements along the northern front of the Hindu Kush would have affected the river course to a minimal extent, certainly much less than in the neighbouring Tedjen. B. Marcolongo has related the changes in the Tedjen lower course to neo tectonic movements as evidenced from the analyses of satellite images in his contribution.

The structure of the middle and lower Murghab, between Kushka and the upper reaches of the system closely resemble that of the Nile, with a well entrenched river course and a fan opening in a sharply designed triangle. In both the Nile and the Murghab the main settlement areas with the largest settlements are to be found at the bottom of the delta, where the waters breake into the fan (Fig. 1). Since there is no sea at the end of the Murghab, the waters have dispersed the silt across the plain, forming a down-stepping slope, looking like a giant staircase of sediments.

The Hilmand Delta in Sistan represents a contrary case of instability evidently connected to the fact that the basin is sharply limited to the west by a N-S barrier made by the front of the Palang Mountains and their piedmont colluvial fans of gravel sediments (Fig. 2). The first noticeable difference between the Hilmand and the Murghab, or the Nile, is the fact that the densest settlement areas and the capital centres have always been since the end of the 4th millennium BC at the end of the delta system, to connect with the river as well as the huge terminal lake. The waters of the Hilmand end in a number of terminal lakes of proverbial instability. The rapid built-up of sediments compels the waters to change their courses several times, while a circular anticlockwise sequence of descending lacustrine basins connected with each other by spillways, like the Sheelagh Rud, drains the overflows to the southernmost sections of the basin. Satellite imageries of southern Sistan indicate some six or seven overlapping delta fans, all dated by the archaeological sites to later historical times, spanning over less than a thousand years in Islamic times (Forte et alii 1997). Even more unstable have been the southern limits of the Hamun, the largest and most perennial of the terminal lakes. The characteristic *takyrs* shaped as triangular tongues pointing eastward to the centre of the basin, represent the sediments of temporary extensions of the lake that have invaded earlier deltaic deposits. The waters of these temporary extensions of lake overflow have cut down the earlier riverine sediments to some 2-3 meters below the Bronze Age ground surface. What is left of these ancient systems, mostly dating to protohistorical times, contemporary to Shahr-i Sokhta, is reduced to thin *yardangs*, columnar sedimentary residues shaped by the dominant winds. Third millennium BC soils, often black by the organic content, have been detected at the top of these *yardang* about two meters above the present level (Meder 1980). The combined action of the expanding lake and the wind erosion has lowered most of the ancient surfaces, destroying all residual evidence of the Bronze Age landscapes.

The Bronze Age mounds of Sistan, also strongly reduced in their size by aeolian action, rise on the *takyr* as isolated pillars, not unlike the *yardangs* around them. When we surveyed this part of Sistan in the seventies we had not immediately realised what was missing: the connective tissue of lower sites or spreads of ceramics indicates more temporary and less monumental occupations that make 70-80% of the Murghab archaeological record from surface evidence. The fact is that lake and wind have destroyed most of the remains of Sistan, leaving us with few isolated archaeological sites, standing like pillars to represent the phantoms of the original settlements.

Physical Conditions of the Murghab Project

Because even the least conspicuous sites were still available to observation, Margiana has turned into a unique experience in fieldwork procedures. In other alluvial desert plains, where we had been working in the past, like Sistan, Mesopotamia, Sindh or Upper Egypt, the remains of sites were very much reduced by factors of erosion or sedimentary cover. Usually only the largest, the most elevated or the most monumental sites are preserved for record, while the vast majority of places, where ordinary people lived, often for shorter periods of time in connection to water fluctuations, were not available any more. Although rank-size analyses and the ingenuity of other methods of quantitative and qualitative classification have allowed us to recover the hierarchical organisation of territorial settings in their historical diversity, true population and land-use studies had been strongly hindered by the discontinuity of the remains surrounding the central sites. If on one hand the preservation of the topsoil across the Murghab delta has created the conditions for an exceptional record of settlement remains, on the other it confronted us with an inexperienced situation.

Our survey had to be developed into a set of walking operations with a massive investment in surface scrutiny and mapping. The result was not only a vast increase in the number of sites recorded, but a significant shift in the conceptual perspectives for the entire

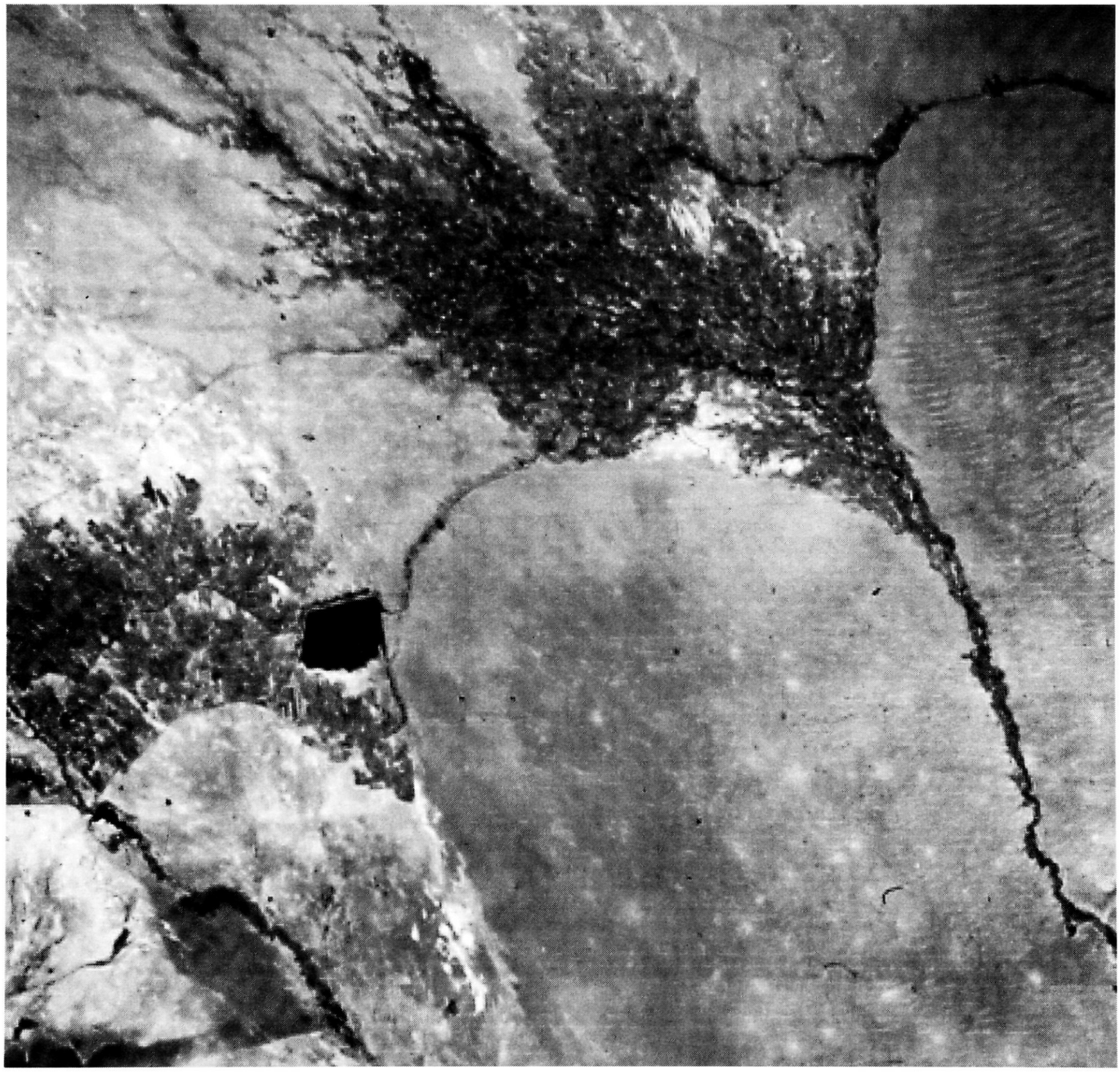

Fig. 1 - The Murghab delta in south-eastern Turkmenistan from ERTS-1 satellite imagering taken on December 22 1972, at an early stage of desert land-reclaiming from the waters of the Karakum Canal. The easternmost part of the Tedjen delta is also visible in the lower left quadrant, while the reclaimed lands in between the two systems cover the Geoksyur Chalcolithic delta and settlement system explored by YuTAKE in the 1950s. The stability of the Murghab delta is evident by the lack of major fossil sediments in the desert lands around it, once compared with the Tedjen or the Hilmand delta in Fig. 2. The elongated Dzhar terminal swampy lake are visible at the center of the fan continuing in the lowermost sections of the delta.

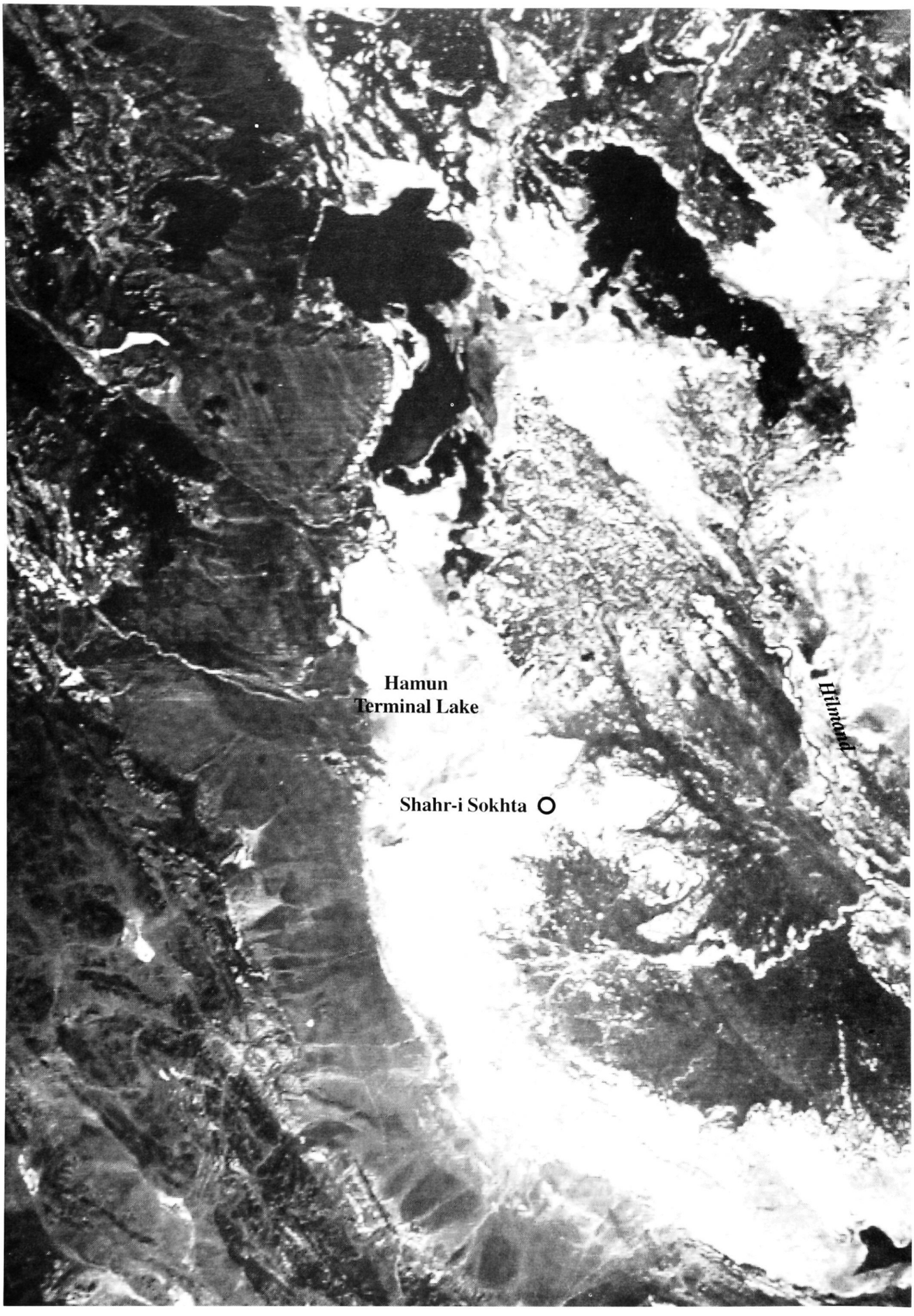

Fig. 2 - The Hilmand delta in Sistan as seen from ERTS-1 satellite imagery in 1972. The riverine sedimentes of the Mediaeval Rud-i Biyaban deltas are visible in the lower part of the image. The Kuh-i Palang mountains to the west block the water flow compelling them to a clockwise rotary motion. Shahr-i Sokhta is located within the present extension area of the terminal lake Hamun as evidenced by the edges of the easternmost sedimentes. The Bronze-age delta systems are not visible.

operation. Research strategies in settlement archaeology, as defined at the end of the sixties and extensively applied in most regions of the world during the following two decades, focused on the hierarchical organisation of sites in order to establish from the archaeological record the degree of territorial integration through the networks of political and economical relations. The understanding of relations between population and land-use, as well as the different functional intersections of specialisation in agriculture and industrial sectors, remained largely out of range for the analytical tools. The minimum time units controlled from a stratigraphical excavation of mounds and other long-term sites was still too coarse for decoding the economic dynamics of an agrarian society. The stability of the Murghab delta has created instead the conditions for an exceptional record. Unfortunately, when we started it was already too late, as we soon realised in face of the rapid re-development of the alluvial desert for intensive cotton farming, made possible by the Karakum Canal. Koshelenko was very much aware of this rapidly deteriorating situation, considering that by the early eighties all the land included within the Partho-Sasanian settlement region between Merv and the line of fortresses between Gebekly and Uly Kishman, was already cultivated leaving the higher mounds as the only recorded sites. The survey of the northern borders of the Merv oasis should have allowed the archaeologists to recover the sites left to the north of the fortified defence lines, as defined by the Soviet specialists. In the region, we found practically no post-Achaemenid sites, proving that since the third century BC those lands were no more involved with irrigation schemes from any mainstream collectors. The majority of sites covering the alluvial deposits between 37° 55' N and 38° 05' N of latitude related to the Iron Age, i.e. the Yaz depe sequence of V.M. Masson between c. 1300 and 300 BC (Masson 1956). Some 253 Iron Age sites have been recorded. Of these 23 are datable to Yaz I, 7 to Yaz II, and 146 to Yaz III, while 77 of them equal to 30.5%, have an occupational range for more than one period. At the present this area, roughly extended for 130 km^2, represents the best documented part of our project from the detailed recording of all low-lying sites, ceramic spreads and tilled farmlands, filling the space among the elevated sites raised by mud brick platforms.

Walking across the still uncultivated portions of the Murghab delta free from sand accumulations, potsherds are found almost everywhere, at all degrees of density, ranging from individual stray pieces to thick deflation pavements. Quite obviously, the critical question has been the definition of discriminatory thresholds, grouping the different levels of density in a scale of well-defined types of occurrences to be articulated with the settlement hierarchy.

Density values for site/non site discrimination have been developed for several regions in the world. However, so many different factors are involved that the definition remains largely context-dependent. In studies of ancient agrarian regions with structured hierarchies of permanent settlements, the issue is further complicated by the practice of the manuring of fields with organic debris from dwelling garbage that included a lot of broken pots (Wilkinson 1982). Ploughing and the digging of ditches and dikes for irrigation further contributed to the dissemination of pottery across the intra-site portions of land. A delta region cutting across a desert, like Margiana, was so continuously populated and so intensely exploited at each period of time, that hardly any square meter of its surface does not contain evidence of human activities. It can be conceptualised as a carpet where on closer inspection the orderly patterns of design break into uncertain edges of knotting. Tracing a closed contour line dividing the *ins* and *outs* of any site develops in a sum of arbitrary actions bearing out any controlled consistency. The definition of the site limits in such a situation of ceramic ubiquity represents the most critical issue for settlement ranking.

In principle, given also the technical means available it would have been possible to define an ideal system of empirical rules for site/non site definition, according to thresholds of decreasing density for zones of artefacts' clustering, distributed over a flat surface. We felt from the beginning that this exercise would have been too abstract for the complex situations faced across Margiana, where we are confronted by array of objective (e.g. sand cover, deflation, cultivation, animal activity) and subjective (e.g. sharp differences of light in daytime) factors of disturbance. Again, like on a carpet, the sharpness of the contour lines should be related to the scale of the map or the distance from the observer. This means that it should be derived by the aggregation of the artefacts individually recorded: the smaller the scale the more shaded the line should be.

The construction of a reference cartography would have required an oversimplification of the data, but given the high quality of the available evidence for the Murghab we had to look for more innovative attempts. A pathway for a solution has been provided by the introduction since the second season in 1991 of three complementary technical devices:

1. Digital Cartography,
2. Total stations equipped with automatic recorders,
3. Global Positioning Systems.

Digital cartography has allowed us to record with no constraints, on different layers and scales not only the position, type, and layout of each site referenced on the digitised 1:100.000 and 1:10.000 base maps, but also all the objects for a chronological and functional characterisation. The total stations made possible the rapid registration of thousand of points that at the end of each day were converted by model building software into the most detailed contour and distribution maps that made possible an almost immediate processing of all the data. Mounds and low-lying sites were mapped with contour lines spaced only 5-10 cm apart. The level of detail allowed for such a high definition of slope variations, that it was often possible to identify within

the mound large buried volumes, such as towers or brick platforms. The best example of this type of slope definition is represented by the shallow mound of Aravalli depe, where the map shows the buried complex of a towered building (fig. 3). The available software packages made it possible to zoom from the 1:100.000 base map down to the smallest scales to visualise the individual sites or portions of them also in 3D wire-frame model. Since these packages build the surface model from randomly selected points, all objects of interest for functional or chronological subdivision of the site, were numbered as spots and pinpointed with total station before collection. They have entered the digital map as indicators subdivided by layers. Thus it has been possible within the same procedure to interpolate two different types of settlement patterning: the dimensional ranking and the functional sectorial breakdown. The survey of Takhirbai 1 identified an Early Iron Age manufacturing area for lapis lazuli and turquoise beads (see Vidale in this volume). The distribution of craft indicators in other sites is currently under study.

The acquisition process was controlled at all stages, because conflicting or incoherent evidence could be re-checked on the ground from the next day onwards. At the end the Map has became an interactive product, generated day after day on computer screens and printouts, incorporating all kinds of interventions with the direct participation of all the specialists in the team.

The third technical device that has greatly facilitated the tackling of the complexity of the surveying an alluvial plain of some 20.000 km^2, has been the GPS, introduced in 1992 and extensively used to mark the position of sites across the northern reaches of the delta.

For each site several (from 10 to more than 100 according to size) GPS fixes were taken by walking along its perimeter and marking all evident corner points along the breaking line of artefacts' primary distribution or along the edges of overlapping elements, mostly accumulations of aeolian sand. For complex sites each individual component was measured separately singling out the individual parts as individual sites using the total station.

From a methodological viewpoint it is interesting to observe that by introducing a factor of randomness the GPS in reality created a positive compromise in the approximation of the site limits. We may state that quite reasonably the real limit of the original site will fall within a 30-m wide band along that line. At an analytical level, in further elaboration of the work, we believe it will be appropriate to calculate both the perimeter and the surfaces of each site as ranging between the extremes of the band. The 30-m wide band imposed by GPS selective availability, certainly includes the possible options for site boundaries as expressed by the falling values for artefacts' density. In oversimplified words we may say that the line designed from the GPS fixes "can not be wrong" or that it is consistently wrong ... Somehow this limitation provides a solution for the question of the arbitrary measurements that might jeopardise the dimensional ranking of sites.

In general, we followed the rule that the contour of sites corresponds to the broken line connecting points of sharp diminishment in artefacts density. Ground observations were oversimplified then as follows:

1. Mounds and elevated sites > 2 m were contoured at their bases;
2. Artefacts' spreads were contoured where density values dropped significantly or along the edges of disturbing features (e.g. sand dunes, ditches and canals).

We have observed an average 20% degree of non-coincidence between the densities of artefacts recorded by the walking transects and the arbitrary limits drawn from the site survey. A symptomatic phenomenon, somehow connected to the arbitrary definition of limits, has been the "expansion" of the sites every time they were examined with greater attention. These constraints do not necessarily reduce the value of the information load contained in the map. However, it ought to be stressed that we do not provide "exact measures of sites", but to comparable "estimates of dimensions" in order to establish a coherent system of relative evaluations.

The "central point" of each site, indispensable to place it as a dot on larger scale maps, was not measured in the field, where it would have been selected very subjectively. Instead it was derived directly on the computer screen as the gravity centre of the polygonal connecting all GPS points.

Criteria of Classification and Field Methods

Sites were described by considering only three attributes: shape, elevation and the relative density of surface artefacts. Not accidentally our classification closely recalls the one devised by S.P. Tolstov more than fifty years ago for his seminal work of the Khwarezm survey (e.g. 1948: 25-36). Formative factors of site morphology, like deposition processes and post-deposition factors of disturbance, were taken into account only for a limited number of sites with the primary aim of developing a future classification primarily based on geo-morphologic variability. We should consider in fact that at its earliest stage the approach has been somewhat opportunistic, leaving aside the definition of a more rigid typological grid. The systematic classification will have to be developed as a result of the exploration work, after the completion of the preliminary framework presented in this volume.

Four main types of sites have been defined to allow a more immediate perception:

1. Tepe

As in all arid regions, they represent the most conspicuous type of site, elevated over the plain against

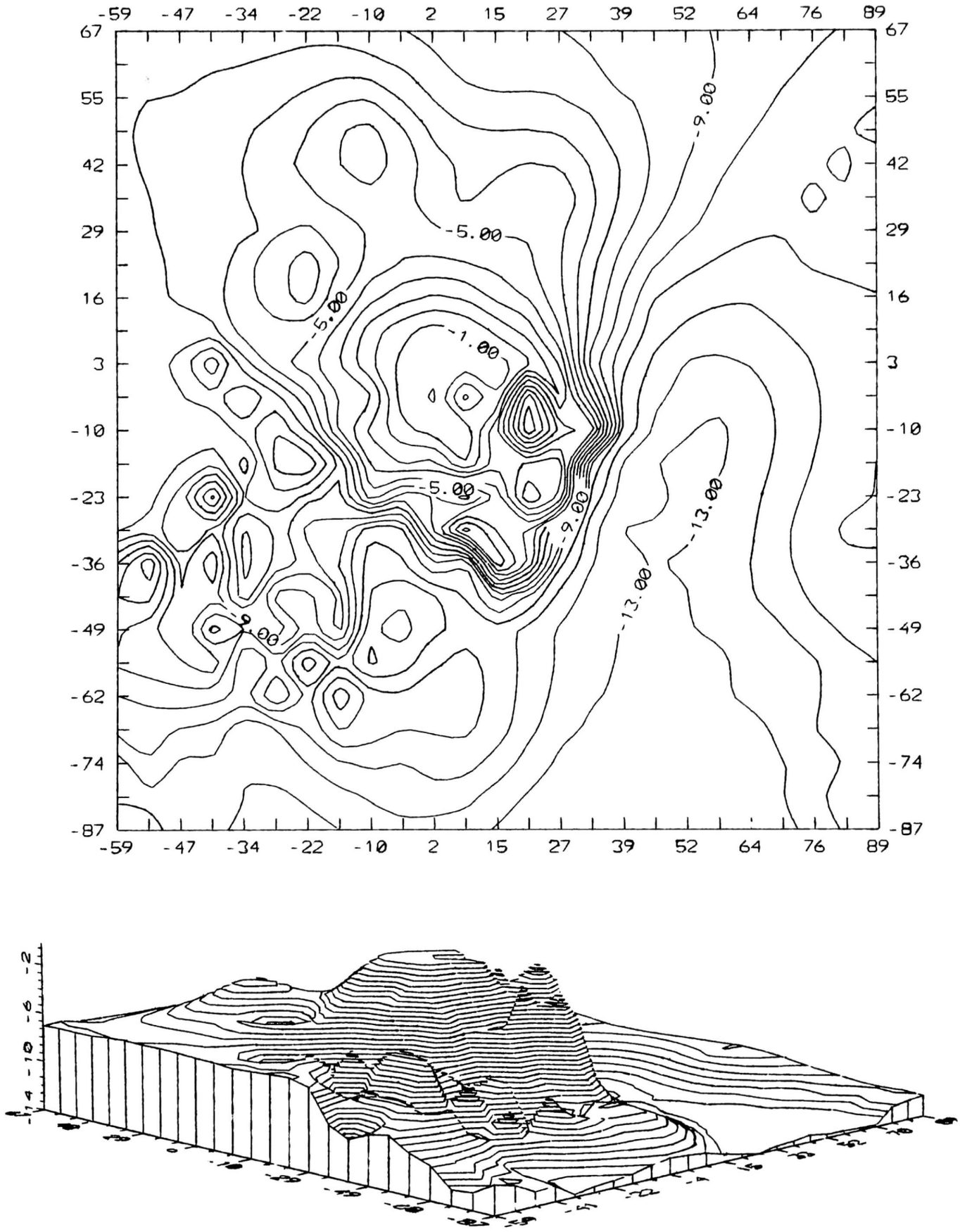

Fig. 3 - Plan of Aravalli Tepe.

the skyline. In Bronze and Iron Age Margiana they appear to have been made by solid volumes of buried structures, more resistant to erosion, usually corresponding to platforms built to elevate ceremonial and administrative buildings above the settlement. Tepes represent also a long-term occupation made by superimposed phases of building activities. For any future analytical evaluation of the settlement pattern, like rank-size ordering, Tepes might be treated with relative confidence as central places containing ceremonial buildings, military activities and specialised productions. According to their morphology Tepes have been further distinguished in two morphological variants: *steep-sided tepes* (Tepe 1) and *shallow mounds* (Tepe 2). Tepe 1 are the most prominent and compact sites in the region. They owe their good state of preservation to solid platforms build above the alluvial plain. The sharp corners of buried structures have often been distinguished through detailed contouring (e.g. site 257). *Shallow mounds* derive most likely from higher erosion determined by modern ploughing and other soil disturbance activities.

2. Elevated Depositional Area (EDA)

EDAs are remains of sites characterised by a very high density of surface materials over slightly elevated (<1 m) sediments, most frequently build up by the mudbricks of decayed structures. EDAs are usually single-period settlements, as opposed of the multi-layered formation of tepes. Individual structures have been rarely identified from ground observation, but it is expected that they can be distinguished from low-altitude observation, as was the case.

3. Low-Lying Depositional Area (LLDA)

LLDA represent the most frequent type of sites in Margiana, but they are also the most problematic to define. LLDAs are flat open areas of uneven artefacts' clustering spreading over silt or sand surfaces, usually containing sections of higher density due to different structural or post-depositional factors. The definition of their limits has been the most difficult and hence the most subjective one.

4. Scatter

It is an isolate area of artefacts' clustering that has been divided in *high-density* and *low-density*. Anyway, since no quantitative criteria have yet been established, this division is still subjective and has been used very little in the present report. The most significant scatter in our survey are the remains of nomadic campsites identified by the sherds of Incised Coarse Ware (ICW), related to the Andronovo tradition of the Eurasian steppes. These sites have been mostly located on sand, surrounding the settlement mounds in the central portion of the survey area, between Togolok and Takhirbaj (see Cerasetti in this volume).

The spaces among sites have been the object of specific investigations initiated in 1993 with the assistance of Serge Cleuziou from the UPR 9032 of the *Centre de Recherche Archeologique* of the French CNRS. The method used was largely derived from T.J Wilkinson walking transects (Wilkinson 1982; 1994). Counts of potsherds per standard units of space in reference to distance and ground morphology allow a coherent classification of the areas in-between in terms of land-use intensity. The first transects have been run by Cleuziou during 1993 in three different sectors of the Murghab delta: the border between the Bronze Age oasis of Togolok and the Iron Age oases to the south; the desert siteless space to the east of the delta connecting with the line of fortresses; an area within the Yaz III agricultural core in the Iron Age.

In all three case the method proved very effective in detecting land-use patterns superimposing through time. In 1995-96 it was also used to validate the hypothesis put forward by M. Cremaschi in his contribution for this volume, that at least till the beginning of the third millennium BC a continuous alluvial plain extended across the delta as far north as the Egri Bogaz cluster of sites. The size and distribution of the Early Bronze Age sites conforms to the rules of the Von Thiessen exagons as evidenced by the test presented by S. Salvatori in this volume. The even distribution of Bronze Age sites in a regular pattern through the whole plain confirms its extensive cultivation. Oases seems to be a later development emerging along the main branches of the delta during the second millennium BC as the sands advanced from the north against the retreating water flows. From 1500 BC and certainly in the Iron Age times oases became the main features of the landscape across Margiana: clusters of settlements surrounded by fields, orchards interspersed with specialised areas for manufacturing and food processing dominated by one or more ceremonial complexes on raised platforms. Their distribution is no more responding to a regular spacing across the territory, but is determined by water flows and irrigation works arranged in close boundless along the main canals: the "site complexes" are the characteristic configuration during the Yaz I-III long period of time. Their internal organisation has not always been easy to define. Mainly for the difficulty to establish the "empty" spaces versus the "full" areas, in 1993-94 A. Bader, V. Gaibov, B. Genito, and M. Erdosy have invested a relevant amount of time and energy in devising the way to distinguish the different sectors of each compound. Careful mapping and systematic sampling have been confirmed as the correct approach. This time there was no smart way for a shortcut and the most traditional type of work has remained the best rewarding option.

With the advancement of the desert sands during the second millennium BC, animal herding was intensified as a positive alternative for the economy of Margiana. Countless small campsites identified by scatters of Incised Coarse Ware (ICW) of the Andronovo tradition have been found around all Bronze age sites. Often their are related to little more than a handful of sherds

scattered in the sand. The work of M. Cattani, A. Bader and B. Udeomuradov around Takhirbaj is being directed to a more careful study of this particular problem.

We expect that further work on the Archaeological Map of the Murghab Delta might ultimately allow a better understanding of the relationships between nomads and farmers during the second millennium BC, before the outbreak of the conflicts emerging into history with the Cymmerian invasion of the 8th century BC. The distribution of those tiny campsites across Margiana around 1500 BC supports the idea that in the beginning the relations between the stock-breeding nomads and the settled farmers were not conflictual but based on the integration for a mutual advantage of two diverging evolutionary pathways dating back to post-Pleistocene adaptive strategies. Here is one of the greatest expectations for future research in the Murghab Delta and Turkmenistan in general. Across the open flatness of the Karakum desert runs the east-west fault line between the northernmost reaches of the Near Eastern farming traditions, locally represented by the Djeitun culture of the 6th millennium BC (Masson 1971) and the southernmost ones of the steppe adaptations by the Eurasian pastoralists, recognised by S.P. Tol'stov in the Kel'teminar technocomplex (Vinogradov 1957; 1960). The straight distance between the furthermost sites of either tradition, as they are known at present, is less than two hundred kilometres. Most certainly this distance will be further reduced by the too long deferred exploration of the Unguz watercourses and other parts of Central Karakum. We may expect that during Middle Holocene times contacts and exchanges between these two most diverging adaptive strategies were consistently influential to both sides. The recent publication of Chalcolithic Sarazm in the Upper Zeravshan provides clear indications in this direction with the discovery of steppe ceramics and burial practices in periods I and II, in the midst of a 4th millennium BC agricultural centre (Isakov 1991: 76-83; table I, no. 182; table X, no. 1).

The archaeological evidence uncovered by the survey of Late Bronze Age and Early Iron Age sites in Margiana has indicated that during the second millennium BC diminishing returns from intensive irrigation agriculture moved the economy of the region towards increasing investments in stock-breeding, negotiating new land deeds with the specialists from the north. The time of war, empires and confrontation of the longest conflict in human history, between the steppe and the sown across Eurasia, had still to come. Once more the progress of historical research brings to light the fact that no war was ever necessary. Alternative political options were always present. We hope that our joint work across the Murghab Delta may disclose new perspectives for research in the near future. It is time to obsolete also for the study of the Eurasian steppes the surviving assumption that environment, climate or Nature determine human decisions.

References

Andrianov B.V. (1969) *Drevneye orositel'nye sistemy Priaral'ya*. Moskva.

Forte, M., Mozzi P. and Zocchi, M. (in press). The Archaeological Map of Southern Sistan. A Preliminary Geo-archaeological Analysis from Satellite Imageries. M. Taddei (ed.), *South Asian Archaeology 1997*. IsIAO: Rome.

Isakov A.I. (1991) *Sarazm. K voprosu stanovleniya rannezemledel'cheskoj kul'tury Zeravshanskoj doliny. Raskopki 1977-1983 gg*. Donish: Dushambe.

Jux U. and Kempf K.E. (1983) Regional Geology of Sistan (Southwest Afghanistan). M. Tosi (ed.), *Prehistoric Sistan 1*. IsMEO: Rome, pp. 5-60.

Masson V.M. (1956) *Drevnezemledel'cheskaya kultura Margiany* (MIA SSSR no. 73). Moskva.

Masson V.M. (1971) *Poselenie Dzhejtun (Problema stanovleniya proisvuodyashchej ekonomiki)* (MIA SSSR no. 180). Nauka: Leningrad.

Meder O. (1979) Klimaökologie und Siedlungsgang auf dem Hochland von Iran in vor- und frühgeschichtlichen Zeit. *Marburger Geographische Schriften*, 80. Marburg/Lahn

Tolstov S.P. (1948) *Po sledam drenekhorezmijskoj tsivilizatsii*. Nauka: Moskva-Leningrad.

Trudy YuTAKE (1960) *Trudy Yuzhno-Turkmenistanskoj Arkheologicheskoj Kompleksnoj Ekspeditsii* X. Ashkhabad.

Vinogradov A.V. (1957) Kvoprosu o yuzhnyh svyazyakh Kel'teminarskoj kul'tury. *Sovetskaya Etnografiya*, 1, pp. 25-45.

Vinogradov A.V. (1960) Novye neoliticheskie nakhodki Khorezmskoj Ekspeditsii AN SSSR 1957 g. S. P. Tolstov and M.A. Itina (eds.), *Polevye Issledovanija Khorezmskoj Expeditsii 1957 godu* (MKhE 4). Moskva, pp. 63-81.

Wilkinson T.J. (1982) The Definition of Ancient Manured Zones by Means of Extensive Sherd-Sampling Techniques. *Journal of Field Archaeology*, 9, pp. 323-333.

Wilkinson T.J. (1994) The Structure and Dynamics of Dry-Farming States in Upper Mesopotamia. *Current Anthropology*, 35, pp. 483-520.

OUTLINE OF RECENT GEOLOGICAL HISTORY OF THE KOPET-DAGH MOUNTAINS AND THE SOUTHERN KARA-KUM

by B. MARCOLONGO AND P. MOZZI

1. INTRODUCTION

This study has been developed in the ambit of the scientific collaboration, started in 1989, between the Institute of Applied Geology – C.N.R. on the one hand and Is.M.E.O. and Institute of Archaeology of the USSR Academy of Sciences on the other hand, concerning a geomorphological and geo-archaeological reconstruction of the late Holocene history of the proluvial plain and inner deltas, bordering the South-eastern Kopet-Dagh range in Turkmenistan.

This is fundamentally leading back to the need of going further into man/environment relationships in areas of dense, long-lasting human occupation such as the Merv oasis and the Kopet-Dagh valleys along the piedmont plain.

The dynamics of the main geomorphological processes generally active in southern Turkmenistan have in fact been up to now so high, that it has always deeply affected the settlement distribution, as much as controlled the possibility of archaeological recovery. Of similar, if not greater, importance has moreover been water availability, essential in a zone characterized in the past and today by dry climatic conditions.

The integrated use of various remote sensing images taken from space and air platforms, has proved to be particularly valid in this research; in fact their interpretation allows correlation and expansion over wider areas of the field observations and surveys. In detail LANDSAT MSS, SPOT, SOYUZ and aerial photos have been elaborated and analyzed, being complementary each other under the multispectral and multitemporal viewpoint and having an increasing geometrical resolution. In the case study of the Sumbar valley, for example, the physiographic observation carried out are mostly based on SOYUZ KFA 1000 satellite image elaboration and interpretation.

2. THE REGIONAL GEOLOGICAL SETTING

The area included in the geomorphological map on the scale of 1:1.000.000 consists of a wide plain ("Turcoman plain") surrounded to SW by the mountain range of Kopet-Dagh, to the S by the North-western fringes of the Hindu-Kush range, to the E by the Amu-darya river and to the N by the plateau areas of the central Kara-Kum desert. The endoreic deltas of the Murghab and Tedzhen rivers prograde in the plain.

The morphostructural situation of the region, with two high areas enclosing a lower one, is strictly linked with the recent geological history.

Southern Turkmenistan lies at the edge of two litospheric plates: the Turan plate in the North and the Persian Plate in the South.

The existence of the highly folded Turkmen-Khorasan system, a segment of the Alpine-Himalayan orogenic belt, is due to compressive inter-plate stresses. Also the terrains pertaining to the Turan plate are folded (Central Kara-Kum anticline, Tuarkyrsk anticline, Kemalsk anticline), but to a much lower degree.

The plicative systems are associated to fault systems mainly NW-SE and NE-SW. The directions of most valleys in the mountainous regions are deeply influenced by this network, and presumably also the Murghab and Tedzhen rivers follow NW-SE orientated fractures. The Amu-darya follows, in this segment, a negative structure called "Khiva" (Kozlov 1991).

Neotectonic evidences such as fault-line scarps, counter slopes and antecedent valleys are recognizable on LANDSAT images in the "prealpine" area of the Kopet-Dagh chain. The outcropping of neogenic sediments at the southern edge of the alluvial plain (indicated as patches of "palaeo-plain" in the Geomorphological map 1:1.000.000) also suggests the existence of Quaternary tectonics: non-depositional and/or erosional phenomena in an area otherwise characterized by high alluvial sedimentation rates throughout the whole Quaternary, give evidence of post-Neogene uplifting.

The Murghab delta, with a westward shifting in its hydrography showed by late Quaternary geomorphological features, seems to be part of a tilted fault block with an eastern rising side and dipping towards the presumably subsiding area between Kopet-Dagh and the central Kara-Kum plateau, called "Turcoman trough" (see Fig. 1). The eastern limit of this block, called "Amu-darya" (Kozlov 1991), is presumably coinciding with the western side of the Khiva depression followed by the Amu-darya. The existence of two relict holocene westward diversions of this river, one just South of Chardzhou (corresponding to

a negative structure) and a more upstream one near Kerki, is consistent with a neotectonic relative uplifting of the eastern block. This motion, together with subsidence of the Khiva depression, could have cut the intake of these palaeochannels, preventing runoff in this direction. (see below for further details).

From the structural point of view it is thus possible to recognize the following large scale unities:

- two uplifted and probably uplifting areas (Turkmen-Khorasan system, Turan plate);
- an area of subsidence probably working as the fore-deep of the Turkmen-Khorasan system ("Turcoman trough"). A similar situation of tectonic subsidence has been recognized further West in the southern portion of the Caspian Sea (Degens and Paluska 1979). The easternmost part of this belt, locally called "Amu-darya" tectonic block, is tilted in a West direction.

Owing to the important climatic changes occured during the whole Quaternary, the Caspian Sea was interested by several transgressive and regressive events.

The study area was partly submerged during the Akçagyl transgression at the Pliocene-Quaternary boundary, when the Aral Sea, the Caspian Sea and the Black Sea formed one, shallow water basin.

During the Khvalyn transgression, corresponding to the Würm glacial maximum, a continuous polar ice-sheet prevented the flow of fluvial waters to the North. This situation led to the creation of a series of pro-glacial lakes in the Sub-arctic Siberian regions, whose waters runned "in cascade" to the Aral Sea through the Turgai Channel; from there they flowed to the Caspian Sea through the Uzboi Channel and, finally, to the Black Sea through the Manych Channel (Ehlers 1971; Grosswald 1980; Varushchenko 1980).

The Khvalyn transgression of the Caspian did not directly interest the study area, covering the most North-western part of the "Turcoman plain", even when the maximum height of 48 m above sea level was reached.

3. Palaeohydrographic Setting in the Turcoman Plain

The analysis of LANDSAT images showed the existence of a palaeohydrographic setting markedly different from the present one.

There are two main ancient flow directions still detectable:

- the palaeochannels related to the Amu-darya
- the "Uzboi Channel"

3.1 Amu-darya Palaeochannels

They run in an approximately E-W general direction.

At the northern edge of the "Turcoman plain" a more or less continuous palaeoriver bed, partially embedded in fluvial terraces, skirts the feet of central Kara-Kum plateau. The diverting of Amu-darya could have taken place just South of Chardzhou, where there are traces of a palaeochannel diverging from the present river-bed in a north-westernly direction.

West of Chardzhou, in a position intersecting the prolongations of the above spoken palaeoriver beds, lies a wide area characterized by fine-grained sediments (silt and clay). Probably it's the relict bed of a dried-up lake.

In this context the fact that no traces of palaeo-channels are detectable in the area means that the lake is likely coeval to the period of activity of this Amu-darya diversion. This would mean that the river whose traces run from the Amu-darya present course acted as a tributary and the other as an emissary flowing to the Caspian sea.

The apparent lack of *sabkhas* on the bed of the dried-up lake could be due to the difficulty of recognizing evaporitic deposits whose reflectance on satellite images is close in range to the one of clay and silt; this could be exalted by the existence of an omogeneous, wide evaporitic layer with vanishing contours, which gives less contrast than the little *sabkha* basins found elsewhere in the region. An alternative and more probable hypothesis could be the low salt content of the Amu-darya waters, pertaining to a basin mainly dissected in crystalline rock outcrops (crystalline basement of the orogenic belt), if compared to the runoff from the sedimentary cover, locally gipsum, of the folded systems of Khorasan and of Turan plate. Nevertheless, ground surveys with sampling and accurate analysis may be required before fully understanding the nature of this geolithologic and geomorphologic feature.

On the south-eastern corner of the geomorphological map at the scale 1:1.000.000, South of Kerki, is visible another palaeoriver bed branching off in a WNW direction from the Amu-darya active alluvial plain.

This ancient downflow direction, spotted with *sabkhas* and wet areas, could either continue North-westward or more decisely westward. That is, it could have acted as a tributary of the dried-up lake, or run tangentially to the alluvial deltas of Murghab and Tedzhen. In both cases, it is possible that Murghab, possibly flowing more to the East than nowadays, was an affluent of this "palaeo-Amu-darya".

Unfortunately, portions of the plain between the Amu-darya and the Murghab delta are covered by active eolian sand dunes which mask the underlying previous morphology, thus hindering the recognition of the palaeohydrographic features.

3.2 Uzboi Channel

The "Uzboi Channel" lies in the North-eastern corner of the geomorphological map at the scale 1:1.000.000. Its direction here changes abruptly from NE-SW to E-W, evidently following the foot of the escarpment of the Ust'-Yurt-Uarkir elevation.

On the LANDSAT images the channel appears with water in its bed, probably artificially diverted here for irrigation purposes.

In fact, the Uzboi is a dry channel running from the depression of the Sarykamysh lake, SW of the Aral Sea, down to the Caspian Sea. During the Khvalyn transgression it acted as a connection between the Aral and Caspian basins; in more recent times a network of canals linked Amu-darya with Sarykamysh lake and, owing to the lower height of the water divide between this depression and the Caspian basin in respect to the one with the Aral basin, to the Uzboi. The last flood bringing waters of the Amu-darya in the Sarykamysh lake (without reaching the Uzboi) took place in 1878 (E. Reclus in R.W. Pumpelly 1908), with an esteemed discharge of 31,500 cubic feet per second.

According to Andrianov (1955, 1969), the Amu-darya North of Turtkul in the early Khvalyn time (75.000-30.000 BP) flowed towards the lowlands between Bel'tau and Kyzyl-Kum, forming first the Khoresm and after the Akcha-darya deltas; later on, in the late Khvalyn time (25.000-15.000 BP) it shifted westward overflooding the Sarykamysh depression and thus forming its third prehistoric delta. During the whole II millennium BC the Amu-darya took again its former flow directions (Khoresm-Akcha).

On the other hand geographers of classic times such as Ptolemy, Strabo, Pliny and of the islamic period such as Edrisi, gave informations about more recent changes in the lowermost course of Amu-darya.

According to their reports, the stretch downstream of Turtkul shifted several times from the Aral to the Caspian basin. The given cronology is:

- Classic age: the river flows to the Caspian
- Medieval-Islamic age: the river flows to the Aral
- XIV century AD: the river flows to the Caspian
- middle XVI century AD: the river flows to the Aral, as it does nowadays (after Pumpelly and E. Reclus in R.W. Pumpelly 1908).

These historical sources somehow match with the palaeohydrographic reconstruction discussed above.

Actually, the palaeoriver beds diverging from Amu-darya 30 km South of Kerki and 25 km South of Chardzhou, showed in the geomorphological map of the Murghab's delta (scale 1:1.000.000), are suitable for being a downflow of the river towards the Caspian. On its western portion this flow followed the Uzboi until reaching the Caspian sea, where a well preserved cuspidate delta is recognizable.

It seems probable that the flow of the Amu-darya to the Caspian, dating back to post-glacial times, was inhibited by neotectonic uplifting of the areas just West of its present course.

After the end of the Würm glaciation there are no data about the periods of activity of the "Uzboi Channel". Neolithic sites located on its left bank just North of the "great bend" (see geomorphological map 1:1.000.000) suggest the presence of running water or groundwater, while the apparent absence of later settlements could be a proof for the complete desertification of the area. Worth of note in this context is the fact that the hypothetical junction with the historically active "palaeo-Amu-darya", which can be located approximately in the correspondence with the bend of the Uzboi, is downstream in respect to the site.

In the whole, it seems probable that the tract of the Uzboi between the Sarykamish lake and the "great bend" was inactive in historic times, while the last part down to the mouth of the channel was utilized by water coming from the Amu Darya.

4. Water Availability and Archaeological Sites Distribution in Southern Turkmenistan

The southern and central portions of "Middle Asia" are hardly reached by the humid air masses coming from the Mediterranean and Atlantic sea, due to the long distance and to the presence of high mountain ranges. On the other hand, because of the geography of their drainage basins, the flows of Murghab and Tedzhen rivers depends on precipitations both on Khorasan and Afghanistan, the latter being related with western extensions of the Indian monsoon.

Brentjes (1988) proposes a regional atmospheric circulation scheme in which rains falling on the Kopet-Dagh area (400 mm/yr) or on southern Turkmenistan (200 mm/yr) mainly originate from the evaporation of the Caspian Sea, with a monsoon-like mechanism. In this view, higher evaporation rates of Caspian water during a warm period would imply more rains in the interior. As most of the rivers coming from the Kopet-Dagh range dry up before reaching the Caspian Sea loosing water in evapotraspiration and infiltration in the underground, if this high temperature situation lasts long enough a sea regression will start taking palce.

Available data coming from palinological analysis and from studies on the evolution of Caspian shorelines seem to fit quite well with this model, showing a relation between warmer periods, lowering of the Caspian sea level (recorded both from a geologic and an historic point of view) and increasing rains on the mountains and piedmont areas of southern Turkmenistan (see Fig. 2).

Whatever the origin of the rain, due to the prevalent semi-aridity of the region the distribution of settlements of all ages, spanning from Neolithic to Medieval times, appears to be strictly correlated with the availability of water.

This is the location of the active and relict "wet" areas:

- Kopet-Dagh piedmont areas and valleys; also nowadays rains are mainly concentrated in the mountainous areas of Turkmenistan and they permit the existence of streams which flow through the piedmont area. Here they end, mainly because of the high evaporation rates, sometimes forming little endoreic deltas (see also chapter 7 and 6);
- Delta oasis. The Murghab (chapter 7) and Tedzhen rivers form two wide endoreic deltas prograding in the tectonic depression. As said before, water of these two rivers comes partly from precipitations in the Khorasan, partly from precipitations in the Hindu-Kush area;
- Amu-darya alluvial plains and palaeo-hydrographical network. The Amu-darya river rely mainly

upon glacier melting waters coming from the Hindu-Kush and Himalayan ranges. Connected to this river are the palaeocourses formerly flowing in an approximately East-West direction, and the traces of what probably is an ancient lake. In the north-western corner of the study area lies the Uzboi Channel (see also before) which here bends decidedly from a North-South to a ENE-WSW direction.

The distribution of the archaeological sites is the following:

- Neolithic (VI-V Mill. BC); the sites of this age are mainly concentrated in the piedmont area and nearby the Uzboi Channel and Amu-darya. Worth of note are two sites located on a strip of what has been interpreted as a palaeo-plain, on the right side of the Tedzhen river.
- Chalcolithic (IV Mill. BC); the sites of this age are mainly concentrated in the montains, in the piedmont area and in two delta areas of the Tedzhen river (the southernmost has been interpreted as a "crevasse splay").
- Bronze Age (III-II Mill. BC) and Iron Age (X-VI century BC); the sites are located in the Kopet-Dagh range (see chapter 7), in the piedmont area and in the central and outer (North-eastern) portion of the Murghab delta oasis; it is possible that during this period Amu-darya run near the northern edge of Murghab delta, probably this last river being its tributary. The juction area should be North of the Bronze Age site of Gonur.
- Late Iron Age (so called Achaemenid: VI-III cent. BC), Antique (III cent. BC-VI cent. AD), early Medieval Age (VI-X cent. AD); the remains of these more recent stages of human occupation are located in the core of the Murghab delta oasis and in the Kopet-Dagh range and piedmont area.

The Kopet-Dagh range and the piedmont area have been constantly inhabited since neolithic times. This shows that meteoric and fluvial waters were, even if in different degrees, always available during Holocene climatic fluctuations.

On the contrary, the Uzboi channel areas show evidence only of a neolithic occupation, thus suggesting that this palaeo-hydrographical feature inherited by the Würm glacial times existed just up to the Atlantic period (8.000-6.000 years BP).

The same happens in the southern border of the study area, where neotectonic activity may have gradually changed the hydrogeological setting and, consequently, the water supply.

The Chalcolithic settlements in the "little Tedzhen delta" probably marks a period of activity of this branch of the river, then followed by a diversion of the waters towards its present downflow direction. This recent westward shifting tendency is similar to the one recognized for Murghab (see chapter 7), supporting the hypothesis of a regional tilting.

The delta of the Murghab presumably existed throughout the whole Holocene. The apparent relatively late peopling of this oasis, which started just in the Bronze Age, may reflect increasing technological skills and a more complex social system rather than a change in the hydrography of the river. On the other hand, the activity of the river itself could have led to the burial of older archaeological remains.

Within the Murghab delta there is an apparent drawing back towards the center of the oasis of the latest settlements in respect to the easternmost, earliest ones. The decay in water availabilty in the peripherical areas of the deltaic system, followed by the advance of eolian sand dunes, seems related to the shifting of the whole Murghab delta runoff in a south-western direction; nevertheless, on the long term tectonic trend some minor wet/dry climatic cryses are recorded (see chapter 7).

The lack of known archaeological sites in the main Tedzhen delta and nearby the E-W Amu-darya palaeo-channels, areas whose (palaeo-) environmental characteristics were favourable to human settlements, is probably due to the lack of a proper archaeological survey. They can thus be pointed out as ground for possible future researches.

5. The Physiographic Context of Bronze Age Sites in the Sumbar Valley (Kopet-Dagh Range)

The Sumbar river, flowing westward from the Kopet-Dagh range down to the Caspian Sea, has long been an element of attraction and support to human settlement, as witnessed by the abundance of archaeological sites referable to the Late Bronze Age (Khlopin 1986) found along its course.

The study area covers the middle portion of the drainage basin of Sumbar river, consisting in large valleys surrounded by 1000-2000 m high peaks, and was visited by the authors during a field trip in 1992.

In order to get a first, preliminary idea of the physiographic context in which to insert the archaeological evidence nearby the oasis of Kara-Kala, a spectrozonal cosmic photo SOYUZ KFA 1000, with two bands 0.58-0.68 and 0.68-0.81 micron, was acquired; the satellite image was scanned with a 600 dpi scanner so as to maintain its original 1.8 m linear geometric resolution.

As this area is near the Turkmenistan – Iran border, no kind of topographic map is available: SOYUZ image not only acted as a thematic data source for the interpretation of the geomorphological and geostructural setting, but also as a cartographic support.

The original document was a 100.000 enlarged false colours print and only through its digitalization was it possible to "extract" again the two bands; the scanner in fact can recognize the Red, Green and Blue percentages for each pixel and gives three new bands as output. Although it introduces a fictious Blue band, the other two can be regareded as corresponding to the original SOYUZ spectral intervals. The "R" band (0.68-0.81 micron) enhances the valley areas with wetter soils (Fig. 3), while in the "G" one (0.58-0.68 micron) the textures and patterns of the land surface are much more evident (Fig. 4).

Several elaborations were undertaken at the C.N.R. Institute of Applied Geology in Padua.

In order to study the network of fractures and faults, a NW directional filter (Emboss filter) was purposely made, oriented in a way that it would intercept the tectonic structures with an approximately 90° angle (Fig. 5).

With this filtering, all the linear elements having some angle with the filter direction assume a relief-like fashion. In this way both the gardens-and-canals Kara-Kala mosaic pattern and the Late Bronze Parkhai-depe are exalted. The latter is clearly recognizable in the 1:50,000 filter enlargement (Fig. 6), thanks to its considerable dimensions. On the contrary the Sumbar necropolis, located on the loess ridge of a tributary valley just South of Kara-Kala, does not have a conspicuous evidence in the filtered image. Its localization is based on ground survey.

An "R" and "G" band composite image, with the overlap of the respective reflectivities, was then made so as to detect the main lithologies outcropping in the area and the kind of land use. The legend of the small scale elaboration is exclusively based on reflectance values, displayed in false colours. This has only an indicative meaning, being impossible to identify univocal attributes for each of objects. For example, the very low values which characterize wet areas, expressed with dark blue, is common also to the carried shadows on the valley sides, as much as the light violet tones are typical both of the irrigated areas and the limestone outcrops. It is thus essential to integrate the automatic evaluation of the surface spectral characteristics with the analysis of texture and forms. In this regard, using a grey scale display palette instead of a false colours one can be of great help.

In order to somehow overcome this problem, in the enlargement of the composition (Fig. 7) we worked out a legend which took into account also the textural aspects, literally sampling reference areas and putting them in the legend boxes.

As a conclusion, it was possible to identify:
- limestone, from massive to well stratified;
- flysch-like deposits;
- alluvial deposits, East of Kara-Kala;
- loess deposits, at the bottom of Sumbar valley.

From a geostructural point of view, the whole area is folded in a wide syncline, with "flysch" at the core, displaced by NE-SW faults. The faults show some evidence of neotectonic activity, as they seem to cut the aeolian and alluvial Quaternary deposits.

Reagarding the palaeoenvironmental aspects, it seems very likely that the two meander-shaped wet areas, one corresponding to the oasis itself and the other nearby Parkhai-depe, are ancient Sumbar palaeoriver beds.

The location of the sites is obviously related in general terms to the Sumbar river. Nevertheless, the presence of vegetation upstream in respect to the Sumbar necropolis, shows the availability of groundwater and runoff water also in this minor tributary valley.

There seems also to be a strict relation between archaeological sites and loess outcrops, possibly the latter providing the best soils available for agriculture.

6. Holocene Geomorphological Evolution of the Eastern Kopet-Dagh Piedmont Plain: a Preliminary Geo-Archaeological Perspective

The area taken in consideration is roughly bounded on the North by the Kara-Kum Canal and on the South-Southwest by the mountain range of Kopet-Dagh, thus being a segment of the piedmont belt which runs across all southern Turkmenistan from the Caspian sea shore to the Afghanistan border. It corresponds to the Meana and Chaacha rivers district. On the East, we extended satellite image interpretation as far as the Serakhs delta, because there are strong evidences for that being the intake location of an ancient artificial canal which is one of the most outstanding archaeological features of the region.

In order to get a synoptic view of the whole area we used Landsat MSS satellite images, selecting the spectral bands more useful for a geomorphological – palaeoenvironmental analysis (bands 4, 6, 7). More detailed information came from the elaboration and interpretation of Soyuz cosmic photos at the scale 1:100.000, characterized by high geometric accuracy.

The creation of a Digital Elevation Model based on 1:200.000 scale cartography allowed us to make a contextual interpretation based on both remote sensing and terrain morphology.

This was a great support to the sedimentological, geomorphological and geoarchaeological data gathered during the September-October 1994 survey carried out in the key area of the Meana and Chaacha river alluvial fans.

Future field work will be concentrated on disentangling the relationships between natural and artificial hydrography, and in general between ancient settlements and palaeoenvironmental evolution, both in the Southeast (Serakhs and Geoksyur) and in the Northwest.

6.1 The Alluvial Fans in the Geomorphological Context

From the tectonic point of view, the mountain range of Kopet-Dagh is part of the so called Turkmen-Khorasan plicative system, an uplifting orogenetic area characterized by active faulting and warping of Mesozoic, Palaeogenic and Neogenic rocks. On the contrary, the plain lying in the north is the morphological counterpart of a subsiding basin (named Turcoman Trough), mainly filled with the alluvial deposits of major rivers coming from Hindu-Kush and its westernmost fringes such as Amu-darya, Murghab and Tedzhen. This basin, segmented in several tectonic blocks, is affected by a regional tilting with a North-western dip. In the Murghab and Tedzhen delta, such an

active movement led to a shifting of the main drainage pattern from East to West (see also chapter 2.0).

The limit of the mountain area is very sharp and linear, marked by a fault-line scarp sometimes modelled in large polygonal facets. This shows that some portion of the chain, such as the one which backs the study area, is still uplifting with neotectonic movements.

The piedmont belt represents the transition between these two tectonic domains. It is characterized by an apron ("bayada") of coalescent alluvial fans with apex located at the opening of the valleys. The streams that built these fans come from the Kopet-Dagh, and they are of ephemeral nature with strong seasonal discharge variations. That is, they carry very little or no water at all in summer time, while during the rainy seasons of spring and especially autumn they can reach relatively high flow peaks.

The natural regimen is presently enhanced by the summer upstream capture of water for irrigation purposes in Iranian territory. This factor existed at least since last century, with political problems concerning the exploitation of water between bordering Russia and Persia, but considering the long term history of human settlement in the region, there could have been some influences on the nature of streams dating further back in historical times.

The alluvial fans of Meana and Chaacha have a rather elongated shape, with a radius of approximately 40 km, a slope of 0.3-0.4%, and are interfingering in their middle and distal portions, reaching the larger Tedzhen fan in the NE. The transitional zone in between Meana and Chaacha has a very flat micromorphology, with an almost linear trend of the contour lines. The activity of these two rivers is prominent in comparison to that of the other streams coming from the Kopet-Dagh. This is clearly shown by the differences in extension between the various fans.

The north-westernmost portions of the Meana fan is marked by a series of fluvial terraces with few metres high, degraded scarps (see the enclosed geomorphological map).

For some kilometers from the apex the rivers run deeply entrenched in respect to the surrounding alluvial plain. Meana river is entrenched for a longer stretch than Chaacha, 15 km against 5 km. The 5-6 m high scarps are almost vertical, with a typical wadi-like morphology which fits well with the present-day dry climate. The active river-beds are 15-30 m wide, commonly occupying all the bottom of the incision.

The walls of these entrenchements provide quite good stratigraphical sections, while in the distal portions of the fans the only chance for undertaking sedimentological observations are irrigation canals and ditches.

In general, the plain appears to be constituted for the first metres from the surface by a sequence of silty clay, silt and fine sand, with sedimentary structures showing the typical fluvial facies: sets of rithmic, planar lamination, sometimes with ripples (overbank fines); cross stratification of sand bars, small point bars, channel fillings (active channel deposition). The latter have been observed almost exclusively in the distal part.

In a section 20 km East of Dushak, across the Khodjubulan river, there are two palaeosoils. The upper one is buried at a depth of 2 m, the other one is 1.5 m below. They both developed in loamy materials, and were buried by sediments of the same texture. The preserved horizons are in both cases a 30-40 cm thick, reddish/brownish B horizon, characterized by medium subangular blocky structure. What seems another reddish palaeosoil outcrops at the bottom of the scarp in the section of Meana, and appears quite strongly cemented.

A distinctive feature of Meana and Chaacha fans is the very poor sorting in particle size going downstream, most of the terms being in general finer than fine sands. This is probably due to the fact that the sedimentary load of these rivers was mainly re-worked loess. In fact, loess covers the bottom of valleys in the Kopet-Dagh chain and buries underneath a few meters thick, continuous layer the northern slope of the mountains backing the plains. Because of its erodibility, it was easily washed downstream.

Gravels do actually exist only in the proximal part of the fan, near the mountains, as fillings of the wadi-like incisions, both active (Khodjubulan river, Meana river) and fossil (Meana river). Their high eterometry and internal structure show that they are debris-flow sediments, deposited during flash-floods of particular strength.

Trying to reconstruct the evolution of this stretch of piedmont plain from the sedimentary record of sub-surface strata, we can thus recognize two distinct phases.

In the older one it occurred the building of the upper portion of the alluvial fans, through the deposition of fine materials mainly coming from the erosion of loess outcrops. The river could have been of the braided – anastomosed kind, with enough power to carry sediments several tens of kilometers away from the mountains. In this period, Meana and Chaacha rivers were tributary of Tedzhen river, which was building up its own mega-fan. The presence of palaeosoils in the alluvial plain sequence shows that some patches of the plain were stable for a relatively long time, and that climatic conditions allowed the development of pedogenic horizons. In general there seems to have been a fairly wet climate with a "temperate" drainage system.

In the following phase, the fluvial system seems to adapt to a shift towards a drier climate, similar to the present one. Rains become more concentrated in time, and the depletion of vegetation makes the infiltration of water in the ground during storms more difficult. Rivers get thinner or dry out completely for a great part of the year, becoming impressive flows of a mixture of water, mud and stones in occasion of strong meteorical events.

Mass transport and deposition take places. Debris flows are characterized by a strong scouring activity at the bottom. The surface of the previous braided river plain is cut by the wadi-like incisions, which, expecially in the earlier stages, can be completely filled by the

debris. This is probably the case of the gravel body in the Meana section. The fact of it being covered by a sequence of fine sediments can indicate that it was deposited during the transition between the first phase, here marked by the palaeosoil, and the drier phase.

The conservation through burial of the palaeosoils was possible because of the general subsidence well recognized in the whole area. On the other hand, the presence of alluvial terraces concentrated just in one part of Meana fan, could to some extent imply an uplifting of this sector. Such a vertical movement may fit well inside a framework of tilting tectonic blocks, as the one recognised at a regional scale.

6.2 Remote Sensing and Digital Elevation Elaborations

The satellite images used in this study were different both in geometric and spectral resolution.

Landsat MSS images are recorded in four different spectral bands, ranging from the visible to the infrared portions of the spectrum. We choose bands named 4, 6 and 7 (corresponding roughly to green, red and near infrared) of an image taken in late autumn, being the ones richer in (palaeo) environmental information. For the eastern portion of the study area, the bands were in separate negative prints, while for the western portion the only available document was an already made false color composition of these same three bands. Therefore the singular bands were extracted by digital processing.

The Soyuz image is a KFA 1000 cosmic photo, available in two, partly overlapping, positive, black and white prints at the scale 1:100.000.

Both images were digitalized with a high resolution scanner. Once in numerical format, the three MSS bands were used for making one false color composition of the whole study area, while the different prints of the Soyuz image were assembled together.

It was then possible to georeference both images using control points of the 1:200.000 scale topographic maps. In practice, images were re-oriented along the geographical reference system, making it possible to overlay cartographic and remote sensing data.

More specifically, through the informatization with a digitizer of the 10 m equidistance contour lines retrievable from cartography, we made a Digital Elevation Model (DEM) of the Meana and Chaacha district.

The bi- and three-dimensional display of the DEM was then draped with the satellite image, concentrating in one single document both the micro-morphology of the alluvial plain (not at all perceivable in the field because to the very low slope gradients) and the spatial distribution of distinct physiographical features.

This helped the interpretation of images, the correlation between remote sensing and terrain data, and the compilation of thematic maps with precise location of the palaeo-hydrographical features and of the alluvial fans.

6.3 Palaeohydrography and Archaeological Evidences: a Critical Synthesis from Images and Field Survey

The interpretation of the digital images allowed the areal expansion of field observation acquired at specific key points, mainly located along the river incisions and the foothills. The results of this contextual analyses are summarized in the thematic maps here enclosed.

The first one shows the geomorphological outlines of Chaacha and Meana plain, in respect to the main archaeological sites of Altyn and Ilgynly.

An ancient canal crosses the whole area from SE to NW, likely with the intake in the Siraks district. In the legend the different typological sections encountered during the survey are represented, varying from well preserved levees to eroded and overflowed banks through intermediate stages.

In particular the canal is very well preserved in the Eastern half of the stretch between Chaacha and Meana. An outstanding phenomenon is the complete interception of relict drainage directions of Chaacha by this artificial feature. Two meandering palaeoriver beds, about 40 m wide and cut for approximately 3 m in the alluvial plain (the larger one is represented in the map), are in fact tributaries of the canal, and no continuation along the natural plain slope has been detected on the other side of the canal. This means that the canal is older than the palaeorivers, and that natural hydrography has been deeply conditioned by man's activity.

The canal was likely excavated for irrigation purposes, perhaps re-distributing waters coming from as far as the Tedzhen river. Future investigations will however be needed in order to fully understand the many-folds meaning of this structure and its age.

Several palaeoriver beds were reported in the map. From a general point of view, the most continuous and conspicuous ones are located to the East of the present active drainage directions.

An attempt to model a general palaeohydrographical scheme for middle-late Holocene is synthetized in the second enclosed map. Meana and Chaacha both shifted from SE to NW, probably being left tributaries of Tedzhen palaeoflows directions during Chalcolithic times (active Geoksyur delta).

In this context, not only Altyn-depe but also Ilgynly was strictly related to an ancient Meana water course. Chalcolithic Altyn and Ilgynly lay along the Meana palaeoriver bed 1; after the drainage North-western shifting, Ilgynly was abandoned and human settlement in Altyn continued with its Bronze Age flourishing phase.

From the above consideration it arises the need for extending field work both in the SE towards Serakhs and along the proluvial plain to the NW. The leading feature of this research proposal is represented by the artificial canal discovered in 1994, possible axis of an ancient water management scheme.

The authors' intentions are to collect and assemble data in a Geographical Information System, a worthy tool for a diachronical environmental analysis.

7. Palaeoenvironmental Evolution of the Merv Oasis

The deltaic alluvial deposits of the Murghab river occupy a wide area between Amu-darya and the Khorasan piedmont area. They are interfingering with the deltaic sediments of the Tedzhen river in the West, with alluvial deposits attributable to an ancient flow direction of Amu-darya in the North and in the East. Locally this boundary is masked by eolian deposits.

The diverging hydrographic pattern of the active delta has been partly altered by the excavation of artificial canals which distribute and regulate both waters of Murghab and Kara-Kum Canal. This canal, carrying water from Amu-darya through hundreds of kilometers of desert land, is the basis of an irrigation scheme started out in the 50's for the development of local agriculture. In older aerial photos cultivated areas appear centred just near the towns of Mary and Bairam-Ali, all the rest being desert land.

Not everywhere is the artificial hydrographic pattern superimposed to the natural one: frequent is the use of old, sometimes inactive branches of the Murghab as drains for irrigation. Anyway, one cannot forget that the Merv oasis in the Murghab delta has been inhabited for millennia and that also what seems now "natural hydrography" is liable to have resented of human activities in the past.

The changings in position and extension of the portion of delta reached by active branches of the river (that is, the oasis) through different times, has long been a problem to whoever wanted to study the history of human settling in this area.

In the eastern part of the delta, through the study of SOYUZ (1), SPOT (2) and aerial images (3), it has been possible to detect the existence of relict and fossil geomorphological features both in the present day oasis and in the outer, inactive plain. This allows a better understanding of the palaeoenvironmental evolution.

There have been recognized (see also the map "Palaeoenvironmental evolution...etc." at the scale 1:200.000):

- palaeoriver beds in the oasis; they are detectable owing to tonal differences of soil and orientation patterns of fields. Sometimes these characteristics are associated with elongated mounds ("pensile river-beds");
- palaeoriver beds in the desert delta lowland. These meandering forms, resulting from the activity of streams smaller than the ones spoken above, are mostly associated with areas of *sabkha*. This is due to the fact that damp soil conditions, and thus the possible existence of evaporitic sedimentation, were strictly linked to the presence of a branch of the river;
- relict eolian dunes: they form approximately N-S oriented fields and are recognizable in the barren portions of the delta. From the analysis of SOYUZ images at the scale 1:50.000 resulted that they are cut by the palaeohydrographic pattern which, as a consequence, proves to be younger. This chronological sequence is suggested also by the control of the dune field directions on the elongation of the *sabkha* areas. Locally there may be reactivation of these relict forms by present blowing winds;
- active eolian dunes: they cover part of the Amu-darya alluvial plain, sometimes overlapping the northernmost edges of the Murghab delta. A general increase in the extension of barren, wind blown areas has been recorded at present times, together with southern shifting mobile sand dunes.

On the basis of this data it is possible to say that there existed at least two phases of withdrawal of the active portion of the delta, when the waters of the Murghab failed to reach the peripherical areas: the one which led to the development of the relict dunes and the actual one.

Between the two, there was a period when the diverging branches of the Murghab were reaching out till the northernmost edge of the delta. The existence of Bronze Age archaeological sites located near palaeoriver beds in nowadays dry land, suggests this phase to have lasted at least during the whole second millennium BC.

It is also possible to hypothize the existence of an antique period of high sedimentation activity of the Murghab, which built the delta later covered by the older generation of dunes. During this phase the river seems to have reached at least as North as in the second millennium, as shown by the extension of the relict dunes.

Which are the causes of these environmental changes in this sector of the Murghab delta?

The existence of recurrent cycles seems to point out a climatic control. The development of the palaeo-hydrographic network could have taken place approximately during the wet phase recognized on the basis of palinological and transgressive/regressive events in the Caspian between 3.800 and 2.000 yr BC (Ehlers 1971; Varushchenko *et al.*, 1980; Brentjes

(1) SOYUZ KFA 1000 multispectral cosmic photos, taken by Russian satellites from an altitude of 270 km, cover an area of 81x81 square km each, with a very high linear geometrical resolution (nominal 5 m, real up to 1.8 m); it is thus possible to get hard copies enlarged up to 1:10.000, where among other the single archaeological sites are well recognizable. In this specific case the SOYUZ photos utilized were taken on September, 20th, 1988 with label numbers 0010/2376 and 0010/2377.

(2) SPOT multispectral images, taken by french satellites from an altitude of 822 km either vertically or sideways, cover each an area respectively of 60x60 and 60x80 square km, with a geometrical resolution of 20 m in case of multispectral recording (XS) and 10 m with panchromatic recording (P). For this research two passages were selected for a multitemporal approach, in order to get differences in soil moisture content due to seasonal climatic conditions changes; the first one is June, 5th, 1988 representative of dry period, the second is February, 5th, 1989 significant for wetter period.

(3) Panchromatic aerial photos taken, in a stereoscopic array at the average scale 1:25.000 during the fifties, with high ground resolution of the order of half a meter. Existence of relict and fossil geomorphological features both in the present oasis and in the outer, inactive plain. This permits a better understanding of the palaeoenvironmental evolution.

1988), already synthetized in fig. 2. Previous to this, the drying of the climate between 4.700 BC and 3.800 BC could have brought a decrease in the Murghab flow, an increase in the evaporation rates and a decay in the vegetation cover, finally leading to suitable conditions for eolian erosion.

Nevertheless, the geomorphological observations so far made suggest that most likely other processes influenced here the environmental changes: that is neotectonics.

There seems to be a general uplifting of the upper plain and "glacis" at the foot of the Khorasan range. The fact that the present course of Murghab is deeply cut in older sediment is favorable to this hypothesis.

More important is the Holocene shifting of the whole delta drainage system to the west. This is evident in the core of the oasis, where the big, sometimes pensile palaeochannels are mainly located to the East of the present Murghab, but the same trend is recognizable in the eastern peripherical portions of the delta. Here it exists the well developed palaeohydrographic pattern discussed above, which is corrispondent to the active one located more to the West.

The shifting is presumably due to the tilting of a fault block, with an eastern rising side limited to the East by the Khiva negative structural element and dipping to the West towards the centre of the Turcoman trough. In the delta, pertaining to the tilted fault block, this implied the divertion of fluvial waters from East to West.

In an hypothetic situation where the flows of the Murghab had remained constant through time, we could assume the total wet area of the oasis to remain constant before, during and after migration. This is obviously not true, owing to the existence of the climatic changes discussed above.

As a whole the two factors, neotectonics and climate, seem to have been working together: the first, acting on presumably longer times, having as more dramatic effects the shifting of the Murghab main drainage line dozens of kilometres to the west and the ultimate diversion of the Amu-darya to the Aral; the second, modelling the neotectonic trend in minor dry/wet cycles bringing climatic crises with expansion and shrinkage of hydrography and desert lands.

References

Andrianov B.V. (1955) *Iz istorii zemel' drevnego orosheniya Khorezmskogo Oazisa*. Pamyati akademika L.S. Berga, Moskva/Leningrad.

Andrianov B.V. (1958) Arkheologo-topograficheskye issledovaniya drevnei irrigatsionnoi seti kanala Chermen. *Trudy Khorezmskoi arkheologo-etnograficheskoi ekspedicii*, II.

Andrianov B.V. (1969) *Drevnye orositel'nye sistemy Priaral'ya.* Moskva.

Andrianov B.V. (1974) K istorii orosheniya Turkestana. *Trudy V.V. Bartol'da v svete novykh isslyedovani.*

Billard A. (1993) Is a Middle Pleistocene Climatic Optimum Recorded in the Loess-Palaeosol Sequences of Eurasia? *Quaternary In.*, vol. 17, pp. 87-94.

Brentjes B. (1988) Oscillations of Clima and History of Settlement in "Middle Asia". *Atti del congr. "Applied and Historical Climatology"*, Elbingerode 31 Ott. - 4 Nov.

Degens E.T. and Paluska A. (1979) Tectonic and Climatic Pulses Recorded in Quaternary Sediments of the Caspian-Black Sea Region. *Sedimentary Geol.* 23, pp. 149-163.

Ehlers E. (1971) Klimageschichte und Siedlungsgang in vor- und frühgeschichtlicher Zeit in der Turkmenensteppe Nordpersiens. *Archäologische Mitteilungen aus Iran*, Neue Folge, Bd. 4, pp. 7- 19, 3 fig.

Fedorov P.V. (1965) Quaternary Shorelines of Black and Caspian Sea and their Possible Correlation with Mediterranean Terraces. *Int. Congr. INQUA Warsaw 1961*, Rep.1, pp. 221-238.

Gorelov S.K. and Redzepov M. (1985) Primenenye aerokosmometodov dlya izucheniya territorii Turkmenskoi SSR. *Tezisy dokladov k V s'yezdu Geograficheskogo obshchestva Turkm. SSR*, p. 100-102, Ashkhabad.

Grichuk V.P. (1964) Comparative Study of the Interglacial and Interstadial Flora of the Russian Plain. *Int. Congr. INQUA Warsaw*, Rep.2, pp. 395-406.

Grosswald M.G. (1980) Late Weichselian Ice Sheet in Northern Eurasia. *Quaternary Research*, 13, pp. 1-32.

Kelly S.B. and Olsen H. (1993) Terminal Fans: a Review with Reference to Devonian Examples. *Sedimentary Geology*, 85, pp. 339-374.

Khlopin I.N. (1986) *Jungebronzezeitliche Gräberfelder im Sumbar-Tal, Sudwest-Turkmenistan*. Verlag C.H. Beck, München.

Kohl P.L. (edited by) (1981) *The Bronze Age Civilization of Central Asia. Recent Soviet discoveries.* M.E.Sharpe Inc, Armonk N.Y.

Kozlov N.P. (1991) *Earth's Nature from Space*. Amerind Publishing Co. Pvt. Ltd., New Delhi.

Marcolongo B. and Mozzi P. (1992) Use of Soyuz KFA 1000 Cosmic Photos for a Detailed Palaeoenvironmental Reconstruction of Murghab's Inner Delta (Turkmenistan). *Bollettino Associazione Italiana di Cartografia*, 86, pp. 13-24, Pavia.

Marcolongo B. and Mozzi P. (1993) Il contesto fisiografico dei siti protostorici della valle di Sumbar (Turkmenistan): una applicazione tematica e cartografica delle fotocosmiche Soyuz ad alta risoluzione. *Bollettino Associazione Italiana di Cartografia*, n. 87-88, Pavia.

Markov K.K. (1961) Sur les phenomènes périglaciaires du Pleistocene dans le territoire de l'U.R.S.S., *Biuletyn peryglacjany* 6, Lodz.

Masson V. M. (1988) *Altyn-depe*, University Museum Monograph, 55, Philadelphia.

Masson V.M. and Sarianidi, V.I. (1972) *Central Asia – Turkmenia before the Achaemenids.* London.

Pumpelly R.W. (1908) Physiography of Central-Asian Deserts and Oases. R. Pumpelly, ed., *Explorations in Turkestan*, pp. 243- 337, vol. II, part V, Washington.

Redlich A. (1982) *Studien zum Neolithikum Mittelasiens.* Antiquitas 3, Bonn.

Sadler S.P. and Kelly s.B. (1993) Fluvial Processes and Ciclicity in Terminal Fan Deposits: an Example from Late Devonian of Southwest Ireland. *Sedimentary Geology*, 85, pp. 375-386.

Shabad T. (1951) *Geography of the U.S.S.R. A Regional Survey.* N.Y.

Suslov S.P. (1961) *Physical Geography of Asiatic Russia.* W.H. Freeman and Company, S. Francisco and London.

Tage N. (1983) *The Pleistocene*. D. Reidel Publishing Company, Dordrecht-Boston-London.

Varushchenko A.N., Varushchenko S.I., Klite R.K. (1980) Izmeneniya urovnya Kaspiyskogo morya v pozdnem

pleistotsene-golotsene. *Kolebaniya uvlazhnennosti Uralo-Kaspiyskogo regiona v golotsene*, Moskva.

Walter H. and Box E.O. (1983) Middle Asian Deserts. *Ecosystems of the World. Vol. 5: Temperate Deserts and Semi-deserts*, ed. by West, N.E., Elsevier Scientific Publishing Company, Amsterdam-Oxford-New York.

Walter H. and Box E.O. (1983) The Kara-Kum Desert, an Example of a Well-studied Eu-biome. *Ecosystems of the World. Vol. 5: Temperate Deserts and Semi-deserts*, ed. by West, N.E., Elsevier Scientific Publishing Company, Amsterdam-Oxford-New York.

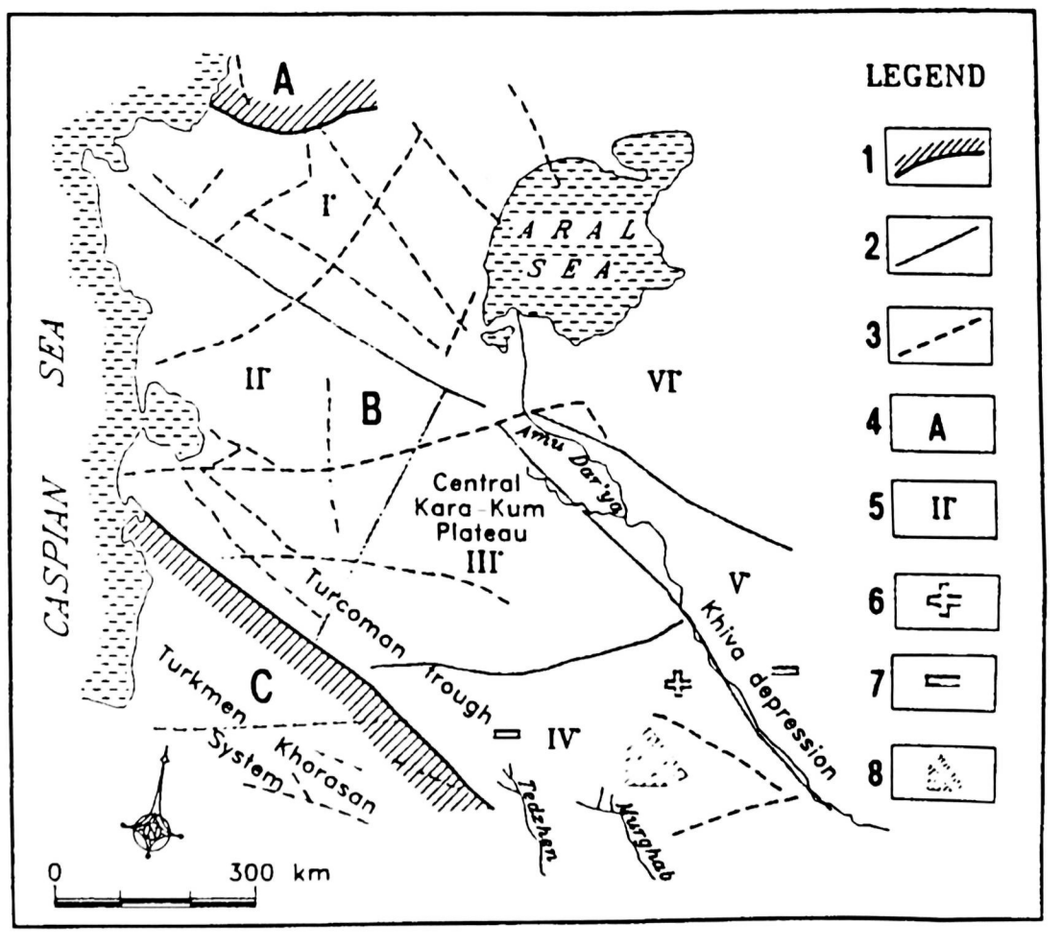

Fig. 1 - Scheme of the structural and tectonic blocks of the Turan plate (after Kozlov 1991, modified).
1. boundary seams; 2.interblock fractures; 3. intrablock fractures; 4. structural and tectonic elements: A. Russian platform, B. Turan plate, C. fold system of Kopet-Dagh; 5. geoblocks of basament: I. North Ust' Yurt, II. Kara-Bogaz, III. Kara-Kum, IV. Amu-darya, V. Bukhara, VI. Kyzyl-Kum; 6. uplifting area; 7. subsiding area; 8. Tilting.

KASPIAN SEA (VARUSHCENKO et al.,1980)			NORTHERN IRAN, TURCOMAN STEPPE (EHLERS,1971)		
Regr.	Transgr.				
	+ 20	9000 yr B.C.			
- 58		9000-8000 yr B.C.			
	- 11	8000-7000 yr B.C.			
-50,5		7000-6700 yr B.C.			
	- 20	6700-6500 yr B.C.			
regr.		6500-4500 yr B.C.		up to 4700 yr B.C.	WET
	- 23	4500-3700 (3300?)yr B.C.	←	4700-3800 yr B.C.	DRY
- 40,5		3700-2000 yr B.C.	←	3800-2000 yr B.C.	WET
	- 20	2000-500 yr B.C.	←	2000-600 yr B.C.	DRY
- 32		500B.C.-500 A.D.	←	600-200 yr B.C.	WET

(EHLERS,1971;South Kaspian shore)

Fig. 2 - Correlation between regressive/transgressive events in the Caspian Sea and palaeoclimatic conditions.

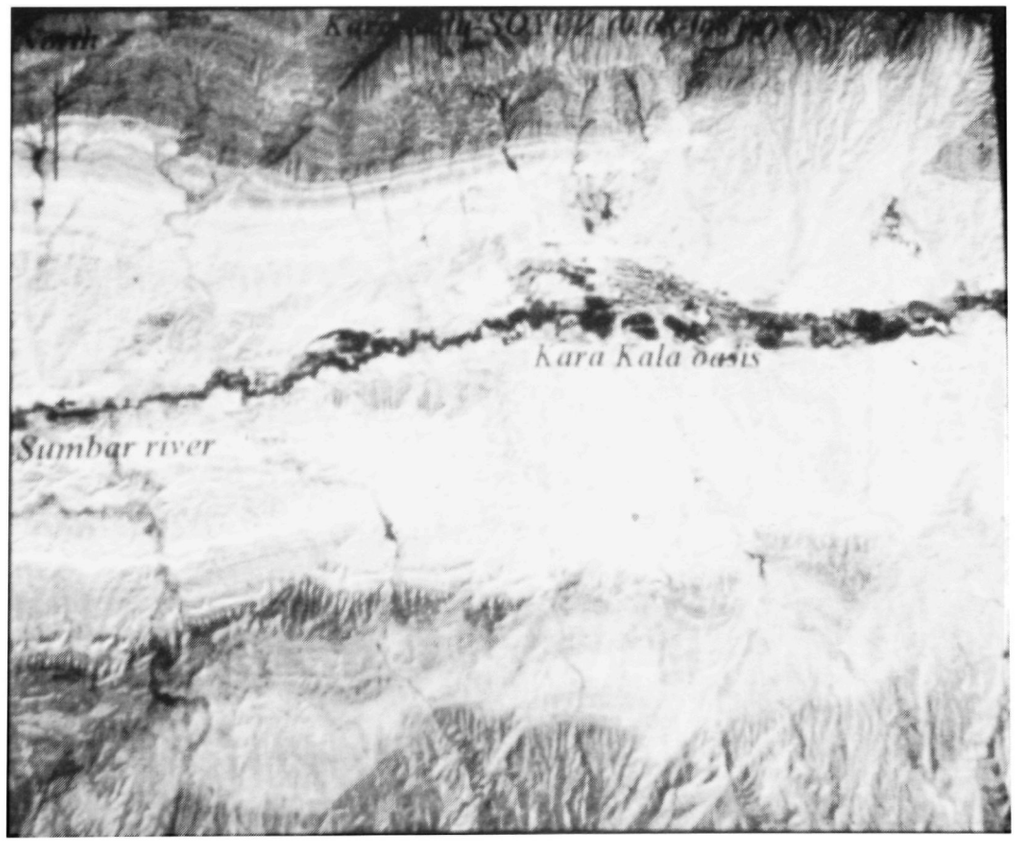

Fig. 3

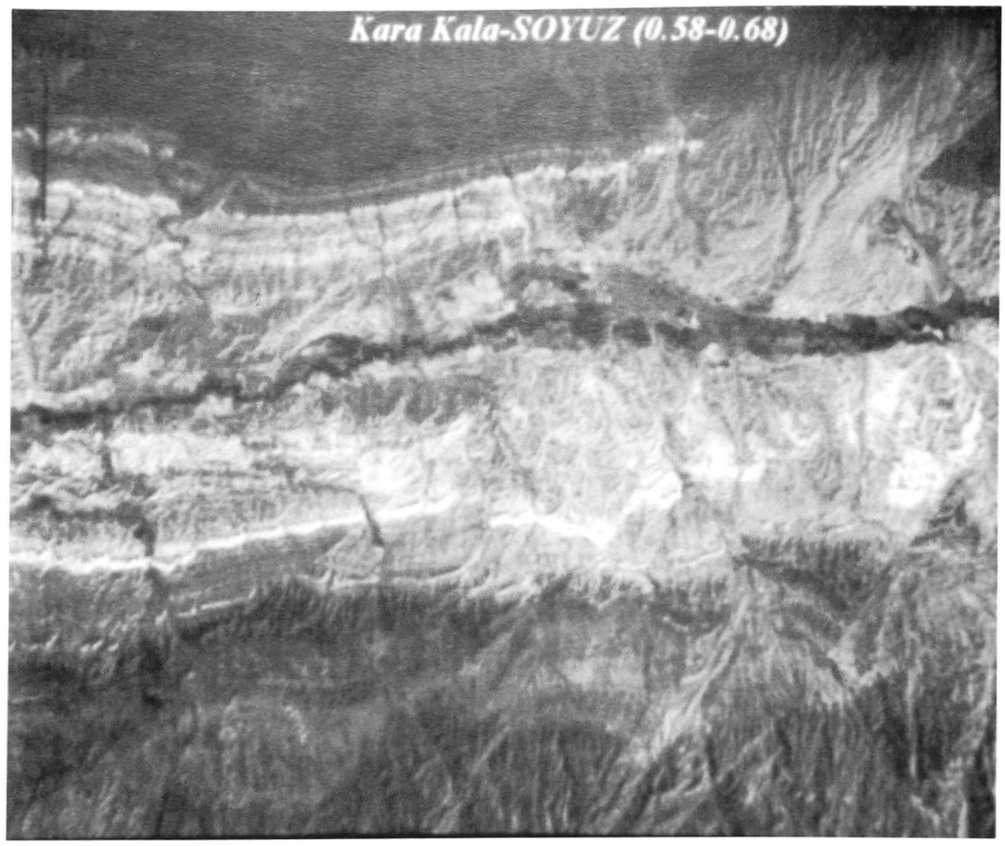
Kara Kala-SOYUZ (0.58-0.68)

Fig. 4

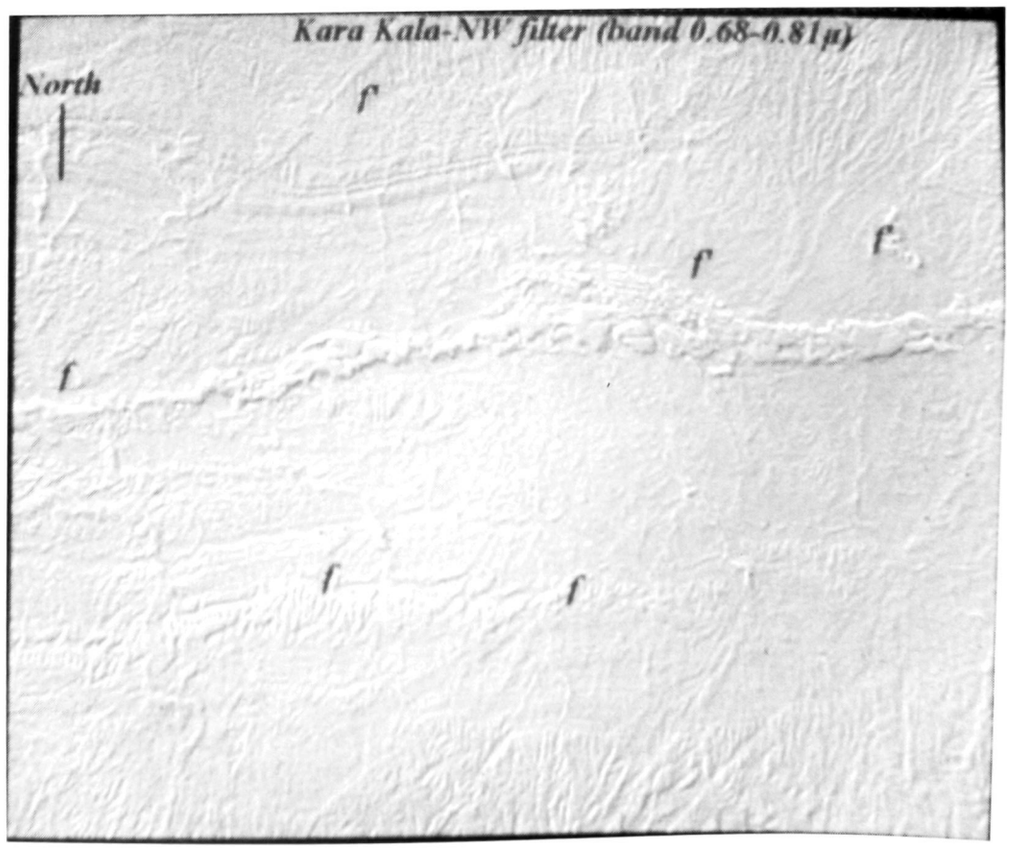
Kara Kala-NW filter (band 0.68-0.81μ)
North

Fig. 5

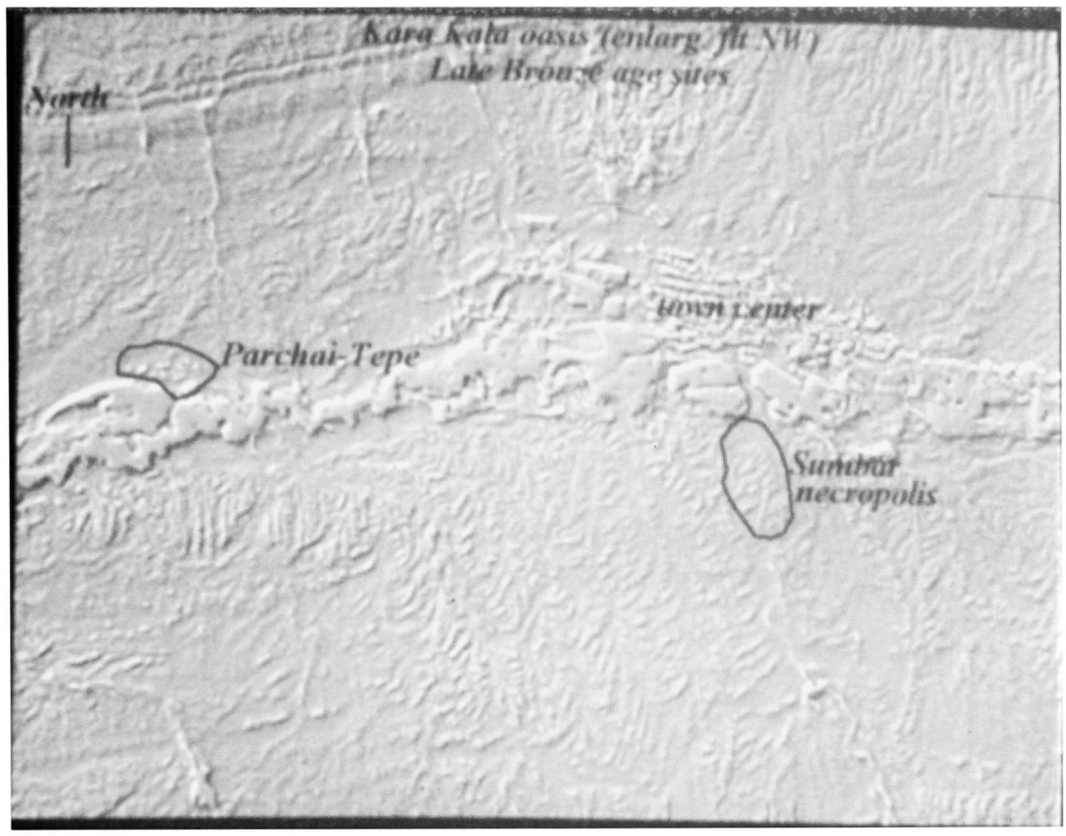
Kara Kala oasis (enlarg. fit NW)
Late Bronze age sites
North
town center
Parchai-Tepe
Sumbar
necropolis

Fig. 6

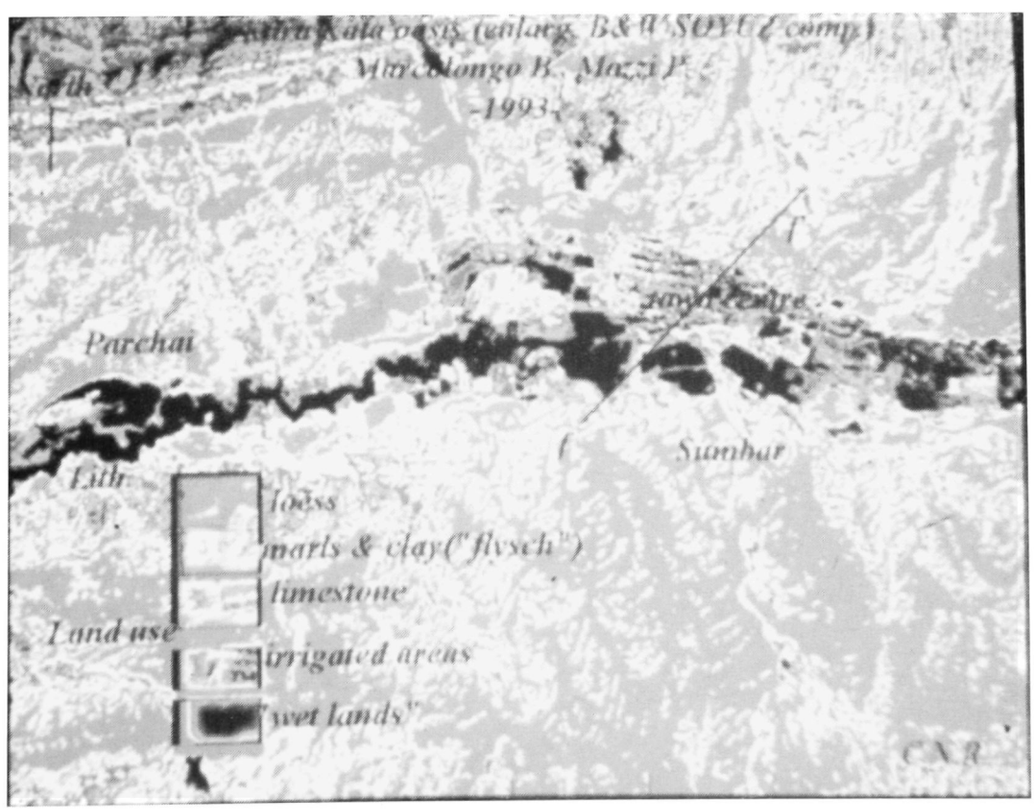
-1993
Parchai
Sumbar
loess
marls & clay("flysch")
limestone
Land use
irrigated areas
wet lands
CNR

Fig. 7

PALAEOHYDROGRAPHY AND MIDDLE HOLOCENE DESERTIFICATION IN THE NORTHERN FRINGE OF THE MURGHAB DELTA

by M. Cremaschi

Foreword

The endoreic delta of the Murghab river is located at the southern edge of the Kara-Kum desert. It extends from an area of high ridged dunes, in which the Murghab river-bed is deeply downcut, towards the lowlands surrounding the Uzboi palaeochannel (Marcolongo and Mozzi 1992) oriented east-west and diping in direction of the Caspian depression.

Since the fifties, the archaeological surveys, carried out by Russian and Turkmenian teams, led to the discovery of many Bronze and Iron Age sites, in the midst of the desert, far north of the Classical age boundaries of the Merv oasis (Sarianidi 1992).

Each cluster of archaeological sites was thought to represent a single oasis fed by a branch of the Murghab river. Such as in the archaeological Mesopotamian models, the irrigated agriculture (Hiebert 1994; Koshelenko *et alii* 1994) was reputed the base of the whole economic strategy. The desactivation of the river branch was believed to have led to the decline and abandonment of the "oases".

However, this model is just a simplistic projection of the present-day situation into the past. To day the desert areas can be farmed only by virtue of a dense net of artificial canals implemented through huge investments, inconceivable prior to the Soviet power, that can be sustained only at the cost of a gradual depletion of water reserves.

Such a scenario can in no way be projected to account for the high concentration of protohistoric sites in the middle of the desert, the existence of which implies at least an environmental context that differed considerably from the present-day one.

To local scale, several authors explain the desertification of the Bronze and Iron Age oases in terms of a gradual westwards shift of the Murghab branches, due to the neo-tectonic rise in eastern part of the area (Gerasimov 1978; Marcolongo and Mozzi *supra*). However, even if important, the neo-tectonic factor should be regarded as a complementary one. It cannot explain the general shrinking of the Murghab delta system which appears to be undeniably linked to an overall loss in available water.

On the other hand, in the papers dealing with archaeological research, the palaeochannels of the Murghab were often inferred a priori exclusively on the basis of settlement distribution (Lyapin 1990) and the geomorphological evidence has so far been traced out only on a small scale (Marcolongo and Mozzi *supra*).

This paper is focused on the results of a detailed geomorphological survey (1) aimed at identifying, describing and mapping the palaeochannels and the related features which are present on the northern edge of the Murghab delta. Palaeo-environmental significance of the palaeo-hydrography, its interrelations with the protohistoric sites and the time of its extinction will also be discussed.

General Information

The Murghab delta area has a subtropical desert continental climate. Mean annual rainfall fluctuates between 139 and 249 mm. The average annual temperature is 14.5°C (Dolukhanov 1981). The physiographic appearance of the area has been changed over the past few decades by the opening of the Kara-Kum canal and the irrigation systems branching off from it. However, outside the irrigated sections, the area consists of barren desert and desert steppe dominated by sand dunes of various type and size, interspersed with *takyrs* (Gerasimov 1978; Gorelov *et alii* 1984).

The survey area corresponds roughly to the Bronze Age "oasis" as described by Kohl (1984). It stretches beyond Yaz I, the northernmost boundary of the Iron Age oasis, as far as about 40 Km North of Kelyadji. To the west it reaches the outskirts of the Mary-Kellely asphalt road, South of Adambaskan, while it is bounded to the East by Tuyaberki.

The geomorphological survey was based on the 1:14.000 scale panchromatic aerial photographs made available by the Cartographic Office of the Turkmenian State of Ashkhabad. This was used to make a 1:50.000 scale geomorphological map. Field controls were performed in key sites, in order to check the landformes observed on the air photographs and to identify geological sections significant for sedimentary facies identification, soil analysis and for collection of samples suitable for radiocarbon dating.

(1) See the Geomorphological map in Appendix (Map 4).

The Geomorphological Map

The survey area consists of a wide, flat plain sloping slightly northwards. The main geomorphological features as observed on the satellite imagery consist of the irrigated areas (Marcolongo and Mozzi *supra*) (Fig. 1), and, to the north, the alluvial sedimentary body at the fringe of the delta, which can be easely distinguished for its bright colour. On the top of it longitudinal strips are superimposed, which southwards merge into unconfined gray areas; they consist of dunes and sand bodies. The landforms of the area are therefore related both to aeolian and fluvial processes (see the geomorphological map, Appendix 4).

Aeolian Landforms

Linear dunes are predominant on the northern part of the map. They may measure some kilometres in length; about fifty metres wide and ten metres high. They have numerous y-junctions, separated by interdunar corridors about one hundred meter wide.

The large linear dunes described by Gorelov *et alii* (1984) as *large ridged reliefs* are almost absent in the area. However, a dune ridge of this type has been possibily identified in the South-East sector of the map, to the South-East of Yakeper. It has the shape of a sandy hill, elongated to the North, probably consisting of the relict of a larger dune, eroded and in part buried by the alluvial deposits. The *large ridged* dunes have been observed about thirty kilometres North of Kelleli. The interdunar corridors intercalated among them include terraced fluviatile deposits corresponding to the extreme reach of the Holocene alluvial plain deposits of the Murghab.

Towards the south the linear dunes decrease rapidly in size, taking on the shape of small barcanoid systems linked together in trains running north-south.

Much more frequently, the small dunes give rise to large network complexes 50-60 metres wide and up to 100 metres long, with irregular crests displaying alternating peaks and saddles. Occasionally, particularly on the western edge of the survey area, the dunes take on the appearance of small squat reliefs several hundreds of metres long, but aligned according to the prevailing winds. They probably correspond to the *honeycomb* dunes described by the Russian researchers (Gorelov *et alii* 1984). At the southern end of the area, on the edge of the irrigated zones, the aeolian sand no longer has any clear-cut geomorphological individuality.

The dunes are anchored by a discontinuous bush vegetation and active forms are somewhat rare, being generally limited to the crest zone of the larger dunes. The dune-forming winds blow from the north for the areas North of Gonur, in which the dunes are usually found to be stabilized, while further south, where the network is not so strongly expressed, the winds fluctuate from north-west to south-east and generate the barcanoids (Suslov 1961).

Landforms due to deflation are fairly frequent. Many of the cavities delimited by the honeycomb dunes are actually blowout cavities, most of which are however inactive. Active wind erosion cavities are to be found in the areas in which recent anthropic artefacts, such as abandoned oil rigs, track junctions and animal pens, have enhanced soil erosion.

Special mention should be made of the *takyr* areas. These are comparatively small flat areas, situated between the dune ridges, with a clayey floor. In this floor, and only in it, does the archaeological evidence of the Bronze and Iron Age sites outcrops. Therefore it represents the exhumed surface of the alluvial sediments which preceded the dune ingression (see following chapter). Therefore, in the surveyed area, the *takyrs* may be defined as *litho-stratigraphic*, to use the nomenclature of Gorelov *et alii* (1984). They actually consist of deflation and erosion areas (Nuberdyev 1982) corresponding to ancient topographic surfaces buried by the dune aggradation and uncovered again by wind erosion. They do not necessarily correspond, as many claimed (e.g. Kohl 1984), to ancient palaeochannels. They may contains traces of palaeochannels, but do not necessarily coincide with them.

Fluvial Landforms

Active Fluvial Landforms

The active fluvial landforms derive exclusively from present-day irrigation. On the southern edge of the map, near *sovkhoz* Bairam-Ali, the land surface has clear evidence of permanent agriculture, consisting of straight canals, crossing at square angle minor irrigation ditches. The surface of the field appears to be artificially levelled. To the North the fluviatile landforms consist mostly of the feeder canals, branching off from the Kara-Kum canal and the expansion areas associated with them. They run in a North, North-East direction, gaining advantage from the topographic gradient, and are designed to flow into and expand in previously levelled lobe-shaped zones. This type of irrigation demands extensive preparation of the land and tends to cancel any microrelief. The entire palaeohydrography is thus cancelled, while most archaeological sites are destroyed. Only the larger *tepes* have survived and emerge from the network of canals and ploughed fields.

The irrigation landform is quite recent. The photographs taken during the Yaz I excavations (Masson 1959), dating back to the fifties and situated only a few hundred metres from the *sovkhoz* Bairam-Ali, show a totally desert landscape which can today only be observed to the North of Gonur.

Palaeohydrographic Evidence

It consists of palaeochannels, particularly well preserved to the north of the irrigated area. They are generally slightly incised inside the alluvial plain and 30-40 metres wide. They display a typical meandering

pattern: crescentic ridges in the meander loops and natural levees are commonly observed on the aerial photographs. Crevasse *splays* are also evident branching from the channel into the alluvial plain.

The palaeochannels were affected by aeolian processes after desactivation as they are interrupted and buried by sand dunes or they appear eroded and enlarged by wind erosion.

Four clusters of palaeochannels have been distinguished in the surveyed area, separated in two groups by the Ashkhabad canal. Each cluster corresponds to different branches of the Murghab, and it is related to concentrations of the Bronze Age sites (oases) identified by archaeologists. In particular along the palaeochannel, running West of the Ashkhabad canal, the main sites of the area are located: Gonur, Togolok and the impressive concentration of sites identified by the archaeological survey. However, no significant concentration of tepe have been observed north of Gonur, but some small scattered sites, with Andronovo pottery, have been identified along the banks of the palaeochannels (as the Kelyadji site).

The three easternmost clusters of palaeochannels display similar geomorphological characteristics as described above, with a prevailing north north-east trend and merge into a single palaeochannel flowing towards north-west.

The westernmost group has different characteristics. It has a more north-western trend, almost parallel to the present day Murghab. The meandering pattern appears to be more accentuate, while the minor fluvial features, as meander ridges, point bars and natural levees are quite freshly preserved and poorly affected by aeolian processes. The river-beds, are not incised inside the plain, but lie at its level or above it. However, in some cases they appear to be superposed to older palaeochannels, incised in the flood plain. It is therefore possible that the activity of this group of palaeochannels lasted longer than that of the eastern clusters.

Artificial Canals

Associated with the meandering palaeochannels, there are palaeochannels which are straight. Since they share the same geomorphological relationship with the floodplain (depth of incision, covering by dunes, wind erosion), they are regarded as contemporaneous of the meandering palaeochannels. Since no natural process can be responsible for their shape, they are interpreted as artificially modified river-beds or man-made canals. They are located in the belt of the Bronze Age sites and slightly north of it. Furthermore, they are directly linked to the Bronze Age sites and therefore maybe considered as contemporary to them.

In the Gonur area a palaeochannel flowing towards the South citadel appears to have been cut off and deviated into a canal which skirts the eastern side of the archaeological area and meets a meandering palaeochannel to the north-east of the site (Fig. 2).

Similar cases have been observed elsewhere, as for instance in the vicinity of Yakeper, and in the area of the eastern clusters of palaeochannels.

The canals do not seem to have an irrigation function, but rather to regulate the watercourses. Only a straight canal, located north of Yakeper and ending in a small delta, appears to be a feeder channel connected to irrigation practice. However, its relation with the other canals is unclear and there are no archaeological sites around it, so its dating remains uncertain.

The Age of the Palaeohydrographic Network and the Related Fluvial Deposits

Several stratigraphic sequences and pedological profiles, together with sections exposed in archaeological excavations have been examined in order to study and date the deposition of the flood plain, the activity of palaeochannels and the onset of desertification.

Takhirbai

According to many authors (e.g. Hiebert 1994), the Takhirbai sites stood on the banks of an important branch of the Murghab delta. However, no trace of palaeochannels can now be detected on the present ground surface, which has been substantially changed under the effect of present-day irrigation works.

The connection between the site and the palaeochannels clearly appeared from the trench excavated in the Takhirbai 1 site (Cattani, *infra*) (Fig. 3). The core of the tepe is represented by a platform resting directly on the flood plain deposits. The platform is bounded to the east by a fluvial channel, the basal deposits of which are constituted by laminated sands, indicative for running water. As the sand overlaps the colluvial deposits coming from the collapse of the platform, the radiocarbon date of (GX 20648) 3375±0 y. BP obtained from an hearth, included into the platform, could be regarded as a minimum age for the activity of this palaeochannel.

Both the eastern channel and the western ditch are sealed by aeolian sand which forms, on the northern side of the tepe, a thick climbing dune. Its progradation followed the desactivation of the palaeochannel which surrounded the site, but cannot be date directly. However, aeolian sand is included in the upper archaeological layers of the tepe (M. Cattani, pers. comm.), and the radiocarbon dating of charcoal included in one of these, – the layer A3 141 (Hel-3641) –, gave 2560±70 y BP. By this time the desertification in the area of Takhirbai was an active process.

Site 55

Along the wall of a freshly cut canal some seven hundred metres to the west of Site 55, in a slight depression corresponding to the faint traces of a palaeochannel visible in the aerial photos, the following

stratigraphic sequence has been recorded (Fig. 4). Forty centimetres of brownish aeolian sand cover alluvial deposits including red clay deformed by gilgai, sets of thin laminated sand and clayey organic silt. Bronze Age pottery, charcoal, and bones were found at that level. At the depth of two metres, a highly bioturbated peat follows, also containing Bronze Age potsherds. It covers massive bioturbated sand which includes a lens of charcoal and burnt bones. These were radiocarbon dated to 3.880±125 y. BP (GX 19833 AMS).

The fluvial sediments which lay below the aeolian sand are typical for floodplain environment: the dates obtained indicate that the alluvial processes were active at the beginning of the fourth millennium BP.

Garry Kishman 2

The section was observed inside a deep canal opened in autumn 1993, along the asphalt road to the north, close to the Carry Kishman citadel. It is constituted (Fig. 5) on top of 1.50 m of aeolian sand, beneath which, down to a depth of 3.5 m, there is a thin inceptisol, followed by fluvial deposits composed of clay, peats and cross-bedded sands. The top inceptisol includes Iron Age sherds, while Bronze Age sherds were found at the base of the fluviatile sequence. Similarly to Site 55, the flood plain sedimentation was still active during the Bronze Age. Apparently fluvial processes were over during the Iron Age, since sherds of this age are included in a soil profile buried by aeolian sand. The Iron Age therefore represents the *post quem* date for desert ingression.

Gonur South

The site of Gonur South (Hiebert 1994), consists of a citadel with several different architectonic phases, all referring to the Namazgha VI period. The bedrock on which the site has been built up consists of flood plain deposits. Clayey silt with thin planar lamination and a top hydromorphic soil were observed on the wall of a storage pit reaching a depth of 1.60 m from the topographic surface.

Below the building structures and related cultural layers of the most recent phase, there are alluvial deposits covering older architectural structures. These deposits have a coarse sandy texture, include water transported sherds and charcoal fragments, and display cross lamination and ripples. They should be interpreted as sediments of running water. A charcoal fragment collected from the alluvial deposit at the base of the room 629 (Fig. 6), has provided a radiocarbon dating of 3.608±75 y. BP (GX 19834 AM), which coincides with the dates reported in Hiebert for the first architectonic phase at Gonur South (1994).

Gonur South (Fig. 2) is located within the loop of a meandering palaeochannel, therefore the sediments interlayered between the two architectural phases of the site may have been determined by a flood or by a slight shifting of the water course. In any case they clearly indicate that the site was located close to a river which was still active during the fourth millennium BP.

The Gonur Graveyard

The graves of the cemetery located to the north west of Gonur South, dating to the Namazgha V period have been extensively looted (Salvatori 1993). The looters penetrated the inner chambers of the graves by digging small cylindrical shafts. While the graves were found to be filled with the same alluvial deposits in which they were excavated, the shafts opened by looters were filled exclusively with aeolian sand, often thinly laminated and intercalated with silt laminae (Fig. 7). This circumstance suggests that, at the time the graves were dug, there was still no aeolian sand input in the area and therefore the desert dune were inactive or they stood at a distance from the Gonur area. The looters' pits, which had been left open, were filled instead with transported sand and disturbed by occasional rains. Therefore at the time of the looting of the graveyard, the area had already been reached by the dunes prograding to the south. The looters' pit in grave 116 was found to be sealed by a fireplace containing Late Bronze Age material (Salvatori pers. com.) and it can thus be considered as the date *ante quem* for the ingression of the desert in the Gonur area and perhaps for the abandonment and ultimate decline of the site.

The Kelyadji Area

Stratigraphic sequences observed over several kilometres in lateral continuity, along fresh-cut irrigation channels, proved that in the whole desert area between Gonur and Kelyadji, below a veneer of aeolian sand, there are flood plain and channel deposits, consisting of fine sand, clay and lenticular sand bodies.

At the sampling site denominated M9 (Fig. 8), aeolian sand covers a buried soil containing Late Bronze Age archaeological material. The soil overlays alluvial finely laminated sand and silt. Inside the laminae occur occasional levels of carbonized swamp plants radiocarbon dated at 4,017±51 y. BP (GX 20858 - AMS).

At Kelyadji, about 20 km north of Gonur, the wind erosion removed the sand cover from a palaeochannel bringing to light its natural levee deposits composed of cross-bedded sandy bodies with a predominance of climbing ripples. At the top of the fluvial deposits an A1 thin horizon includes Andronovo sherds (Fig. 9).

On the base of the stratigraphic sections discussed above and their dating, the oldest age for the aggradation of the alluvial plain is the late fifth millennium BP. Fluvial activity is clearly recorded simultaneously to the live of the Bronze Age settlements. Stratigraphy and sedimentary facies confirm the close relationship between the archaeological sites and the palaeochannels. The Namazgha citadels were built upon an alluvial plain, close to active rivers courses.

The desactivation of the fluviatile net and the onset of the desertification occurred at the north, in the Gonur area, during the late Bronze Age, but at the same time in more southern position, for example at Garry Kishman and Takhirbai, fluvial sedimentation was still active during the Iron Age. Basing upon the stratigraphic sequence of the Anthiochus' wall (Angelucci and Cremaschi *infra*) it is possible that the sand dune reached the boundary of the Classical Merv oasis only during the first millennium BC.

Final Remarks

The present state of the information is still too scarse for reconstructing an exhaustive history of the Holocene environmental changes in the Murghab delta. However, several emerging facts made it possible to define the environmental conditions at the height of the Bronze and Iron Age, from the fourth to the second millennium BP and at the onset of the desert.

- The Murghab delta in the investigated area is constituted by alluvial sediments, ranging in size from clay to fine sand that were deposited at least from the fifth to the second millennium and subsequently covered by aeolian sand. The alluvial body covers an earlier dune system, a remnant of which was observed south-east of Yakeper.

- The sedimentary facies identified and the geomorphological characteristics of the meandering palaeochannels clearly indicate a water supply that was much greater than that of today. The palaeochannels were not ephemeral streams penetrating a desert area but branches of the Murghab delta system meandering over a true flood plain.

This disproves Gerasimov's claim (1978), as already pointed out by Mamedov (1984) for the Kyzyl-Kum desert, that during the Holocene no substantial climatic variations occurred with respect to the present desert conditions. The radiocarbon datings, available up to now, point to a larger availability of water until the second millennium BC, thus putting off by some two thousand years the beginning of the arid conditions reported by Mamedov (1984).

- While a punctual dating for each palaeochannel is not possible, comparison between the distribution of the archaeological sites and the palaeochannels, and the stratigraphic sequences observed at Gonur and Takhirbai, suggest that the river system was active until the end of the Bronze Age.

- The palaeochannel network was enriched by contemporary artificial canals. Their function is difficult to establish, because the density of the palaeochannels and the alluvial nature of the plain in which they are excavated, makes it difficult to imagine that they were made just for irrigation. It is more likely that these canals just represent adaptations of the river network to territorial management.

The artificial canals are concentrated in the area in which the main Bronze Age sites are located and slightly north of it. It is thus likely that they were contemporary with these sites although it cannot be excluded that they were modified and enlarged in later ages, but the palaeoidrography and the related canals in the Iron Age and Classical oases have been destroyed by the present agricultural pratice.

- The whole area is covered by aeolian sand organised in linear dunes. These dunes are systematically superimposed to the alluvial plain to the archaeological sites constructed on them and to the palaeochannels.

- The fluviatile deposits and the related archaeological sites have been discovered mainly in the deflated areas. The archaeological map resulting from the present survey gives evidence for fragments only of the archaeological landscape as many sites still lie buried beneath the sand dunes and are not accessible to surface reconnaissance. According to Sarianidi (1975), some thirty percent of the sites are probably buried under aeolian sand deposits.

- A comparison of the stratigraphic sequences north and south of the area so far investigated seems to indicate that the aeolian sand progradation, and therefore the desert onset has been time-transgressive. Aeolian sand deposition was active at the end of the third millennium, in the Gonur area, while only about one millennium later a longitudinal dune was prograding on the northern slope of the Takhirbai tepe. This may confirm the progressive contraction of the area subject to alluvial sedimentation, as originally asserted by Lyapin (1990) and recently reiterated by Koshelenko *et alii* (1994).

Consequently, while Bronze Age sites in the Gonur area lay at the surface, in the Garry Kishman area to the south they are buried beneath some metres of alluvial deposits.

Acknowledgements

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References

Dolukhanov, P.M. (1981) The Ecological Prerequisites for Early Farming in Southern Turkmenia. Kohl, P.L. (ed.), *The Bronze Age Civilisation of Central Asia – Recent Soviet Discoveries*, pp. 359-85. Armonk N.Y.

Gerasimov, I.P. (1978) Ancients Rivers in the Desert of Soviet Central Asia. Brice, W.C. (ed.) *The Environmental History of the Near and Middle East Since the Last Ice Age*, pp. 319-34. Academic Press New York.

Gorelov, S.K., Redzhepov, M. and Zhumashov (1984) *Origin of Reliev in the Central Kara-Kum Lowlands. Problemy Osvoeniya Pustyn'*, *5*, pp. 64-75.

Hiebert, F. T. (1994) Origins of the Bronze Age Oasis Civilization in Central Asia. *American School of Prehistorical Research*, Bulletin 42, Cambridge (Ma), p. 200.

Lyapin, A.A. (1990) *Paleogeografiya del'ty Murgaba (Bronzovy i zheleznyy veka). Problemy Osvoeniya Pustyn'*, *3*, pp. 57-65.

Masson, V.M. (1959) *Drevnezemledel'cheskaya Kul'tura Margiany-Materialy i isseledovaniya po arkheologii SSSR*, 73, Moskva.

Madenov, E. (1984) *Proluvial Desert Palaeoclimates in the Pleistocene. Problemy Osvoeniya Pustyn'*, *3*, pp. 10-16.

Marcolongo B. and Mozzi P. (1992) *Geomorphological and Palaeoenvironmental Observations Related to Ancient Settlement Patterns in the Murghab's Delta and Surrounding Areas and Included Geomorphological Map*. Unpublished Internal Report of ISMEO, Rome.

Nurberdyev, A. (1982) *On Soil Formation and Erosion of Takyrs. Problemy Osvoeniya Pustyn'*, *5*, pp. 9-17.

Kohl, Ph. (1984) *Central Asia Palaeolithic Beginnings to the Iron Age*. Editions Recherche sur les Civilisations, Paris.

Koshelenko, G.A., Gubaev, A.G., Gaibov V.A. and Bader A. (1994) Mervski oazis: dinamika sistem rasseleniya i irrigatsii. *Vestnik drevnei istorii*, 4, pp. 79-91.

Salvatori, S. (1993) The Discovery of the Graveyard of Gonur Depe-1. *Rivista di Archeologia*, XVII, pp. 5-13, Venezia.

Sarianidi, V. (1975) Novie otkrytiya v nizov'yakh Murghaba. *Arkheologicheskiye Otkrytiya - 1974 g*, pp. 528-530. Moskva.

Sarianidi, V. (1992) *The Oldest Merv*, Moskva.

Sample Name	Lab. Number	Date BP	Materials	Comments
M9	GX 20858 AMS	4017 ± 51 BP	Charred Plant Fragment	Overbank Clay
Site 55	GX 19833 AMS	3880 ±150 BP	Burnt Bones	Fluvial Sediments
Gonur South	GX 19834 AMS	3608 ± 75 BP	Charcoal	Fluvial Sediments
Takhirbai TH1A5	GX 20648	3375 ± 80 BP	Charcoal	Related to Channel Activity

Table I - Radiocarbon Datings for Fluvial Activity in the Murghab Delta.

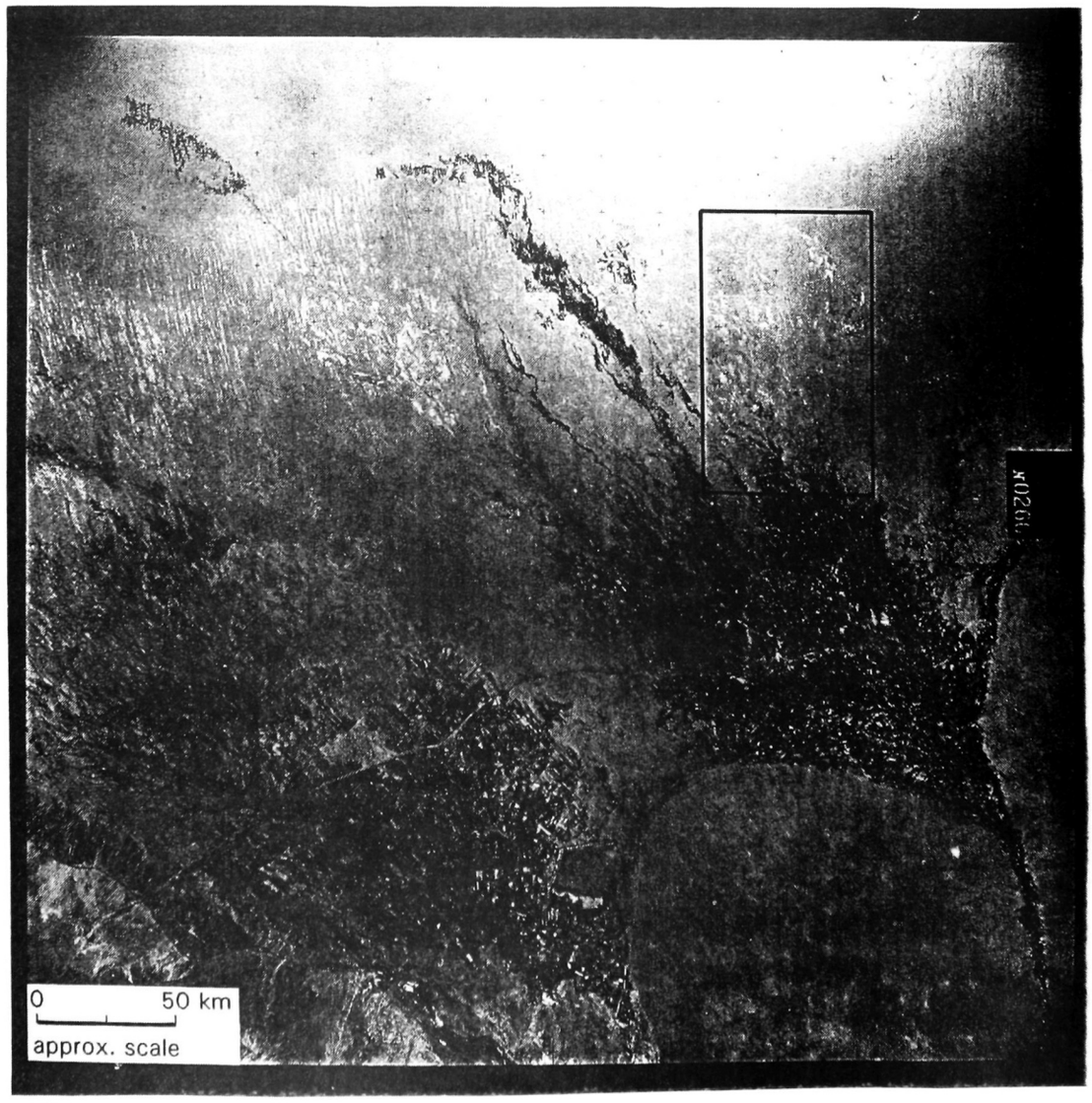


Fig. 1 - Soyuz satellite-photograph of present-day Murghab delta; the rectangle circumscribes the area of the geomorphological mapping. Dark colour indicates vegetations in the irrigated area and along the Murghab river and irrigation canals. The white area in the northern part of the photographs consists of the alluvial deposits of the Middle Holocene Murghab plain.

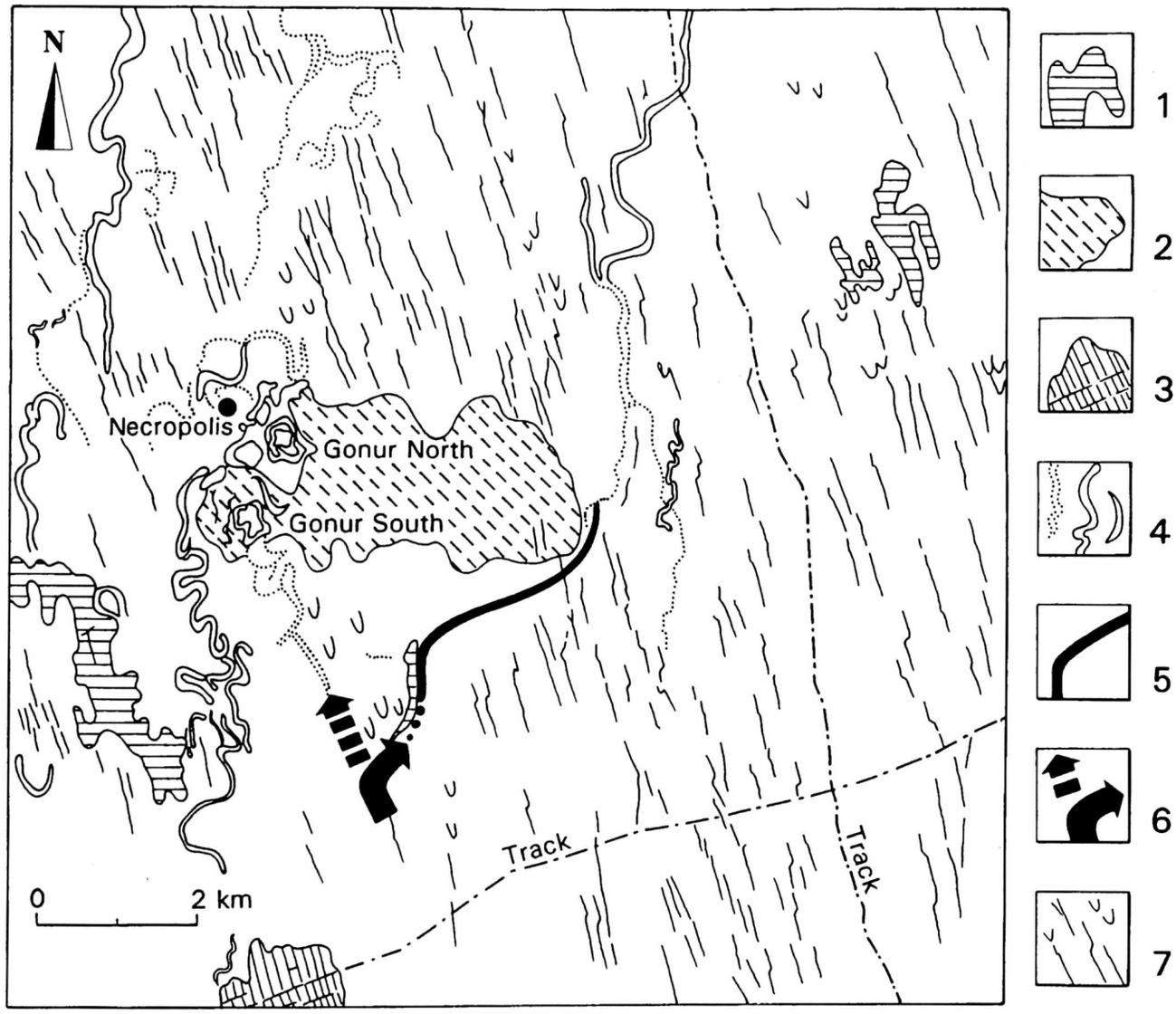


Fig. 2 - Geomorphological map of the Gonur area: below the dune ridges, dry palaeochannels and canals surround thearchaeological site. 1 - takyrs; 2 - archaeological zone of Gonur; 3 - present-day irrigation area; 4 - palaeochannels; 5 - artificial canals; 6 - artificial cut of a palaeochannel in a canal; 7 - dunes.

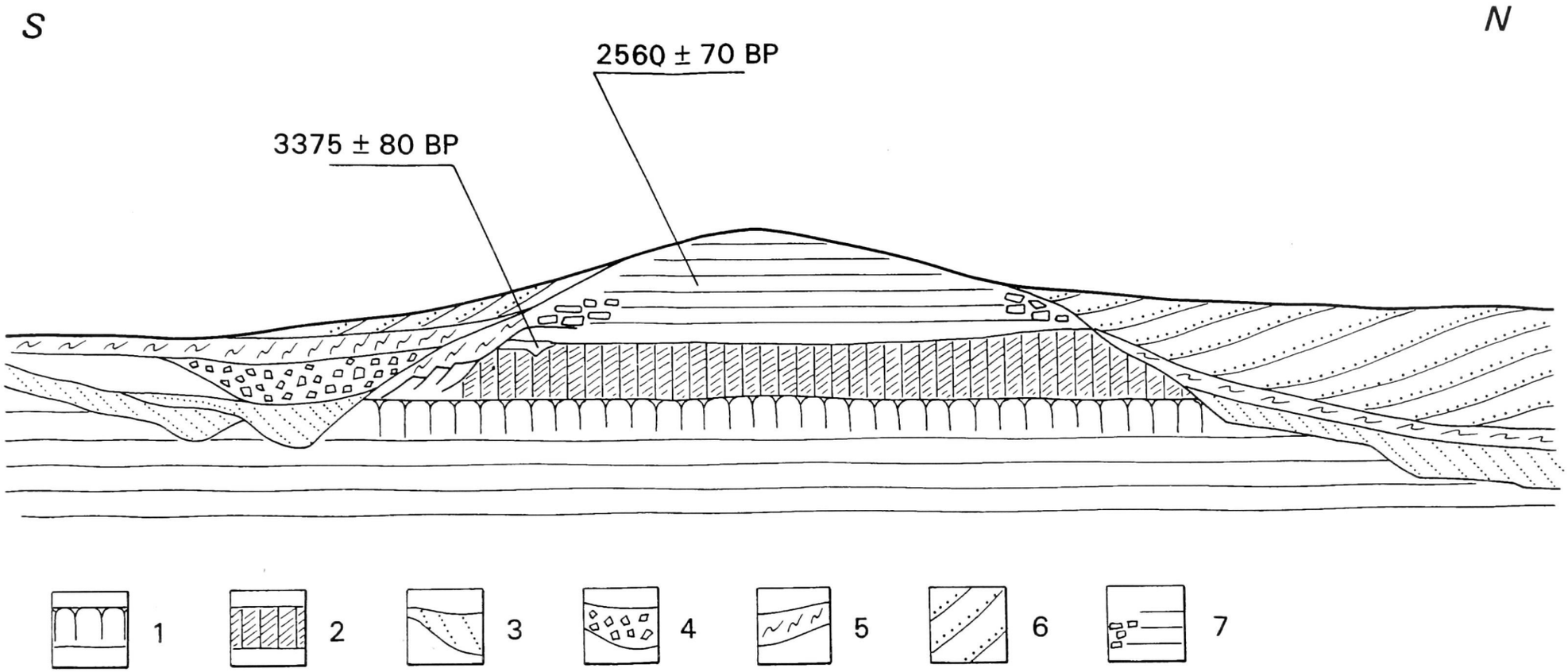
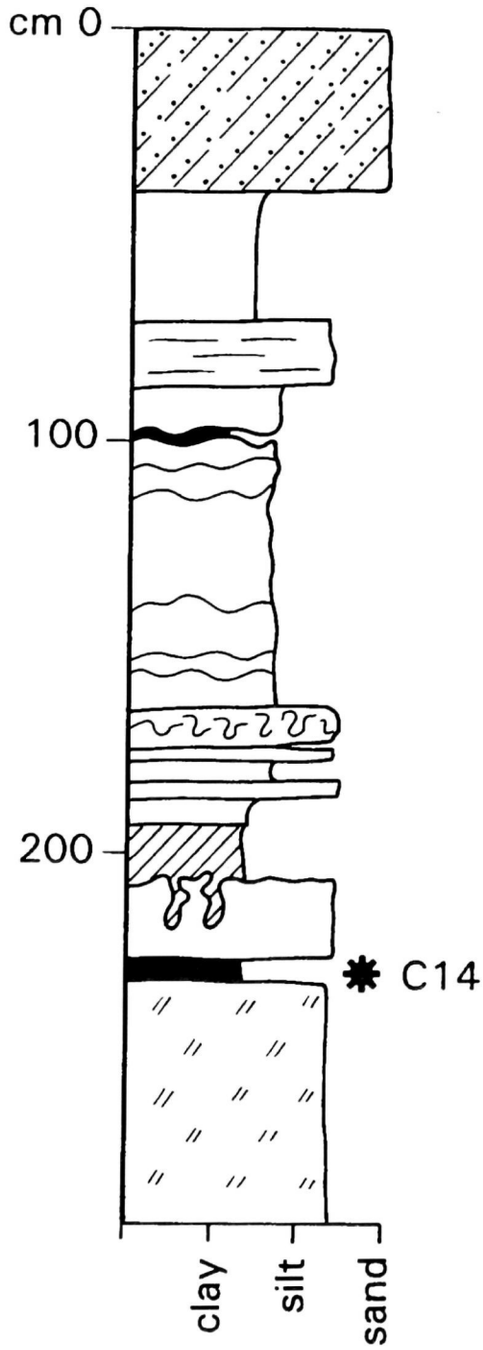


Fig. 3 - Stratigraphic section at Takhirbai 3. The platform and the older layers of the mound are connected to fluvial sedimentation occurring in the ditches which surrounded the site. 1 - fluvial deposits of overbank facies and top soil; 2 - platform, 3 - ditches filled by running-water sediments; 4 - ditch filled of colluvial material; 5 - colluvial deposits; 6 - dune and aeolian sands; 7 - archaeological stratification.



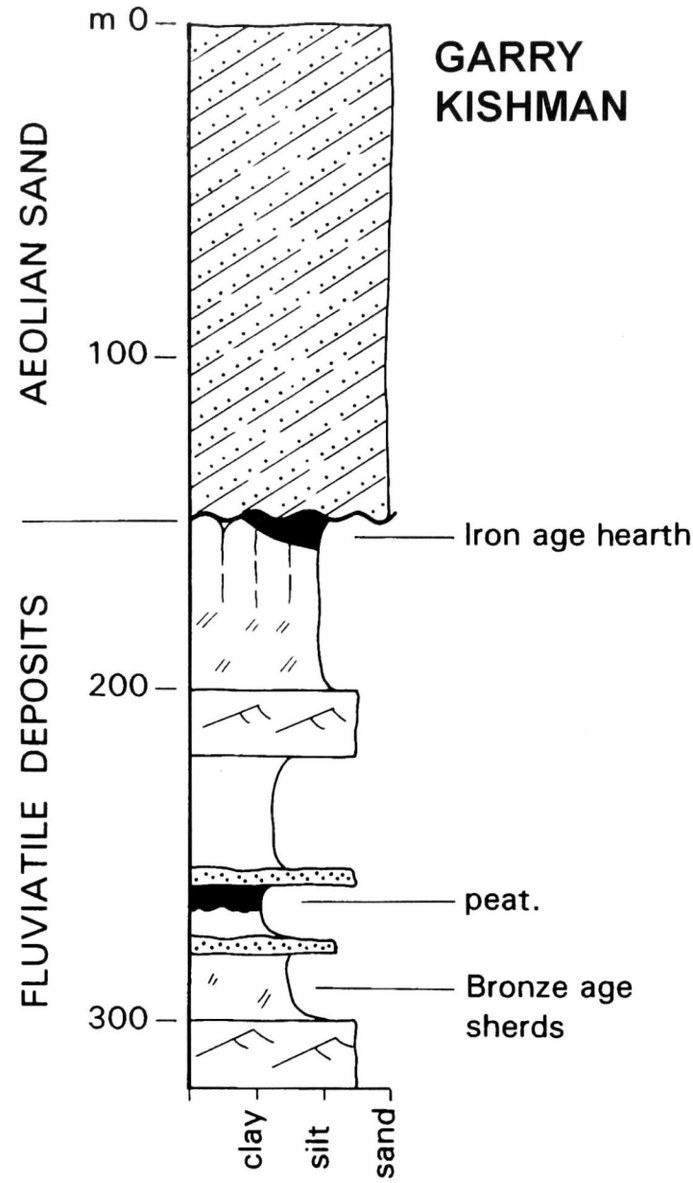


Fig. 5 - Stratigraphic sequence at Garry Kishman 2. Below a sand dune, alluvial deposits occur, including at the base Bronze Age sherds.

Fig. 4 - Stratigraphic sequence at the Site 55. Below wind blown sand, a thick alluvial sequence occurs which includes Bronze Age sherds. In the lower peat layer the sample for radiocarbon dating has been collected.

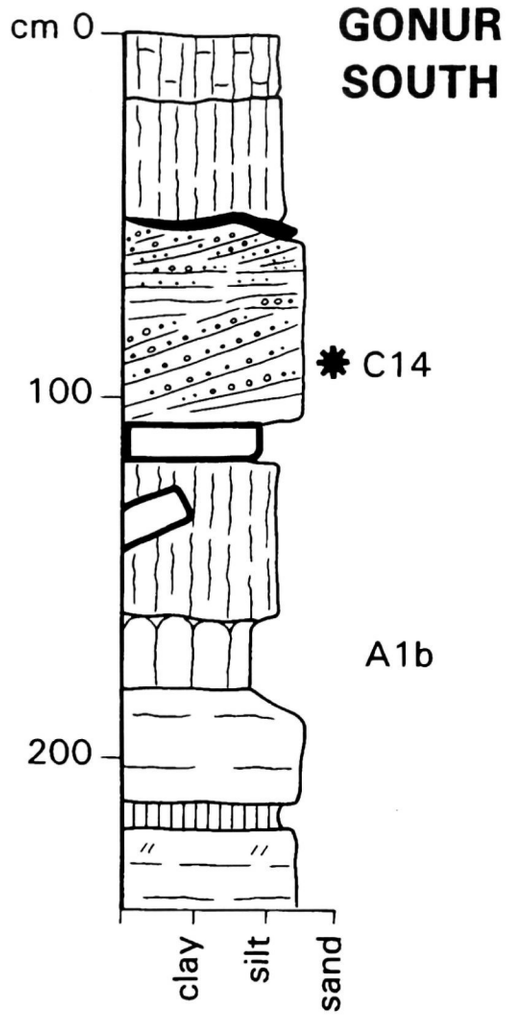


Fig. 6 - Stratigraphic sequence inside the room 629 at Gonur South. Two phases of building construction are separated by fluvial sediments where charcoals for radiocarbon dating have been collected. The archaeological sequence lies upon overbank sediments covered by a weakly developed soil (A1b).

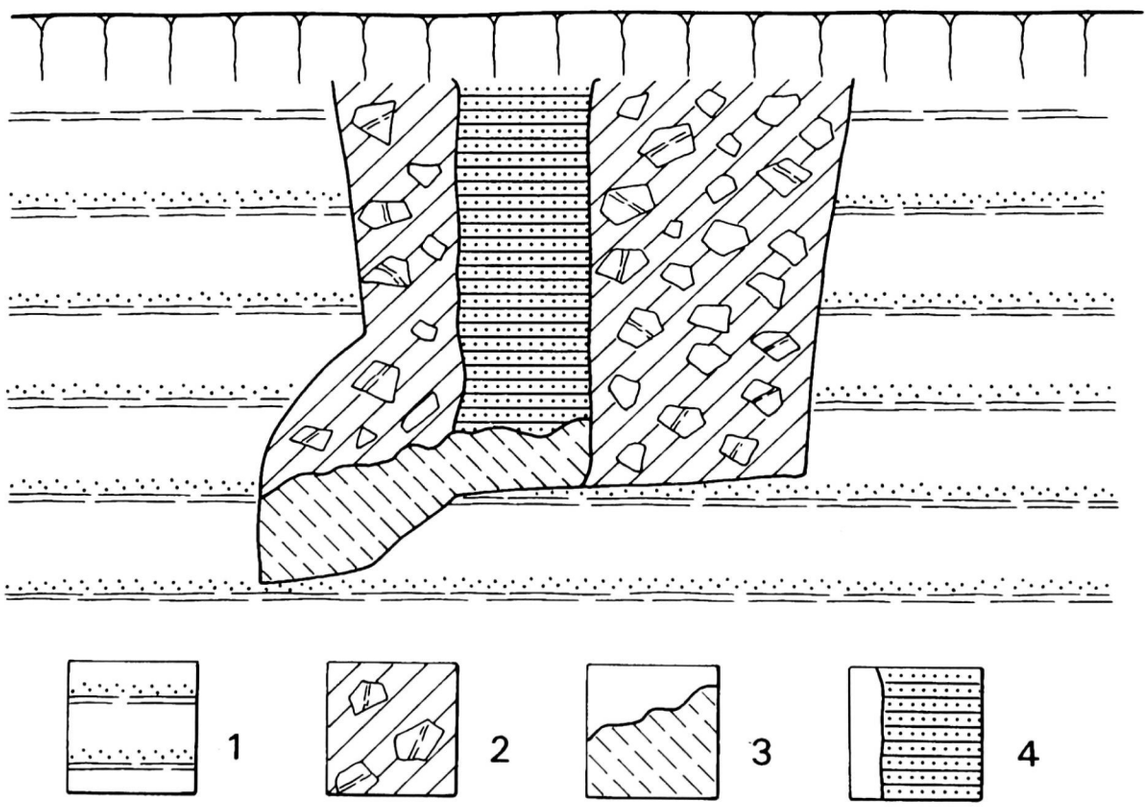


Fig. 7 - Schematic cross section of grave 34 of the Gonur cemetery. The pit excavated by looters inside the grave is filled by aeolian sand. 1 - alluvial deposits; 2 - fill of the grave; 3 - collapsed fill; 4 - fill of the looters' pit.

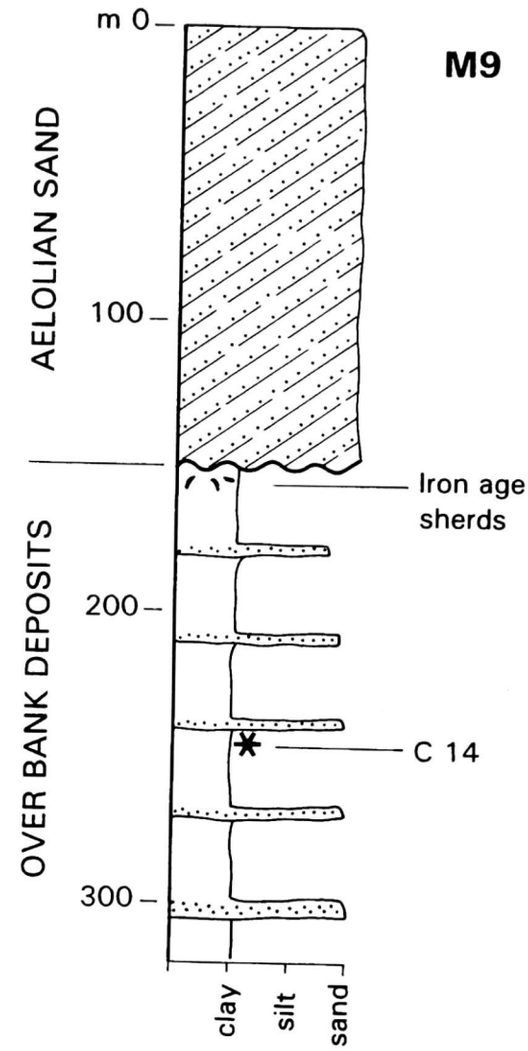


Fig. 8 - Stratigraphic diagram at site M9. Below thick aeolian sand overbank fluvial deposits occurs. Location of the sample for radiocarbon dating is indicated.

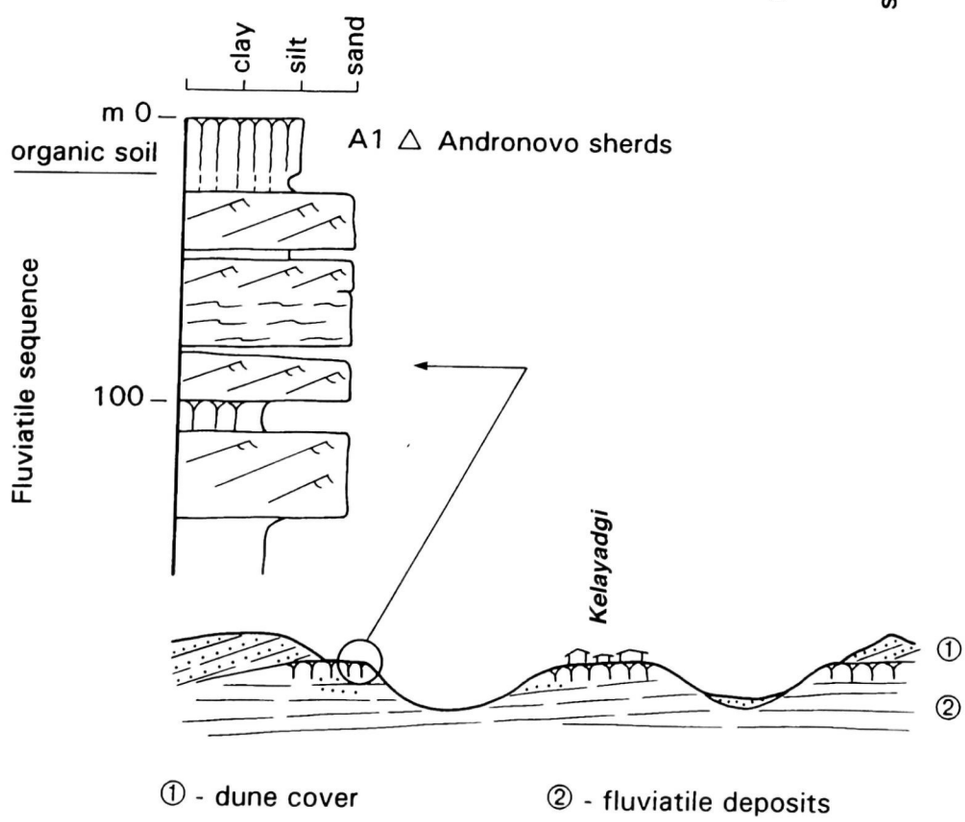


Fig. 9 - Geological cross section at the Kelyadji site. In a large blowout, below sand dunes, fluviatile sequence occurs in which a meandering palaeochannel is downcut. On the bank of the palaeochannels an archaeological site, including Andronovo pottery, has been found.

OFF-SITE ARCHAEOLOGICAL TRANSECTS IN NORTHERN MARGIANA

by S. Cleuziou, V. Gaibov and A. Annaev

The development of a fully comprehensive archaeology of landscape and land use implies the development of methods that can accurately explain horizontal dispersal of archaeological items outside the places recognized as archaeological sites. In the arid steppe environments of the Near and Middle East, it is commonly assumed that the erosion of the slopes of the tells is responsible for the dispersion of sherds on a vast surrounding area, while in temperate countries it is often assumed that the presence of sherds far away from known site is an effect of their transportation by ploughing activities. Recent studies in Western Europe, Greece or northern Syria have shown that, apart from the close vicinity of the sites, such factors are not the only ones. The transportation by man of rich organic soils or compost from the settled areas to bring manure on the cultivated fields is much likely to be responsible for the presence of sherds far away from settled areas. Such an hypothesis may therefore be used to understand the extension and evolution of cultivated areas around the sites. There are of course obvious pitfalls. The recent use of soil taken from the IVth and IIIrd millennium cultural layers of Ak-depe near Ashkhabad by local peasants does not give any indication on the extension of Bronze Age cultivated fields. But in areas where no settlement has occurred since long time, the method may be a powerful tool in the reconstruction of land use.

Such methods have recently be successfully applied by T.J. Wilkinson in his study of territories around the Bronze Age sites of the Jazira of northern Iraq, and their methodology is detailed in several very interesting papers (Wilkinson 1982; 1988; 1989; 1990; 1992). The desert areas of northern Margiana that until recently had been left uncultivated since protohistoric times seemed to represent an adequate area for such explorations, and three experimental transects have been made in order to check if it was possible to delineate ancient agricultural territories, using Wilkinson's assumptions.

Method

Sampling of all sherds by squares of 10x10 m at regular intervals, following the method developed by T.J. Wilkinson in the Jazira of northern Iraq (Wilkinson 1982; 1984).

All the distance has been walked and sampling areas were selected each ca. 150 m, following the indications given by the navigation screen of a GPS. When crossing difficult areas (mainly *barkhan* or areas with dense vegetation, we selected for sampling the nearest possible area (if any). All points have been fixed with GPS, using a Trimble Ensign-GPS. Setting was made on 3D-mode, using WGS-84 datum, 210 as height of antenna, and Magnetic north (for the purpose of bearing control). Sampling squares were traced by pace. All sherds were counted and left on the field in a corner of the square, except rimsherds that have been systematically collected. Points are named after their number in the GPS library of waypoints during transects, and this number is written on the bag.

Three transects were worked in two different areas. Transect 1 runs east to west between Takhirbai 1 and Site 55, while transect 3 runs perpendicular northwards from it to Togolok 1. Transect 2 runs between two "Achaemenid" fortresses, site 172 and 215.

All over the walked area, sherds were present almost everywhere. they were found in recently ploughed areas as well as on untouched ones, and only dense vegetation appeared as an obstacle to the work. At this very experimental stage of work, we did not make any attempt to evaluate the loss of information due to each particular condition. The results are tabulated below, giving for each point an idea of surface condition and of the kind of material found, as we also suspect that average size of material may also be indicative. We therefore use "small" for sherds less than 2-3 cm in their largest dimension, medium to sherds less than 7-8 cm, and large for the others. No measure were taken and these indications are only the result of our own estimations.

Transect 1: Between Takhirbai 1 and Site 55 (20/9-21/9/94)

The transect started immediately west of Takhirbai Brigade (N: 38°03'575; E: 62°04'602), following a bearing of 073 westwards.

Point	North	East	Sherds	Surface	Comments
8	38°03'555	62°04'523	97	Flat zone of takyr, covered with sparse bushy vegetation	Most sherd very small. Some Yaz I material
9	38°03'541	62°04'434	5	Flat takyr with rather dense covering of Camel-thorn bushes	Small to medium
10	38°03'533	62°04'383	0	Beginning of Sandy area	
11	38°03'511	62°04'253	1	End of sandy area, flat takyr	
12	38°03'501	62°04'178	8	Flat takyr, sandy surface, very sparse vegetation of low saxaul bushes	
13	38°03'491	62°04'110	0	South/north course of a canal, perturbation area, no sampling possible	
14	38°03'477	62°04'017	1	Flat takyr, very sparse vegetation of low saxaul bushes	
15	38°03'462	62°03'955	0	Flat takyr, sparse vegetation of low saxaul bushes	
16	38°03'451	62°03'882	260	Very low undulated silt surface east of an old disused channel, sparse saxaul bushes	
17	38°03'438	62°03'821		Western limit of the above quoted area, beginning of modern abandoned field	Not sampled
18	38°03'411	62°03'724		Western limit of the modern abandoned field, beginning of a barkhan area	Not sampled
19	38°03'397	62°03'686	49	Very flat takyr, immediately west of the sandy area	Small to large sherds
20	38°03'380	62°03'598	80	Large area of low undulated silt, sparse saxaul covering	Includes 12 rimsherds, from medium to large
21	38°03'366	62°03'510	15	Rather flat silty area with sparse saxaul covering	3 rimsherds
22	38°03'355	62°03'386	0	Low undulated silt, very scarce vegetation	
23	38° 03'319	62°03'292	5	Low undulated silt, very scarce vegetation	
24	38°03'249	62°03'171	26	Flat area with light sandy covering and sparse saxaul	6 rimsherds, number is underestimated due to sandy covering
25	38°03'249	62°03'055	210	Flat takyr area appear under sand cover of small barkhans, sparse saxaul vegetation	very small to small sherds, number is underestimated due to sandy covering
26	38°03'237	62°02'973	136	Undulated silty area with sparse saxaul vegetation	very small or small sherds
27	38°03'222	62°02'888	16	Almost flat silty area, little sand, sparse saxaul vegetation	
28	38°03'217	62°02'771	0	Flat takyr area, rather dense bushy vegetation	
29	38°03'196	62°02'661	0	Barkhan area	
30	38°03'168	62°02'572	9	Area where takyr appear by places under barkhans	Underestimated, only 25% of surface free of sand
31	38°03'153	62°02'494	12	Flat takyr area, rare saxaul vegetation	Small
32	38°03'136	62°02'426	0	Modern abandoned fields covered with almost continuous vegetation of camel-thorn bushes	No sampling possible

Point	North	East	Sherds	Surface	Comments
33	38°03'114	62°02'367	2	First hole in the vegetation crossed since point 33, still in modern abandoned fields	Medium
34	38°03'109	62°02'241	14	Flat takyr area covered with sparse saxaul vegetation	Medium size
35	38°03'107	62°02'099	69	Silty area with sparse saxaul vegetation	Small to large
39	38°03'106	62°01'940	272	Flat takyr area perturbed by long and deep N/S bulldozer trenches	Medium to large
40	38°03'039	62°01'892	1141	Silty surface with light sand covering, sparse saxaul vegetation. Must be a site	All sizes, including circular reshaped sherds
41	38°02'983	62°01'837	155	Silty surface with sparse saxaul vegetation, light sand cover	Medium size
42	38°02'918	62°01'792	73	Flat takyr with rather thick sand covering	medium to rather large, including Yaz III, Late Sasanian and early Islamic
43	38°02'862	62°01'707	108	Flat takyr. Very sparse saxaul vegetation	Small and medium
44	38°02'808	62°01'639	535	Small depression of flat takyr across a large barkhan area	Medium to large
45	38°02'739	62°01'572	0	Sandy covered area, very sparse saxaul vegetation	
46	38°02'685	62°01'526	4	Sandy covered area close to the eastern bank of an active aryk	
47	38°02'638	62°01'482	11	Sandy covered area with sparse camel-thorn bushes	Small to medium size
48	38°02'564	62°01'402	14	Sandy covered area with sparse saxaul vegetation	Very small to medium
49	38°02'551	62°01'351	198	Flat takyr area free of sand	Small to medium
50	38°02'476	62°01'309	20	Flat takyr area, light sand cover, sparse saxaul vegetation	Small to medium size
51	38°02'427	62°01'265	20	Flat takyr area, light sand cover, sparse saxaul vegetation	Medium size
52	38°02'370	62°01'211	150	Flat takyr area, light sand cover, sparse saxaul vegetation	Small to medium size
53	38°02'308	62°01'172	638	Large flat takyr area free from sand and vegetation	Very small to small
54	38°02'245	62°01'172	2041	Large flat takyr area free from sand and vegetation	Very small to small, 3 sherds of painted Yaz I pottery
55	38°02'156	62°01'027	> 2000	Site 55	Not sampled

TRANSECT 2: FROM FORT 215 TO FORT 172 (22/9/94)

The transect was planned between two forts belonging to the Achaemenid fort line.

Point	North	East	Sherds	Surface	Comments
15	38°03'939	62°09'125		Departure from fort	Not sampled
16	38°03'875	62°09'144	12	Flat takyr area, sparse vegetation	Small to medium, plus 5 fragments of brick

Point	North	East	Sherds	Surface	Comments
17	38°03'800	62°09'179	17	Flat takyr depression across a barkhan area	Medium size
18	38°03'748	62°09'213	0	Barkhan area	
19	38°03'698	62°09'249	2	Flat takyr depression across a barkhan area	Medium size
20	38°03'655	62°09'282	10	Flat takyr depression across a barkhan area	Small size
22	38°03'589	62°09'314	2	Flat takyr depression across a barkhan area	small, one piece of stoneware
23	38°03'541	62°03'541	9	Flat takyr depression across a barkhan area	Small to medium
24	38°03'500	62°09'402	0	Flat takyr depression across a barkhan area	
25	38°03'399	62°09'468	4	Flat takyr depression across a barkhan area	Small
26	38°03'293	62°09'540	4	Flat takyr depression across a barkhan area	Small to medium
27	38°03'222	62°09'576	0	Flat takyr depression across a barkhan area	
28	38°03'172	62°09'669	0	Flat takyr depression across a barkhan area	
29	38°03'067	62°09'669	37	Flat takyr, almost free of sand	Very small
30	38°03'019	62°09'726	194	Flat takyr	Very small to small, one iron slag and 4 fragments of brick
31	38°02'985	72°09'744		Fort	Not sampled

TRANSECT 3: FROM POINT 43 OF TRANSECT 1 TO TOGOLOK 1 (23/9/94).

Starts northwards from point 43 of transect 1.

Point	North	East	Sherds	Surface	Comments
9	38°02'985	62°01'642	69	Flat takyr, sparse vegetal cover	Small to medium size
10	38°03'022	62°01'627	158	Flat takyr, sparse vegetal cover	Medium size
11	38°03'083	62°01'603	6	Flat takyr, rather dense vegetal cover	Medium size - underestimated due to vegetal cover
12	38°03'146	62°01'583	20	Flat takyr, rather dense vegetal cover	Medium size
13	38°03'214	62°01'552	66	Flat takyr, rather dense vegetal cover	Medium size
14	38°03'324	62°01'575	4	Sandy covered takyr with 50 cm deep parallel trenches dug for agricultural purpose	Underestimated
15	38°03'995	62°01'548	6	Sandy covered takyr with 50 cm deep parallel trenches dug for agricultural purpose	Medium size, number underestimated
16	38°03'480	62°01'498	14	Flat takyr	Medium size
17	38°03'547	62°01'462	7	Sandy covered takyr with 50 cm deep parallel trenches dug for agricultural purpose	Medium size, number underestimated

Point	North	East	Sherds	Surface	Comments
18	38°03'618	62°01'444	5	Flat takyr with light sandy cover and rather dense vegetation	Small size
19	38°03'722	62°01'412	473	Small takyr depression across a large barkhan area	Probably an over-concentration due to depression
20	38°03'823	62°01'367	148	Takyr, sparse vegetation	Small and medium size
21	38°03'872	62°01'294		Out of transect. Heavy concentration of large sherds in the turning marks of the machines at the end of a cultivated field	Yaz III and possibly Late Bronze Age. Very large fragments of very large storage vessels
22	38°03'919	62°01'293	34	Flat takyr area, no vegetation	Very small, a few large ones
23	38°03'989	62°01'294	18	Flat takyr area, no vegetation	Medium size
24	38°04'092	62°01'258	18	Flat takyr area, no vegetation	Medium size
25	38°04'092	62°01'226	37	Flat takyr area, no vegetation	Small and medium size
26	38°04'248	62°01'129	47	Flat takyr area, ploughed and abandoned, no vegetation	Small and medium size
27	38°04'338	62°01'022	36	Flat takyr area, ploughed and abandoned, no vegetation	Medium size, half a small biconical spindle whorl of white stone was found between 26 and 27
28	38°04'411	62°01'006	10	Flat takyr covered with dense vegetation	Medium size - probably underestimated
29	38°04'509	62°01'012	4	Flat takyr	Medium size
30	38°04'991	62°00'982	6	Deep ploughed field	Underestimated
31	38°04'666	62°00'945	10	Deep ploughed field	Underestimated
32	38°04'813	62°00'909	24	Flat takyr area, no vegetation	
33	38°04'941	62°00'823	3	Slightly undulated area of takyr	Small size
34	38°05'071	62°00'750	24	Slightly undulated area of takyr	Middle size
35	38°05'071	62°00'750	20	Ploughed field	Medium and large size
36	38°05'249	62°00'698	8	Ploughed field	Medium size
37	38°05'355	62°00'601	14	Takyr area	Small size
38	38°05'432	62°00'598	56	Takyr area	Small to medium, some Late Bronze Age
39	38°05'515	62°00'528	26	Takyr area	Small to medium
40	38°06'602	62°00'502	2	Ancient ploughing, sparse vegetation	Small
41	38°05'694	62°00'456	13	Ancient ploughing, sparse vegetation	Small
42	38°05'777	62°00'431	0	Ancient ploughing, sparse vegetation	
43	38°05'880	62°00'386	0	Ancient ploughing, sparse vegetation	
44	38°05'958	62°00'355	2	Ancient ploughing, sparse vegetation	Medium size
45	38°06'100	62°00'328	105	Small takyr depression across a large barkhan area	Very small to small
46	38°06'197	62°00'244	207	Large takyr depression across the barkhans	Very small to medium
47	38°06'294	62°00'219	141	Large takyr depression across the barkhans	Very small to medium
48	38°06'393	62°00'193	149	Large takyr depression across the barkhans	Very small to medium

Point	North	East	Sherds	Surface	Comments
49	38°06'461	62°00'140	1968	Flat takyr, very sparse vegetation	All sizes, many very small
50	38°06'527	62°00'119	> 2000	Flat takyr, very sparse vegetation	All sizes, many very small
51	38°06'585	62°00'093	> 2000	Flat takyr, very sparse vegetation	All sizes, many very small
52	38°06'649	62°00'076	> 2000	Flat takyr, very sparse vegetation	All sizes, many very small
53	38°06'709	62°00'050	> 2000	Flat takyr, very sparse vegetation	All sizes, many very small
54	38°06'760	62°00'015	> 2000	Flat takyr, very sparse vegetation	All sizes, many very small
55	38°06'760	62°00'015		Ancient excavation on the summit of Togolok 1	

INTERPRETATION

These few days of work have clearly demonstrated the interest and feasibility of such transects. Material was clearly present whathever the situation that was faced, and only recent dense covering of sand appears as a significant obstacle. The best situation is of course that found on *takyr* surface that have been left untouched since Antiquity, but even in deep ploughed fields sherds were found, although in clearly lower number than on *takyr* flats. In these fields, the average size of the sherds is also larger, probably due to the fact that the smaller sherds were not so easily spotted. These types of areas should clearly be treated separately when integrating statistical figures. Another factor of perturbation may be over concentration sherds in depressions, that should preferably be avoided. But here again correcting factors can be found in the case of statistical treatment.

As a result, and with the exception of fully sand covered areas, the absence of sherds can be considered significant when recurrent on more than one sampled point.

Transect 1 was laid across an area with Iron Age occupation, mostly identified as Yaz II-III with some Yaz I material. Sherds density quickly lowers west of Takhirbai 1 (point 8) and stays very low (less than 10) until point 15. It abruptly raises at point 16 (260) along a disused *arik*. It remains high until point 20, and this may be interpreted as the presence of a small farmstead (not reported on the prospection map). It then goes down (reaching 0 in point 22, but a single point should not be considered significant) to raise again from point 24 to 27, reaching figures over 100 and this area should be given the same interpretation. Between 27 and 34 we meet again low values (around 10, the 0 being considered as non significant due to surface context). From point 39 to 44, we hit a larger site, with average values ranging over 100, the peaks at 1141 (point 40) and 535 (point 44) corresponding to the proper settled areas. This corresponds to site 148 identified northwards by the prospection team. South-west of it, and with the exception of sand covered areas, we always meet a significant amount of sherds, 10 to 20 until at point 52 we reach the edge of the proper erosion sherd scatter around large Site 55 (the area being identified as sites 146 and 147 by the prospection team). An isolated peak at point 49 (198) is probably linked to the presence of a small settlement or farmstead northwards (see transect 2). If we consider Wilkinson's hypothesis valid, we can conclude that all the area between Takhirbai 1 and Site 55 was cultivated in the Iron Age, alternating farmsteads and larger sites, with possibly lower intensity in the eastern part of the transect.

Transect 3 was laid with the purpose to find limits between the northern extension of Iron Age cultivated area, covering or not earlier Bronze Age fields. Sherds were only identified on the field, but without any difficulty and these identification can be considered as accurate for our purpose.

From the starting point of the transect until point 22, we crossed an area where sherds are always present. The average density ranges between 10 and 20 until point 19, if we accept that in several points the amount of sherds was underestimated due to surface condition The whole area should correspond to cultivations linked to site 148, but we clearly are out of the site itself except maybe at point 13 where the density reaches 69. High densities between 19 and 23 may be linked to sites 149 and 150, although another farmstead or site located slightly westwards should also be considered, according to the situation at point 21. This point was outside our bearing, at the northern end of a deep ploughed field, and a dense covering of large sherds probably concentrated there by the ploughing machines attracted one attention. The presence of large fragments of Yaz III storage vessels probably witnesses the nearby presence of a settled area buried under the sediments and that was hit by the ploughs. Among these sherds were also the southernmost Late Bronze Age sherds found during the transect.

North of point 22, the density of sherds remains rather high, ranging around 20 if we correct the figures obtained in ploughed fields. We run parallel to a series of sites identified during the prospection (150 to 154), broadly following a meanderizing fossil water course on our right side. Whether the figures obtained are due to man transport through manuring of the field or to the erosion of the sites should of course be questioned. Although these sites have been identified as Namazga VI during the prospection, no sherd securely attributable to this period were found, and this may be an indication that transport of Iron Age sherds, wathever its origin, has obliterated earlier configuration. It is only at point 38 that Late Bronze Age sherds were securely found again, just before a significant lowering of the amount of sherds

between points 40 and 44. Point 39 also marks the northernmost extension of Iron Age sherds, and probably that of Iron Age fields (no secure attribution can be made for the two sherds of point 40, while the only decidable ones of point 41 were considered as probably Bronze Age). The gap between 40 and 44 may be the result of ploughing, although we consider that the density of sherds met from 45 northwards would have led to definitely higher figures if it continued to the south. It is also to be stressed that sites 192-194, 3-400 m to the east, have no apparent influence on the figures on this part of the transect.

From 45 to 49, we meet large densities of Bronze Age sherds that can be interpreted either as the product of the erosion process on nearby Togolok site, or as densely manured Bronze Age fields. The proper scatter clearly related to the site starting at point 49, where density much over 2000 are found all over the flat area dominated by Bronze Age mounds. This rapid fall-off of sherd density between points 48 and 49 marks however a clear border, that is more likely to be due to land use than to erosion process, where less discontinuity would have been expected.

Transect 3 is probably the easiest one to interpret. Sherds concentration falls rapidly when leaving fort 215, and the presence of brick fragments in point 16 clearly indicates that we are still there in the area of erosion deposits. Very low concentrations occur until point 26, even reaching 0, with the exception of points 20 and 23 that may be due to the presence of a small flat site located 2/300 m eastwards. They raise again abruptly at point 29, when the erosion deposits coming from fort 172 are found. Following Wilkinson's hypothesis, we may assume that the forts were settled in an almost empty area.

Conclusions

This work was only a preliminary test application, and can only take sense in relation with other types of work developed in the area, noticeably the pedological reconnaissance developed by M. Cremaschi (this volume). As far as Bronze Age is concerned, the southern limit obtained in transect 3 may only be linked to the fact that Iron Age fields southwards have obliterated earlier fields, and the empty space south of these Bronze fields may be considered as the result of recent alterations of the surface by ploughing. This is coherent with Cremaschi's demonstration of a continuous occupation of the alluvial fan during Bronze Age, against the generally accepted hypothesis of isolated oases. It would be interesting in this respect to walk east-west transects off the Bronze Age sites in the future. Transect 1 displays a type of settlement where small farmsteads alternate with larger sites. Sherds are again present everywhere. Only the area east of Takhirbai 1 may be considered as almost empty, and some more transects may help to check the idea of an Iron Age land use interdigitating cultivated areas along the water courses with desert or desertified areas, although none of these can really be considered as "empty". Transect 2 clearly concerns a different environment, as the density of sherds is constantly very low. This may indicate occasional land use, or no land use at all, depending to the level under which we consider the number of sherds found on 100 square meters at less than one kilometer from a site to be casual and non significant.

There is no doubt that northern Margiana is an adequate field for the application of such methods, and that results can be gained both from systematic grid sampling of large selected areas or from transects, that will gain significance if linked to proper soil and canal survey. Other surveys of this type should be tried in long time cultivated areas of the southern part of the delta as well, as previous work in Europe also demonstrated the interest of such procedures (Wilkinson 1982). The technology is nowadays simple and only a GPS, accurate knowledge of pottery and a dedicated and enthusiast archaeologist are requested.

Bibliography

Wilkinson, T.J. (1982) The Definition of Ancient Manured Zones by Means of Extensive Sherd Sampling Techniques, *Journal of Field Archaeology*, 9: 323-33.

Wilkinson, T.J. (1988) The Archaeological Component of Agricultural Soils in the Middle East: The Effects of Manuring in Antiquity, in: W. Groenman van Waateringe and M. Robinson (eds.), *Man Made Soils. Symposia in Environmental Archaeology*, BAR S.410, Oxford: 93-114.

Wilkinson, T.J. (1989) Extensive Sherd Scatters and Land-Use Intensivity: Some Recent Results, *Journal of Field Archaeology*, 16: 31-46.

Wilkinson, T.J. (1990) The Development of Settlement in the North Jazira Between the 7th and the 1st Millennia BC, *Iraq*, 52: 49-62.

Wilkinson, T.J. (1992) Off-site Archaeology, *National Geographic Research & Exploration*, 8(2): 196-207.

PRELIMINARY ANALYSIS OF THE BRONZE AGE MATERIAL COLLECTED BY THE MARGIANA ARCHAEOLOGICAL PROJECT AND A FIRST CHRONOLOGICAL ASSESSMENT

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This preliminary examination of the material gathered during the surface survey follows a basically selective approach. This was due not only to reasons of time but even more to reasons inherent in the prevailing logic underlying the publication of the materials from excavations carried out in the area since the fifties. We have therefore limited the examination to those materials that can be related with a fair degree of confidence to relatively precise phases of the protohistoric Margiana sequence. We are still left with a large area of uncertainty as a reliable and comprehensive typo-chronological sequence of the cultural subphases of Bronze Age Margiana are still not available. Within the above limits we shall treat a number of specific categories of materials either single or in groups.

ANTHROPOMORPHIC FIGURINES (FIG. 1)

The fine series obtained from sites **340**/614 ([1]), **395**/584, **409**/585, **414**/600-601 and **643** without any doubt bear witness to the spread of the Middle Bronze Age settlements. Similar examples, related to the same typologies, had already been reported at Kelleli (Masimov 1979 figs. 7:5,12), Togolok 21 (Sarianidi 1990 Pl. LXXVIII:1,7), Gonur 1 North (*Ibidem*, Pl. XXII:1 - room 23; Pl. XVI:3 and XVII:4 -surface; Pl. XVII:1- room 4; Pl. XVI:9, 11, 12), Togolok 1 (*Ibidem*, Pl. XVIII:1; XXI:5). The distribution of this kind of figurines outside Margiana is limited to the piedmont strip of Turkmenistan. However, even though the relationships with this area emerge from precise and thorough scrutiny, as a general rule the productions do not completely coincide stylistically. The production known to come from sites like Namazgha and Altyn is easily distinguished from that from the Margiana sites where, for instance, examples with applied and formally elaborated hair styling are absent. The two productions are certainly related and largely contemporaneous, although they can easily be broken down into regional sets on the basis of features that, although formal, are heavily marked by a set of characters. It is still possible that in future we shall succeed in clearing up a diachronic development for the two productions, as seems to be indicated by the Altyn series (levels 0-2) published by Udeumuradov (1993), a series apparently akin to one of the "simplest" Margiana types.

Nevertheless, it must be emphasised that the production of this type of anthropomorphic figurine comes to an abrupt halt at the end of the Middle Bronze Age (Namazgha V), both on the piedmont plain and in Murghab delta and thus it can be considered as a highly discriminating pointer in the chronological attribution of the sites in the area.

CERAMIC ZOOMORPHIC FIGURINES (FIG. 2)

The examples **394**/615 and 624, **412**/590, **67**/116 and 339, **64**/117, **172**/492, **234**/470 and **438** belong to a specific category of zoomorphic figurines, namely those used to decorate the rim of pots so far found only in Margiana. Several almost intact specimens have been found at Togolok and Gonur in Late Bronze Age layers ([2]).

ALABASTER (CALCITE) VESSELS (FIG. 3.1-2)

Fragment **414**/586 belongs to a cylindrical or sub cylindrical alabaster vase type with a flaring rim distributed throughout the Near and the Middle East during the 3rd millennium BC. Another calcite vessel fragment was found at site **132**/197. In Margiana there are not many published finds, at least to our knowledge, of this particular type of vase. There are only single fragments from Kelleli (Masimov 1979: fig. 12:14), Togolok 15 (Sarianidi 1990 Pl. XXVII:2), Togolok 1 (*Ibidem*, Pl. XXVII:1) and Gonur 1 South (Hiebert 1994a: fig. 9.10:7). A complete specimen was instead

([1]) The first number is that of the site, the second one after the slash is the inventory number of the item.

([2]) Gonur 1: Sarianidi 1990, Pl. XII:8; XXIV; L:1-3; LXXVII:2,4,6; one complete specimen was recovered from a surface level at Gonur South during the 1991 Autumn campaign; Togolok 21: *Ibidem*, Pl. XII:6-7; LXXIV; LXXV:1 -room 28; 2- room 14; 3 -room 4; 4 -room 56; LXXVI:3 -room 156; 2 -room 12; LXXVII: 9-11 surface; 1 - room 51; Togolok 1: *Ibidem*, Pl. XXIII:6-7,10; XLIX:1; Togolok 2: *Ibidem*, Pl. XXIII:2,4,11; Togolok 3: *Ibidem*, Pl. XXIII:15; Togolok 6: *Ibidem*, Pl. XXIII:5; Togolok 20: *Ibidem*, Pl. XXIII:1.

found in Grave 91 of the Bronze Age graveyard at Gonur (Salvatori 1995c: fig. 10). During the short 1995 field season, we have recovered on the surface of site **285** (Egri Bogaz 1) a fragment from a cylindrical cup on high stand of a type largely attested in Bactria, Margiana and from several archaeological sites in Afghanistan, Pakistan and Iran as we will see below.

Except for the specimens found out of context, at the present state of our knowledge it would seem that the Margiana production of alabaster or calcite vessels falls within the chronological limits of the Bronze Age. One exception would be the fragment attributed by Hiebert to a dwelling context at Gonur South. Nevertheless, it should be pointed out that also other types of calcite vessels from Margiana can be attributed with certainty to the Middle Bronze Age. One example is the twin vase from the Middle Bronze Age graveyard of Gonur (Salvatori 1993: Figs. 9, 12:G.C.2/12), a bowl on high foot from a same period grave at Takta Bazar (Udeumuradov 1993: fig. 34) and one from Gonur 1 North (Sarianidi 1990: Pl. IV:2 room 22).

A number of specimens of flaring rim cylindrical alabastrine or calcite vessels are known in Bactria (Pottier 1984: Figs. 26:203-204; 27:205; Pls. XXV:203; XXVI:207).

Unfortunately, as the base of the specimens from sites **414** and **132** is missing it was impossible to ascertain whether those too, like other similar vessels found in Margiana (Salvatori 1993; 1995c) and Bactria (Pottier 1984: Fig. 26:204), had a base with a convex or prominent umbilicus-like interior. The latter feature must be taken into careful consideration as it seems to be a good guide to the identification of different production areas for this rather typical category of luxury items. For the time being the convex base seems to be characteristic of the Bactria and Margiana production, although it must also be borne in mind that the same feature is encountered on alabaster/calcite vessels certainly imported into the Mesopotamian area and definitely datable between the Early Dynastic III and the post-Sargonid Akkadian period. This is true for instance of a specimen from Ur dated to the Early Dynastic III (Heinz 1989: Fig. 11) and several variegated alabaster vessels, again from Ur, bearing dedicatory inscriptions of Rimush and Naram-Sin which identifies them as part of the loot from the eastern campaigns of these two Akkadian kings (Potts 1989: Figs. 1, 6, 11).

While this feature is absolutely extraneous to the Shahr-i Sokhta and other Seistanic sites production, as can be inferred from the in-depth work by R. Ciarla (1979; 1981. See also the absence of the internal convexity in the specimens from Site 109 of the Gardang Reg survey in Fairservis 1961: Fig. 29), it is found on at least one specimen of bowl on high foot from the Shahdad graveyard (Hakemi 1996), as well as on a cylindrical vessel with flaring rim from the hoard known as "Vase à la Cachette" from Susa, dated at around 2400 BC (Amiet 1986: Fig. 96:7). In Turkmenistan it is found on a low sub-cylindrical alabaster vase from Grave 843-845 at Altyn depe (Kircho 1988: Fig. 4:7), a grave dated to the Namazgha IV period. The Mesopotamian specimens and the Susa one represent a safe chronological reference for this production with its characteristic convex interior shared by such different types as flaring rim cylindrical vessels, cylindrical bowls on high foot, twin vases, etc.

To return to the specimens from site **414** and **132** it would seem possible to conclude that they are evidence, together with the two fragments of anthropomorphic figurines gathered there, of a Middle Bronze Age settlement phase, while the biconical spindle-whorl with dotted circle decoration from site **414** indicates that the site was occupied also at some time during the Late Bronze Age.

Fragments of Chlorite Bowls with Incised Geometric Decoration (Fig. 3.3-5)

The fragment of rim and wall of a green chlorite bowl with incised geometric pattern (**395**/621) has a precise equivalent as regards both shape and the use of incised decoration only at Gonur 1 (Sarianidi 1990: Pl. XXVIII:7,8).

However, this vase shape is well known throughout the area of diffusion of chlorite ware of the so-called "série récente".

Another fragment of chlorite vessel comes from site **67**/168. It consists of a bowl with an externally incised rim that may be likened to numerous specimens from Togolok 21 (*Ibidem*, Pl. LXXXIV), Togolok 20 and Gonur 1 (*Ibidem*, Pl. IV:8,9).

Finally, several fragments of an incised chlorite vessel have been gathered at the surface of site **406** (Adzhi Kui 1). The shape of the vessel seems to be cylindrical with flattened rim while the decoration pattern is made by a dense grid around a V-shaped undecorated field.

Chlorite Cosmetic Bottle with Incised Decoration (Fig. 4.1)

The fragment, gathered on the surface of site **392**/592, is significant in that its walls bear complex incised representations. The larger lateral face of the object is too wind-worn to attempt to interpret the incised pattern. The other two faces are only partially preserved: one depicts a seated figure with a linear kaunakes type dress and elaborate hairstyle, or more probably a horned tiara; the other is a seated figure with a taped dress. The neck of the bottle, although incomplete, displays at least two decorated horizontal registers with two incised concentric circles with a dotted centre. The base of the neck is underscored by a line made up of juxtaposed triangular incisions. The surface of the neck free of the double dotted circles is covered with scattered spots.

The linear pattern of the kaunakes is reminiscent of the dress of one of the seated figures depicted on the upper register of the Bactrian cylindrical silver vessel

published by Pottier (1984: Pl. XXX:250) and by Amiet (1986: fig. 202). The garment worn by the figure portrayed on the opposite face can be compared with the dress of the other figures depicted on the same silver vessel. However, on a closer inspection the garment worn by the most prominent figure on the silver vase has been treated in the same way as the fur of the bull on a bitumen bowl from Susa dating to the early 2nd millennium (the same style features are found on other bitumen objects again from Susa: Amiet 1966, p. 273 ss., Figs. 203, 204, 205. The lower chronological limit for all the above mentioned objects could be the XVIII century BC: cf. Amiet 1966, pgs. 312-13, Fig. 234 A-B). The silver vase is dated by Amiet (1986:204) between the 3rd dynasty of Ur and the first dynasty of Babylon, i.e. the beginning of the dynasty of the Sukkalmahhu of Elam. The linear style can be compared with a set of Anshanite seals contemporary with the first Babylonian dynasty, as is shown, among other things, by the seal with inscription of the bride of King Ebarat, the first sovereign of the Sukkalmahhu dynasty (Lambert 1979, pg. 15, note 42). For the horned tiara that we think the figure with the linearly treated garment is wearing a suitable comparison is the painting depicting the "king's investiture" from the Palace of Zimri-Lim at Mari. The same type of tiara can be found on Palaeo-Babylonian seals (First Babylonian dynasty: Frankfort 1939: Pl. XXVII:b).

The bottle type is known from several specimens from Bactria (Pottier 1984: Figs. 18-19-20-21. For specimens with a round hole in the base, cf. *Ibidem*, Figs. 19:143; 20:146). The Susa specimens have been published by P. de Miroschedji (1973, pgs. 9-79, figs. 11:1-6; Pl. VIII: a-e, g-i, k) and have been attributed to his *série récente*.

Also the presence of the double dotted circle is interesting. It should be distinguished from the simple dotted circle and could be used as an indicator of a characteristic style. This particular type of double dotted circle was rather widespread and spans the entire second half of the 3rd millennium BC ([3]).

The double dotted circle, to judge by the objects that can be dated with any certainty, spans the entire period that stretches from the Sargonid dynasty to the 18th century. Direct confirmation comes from C14 datings of Maysar-1 in Oman (Weisgerber 1980: 3840±50 cal. 2247 BC; 3460±50 cal. 1739 BC; 3780±60 cal. 2146 BC; 3560±70 cal. 1837 BC). In view of its stylistic features of the figures depicted on the two fragmentary faces of the object our specimen can be dated to the early 2nd millennium, around the 19th century BC.

Fragmentary Compartmented Stamp Seal in Green Chlorite (Fig. 4.2)

The fragment was found on the surface of site **377**/582. The details of the decorative pattern are no longer visible. Chlorite stamp seals with perforated grip on the back are not rare in Margiana and Bactria. Several examples have been found at Togolok 21 (Sarianidi 1990, Pls. XXIX:7; XLVIII:3, 14 from the same dwelling context), Togolok 9 (*Ibid.*, Pl. XXXII:14), Takirbai 3 (*Ibidem*, Pl. XXXI:18), Gonur 1 (*Ibidem*, Pl. XXXI:10-11, 13, 15, 17, 20-21). Two of the three square seals that more closely resemble the fragment published herein come from Togolok 21 (*Ibidem*, Pl. XXXI:6, 16 both from surface collections) and one again from Margiana although without any indication of the site (*Ibid.*, Pl. XXXI:3).

Similar seals are known also in Bactria, for instance at Sapalli depe (Askarov 1977).

Schist Stone Rod (Fig. 4.3)

This fragment from site **287**/570, can be compared with specimens from a firm context in the Middle Bronze Age graveyard at Gonur (Salvatori 1993, fig. 16: G. 5/4). The use of these objects is however uncertain. Similar objects have been found in the palace area at Dashly 3 (Sarianidi 1984, fig. 17 at pg. 24) in Bactria and whole specimens are known only among the materials of the pillaged graveyards of southern Bactria (Pottier 1984, Pls. XXXI:259-60). Pottier suggests that they were used as mortar pestles. Some Bactrian specimens, which incidentally show no signs of wear, also have silver bands around them. Banding can also be postulated for the Grave 5 specimen from the Middle Bronze Age graveyard at Gonur. Evidence for this comes from a groove that was certainly cut to house a probably precious metal band. Despite the little that can be said about this type of object, it seems that it can be dated within the Middle Bronze Age.

([3]) Bactria: composite statuette in the Foroughi collection (Amiet 1986: fig. 204; *Idem* 1980: pg. 163 and Pl. III); two chlorite phials (Pottier 1984: Pl. XX:152; Figs. 20:152-153); Margiana: Togolok 1 - fragment of chlorite vessel (Sarianidi 1990: Pl. XXVII:7); Susa: objects imported from Central Asia and/or eastern Iran (Amiet 1986: fig. 97:3); chlorite vessels imported from the Gulf (late 3rd mill.) (Amiet 1986; Miroschedji 1973: Pls. VI:f,g,i; VII: e,h); Shahdad: Grave 26 - chlorite vessel (Hakemi n.d.); chlorite phials (*Ibid.*); chlorite vase from Grave 44 (Cemetery B) (*Ibid.*); Telloh: clorite vase offered by Ur Bawu, at the time of Amar-Sin, king of Ur (Amiet 1986); Ur: chlorite vase with incription of Naram-Sin ("Naram-Sin, king of the four quarters, bowl [from] the booty of Magan") (Potts 1989: Fig. 10); Hili North, Grave A (Vogt 1985: pl. 27); Hili (grave) (Frifelt 1970: fig. 3A; 1975, fig. 17d); Tarut (Zarins 1978); Rumeilah (Boucharlat, Lombard 1985: Pl. 60:3. This, to our knowledge, is the latest context in which the double dotted circle is found in the Gulf area and could also indicate a later reuse of the object); Baat: Umm an-Nar period graves (Frifelt 1975: Figs. 28d, e); Maysar-1 and Maysar-18 (Weisgerber 1980: Figs. 39-40 -Haus 3; *Idem*, 1981: fig. 46); Maysar-9: Graves 1101 and 80 (*Ibidem*: fig. 47); Biladal-Maaidin (*Ibidem*: figs. 43:1,3).

It should be stressed that a distinction must be made between this type of object and the long rods, again of stone, that are widespread in both Margiana (Gonur and Togolok) and Bactria (south and north), as well as at Altyn depe, Quetta, Mehrgarh VIII and Shahdad.

Spindle Whorls (Fig. 5.1-14)

One specific feature of the material culture of the Late Bronze Age is represented by the so-called biconical chlorite spindle whorls bearing a decoration on each cone consisting of three incised circles with a dotted centre. This type of object is widespread in Margiana and Bactria in residential areas and graves ascribable to the Late Bronze Age, while similar examples are found in other Middle Asia sites.

The specimens gathered at the surface of various sites of the Murghab delta (**413**/618, **414**/603, **415**/604, **364**/632, **377**/580, **406**, **412**; to this inventory the conical specimen **64**/269, again with incised dotted circle decoration, must be added) have many points in common with published materials from excavations and reconnaissances by Russian and Turkmenian colleagues ([4]). A biconical chlorite spindle whorl from site **412** which shows an unusual incised decoration consisting of bands filled with horizontal lines could be compared with a similar item from Togolok 21 (Sarianidi 1990: Pl. LXXX:2).

To our knowledge, outside this area there is only an alabastrine calcite specimen from Hissar III C (Schmidt 1937: Pl. LXX:H.2788; pg. 232: Grave CF47 x-2) and another, this time of chlorite, from Mundigak (Casal 1961: fig. 138:37), unfortunately from an undatable context.

As far as we know, also with regard to the evidence provided by finds made in the graveyard of this period at Gonur, in the Middle Bronze Age spindle whorls, which were always biconical, did not display any decorative features. Furthermore, during this same period, other types of stone rather than chlorite were apparently used for making beads or biconical spindle whorls.

To this earlier group could pertain the specimens from sites **405**/571, **412**/589 and **394**/622. By way of example, a similar situation outside the Bactro-Margiana area is represented by the distribution of beads or undecorated biconical spindle whorls in levels II.1-IV.1 of Mundigak (Casal 1961: 240).

Ellipsoidal Bead with Incised Decorative Motif (Fig. 5.15)

The interest of the decorative motif incised on one face of this chlorite bead from site **394**/626 is due to the fact that it repeats the motif on a stone stamp seal from Altyn depe (Udeumuradov 1993: fig. 23:3).

Beads bearing incised figurative or geometric motifs are known at Togolok 21 (Sarianidi 1990: Pls. LXXXVI:3-4; LXXXVIII:7; XLVIII) and Togolok 15 (*Ibidem*: Pl. XLVIII:7), while the shape is reminiscent of a specimen from Togolok 25 (*Ibidem*: Pl. XXX:1).

Necklace Beads of Semi-precious Stone, Soft Stone and Faience

Some of the comparatively large number of necklace beads collected during the reconnaissances were clearly worked in situ. The materials used include turquoise, by far the most common and for which a workshop has probably been identified (site **204**), lapis lazuli, carnelian, chalcedony, aragonite, steatite and alabaster. An interesting barrel-shaped etched carnelian bead decorated with parallel lines (inv. n. 12) was found in site **38**. This type is widely found from the Indus to Mesopotamia during the second half of the 3rd millennium BC (During Caspers 1971:83). The only, still unpublished, Margianan specimen we know bearing an eight-shaped decoration comes from Sarianidi's surface collections in the area of Togolok.

Also of interest is the presence of several faience beads, and in particular a cylindrical blue faience bead found on site **204**/414. In connection with this object it is interesting to note the finding of hundreds of cylindrical blue, green and black faience beads belonging to a necklace or pectoral from Grave 91 of the Middle Bronze Age graveyard at Gonur 1 (Salvatori 1995c) and that similar contemporary productions are known in the Mature Harappan phase of the Indus Civilisation.

Copper Pin with Stamp Seal-like Head (Fig. 5.16)

The pin with a star-like head found on site **236**/554, is a typical object of the Bactro-Margiana area. The numerous known specimens come mainly from the materials found in the Bactrian graveyards pillaged during the '70s (Pottier 1984: fig. 24:186; Amiet 1977: fig. 18:16; Ligabue, Salvatori 1979: figs. 9-14). Similar specimens have been found in excavations at Dashly 3 in southern Bactria (Sarianidi 1977: fig. 44, Pls. I:9; II:5; III:2-4), in northern Bactria at Sapalli (Askarov 1973: Pls. 26:22-23; 32:7-8) and Djarkutan (Askarov 1977; Khol 1984) and lastly from the piedmont area of Turkmenistan (Ashkabad cemetery in Masson, Sarianidi 1972: fig. 31.e). In Margiana we know only one other specimen from Gonur (Sarianidi 1990: Pl. CII:260).

The chronology of this type of pin with a head which recall the compartmented seals is uncertain although it could well be a production dating to an early sub-phase of the Late Bronze Age as the Djarkutan and Sapalli specimens seem to indicate. Some impressions on pottery, dubiously made with such a type of object,

([4]) Kelleli: Masimov 1979: figs. 12:1.10-11; Gonur 1: Sarianidi 1990: Pl. XXV:7,11; several specimens from Gonur South and its Late Bronze Age graveyard are still unpublished; Togolok 1: *Ibidem*: Pl. XXV:6,15; Togolok 21: *Ibidem*: Pl. LXXIX:12-14 from rooms 137, 150 and 175; Pl. LXXX: 4-5 rooms 21 and 216; Pl. V:6 surface; Togolok 24: *Ibidem*: Pl. XXV:14; Takirbai 7: *Ibidem*: Pl. XXV:12; northern Bactria: Sapalli: Sarianidi 1977: fig. 64; southern Bactria: Dashly 3: *Ibidem*: fig. 54:5-9.

found at Kelleli in a very late Namazgha V context (Udeumuradov 1993 fig. 27:22) could suggest a little older date for the type.

Copper/Bronze Stamp Seals (Fig. 6)

Only seven specimens of bronze stamp seals were found, four of which fragmentary (**90**/200, **90**/201, **64**/263 and 264, **172**/510, **433**, **643**). The intact specimens are from sites **433**, **643** and **64**/263 (Takhirbai 1), here with a fragmentary one (inv. 264). Of the last two, the former, sub-rectangular in shape, is decorated with a motif represented by two wavy parallel lines. Both in its shape and because of the motif it is so far unique in the field of Bactro-Margiana glyptics. The decorative motif of the latter, which is circular in shape and has an indented edge, has been strongly oxidised and is no longer visible. However, it probably belongs to a recent series (NMZ VI) of bronze stamp seals together, for example, with a specimen from Room 10 of Gonur South (Hiebert 1994a: Fig. 9.26:7) and another from Djarkutan graveyard (Grave 192: Kohl 1984: fig. 17c). The same recent series could also include the two fragmentary specimens found at site **90**, although their state of preservation does not allow any certain attribution.

The seal collected on the surface of site **643** is a circular open-work compartmented seal with a curvilinear radiating motif. The suspension loop is a raised, massive, rectangular one, which on a typological ground looks like the loops on the seals from the Middle Bronze Age graveyard at Gonur (Salvatori 1994b: figs. 11.4, 13.6; 1995c: fig. 10). For the motive it can be compared with several specimens from Bactria (i.e. Pittman 1984: fig. 24a; Sarianidi 1977: fig. 49.2, 5). The seal from site **433** is a closed back compartmented seal with concave edges. Its suspension loop is a simple semicircular ring.

Addendum

Preliminary Analysis of the Bronze Age Pottery

During the short 1995 campaign we were allowed to examine the pottery sherds collected during the previous seasons by the team of the project for the archaeological map of the Murghab delta. It was thus possible to arrange the sites in a first, provisional relative chronological order under the following scheme: Middle Bronze, Late Bronze A (the so-called Gonur and Togolok phases which only future excavations would help to appropriately describe) and Late Bronze B, i.e. the Takhirbai 3 sub-phase. The results of this pottery survey, which we hope of some advantage for study of the Margiana Bronze Age settlement pattern, have been charted ordering sites against chronological periods and phases on Fig. 7.

References

Amiet, P. (1966) *Elam*, Paris.

Amiet, P. (1977) Bactriane Proto-historique, *Syria* LIV, pp. 89-121.

Amiet, P. (1986) *L'âge des échanges inter-iraniens 3500-1700 avant J.-C.*, Paris.

Askarov, A.A. (1973) *Sapallitepa*, Tashkent.

Askarov, A.A. (1977) *Drevnezemledel'cheskaya Kul'tura Epokhi Bronzy Yuga Uzbekistana*, Tashkent.

Boucharlat, R., Lombard, P. (1985) The Oasis of Al Ain in the Iron Age. Excavations at Rumeilah 1981-1983, Survey at Hili 14, *Archaeology in the United Arab Emirates*, IV, pp. 44-73.

Casal, J.-M. (1961) *Fouilles de Mundigak*, 2 voll., Paris.

Ciarla, R. (1979) The Manufacture of Alabaster Vessels at Shahr- i Sokhta and Mundigak in the 3rd Millennium BC: A Problem of Cultural Identity, *Iranica*, pp. 319-35.

Ciarla, R. (1981) A Preliminary Analysis of the Manufacture of Alabaster Vessels at Shahr-i Sokhta and Mundigak in the 3rd Millennium BC. H. Härtel (ed.), *South Asian Archaeology 1979*, Berlin, pp. 45-63.

During Caspers, E.C.L. (1971) Etched Cornelian Beads, *Institute of Archaeology of London Bulletin* 10, pp. 83-98.

Fairservis, W.A. (1961) *Archaeological Studies in the Seistan Basin of South-Western Afghanistan and Eastern Iran*, New York.

Frankfort, H. (1939), *Cylinder Seals*, London.

Frifelt, K. (1970) Jamdat Nasr fund fra Oman, *KUML*, pp. 355-383.

Frifelt, K. (1975) On Prehistoric Settlement and Chronology of the Oman Peninsula, *East and West* 25, pp. 359-426.

Hakemi, A. (1996) *The Graveyard of Shahdad: Excavations of a Bronze Age Burial Ground at the Edge of the Lut Desert*, Rome.

H. Härtel, H. (1981) (ed.), *South Asian Archaeology 1979*, Berlin.

Heinz, M. (1989) Die Steingefässe aus Süd-und Mittel mesopotamien als Inschriftenträger der Frühdynastischen Zeit, *BaM* 20, pp. 197-224.

Hiebert, F.T. (1994) *Origins of the Bronze Age Oasis Civilization in Central Asia*, (American School of Prehistoric Research Bulletin 42), Cambridge.

Kircho, L.B. (1988) The Beginning of the Early Bronze Age in Southern Turkmenia on the Basis of Altyn-depe Materials, *East and West* 38, pp. 33-64.

Kohl, Ph.L. (1984) *Central Asia. Palaeolithic Beginnings to Early Iron Age*, Paris.

Lambert, W.G. (1979) Near East Seals in the Gulbenkian Museum of Oriental Art. University of Durham, *Iraq*, 41, pp. 1-45.

Ligabue, G., Salvatori, S. (1979) La Battriana e l'occidente dalla fine del III alla metà del II millennio a.Cr., *Rivista di Archeologia* III, pp. 5-11.

Masimov, I.S. (1979) Izucheniye pamyatnikov epokhi bronzi nizovi Murghaba, *SA*, (1), pp. 111-31.

Masson, V.M., Sarianidi, V.I. (1972) *Central Asia. Turkmenia Before the Achaemenids*, London.

Miroschedji, P. de (1973) Vases et objets en stéatite susiens du musée du Louvre, *Cahiers de la DAFI*, 3, pp. 9-80.

Pittman, H. (1984) *Art of the Bronze Age. Southeastern Iran, Western Central Asia, and the Indus Valley*, New York.

Pottier, M.-H. (1984) *Matériel funéraire de la Bactriane méridionale de l'âge du Bronze*, Paris.

Potts, T.F. (1989) Foreign Stone Vessels of the Late Third Millennium BC from Southern Mesopotamia: their Origin and Mechanisms of Exchange, *Iraq*, LI, pp. 123-164.

Salvatori, S. (1993) The Discovery of the Graveyard of Gonur-depe 1 (Murghab Delta, Turkmenistan): 1992 Campaign Preliminary Report, *Rivista di Archeologia*, XVII, pp. 5-13.

Salvatori, S. (1994) Excavations at the Namazgha V Late Graveyard of Gonur 1 (Murghab Delta, Turkmenistan). Preliminary Report on the 1993 field season, *Rivista di Archeologia*, XVIII, pp. 14-39.

Salvatori, S. (1995) Gonur-depe 1 (Margiana, Turkmenistan): The Middle Bronze Age Graveyard. Preliminary Report on the 1994 Excavation Campaign, *Rivista di Archeologia*, XIX, pp. 5-37.

Sarianidi, V.I. (1977) *Drevnie Zemledel'tsy Afghanistana*, Moskva.

Sarianidi, V.I. (1984) Raskopki Monumental'nikh zdani na Dashly-3, *Drevnyaya Baktria. 3. Materialy Sovetsko-Afghanskoi archeologicheskoi ekspeditsii*, Moskva, pp. 5-32.

Sarianidi, V.I. (1990) *Drevnosti strany Margush*, Ashkhabad.

Schmidt, E.F. (1937) *Excavations at Tepe Hissar Damghan*, Philadelphia.

Udeumuradov, V.N. (1993) *Altyn-depe i Marghiana: svyazi, khronologiya, proiskhozhdenye*, Ashkhabad.

Vogt, B. (1985) The Umm an-Nar Tomb A at Hili North: A Preliminary Report on Three Seasons of Excavation, 1982-1984, *Archaeology in the United Arab Emirates*, IV, pp. 20-37.

Weisgerber, G. (1980) "...und Kupfer in Oman" - Das Oman-Projekt des Deutschen Bergau-Museums, *Der Anschnitt*, 32 (2-3), pp. 62-110.

Zarins, J. (1978) Steatite vessels in the Riyad Museum, *Atlal*, 2, pp. 65-94.

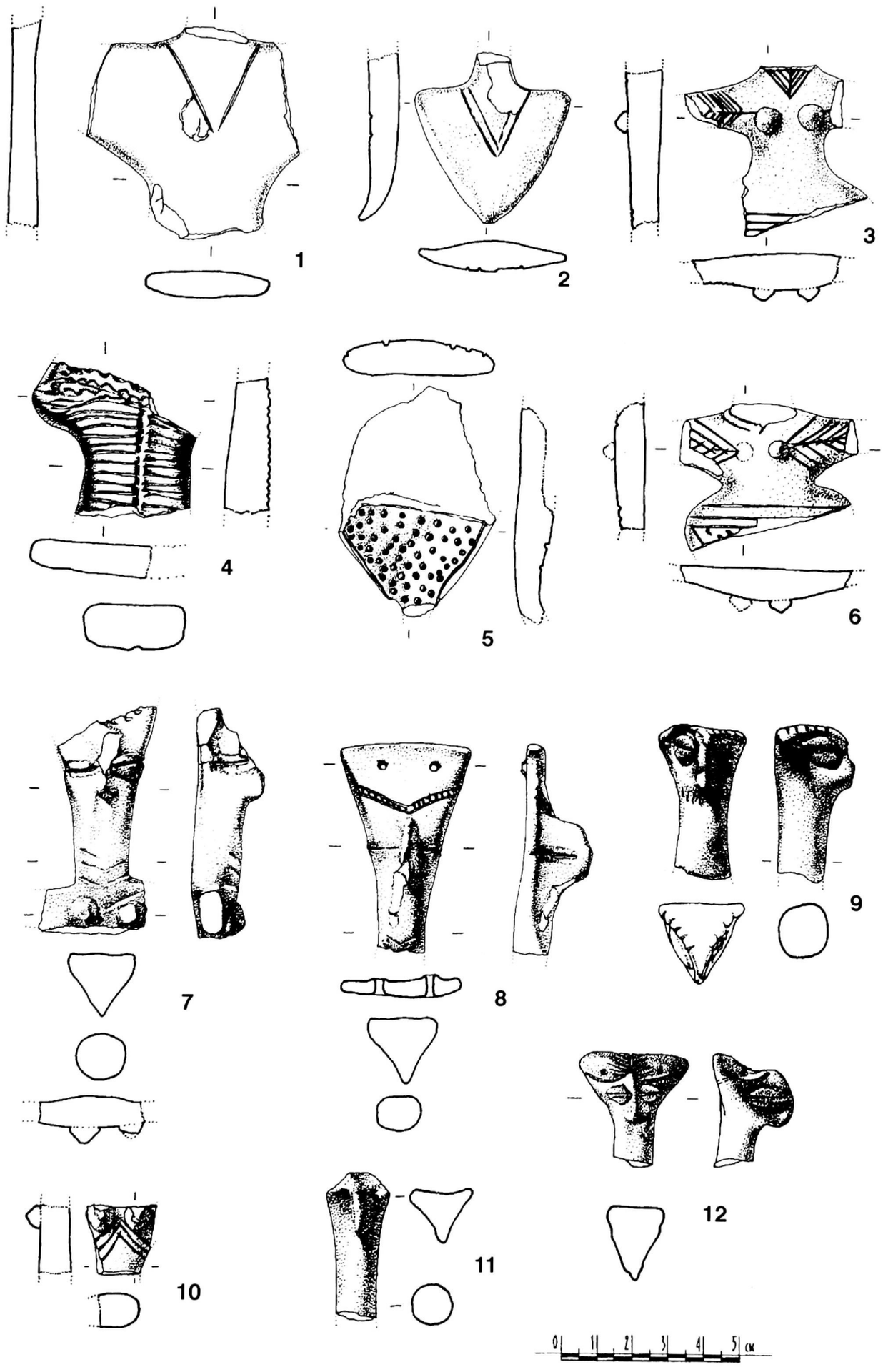


Fig. 1 - Anthropomorphic figurines from various sites in the Murghab Delta (1, 2, 10: site 643; 3, 7, 12: site 409; 4, 8: site 414; 5, 6: site 421; 9: site 340; 11: site 395).

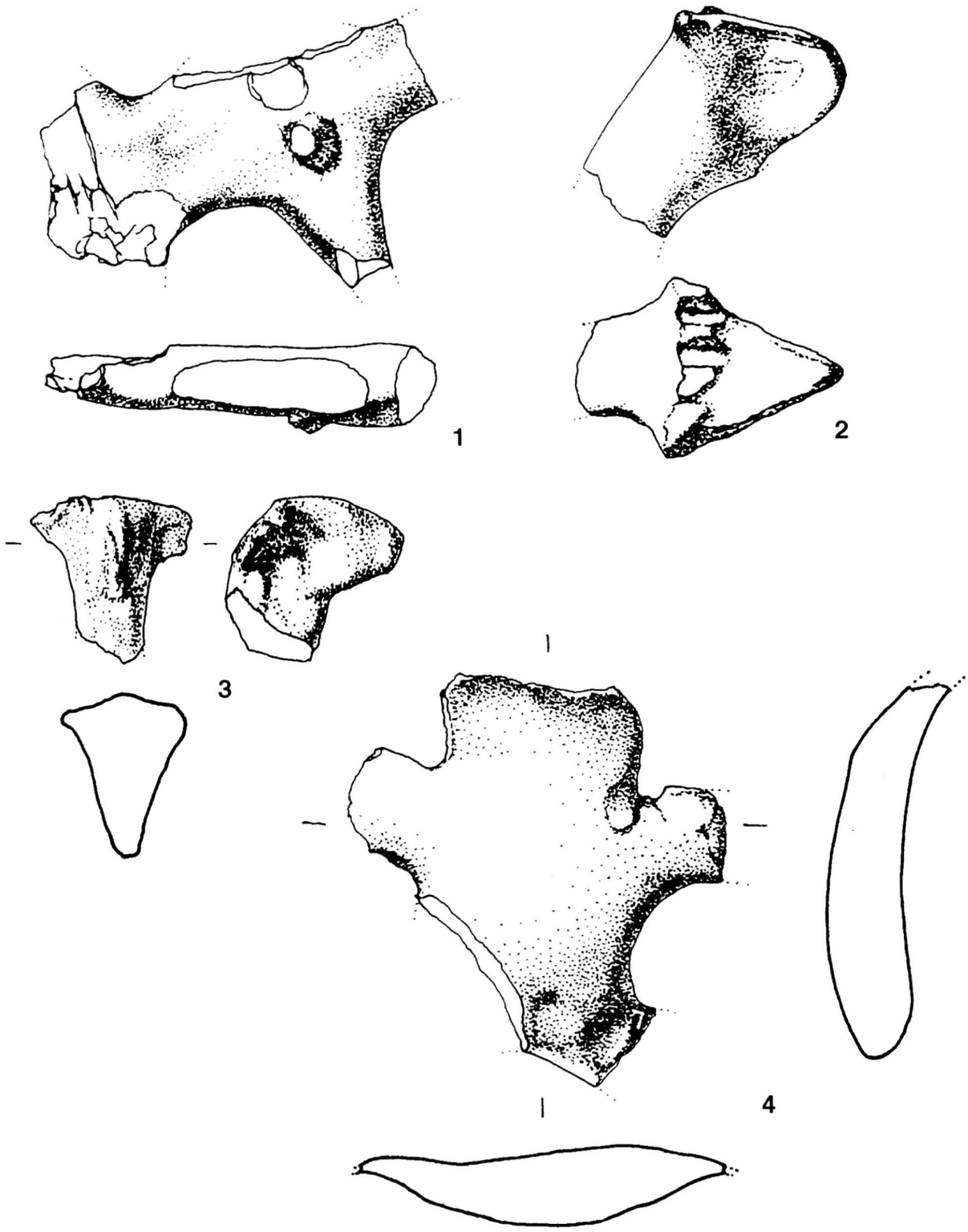


Fig. 2 - Zoomorphic figurines from various sites in the Murghab Delta (1, 2: site 394; 3: site 438; 4: site 412).

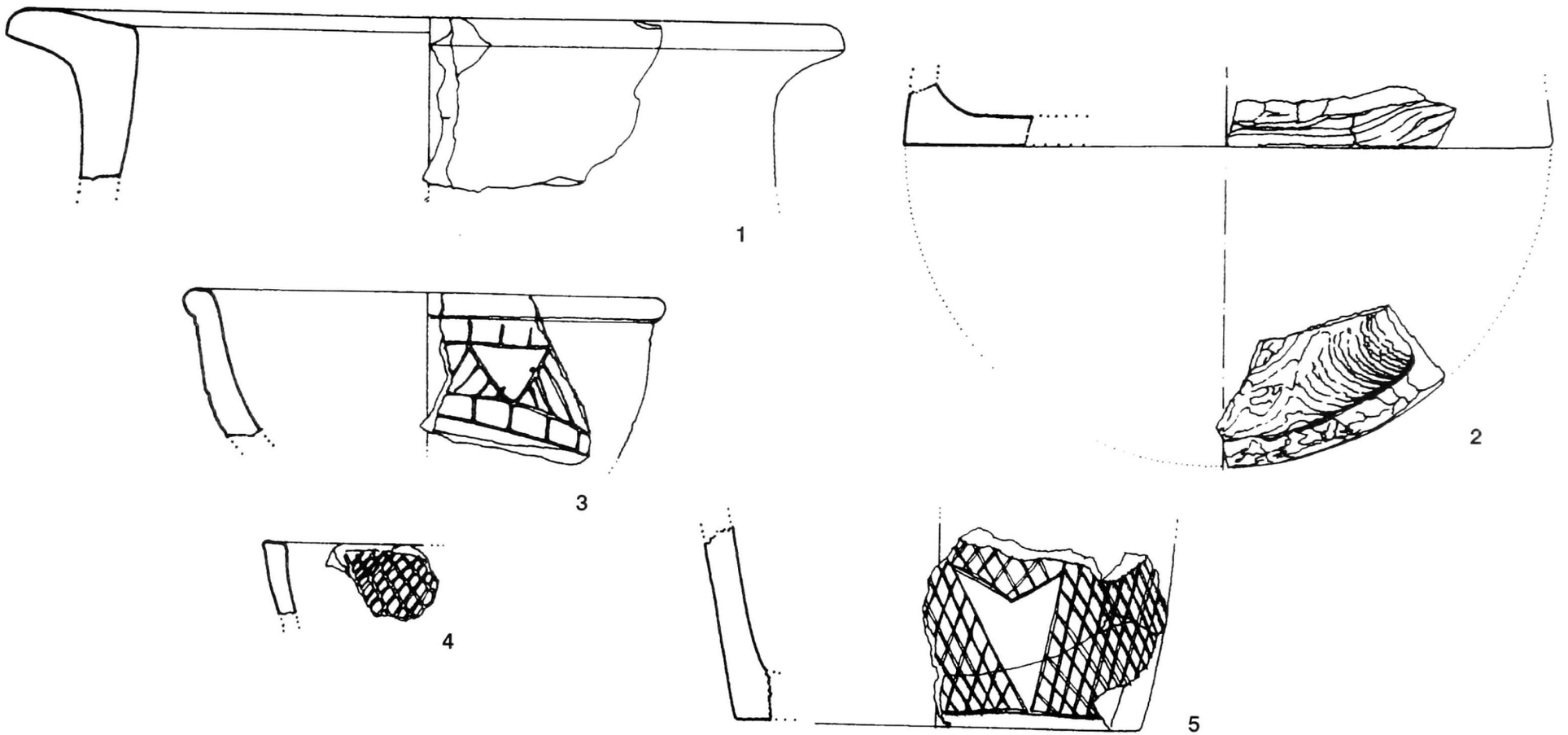


Fig. 3 - Stone vessels from various sites in the Murghab Delta (1: site 414; 2: site 132; 3: site 621; 4-5: site 406).

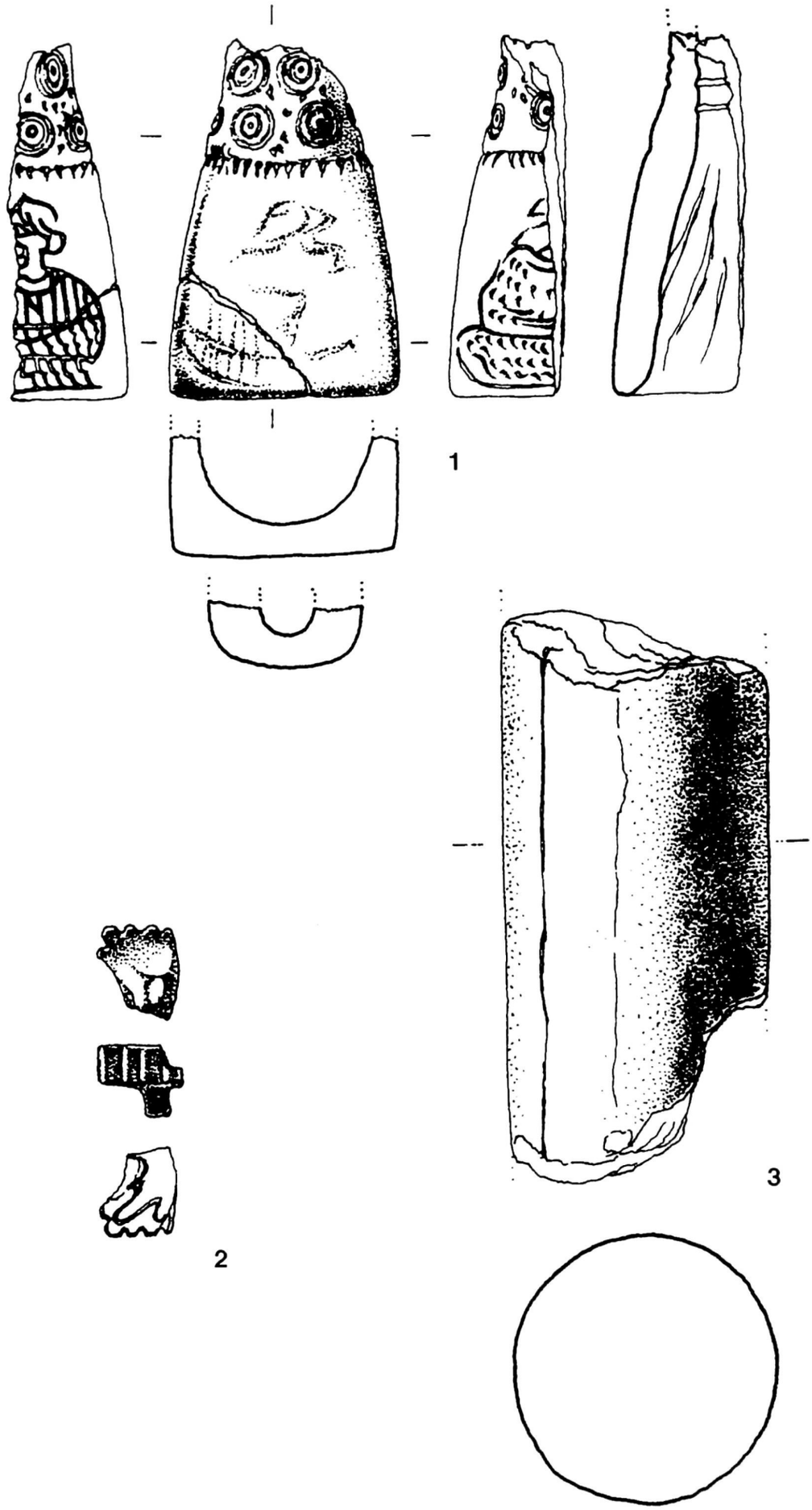


Fig. 4 - 1. Chlorite cosmetic bottle from site 392; 2. Fragmentary compartemented chlorite stamp seal from site 377; 3. Schist stone rod from site 287.

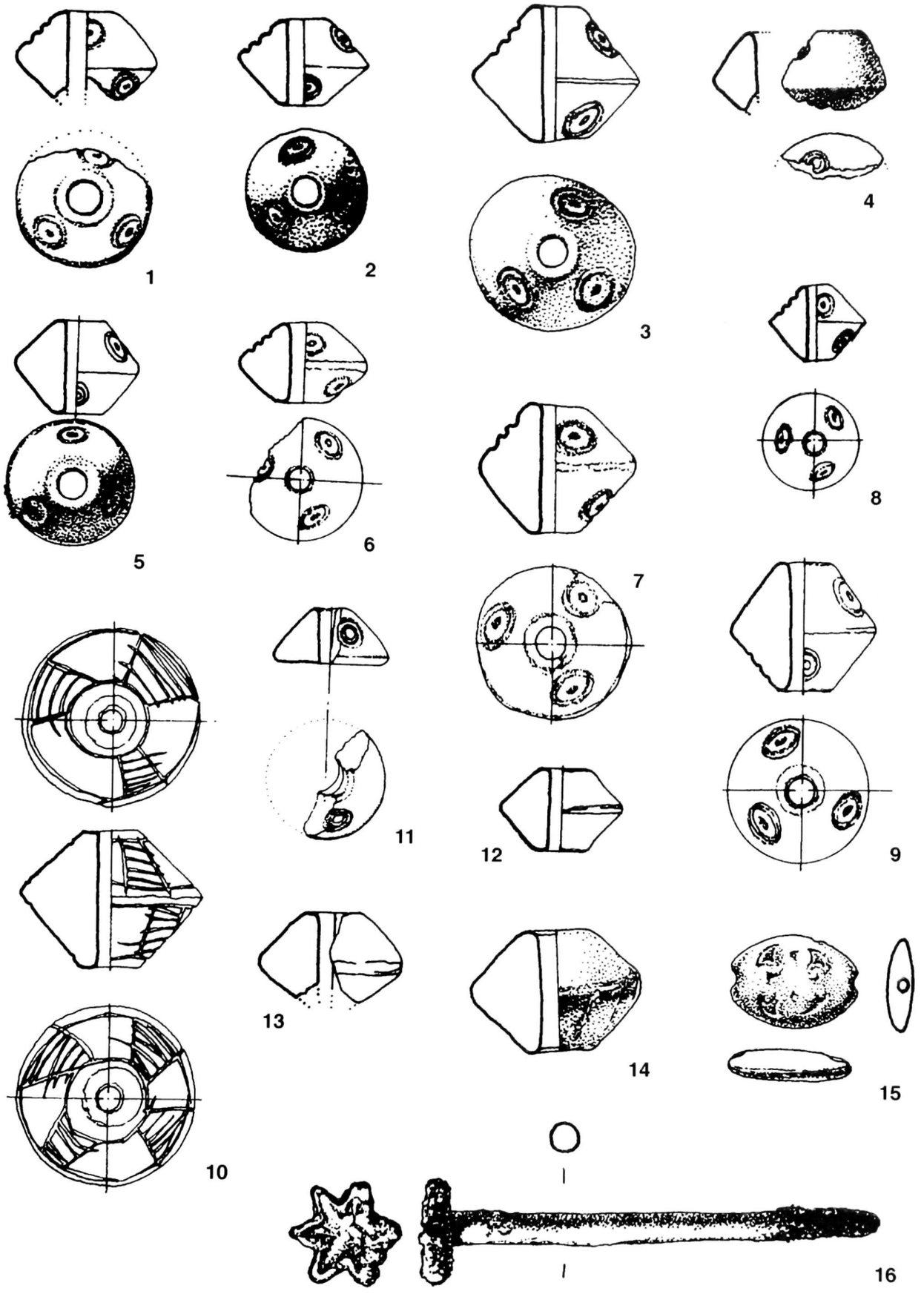


Fig. 5 - 1-11. Chlorite spindle whorls (1: site 413; 2: site 414; 3: site 415; 4: site 364; 5: site 377; 6-7: site 406; 8-10: site 412); 12-14. White stone spindle whorls (12: site 405; 13: site 412; 14: site 394); 15. Ellipsoidal chlorite bead (site 394); 16. Copper pin (site 236).

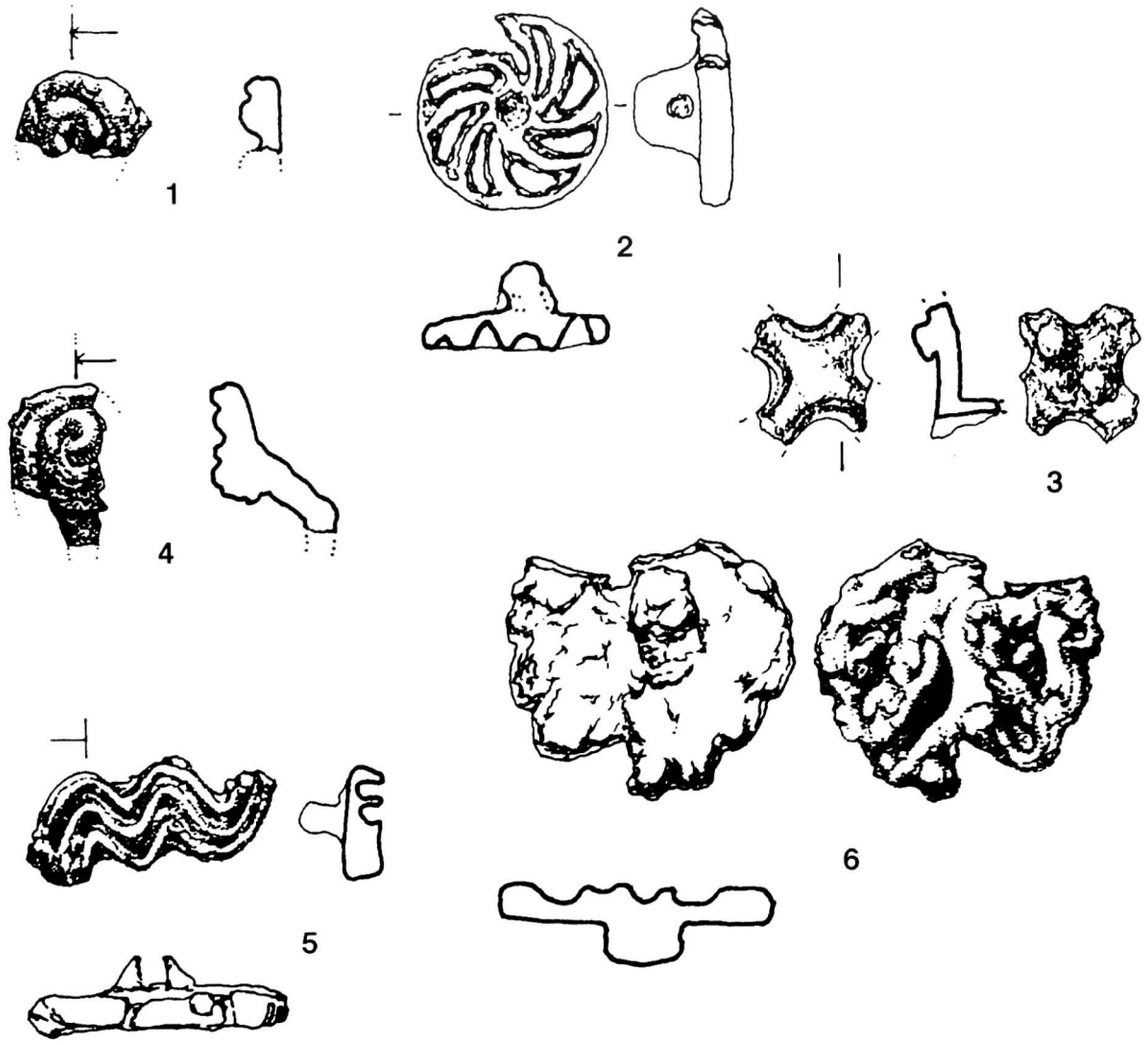


Fig. 6 - Copper/bronze stamp seals (1, 4: site 90; 2: site 643; 3: site 433; 5-6: site 64).

Site Nr.	Middle Bronze	Late Bronze A	Late Bronze B
340, 287, 407,132, 409, 287.			
285, 405, 418, 428, 433, 643,90. 421, 414,394, 395, 177,237, 232, 702, 713, 717, 718,723, 724, 725, 726, 730, 731,732,738,742,746.			
412, 172			
69,233,252,179,180,192,263,367,392,236, 400, 401,410,411,416,419,420,422,423,424,426,427, 429, 430, 431, 432, 437,438, 632, 634, 637, 638, 639,645, 646, 647,648, 651, 654,655, 656, 657, 658, 659,701,709,711,712,714,741,752.			
64, 377, 413,415, 364, 394,67, 234, 406,436.			
188			

Fig. 7 - Sites list according to their chronological attribution.

THE BRONZE AGE IN MARGIANA

by S. SALVATORI

The intensification of archaeological research in areas that, sometimes purely due to chance, long remained unexplored or marginalized, inevitably leads to an often dramatic broadening of the geopolitical perception of certain historical phenomena and the realisation of their unexpected diachronic depth. The Bactro-Margiana, or rather Central Asian, *miracle* (in order to deliberately refer to a larger and more closely interrelated geographic and cultural system) can now be viewed as a phenomenon that is characteristic of the entire region from prehistoric times. The results of archaeological research carried out in recent decades, at least in general terms, point to a singular continuity of this "miracle": if the latter is referred to the broader geographic scope of Central Asia or Middle Asia, there are seen to be no gaps from at least the Neolithic on; it can certainly be justifiably applied to the urban societies of the 3rd millennium BC (Masson, Sarianidi 1972).

As the scope cannot include the whole area or trace back the entire historical path, the present treatment will be focused on the earliest phase of urban development of the regions historically denoted as Margiana and Bactria, with special reference to the former.

The present geomorphological configuration of the desert plains of Central Asia is determined not only by the unceasing modelling action of erosion and wind transport. It is largely the result also of the action of rivers that, at different flowrates and courses from the present, have left behind visible traces of the ancient flows across these desert plains.

The Murghab delta is only one of the numerous fossil remains of the final outflow of the inland river systems a common aspect of all hydrographic systems in Central Asia (Miroshnikov 1987, 1992). In all arid regions of Earth population dynamics and economic activities are determined by surface waterbodies and in particular by the size and continuity of river courses. In Central Asia these are a specifically connected to precipitations and the water storage in the orographic belts along its southern borders, which determine the flow rates of all river systems crossing its desert lowlands (Gerosimov 1978: 332-33). The erraticity of rivers were combined with the effects of other factors, like tectonic movements, the barrier effect of terminal alluvial deposits and the influence of the Earth's rotation show produces significant deviations in the rivers' path.

When observed over a period of several millennia, these phenomena of gradual reduction of flowrate in the inland rivers of Central Asia are seen to play an important role in the environment, the variability of which meant that population dynamics and cultural developments had to be adapted on several occasions, thereby modifying the social structure of the human communities. Regardless of their degree of success, responses always moved in the direction of intensifying production and the hierarchical structuring of power.

The reconstruction of the historical geomorphology of these environments and the watercourse-related events is of fundamental importance in actually identifying the traces of human settlement and in understanding the developments and socio-political transformations through territorial dynamics. From this point of view, the Murghab delta, owing to the excellent state of preservation of the archaeological record found in it, represents a privileged laboratory. In recent years numerous international research endeavours have been focused on it, following up the pioneering reconnaissances that in the mid fifties (Masson 1956, 1959; Sarianidi 1957) and above all since the early seventies (Lyapin 1975; Masimov 1981a; Sarianidi 1981; 1990) uncovered the Margiana Bronze Age civilisation (1).

(1) See the wide ranging synthesis by Ph. L. Kohl 1984:143-50 and the more recent one by F.T. Hiebert 1994a:15-28. The archaeological events occurring in Bactria were definitely more varied. In the southern sector (northern Afghanistan) for about ten years (1969-1979) a Soviet-Afghan mission actively carried out extensive reconnaissance and excavation work (much of which unfortunately is still unpublished). This work uncovered a diffuse Bronze Age settlement system in the four oases of Doulatabad, Dashly, Nichkin and Farukhabad (Sarianidi 1977). In the same area there are numerous palaeolithic and neolithic sites only minimally explored (Vinogradov 1979). In the same years the Kabul antiquary market has been inundated with a huge mass of material from unauthorized digs in the graveyards associated with the above mentioned settlement ares (Pottier 1984).

In 1974, in the eastern sector of the region (northeast Afghanistan) a French mission began a research programme along the left bank of the Amu Darya, in the basins of the

The survey and excavation activities during the early stages of the research (1949-1989) have given rise to various, often contradictory, systems to account for both the place occupied by this region in the wider horizon of the cultural development of Central Asia and the internal population dynamics during the Bronze and Iron Ages.

In those years the entire Murghab delta was explored and although the survey work was not adequately supported by the necessary aerial photography coverage, they led to the discovery of at least a hundred protohistoric sites. It was immediately apparent to Russian and Turkmenian researchers that the maps they were drawing referred to aggregates and clusters of settlements. The first attempt to order them into a settlement system was made by Masimov (1981b) who identified three categories of sites on the basis of their size: 1) less than 5 hectares; 2) between 5 and 10 hectares; 3) greater than 10 hectares. This three-tier hierarchy appeared at the time to be respected in the above system of aggregates. One exception was Gonur 1, which exceeded 40 hectares according to an estimate by V. Sarianidi as reported by Ph. Kohl (1984:146). Because of its great size it was long referred to as the regional capital (Sarianidi 1993) ([2]). Nine site aggregations of "micro-oases" were thus identified, usually named after well nearest to them (Kelleli, Egri Bogaz, Taip, Adzhi Kui, Gonur, Auchin, Adam Basan, Togolok, Takhirbai) (Fig. 1). On the strength of a rough sequence intuitively derived from the first results of excavations carried out at various sites in the delta ([3]) a history of the human occupation of the area was made, which is still widely accepted (Sarianidi 1981:188; Masimov 1981a:218; Hiebert 1994a:72,174-75). This reconstruction involves an initial stage, limited to the north-western zone of the delta (Kelleli sites area), which has been attributed to the final section of the Namazgha V period of the piedmont zone. This first phase is believed to have been followed by a period of strong demographic explosion accompanied by an appreciable increase in the number of settlements, but also by a southward shift of the more densely populated areas (Gonur phase, from the name of the largest archaeological site discovered in the central delta area). This phase is believed to have occurred in the early Late Bronze Age and to have been followed by a further southward shift of the settlement system (Togolok phase). In this reconstruction the greater density of the Iron Age settlements towards the base of the delta represents a further phase of drought of many centuries duration. Over the years some features of this reconstruction, which had both given rise to, and was based, though a tautological process, on a linear regression model of the Murghab delta desiccation, have been modified to bring it into line with the results of current research.

In fact, as we have seen elsewhere in this volume, the different micro-oases into which the delta area has been subdivided, do not represent chronological reference units, as each contains settlements ascribable to several phases in the Margiana sequence.

However, the problem does not consist solely in interpreting the settlement pattern, but it also means making reconstructions involving the entire geopolitical system of Central Asia and northern Afghanistan. In other words, the attribution to a Late Namazgha V period of the earliest settlement evidence in the Murghab delta has been interpreted as the effect of the progressive urban crisis affecting the piedmont strip of southern Turkmenistan (Masson 1959; Biscione 1977; Biscione, Tosi 1979; Masimov 1979), a crisis due also to the co-occurrence of a peak of xerothermal conditions (Masson 1986a:81). The farming population of these areas is believed to have moved into the delta area and to have occupied a niche more favourable to the conservation and development of a productive structure based on irrigation agriculture and already strongly structured as such in the original regions. These groups probably found better conditions such as to give rise to a considerable demographic growth in the Late Bronze Age. This in turn served as a further impulse to seek

Kokcha and Taluqan-Kunduz rivers. Among other things, in 1975 this mission located the extremely peculiar site of Shortughai in the northern section of the Dasht-i Qala plain, 4 Km from the Amu Darya and from the Tadjikistan border. This site was subsequently explored in 1976 and 1979 (Francfort 1989). The excavations revealed two cultural periods, an earlier one characterized by the massive presence of typical Indus Civilization materials, which make the Shortughai settlement the northernmost outpost of that civilization known to date, probably of a trading nature or to do with the control over specific resources; and a more recent one characterized by local cultural traits linked to the Late Bronze Age facies of southern Uzbekistan and Tajikistan.

In northern Bactria (southern Uzbekistan), the Bronze Age civilization began to emerge in 1969 with the beginning of excavation work in the Sapalli tepe settlement (Askarov 1973). Intense research work then revealed the spread of settlements of this period and of the Iron Age to the terminal deltas of the northern tributaries of the Amu Darya (Kohl 1984: Map 17, p. 152; Rtveladze, Sagdullaev 1985).

Proper excavations were undertaken at Bronze Age sites and graveyards like Sapalli tepe, Djiarkutan (Askarov, Abdullaev 1983), Molali and Bandikhan (Askarov 1977). Other contemporary settlements are even known in the close southern Tadjikistan (P'iankova 1981, 1985).

([2]) This view is actually the result of a chronological flattening of the settlement system by the early explorers of the area. The settlement of Gonur 1, for example, consists of two mounds, a larger one to the north and a much smaller one to the south. The northern one is wholly ascribable to the Namazgha V period, while the southern one, except for its base level, can be wholly referred to the subsequent Namazgha VI period. A much more complex approach is now being developed and the spatial organization model proposed by Masimov in 1981 has now been superseded.

([3]) *Takhirbai 3*: Masson 1959; Sarianidi 1990. *Auchin depe*: Masson 1956, 1959; Sarianidi 1957. *Kelleli, Taip, Adam Basan, Adzhi Kui*: Masimov 1984, 1986; Masimov, Lyapin 1977. *Togolok 1, Togolok 21, Gonur 1 North* and *South*: Sarianidi 1990.

territorial expansion into the region astride the Amu Darya, that is, towards Bactria and Sogdiana. An alternative reconstruction, which has at least two variants, has been proposed by several other researches. They postulate a colonisation of Margiana during the Namazgha VI period by peoples from Bactria, accompanied by an, albeit limited, penetration into the piedmont area where the ongoing urbanisation crisis allowed scope for intake of new arrivals (Alekshin 1983; Francfort 1984:174; 1989:375).

A variation of this hypothesis was recently put forward by J.-F. Jarrige (1994) which, on the strength of a few pottery types that he claims are older in the Quetta Valley sites (Nausharo, Mehrgarh VIII, Sibri), he suggests a sort of colonisation of the area of eastern Pakistan, first in the direction of Bactria and then of Margiana.

The results of the research carried out in recent years and a reappraisal of the evidence already acquired now make it possible to attempt a re-calibration of the Murghab delta population model described above and of the hypothesised population movements.

The extensive reconnaissances of the early phase were replaced in 1989 by intensive searches supported by geomorphological surveys, using the latest remote sensing methods, together with ground based control activities guided by the availability of a complete aerial photography coverage (AA.VV. 1994). The ancient delta area thus proved to be part of a much larger system than was previously imagined which was linked, in a comparatively early stage of its history, to a fluvial collector, an ancient branch of the Amu Darya (see Cremaschi, present volume) into which the active arms of the Murghab emptied.

The ancient fluvial collector north of the subfossil delta of the Murghab is now almost completely filled with sand from the Kara-Kum desert. These sands have the form of dunes elongated in a north-south direction which also cover a large part of the delta area. Together with the alluvially transported material they could conceal the earlier remains of the human presence in the area (Cremaschi 1994).

The team of researchers associated with the present project has over the years produced an enormous quantity of archaeological and geomorphological data (AA.VV. 1994; and this volume). These data already allow several of the conclusions to which the former historical-archaeological research had come to be rectified. These include, as has been stated elsewhere in this volume, the evidence of Middle Bronze Age settlements in the southern sector of the delta to the south of Togolok.

If it is borne in mind that it has been ascertained that settlements from this period have a distribution ranging from the north-western sector (Kelleli area) to the entire central area in which, among others, the large settlement of Gonur 1 North stands out (with its ca. 40 hectares the latter represents the largest protohistoric site in Margiana), to the southern area also south of Togolok, with significant presences as far as south Takhta Bazar, on the middle reaches of the Murghab (Udeumuradov 1993:71-80), the evaluation of the settlement pattern during the Namazgha V period changes radically.

Furthermore, the phenomenon of the delta's regression, linked to the rainfall regimen in the area of the large mountainous areas of the Hindu Kush and the Pamir, seems in no way as linear as was assumed by the above mentioned authors. Again, the shift of the centre of gravity of the more densely populated areas would today seem to be a fact mainly concerning the Iron Age population dynamics linked to phenomena related to the advance of the dunes in the distal portion of the delta (Cremaschi 1994). It is too early to attempt to trace out an overall picture of these phenomena as the geomorphological survey of the delta within the framework of the Murghab archaeological map project is still in progress. Furthermore, a convincing and sufficiently comprehensive and detailed sequence of the Middle and Late Bronze Age has yet to be drawn up for this area. Despite the great excavation endeavours of V. I. Sarianidi, especially in the sites of Gonur 1, Togolok 21 and Togolok 1, the typo-chronological studies still lag far behind and do not provide the necessary reference grid on which to base a credible sequence for the materials coming from surveys and surface collections. However, further insights into the Middle Bronze Age developments have come from Masimov's excavations at the sites of Kelleli 1, 3 and 4 (Masimov 1984, 1986) and from the comparative studies performed on the materials from the latter sites, as well as those from levels 0-2 of Altyn depe, one of the largest Bronze Age settlements in the piedmont area (Masson 1981), recently published by Udeumuradov (1993).

In addition to this, the excavations of the northern depe at Gonur 1, resumed in 1994 by V.I. Sarianidi, have already confirmed that, during the Middle Bronze Age, the site was a large urban aggregate including a huge palace building at the centre. The latter underwent at least three reconstruction phases after the first building was destroyed in a devastating fire (Sarianidi, personal communication). The excavations of the north depe confirm the indications of a deep trench dug by Sarianidi in the early '80s (Sarianidi 1990) and of the trial trenches dug, again on the north depe, by Fred Hiebert from Harvard University in 1988-89 (Hiebert 1994a). All this must be added to evidence of a contemporary settlement at Togolok 1 in the south-western delta (Sarianidi 1990). The chronology of this Middle Bronze Age phase and its development during the second half of the 3rd millennium is largely confirmed by both the material culture and C14 dating (Kohl 1992; Hiebert 1993a; Salvatori 1995b).

While available evidence now seems to point more strongly in the direction of a generalised distribution of settlements ascribable to the Bronze Age throughout the delta area as far as the middle reaches of the river, it is also true that there is still a lack of adequately structured information concerning their number and size. However, there is one certain fact, the importance of which must not be overlooked or underestimated, namely the size of the urban agglomeration of Gonur North and the fact

that the excavations are yielding a sequence characterised by a high degree of diachronic variability in pottery typology. This variability is such as to arouse the legitimate suspicion that the Margiana urban civilisation had a comparatively long development entirely within the Middle Bronze Age (Namazgha V).

The Middle Bronze Age Graveyard of Gonur

In view of this renewed interest in the protohistory of Margiana, in 1992, after a preliminary visit to appraise the situation of the delta and within the framework of a collaboration agreement between the Ligabue Study and Research Centre of Venice, the Institute of Archaeology of the Academy of Sciences of Moscow and the Ministry of Culture of the Republic of Turkmenistan, an excavation project was begun for the purpose of identifying the graveyard that was contemporary with the earliest cultural phase of the Gonur 1 settlement. The graveyard, located to the west of the 3rd millennium urban settlement, grouped within a sweeping bend in one of the delta arms, was partially investigated in three successive campaigns between 1992 and 1994 (Salvatori 1993; 1994a; 1994b; 1995c) ([4]), although it had been almost systematically pillaged in ancient times it yielded a substantial set of data of fundamental importance in the cultural classification of the archaeological remains in the Bactria area.

As far as can be judged at the moment, the graveyard area extends about 350 metres along a north-south axis and for at least 300 metres along the east-west axis, it therefore covers an area of about 10.5 hectares.

During the three campaigns carried out so far, two large areas were opened in the northern section of the graveyard together with a few exploratory trenches intended to identify the graveyard boundaries and to gather certain evidence concerning the time it ceased to be used.

The composition of the grave goods is quite homogeneous. A group of graves is accompanied by a single element, usually a cup. The others have a minimum furniture composition consisting of a cup, a bowl, a jar or a bottle. Any variation on this scheme is usually quantitative in nature.

Some graves, in addition to the ceramic grave goods, have yielded bronze or copper objects (vases, pins, mirrors, cosmetic flacons, compartmented stamp seals), or objects of silver (earrings and pins), gold (necklaces), semi-precious or faience stones (necklace beads), alabastrine calcite (various spindle whorls), of bone (pins, etc.).

The pottery shapes yielded by the grave furniture of the Gonur cemetery are completely consistent with the materials from the Margiana settlements of Kelleli 3 and 4 (Udeumuradov 1993), Gonur 1 North (Sarianidi 1990) and Togolok 1 (deep levels) (*Ibid.*). As clearly demonstrated by Udeumuradov in his comparative study of the materials of Kelleli 3 and 4 and levels 0-2 of Altyn depe (Udeumuradov 1993) these represent a regional variant of the cultural phase of the Middle Bronze Age known in the piedmont zone as Namazgha V. This variant developed autonomously and does not appear to be the result of a sudden massive cultural transplant, if it is a cultural transplant at all. The collection of ceramic materials displays significant differences such as to prevent an automatic assimilation of the two complexes, i.e. that of Margiana and that of the piedmont strip, in terms of inter specific dependence.

The non ceramic materials make it possible also to develop a very close comparison with some of the material from the Bactria graveyards pillaged during the '70s. The importance of this topic is clear above all in relation to the historic-cultural reconstructions proposed for this area over the last decade (Salvatori 1995a). In a word, the materials of this graveyard make it possible to attribute to a large extent to the Middle Bronze Age (Namazgha V) a large part of those coming from the pillaged graveyards of southern Bactria (Salvatori 1995b). This shows that also the latter region had taken part in the urban type cultural developments on a par with the piedmont strip of southern Turkmenistan and the Murghab delta region.

The foregoing detracts considerably from the migrationist and integrationist theories proposed as a system accounting for the development of the Bronze Age civilisation in these regions. It automatically explodes the still widespread hypothesis of a migration from the Turkmenian piedmont zone as a consequence of an alleged urban crisis in that area towards the Murghab delta, which was supposedly followed in time by a further wave of migration that colonised the Bactrian "oases" during the Namazgha VI period. Such a population movement would have been hindered by an already strongly rooted and widespread peopling of the area that certainly did not offer much scope for any new arrivals. This throws a completely different light on the observed strong homogeneity that has been denoted as BMAC (Bactria-Margiana Archaeological Complex) (Sarianidi 1987; Hiebert, Lamberg- Karlovsky 1992; Hiebert 1994a, 1994b). Also this last mentioned theoretical-explanatory appendix, defined above as integrationist, actually appears completely anachronistic in the light of the facts. If it was a matter of cultural *koiné* then this existed already in the Middle Bronze Age, except for the regional variants that certainly developed, as revealed not only by the comparison of the various pottery complexes of the piedmont zone with those of Margiana, but also between the Margiana complexes and the Bactrian ones (P'iankova 1993).

([4]) The Late Bronze Age graveyard associated with the fortified site of Gonur 1 South is located on the top and along the slopes of the northern mound. Numerous graves (about 50) were excavated during the preliminary exploration of Gonur 1 North (Sarianidi 1990), while a large number of graves were excavated during the first two campaigns during the Spring and Autumn of 1994.

This new interpretation of the Bactria-Margiana sequence shakes to its foundations the entire preceding construction that, as we have extensively reported, accounted for the apparent anomalies in the archaeological documentation of these regions by using the classical migrationist explanation. The fact that the materials of the pillaged graveyards in the "oases" of northern Afghanistan can largely be related back to the chronological phases of the ancient graveyard of Gonur 1, shows that the migratory model does not account for the facts. Indeed in Bactria a Middle Bronze Age civilisation grew up which was quite similar, if not indeed even richer and more central to the mechanism of interaction with the contemporary Mesopotamian, Elamite and Indian subcontinent cultures (Indus Civilisation), to that of Margiana and the Turkmenistan piedmont zone. The current lack of settlements of this period, excluding graveyards, in southern Bactria is due solely to the highly random nature of the surveys carried out in the '70s and is a consequence of the incomplete publication of the excavations, as other researchers have long been pointing out (e.g. Tosi 1973; Kohl 1984:170). A reasonable doubt concerning the migratory hypothesis (from West to East) had previously been advanced by H.-P. Francfort, who held it highly unlikely that a settlement such as Shortughai, an Indus Civilisation trading colony, could be founded in the second half of the 3rd millennium in eastern Bactria, on the outskirt of the valley of Badakshan, famous for its lapis lazuli mines (Tosi 1974), in a geocultural vacuum (Francfort 1984). In actual facts, as we have seen, this vacuum was actually consisted of an inexact evaluation of the reference system assigned to a part of the available archaeological evidence.

Architecture and Territorial Organisation

One important aspect of the Bronze Age in Margiana and Bactria is without doubt the architecture. This is particularly true of the urban centres ascribable to the Namazgha VI period, which is characterised by large defensive works enclosing the entire inhabited area. For the most recent phase in Margiana reference may currently be made to the evidence yielded by the large-scale excavations made by Sarianidi at Togolok 21 (Sarianidi 1986a, 1990), Togolok 1 (*Idem*, 1993) and Gonur 1 South (Hiebert 1993b, 1994a: Fig. 7.3). For the ancient phase, on the other hand, the reference consists of the sites of Kelleli 3 and 4 excavated by Masimov (1984, 1986), Adzhi Kui 8 (Sarianidi 1986b) and Gonur 1 North (Sarianidi 1990; Hiebert 1994a) in the process of being excavated by V.I. Sarianidi. Much has already been written about this imposing architecture characterising the Margiana and Bactrian Bronze Age settlements (Sarianidi 1986b, 1994; Hiebert 1994a; Askarov 1981). For this reason here we shall simply try to view them in a more general context and evaluate the contribution they made to the study of the development of the settlement system.

The most impressive monument in the ancient series is the palace dominating the centre of the urban settlement of Gonur 1 North. The building, square-shaped with quadrangular towers at the corners, at least in its third and last phase, displayed a complex internal distribution, of which only the south-western part has been excavated. Current excavation work indicates that the building had at least three phases, although at the present state of the work it is not possible to evaluate the differences in the structures referring to the three successive phases. However, the urban complex does not seem to have been surrounded by a wall.

A much smaller and less complex building has been unearthed also at Kelleli 4 (Masimov 1984). The wall surrounding the building has two quadrangular towers at the sides of the southern entrance and one quadrangular tower located midway along each of the other three sides. Around the palace traces of private dwellings are to be found, although also in this case it is not clear whether there was any outer wall protecting the settlement area as a whole.

The situation at Adzhi Kui 8 and Kelleli 3 is different. The former does have an outer wall with a single quadrangular tower beside the entrance. The interior of the wall has been reinforced by a series of pilasters or buttresses placed at regular intervals, perhaps also to support a wooden walkway (?) (Sarianidi 1986a). Kelleli 3 (Masimov 1986) instead has a square wall system with a double curtain of quadrangular towers besides each of the four gates along each side. On each side there are a further four regularly spaced quadrangular towers (making a total of six per side).

The defensive architecture of the Namazgha VI period is quite different and is represented by the structures unearthed at Auchin (Sarianidi 1990), Gonur 1 South, Togolok 21 and Togolok 1 (Hiebert 1994a; Sarianidi 1986a, 1994).

The characteristic features shared by all the above-mentioned architectures is the use of a circular tower at the corners of the surrounding walls and of semi-circular towers along the actual wall perimeters. Another important element is the fact that defensive wall structures enclose the entire settlement within their embrace. In other words, we are dealing with truly fortified settlements.

The peculiar and distinctive feature of the circular and semi-circular towers find specific terms of comparison also in Bactria, in the structures of Dashly 1 (Sarianidi 1977: Fig. 99 and Tikar 4 (*Ibid.*, pp. 23-4) while the quadrangular towers are found at Dashly 3 "Temple" (*Ibid.*, Fig. 13).

A separate category seems to be formed by architectures with T corridors, so far found only in Bactria, at Sapalli depe (Askarov 1981: Fig. 2) and Dashly 3 "Palace" (Sarianidi 1977: Fig. 15). In the case of Dashly 3, which underwent three phases like the Sapalli building, it is conceivable that the settlement originally developed outside and around the place and that only during the third and last phase (a fourth phase of use is represented by a series of graves dug in the

rubble of the abandoned building) were any dwellings or storehouses built.

Although I am personally convinced that both southern Turkmenistan and the regions of Bactria and Margiana will still give as much food for the historical thought concerning cultural relations during the Bronze Age, it is nevertheless possible to try and make more general reappraisal of the data now available. What we find in Margiana does not appear to be very different from the situation in the piedmont plain of south-eastern Turkmenistan. During an early phase of great urban growth during the Namazgha V period (Namazga depe: about 40 ha.; Altyn depe 27 ha.; Gonur 1 North 40 ha.; plus the series of smaller sites ranging in size between 5 and 10 ha.: Ulug-depe, Hapuz-depe in the piedmont zone, while no reliable data are yet available for Margiana), characterised by the rise of large primary centres, sometimes provided with town walls (Altyn depe already from Namazgha IV period on) and second (ca. 10 ha.) and third level (ca. 1-2 ha.) satellite settlements, the entire area underwent a transformation that was revolutionary to say the least. The large urban centres seem to pass through a crisis and the overall system was modified in the direction of a different organisational order. The Namazgha VI period witnessed the rise of an urban system based on smaller centres (10-15 hectares) (in this connection more information is available for Margiana and Bactria than for southern Turkmenistan) and on a series of small settlements in the order of 1-2 hectares in size clustering around the larger ones. The most conspicuous feature of the centres of this period is their configuration as fortified villages that, inside the perimeter walls, combine almost all the functions related to craft production and the storage of primary produce. Both in Margiana and Bactria also several of the fortified villages were found to be surrounded by a large ditch, without doubt also with defensive functions, and not intended solely as a water reservoir.

One further feature, no less important an indicator of a substantial transformation, is the different contribution made by the area as a whole in these two periods (NMZ V and VI) to the network of interregional relations. It is increasingly evident that during the explosion of the phenomenon of urbanism, the entire area participated actively in a complex trading system (Amiet 1986). There was in fact close contact with the Elamite world and with the Indus Civilisation, and the image projected by the archaeological documentation of the period is that of an affluent society, heavily engaged in the production of trading goods and commerce. The global dimension of the succeeding period, without however betraying any technical-cultural decline, is instead apparently less projected towards the exterior. Relations certainly continued to be entertained with other regions, but the overall volume of trade and exchanges seems to have gradually but constantly to have decreased. In all probability the crisis of the urban system was accompanied by the waning of the of the political power and thus by a diminished organisational capacity in the field of long-distance relations. What still remains to be determined are the causes leading up to this shift in the developmental trajectory of the Turkmenian and Bactro-Margianan societies, which was the main driving force behind such radically different choices that, generally speaking, were no less successful.

An Open Conclusion

At the present state of our knowledge there is only scanty, sporadic and dubious evidence (P'iankova 1994) concerning periods earlier than the Middle Bronze Age in Margiana. The bulk of the archaeological evidence is currently represented by settlements scattered throughout the entire area of the Murghab delta and, on the basis of their material culture and of an even more limited set of radiometric determinations (Kohl 1992; Hiebert 1993a; Salvatori 1995a), datable to the second half of the 3rd and the first half of the 2nd millennium BC.

However, several other comparatively important problems related to a reconstruction of the Margiana and Bactria population dynamics for the periods earlier than the Middle Bronze Age remain open. The evidence obtained from a handful of fragments ascribed to Namazgha III and IV periods of the Turkmenian sequence, gathered in the north-western area of the Murghab delta (Masimov 1981b) and the news of a NMZ IV settlement on the right bank of the Amu Darya in the Kerki area (Kuzmina 1976:114) are doubtless a relatively scanty evidence and yet it is difficult to believe that the Margiana and Bactria areas were uninhabited during the 4th and the first half of the 3rd millennium while all the surrounding regions have yielded significant evidence that can without doubt be ascribed to that period of time. North of Bactria, in Sogdiana of historical times, along the middle-upper reaches of the Zeravshan river, the excavations carried out by Isakov in the great protourban centre of Sarazm (Isakov 1981, 1985, 1991; Besenval 1987) have brought to light a sequence characterised by close links with both the contemporary settlements of the Turkmenistan piedmont zone and the Afghan region of Kandahar (Mundigak). Inside the ideal triangle that can be drawn between Sarazm, Mundigak and Namazgha depe lie the two regions of Bactria and Margiana, with delta systems suitable for the development of agricultural communities technologically similar to the Late Chalcolithic and Ancient Bronze Age systems. In our opinion only a wrong turning taken by the research or conditions of burial under alluvial deposits or the advancing sand dunes (in the distal areas of the delta) have so far stood in the way of the identification of the presence of an earlier settlement pattern.

It is no coincidence that all these regions that have seen the development of important agricultural communities during the Middle and Late Bronze Age later became the fulcrum of large urban centres throughout the Iron Age and up to the well-known instances in historical times (Holt 1982). While the constant line of development

of human experience in this huge area of Asia is now clear, a very strong urge has arisen to shed light also on the earlier phases, for which there is little evidence and which refer to a period that elsewhere has proved of great importance in determining revolutionary events, collapse and development in complex societies. First the question of the Neolithic, although settlements from this stage seem to have been located in the middle reaches of the Murghab river (Kohl 1984) and in the oases of southern Bactria (Vinogradov 1979), and then that of the Chalcolithic and Early Bronze Age, have to be decided on in these regions which, throughout their history, and also because of their geographic position, have played a key role in the development of material and cultural communications throughout the Middle East.

For the time being, in view of the scant material evidence available, the hypothesis of the possible peopling of the Murghab delta and of the Bactrian oases during the Chalcolithic and the Early Bronze Age of course remains a mere working hypothesis, which nevertheless needs to be verified by means of the precise and multidisciplinary research strategies that, as we have seen, are the only ones capable of yielding data reliable enough to be used in a correct historical reconstruction. And precisely in view of the new data obtained from the excavation of the ancient graveyard of Gonur 1 as well as from systematic reconnaissance work in drawing up the archaeological map of the Murghab, our mind goes back to what Ph. L. Kohl wrote in far-off 1984: "*It is equally obvious that understanding of third and second millennia BC developments in Western Turkestan have changed drastically as a result of these discoveries* [those occurring in Margiana], *a fact which, in turn, compels the cautious archaeologist to distrust unqualified reconstructions of historical processes and to suspect that additional major discoveries in the poorly investigated regions will (or can) be made which also will radically alter current understanding*" (p. 143), an appeal that our personal experience compels to endorse.

References

AA.VV (1994) *Archaeological Map of the Murghab Delta. Report in Progress, September 1994*, Rome.

Alekshin, V.A. (1983) Burial Customs as an Archaeological Source, *Current Anthropology* 24 (2), pp. 137-45.

Allchin, B. (1984) (ed.), *South Asian Archaeology 1981*, Cambridge.

Amiet, P. (1980) Antiquités de serpentine, *Iranica Antiqua* 15:155-166.

Askarov, A.A. (1973) *Sapallitepa*, Tashkent.

Askarov, A.A. (1977) *Drevnezemledelcheskaya Kultura Epokhi Bronzi Iuga Uzbekistana*, Tashkent.

Askarov, A.A. (1981) Southern Uzbekistan in the Second Millennium BC. Kohl (ed.) 1981, pp. 256-79.

Askarov, A.A., Abdullaev, B.N. (1983) *Dzharkutan*, Tashkent.

Besenval, R. (1987) Découvertes récentes à Sarazm (R.S.S. du Tadjikistan): attestation des relations au IIIe millénaire entre l'Asie centrale, l'Iran du nord-est et le Baluchistan, *Compte-rendus de l'Académie des Inscriptions et Belles-lettres*, pp. 441-56.

Biscione, R. (1977) The Crisis of Central Asian Urbanization in the II Millennium BC and Villages as an Alternative System. Deshayes (ed.) 1977, pp. 113-27.

Biscione, R., Tosi, M. (1979) *Protostoria degli stati turanici*, Napoli.

Brice, W.C. (1978) (ed.), *The Environmental History of the Near and Middle East since the Last Ice Age*, London.

Cremaschi, M. (1994) Geoarchaeological Research in the Murghab Delta. Preliminary Results of the 1993 Field-season. AA.VV. 1994, pp. 69-78.

Dani, A.H., Masson V.M. (1992) (eds.), *History of Civilizations of Central Asia. Volume I. The Dawn of Civilisation: Earliest Times to 700 BC*, Paris.

Deshayes J. (1977) (ed.), *Le Plateau Iranien et l'Asie Centrale des Origines à la Conquête Islamique*, Paris.

Ehrich R.W. (1992) (ed.), *Chronologies in Old World Archaeology*, 2 Voll., Unifersity of Chicago Press.

Francfort, H.-P. (1984) The Early Periods of Shortughai (Harappan) and the Western Bactrian Culture of Dashly. Allchin (ed.) 1984, pp. 170-5.

Francfort, H.-P. (1989) *Fouilles de Shortughai. Recherches sur l'Asie centrale protohistorique*, 2 voll., Paris.

Gardin, J.-C. (1985) (ed.), *L'archéologie de la Bactriane ancienne. Actes du colloque franco-soviétique*, Paris.

Gerasimov, I.P. (1978) Ancient Rivers in the Deserts of Soviet Central Asia. Brice (ed.) 1978, pp. 319-34.

Hiebert, F.T. (1993a) Excavations of Domestic Quarters from Gonur Depe (north): Excavations of Spring 1989, *Information Bulletin IASCCA* 19, pp. 78-95.

Hiebert, F.T. (1993b) Chronology of Margiana and Radiocarbon Dates, *Information Bulletin IASCCA* 19, pp. 136-48.

Hiebert, F.T (1994a) *Origins of the Bronze Age Oasis Civilization in Central Asia*, (American School of Prehistoric Research Bulletin 42), Cambridge (MA).

Hiebert, F.T. (1994b) Production Evidence for the Origins of the Oxus Civilization, *Antiquity*, 68 (259), pp. 372-87.

Hiebert, F.T., Lamberg-Karlovsky, C.C. (1992) Central Asia and the Indo-Iranian Borderlands, *Iran*, XXX, pp. 1-15.

Holt, F.L. (1989) *Alexander the Great and Bactria*, Leiden.

Isakov, A.I. (1981) Excavations of the Bronze Age Settlement of Sarazm. Kohl 1981, pp. 273-86.

Isakov, A.I. (1985) Sarazm et ses rapports avec le Sud. Gardin (ed.) 1985, pp. 229-34.

Isakov A.I. (1991) *Sarazm. K voprosu stanovleniya rannez-emledel'cheskoj kul'tury Zeravshanskoj doliny. Raskopki 1977-1983 gg*. Donish: Dushambe.

Jarrige, J.-F. (1994) The Final Phase of the Indus Occupation at Nausharo and its Connection with the Following Cultural Complex of Mehrgarh VIII. Parpola and Koskikallio (ed.) 1994, pp. 295-313.

Kohl, Ph.L. (1981) (ed.), *The Bronze Age Civilization of Central Asia. Recent Soviet discoveries*, New York.

Kohl, Ph.L. (1984) *Central Asia. Palaeolithic Beginnings to Early Iron Age*, Paris.

Kohl, Ph.L. (1992) Central Asia (Western Turkestan): Neolithic to the Early Iron Age. Ehrich (ed.) 1992, Vol. I, pp. 179- 195; Vol. II, pp. 154-162.

Kuz'mina, E.E. (1976) The "Bactrian Mirage" and the Archaeological Reality. On the Problem of the Formation of North Bactrian Culture, *East and West*, 26 (1-2), pp. 111-31.

Lyapin, A.A. (1975) Novye pamyatniki epokhi bronzy Yuzhnogo Turkmenistana, *Uspekhi Sredneaziatskoi Arkheologii* 3, pp. 73-76.

Masimov, I.S. (1979) Izuchenie pomatnikov epokhi bronzy nizovii Murgaba, *SA*, (1):111-31.

Masimov, I.S. (1981a) The Study of Bronze Age Sites in the Lower Murghab. Kohl (ed.) 1981, pp. 194-220.

Masimov, I.S. (1981b) Raskopki v Kellelinskom oazise, *Arkheologicheskie Otkrytiya - 1980 Goda*, pp. 466-7. Moskva.

Masimov, I.S. (1984) Zhiloi dom na Kelleli, *Pamiyatniki Turkmenistana* 2/38, pp. 16-8. Ashkhabad.

Masimov, I.S. (1986) Novye issledovaniya pamyatnikov epokhi bronzy na Murgabe. Masson (ed.) pp. 171-81.

Masimov, I.S., Lyapin, A. (1977) Arkheologo-topograficheskie raboty v nizovyakh drevnego Murghaba, *Archeologicheskie Otkrytiya, 1976 Goda*, Moskva, p. 552.

Masson, V.M. (1956) Raspisnaya keramika Yuzhnoi Turkmenii po raskopkam B.A. Kuftina, *Trudy YuTAKE* 7, pp. 291-373.

Masson, V.M. (1959) *Drevnezemledel'cheskaya kultura Margiany*, (MIA, no. 73). Moskva.

Masson, V.M. (1981) *Altyn-depe*, (Trudy YuTAKE 18), Moscow.

Masson, V.M. (1986a) Ancient Central Asian Civilization: Trends of Development, Assimilation of Ecological Niches, Cultural Links (Antiquity to Early Iron Period), *Information Bulletin IASCCA*, 11, Moscow, pp. 76-84.

Masson, V.M. (1986b) (ed.), *Drevnye Tsivilizatsii Vostoka*, Tashkent.

Masson, V.M., Sarianidi, V.I. (1972) *Central Asia. Turkmenia Before the Achaemenids*, London.

Miroshnikov, L.I. (1987) Central Asia: Towards the Issue of Geograhic Boundaries of a Historico-Cultural Region, *Information Bulletin IASCCA*, Special Issue, Moscow, pp. 53-57.

Miroshnikov, L.I. (1992) A Note on the Meaning of the Term "Central Asia" as Used in this Book. Dani A.H. and Masson V.M. (eds.) 1992, pp. 477-80.

Parpola, A., Koskikallio P. (1994) (eds.), *South Asian Archaeology 1993*. (Annales Academiae Scientiarum Fennicae, Series B, Vol. 271), Helsinki.

P'iankova, L.T. (1981) Bronze Age Settlements of Southern Tadjikistan. Kohl (ed.) 1981, pp. 287-310.

P'iankova, L.T. (1985) Les particularités de l'évolution historique du Tadjikistan méridional à l'Age du Bronze. Gardin (ed.) 1985, pp. 147-55.

P'iankova, L.T. (1993) Pottery of Margiana and Bactria in the Bronze Age, *Information Bulletin IASCCA*, 19, pp. 109-27. Moscow.

P'iankova, L.T. (1994) Central Asia in the Bronze Age: sedentary and nomadic cultures, *Antiquity* 68 (259), pp. 355-72.

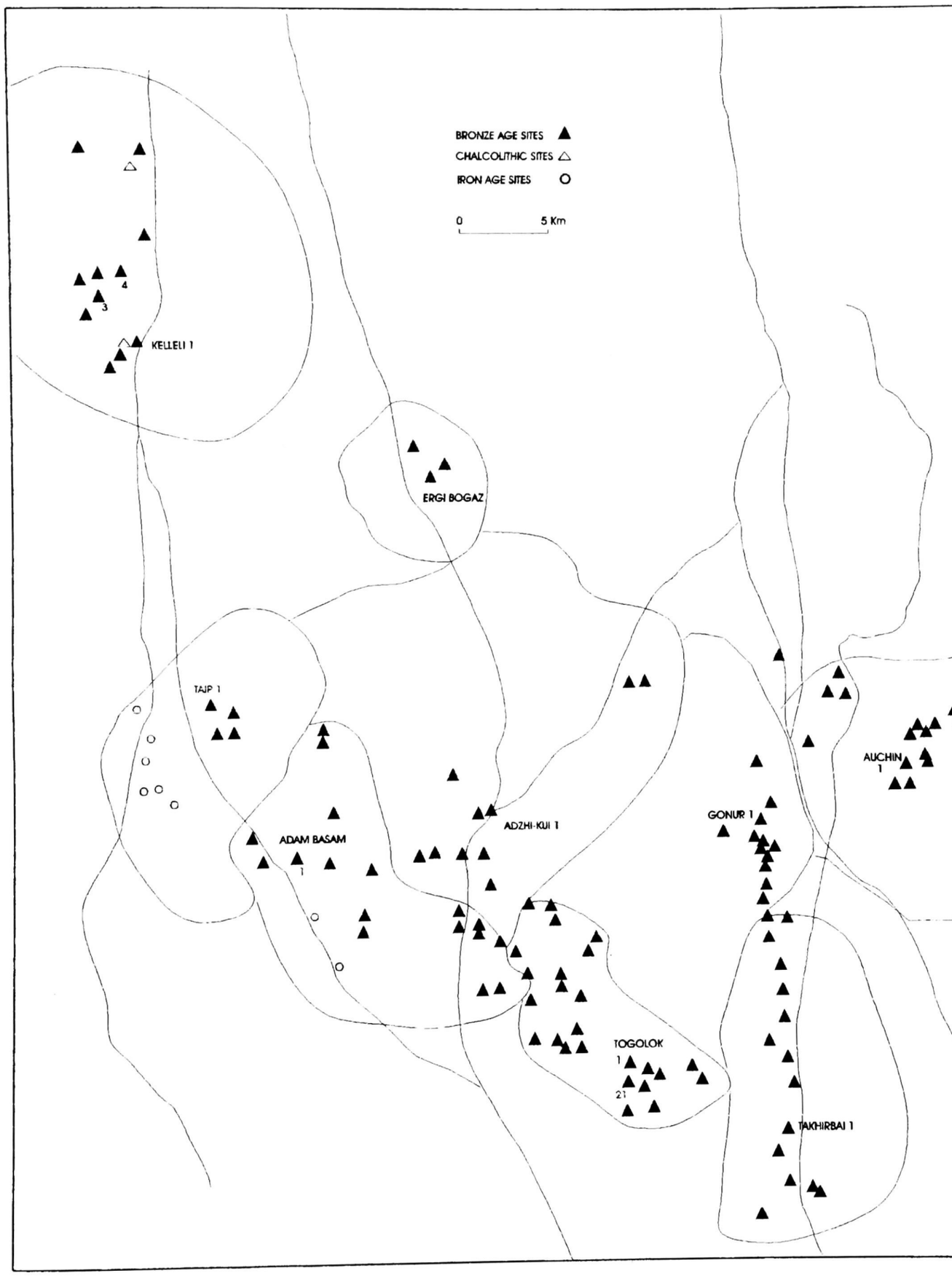


Fig. 1 - Bronze Age sites distribution according to Sarianidi 1990.

MARGIANA ARCHAEOLOGICAL MAP: THE BRONZE AGE SETTLEMENT PATTERN

by S. SALVATORI

The systematic survey of the Murghab delta within the framework of the Margiana Archaeological Map Project has substantially increased our knowledge of the peopling of the area during the Middle and Late Bronze Age. We have consequently been able to refine the picture provided by the early pioneering explorations of the 'fifties and 'seventies. What emerges with increasing clarity is a generalised distribution over the entire area of the delta of settlements belonging to a period roughly contemporaneous with Namazgha V in the piedmont plain of the Etek, although the specific material culture elements characterising it tends to make it a specific regional variant. This period which, as far as absolute chronology is concerned, spans a period running practically from 2400 to 2100 BC, witnessed in Margiana the development of phenomena of urban concentration not unlike those discovered a long time ago along the piedmont plain of southern Turkmenistan, from the Abiverd region (Namazgha depe) to that of Meana and Chaacha (Altyn depe). The large site of Gonur 1 North (an area of about 40 hectares), the whole sequence of which refers to the Middle Bronze Age, is clear evidence of a protourban centre that, in the Murghab area, is comparable with the urban poles of the piedmont plain.

The area of greatest site concentration relative to the Middle Bronze Age is currently the one identified in the centre-north section of the Murghab delta. However, a certain number of settlements from the same period have also be identified in the southern portion. In our opinion, the lower density observed can be accounted for in terms of masking phenomena produced by the successive superimposition of fluvial sediments and/or later cultural layers. This hypothesis seems fairly plausible and has been corroborated to some extent by the deep sounding dug in the '80s at Togolok 1 by V.I. Sarianidi (1990), as well as by the evidence of a site found by M. Cremaschi in the section of a modern artificial canal (Cremaschi *supra*). The deep layers of the trial trench at Togolok 1 have revealed the presence of occupation levels certainly belonging to the Middle Bronze Age, a period for which there was absolutely no evidence among surface materials. The same situation could also apply to many other sites in the delta attributed, on the strength of the surface evidence, to different sub phases of the Late Bronze Age and even to the Early Iron Age. The now proven presence of Middle Bronze Age sites also south of the Togolok area makes the pattern of the peopling of the Murghab delta much less straightforward than described in the past. At the same time, geomorphological surveys and fresh archaeological data, clearly point to a different interpretation of the phenomenon of the drying up of the delta, previously explained in terms of a simplistic model of gradual regression. The data acquired in recent years (Fig. 1) on the one hand indicate a generalised distribution of the Middle Bronze Age sites throughout the whole delta, on the other, an equally generalised presence of Late Bronze Age settlements. This still to some extent excludes a northern portion where reconnaissance is made difficult by the widespread presence of mobile sand-dunes, and the base of the delta, where modern farming activity is most intense. Nevertheless, the results of the archaeological survey make it difficult to accept a model of gradual drying up of the delta at a rate and in a way unrelated to the prolonged presence of extensive human settlement during the Late Bronze Age in the central-northern sector of the delta.

Although fully aware that at the present state of our research we still lack a sufficiently accurate body of data, above all as far as the chronology of the sites is concerned, and cannot therefore make the necessary complete distinction between Middle and Late Bronze Age sites, we have nevertheless made a first approximate attempt to infer the rules governing the settlement pattern. In this first approach to the problem, as outlined above, we took into consideration both sites like Gonur North which belong exclusively to the Middle Bronze Age and sites like Togolok 1 that were continuously settled from the Middle to the Late Bronze Age. This doubtless represents a severe limitation on any type of analysis one intends to carry out, whether it consists of the classical theory of Christaller, based on "Thiessen's polygons" or on the "rank-size rule" in the formulation proposed by G. A. Johnson (1977, 1980) for the study of the degree of political-administrative integration of archaeological sites. Both types of analysis actually presuppose the existence of a fair knowledge of the size of the area occupied by the sites during the various phases or periods of settlement and that it can be

assumed with some realibility that they were largely contemporaneous. As in our case these fundamental preconditions were not fully satisfied, the following can only be seen as an initial attempt to produce a set of hypotheses that, although in no way historically resolutive, can lead in the direction of the future progress of the research project undertaking the archaeological mapping of the Murghab delta.

The classical projection of the polygonal network on the Bronze Age Margiana sites map produces a somewhat regular grid (Fig. 2) which highlights the central importance of sites larger than 5 hectares. The distribution of the sites, in an interpretation that is common practice, points to a systematic occupation of this part of the delta (3600 km^2). Such a distribution would seem to indicate that, at least in this period, it is not possible to refer to a settlement pattern broken up into oases but to a continuum one, the rules governing which appear to have been shaped not so much by specific environmental situation as by the dynamics of group organisation. To verify the assumption that the third and early second millennium settlement pattern were not affected by environmental constraints such as sandy areas, we designed a specific subproject accomplished during the last two field seasons (1995 and 1996). It was intended to prove, through a series of surveying transects, mainly east-west oriented and linking major known sites, that there was no solution of continuity in the Murghab delta settlement distribution. The transects surveyed are: Taip 1 - Adzhi Kui 1; Adzhi Kui 1 - Gonur 1; Gonur 1 - Auchin 1; Kelleli 1 - Egri Bogaz 4; Egri Bogaz 4 - Gonur 1 and Egri Bogaz 2 - Adzhi Kui 1 (Fig. 3). Such a strategy has allowed to consistently enrich the number of Bronze Age sites known in the region and to add two new very large sites (723 and 746) which significantly contribute to the effectiveness of the polygonal lattice we can superimpose to the major sites distribution. The most impressive result, however, has been the documentation of a practically uninterrupted presence of Bronze Age pottery along the tracks we walked along. Such an evidence is the best prove that, during the Middle and the beginning of the Late Bronze Age the whole Murghab delta was available for unconstraint farming exploitation.

The limitations referred to above, mainly the chrono-typological ones, oblige us to follow a differential interpretation of the distribution pattern for the Middle and the Late Bronze Age. It has in fact been demonstrated that, during the Middle Bronze Age, the settlement of Gonur 1 North attained and perhaps even exceeded the size of 40 hectares (Fig. 4). This would make it without doubt the largest settlement in the whole delta at that time. If at this point we draw circles taking Gonur as the centre and having a radius of about 10, 15, 20, 30 and 40 km, respectively (Fig. 5), we intercepts the entire system of sites as they are known today. It is immediately apparent how the other centres of the polygons are arranged in concentric rings around the larger site and how the system becomes somewhat rarefied towards the periphery. As far as the Middle Bronze Age is concerned, this would seem to indicate some form of integrated territorial hierarchy or political-administrative dominance by the centre in Gonur.

On the other hand, if we view the same grid while bearing in mind the changed situation of the Late Bronze Age, when Gonur South was less than 5 hectares in size, the system appears as a series of juxtaposed polygons with no predominant centres (Fig. 6). In this case we are dealing with a situation of territorial fragmentation which is self-regulating under the laws of proxemics and not integrated in any central political and administrative system.

The decisive factor in the differential interpretation of the same grid is obviously the variable represented by the substantial different size of Gonur during the Middle and Late Bronze Age.

Application of the rank-size rule to the same data set seems more or less to support the above interpretation. The curve generated by applying the RS procedures (Fig. 7) is in fact anomalous (prime-convex) and in all likelihood is the result of interpolating two different territorial organisational arrangements (Falconer and Savage 1995:41). The latter are related respectively to the decidedly more highly integrated layout of the Middle Bronze Age compared with the highly fragmented situation of the Late Bronze Age. As shown in the figure, compared with the log normal plot, the first section of the curve is concave. This corresponds to the larger settlements which seem to be in a size scale ratio consistent with the principle of hierarchic distribution. It then becomes highly convex when the sites smaller than 5 hectares appear. If the RS is applied using the size of Gonur during the Late Bronze Age the resulting curve is highly convex throughout, confirming the interpretation postulated above during the discussion of the configuration of the polygonal grid.

Nevertheless, it should be emphasised that all this, at the present stage of the research, should be considered as purely indicative. Only a greater degree of disaggregation of both the time and the size scales than has been done so far will possibly allow conclusions of use in providing a historical interpretation of the phenomenon of the human settlement of the Margiana during the Bronze Age to be drawn.

However, little or nothing is known with reference to the Middle and Late Bronze Age, a period spanning nearly one thousand years, concerning the human settlement at the base of the delta, that is, the medieval Merv area. It is quite conceivable from a theoretical point of view that a settlement of the size of Gonur North could have developed either during the Middle or Late Bronze Age. If this were true the interpretation of the settlement pattern of the earlier period would not change very much. We would in fact merely have a second pole of territorial centrality. The situation would be much different if we postulated the existence of a large site at the base of the delta during the Late Bronze Age. In this case the above hypothesis of a highly fragmented and loosely integrated system would have to be substituted

by one involving the conservation of the preceding organisation accompanied by a southward shifting of the regional centre of gravity.

The situation could of course be presented as being much more complex than the above schematic outline. However, we have deliberately refrained from pushing our hypothesis constructing exercise so far. What appears a priority at the present stage of the work is a further refinement of the operating strategies in the field in order to fill several objective gaps that still prevent us from obtaining a sufficiently comprehensive picture and a satisfactory level of interpretative certainty.

References

Falconer, S.E., Savage, S.H. (1995) Heartlands and Hinterlands: Alternative Trajectories of Early Urbanization in Mesopotamia and the Southern Levant, *American Antiquity*, 60(1), pp. 37-58.

Johnson, G.A. (1977) Aspects of Regional Analysis in Archaeology, *Annual Review of Anthropology*, 6, pp. 479-508.

Johnson, G.A. (1980) Rank-Size Convexity and System Integration: A View from Archaeology, *Economic Geography*, 56(3), pp. 234-247.

Sarianidi, V.I. (1990) *Drevnosti strany Margush*, Ashkhabad.

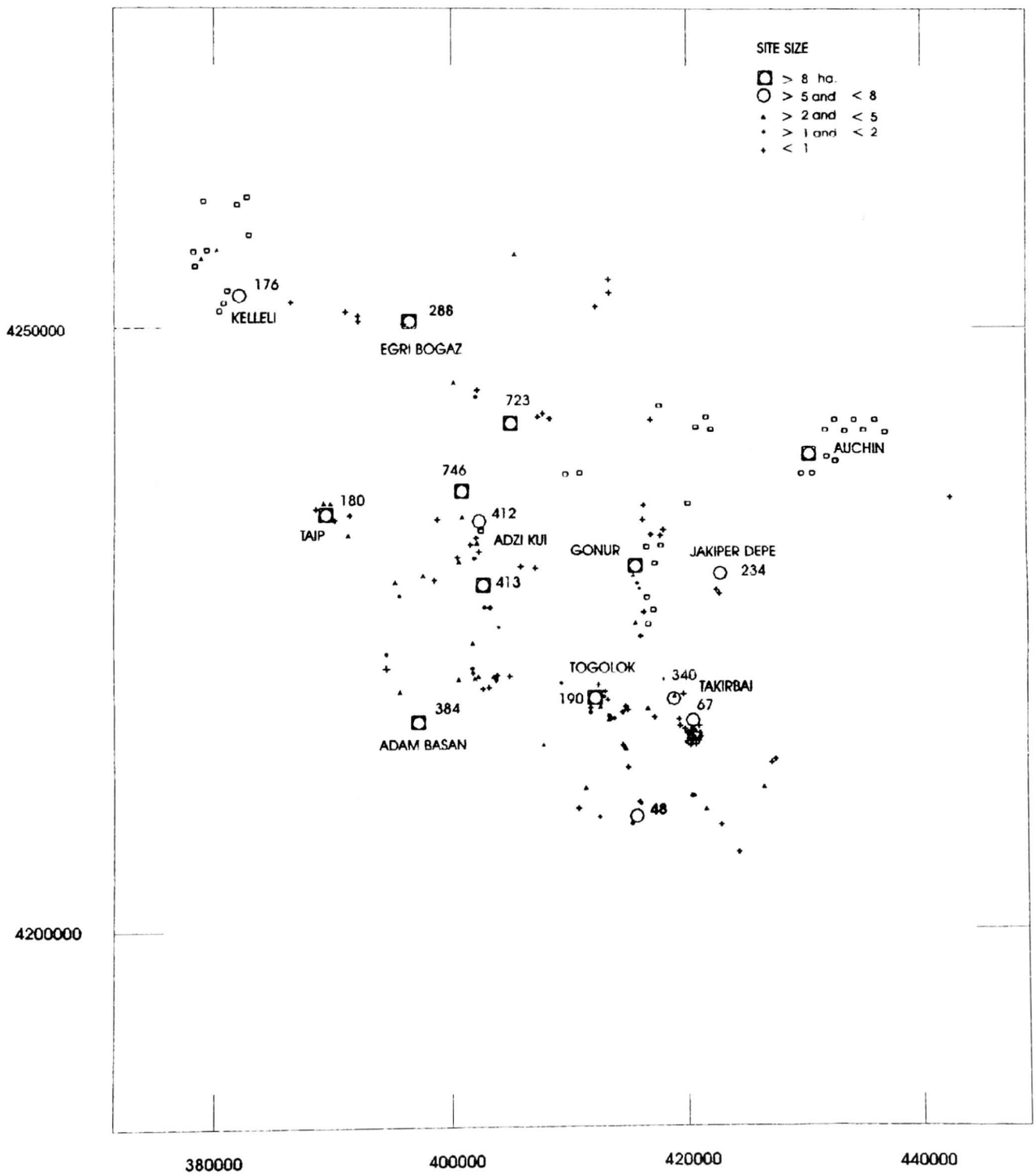


Fig. 1 - Margiana Bronze Age site locations.

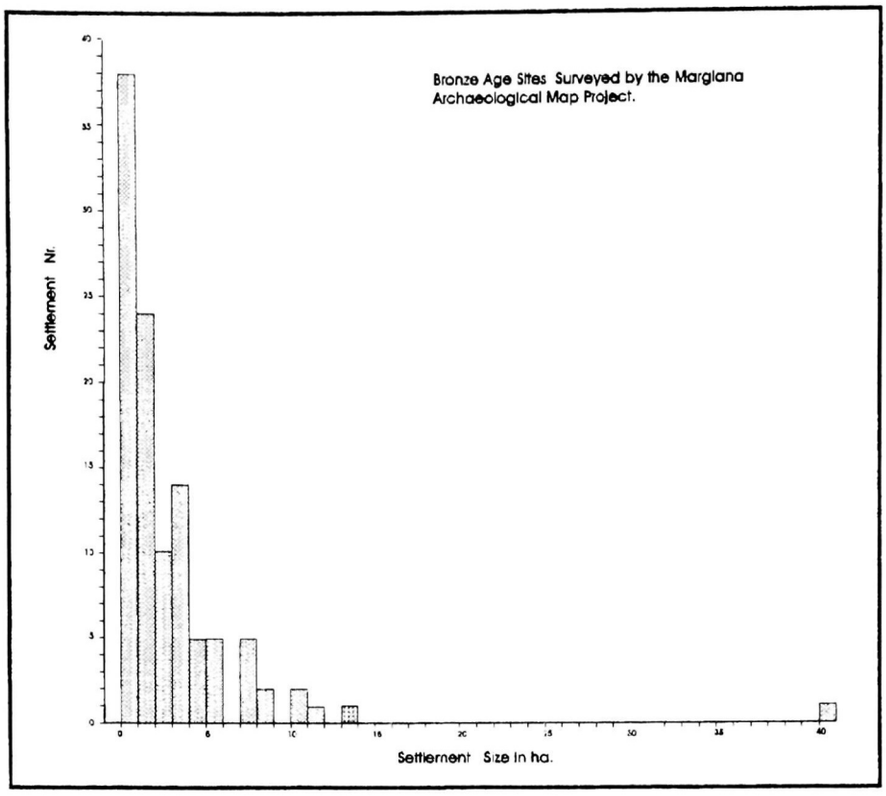


Fig. 2 - Bronze Age site distribution according to estimated size in ha.

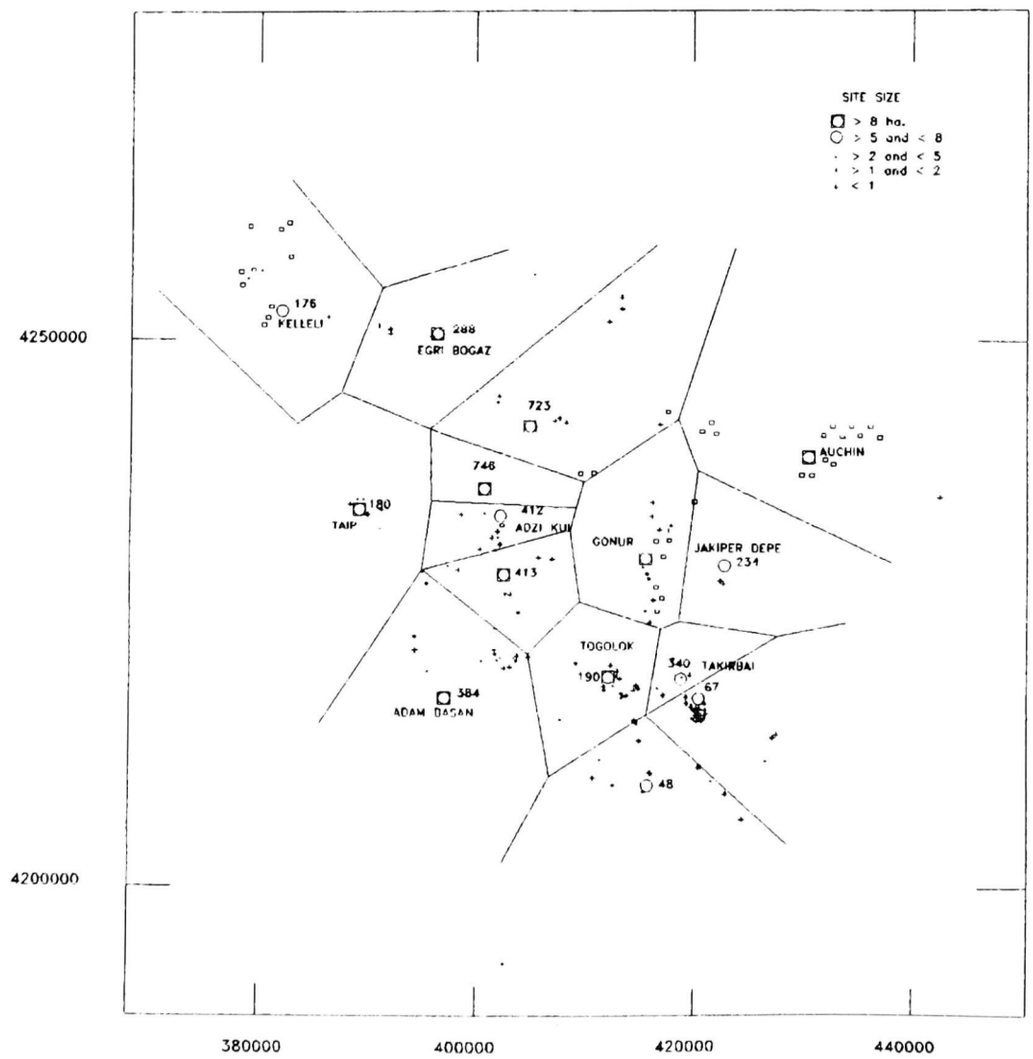


Fig. 3 - Thiessen polygonal lattice calculated with Gonur North estimated at 40 ha.

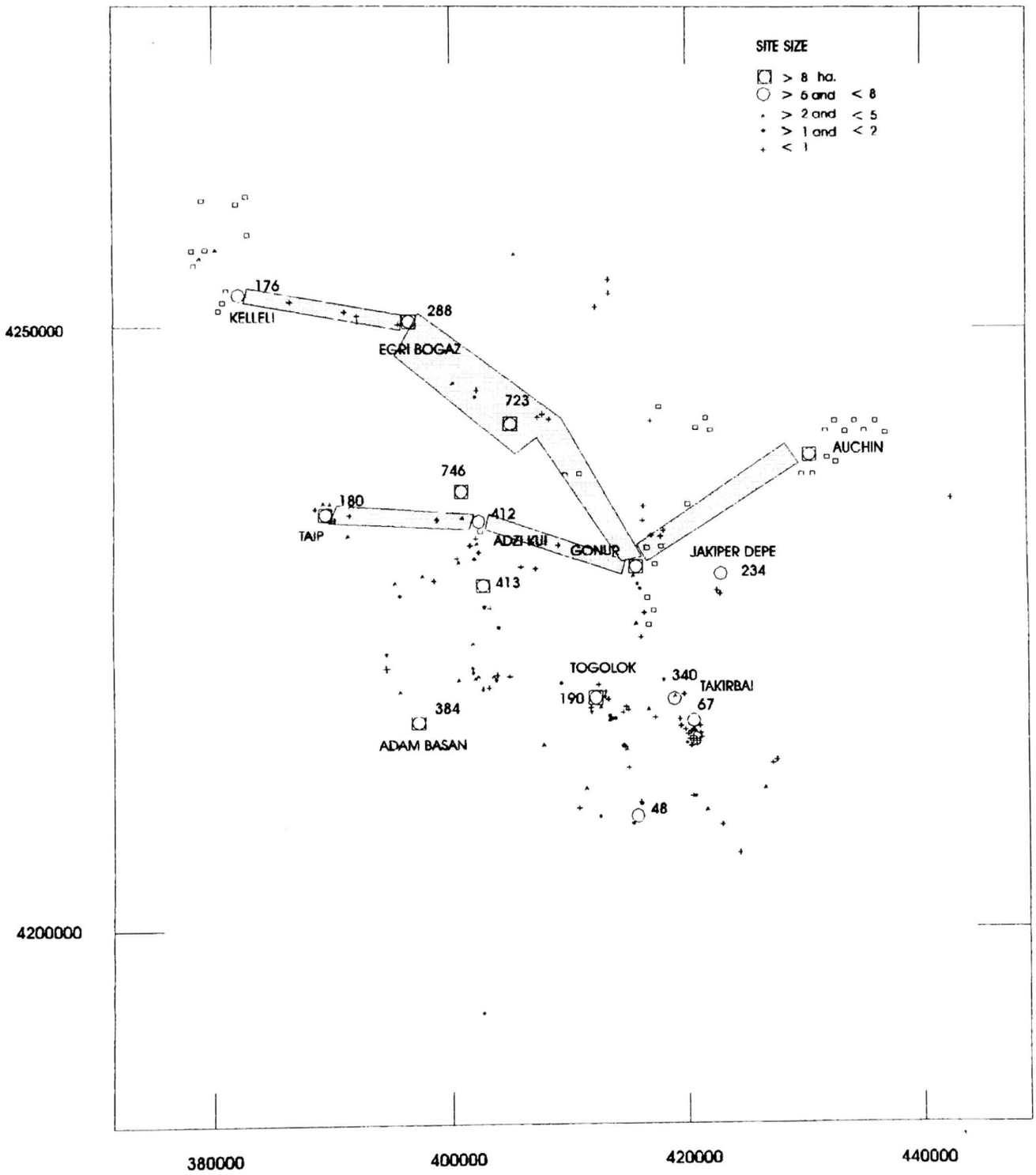


Fig. 4 - Transect surveyed during the 1995 and 1996 campaigns.

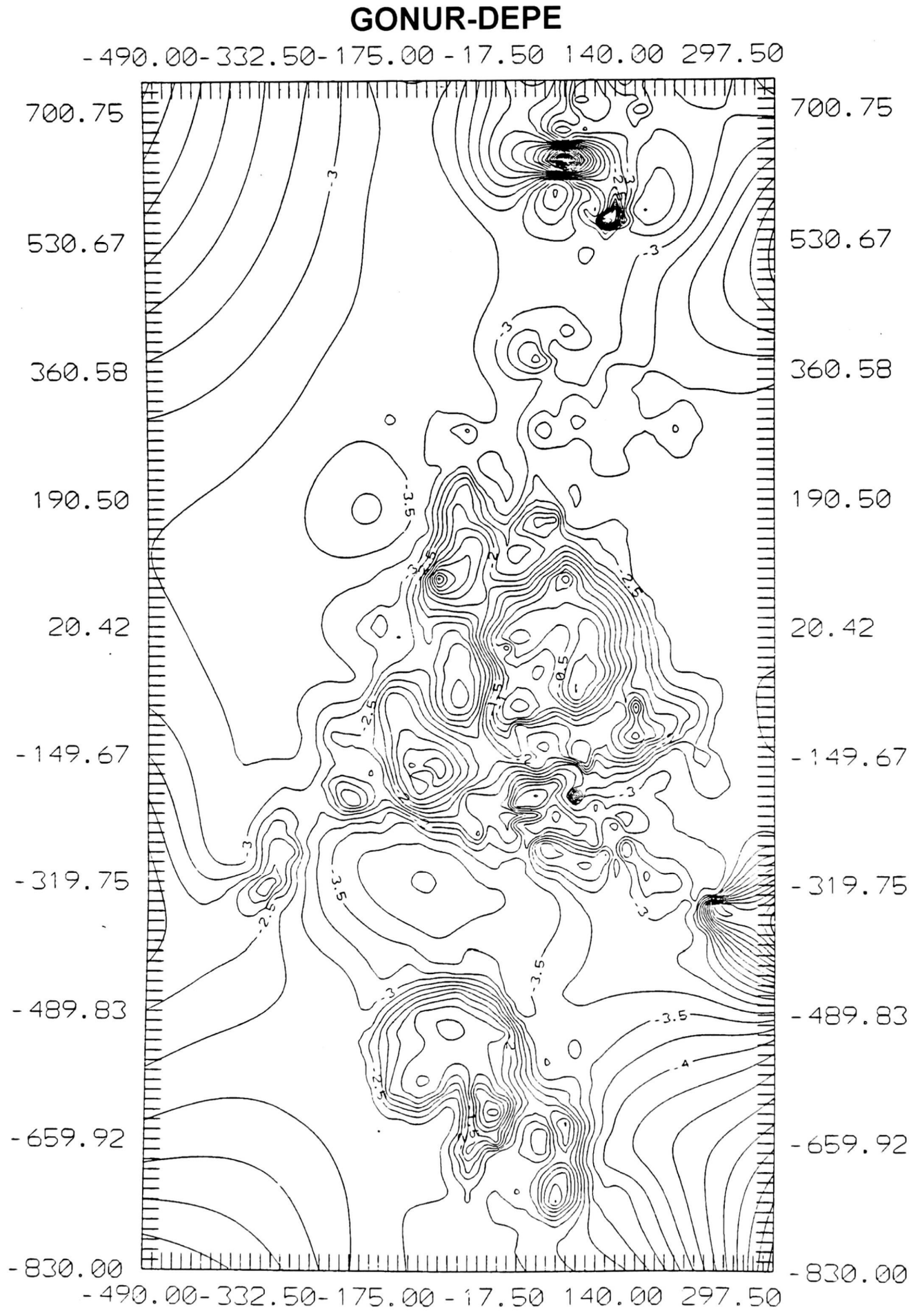


Fig. 5 - Instrumental map of the Gonur settlement.

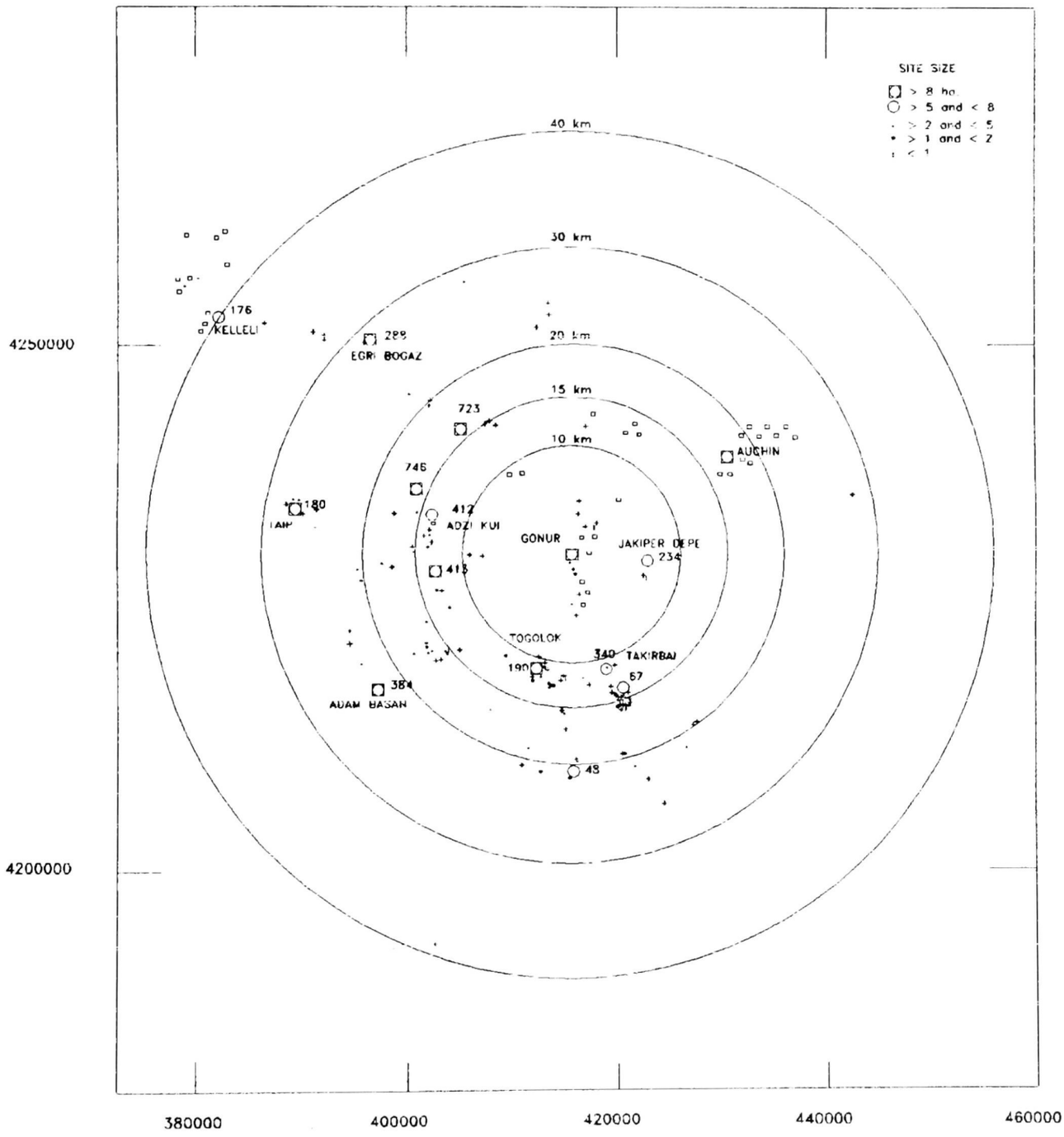


Fig. 6 - Bronze Age site distance from Gonur.

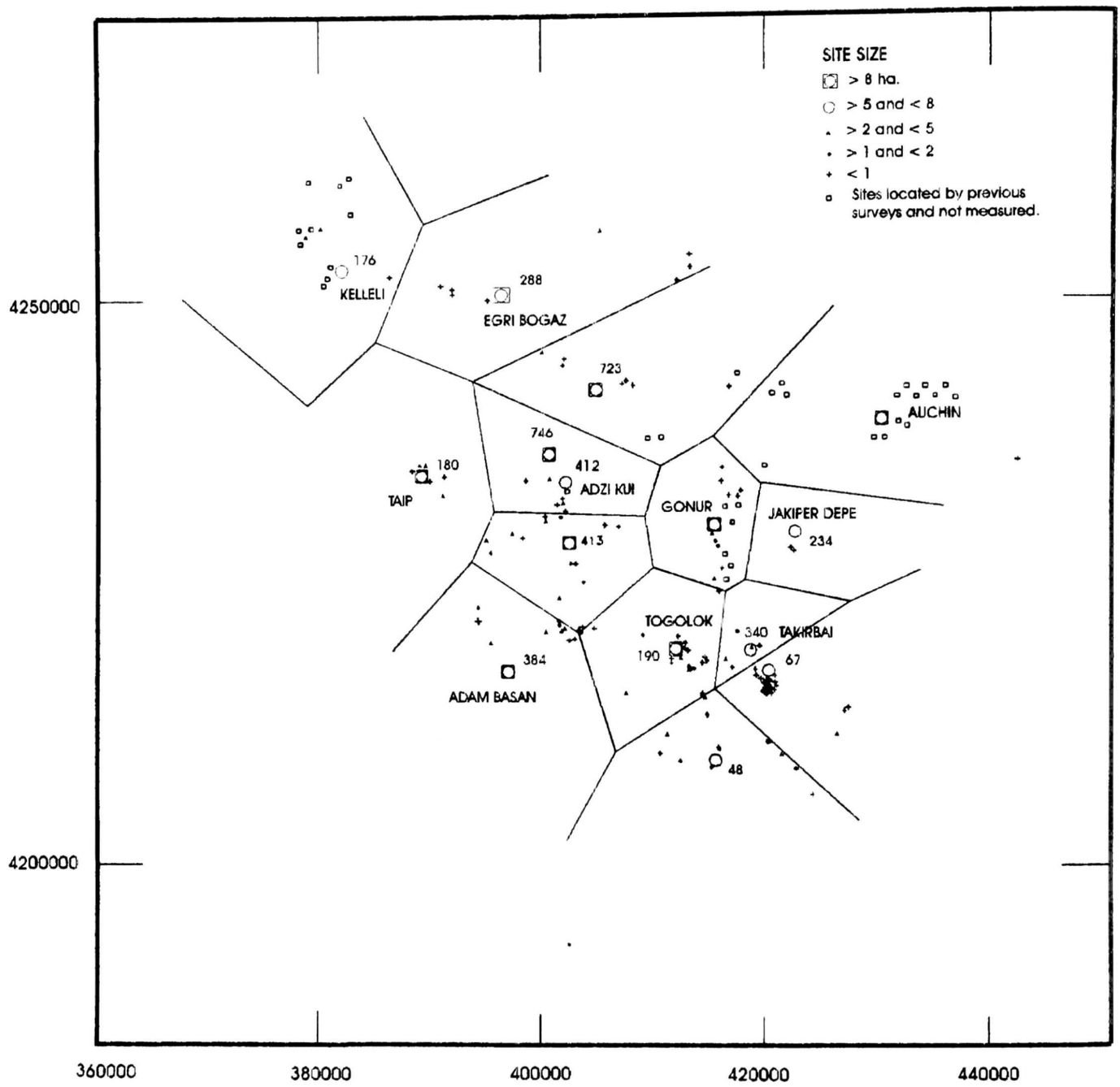


Fig. 7 - Thiessen polygonal lattice calculated with Gonur South at 5 ha.

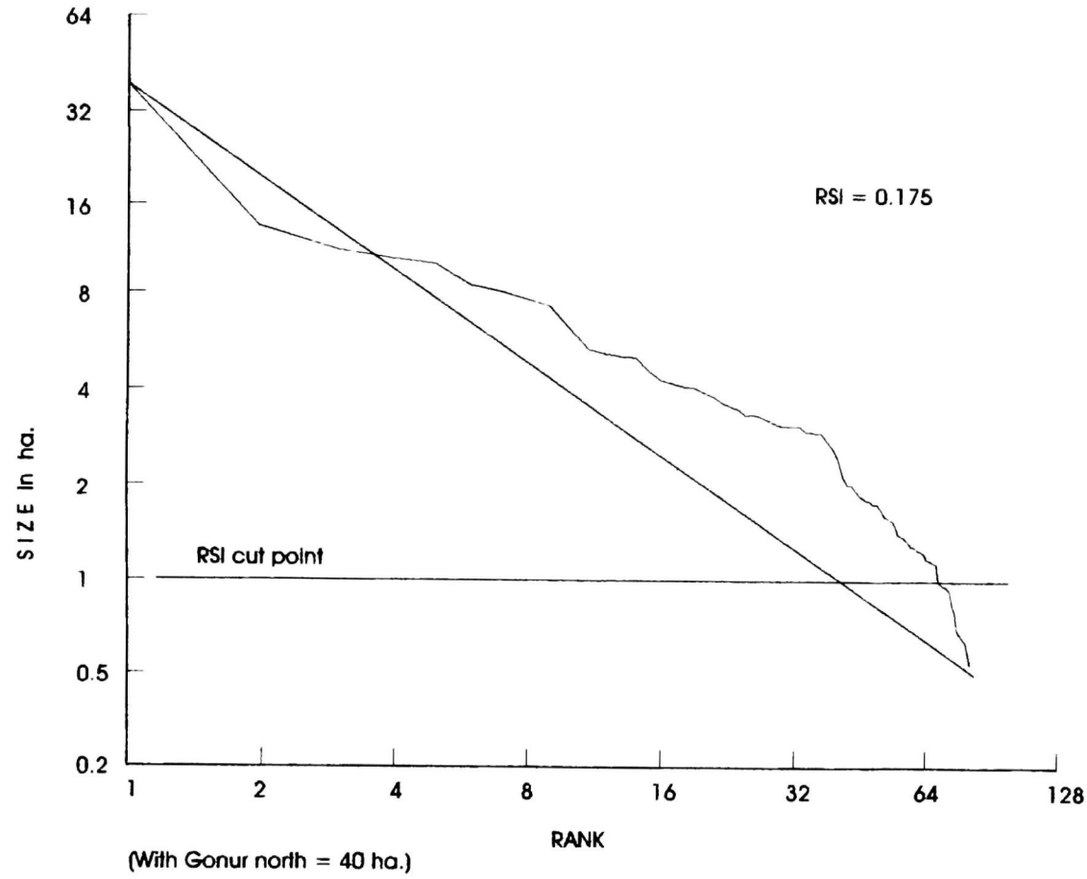


Fig. 8 - Margiana Middle Bronze Age sites Rank Size Index.

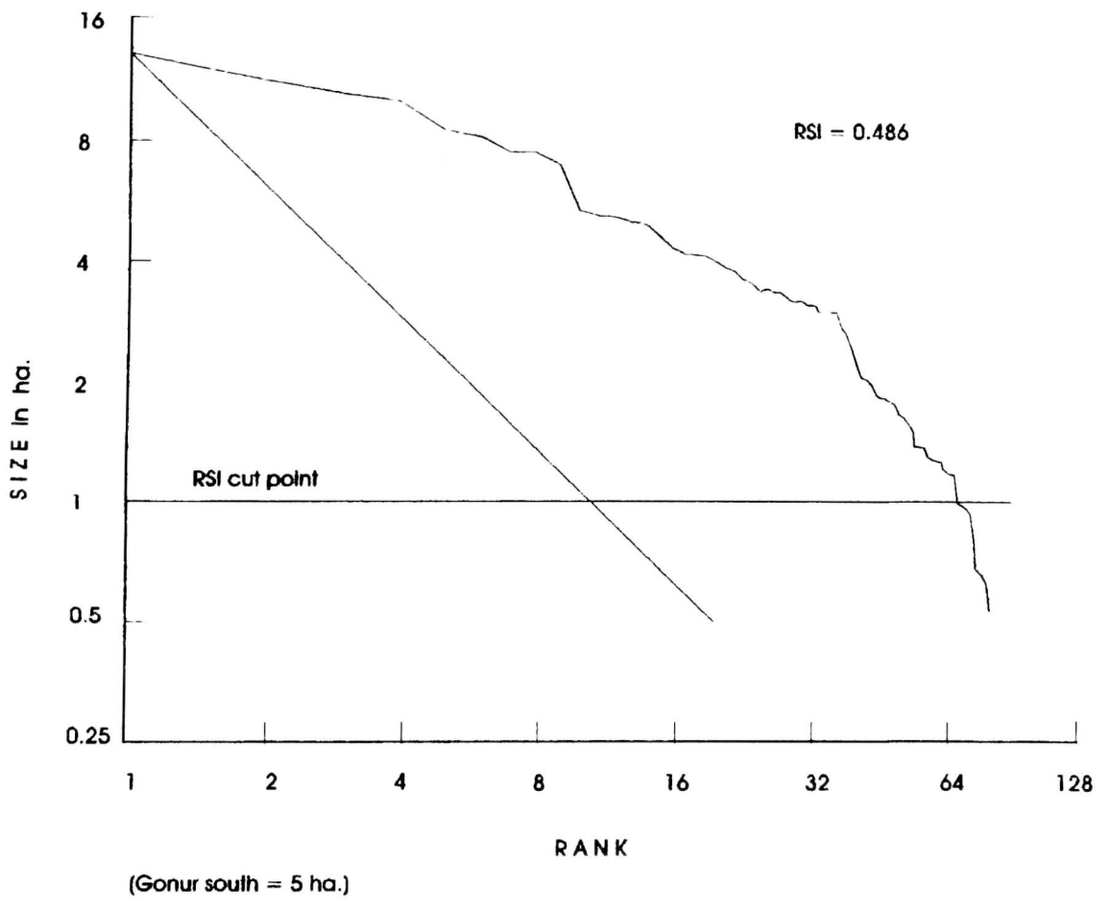


Fig. 9 - Margiana Late Bronze Age sites Rank Size Index.

PRELIMINARY REPORT ON ORNAMENTAL ELEMENTS OF "INCISED COARSE WARE"

by B. CERASETTI

The surface survey carried out by the field team of the Archaeological Map of Murghab Delta Project in 1990-96 has recovered a significant amount of Incised Coarse Ware (ICW), related to Bronze Age nomadic stock-riders over a vast portion of Eurasia, between the Urals and Kashgarian.

Soviet authors have often labelled this type of pottery as "Andronovo Ware" ([1]). We prefer the more descriptive definition Incised Coarse Ware, given the ongoing fragmentation of the "Andronovo concept" stemming from the progress of research work.

The association of Incised Coarse Ware in the nomadic camp-sites in the Murghab delta is quite evident from the distribution in small sherd scatters, most frequently on sand covering the Early Bronze Age alluvium, surrounding the Namazga VI settlement mounds ([2]).

Incised Coarse Ware sherds has been recovered on 34 sites for a total of 336 fragments. The present text is the presentation of the incised ornamental patterns so far identified.

In spite of the fragmentary nature of the recovered material it was possible to illustrate the main ornamental elements in the summary table ([3]). However, we present now the isolated motives in these schematic patterns with their sites occurences on the Murghab and the comparative finds from other sites across the "Andronovo space" table.

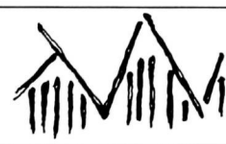
([1]) Tolstov (1958); Gryaznov (1966); Gulyamov, Islamov and Askarov (1966); Kuz'mina (1971); Sarianidi (1975); Itina (1977); Smirnov and Kuz'mina (1977); Kuz'mina (1985); Kuz'mina (1986); Gening, Zdanovich and Gening (1992); Kuz'mina (1994).

([2]) Cattani, *infra*.

([3]) In this article, we present four plates of a part of ICW fragments, recovered in the Murghab delta during the 1990-96 seasons. For the bibliographical references of sherd shape, cf. M. Cattani and B. Genito *infra*.

Type No.	Definition	Schematic Pattern	MAM Sites Occurrence	Comparative Occurrences	Bibliography
1	Frieze of Impressed Angles		69, 188, 338, 341	1601 Sintashta	Itina (1977): 106, fig. 57, 5 Gening-Zdanovich-Gening (1992): 91, fig. 24, 6
2	Incised Irregular Lines		69, 157, 226, 326, 329, 330, 331,333, 336, 338, 339, 341, 342, 346, 349, 351, 352, 701, 703 705, 712, 821	Kokcha 3 Kel-Adzhi	Tol'stov (1958): 18, fig. 5, 3 Kuz'mina (1994): 450, fig. 50, 40
3	Incised Cross-Hatched Lines		336,703,705	Tasty-Butak MT 2	Gryaznov (1966): pl. XXXV, 12 Gulyamov-Islamov-Askarov (1966): pl. XXVIII A, 4

Type No.	Definition	Schematic Pattern	MAM Sites Occurrence	Comparative Occurrences	Bibliography
4	Incised Horizontal ZigZag		69, 188, 326, 330, 333, 336, 338, 349, 352, 701	Kokcha 3	Tolstov (1958): 18, fig. 5, 2
				Tasty-Butak	Gryaznov (1966): pl. XXXV, 6
				Makhankulya	Gulyamov-Islamov-Askarov (1966): pl. XXVI, 1
				Gudzhaili 4	*ibidem*: pl. XXIX A, 7
				Auchin 1	Sarianidi (1975): 21, fig. 1, 6
				Alakul'	Kuz'mina (1994): 411, fig. 15, 25
				Alekseevka	*ibidem*: 412, fig. 16, 18
				Biyrek-kol'	*ibidem*: 416, fig. 20a, 2
				Dzheitun	*ibidem*: 449, fig. 49, 16
5	Incised Vertical ZigZag		69, 241, 306, 326, 330, 333, 334, 336, 338, 341, 342, 346, 349, 352, 701, 821	Gudzhaili 9	Gulyamov-Islamov- Askarov (1966): pl. XXVIII B, 8
				Gudzhaili 4	*ibidem*: pl. XXIX B, 1
				Auchin 1	Sarianidi (1975): 21, fig. 1, 1, 2
6	Incised Horizontal Parallel Lines		69, 249, 338, 341, 701, 703	Bairam Kazgan 2	Itina (1977): 94, fig. 51, 4
7	Incised Oblique Parallel Lines		69, 233, 236, 249, 321, 326, 330, 333, 334, 336, 337, 338, 339, 341, 342, 346, 349, 352, 701, 703, 705, 711, 821	MT 1	Gulyamov-Islamov-Askarov (1966): pl. XXVII B, 4
				Auchin 1	Sarianidi (1975): 21, fig. 1, 4
				Auchin 11	*ibidem*: 22, fig. 2, 4
				Anau	Kuz'mina (1994): 452, fig. 52, 4
				Bezmeina	*ibidem*: 450, fig. 50, 38
				Kel-Adzhi	*ibidem*: 450, fig. 50, 41
				Kodzha	*ibidem*: 449, fig. 49, 3
				Namazga-depe	*ibidem*: 452, fig. 52, 21
				Sagat-Yasyr	*ibidem*: 450, fig. 50, 43
8	Incised Vertical Parallel Lines		69, 188, 326, 338, 341, 701, 705	Darbazakyr I	Gulyamov-Islamov-Askarov (1966): 34, fig. 11, 3
				Ushkatty	Gryaznov (1966): pl. XXIX, 7
				Novy Kumak	Smirnov-Kuz'mina (1977): 16, fig. 5, 5
9	Meander		188	Gudzhaili 9	Gulyamov-Islamov-Askarov (1966): pl. XXXIII A, 1
10	Incised Triangle Horizontal Hatched Lines		69, 336, 338, 346	Kokcha 3	Tolstov (1958): 18, fig. 5, 8
				Kokcha 15	Itina (1977): 70, fig. 24, 2
				Ovadan-depe	Kuz'mina (1994): 450, fig. 50, 5

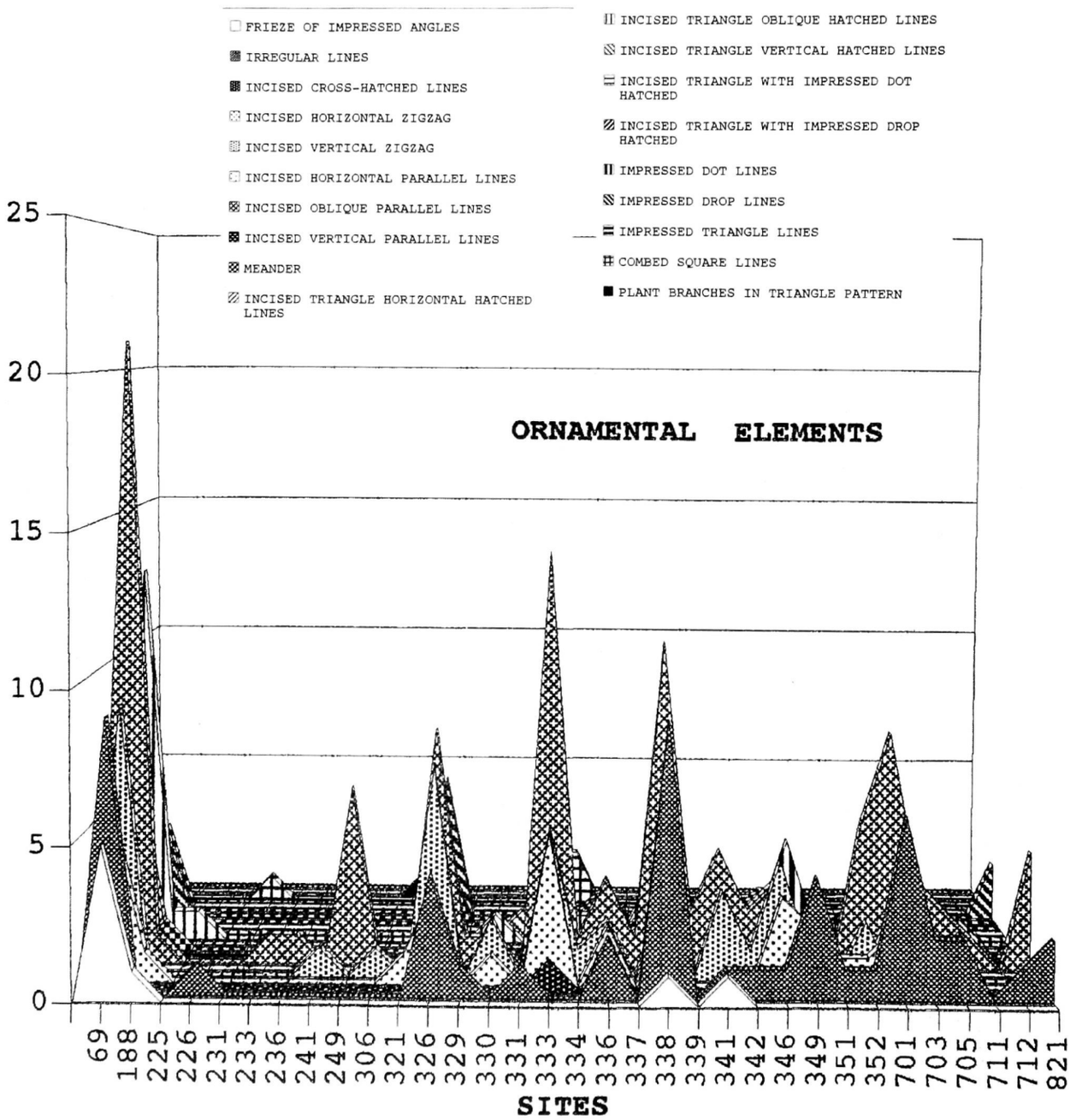
Type No.	Definition	Schematic Pattern	MAM Sites Occurrence	Comparative Occurrences	Bibliography
11	Incised Triangle Oblique Hatched Lines		69, 188, 225, 326, 333, 334, 336, 341, 346, 349, 711	Gudzhaili 9	Gulyamov-Islamov-Askarov (1966): pl. XXVIII A, 1
				Alakul'	Gryaznov (1966): pl. XI, 2
				Smolino	*ibidem*: pl. VI, 4
				Auchin 1	Sarianidi (1975): 21, fig. 1, 8
				Auchin 11	*ibidem*: 22, fig. 2, 7, 8
				Auchin 11/12	*ibidem*: 23, fig. 3, 10
				Auchin 1 Takhirbai 13/15	*ibidem*: 27, fig. 5, 1
				Takhirbai 3/15	*ibidem*: 24, fig. 4, 1
				Kokcha 15A	Itina (1977): 73, fig. 27, 2
				Kokcha 16	*ibidem*: 79, fig. 33, 2; 84, fig. 38, 3
				Bezmeina	Kuz'mina (1994): 449, fig. 49, 35
				Bliznetsy II	*ibidem*: 422, fig. 24, 12
				Borovoe	*ibidem*: 416, fig. 20a, 22
				Gurdush	*ibidem*: 446, fig. 46, 3
				Karakul'	*ibidem*: 444, fig. 44, 19
				Ovadan-depe	*ibidem*: 450, fig. 50, 10, 14
12	Incised Triangle Vertical Hatched Lines		69, 333	Novy Kumak	Smirnov-Kuz'mina (1977): 16, fig. 5, 4
13	Incised Triangle with Impressed Dot Hatched		338	Tautar	Kuz'mina (1994): 425, fig. 27, 3
14	Incised Triangle with Impressed Drop Hatched		326, 338	Yakke-Parsan 2	Itina (1977): 168, fig. 82, 12
				Sintashta	Gening-Zdanovich-Gening (1992): 291, fig. 163, 8
				Alakul'	Kuz'mina (1994): 411, fig. 15, 9
15	Impressed Dot Lines		69, 326, 333, 338, 342, 349	Kokcha 3	Tolstov (1958): 18, fig. 5, 2
				Gudzhaili 6	Gulyamov-Islamov-Askarov (1966): pl. XXVII B, 1
				Novy Kumak	Smirnov-Kuz'mina (1977): 16, fig. 5, 7
16	Impressed Drop Lines		69, 326, 333, 336, 346, 349, 821	Darbazakyr I	Gulyamov-Islamov-Askarov (1966): 34, fig. 11, 4, 13
17	Impressed Triangle Lines		69, 349	Tuzkan	Gulyamov-Islamov-Askarov (1966): 65, fig. 34, 7
				Smolino	Gryaznov (1966): pl. V, 12
				Sintashta	Gening-Zdanovich-Gening (1992): 90, fig. 23, 6; 93, fig. 26, 9

Type No.	Definition	Schematic Pattern	MAM Sites Occurrence	Comparative Occurrences	Bibliography
			231, 333, 334	Alekseevka	Gryaznov (1966): pl. XVI, 10
18	Combed Square Lines			Barak-tam 4	Itina (1977): 42, fig. 3, 6
				Sintashta	Gening-Zdanovich-Gening (1992): 90, fig. 23, 10; 93, fig. 26, 1, 7
				Kartaly	Kuz'mina (1994): 444, fig. 44, 30
19	Plant Branches in Triangle Pattern		326, 334	Bykovo	Smirnov-Kuz'mina (1977): 31, fig. 9, 13

Quite expectevely, the most frequent and direct comparisons are with settlements and composites on the Akchadarya Delta in Khorezm, related to the Tazabagyab culture refer (4).

A frequency graphic indicates a no remarkable disproportion about the distribution of ICW ornamental elements between the Murghab delta sites:

(4) Itina (1977).



BIBLIOGRAPHY

AA.VV. (1994) *Archaeological Map of the Murghab Delta*. Rome.

Balfet, H., Fauvet M.F. and Monzon, S. (eds.) (1988) *Lexique plurilingue pour la description des poteries* (CNRS). Paris.

Biscione, R. and Bulgarelli, M.C. (1983) Painted Geometrical Decoration on the Shahr-i Sokhta Buff Ware: Approach to a Systematic Classification. In *Prehistoric Sistan*, Tosi (ed.), pp. 211-64.

Brock, J.K. (1957) *Fortetsa Early Greek Tombs Near Knossos*. Cambridge.

Gening, V.F., Zdanovich, G.B. and Gening, V.V. (1992) *Sintashta. Arkheologicheskie pamjatniki ariiskikh plemen Uralo-Kazakhstanskikh stepei*. Chelyabinsk.

Gryaznov, M.P. (ed.) (1966) *Andronovskaya kul'tura*. Moskva-Leningrad.

Gulyamov, Ja.G., Islamov, U. and Askarov, A. (1966) *Pervobytnaya kul'tura i vozniknovenie oroshaemogo zemledeliya v nizov'yakh Zarafshana*. Tashkent.

Itina, M.A. (1977) *Istoria stepnykh plemen Juzhnogo Priaralya*. Moskva.

Kuz'mina, E.E. (1971) Earliest Evidence of Horse Domestication and Spread of Wheeled Vehicles in Connection with Problem of Time and Place of Formation of Indo-European Unity. *VIII Congrès International des Sciences Préhistoriques et Protohistoriques*. Belgrade.

Kuz'mina, E.E. (1985) Classification and Periodisation of Andronovo Cultural Community Sites. *Information Bulletin*, IASCCA 9, pp. 23-46. Moscow.

Kuz'mina, E.E. (1986) *Drevneishie skotovody ot Urala do Tyan'-Shanya*. Frunze.

Kuz'mina, E.E. (1994) *Otkuda prishli Indoarii? Material'naya kul'tura plemen andronovskoi obshchnosti i proiskhozhdenie indoirantsev*. Moskva.

Sarianidi, V.I. (1975) Stepnye plemena epokhi bronzy v Margiane. *Sovetskaya Arkheologiya*, 2, pp. 20-29.

Smirnov, K.F. and Kuz'mina, E.E. (1977) *Proiskhozhdenie indoirantsev v svete noveishikh arkheologicheskikh otkryti*. Moskva.

Tolstov, S.P. (1958) The Prehistoric Cultures and Primitive Irrigation Systems of Ancient Chorasmia. *Annual Report and Bulletin for 1955-56*, 13, pp. 8-36.

Tosi, M.(ed.) (1983) *Prehistoric Sistan 1*, XIX 1. Rome.

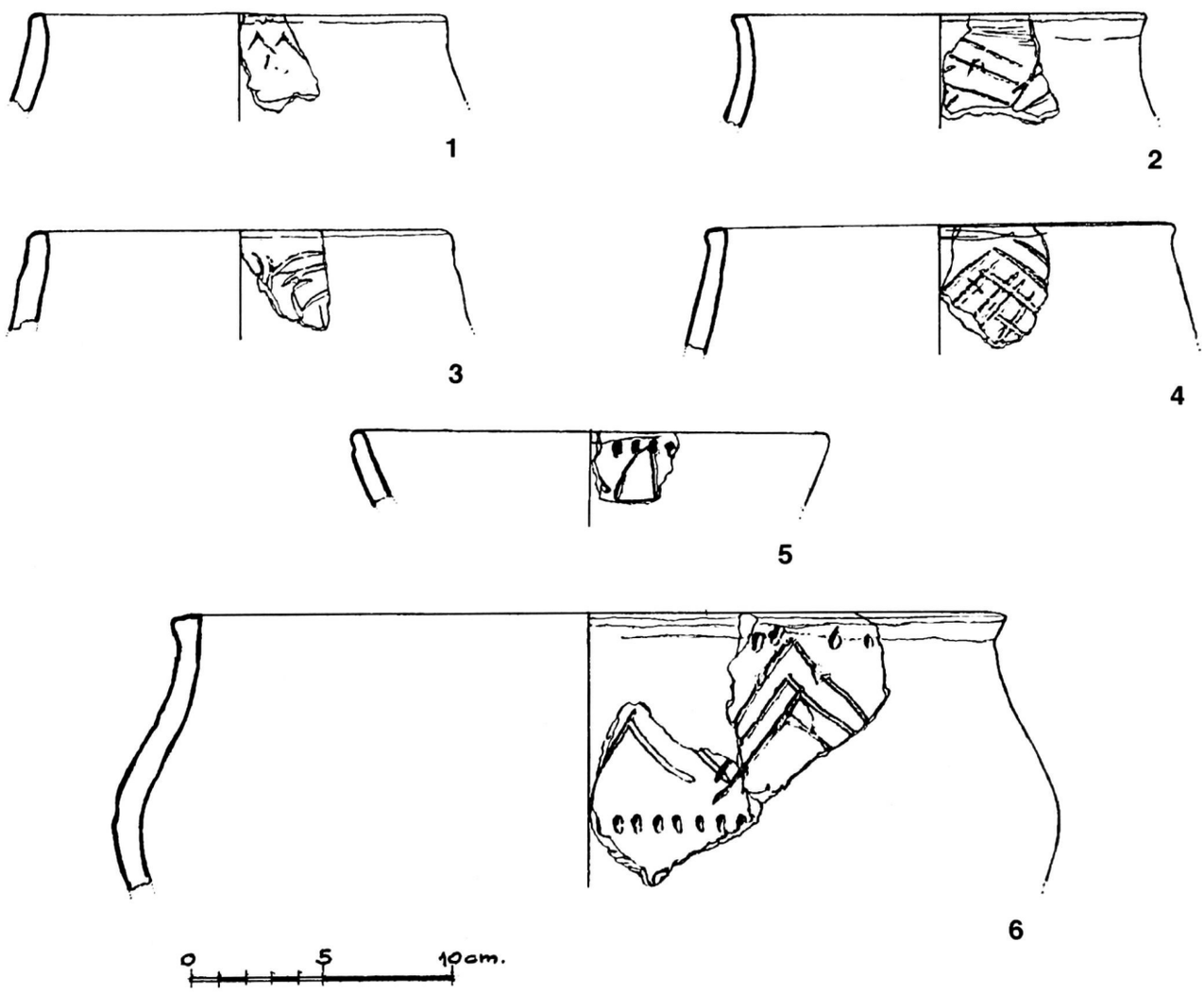


Plate I. Typology of Ornamental Elements in "Incised Coarse Ware": no. 1, site 338, tab. 3, 4; no. 2, site 338, tab. 3, 10; no. 3, site 349, tab. 3, 12; no. 4, site 336, tab. 3, 11; no. 5, 349, tab. 3, 1; no. 6, site 326, tab. 3, 10.

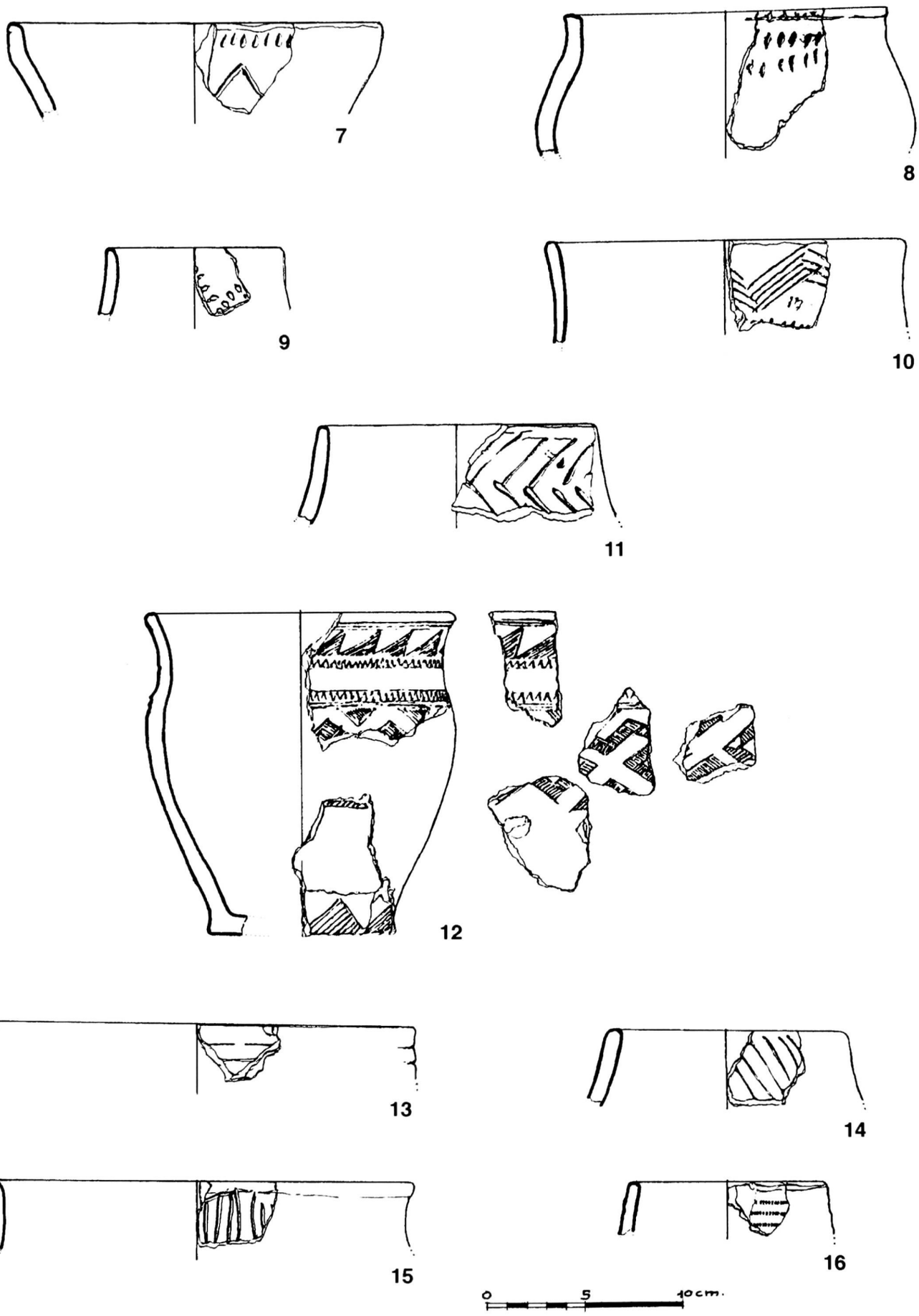


Plate II. Typology of ornamental elements in "Incised Coarse Ware": no. 7, site 349, tab. 3, 2; no. 8, site 326, tab. 3, 4; no. 9, site 336, tab. 3, 4; no. 10, site 188, tab. 3, 4; no. 11, site 352, tab. 3, 4; no. 12, site 188, tab. 3, 10; no. 13, site 69, tab. 3, 4; no. 14, site 69, tab. 3, 4; no. 15, site 338, tab. 10; no. 16, site 333, tab. 3, 4.

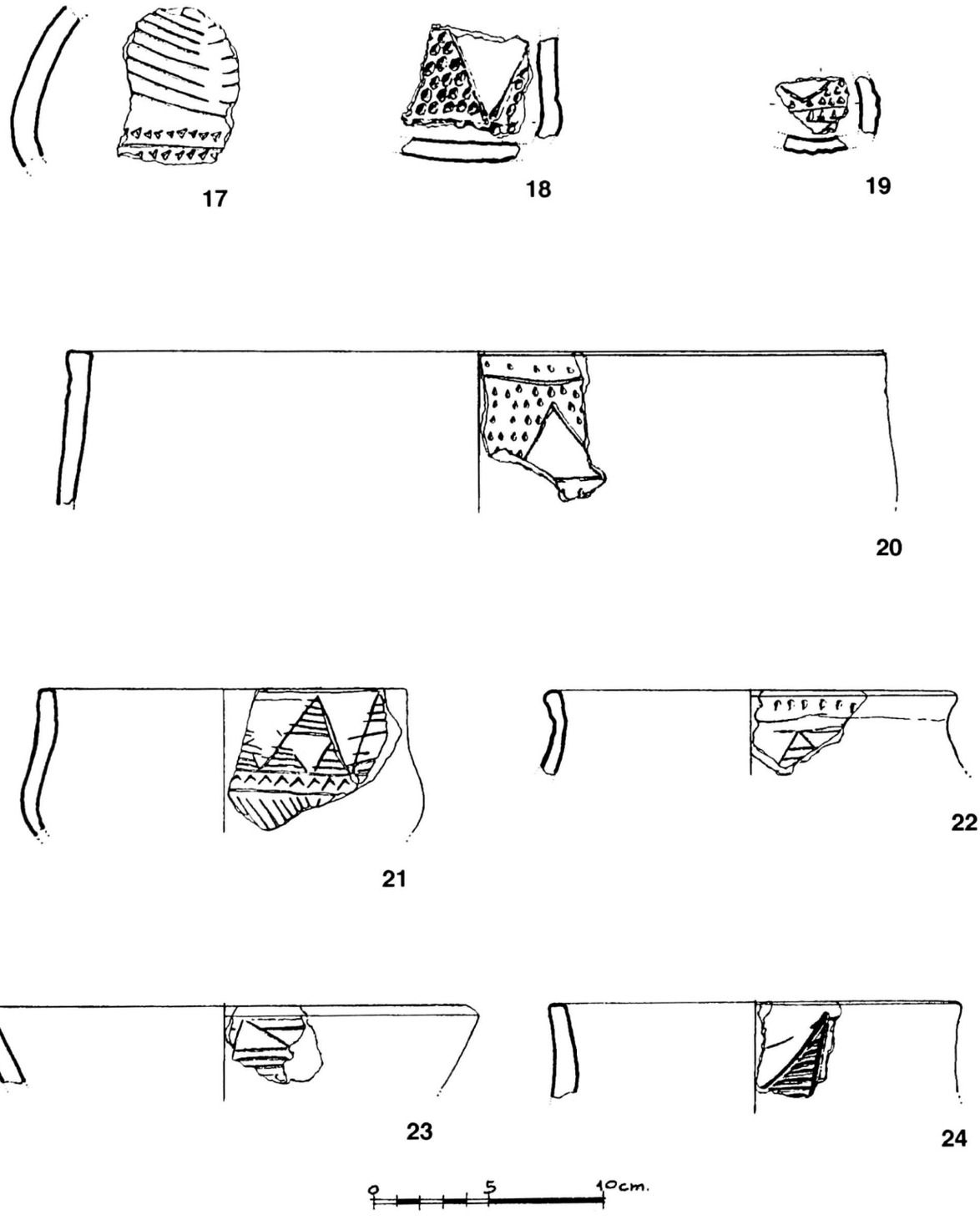


Plate III. Typology of ornamental elements in "Incised Coarse Ware": no. 17, site 69; no. 18, site 338; no. 19, site 338; no. 20, site 326, tab. 3, 4; no. 21, site 69, tab. 3, 4; no. 22, site 346, tab. 3, 10; no. 23, site 346, tab. 3, 1; no. 24, site 336, tab. 3, 4.

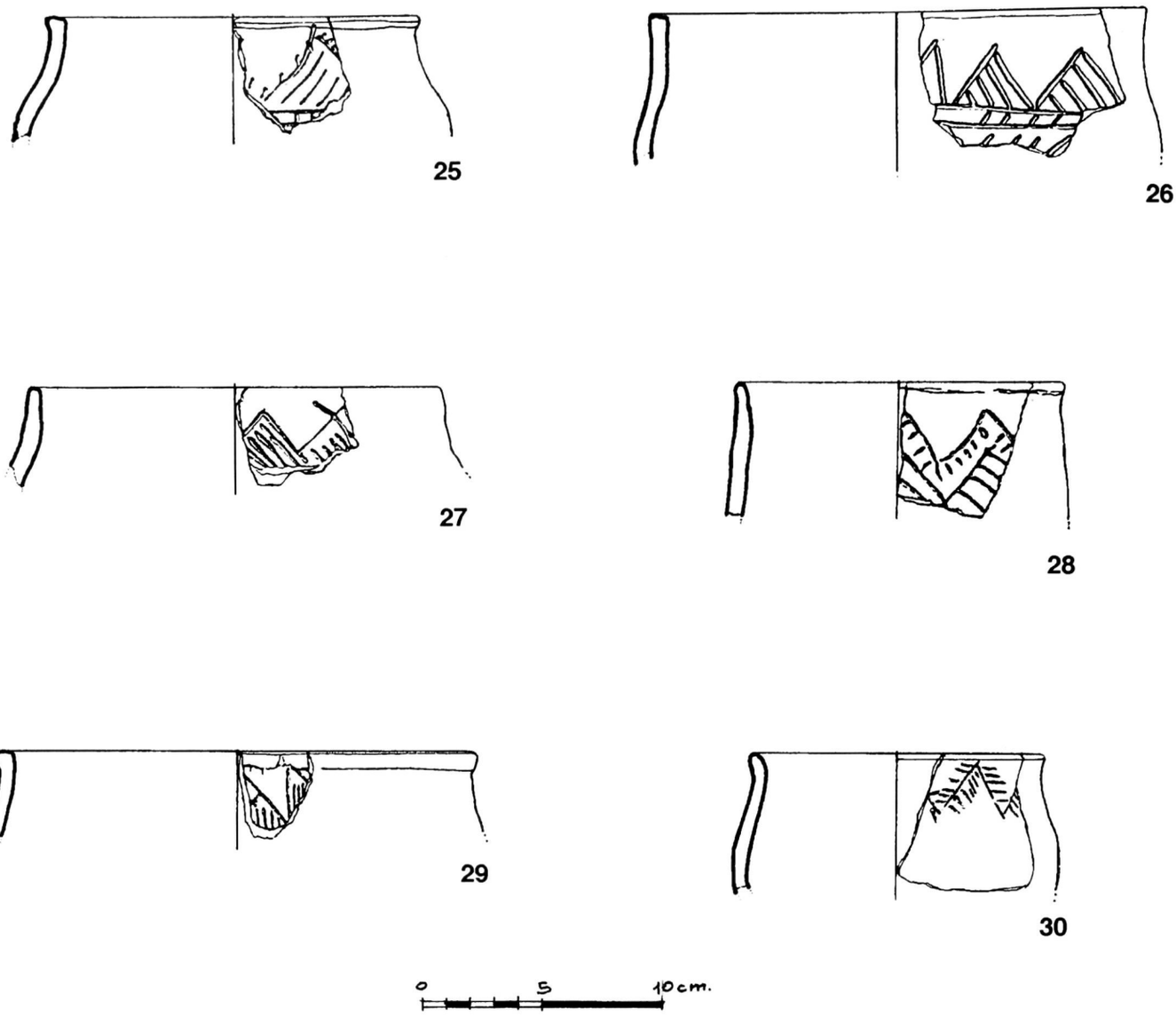


Plate IV. Typology of ornamental elements in "Incised Coarse Ware": no. 25, site 333, tab. 3, 7; no. 26, site 69, tab. 3, 4; no. 27, site 69, tab. 3, 3; no. 28, site 326, tab. 3, ; no. 29, site 69, tab. 3, 11; no. 30, site 334, tab. 3.

THE POTTERY CHRONOLOGICAL SERIATION OF THE MURGHAB DELTA FROM THE END OF THE BRONZE AGE TO THE ACHAEMENID PERIOD: A PRELIMINARY NOTE

by M. CATTANI AND B. GENITO

During the last decades differing and various scholars studied and dealt with the pottery from Merv Oasis with different touch and richness in details (Masson 1959; Masimov 1982; Kuz'mina and Lyapin 1984; Udeumuradov 1986; 1993; Pjankova 1989; 1993). These and other contributions, up to the present time at disposal of the scholars and mainly relating to the Bronze and Iron Ages, generally have constituted too short analyses on the matter; it is, thus, still missing a full and complete picture of the typological evolution of that production in the area. Masson had established, nevertheless, in the late fifties, a very important chronological sequence from the Late Bronze Age to the Iron Age, basing the results on some of the excavations effected in the area (Masson 1959). His final proposal was the identification of the s.c. Yaz I-III horizons, ranging from the 10th to the 5th centuries BC. That chronology, though variously submitted to criticism (Koshelenko 1985; Diakonov 1985) up to ninety was never really alterated as far as the main set up was concerning. A revision of that chronological sequence, nevertheless, appears more and more necessary today according to the new results of more recent field-work in the area (Hiebert 1993; 1994; AA.VV. 1994) and to a more ample reconsideration of the chronologies in archaeology based on the calibrated C 14 dating, and in particular to the efforts made by scholars with regard to Central Asia from Neolithic to the Early Iron Age (Kohl 1992). What we would like here to present, then, does not want to be a new generic work on the subject, but rather a proposal of ceramic typology, though preliminary, strictly based on the largest amount of pottery fragments never collected in the area. The typology proposed, nevertheless, is very far from being a completely new hypothesis and follows more or less the former ones, with the addition of some significant changes one can see in the following tables. The trenches opened at Takhirbai tepe (THR 1) (Cattani *infra*) and the topographical work, during 6 seasons of work (1990-1996) (AA.VV 1994) of the joint Turkmenian, Russian and Italian mission, have actually given an enormous quantity of pottery fragments (20.000 c.) distributed in more than 800 archaeological areas (mostly new, including tepes, flat sites, and scatters). This large amount has represented the main data-basis for the reconstruction of the typology and the morphology of the pottery from the latest phase of the Late Bronze Age to the latest phase of the Late Iron Age in the area. From one side the topographical work was aimed to the historical reconstruction of the settlement pattern spread over the area from the Bronze to the Iron Ages. From the other the opening of trenches at Takhirbai depe was, furthermore, oriented to link the pottery sequence yielded from the survey to a more precise and secure relative chronology based, instead, on a new archaeological stratigraphy. The type-evolution here outlined has been possible thanks to those two set of works. Though constituting a preliminary step to be furthermore developed this evolution seems very useful and we hope it could give more light to the numerous unsolved historical problems of such a strategic area like Merv Oasis. The results, up to now, achieved should be, of course, confirmed by new archaeological excavations and soundings related to different periods we hope very much to carry out in the future.

Here one can see the following 11 tables respectively related to the final phase of LBA (1800-1400 BC) including the production of the incised coarse ware (Andronovo) (1800-1400 BC), to the Iron Age, including Yaz I (1400-900 BC), Yaz II (900-550 ? BC) and Yaz III (550 ?-300 BC). A later phase has been, furthermore, identified within the pottery types analyzed and the name proposed for it is "Late Yaz III" (300-? BC). For what concerns the continuity from the Late Iron Age to the Parthian and Sasanian periods it needs further analyses in detail.

In the tables (Nos. 1, 2) relating to the latest phase of Late Bronze Age the most representative site for the types made in the common ware is Takhirbai 3, more recently explored; there is a clear confirmation for the presence of the same pottery forms already proposed and published by Masson (1959, 173-177, tabl. V-IX). This group of ceramic is testifying to the very end of the Bronze Age and in the meantime is representing the continuity between the Bronze Age and the Yaz I horizon as documented by the excavations in Takhirbai depe (Cattani *infra*). In the same phase is also present a coarse ware hand- and wheel-made (c. 10-20%) chaff tempered.

In the Table 3 there are present types of a very characteristic hand-made coarse ware with incised

decoration which we name ICW (Incised Coarse Ware). This pottery is commonly related to the Andronovo culture (Kuz'mina 1994), or it is often described with the generic term of "Steppe pottery" (Sarianidi 1990) spread all over Central Asia from Urals to Tien Shan during the Bronze Age. The chronological and cultural definition of these pottery fragments, inside a wider definition of Andronovo culture, belongs to the Tazabagyab culture, of the middle of the second mill. BC in the southern delta of Akchadarya in Khoresm. Identidied by Tolstov since 1938, Tazabagyab culture is also named as south-western variant of Late Andronovo (Alakul phase), with traces of nomadic and semi-nomadic people.

In the tables (Nos. 4, 5) relating to the Yaz I horizon is evident the spread of a painted hand-made pottery, together with a hand-made gray polished pottery representing a particular change within the traditional production of the Late Bronze Age. In any case it has never been recognized the strong difference between the percentage of the hand-made (89%) and the wheel-made production (11%) as by Masson identified (1959, p. 35). The ratio in the percentage identified between those two classes is more close to the similarity of approximately half quantity each other, though it is not supported by extensive excavation activities but only by a surface collection.

In the table (No. 6) relating to the Yaz II horizon the painted pottery clearly disappears, though a very limited coarse ware is still existing. In the production of the common pottery there is a consistent increase of the number of the types and one can recognize within them some particular morphological or decorative aspects which allow one to characterize the cultural horizon: in particular amongst the cylindrical jars we can mention the cordoned or grooved decoration on the shoulder.

In the tables (Nos. 7, 8, 9) relating to the Yaz III horizon we have selected and proposed the most significant and widespread types, already enough known. The number of types during this period are more and more increasing in particular in the case of the jars with a very ample variety of rims.

In the tables (Nos. 10, 11) relating to the "Late Yaz III" horizon we have selected some types characterizing that intermediate phase between the Yaz III and the Parthian and Sasanian period.

References

AA.VV. (1994) *Joint Project. Archaeological Map of the Murghab Delta. Report in Progress. Issue September 1994.* Rome.

Cattani, M. (infra) *Excavations at Takhirbai depe (1992-1994). A Prelimirary Note.*

Diakonov, M.I. (1985) Media, *Cambridge History of Iran*, II, pp. 36-148, Cambridge.

Hiebert, F.T. (1994) *Origins of the Bronze Age Oasis Civilization in Central Asia.* Cambridge, MA.

Hiebert, F.T. and Moore, K.M. (1993) New Stratigraphic Excavations at Gonur Tepe (North), *Information Bullettin, IASCCA* , 19. Moscow, pp. 96-108.

Kohl, P. (1992) Central Asia (Western Turkestan): Neolithic to the Early Iron Age, Erich, R.W. (ed.), *Chronologies in Old World Archaeology*, Vol. I, pp. 179-96. Chicago.

Koshelenko, G.A. (ed.) (1985) *Drevneishie Gosudarstva Kavkaza i Srednei Azii.* Moskva.

Kuz'mina, E.E. and Lyapin, A.A. (1984) Novye nakhodki stepnoi keramiki na Murghabe, *Problemy arkheologii Turmenistana.* Ashkhabad.

Masimov, I.S. (1982) Novye pamyatniki rannezheleznogo veka Murghabskogo oazisa, *Novye arkheologicheskiye otkrytiya v Turkmenistane*, pp. 20-33. Ashkhabad.

Masson, V.M. (1959) *Drevnezemledel'cheskaya Kul'tura Margiany, MIA SSSR, 73*, Moskva-Leningrad.

P'iankova, L. (1989) Pottery Complexes of Bronze Margiana (Gonur and Togolok 21), *Information Bullettin, 19 IASCCA*, 19, pp. 27-54. Moscow.

P'iankova, L. (1993) Pottery of Margiana and Bactria in the Bronze Age, *Information Bullettin, 19 IASCC*, 19, pp. 109-127. Moscow.

Udeumuradov, B.N. (1986) Keramicheski kompleks Kelleli (o genezise i svyazyakh), *Izvestiya Akademii Nauk Turkmenskoi SSR*, 6, pp. 26-33. Ashkhabad.

Udeumuradov, B.N. (1993) *Altyn-depe i Margiana: Svyazi Khronologiya, proiskhozhdenie.* Ashkhabad.

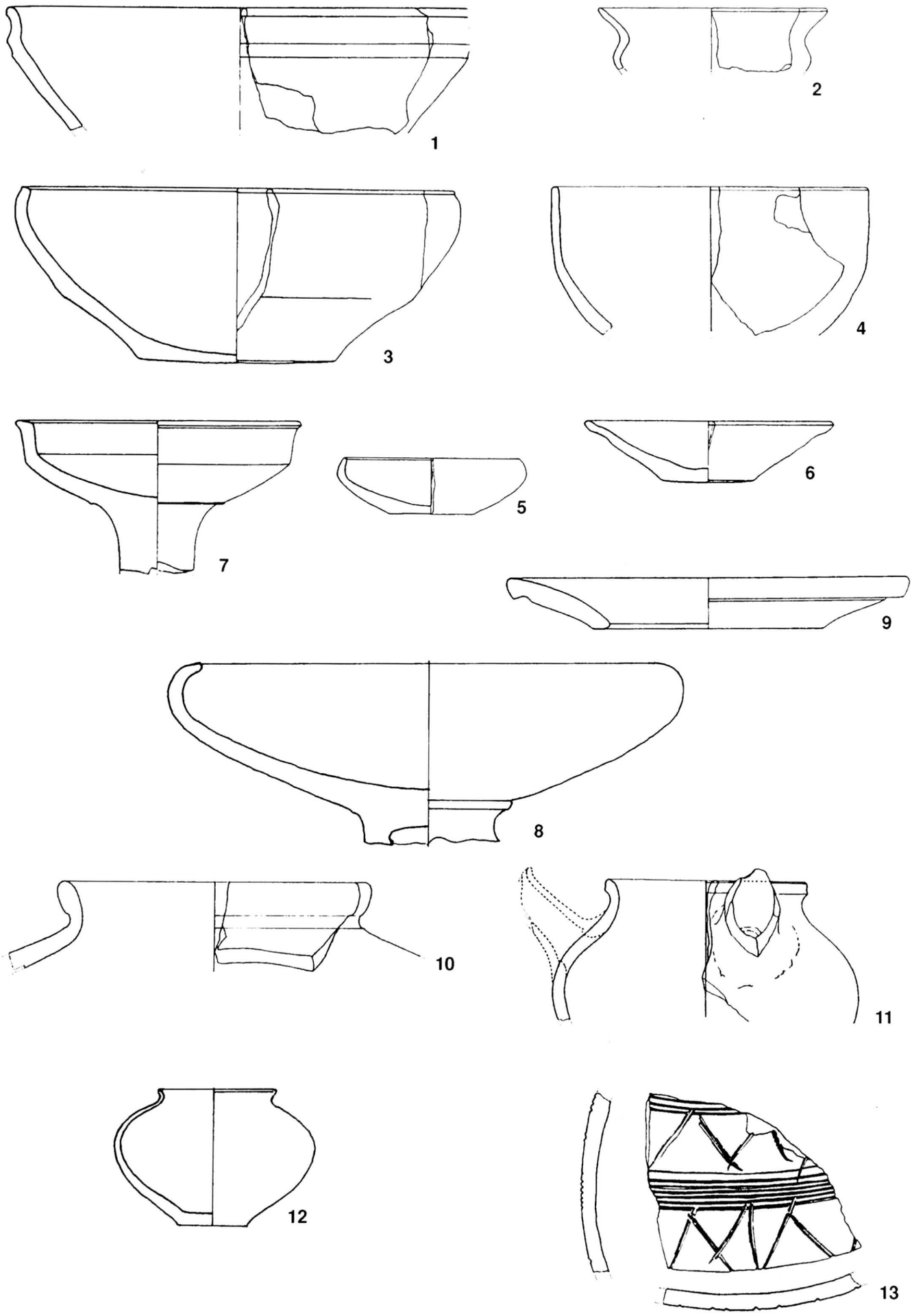


Table 1 - Pottery types from the latest phase of the Late Bronze Age, Common ware: Carinated bowls nos. 1, 2; Emispherical bowls nos. 3-5; Truncated-cone bowls no. 6; Carinated bowl on stand no. 7; Emispherical bowl on stand no. 8; Pot-stand no. 9; Globular jar no. 10; Globular spouted jar no. 11; Small globular jar no. 12; Incised decoration no. 13.

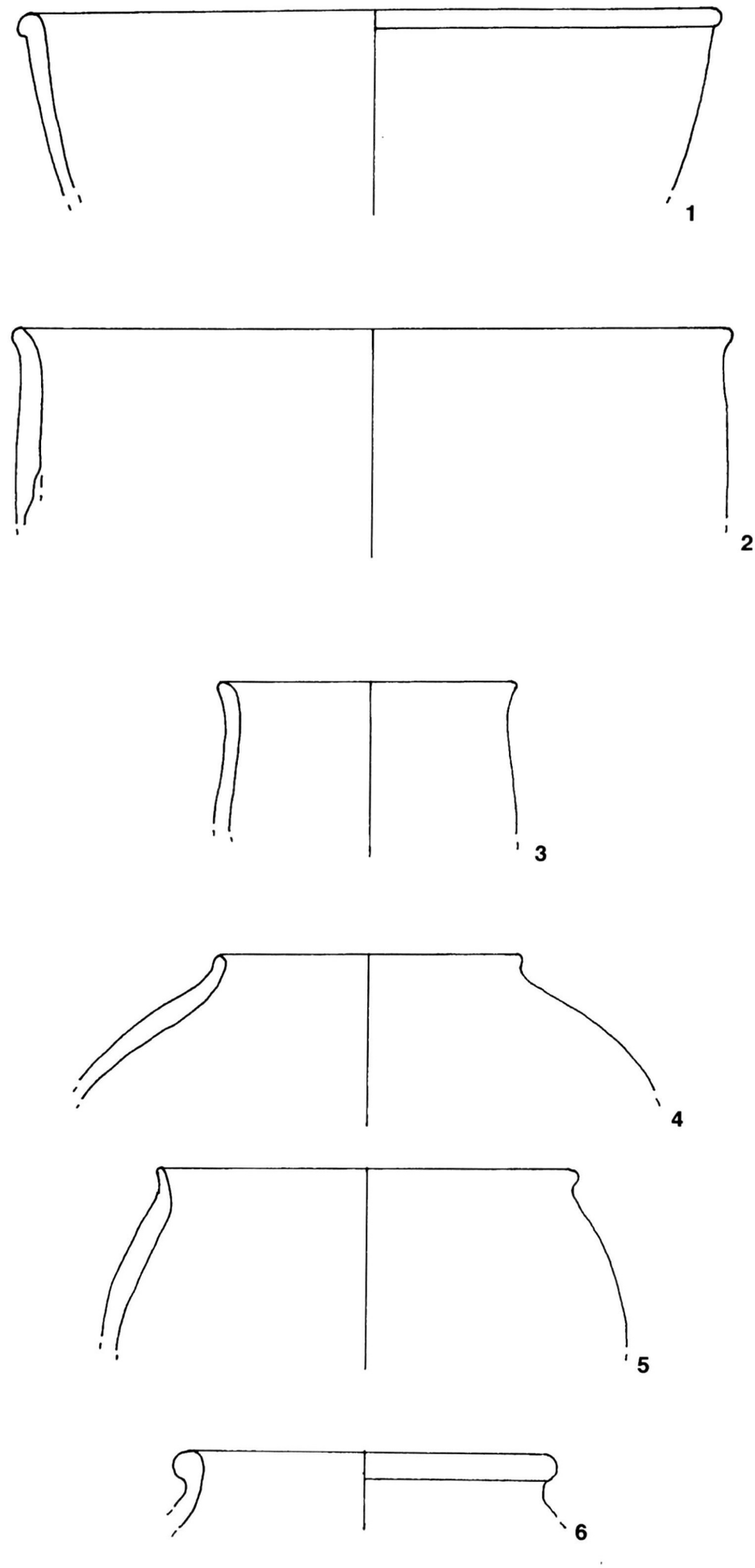


Table 2 - Pottery types from the latest phase of the Late Bronze Age, Coarse ware: Truncated-cone basin no. 1; Cylindrical jar nos. 2-3; Globular jar no. 4; Ovoid jar no. 5; Globular jar with thick rim no. 6.

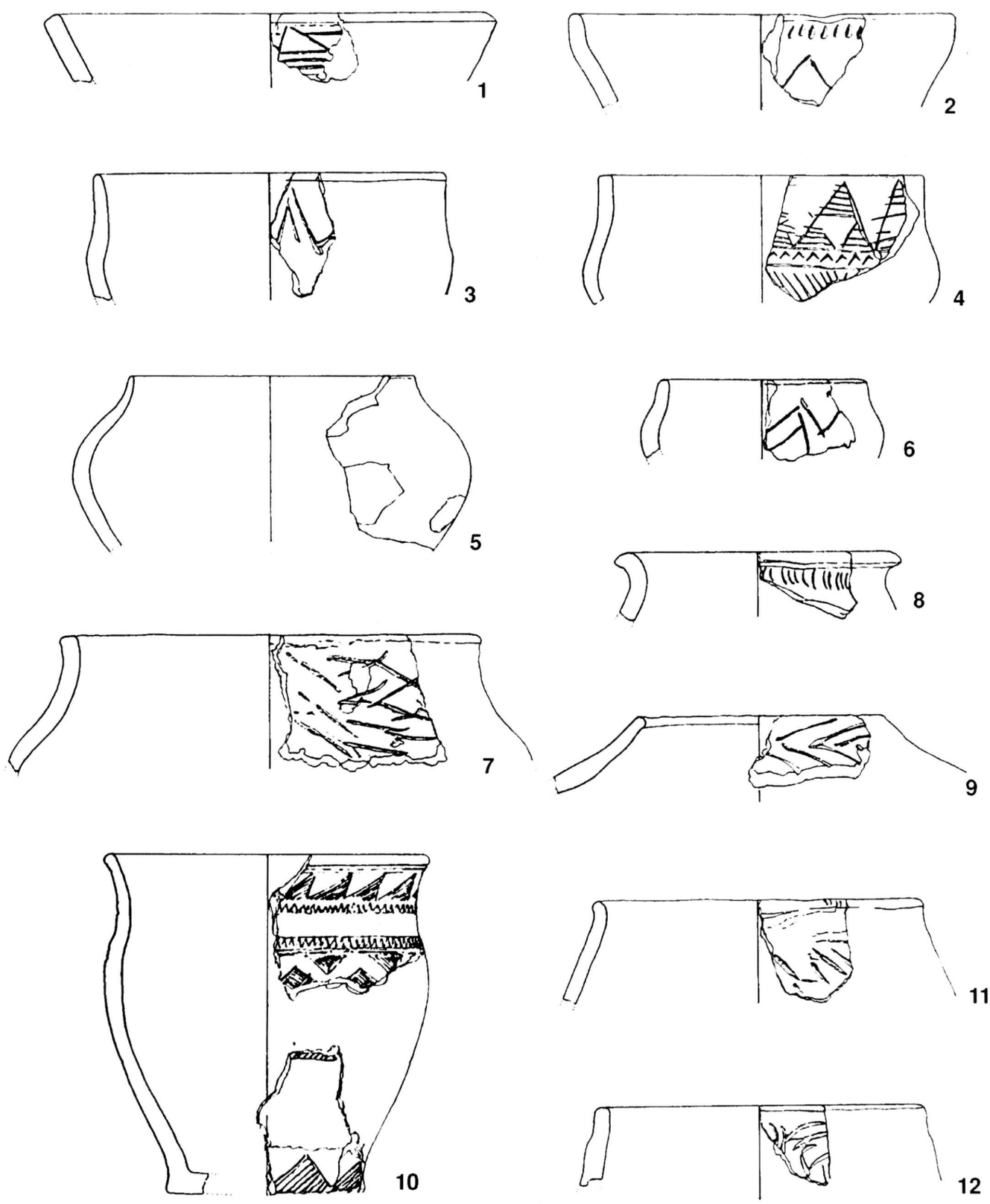


Table 3 - Pottery types from the latest phase of the Late Bronze Age, Incised Coarse ware (Andronovo): Truncated-cone bowls nos. 1-2; Small ovoid jars nos. 3-9.

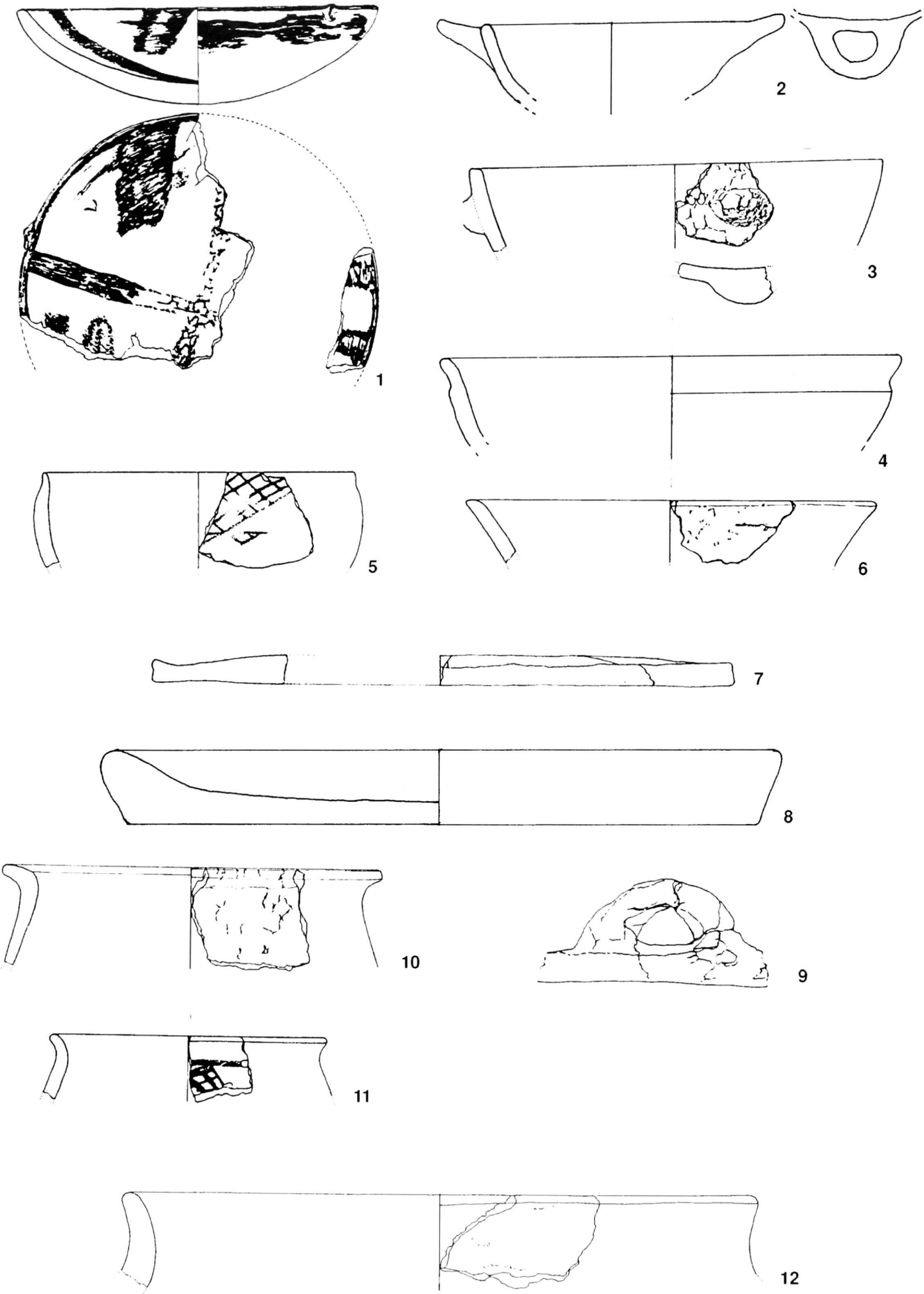


Table 4 - Pottery types from the Yaz I Horizon, Hand-made coarse ware: Emispherical shallow bowl with painted decoration no. 1; Emispherical bowl with horizontal handles (Gray ware) no. 2; Emispherical bowl nos. 3-4; Emispherical deep bowl with painted decoration no. 5; Truncated-cone bowl no. 6; Baking pans nos. 7-8; Cover with handle no. 9; Ovoid jar nos. 10-12.

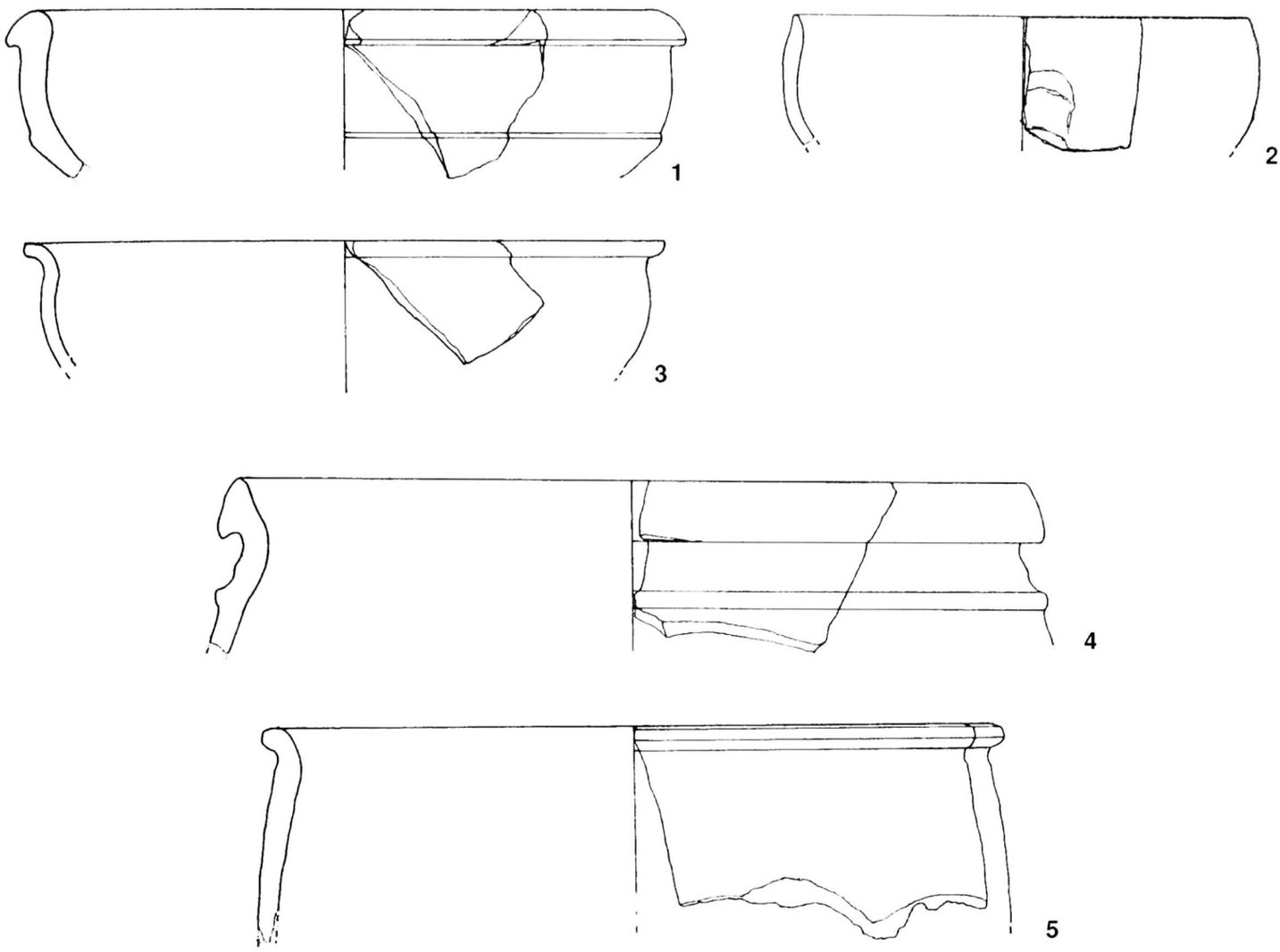


Table 5 - Pottery types from the Yaz I Horizon, Wheel-made common ware: Carinated basin no. 1; Emispherical bowls nos. 2-3; Cylindrical jars nos. 4-5.

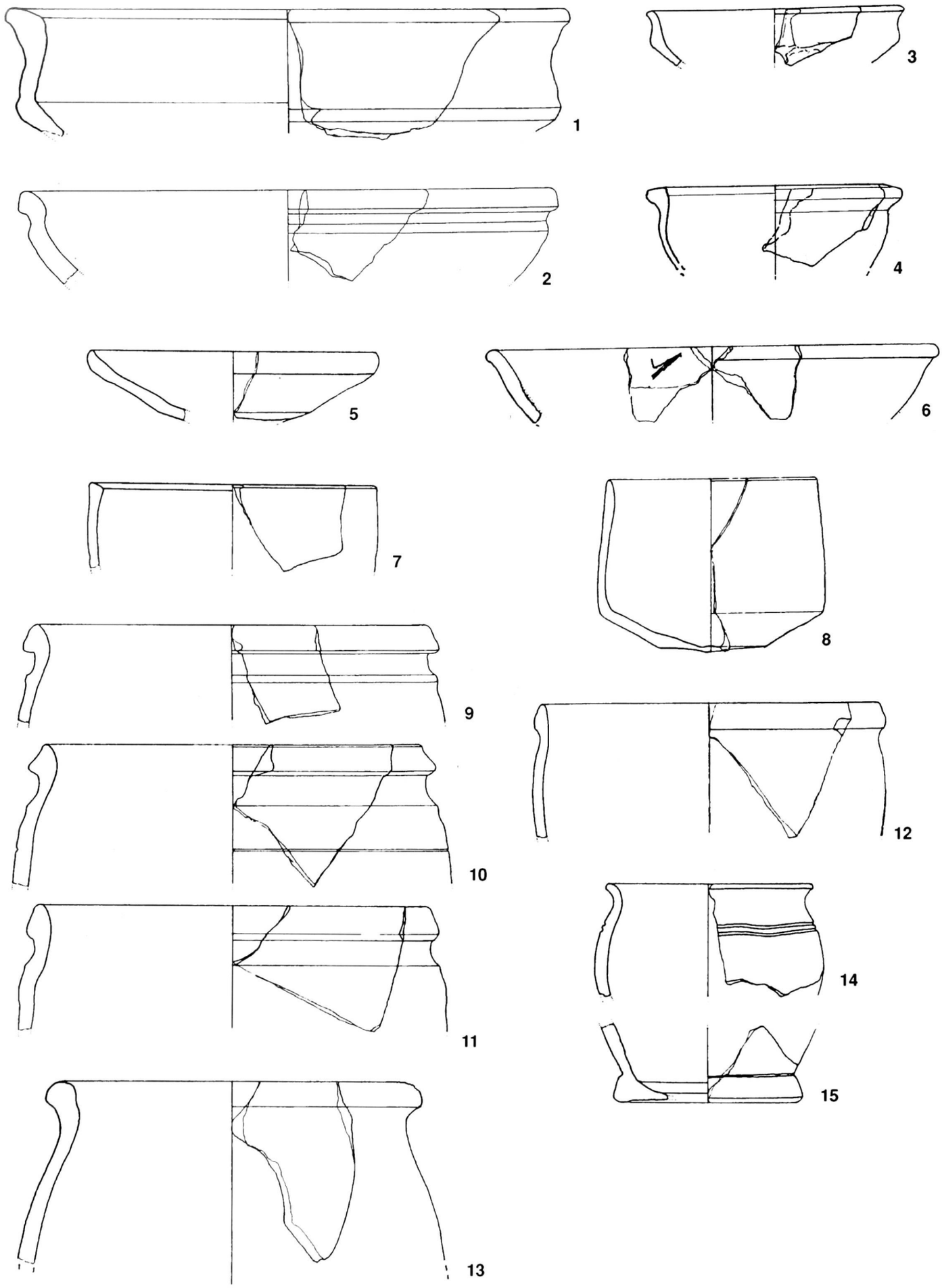


Table 6 - Pottery types from the Yaz II Horizon: Carinated basins nos. 1-2; Carinated bowl no. 3; Emispherical bowls nos. 4-6; Cylindrical bowls nos. 7-8; Cylindrical jars nos. 9-12; Ovoid jar no. 13; Ovoid small jar nos. 14-15.

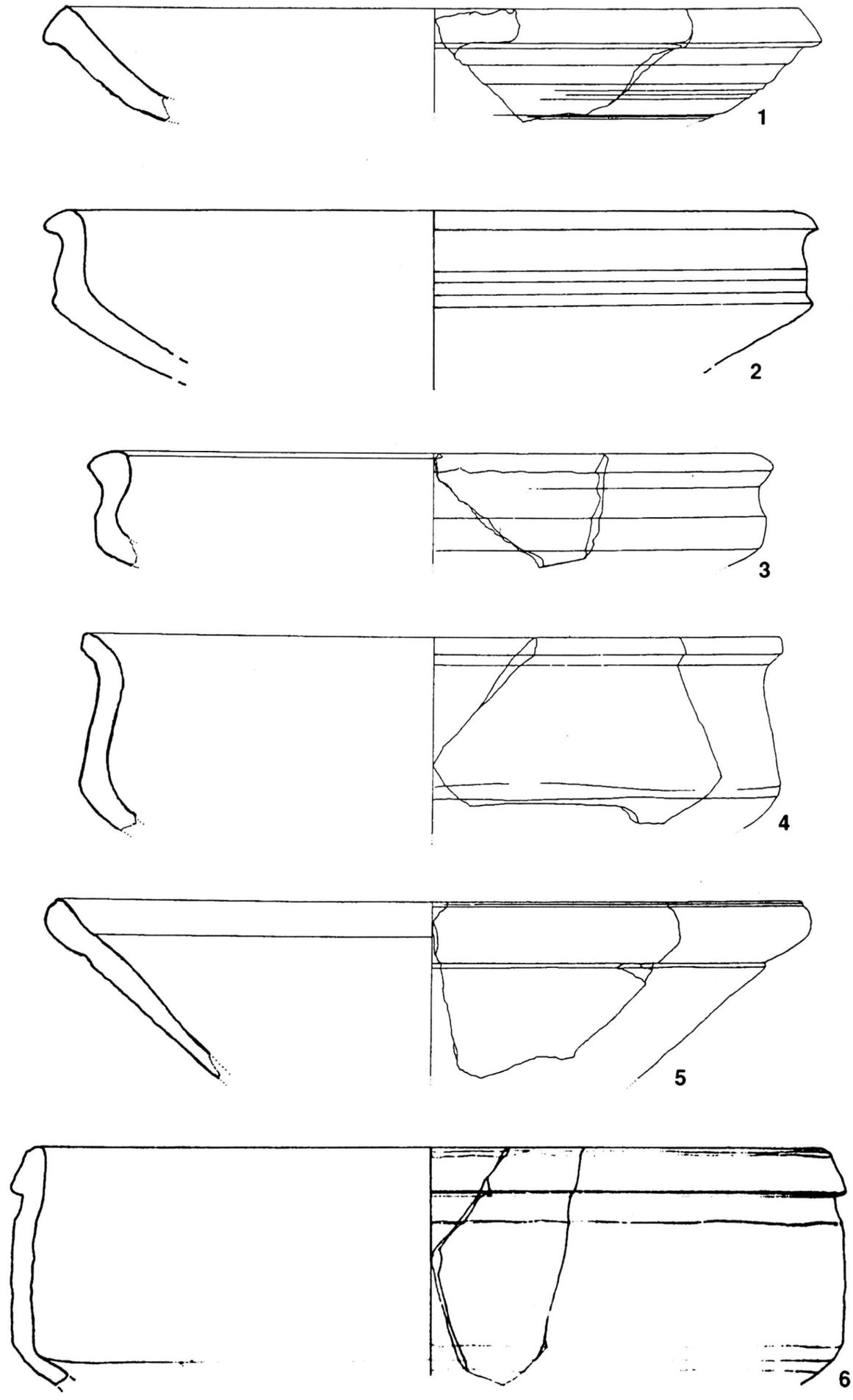


Table 7 - Pottery types from the Yaz III Horizon: Emispherical basin no. 1; Carinated basins nos. 2-4; Truncated cone basin no. 5; Cylindrical basin no. 6.

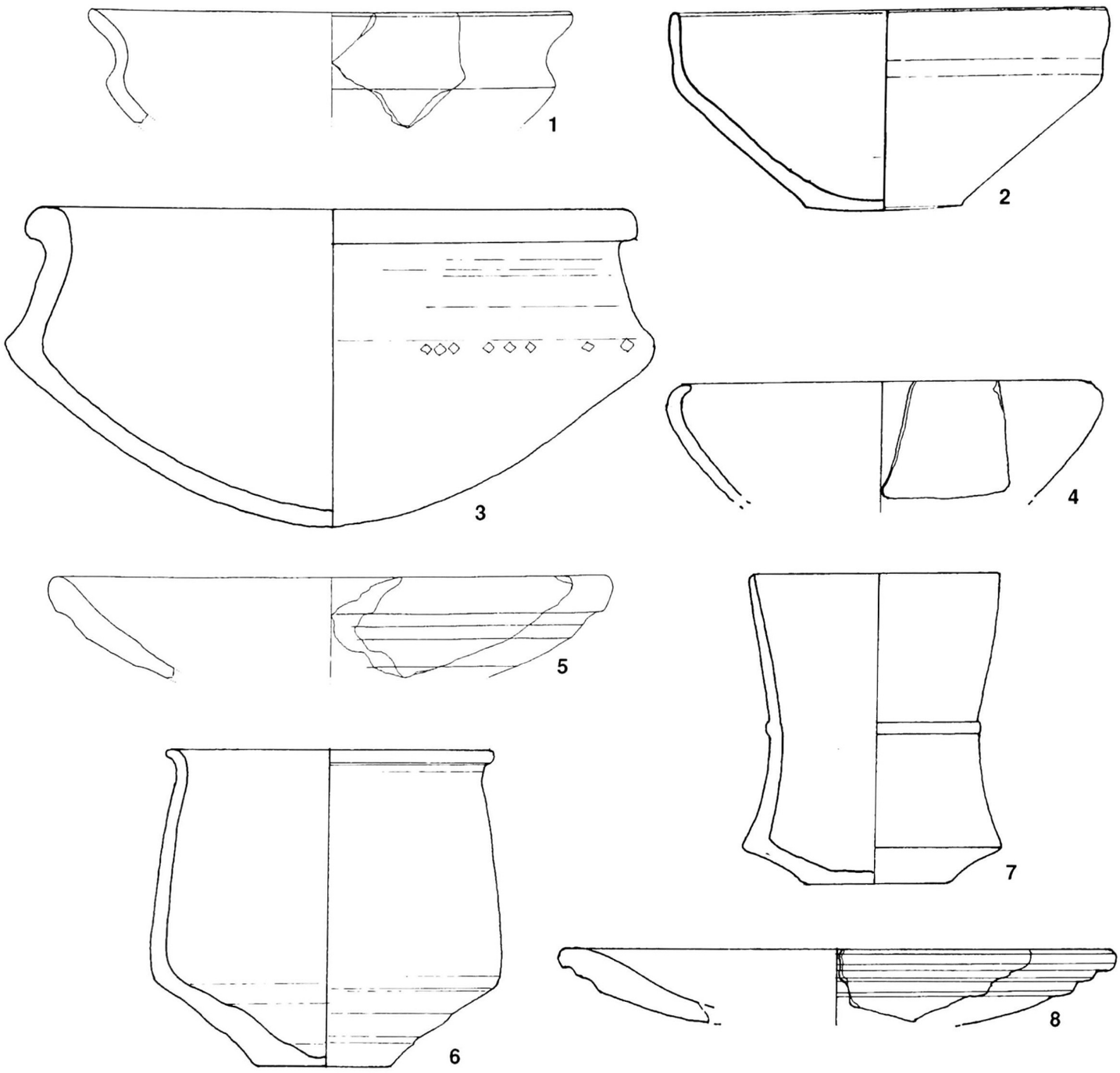


Table 8 - Pottery types from the Yaz III Horizon: Carinated bowl nos. 1-3; Emispherical bowls no. 4; Truncated-cone bowl no. 5; Cylindrical bowl no. 6; Beaker no. 7; Dish no. 8.

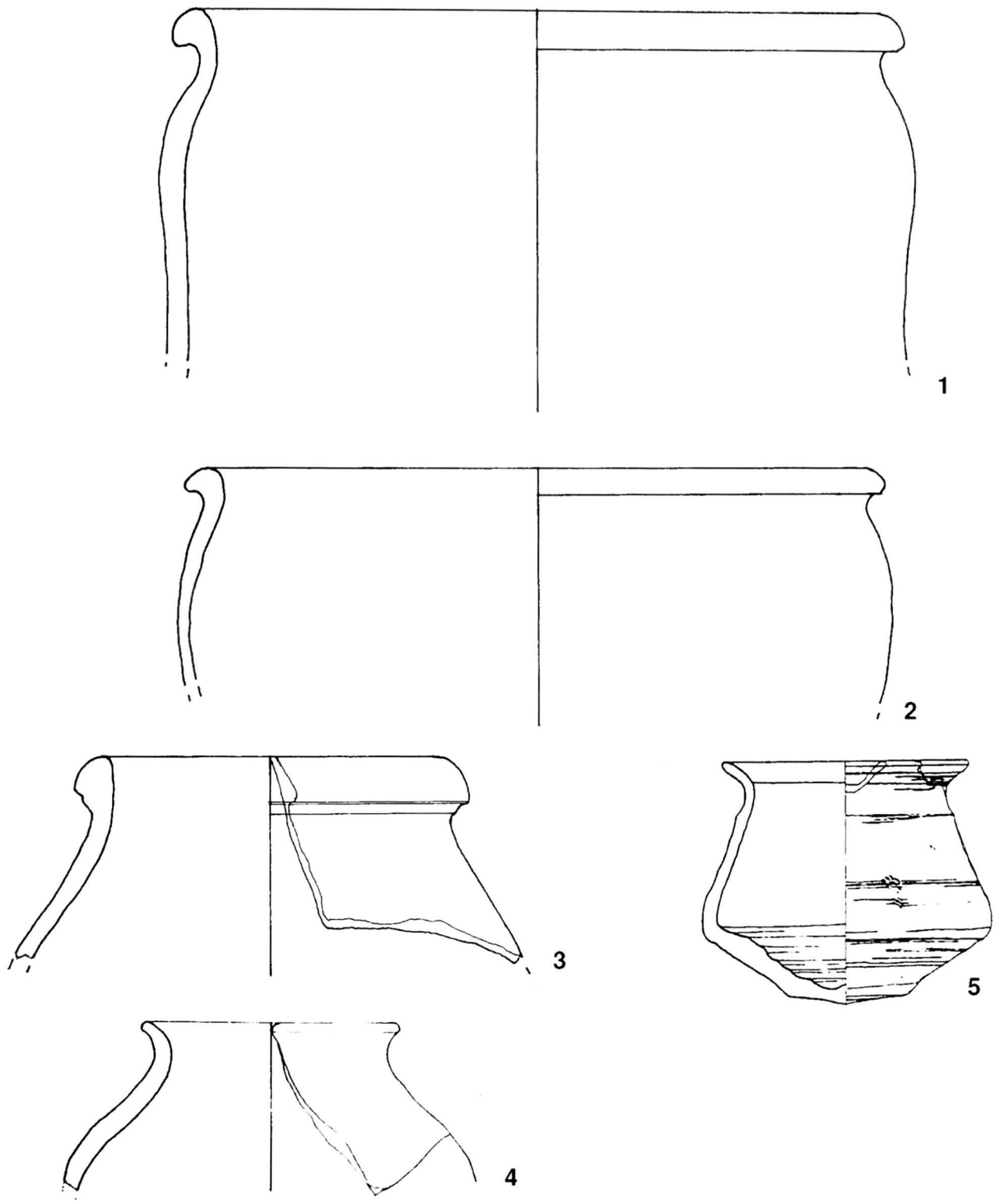


Table 9 - Pottery types from the Yaz III Horizon: Cylindrical jar no. 1; Ovoid jar nos. 2-3; Globular jar no. 4; Biconical small jar no. 5.

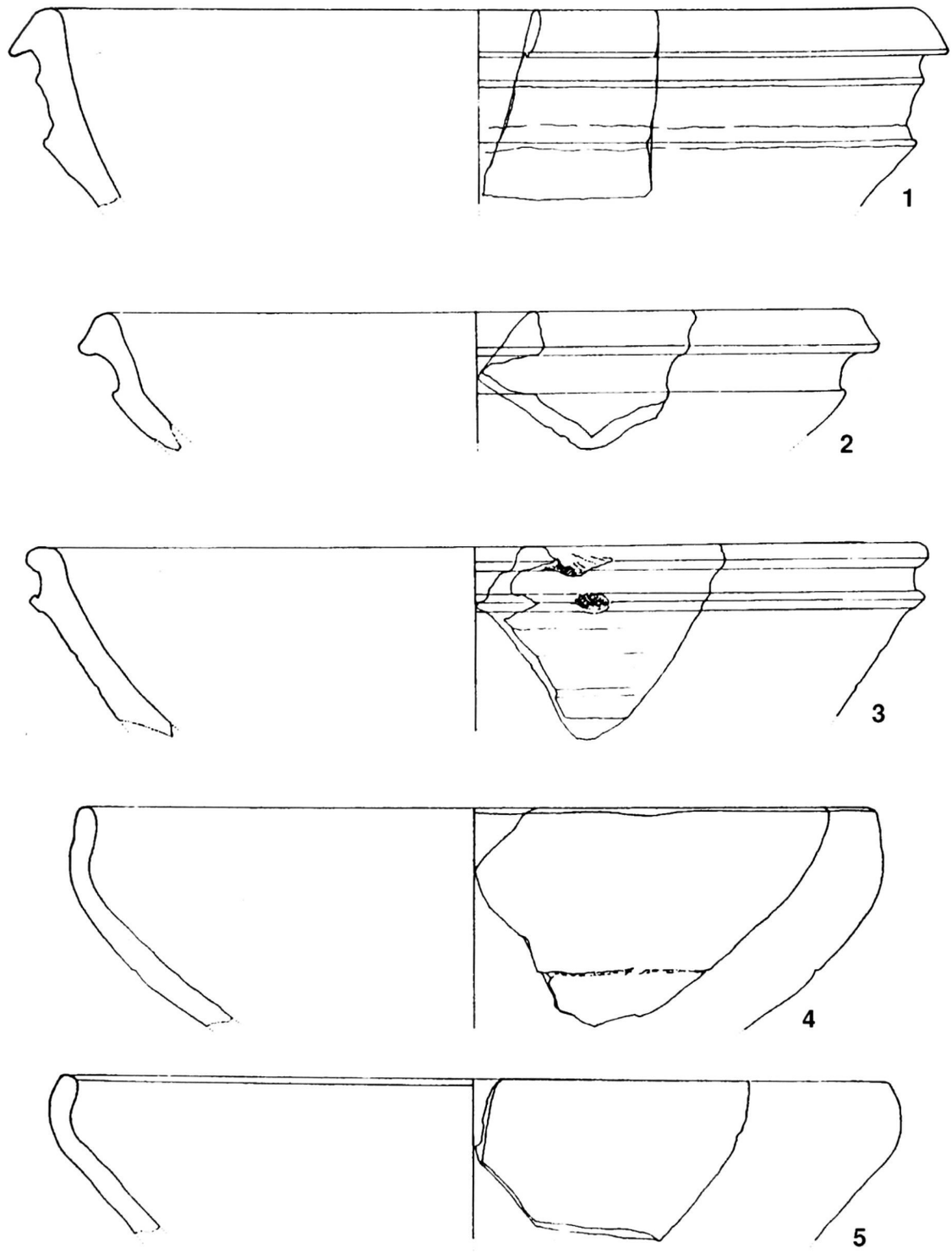


Table 10 - Pottery types from the Late Yaz III Horizon: Carinated basins nos. 1-3; Emispherical basins nos. 4-5.

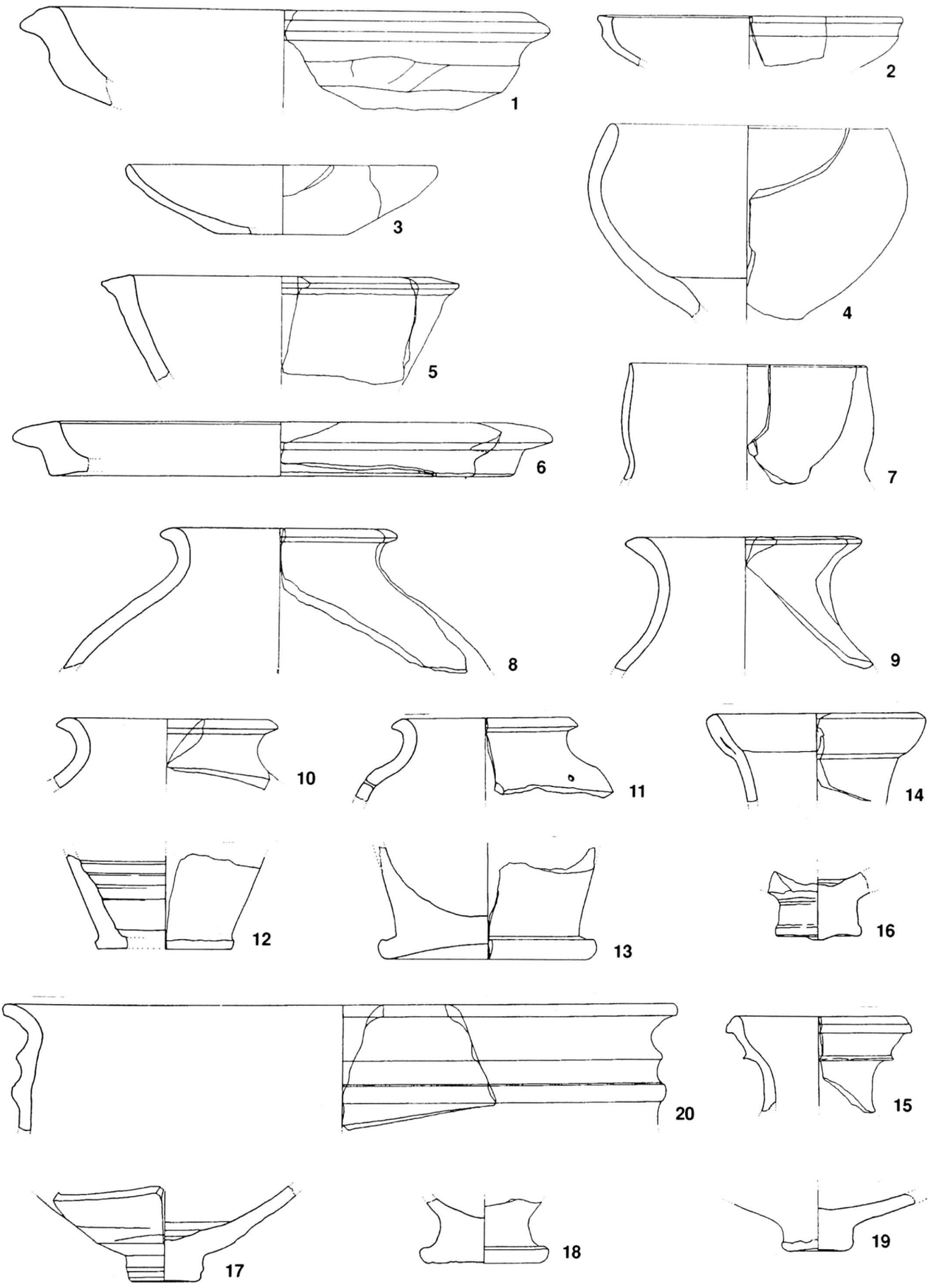


Table 11 - Pottery types from the Late Yaz III Horizon: Carinated bowls nos. 1-2; Emispherical bowls nos. 3-4; Truncated-cone bowl no. 5; Dish no. 6; Beaker no. 7; Globular jar no. 8; Ovoid jar no. 9; Small jars nos. 10-13; Flasks nos. 14-15; Possibly foot related to the flasks nos. 16-19; Cylindrical jar no. 20.

THE IRON AGE IN MERV OASIS

by B. Genito

1. Introduction

Unlike Bronze Age, Iron Age in Merv oasis has not been very much investigated; the reasons of such a difference in the quantity and quality of the archaeological documentation are both related to the strong continuity of the material culture in that period and to some characteristics of the archaeological research there effected. The area has been supposed to be very unitarian and uniform in its cultural character though remaining, unfortunately, lacking of Iron-Age secure contexts. The major part of scholars, in time, having field experience within the area on that period, were, furthermore, mainly specialists of Bronze Age or of the late historical time, and only, rarely, experts of Iron Age. The period, nevertheless, is fundamental for the comprehension of the historical development of such a crucial area, specially of the very significant transition from the archaic communities of the Late Bronze Age to the more complex societies of the Early Iron Age. The period in the area is, nonetheless, very important also for the historical problem of the coming of the Iranians into the plateau and also for the more related ample question of the Indo-Europeans (Renfrew 1987; Mallory 1989), Proto-Indo-Europeans (Makkay 1988), Proto-Aryans, Proto-Indians (Harmatta 1981; Dani and Sinor 1992; Khlopin in press) and Proto-Indo-Aryans (Burrows 1973; Rossi 1988) (see also Erdosy *infra*). This historical task very hard to be solved from an archaeological point of view, has multi-faceted grounds of discussion (linguistic, ethnical, historical, archaeological, Kuz'mina 1986 etc.) and it has been geographically connected also to South-Turkmenistan. Amongst the differing theories of the scholars about the provenience of those groups of peoples, it has been also proposed, in fact, that Iranians reached the plateau, also throughout the Kopet-Dagh chain (Ghirshman 1977), having started, thus, in a given historical moment, to iranize Merv Oasis and hence the plateau! No very clear are, nevertheless, the ways and the modes how that epochal arrival really developed and the role of the Merv oasis in it. Uncertain remains, e.g., the socio-economic and political situation there occurred, except during the early times of the Achaemenid dynasty, or in the times immediately before, whereas historical information is, however, available, on the basis of sources (Struve 1949a; 1949b). According to the majority of the scholars, nonetheless, the iranization process has been a very long and complex historical phenomenon and Merv oasis, as other endoreic basins in Central Asia (because of their very favourable living and environmental conditions), could have been one of the places where its realization actually started. It has been never easy to consider "Merv Oasis" in its archaeological characterization distinct from "Margiana" in its historical definition; the landscape and the ecological characteristics of the oasis, more than other regions of Central Asia, have been, actually, fully merged into an ample and "historical" context of a highly developed urban caracterization which makes the territorial aspects of later periods strongly predominant. The presence of the so-called "twin cities" such as Erk-Kala and Gyaur-Kala is very much visible and important; these sites are the largest to the South of the oasis (the first one completely inhabited in Iron Age and the second only partly). More to the North along the line of the s.c. Anthiochus wall (Bader, Callieri and Khodzhaniyazov *infra*) the large and articulated tepe-sites as Garry and Uly Kishman, of Parthian, Sasanian and Islamic Age, did not facilitate scholars to interpretate the evolution of the settlement pattern in the area from Iron Age to the historical time. Those sites (for Erk and Gyaur-Kala see Piotrovski 1949; Filanovich 1973; 1974a; 1974b; Usmanova 1963; 1969; Usmanova and Filanovich 1979) (for Garry and Uly Kishman see Pugachenkova 1958; Gubaev, Koshelenko and Novikov 1990a; Gubaev, Koshelenko and Novikov 1990b; Koshelenko, Bader, and Gaibov 1991; Bader, Gaibov and Koshelenko 1992) characterizing the oasis with great monumental evidences of a state-power, also defensive in character, have probably given to the full comprehension of the area a misleading interpretation without, furthermore, providing scholars with a clear ethnic or dynastic affiliation. Given these premises great difficulty arises in fitting the very scarce amount of historical sources to the archaeological data; typical for the times, the peripheral areas in question and the historical-archaeological comprehension of the Merv oasis, this situation, already very difficult for the Early Iron Age, remains, then, particularly complicated as much as one is going towards the Late Iron Age.

Thanks to numerous and important contributions during more than thirty years of intense field-work of soviet scholars in Turkmenistan (see amonst them Masson, V.M. 1956a; 1956b; 1959; 1987; Masson V.M. and Sarianidi 1973) and of western archaeologists in Iran (Dehayes 1969; Cleuziou 1985), significant and important have been the achieved scientific results, though still under debate. The hypothesis of a "Gray Ware Indo-Aryan route" (2000-1500 BC), throughout the Kopeth Dagh area, first suggested by French scholars at the end of 70' (Deshayes 1969), the identification of the so-called Yaz I-III cultural horizons (900-300 BC) (Masson V.M., 1959) and the more recent theories of a Bactrian-Margian cultural complex (Sarianidi 1977; 1988) did represent, up to now, the most interesting assumptions proposed by scholars, for the interpretation of the ancient north-eastern Iran, Turkmenistan and north-western Afghanistan. These hypotheses are comparable with those proposed by Young, who first organized and distributed the material documentation of Iron Age in north-western Iran (1965; 1967) to the light of the historical arrival of the Iranians. While Masson and Sarianidi had giving (1972) a synthetic evidence of the very difficulties met by scholars in identifying Iron-Age sites in South-Turkmenistan and Central Asia, concentrating mostly on the more clear Neolithic and Bronze Age cultures, Cattenat and Gardin (1977), dealing with the pottery remains of Iran and Central Asia in Achaemenid time, in spite of a possibly uniform material culture, had evidencing the particularly strict regional characteristics of the archaeological cultures of the time. Medvedskaja dealt again with the question of the Iranians in Iron Age and her book (1982) and other contributions (1977a; 1977b; 1980; 1983), though very well documented and particularly discussed (Dyson and Muscarella 1989), left unsolved the long debated aspects of the proper material evidence of the Iranians. In the last decade numerous other contributions have dealt with some specific regional characteristic of the archaeological remains of the western part of Central Asia (Turkestan) in Iron Age (Kohl 1984). Some of the controversial and crucial questions of the topic, nevertheless, still remain unsolved. Young again discussed the question (1986) but the lack of any new archaeological evidence on the matter, did prevent him to re-interpretate the old data. Levine (1987) Kohl (1981; 1984), others (Bulletin 1993; Antiquity 1994) and Hiebert (1994) almost completely dedicate their contributions to the Bronze Age meanwhile the earlier large synthesis of Koshelenko (ed. 1985) were devoted to the social organizations of the ancient states, rather oriented to understand the post-Yaz III horizon and, in any case, the post-Achaemenid age.

Given a possible, generally accepted, superimposition of the Bronze and Iron Age in Merv oasis, the Yaz I related cultures, as they have been identified, seem more easily defined by small changes in the material culture, rather than by the presence of iron objects (Kohl 1984, 193). Given the set of archaeological documentation scholars believe that the similar cultural traits of the Iron age belong to a more ample and articulated cultural complex, very different from the almost unitarian of the Bronze Age. The most important interpretative results on the basis of the analyses made by scholars and archaeologists suggest that is impossible to talk about a epoch of a "foreign" occupation with an almost total abandonment, but rather about a strong continuity between Late Bronze Age and Early Iron Age. This certainly, did not help scholars to fit together the material evidence to the presumed chronological span-time of the arrival of an Iron-people as the Iranians have always been supposed to be. The material culture individuated by Soviet and Turkmenian scholars related to the Yaz I cultural horizon is mainly constituted by the spread of an hand-made ware with simple painted geometric designs and of the typical fortified citadel-sites built on high platforms. These early Iron Age characteristics, more or less connected and contemporaneous with those recognized in north-western Iran (Young 1967; 1974), were originally identified by Masson, and in time, related by Askarov and Al'baum also to the s. c. Early-Bactrian complex (1979) and by Sarianidi to a generic Khorasan culture (1977).

2. An Archaeological Outline of the Iron Age Remains in the Ancient Merv Oasis

Around 1000 BC a highly developed culture spread over the area, with a gradual transition from Bronze to Iron technology, in Hyrcania, in the north (at Anau IV), and north-west of Parthia, probably in Haria, and very definitely in Merv oasis. The former Namazgha VI culture disappeared without leaving traces in those areas, and it was succeeded by the Yaz I complex, which, according to some scholars (Diakonov 1985: 127), was probably belonging to a population already Iranian-speaking. The population in the oasis strongly increased during this phase and the culture remains characterizing, according to Masson (1959), by large urban settlement surmounted by citadels on platforms. Yaz I culture which presents certain links with "Necropolis B" in Tepe Syalk (Ghirshman 1938) as well as with the first or Median period of the "Achaemenid" village in Susa (Ghirshman 1954) spread very much in an ample area, extending from Dahistan, piedmont Kopeth Dagh, Merv Oasis to Northern-Bactria, South-Bactria, South-Uzbekistan, North-Western Afghanistan. In the last decades (Kohl 1984) four main areas of site distribution have been emphasized:

a. Meshed-Misrian and Chat Plains (Ancient Dahistan) (Masson 1956b, 385, 387, 423-424; Lisitsina 1978; Khlopin 1975: 118) with the type-sites of Madau, Tangsikil'dzha, Izat Kuli, Chialik, Benguvan, Geokchik, Til'ki and Chopan;

b. Piedmont Kopet-Dagh, with Dashli, the southern mound of Anau, El'ken-depe (Kachuris 1967; Marushenko 1969), Yashili-depe, Yasi-depe, Ulug-depe (Sarianidi and Kachuris 1968), Saryk, Chemche, Kush and Khairak;

c. Northern-Bactria/Southern-Uzbekistan, with Kuchuk, Kyzyl, Kyzylcha 1-7, Buirachi- tepe 1, Buirachi-tepe 2, Dabil' Kurgan, Talashkan 1, Pachmak-tepe, Dzhandavylat-tepe, Sar-tepe, Pshak-tepe, some settlements of pre-Achaemenid date in the Yakkabag piedmont zone in the Kashkararya basin (Sagdullaev 1981, 459) and the possibly largest site Dara tepe;

d. South-Bactria/North-Western Afghanistan with the type-site of Tillya-tepe (Sarianidi 1977: 110) and in the Shibergan area with Emshi-tepe and Imam Sahib, and other sites in the Naibabad oasis, and in the Farukhabad oasis.

"Urban" settlements also appeared in the same period in Corasmia (at the stronghold Kyzeli-gyr), in Transoxiana (in the valley of the Zerafshan at Afrasyab I) and on the northern bank of the central Oxus valley (at Kuchuk-depe and Kobadian I).

Not particularly significant are the changes observed between Yaz I and Yaz II periods. It is, nevertheless, significant that at this period the citadel of Yaz depe seems to be abandoned and the population dwindled, perhaps, in connection with a presumed Bactrian expansion, first described by Dionysius by Syracuse (II, 6, 26). These processes within the archaeological record have been connected, with the so-called Turanian Civilization (Biscione and Tosi 1979), but, unfortunately, the hypothesis of Dionysius is devoid of any archaeological consistency, at least from historical times (Bactriane 1985; Briant 1985).

The density of the population falls sharply again during the period of Yaz III and in Achaemenid times, or somewhat earlier, the center of Margiana was transferred further to the south, at Gyaur-Kala (Old Merv) a large platform with citadel (Herrmann, Masson and Kurbansakhatov 1993; Herrmann, Kurbansakhatov *et alii* 1994; Herrmann, Kurbansakhatov *et alii* 1995). Among the principal sites in Margiana, it is probable that during this period Yaz depe lost its walls, while Aravali depe, the stronghold, next in size, is destroyed altogether. This process has been connected by some scholars (Diakonov 1985, 127) with the famous massacre perpetrated in Margiana by Dadrsi (Dadarsis), the general of Darius I who subdued the revolt of Frada at the cost of 55,243 dead and 6,572 taken prisoner according to the Bisutun inscription.

4. Italian Topographical Work 1990-1995

With an exceptional investment of specialists and means Italian activity is completing the basic preparation work for the archaeological map of Murghab Delta. The activities of 1993 and 1994 fieldwork season were very critical for the growth of the project following the initial stages in 1990-92. Efforts were directed towards the completion of the preliminary activities of the previous years as well as the investigation of the priority problems of the settlements history of the Murghab Delta that have emerged as a result of our own work. As in any long-term research project increasing familiarity with the quantity and quality of newly available data has lead to the formulation of new research problems. Thus, for the first time in 1993, the scope of the work was expanded well beyond the initial aim of laying barely the settlement patterns of the Iron Age northernmost limits of the cultivated area. The chronological time span of the cultures of the Merv Oasis up till now based only on the typological ground of the pottery forms, can be enriched by new data of the topographical work. The large amount of fragmentary surface materials, systematically collected in these years has started to provide better chronological divisions. Waiting for the final results of the trial-trenches at Takhirbai 1, for more concrete data on the pottery dating, one should very much stress the fact that meanwhile the traditional distinction in three periods inside the Yaz horizon is still possible on the basis of the pottery typology, a large amount of copper arrowheads represent the most significant item collected for the purpose of dating: the most common being the 2 – or 3 – barbed socketed of E or F Cleuziou-type (1977) ranging from 8th to 4th Century BC and unique types a 4 – barbed socketed example and a 3 – barbed tanged one, dating between the 9th and 6th Century BC (Cleuziou *infra*).

Meanwhile the distinction between Yaz I and the other two horizons is rather evident, the difference between Yaz II and III are, instead, still to be completely detected. More complicated and difficult is, at the moment, actually, to say how many Yaz II or Yaz III horizon sites are distributed over the area investigated. With regard to the different morphologies, depositional processes and formation modes of the archaeological evidences, the tepes constitute the most identifiable settlement-pattern uncovered, either in the steep-sided variant, containing the entirety of the inner deposit, either in the small shallow mounds, partially or completely eroded for ploughing, wind and cultivation. The Elevated depositional Areas (EdA), consisting of slightly elevated deposit, are also very well documented, but still uncertain is the real content and depth of the archaeological deposit; the Low Lying depositional Areas (LLdA) are the most cospicuous archaeological evidences, consisting in multi-sized takyr, nearly followed by the Scatter, either in the low-density variant, probably more related to the ancient agricultural fields, or in the, less frequent high-density one (Table 1). The definite historical-archaeological collocation of the remains identified will be reliable to the solution of the following main questions: how the Long Lying depositional Areas were each other related, what they really represent in the settlement-pattern of the time, how they were in relation with the Tepes of the same period and what the EdA really constitute in terms of archaeological consistency. In the absence of more precise chronological framework, neither the spacing of fortified central places, nor their relationship to the extensive "flat" sites can be specified, although they will be of crucial significance in the reconstruction of social

and political structures. However, while it is presently impossible to apply such methods as Nearest Neighbour Analysis, the drawing of site catchment or of rank-size curves, general comments about the existence of site cluster can already be made. It may be observed that each of the principal mounds is surrounded by extensive occupation, that each such complex is separated from another by inhabitated areas, and – to confuse this neat picture somewhat – there appear to be some extensive site complexes without a prominent central place even if few of the latter are devoid of associated 'flat' areas. One of the main result of the topographical work, thus, has been the identification of a rather major extension of the distribution system of the sites, up to now considered distinguished in 4 main "historical" oases of Takhirbai, Togolok, Yaz and Aravali (see above). New groups of sites have been identified and named as Site Complexes because of their inner relationship, other are very nearly to be considered as Site complexes, and other sites could have constituted central places of Site Complexes at the moment unknown because of lack of intense detailed mapping and of the presence of consistent mounds. This more articulated system enlarges and extends the territorial meaning of the oasis-system, giving evidence of interconnected living areas distributed around one or different central places, unless be tepe or not.

The identification and the definition of such Site-Complexes has been strongly dependent from the level of detail of the field analysis, enable often to orient one to consider, somewhere, and verify the areas of archaeological interest. The choose done will be, of course, object of discussion and revision in the future, but our field work, as every other, is generally developing under determined conditions: from the clear visibility of remains, the capacity of field workers, to the practical and wheather difficulties. The identification of the groups of sites proposed, appears rather convincing and precise specially to the light of the previous knowledge of the area and must be naturally considered only as a possibly field interpretation, with all its charge of uncertainty.

The first Site Complex identified, mapped in 1990-91, Sc- 1, centered with site no. 46, as central place, with ca. forty sites around, has a general extension of ca. 20 hectares and it is located in NE. The sites of the area can be grouped as it follows: Tepe 2 (2 sites), Tepe 2 + LLdA (2 sites), EdA (3 sites), LLdA (24 sites), LLdA + Spot (1 Site), Scatters (7 sites), Spot (1 site) (See Table 2). Amongst the tepes, only sites no. 46 + 46E with 2.3 ha. seem to have the real consistency of a central place, whereas no. 207 is smaller with 2 ha., and 148 and 155 (unless be a Tepe 2+ LLdA) have respectively 12 and 6.9 ha. Particularly significant amongst the EdA is site no. 47 W with 3.3 ha. and amongst LLdA sites no. 151 with 7.9 ha., no. 48 with 5.4 ha., 56 with 3.2 ha., 153 with 2.6, 150 with 2 ha. and 37E + 37 W with 1.5 represent the most extended flat areas. It would be very interesting to put in relation the site extensions in order to define a rank size settlement and have a confirmation of eventual central places. The tepes are always more than 2 ha. (from 2 to 12 ha.), the EdA, with the exception of site no. 47W, are up to 1.5 ha. (from 0.2 to 1.5 ha.), whereas the LLdA, except those six exceptions, already mentioned, are always less than 1 ha (0,06 to 0.8 ha.). Amongst the Scatter site no. 71 is far extended over the others with 1.1 ha.

The second complex of sites Sc- 2, extending over an area of 30 hectares with possibly central places nos. 135 and 203 and minor areas and fields, ca. thirty sites around, is located, instead in NW. The main sites are grouped as it follows: Tepe 2 (2 sites), Tepe 2 + EdA (1 site), EdA (11 sites), EdA + Scatter (1 site) LLdA (5 sites), Scatter (13 sites) (see Table 3).

Unlikely from the Sc-1, amongst the Tepes 2, site no. 203 with 6.1 ha., no. 135 with 2.8 and site no. 49 with 1.8 ha. (unless be a Tepe 2 + EdA) seem the more ample central places; amongst the EdA it is interesting that site no. 206 with 3.8 ha., no. 204 with 3.3 ha., site no. 50 with 6.6 (unless it be an EdA + Scatters) and no. 160 with 1.8 are the more consistent areas. The EdA, outside of those exceptions, are not more than 1 ha. large. The LLdA are generally less than 1 ha. except site no. 137 with 1.7, no. 103 with 1.2 and amongst the Scatter there is site no. 57 with 2.5 ha., 142 with 1.6, 136 with 1.5, while the rest is less than 1 ha.

Bibliography

Antiquity (1994) The Oxus Civilisation: the Bronze Age of Central Asia, *Special Section in the Volume*, 68, No.259, June 1994, pp. 353-427. London.

Askarov, A.A. and Al'baum, L.I. (1979) *Poseleniye Kuchuk tepa*. Tashkent.

Bactriane (1985) *L'archéologie de la Bactriane Ancienne, Actes du Colloque franco-sovietique, Dushanbe (U.R.S.S.), 27 octobre - 3 novembre 1982*. Édition du CNRS. Paris.

Bader, A. Callieri, P. and Khodzhaniyazov T. (infra) *Survey of the "Antiochus' wall". Preliminary Report on the 1993-1994 Campaigns*.

Bader, A. Gaibov, V. and Koshelenko, G. (1992) Materials for an Archaeological Map of the Merv Oasis: Köne Kishman, *Mesopotamia*, 27, pp. 226-250. Torino.

Biscione, R. and Tosi, M. (1979) Protostoria degli Stati Turanici, *Suppl. Annali dell'Istituto Universitario Orientale*. Napoli.

Briant, P. (1985) La Bactriane dans l'empire Achéménide. L'Etat central achéménide en Bactriane, *L'archéologie de la Bactriane Ancienne, Actes du Colloque franco-sovietique, Dushanbe (U.R.S.S.), 27 octobre - 3 novembre 1982*. Édition du CNRS, pp. 243-251. Paris.

Bulletin (1993) *International Association for the Study of the Cultures of Central Asia. Information Bulletin, 19*. Moscow.

Burrow, T. (1973) The Protoindoaryans, *Journal of Royal Asiatic Society*, XCXIV, pp. 123-40. London.

Cattenat, A. and Gardin, J.C. (1977) Diffusion comparée de quelques genres de poterie caractèristique de l'époque Achémenide sur le plateau iranien et en Asie Centrale, *Le Plateau Iranien et l'Asie Centrale des Origines à la Conquête Islamique*, pp. 225-148. Paris.

Cleuziou, S. (1977) Les pointes de fleches "scythiques" au Proche et Moyen Orient, *Le Plateau Iranien et l'Asie Centrale*, pp. 187-99. Paris.

Cleuziou, S. (1985) L'Age du Fer à Tureng Tepe (Iran) et ses relations avec l'Asie centrale, *Actes du Colloque franco-soviétique, L'Archéologie de la Bactriane Ancienne Dushambe (U.R.S.S.), 27 octobre- 3 novembre 1982. Éditions du CNRS,* pp. 175-185. Paris.

Dani, A.H. and Masson, V.M. (eds.) (1992) *History of Civilizations of Central Asia. Vol. I. The Dawn of Civilization: Earliest Times to 700 BC*. Paris.

Deshayes, J. (1969) New Evidence for the Indo-Europeans from Tureng Tepe, Iran, *Archaeology*, 22 (1), pp. 10-17. London.

Diakonov, M.I. (1985) Media, *Cambridge History of Iran*, II, pp.36-148, Cambridge.

Dyson, jr. R. H. and Muscarella, O.W. (1989) Constructing the Chronology and Historical Implications of Hasanlu IV, *Iran*, 27, pp. 1-27. London.

Empires (1985) *The Emergence of Empires (1st Millennium BC - 1st Millennium AD), Actes du Semimaire CNRS/NSF de Bellevaux (24-29 juin 1985), Paléorient*, 11/12, pp. 57-82. Paris.

Filanovich, M.I. (1973) K stratigrafii Gyaur-Kaly starogo Merva, *Izv. AN Turkmenskoi SSR Ser. obschestv. nauk.*, 1, pp. 60-64. Ashkhabad.

Filanovich, M.I. (1974a) Drevni Merv v svete izucheniya stratigrafii gorodishcha Gyaur-Kaly, *Avtoref. kand. dis.* Tashkent.

Filanovich, M.I. (1974b) Gyaur-kala, Trudy *YuTAKE*, XV, pp. 15-139. Ashkhabad.

Ghirshman, R. (1938) *Fouilles de Syalk*, Paris.

Ghirshman, R. (1954) *Le village Perse-Achéménide. Mémoires de la Mission Archéologique en Iran*, XXXVI. Paris.

Ghirshman, R. (1977) *L'Iran et la Migration des Indo-Aryens et des Iraniens*. Leiden.

Gubaev, A.G., Koshelenko G.A. and Novikov, S.V., (1990a), Arkheologicheskiye Issledovaniya v Mervskom Oazise, *Vestnik Drevnei Istorii*, 3, pp.117-127. Moskva.

Gubaev, A.G., Koshelenko G.A. and Novikov, S.V., (1990b) Archaeological Exploration of the Merv Oasis, *Mesopotamia,* 25, pp. 51-60. Torino.

Harmatta, J. (1981) Proto-Iranians and Proto-Indians in Central Asia in the 2nd Millennium BC (Linguistic Evidence), *Etnicheskie problemy istorii central'noi Azii v drevnosti II tysyacheletie do n.e.)*, p.75-83, Moskva.

Herrmann, G. and Kurbansakhatov, K. *et alii* (1994) The International Merv Project, Preliminary Report on the Second Season (1993), *Iran*, 32, pp. 53-76. London.

Herrmann, G. and Kurbansakhatov, K. *et alii* (1995) The International Merv Project, Preliminary Report on the Third Season (1994), *Iran*, 33, pp. 31-60. London.

Herrmann, G., Masson, V.M. and Kurbansakhatov, K. (1993) The International Merv Project, Preliminary Report on the First Season (1992), *Iran*, 31, pp. 39-62. London.

Hiebert, F.T. (1994) *Origins of the Bronze Age Oasis Civilization in Central Asia*. Cambridge, MA.

Kachuris, K. (1967) Raskopki na El'ken-depe v Juzhnoi Turkmenii, *Arkheologicheskiye Otkrytiya*, 1966, p. 336. Moskva.

Khlopin, I.N. (1975) Poseleniye epokhi bronzy Parkhai-depe, *Kratkiye Soobshcheniya Instituta Arkheologii*, 142, pp. 116-121. Moskva.

Khlopin, I.N. (in press) *Something more about Aryans and their Original Motherland.*

Kohl, P. L. (ed.) (1981) *The Bronze Age Civilisation of Central Asia*. New York.

Kohl, P. L. (1984) *Central Asia, Palaeolithic Beginnings to the Iron Age*. Paris.

Kohl, P.L., Biscione, R. and Inghrahan, M.L. (1982) Implications of Recent Evidence for the Prehistory of Northwestern Iran and Southwestern Turkmenistan, *Iranica Antiqua,* 17, pp. 1-20. Gent.

Koshelenko, G. Bader, A. and Gaibov, V. (1991) Materials from an Archaeological Map of Margiana: the Changly Region, *Mesopotamia*, 26, pp. 165-186. Torino.

Koshelenko, G.A. (ed.) (1985) *Drevneishie Gosudarstva Kavkaza i Srednei Azii*. Moskva.

Kuz'mina, E.E. (1986) O nekotorykh arkheologicheskikh aspektakh problemy proiskhozhdeniya indoirantsev, *Peredneaziatski sbornik*, p. 204. Moskva.

Levine, L.M. (1987) The Iron Age, Hole, F. (ed) *The Archaeology of Western Iran. Settlement and Society from Prehistory to the Islamic Conquest*, pp. 229-50. Washington.

Lisitsyna, G.N. (1978) *Stanovleniye i Razvitiye Oroshayemogo Zemledeliya v Yuzhnoi Turkmenii*. Moskva.

Makkay, J. (1988) Cultural Groups of SE-Europe in the Neolithic: the PIE Homeland Problem and the Origins of the Proto-Greeks, *AIΩN, Annali del Dipartimento di Studi del Mondo Classico e del Mediterraneo Antico, Sez. Linguistica*, 10, pp. 117-37. Napoli.

Mallory, J.P. (1989) *In Search of the Indo-Europeans*. London.

Marushchenko, A.A. (1969) El'ken-depe (Otchet o raskopkakh 1953-1955-1956 gg.) *Trudy Instituta istorii, arkheologii i etnografii*, p. 67. Ashkhabad.

Masson, V.M. (1956a) Izuchenie drevnezemdedel'cheskikh poseleni v del'te Murghaba, *Izv. AN Turkm.* SSR 2. Ashkhabad.

Masson, V.M. (1956b) Poseleniya pozdnei bronzy i rannego zheleza v del'te Murghaba, *Kratkiye Soobshcheniya Instituta Istorii Material'noi Kul'tury*, 64. Moskva.

Masson, V.M. (1959) *Drevnezemledel'cheskaya Kul'tura Margiany, MIA SSSR, 73*, Moskva-Leningrad.

Masson, V.M. (1987) Archaeology, V, Pre-Islamic Central Asia, *Encyclopaedia Iranica*, II, Yarshater, E., (ed.), pp. 308-317. London-New York.

Masson, V.M. and Sarianidi, V. (1972) *Central Asia. Turkmenia before the Achaemenids*. London.

Masson, V.M. and Sarianidi, V. (1973) *Sredneaziatskaya terrakota epokhi bronzy*. Moskva.

Medvedskaya, I.N. (1977a) Mogil'nik Kaitariye-novyi pamyatnik rannezhelezhnogo veka Irana, *Sovetskaya Arkheologiya*, 1, pp. 169-175. Moskva.

Medvedskaya, I.N. (1977b) Ob "iranskoi" prinadlezhnosti seroi keramiki rannezheleznogo veka Irana, *Vestnik Drevnei istorii*, 2, 140, pp. 93-105. Moskva.

Medvedskaya, I.N. (1980) Metallicheskiye nakonechniki strel Perednego Vostoka i Evraziskikh stepei II-pervoi poloviny I tysyacheletiya do N.E., *Sovetskaiya Arheologiya*, 4, pp. 23-37. Moskva.

Medvedskaya, I.N. (1982) *Iron Age in Iran, British Archaeological Report, International Series*, London.

Medvedskaya, I.N. (1983) Konski ubor iz mogil'nika Sialk B, *Iranica Antiqua*, 18, pp. 59-79. Gent.

Medveskaya, I.N. (1988) Who destroyed Hasanlu IV, *Iran*, 26, pp. 1-15. London.

Perrot, J. (1985) Suse à la periode achaéménide, *Paléorient*, 11, 2, 1, fig. pp. 67-69. Paris.

Piotrovski, B.B. (1949) Razvedochnye raboty na Gyaur-kale v Starom Merve, *Trudy YuTAKE*, 1, Ashkhabad.

Pugachenkova, G.A. (1958) *Puti razvitiya arkhitektury Yuzhnogo Turkmenistana pory rabovladeniya i feodalizma*. Moskva.

Renfrew, C. (1987) *Archaeology and Language*. London-New York.

Rossi, A.V. (1988) Preistoria linguistica dell'area di contatto Indo-Iranica, *AIΩN, Annali del Dipartimento di Studi del Mondo Classico e del Mediterraneo Antico, Sezione Linguistica*, 10, pp. 217-237. Napoli.

Sagdullaev, A.S. (1981) Raboty na yuge Uzbekistana, *Arkheologicheskiye Otkrytiya*, 1980, pp. 459-60. Moskva.

Sarianidi, V.I. (1977) *Drevniye zemledel'tsy Afghanistana*. Moskva.

Sarianidi, V.I. (1988) Kultovaya simvolika amuletov Baktrii i Margiany, *Sbornik Pamyati G. Tucci*.

Sarianidi, V.I. and Kachuris, K.A. (1968) Raskopki na Ulug-depe, *Arkheologicheskiye Otkrytiya*, 1980, pp. 342-344. Moskva.

Struve, V.V. (1949a) Vosstaniye v Margiane pri Darii I, *Vestnik Drevnei Istorii*, 28, 2, pp. 10-29. Moskva.

Struve, V.V. (1949b) Vosstaniye v Margiane pri Darii I, *Trudy YuTAKE*, 1, pp. 9-27. Ashkhabad.

Usmanova, Z.I. (1963) Erk-Kala, *Trudy YuTAKE*, XII. Ashkhabad.

Usmanova, Z.I. (1969) Erk-Kala-gorodishche Starogo Merva pory antichnosti i rannego srednevekovya (K istorii razvitiya drevnikh gorodov Srednei Azii) *Avtoref. kand. dis.*, Tashkent.

Usmanova, Z.I. and Filanovich, M.I. (1979) Arkheologicheskiye kompleksy Erk-Kaly i Gyaur-Kaly: osnova periodizatsii gorodskoi kul'tury antichnogo Merva, *Antichnaya Kul'tura Srednei Azii i Kazakhstana, TD VNS*, pp.26-31. Tashkent.

Young, T.C. (1965) A Comparative Ceramic Chronology for Western Iran 1500-500 BC, *Iran*, 3, pp. 53-85. London.

Young, T.C. (1967) The Iranian Migration into Zagros, *Iran*, 5, pp. 11-34. London.

Young, T.C. (1978) The Comparative Stratigraphy of Second and First Millennium Khuzistan, *Paléorient*, 4, pp. 237-246. Paris.

Young, T.C. (1985) Early Iron Age Revisited: Preliminary Suggestions for the Re-Analysis of Old Constructs, *De l'Indus aux Balkans, Recueil à la memoire de Jean Deshayes*, pp. 361-378, Paris.

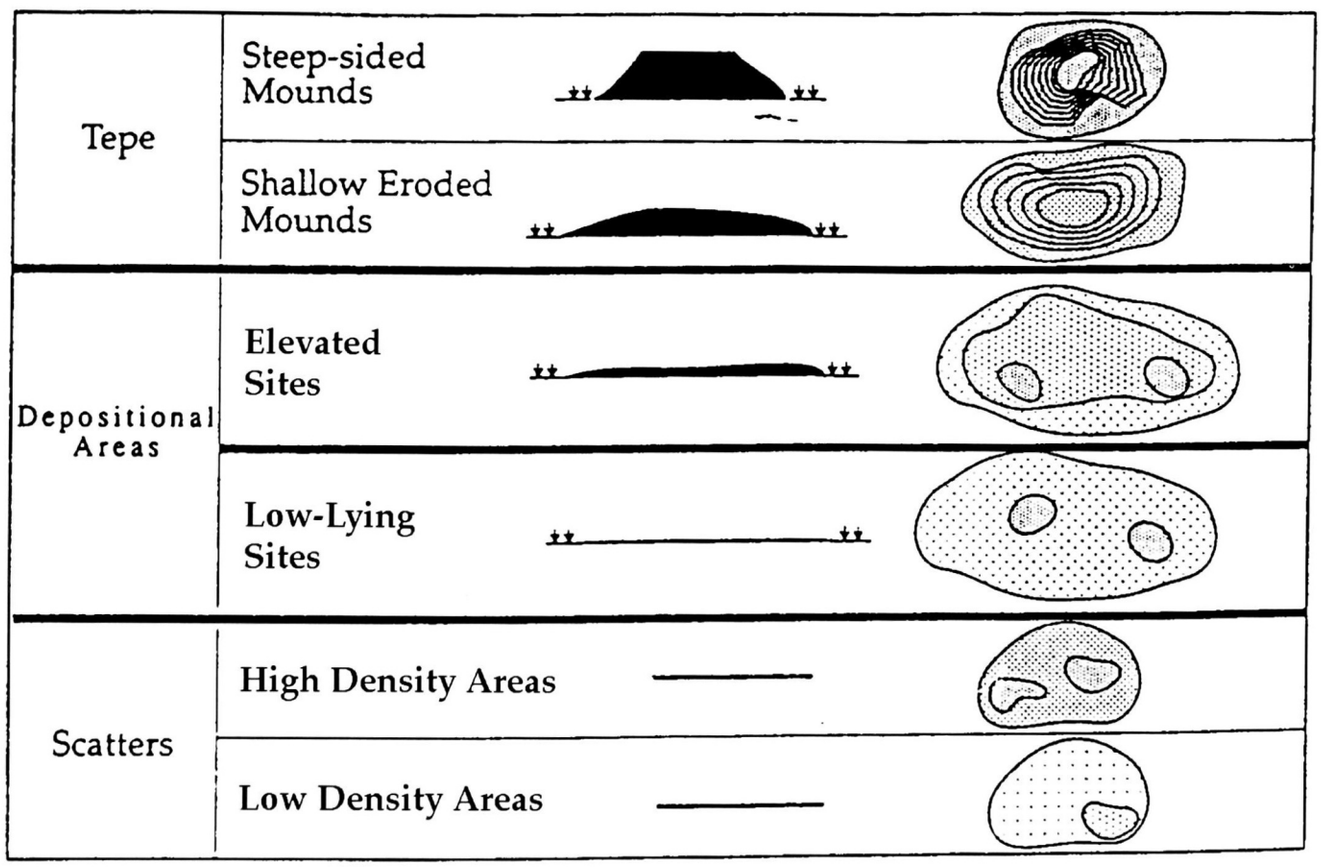


Table 1 - Main types of sites classified in the Murghab Delta.

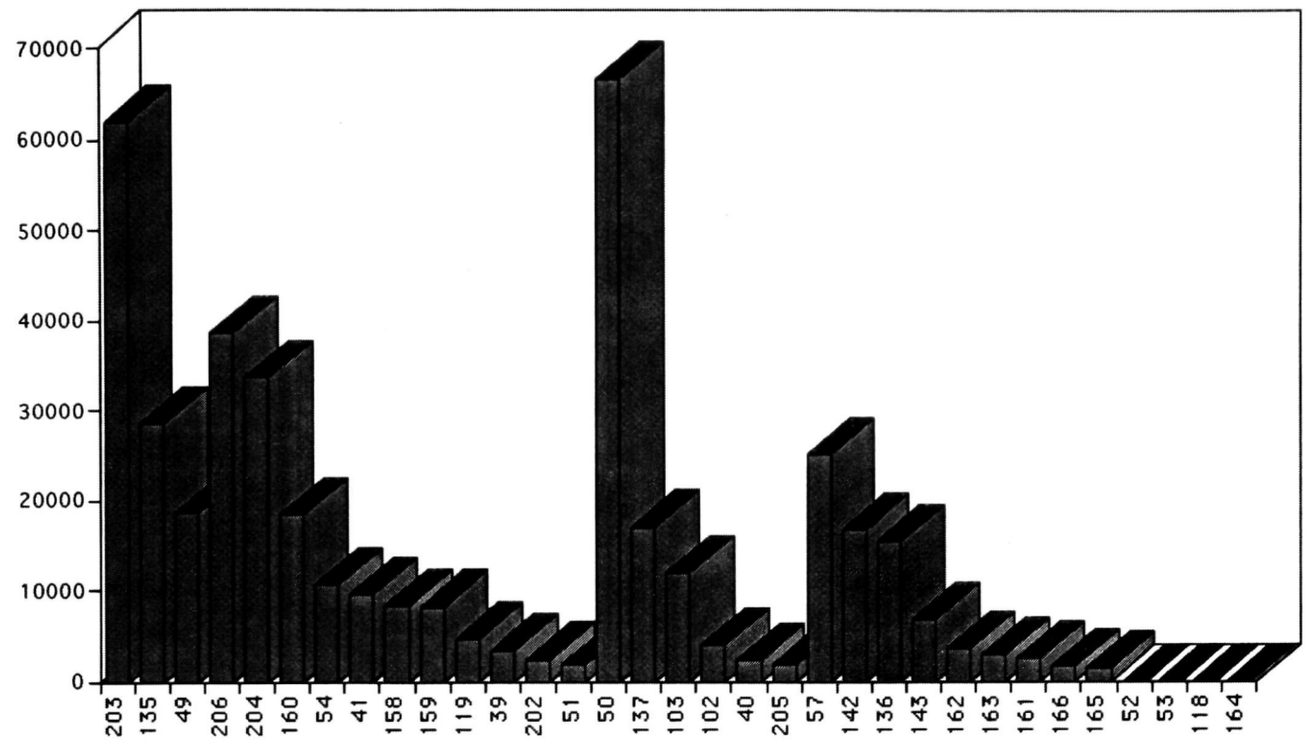


Table 2 - Diagram of the site-size of Site Complex 1

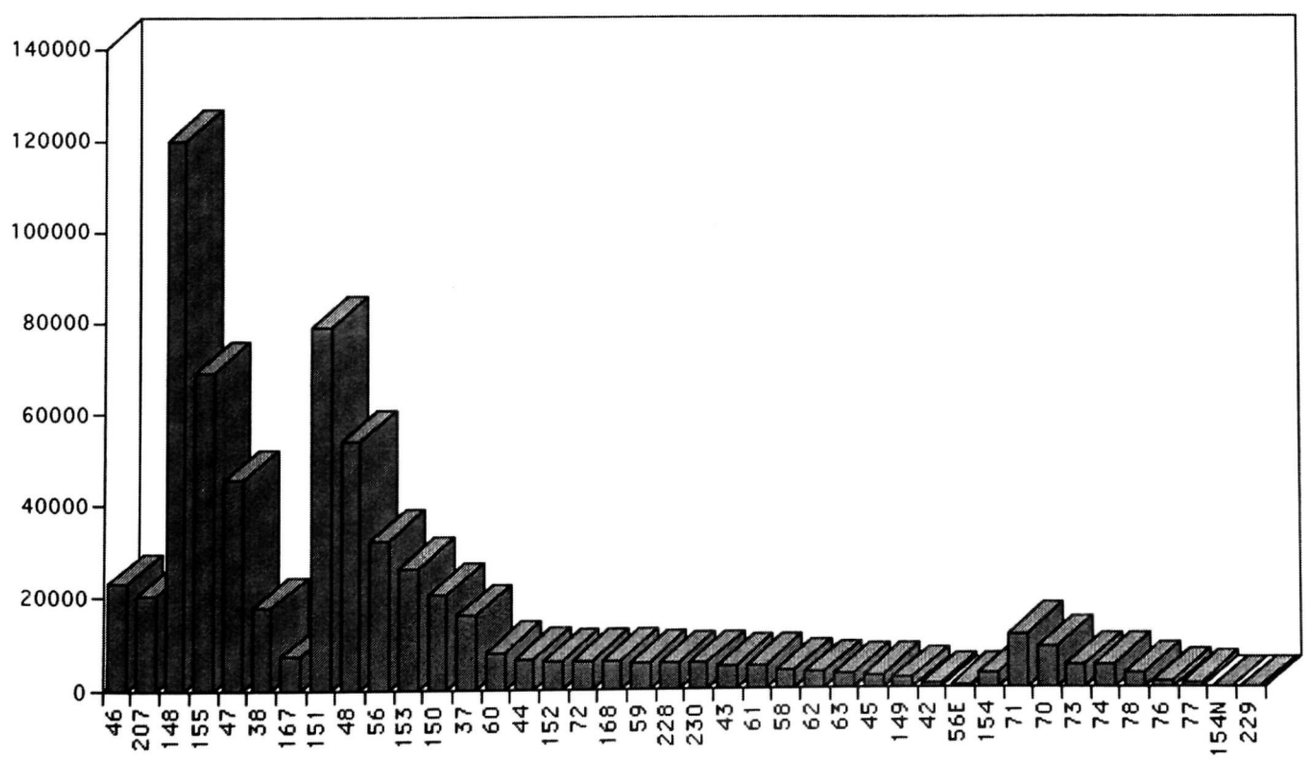


Table 3 - Diagram of the site-size of Site Complex 2

EXCAVATIONS AT TAKHIRBAI TEPE (THR-1) (1992-1993). PRELIMINARY NOTES

by M. CATTANI

The excavations at Takhirbai tepe constitute one of the field-work of the general Italian - Russian - Turkmenian project "Archaeological Map of the Murghab delta".

After the first topographical campaigns with a systematic survey and the recognition of several archaeological sites, it was necessary to organize a general archaeological framework to support the chronology of the materials (mainly ceramic) collected from the surface. This led us to choose a specific settlement to be excavated in order to have a stratigraphic sequence.

Takhirbai was singled out as the most suitable site for such an analysis, because of its long occupation phase starting from the late Bronze up to the Achaemenid Age (14th - 5th BC).

Takhirbai tepe is an extensive mound located 9 km to NE of Karakul village, on the northern edge of the presently cultivated area. Its high elevation renders it visible from a long distance; indeed, it is the most prominent site in the vast area between the Yaz tepe and the Togolok oasis.

Discovered by Masson in the fifties and dated to the early Iron Age (Masson, 1959) it was selected for the excavation because of its prominent location and chronological range; it should provide not only a chronological scheme vital for the interpretation of surface finds from other sites, but also a model for the most prominent settlement category of the Iron Age, classified as "Tepe 1" (steep-sided mounds). The preliminary campaign of 1991 focused on the mapping of the site with a laser theodolite. A contour map with 30 cm intervals confirmed the preliminary observation, that the site was quadrangular, but with rounded corners, suggesting that it was fortified (Fig. 1-2). Aerial photographs taken in the course of successive seasons demonstrated this particularly well.

The surface of the site has been extensively sampled in three phases. First, diagnostic ceramics and indicators of craft activities (metal, precious stone objects) (Figs. 3-4) were picked up at random from the entire area. Later, all artifacts were picked up from a 170 x 5 m long transect (divided into 5 x 5 m squares); pottery was weighed and counted, and diagnostic (along with all other artifacts categories), were kept. Other artifacts have been located in a map (Fig. 5). This allowed us to compare different sites and to analyze their preservation levels and characteristics. Then, in selected areas with high surface concentrations of lapis and turquoise, the top surface divided in 1 m squares was scraped and sieved with a 1 mm sieve in order to see if the presence of a bead-making industry could be detected (Vidale, Bianchetti, Cattani, *infra*). It was in this area that trenches were subsequently laid out in excavation.

Although the main aim of the trenches at Takhirbai were oriented to have a chronological sequence of the artefacts, we also made every efforts to detect the diachronical structural organization of the settlement. For this reason, a trench 80 m long and 5 m wide was laid out, running from the top of the mound to the middle of the deflated area to its West, where other archaeological evidences were recognized in the surface survey (Fig. 6). The trench has been divided in 5 m squares named from A1 to A16.

Inside this trench during the 1992-1993 campaigns a 43 m long and 5 m wide excavation has been carried out starting from square A1 to square A8. A second excavation has been carried out inside the square A16, in order to verify the archaeological and stratigraphic consistence of the deflated area. An enlargement of the excavation with three new 5 m squares was laid out in the second campaign in order to give evidence to some of the important structural elements recognized in the former campaign (squares B23, B4, C4) (Fig. 6).

The results achieved at the end of these two excavation campaigns can be outlined as follow:

- a stratigraphic sequence was laid out ranging from the latest phase of Bronze Age or beginning of Early Iron Age (presumed starting phase of settlement) to the Achaemenid Age;

- this stratigraphic sequence represents the basis for a detailed analysis of the chronology of Margiana. In particular, it represents a good opportunity to set up a seriation of the pottery production of the so-called Yaz horizon. The hypothesis and the proposal of a new sequence should be confirmed only on the basis of new investigation, but they can be used, for now, as the chronological basis for the sites of the Yaz horizon recognized on surface;

- the excavation allowed us to single out the main settlement pattern of the site, i.e. a citadel with platform, a fortified wall and an ample moat;

- the very detailed geopedological analysis of the filling of the moat, made by Prof. Cremaschi and Dott. Angelucci, has revealed a rather significant dynamics in order to understand the function of the moat and to study the environmental evolution;

- the sampling of the faunal and palaeobotanical remains and the analysis of the pottery gave the first indications about the palaeoenvironmental setting in Margiana between Iron and Achaemenid Age.

As already said, the archaeological excavation at Takhirbai aimed at reconstructing a stratigraphic sequence which could be of help to the comprehension and the chronological attribution of the various sites found out during the works for the Archaeological Map of the Murghab delta. Therefore, during the excavation great attention was paid to the systematic and accurate control of the archaeological stratigraphy.

The short amount of time at disposal for the excavation and the necessity of undertaking a non destructive investigation of the site led us to make either a sounding of limitable dimensions, quick to make and with accurate describable stratigraphic sections, or a long trench, planned in order to achieve the most indicative sections of the site.

Experience taught that the interpretation of a single stratigraphic section is not enough, and that it can be easily misleading especially in a settlement continuously inhabited for long time. The sampling of the materials, needed to make a chronological seriation must be of a consistent amount, and this was not possible only exploring the visible vertical surface of the section.

In the excavation we have chosen a long trench enough wide for sampling. During the excavations we payed particular attention to the individuation of the relationships between the stratigraphic units, not only in the vertical sequence, but also basically in its horizontal continuity. In some cases the trench has been enlarged in order to understand better particular architectural features.

This method did not allow the realization of an excavation with a continuous interpretation of the sections from the surface to the virgin soil along the whole trench, but gave indications often discontinuous on the site evolution. The stratigraphic sequence has been achieved with sets of stratigraphic units starting from the top of the tepe to the deflated area. This method allowed the simultaneous activity of groups of 2/3 archaeologists engaged in different sectors. We always tried, anyway, to keep the stratigraphic connection.

The excavation has been carried out using the trowel, and only in layers particularly thick the shovel. The soft character of the sandy soil of the layers inside the citadel did not allow the use of the pick-axe, which has been many times used in the excavation of the moat. A very useful tool in the arid and dusty soil has been the vacuum cleaner. The cleaning operations of the surfaces excavated allowed us recognizing more easily the stratigraphic units.

Most of the removed soil has been sieved with differing kind of sieves (1 mm to 3 cm). Soil sampling for flotation and palaeobotanical analyses have been collected during the second campaign thanks to Dr M. Nesbitt, University of London, Institute of Archaeology. Coal samples, furthermore, have been collected from different stratigraphic units.

The Phases

Particular stratigraphic units, indicating discontinuity in the settlement life, have been selected as elements charecterizing the archaeological phases: abandonment layers or light anthropic sedimentation or layers suggesting traumatic events as burning or collapse of the architectural features. The individuation of these phases is valid only for the excavated area and can be extended to the rest of the settlement only as a preliminary hypothesis. With the exception of a big difference between the first and the successive periods, there were not particular differences within the material culture.

I. Construction on the Virgin Soil of the Platform, Excavation of the Moat and Construction of a First Wall Enclosure of the Citadel (III Period)

In the excavation of the trench it has been possible to verify that the platform is located just above the virgin soil (US 127) of compact silt. We could not exclude the presence of older stratification located in a more central position of the tepe. It has been possible to attest a LBA phase on the basis of some materials collected in the France and on the surface.

The platform is constituted by at least four different layers of clay silt with a total thickness of 1.30 m. Within these silt layers are some pottery and charcoal fragments, often horizontally located (US 93, 120, 122,125). Inside the platform a pit has been individuated with a large amount of charcoal and a fragment of bowl containing some clay balls hardened by fire (US 123, 124). The limited dimensions of the trench effected inside the platform did not allow a complete understanding of the presence of this stratification: it is probable, however, that these layers were located above the first phase of the construction covered later by a rebuilding or the end of the same platform.

The surface of the platform beneath the first layers corresponding to the level of living is constituted by big blocks of silt, the contour of which has been already recognized in a strip of 2 m ca. To the South the platform is directly related with the wall enclosure made by bricks (US 145) and to the North with the moat.

Above the platform and against the wall enclosure are some silt, silt sand and ash levels, alternated at random (US 88). In this layer different hand-made painted ceramic artefacts and some bone tools datable to Yaz I horizon have been found.

The bowl collected in the US 124 belongs to LBA. These two chronological indicators allow the dating of the construction of the platform, the wall enclosure and

the moat to the mid of the 2nd millennium or to the second half of 2nd millennium BC.

The moat looks like excavated contemporaneously to the construction of the platform and of the wall enclosure. Stratigraphically the platform is later than the moat, but it is probable that the two events were contemporaneous.

II. Living Phase up to the Collapse of the Wall Enclosure (III Period)

To this phase belong the stratigraphic units of the first filling of the moat and some layers, partially taken into consideration also in the phase 1 (US 88), corresponding to the life of the settlement up to the collapse of the wall enclosure.

The moat has a first filling (US 129) constituted by silty sand, which may be due to the remains of the daily refuse of the settlement, without water traces. Inside the US 129 numerous fragments of hand-made painted ware, of hand-made gray-blackish slipped ware, and very coarse ware have been collected. Very fine wheel-made ware is present as well.

The wall enclosure has been found partially destroyed or preserved only in some brick courses, beneath an erosive interface (US 147) and a sand layer (US 146). Above the sand layer a very thin ash and charcoal layer (US 138) is present, becoming thicker to the West.

III. Construction or Restoration of the Second Wall Enclosure (III Period)

Above the layers of sedimentation and of partial occupation of the site obliterating the wall enclosure of the first phase is present also a second wall enclosure made by silt clay bricks (US 81). This is built approximately in the same position of the former and with the same orientation. It is probable that it represents the restoration of the wall, still visible and preserved in other traits along its perimeter. When the restoration occurred the soil raised of 60-70 cm and the original surface of the platform was completely obliterated.

Some layers with ash and charcoal horizontally located and related with the wall may give evidence of the surface. The basis of the wall undergoes to a strong erosion due, probably, to the rain which generally cuts and destroys the first courses of bricks.

IV. The Collapse of the Wall Enclosure and the Probable Abandonment Phase of the Citadel (III Period)

The wall enclosure collapses or is almost completely destroyed already in a rather old phase of the settlement because all the layers covering the surface of the wall and of the platform are cut later or partially disturbed by the following phases.

V. Reoccupation of the Site with Inner Rebuilding and Partial Reutilisation of the Wall Enclosure, Probably Still Partially in Shape (II Period)

The outer side related to this phase is completely lost because of the erosion. Inside, instead, we could note new building activities also with a partial restoration of the wall enclosure. Walls build on a negative interface, cutting partially the main wall, are set up. This phase has been not easily documented for the numerous changements of the successive phases.

Among the materials the hand-made pottery is decreasing while the wheel-made is enduring with the former few shapes.

VI. Burning with Collapse of the Inner Walls and Presence of Large Amount of Red Burnt Sand (II Period)

The building activity previously documented is completely destroyed by a fire and a subsequent collapse. The situation illustrated by the excavation shows a chaotic large amount of bricks and parts of wall completely burnt or baked. To the base of the collapse we have found some earth floors where we decided to stop the excavation.

Above the collapse layer some black charred layers with numerous artefacts and faunal remains were located. In this layers a skeleton of an adult was found without a clear evidence of a ritual interment. The skeleton without any grave goods is recumbent with folded legs and located near part of a burnt wall.

VII. Rebuilding with more Floor Levels of Inner Site (I Period)

The burnt layer is obliterated by earth floor layers alternated by siltysand and red sand layers. The characteristic color is attributable to fire, but we can absolutely exclude any relationship with the burning levels of the underlying phase: it seems instead more probable the relationship of these layers with a fireplace on a mud brick square platform nearly located. To the same phase are attributable some remains of some mud bricks walls and a circular clay container.

The materials of this phase are more various expecially as far as concerns the ceramic production with rather numerous biconical beakers and the carinated cups with convex sides.

VIII. Abandonment Phase

This phase is documented by a rather thick sand layer alternated with bricks fragments and artefacts (mainly pottery). We can interpret this level as an abandonment phase after which is present a restoration of the area.

IX. Building Phase of Different Rooms Connected with a Probable Craftsmanship Activity (I period)

In this phase a strong building activity has been documented with the construction of numerous small rooms with a small enclosure and some clay container. In particular one of the rooms had 4 big fragmented jars re-utilized as containers. The finding of some grinding stones and some other stone tools, probably pestles, led us to identify this area as one of the craft areas probably connected with a cloth factory. The big jars and the numerous vessels belong to the Yaz III horizon, which constitutes the last phase of stable occupation of the tepe. The most recent stratigraphic units individuated belong to the abandonment layers, strongly eroded by the contact with the surface.

X. Abandonment Phase of the Site and Beginning of Erosion Activities

This phase shows the abandonment of the site, witnessed by some Sasanian potsherds and the beginning of the erosion of the tepe slope.

Unfortunately the state of the erosion does not allow us to understand easily the real dynamic of the abandonment activity of the site.

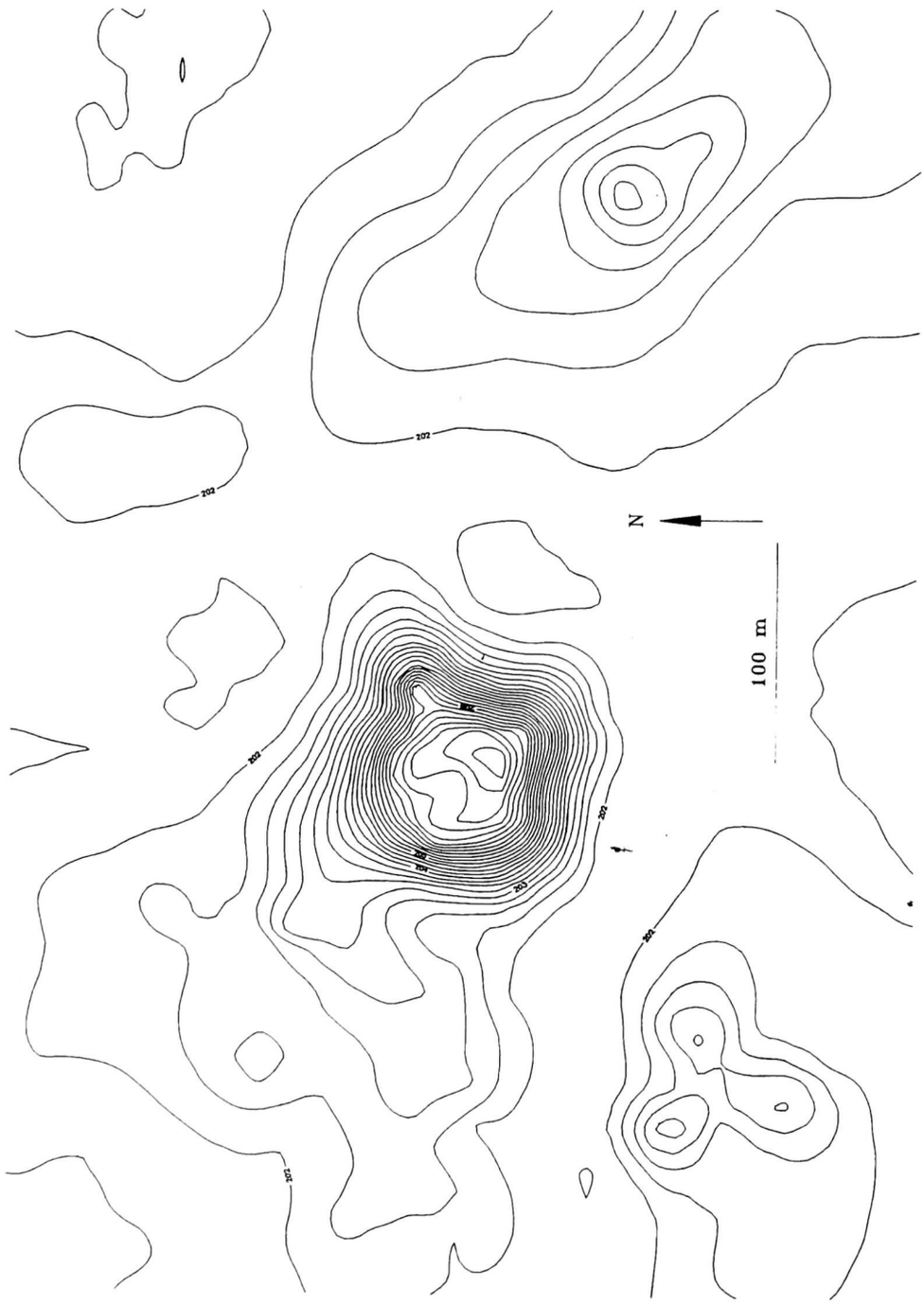


Fig. 1 - Takhirbai Depe General contour plan of archeological area.

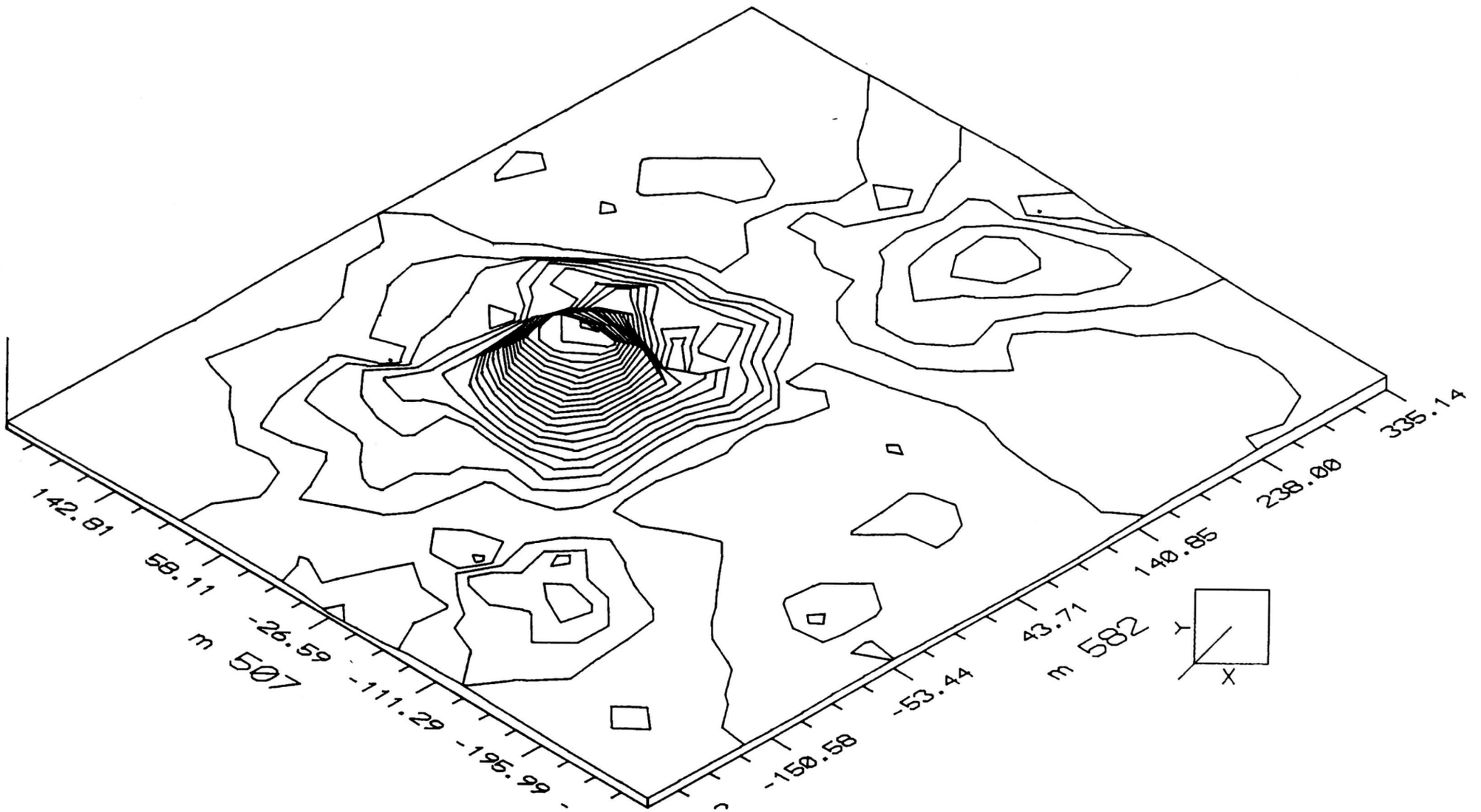


Fig. 2 - Takhirbai Depe General isometrical view of archeological area as projected by computer-assisted graphics, ephasizing massive understructures of central mound.

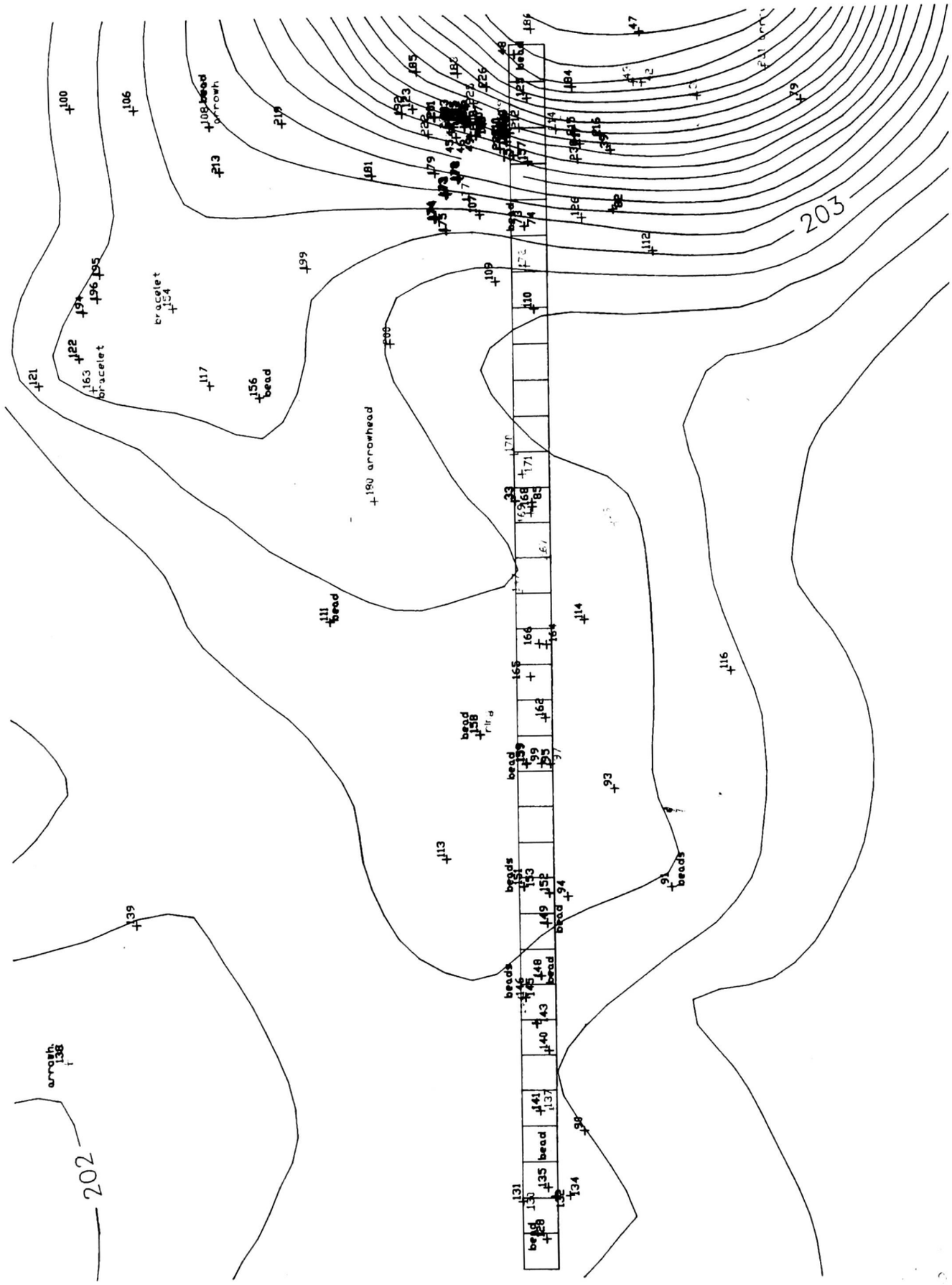


Fig. 3 - Takhirbai 1. Sampling transect and location of craft indicators and other small finds.



Fig. 4 - Takhirbai 1. Air view from WWN with cross section.

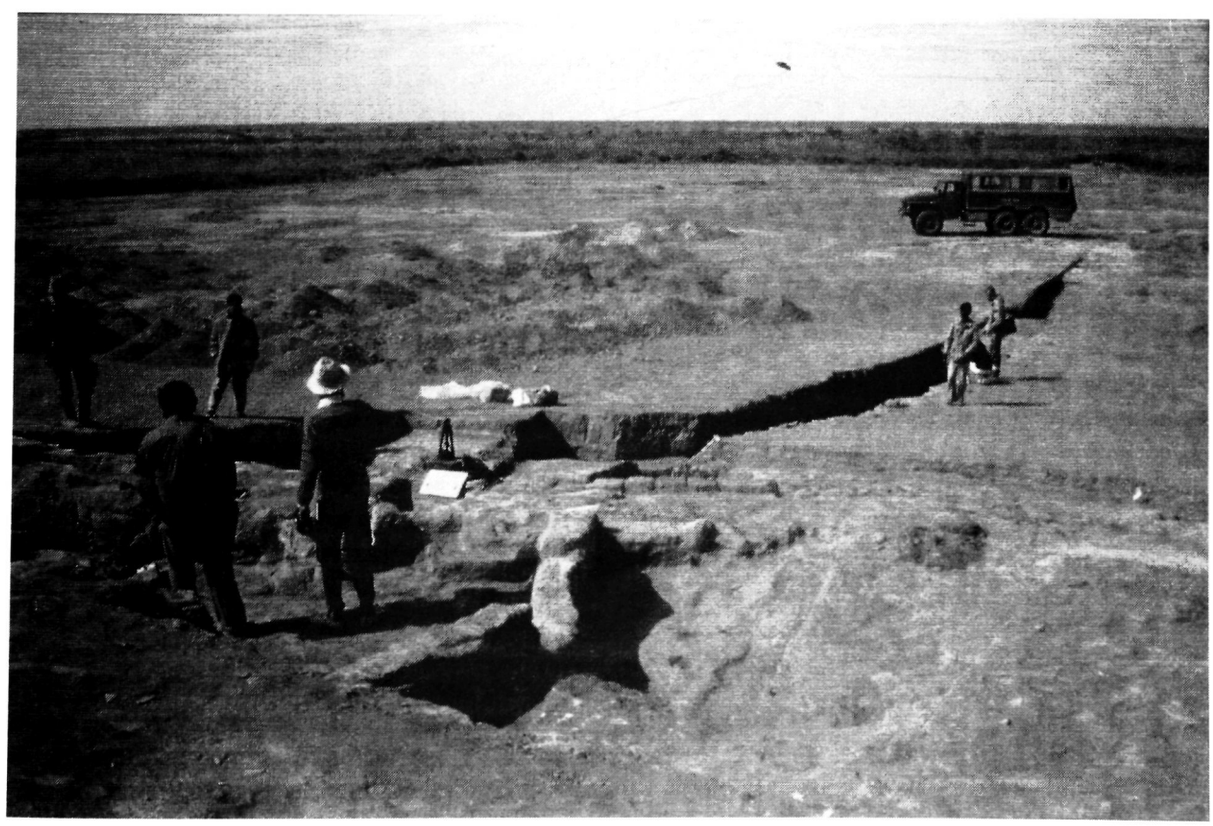


Fig. 5 - Takhirbai 1. View of the test trench from NE.

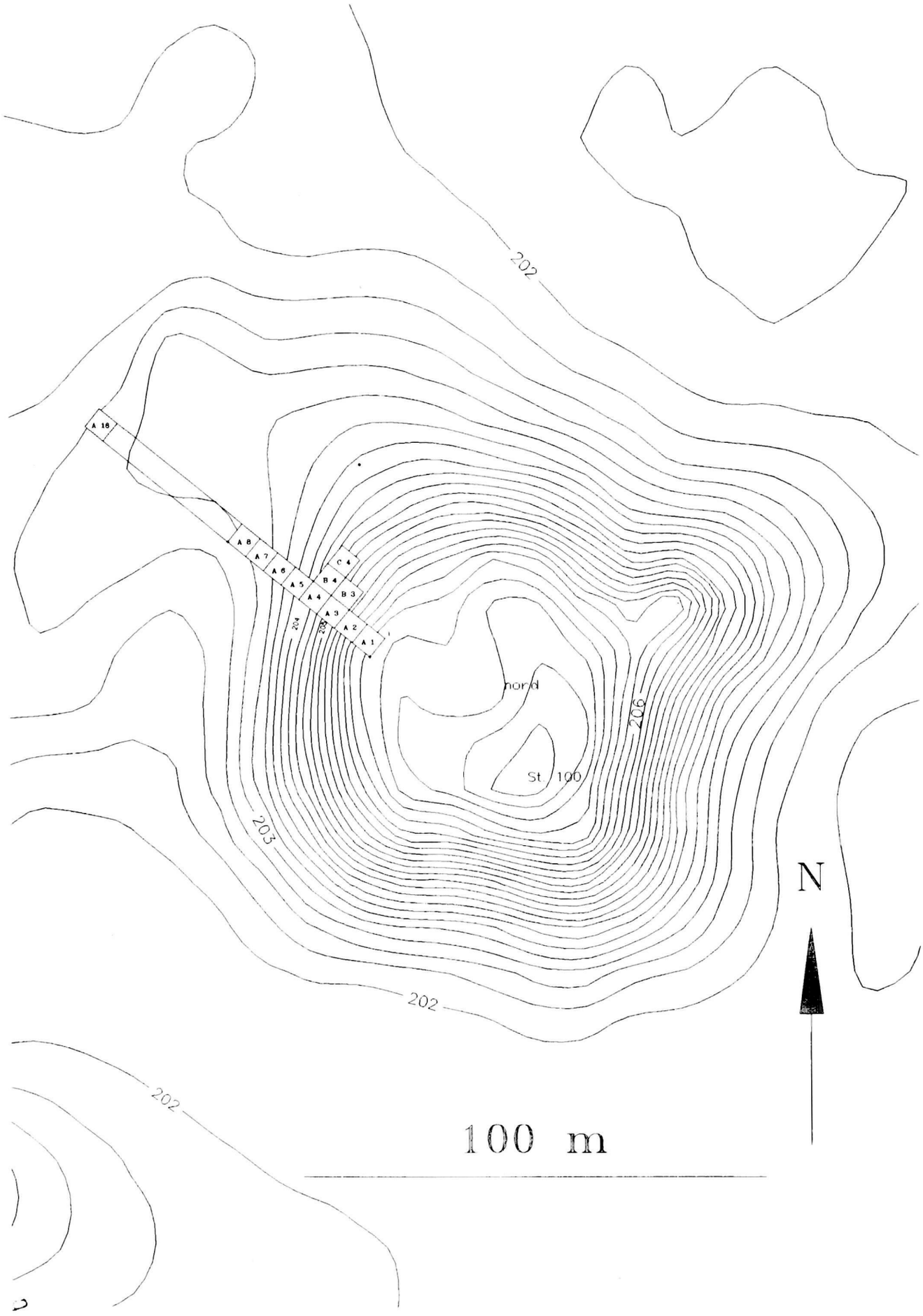


Fig. 6 - Takhirbai 1. Layout of excavation trenches A1-A16.

A SEMIPRECIOUS STONE-WORKING AREA DATING TO THE LATE IRON AGE ON THE SURFACE OF TAKHIRBAI-DEPE

by M. Vidale, P. Bianchetti, M. Cattani

1. Introduction

Takhirbai depe has an important archaeological sequence, extending from the Late Bronze Age to the Achaemenid period (approximately XIV-V century BC). In 1991, as a step of the systematic survey carried out by the joint Russian and Italiana Archaeological Mission in the Murgharb delta, the site was explored with different research methods, like a very detailed contour line map and a sampling collection of materials on the surface.

The surface survey brought to the identification of a small cluster of indicators of bead making activities (mainly flakes and semifinished specimens of lapislazuli and turquoise) (Figs. 1, 2). This concentration of micro-artefacts was identified near the north-western corner of the mound, on a slope; although isolated beads and other flakes were found also in other parts of the mound, the primary cluster was segregated and easily identifiable. The location of individual finds was recorded with centimetric co-ordinates. Then on the surface of this area was laid a grid of 1 x 1 m squares; all the surface sediments, loosened by erosion, were collected and sifted with 1 mm mesh grid sieves, recovering a total number of 86 small artefacts in stone, glass, metal and bone.

As the site had been selected for a stratigraphic test trench aimed at monitoring the relative chronology of the ceramics recovered on the surface, a trench measuring 80 x 5 m, oriented from west to east, was laid and excavated. It run aside the major cluster of semiprecious stone bead-making indicators, with the purpose of testing the subsurface archaeological context and the absolute chronology of this interesting activity area. The excavation brought to light a lower huge platform built with clay and mud bricks dating to the latest phase of Bronze Age or to the beginning of the Iron Age. Such platform was probably the base of a substantial defence wall, surrounded by a large ditch; the settlement survived for centuries growing, with complex stratigraphic events, onto this imposing structure, till its final abandonment in the Yaz III phase. The bead making indicators were found exclusively in the uppermost, badly eroded layers and therefore may be preliminarly dated to a late moment of an Achemenian occupation or even to a later period. The cluster probably represent what remains of a small primary or secondary dump abandoned by a single craftsman after the production of a small amount of beads. In this paper we examine the composition of this small dump, attempting at defining which stones were used, which kind of beads were manufactured, and which kind of reduction techniques were on record.

While there is a substantial bibliography on bead making activity areas and techniques dating to the 3rd millennium BC in Central Asia, South Asia and the Indian subcontinent (Mackay 1937; Vinogradov 1972, 1973; Bulgarelli 1979, 1981; Piperno 1973, 1976, 1981; Tosi and Piperno 1973; Tosi 1973, 1974; Gwinnet and Gorelick 1978; Salvatori and Vidale 1982; Vidale 1987; Tosi and Vidale 1990; Kenoyer and Vidale 1992; Vidale 1995; Vidale and Bianchetti 1995, in press) there is virtually no record or archaeological information available for later bead making industries. This is why the assemblage from Takhirbai-depe, in spite of its limited size, is extremely important. We should also stress that, just because of the relative isolation of this find, some aspects of the proposed palaeotechnological reconstruction remain, for the moment, uncompleted and somehow uncertain.

2. Identifying Apatite and Turquoise

The manufacturing of turquoise ornaments in Central Asia and eastern Iran is well known since the discovery of important activity areas dating to the third millennium BC (Vinogradov 1972, 1973; Tosi 1974; Bulgarelli 1981). Some blanks of greenish hard stone resembling turquoise were cleaned in de-ionised water, coated with carbon and analysed with a SEM (Scanning Electron Microscopy) provided with an X-ray energy dispersive analyser (EDAX), mainly with the purpose of micro morphological analysis and palaeotechnological reconstruction. At the microprobe (fig. 3), a set of samples of such stone showed peaks of Al, P and Cu, compatible with the chemical composition of turquoise, plus a secondary silicatic component with Si, Ca, K possibly associated to Ca and K and traces of Fe. As a consequence, at the beginning we thought that all the green stone represented in the Takhirbai bead making assemblage was turquoise as well.

In order to test this assumption, and being used to the wide range of variability of greenish hard stones in South Asia, some fragments of this stone were analysed with X-ray diffraction (XRD). We used a X-ray Powder

Diffraction System Seifert 3000 provided with a MZ IV goniometer (30kv, 45ma, Cu Ka-/ID radiation).

The analysis of one fragment (THR 1-173) excluded the identification with turquoise (fig. 4). The pattern obtained for this sample has a good match with PDF 25-166, Hydroxylapatite, chlorian, Calcium Chloride Fluoride Phosphate Hydroxide, $Ca_5(PO_4)_3(OH, Cl, F)$, as well as with PDF 25-167, chlorellestadite (Calcium Phosphate Silicate Sulfate Chloride Fluoride Hydroxide, $Ca_5(P, Si, S)_3O_{12}(Cl, OH, F)$, both minerals of the apatites groups whose colour may be similar to that of turquoise. As both matches are very close (Fig. 4, lower spectrum), for the moment this stone has been preliminarly identified as "apatite".

Fig. 5 shows the good match we obtained between sample THR1-183 and two forms of turquoise: PDF 6-214, turquoise, Copper Aluminum Phosphate Hydroxide Hydrate, $CuAl_6(PO_4)_4(OH)_8\ 5H_2O$, and PDF 25-260, turquoise, ferrian, Copper Aluminum Iron Phosphate Hydroxide Hydrate, $Cu(Al, Fe)_6(PO_4)_4(OH)_8\ 5H_2O$. The second match accounts for the traces of Fe identified through microprobe and it appears slightly more satisfactory. Si is not present in form of quartz; the silicatic component with Si, Ca, and K revealed by microprobe is not visible in the XRD pattern and therefore remains unidentified. Turquoise occurs as a secondary mineral formed by the action of surface waters saturated with Cu solutions and circulating on aluminous rocks, both sedimentary or volcanic, containing apatite and feldspars; it often appears as a filling of lithoclastic features. When turquoise contains 20-21% of Fe_2O_3 this might be due to the presence, in the rock, of crystals of chalchosiderite. As it might be difficult to distinguish visually turquoise from apatite, in the following pages the greenish semiprecious stone from Takhirbai 1 is preliminarly defined as turquoise/apatite.

3. Composition of the Assemblage: General Remarks

In this paper, "rough-out" means a chipped semi-finished bead in form of a blocklet, while "blank" indicates a ground or partially polished bead, unperforated or broken during perforation. The Takhirbai-depe assemblage may be classified into the following classes:

Lapislazuli flakes	44
Lapislazuli, flakes from rough-out preparation	3
Lapislazuli rough-outs	10
Lapislazuli blanks	4
Turquoise/apatite flakes	5
Turquoise/apatite blanks	6
Turquoise/apatite disk bead	1
Other stone, glass and bone objects	6
Fragmentary copper objects	4
Bone fragments	3
Total	86

The assemblage shows clearly that the debitage was left after the manufacture of lapislazuli and apatite beads. There is an evident anomaly in the rate of flakes to semi-finished defective beads between the two stones (approximately 3/1 for lapislazuli and 1/1 for apatite). As the collection was systematic, this anomaly, at present, cannot be satisfactorily explained.

A striking feature, for those used to record and study bead making assemblages dating to the 3rd millennium BC, is the total absence of lithic tools and flakes. In all protohistoric activity areas so far known, semiprecious stones flakes are constantly associated to numberless flakes or blades of flint, chert, basalt, chalcedony and other stone varieties. This association is explained, at least in part, by the use of detaching blades and microblades out of polyhedral cores and modifying the blades themselves into various types of drill-heads. The absence of such indicators might suggest that in our Iron Age activity area drills and other manufacturing tools were actually manufactured with metals.

The fragments of copper objects recovered together with the lithics are scarcely diagnostic, and unfortunately they could actually belong to broken lost ornaments casually included in the surface assemblage. The manufacturing traces left by drills, by themselves, cannot be used for testing such hypothesis. Only the observation of a larger number of samples from similar craft industries and the recourse to experiments planned *ad hoc* might help in solving this problem.

4. Bead Types and Bead Making Techniques: Lapislazuli

The manufacture of lapislazuli beads is attested by a series of broken rough-outs and few fragments of broken blanks, polished beads broken in perforation. The rough-outs are fragments of small chipped parallelepipeds, probably meant for the production of small cylindrical beads of which we have no record. Three flakes are long, pointed, and have a triangular section; they have been ascribed to the preparation of rough-outs for the manufacture of barrel-shaped or ovoid beads (see Tosi and Vidale 1990). One of these flakes, furthermore, shows the unmistakable traces of the crested ridge technique. The SEM picture of fig. 6 shows an ovoid(?) lapislazuli bead blank split during a defective eccentric bipolar perforation. The shape of the drilling canals is irregularly sinuous, with a subrounded tip. One of the broken blanks is a tiny, well fashioned pointed extremity, and suggests that more complex bead forms were also produced at Takhirbai 1.

5. The Manufacture of Turquoise/Apatite Beads

The higher number of turquoise/apatite bead blanks in this assemblage allows a preliminary palaeotechnological reconstruction of the manufacturing sequence of two types of small beads: cylindrical and disk-shaped.

Cylindrical beads (measuring approximately 4-5 mm X 2-3 mm) were shaped by chipping the stone into small

parallelepiped- shaped rough-outs, and then by grinding them onto an abrasive tool, such as a fine-grained sandstone. Grinding proceeded first by smoothing the rough-outs along their primary planes, and then by smoothing down their edges and corners. The first stage of grinding is put in evidence by the traces observable in the SEM picture of fig. 7. Figs. 8 and 9 show two turquoise/apatite blanks, polished or partially polished, split after as many defective bipolar drilling stages. In both cases the drilling canals are cylindrical and very regular; the drills might have had a flat extremity. These features contrast with the drilling canals of the single lapislazuli blank preserved in this assemblage, suggesting that different types of drills were used for the comparatively softer lapislazuli and for turquoise/apatite beads.

Disk beads were made by detaching from a core flat irregular flakes representing rough-outs. This operation might have been performed with direct percussion, but indirect percussion, given the small size of the pieces, is a likely alternative. Next, such flat, irregular flakes were ground on their main parallel planes (fig. 11), leaving their irregular edge unmodified. As a further step, such ground blanks were perforated. The SEM image of fig. 12 suggests that such perforation at least in this case, might have been monopolar, but drilling from the opposite face would have easily rectified the perforation canals. The SEM picture of fig. 13 shows an incompletely rounded turquoise/apatite bead. The easiest technique for rounding such blanks would have been to tie together onto a string a large number of them, and then to carefully grind them onto a flat abrasive surface, as described for Native American bead industries and for the talc disk beads from Mehrgarh (Foreman 1978; Vidale 1995).

6. Conclusions

The small dump of Takhirbai 1 reflects a small-scale production episode: comparatively luxury small beads were made out of lapislazuli and greenish-bluish stones. Turquoise and some minerals of the apatite group, visually rather similar, might have not been properly distinguished by the ancient jewellers. In spite of its very limited size, the collection from Takhirbai 1 documents the production of different types of beads, and possibly a variable range of techniques and tools.

References

Bulgarelli G.M. (1979) The Lithic Industry of Tepe Hissar at the Light of Recent Excavations. In M. Taddei (ed.), *South Asian Archaeology* 1977, pp. 39-54.

Bulgarelli G.M. (1981) Turquoise Working in the Helmand Civilization. Some Observations. In H. Härtel (ed.), *South Asian Archaeology* 1979, pp. 65-69.

Foreman R. (1978) Disk Beads: Production by Primitive Techniques. *The Bead Journal*, 3, 3/4, pp. 17-22.

Gwinnet A.J. and L. Gorelik (1978), Bead Making in Iran in the Early Bronze Age. *Expedition*, 24, 1, pp. 10-23.

Kenoyer M. and M. Vidale (1992) A New Look to the Stone Drills of the Indus Tradition. In P.B. Vandiver, J.R. Druzik, G.S. Wheeler and I.C. Freestone (eds.), Material Issues in *Art and Archaeology III, Material Research Society*, Pittsburgh, pp. 495-518.

Mackay E.J.H. (1937) Bead Making in Ancient Sind. *Journal of the American Oriental Society*, 47, pp. 1-15.

Piperno M. (1973) Micro-drilling at Shahr-i Sokhta: the Making and Use of theLithic Drill-heads. In N. Hammond (ed.), *South Asian Archaeology* 1971, pp. 119-129.

Piperno M. (1976) Grave 77 at Shahr-i Sokhta: Further Evidence of Technological Specialization in the Third Millenniuum BC. *East and West*, 26, pp. 9-12.

Piperno M. (1981) Bead-Making and Boring Techniques in the 3rd Millennium Indo-Iran. In M. Tosi (ed.), *Prehistoric Sistan 1*, pp. 319-325.

Salvatori S. and M. Vidale (1982) A Brief Surface Srvey of the Protohistoric Site of Shahdad (Kerman, Iran). Preliminary Report. *Rivista di Archeologia*, VI, pp. 5-10.

Tosi M. (1973) L'industria litica e la lavorazione degli elementi di collana a Shahr-i Sokhta, Iran. *Geo-archeologia*, 1, pp. 23-29.

Tosi M. (1974) The Problem of Turquoise in Protohistoric Trade on the Iranian Plateau. *Memorie dell'Istituto Italiano di Paleontologia Umana*, II, pp. 147-162.

Tosi M. and M. Piperno (1973) Lithic Technology behind the ancient Lapis Lazuli Trade. *Expedition*, 16, 1, pp. 15-23.

Tosi M. and M. Vidale (1990) 4th Millennium BC Lapis Lazuli Working at Mehrgarh, Pakistan. *Paléorient*, Vol. 16/2, 1990, pp. 89-99.

Vidale M. (1987), Some Aspects of Lapidary Craft at Moenjodaro in the Light of the Surface Record of Moneer South East area. In M. Jansen, G. Urban (eds.), *Interim Reports* Vol. 2, Aachen, 1987, pp. 113-150.

Vidale M. (1995) Early Beadmakers of the Indus Tradition: the Manufacturing Sequence of Talc Beads at Mehrgarh in the 5th Millennium BC. *East and West*, 45, 1-4, pp. 45-80.

Vidale M. and P. Bianchetti (1995) New Researches on the Steatite Beads of Pakistan, *Bead Study Trust Newsletter*, 1995, 5.

Vidale M. and P. Bianchetti (in press) Mineralogical Identification of Green Semiprecious Stones from Pakistan. *South Asian Archaeology* 1995, Cambridge.

Vinogradov A.V. (1972) Kyzilkumskiye yuveliry. *Uspekhi Sredneaziatskoi Arkheologii*, 2, pp. 43-45.

Vinogradov A.V. (1973) Pervobytnye yuveliry. *Nauka i Zhizn'*, 3, pp. 132-134.

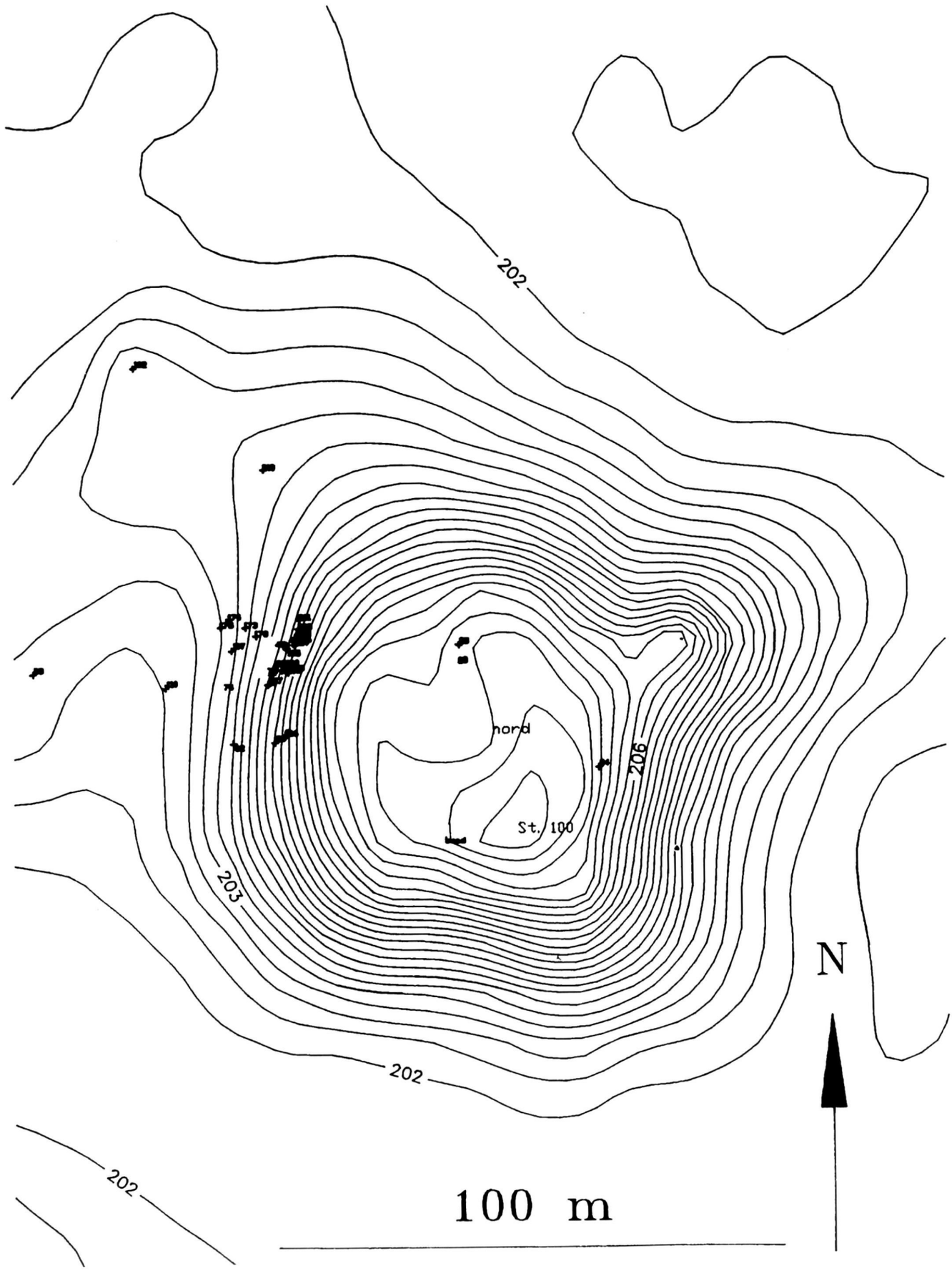


Fig. 1 - Takhirbai 1. Distribution of lapis lazuli flakes and unfinished beads, detecting major cluster on western edge of buried platform.

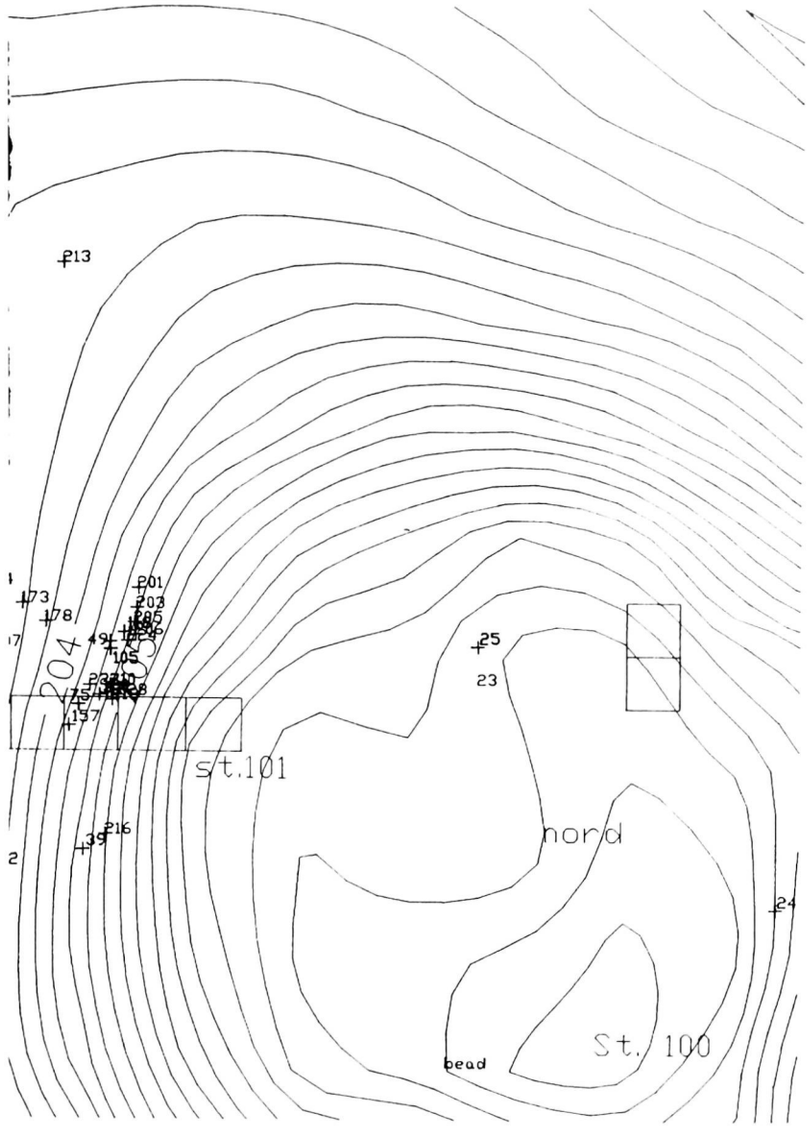


Fig. 2 - Takhirbai 1. Distribution of turquoise-apatite flakes and unfinished beads.

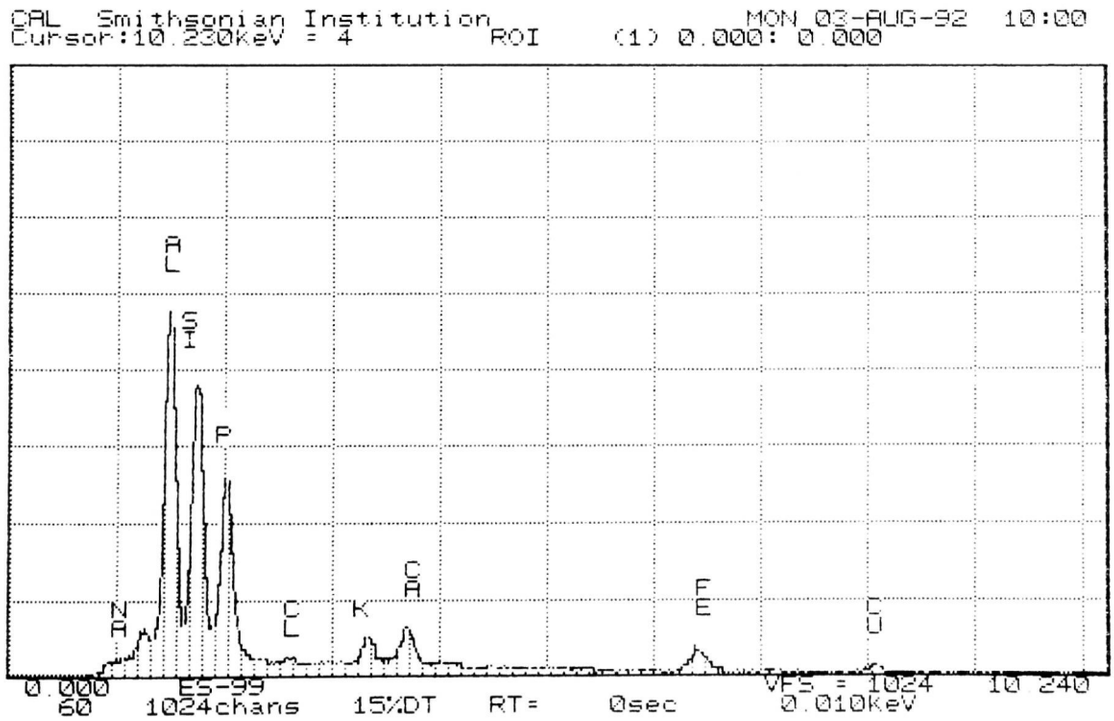
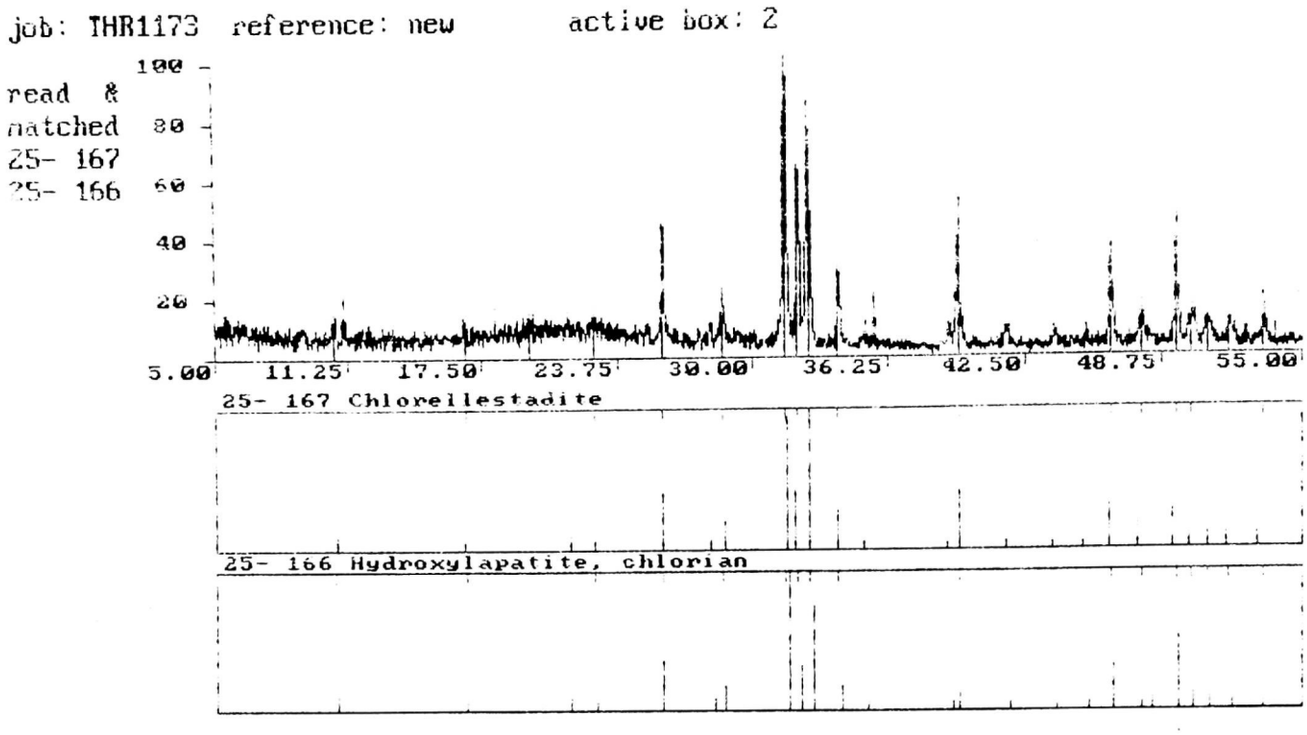


Fig. 3 - SEM-EDAX elemental pattern obtained for a bead blank, possibly in turquoise (courtesy of CAL, Smithsonian Institution).



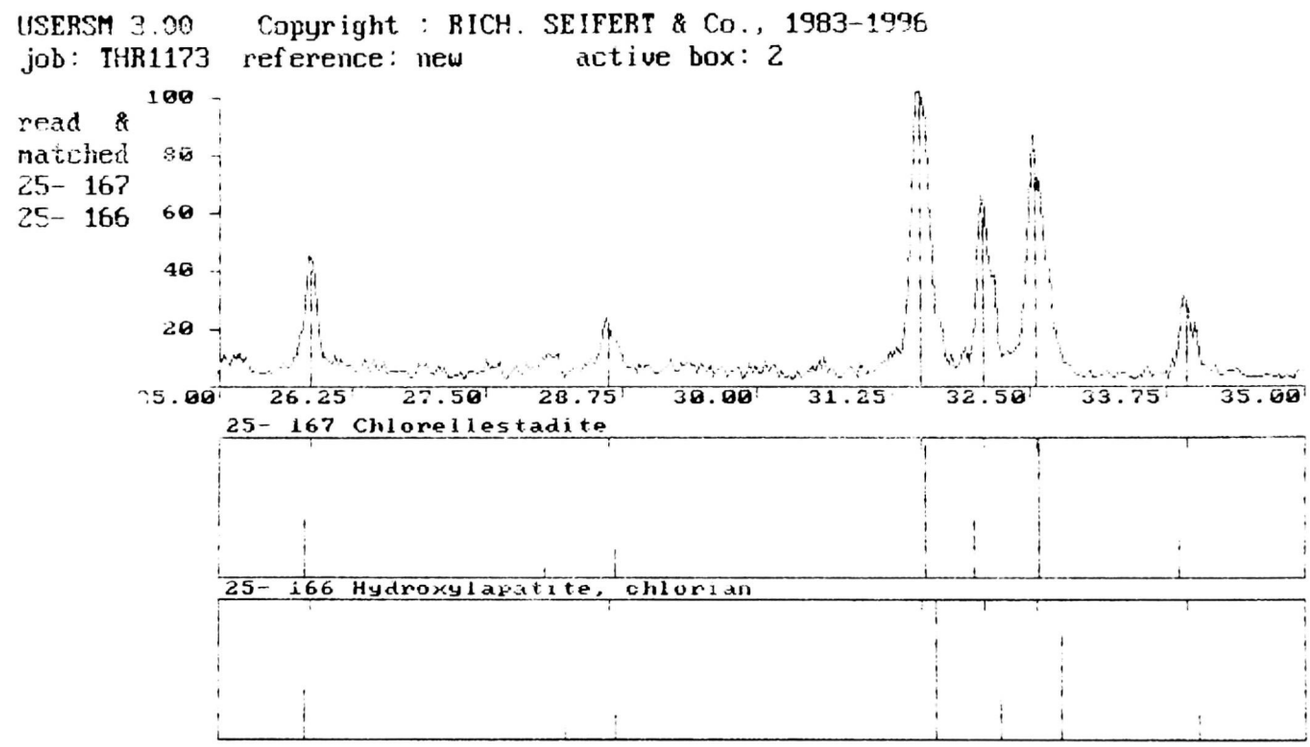


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Fig. 4 - XRD pattern of sample THR1-173 matching with PDF 25-167 and 25-166 (chlorellestadite or hydroxylapatite).

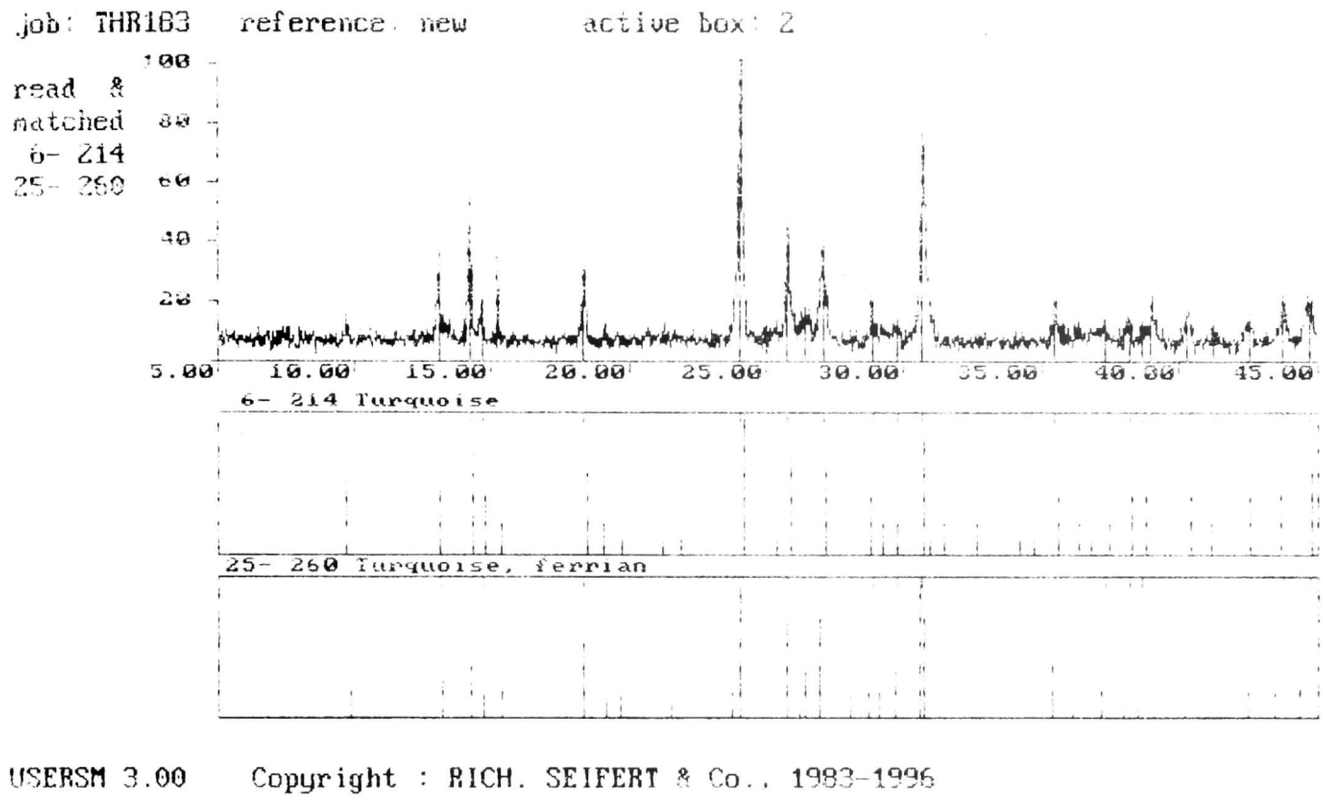


Fig. 5 - XRD pattern of sample THR1-183 matching with PDF 6-214 and 25-260 (turquoise and turquoise, ferrian).

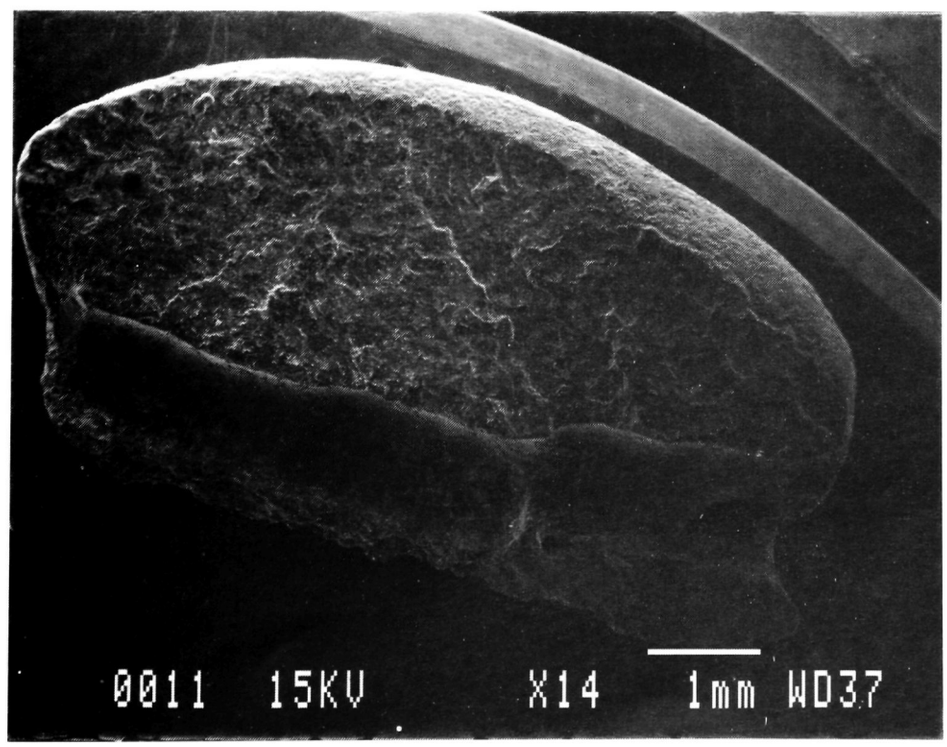
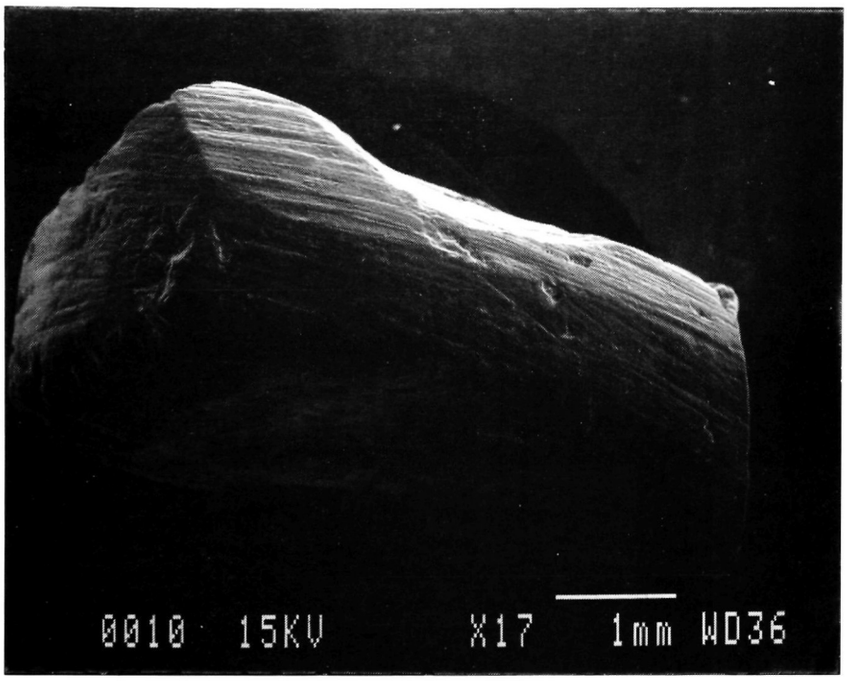


Fig. 6 - Takhirbai 1, SEM picture of a lapislazuli blank split in perforation, THR1 M-91).
Note the sinuous shape of the opposite drilling canals.



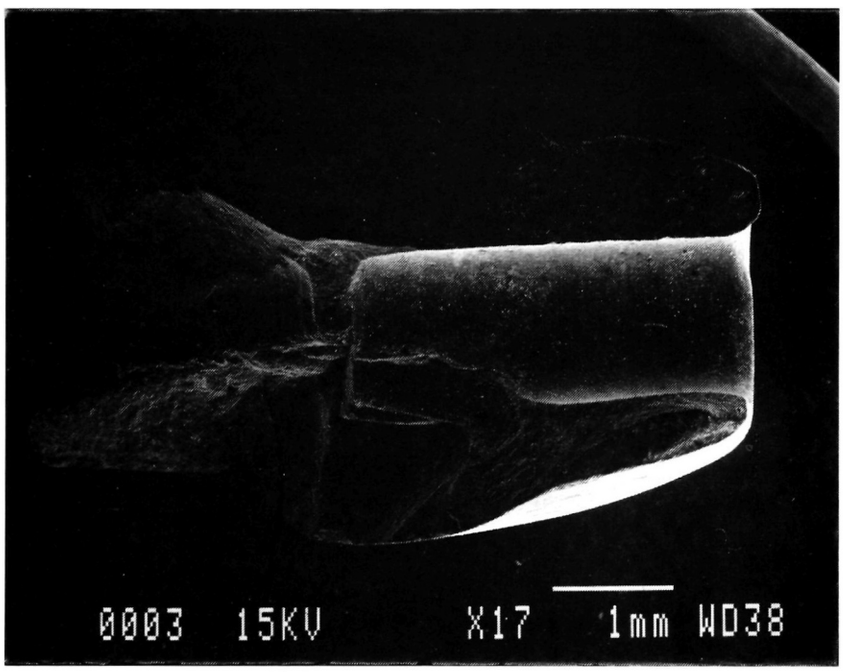




Fig. 7 - Takhirbai 1, SEM picture of a split, partially ground blank of turquoise/apatite (THR1-98), showing grinding striations.

Figs. 8 and 9 - Takhirbai 1, SEM pictures of two turquoise/apatite bead blanks split during perforation (THR1, sq. XVIII and THR1-143, sq. VIII). Compare the drilling canals of these two blanks with those in fig. 6.

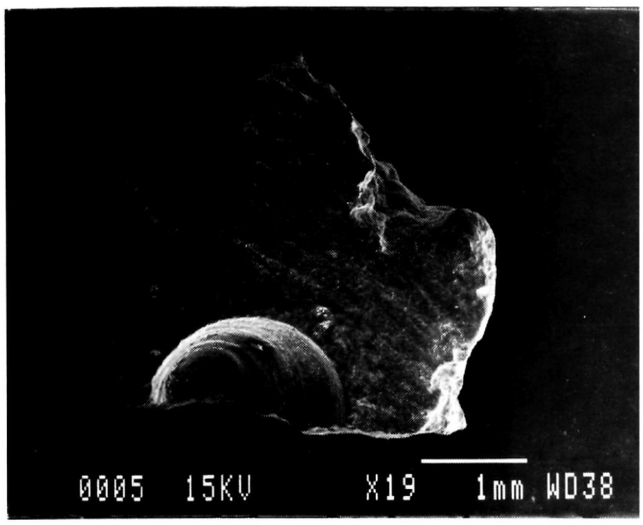


Fig. 10 - Takhirbai 1, SEM picture of a flat, partially ground blank for the manufacture of a disk bead in turquoise/apatite (THR1, sq. XVIII).

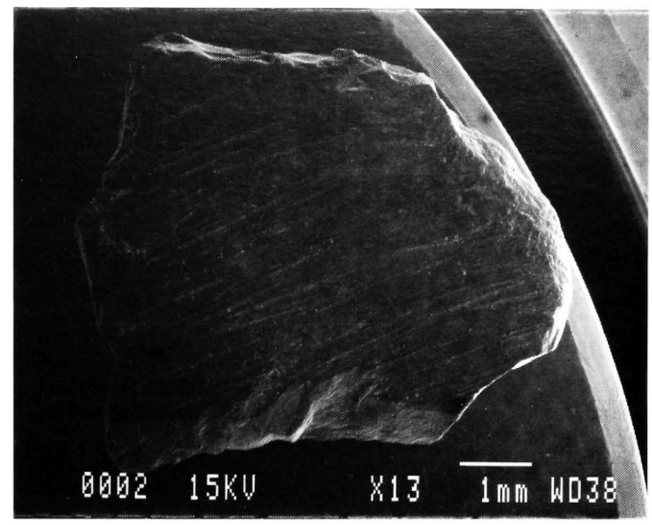


Fig. 11 - Takhirbai 1, SEM picture of partially ground blank for the manufacture of a turquoise/apatite disk bead split after monopolar drilling (THR1-MA 91, sq. XX).

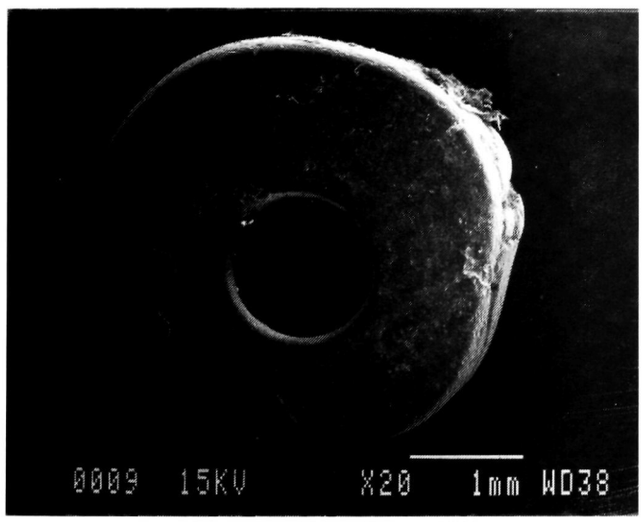


Fig. 12 - Takhirbai 1, SEM picture of an unfinished, only partially rounded disk bead in turquoise/apatite (THR1-135, sq. III). All SEM pictures by courtesy of CAL, Smithsonian Institution.

A PRELIMINARY REPORT ON THE FAUNAL REMAINS AT TAKHIRBAI 1, TURKMENISTAN

by P.P. JOGLEKAR

GENERAL COMMENTS

Preservation

The bones found at Takhirbai 1 indicate fairly good conditions for preservation. Except in one area of the site, the bones look remarkably fresh. Most of the bones do not exhibit marks of prolonged exposure. A small number of bovid teeth show post-depositional splitting due to weathering. Also in case of a majority of bone splinters, the edges are sharp and devoid of post-depositional rolling or a major displacement from their primary depositional context.

THE TRENCHES AND STRATIGRAPHIC SEQUENCE

Animal bones have been recovered from almost all trenches at Takhirbai 1. In only a few cases, such as layers 30-31 and 46-47, which mainly comprized of sand, were there hardly any animal bones or splinters.

Phase	Cultural Phase	Layers	Time Brackets*
I	Yaz III	1-20, 50-80, 89-91, 97-101, 110-112	6th-4th BC
II	Yaz II	21-47, 94-96, 102-109, 113-119, 130-137, 140-144	9th-6th BC
III	Yaz I	48-49, 81-88, 92-93, 120-129, 138-139	14th-10th BC

*Provisional according to the excavators

Table 1 - Stratigraphic correlations.

IDENTIFICATION OF BONES

A total of 3227 bones, unearthed during two field seasons at Takhirbai 1 in 1992 and 1993, were analysed. Out of this corpus, 20 fragments belonged to human skeletons and thus were excluded from analysis. Of the rest, numbering 3207 bones, 1888 (or 59.0%) were identifiable (Table 2). The number of bones and the degree of certainty of identification are both sufficiently high to warrant drawing conclusions. As for unidentified bones, they total 1319 fragments (Table 2). These unidentified fragments were classified into "large" (length $\geq$ 10 cm), "medium" (length 3-9 cm) and "small" (length $\leq$ 3 cm). This classification, although subjective, provides information about breakage patterns at an archaeological site. For instance, at Takhirbai 1 only 47% of the unidentified fragments (613/1319) were "small," which suggests that bones were not primarily used for making tools, as one would then expect a larger proportion of "small" splinters. It is not, therefore, surprizing that a majority of splinters also show no retouching. Thus at Takhirbai 1, a bone tool tradition does not seem to have existed. Conversely, a large proportion of long bones shows cut marks and also indicate marrow cooking activities.

THE SPECIES

The faunal remains at Takhirbai 1 belong to several mammalian species, fish, birds and reptiles (Table 3). A total of 18 mammalian species could be identified. However, the mammalian remains contain rodent bones as well bones that cannot be ascribed to any definite taxonomic unit. Consequently, they were excluded from percentage analysis of the number of identified specimens (NISP).

All cultural phases pulled together indicate that the share of wild animals was as low as about 10% (Table 3). Also, the share of wild animals progressively diminished from 13% to 7% (Table 3), although in the Yaz I phase a large number of snake bones were found, and thus the reduction may not be considered a significant aspect.

Taking the three cultural phases together, 8 domestic mammals were found, to wit, cattle, sheep, goat, ass, dog, horse, camel and pig. In all the three cultural phases, sheep and goat were the predominant animals (Table 4), making up 52% of the total mammalian remains in the three phases (935/1792 NISP). If one looks at the relative proportions of various domestic mammals, the pattern of predominance remains more or less same in the cultural phases (Fig. 1-3). Sheep and goat contributed 58, 62 and 59% in Yaz I,II and III respectively. The second most important domestic mammal was cattle which contributed 19-22%.

Cultural Phase	NISP		Unidentified (UF)			Total UF	Total Fragments
	No.	*%*	*Small*	*Medium*	*Large*		
Yaz I	393	62.0	82	129	27	238	631
Yaz II	688	58.0	242	232	28	502	1190
Yaz III	807	58.0	289	243	47	579	1386
Total	1888	59.0	613	604	102	1319	3207

Table 2 - Summary of faunal remains at Takhirbai 1.

Culture Phase	Yaz I	Yaz II	Yaz III	Total
NISP (Wild)	51	58	55	164
% NISP (Wild)	13.28	9.46	6.92	9.15
Total	384	613	795	1792

Table 3 - Relative Proportion of Wild Animals at Takhirbai 1.

Domestic pigs also had a sizeable share, i.e. 9-11% in various cultural phases.

It cannot be determined at present whether the cattle found at Takhirbai 1 was of the humped or humpless variety. No bifid spines of the thoracic vertebra were found, although such negative evidence cannot be considered conclusive. The morphological features of the cattle bones were similar to the "taurus"

Species	Yaz I		Yaz II		Yaz III		Total	
	NISP	*%*	*NISP*	*%*	*NISP*	*%*	*NISP*	*%*
Domestic Mammals								
Cattle	81	21.10	101	10.98	157	19.75	339	18.92
Goat	32	8.34	39	6.36	47	5.51	118	6.58
Sheep/Goat	136	35.43	259	42.25	326	41.01	721	40.24
Sheep	19	4.95	34	5.55	43	5.41	96	5.36
Pig	29	7.55	57	9.30	61	7.67	147	8.20
Dog	7	1.82	11	1.79	25	3.14	43	2.40
Camel	4	4.01	10	1.63	5	0.63	19	1.06
Equidae	4	1.04	4	0.65	9	1.13	17	0.95
Horse	10	2.60	12	1.96	21	2.64	43	2.40
Ass	3	0.78	6	0.98	15	1.89	24	1.34
Wild Mammals								
Wild Cattle	6	1.56	14	2.28	2	0.25	22	1.23
Wild Goat	1	0.26	1	0.16	2	0.25	4	0.22
Wild Sheep	0	0	0	0	2	0.25	2	0.11
Spotted Deer	4	1.04	6	0.98	5	0.63	15	0.84
Gazelle	3	6.78	15	2.45	30	3.77	48	2.68
Wild Pig	4	1.04	14	2.28	10	1.26	28	1.56
Wild Cat	1	0.26	1	0.16	0	0	2	0.11
LargeWild Cat	1	0.26	0	0	0	0	1	0.06
Wolf	2	0.52	2	0.33	2	0.25	6	0.33
Fox	1	0.26	1	0.16	1	0.13	3	0.17
Species Not Determinable								
Rodentia[1]	6	-	65	-	10	-	81	-
Very Small Animal[2]	4	1.04	9	1.47	8	1.01	21	1.17
Small Animal[3]	3	0.78	7	1.14	9	1.13	19	1.06
Mediun Animal[4]	1	0.26	2	0.33	0	0	3	0.17
Large Animal[5]	0	0	4	0.65	14	1.76	18	1.00
Mammalian Bone[1]	3	-	10	-	2	-	15	-
Non-mammalian								
Fish	2	0.52	1	0.16	1	0.13	4	0.22
Snake	26	6.77	0	0	0	0	26	1.45
Bird	0	0	3	0.49	0	0	3	0.17
Total	393	-	688	-	807	-	1888	-

[1]Excluded from percentage analysis; [2]Very small mammal of hare size; [3]Small mammal of goat size; [4]Medium mammal of cattle size; [5]Large mammal larger than of cattle size.

Table 4 - Summary of Identified Specimens at Takhirbai 1.

type and, thus, could have been of the humpless variety. More data on bull figurines and on pictorial depictions is necessary in this regard.

Both sheep and goat were present at Takhirbai 1, in roughly equal numbers; the ratio of sheep to goat is 1.24:1 (pooled for all three phases). As usual, the two species being osteologically highly similar, a large number of caprovine bones were difficult to separate and were lumped in a single sheep/goat category (Table 3). A preliminary analysis of the age groups based on mandibular wear pattern indicates that all animals of all age groups could be noticed (Table 5), an age profile which is suggestive of a mixed mode of economy at Takhirbai 1 (Table 5 and Fig. 4). If sheep and goat are valued primarily for meat, one would expect a much larger proportion of young animals between 1-2 years (since meat losses its tenderness afterwards). On the other hand, the large number of adults perhaps indicates that sheep and goat were also valued for hide and milk.

The presence of domestic pig, making up 10% of NISP, suggests a moist climate near Takhirbai 1 noteworthy in this connection, since pigs cannot survive in arid conditions.

Concerning individual species, the deer could not be identified to specific level for want of comparative skeletons of similar species, but perhaps it was *Cervus maral*. This deer perhaps existed along the Murghab (Heptner *et al.* 1961) in pockets of thickets and in the slopes of the Kopet-Dagh mountains. A few elements recovered at Takhirbai 1 could have been remains of an occasional hunt or could have been obtained from distant hunting campaigns. Sarianidi (1992) has suggested that people of ancient Margush might have led long expeditions in Kopet-Dagh to obtain stone material. In the same fashion, they might have hunted the animals on the way and thus the presence of the bones of a few such mountain varieties could be explained.

The species of gazelle, unlike deer, could be identified as *Gazella subgutturosa*, Gueldenstaedt 1780. This species – Goitered Gazelle – was commonly found in all of Turkmenistan as late as 1950 (Heptner *et al.* 1961) and thus its presence at Takhirbai 1 during the

Culture	**Yaz I**		**Yaz II**		**Yaz III**		**Total**	
	No.	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*
Very old (>6-8Y)	-	-	3	10.0	-	-	3	6.00
Adult (2-5Y)	4	40.0	14	46.5	6	60.0	24	48.00
Young (1-2Y)	4	40.0	7	23.5	2	20.0	13	26.00
Juvenile (<1Y)	2	20.0	6	20.0	2	20.0	10	20.00
Total	10	-	30	-	10	-	50	-

Table 5 - Age groups of sheep/goat based on mandibles at Takhirbai 1.

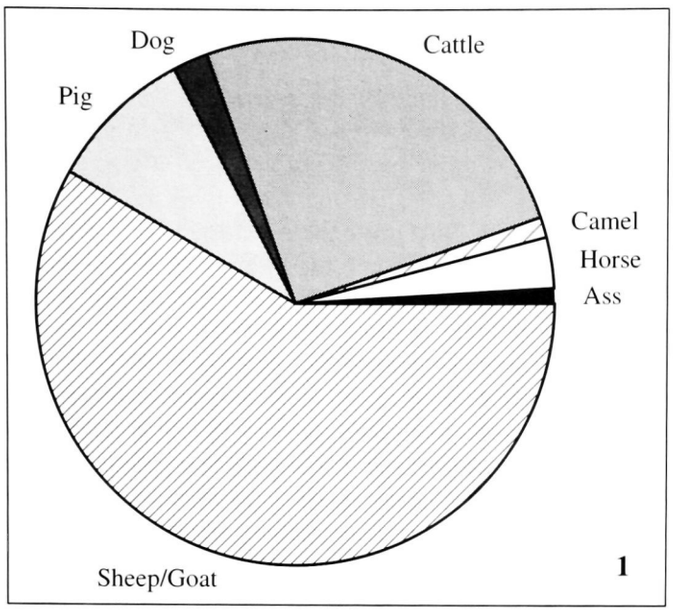
considering the fact that several juvenile and young adult bones were found. This indicates that pigs were bred at the site since it clearly eliminates the possibility of pigs obtained in trade exchange.

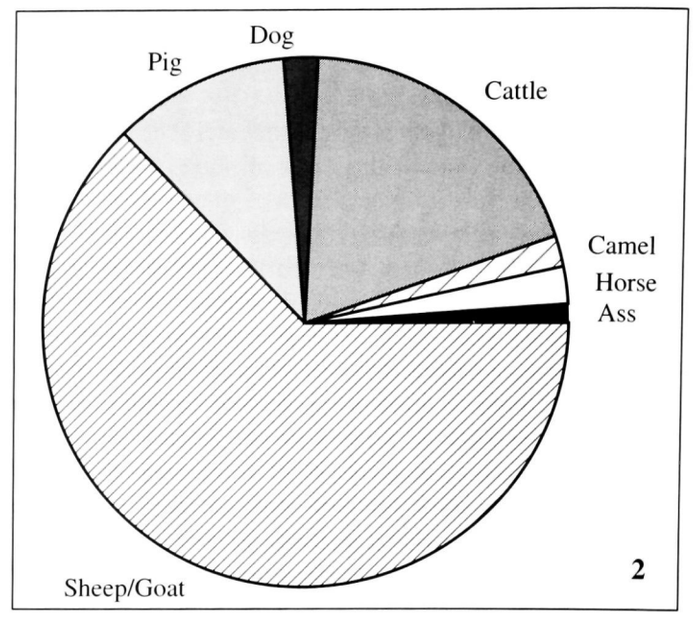
Among other domestic species, horse, dog and ass perhaps represent species not contributing to the food economy for obvious reasons. Likewise, camel bones, by and large, do not show evidence of cutting and charring.

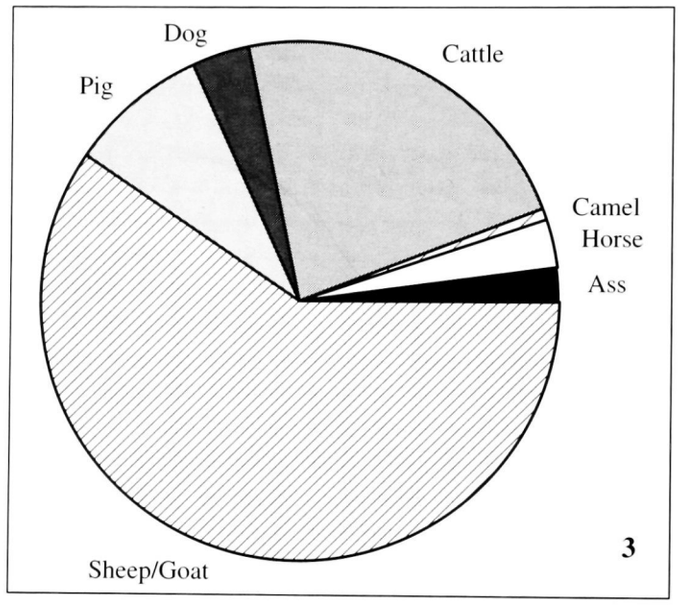
The Wild Animals

The wild fauna at Takhirbai 1 is extremely diverse, although taken together it had a minor role in the subsistence economy. The faunal types indicate a different environmental picture, although at present the site is situated in the Kara-Kum desert. The presence of wild cattle, deer and wild pig indicates that there must have been enough pockets of vegetation to support such animals. In particular, the presence of wild pigs is Iron Age is not surprizing. As for wild goat species, they are difficult to segregate from the post-cranial bones. However, the horn cores found indicate presence of both Bezoar Goats (*Capra aegagrus* Erxleben 1777) and Siberian Ibex (*Capra siberica* Pallas 1776). The Turkmen variety of this species (*C. a. turcmenica*) was found to be distributed in southern Turkmenistan near Ashkhabad until 1950 (Heptner *et al.* 1961).

Finally, it is interesting to note the presence of wild cattle – perhaps aurochs (*Bos primigenius* Bojanus 1827) – at Takhirbai 1. The aurochs were widely dispersed in the Old World, including Turkmenistan (Heptner *et al.* 1961), because they were capable of living in extremely diverse natural conditions. At Takhirbai 1, the wild cattle bones are very few (only 22), but are indicative that wild cattle might have survived during the Iron Age and was either hunted or had its bones collected (because of their sturdy character).







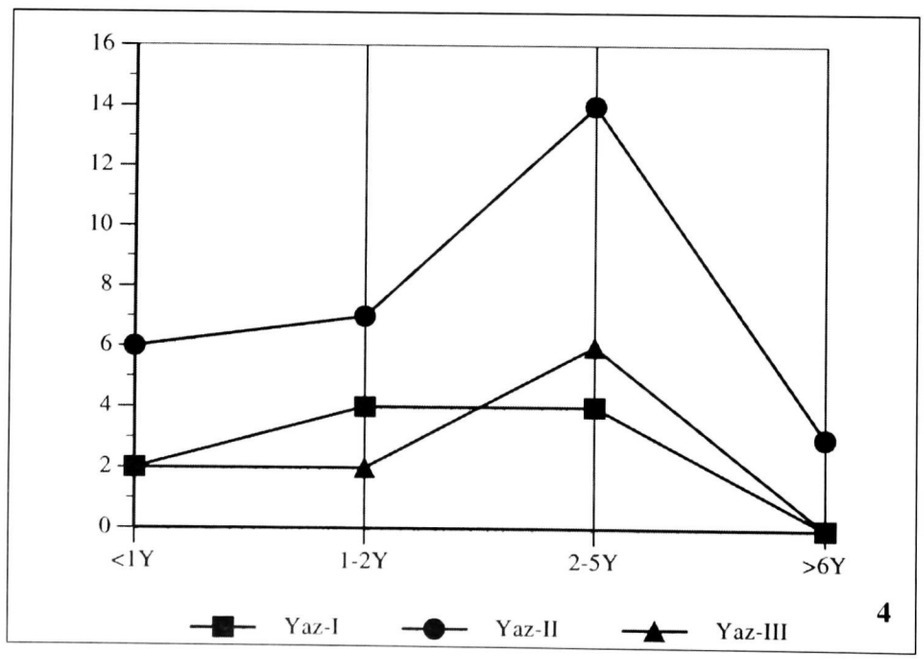


Fig. 1 - Domestic Mammals at Takhirbai 1 (Yaz I).
Fig. 2 - Domestic Mammals at Takhirbai 1 (Yaz II).
Fig. 3 - Domestic Mammals at Takhirbai 1 (Yaz III).
Fig. 4 - Age profiles of Sheep/Goat at Takhirbai 1.

COPPER ARROWHEADS TYPOLOGY AND CHRONOLOGY

by S. CLEUZIOU

A total of 31 copper arrowheads were found from various surface locations during the survey operations. With only one exception they belong to various types of socketed arrowheads, a kind of object widely found all over Middle and Central Asia but also the Near and Middle East, southern Russia, Ukraine and the Balkans. In western archaeological literature, these are usually known as "scythian arrowheads", an obviously misleading denomination. They have been the subject of many studies concerning chronological evolution and possible attribution to various kind of people. In what follows, I have used an analytical typology designed for an earlier work mainly concerning the distribution and chronology of these objects in the Near and Middle East (Cleuziou 1974, 1976), in comparison with the material of southern Russia and Middle Asia. The type numbers attributed to the objects in table 1 refer to this classification, and are compared with the typology recently proposed for the same kind of objects by Yusupov (1987) working on material from north-western Turkmenistan.

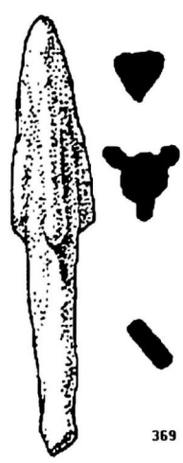


Fig. 1 - Three flanged arrowhead with long flat tang (n° 369).

1. THREE FLANGED ARROWHEAD WITH FLAT TANG

The only non-socketed arrowhead is number 369, found on site 50. It is a three winged object with a triangular solid tip, and the tang is flat. This type classified as G3 is rare and was found only east of Turkmenistan, from the lower Syr Daria in Taguisken (Tolstov and Itina 1966: fig. 9) to Kazakhstan and western Siberia (Akishev and Kushaiev 1963: 117). The dates proposed range from the 9th to the 6th century BC and these objects are apparently older than three-winged socketed arrowheads.

2. TWO WINGED SOCKETED ARROWHEADS

Two winged socketed arrowheads are present as type E1, E8 and E 16, all having a wide distribution in and outside Middle Asia. In the Near and Middle East.

Type E1 is defined by wings that are almost as long as the object itself and a central part of round or slightly flattened section. In the Near and Middle East, this type is mainly found in Achemenian related levels noticeably at Susa (de Morgan 1900 fig. 264, 267), Persepolis (Schmidt 1957 pl. 79 n° 19, 20), or Byblos (Dunand 1958 fig 1176). One was found at Tureng Tepe (TTB 247, unpublished) also in "achaemenid" context. In Turkmenistan they are related to an earlier context at Iaz Depe II (Masson 1959: pl. XXXIV n° 2-4).

Type E8 is defined by a protruding socket and a maximum width towards the middle of the wings. It appears as soon as the VIIth century in Anatolia for instance at Bogaz Köy (Boehmer 1972: pl. XXX) or Didyma (Tuchelt 1970 pl. 2 n° 258-259) and is commonly linked with the Cimmerians. At Karmir Blur in Armenia, it is associated to the destruction of the site in 625 (Piotrovski 1950: fig. 55). The same date is proposed for the objects found from Ukraine to western Kazakhstan steppes (Melyukova 1964: type I.2.1). In Turkmenistan these objects were found in late archaic Dehistan context at Isat Kuli (Kuz'mina 1966: pl. VI n° 2), in period II at Iaz Depe (Masson 1959 pl. XXXII n°5,10, fig. 32 and 34) and in the lowest layers at Erk-Kala (Usmanova 1963 pl. 33a).

Types E 16 is similar to E8 with its maximum width towards the 2/3rds of the length of the wings. It follows the same geographical and chronological distribution as E 16. The oldest occurrences may even date back to the 8th or 9th century, being present as soon as Iaz Depe I (Masson 1959 pl. XXXIII n° 9 and pl. XXXIV n° 3,

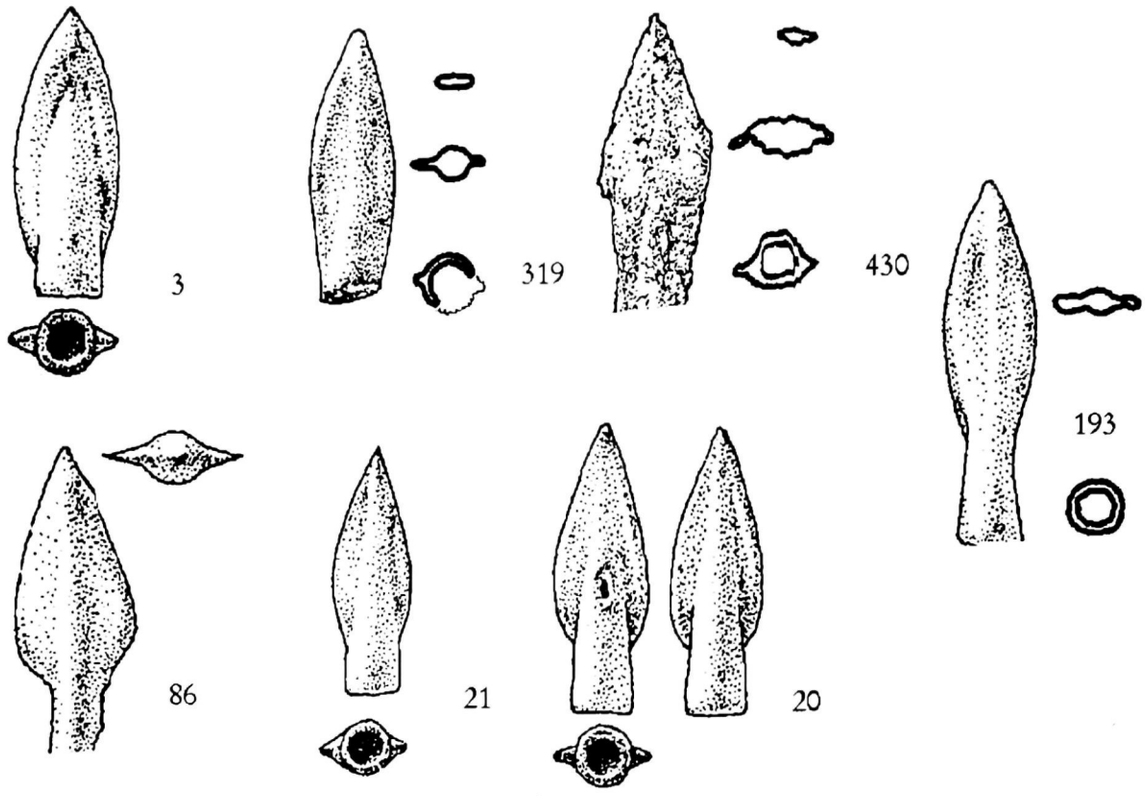


Fig. 2 - Two wings socketed arrowheads of type E1 (n° 3, 319, 430), E8 (n° 193) and E16 (n° 20, 21, 86).



Fig. 3 - Three flanged socketed arrowheads of type F1.

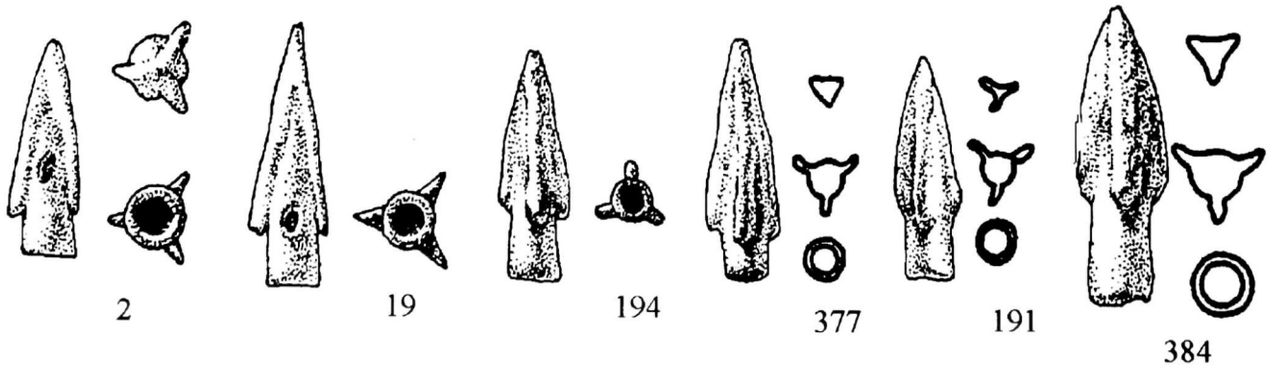


Fig. 4 - Three flanged socketed arrowheads of type F7.

Kuzmina 1966 pl. VI n° 22, 23). It is to be noted that moulds allowing the cast of E 16 type arrowheads have been found at Isat Kuli in Archaic Dehistan context (Kuzmina 1966: fig. 3 and 4).

The fact that these objects are rare in the Near and Middle East clearly suggests that they originate from Middle or Central Asia, where the earliest occurrences are found. All are grouped by Yusupov in his type II, for which he accepts the same chronological distribution, that is certainly 7th and 6th century, possibly starting in the 8th century (although this can safely be excluded outside Middle Asia) and continuing into the 5th century. We should therefore safely conclude that sites 46, 47, 55, 64 and Takhirbai 1 were occupied during this period, a conclusion matched by other types of evidence.

3. Three Flanged Socketed Arrowheads

As far as we can judge from their state of preservation, three objects (n° 358 from site 151, n° 376 from site 41, and n° 383 from site 206 belong to our type F1, characterized by long thick barbs. The distribution of this type seems rather limited to Middle Asia. It is not mentioned by Melyukova for southern Russia, although one occurrence is quoted by Rau (1929: pl. XV) for the Lower Volga. Three occurrences were found at the Treasury of Persepolis (Schmidt 1957: pl. 79 n° 11) among 3862 arrowheads and are considered as belonging to Middle Asian mercenaries enrolled in the Achaemenid army (Schmidt 1957: 99). At Yaz Depe (Masson 1959, fig. XXXIV n° 11) they belong to period III and those of Erk-Kala (Usmanova 1963: pl. 33a) belong to the same period. They correspond to Jusupov's type VIII dated by him from the 4th and 3rd centuries BC, a date with which we agree, although the late 5th century should possibly be added.

Type F7 is characterized by wings of thick section, usually ending in small barbs, with a protruding socket. Its distribution compares with that of the previous type and it is mainly a middle Asian type where is it is widely found, noticeably in Yaz III levels at Erk-Kala (Usmanova 1963, pl. 33a). Its distribution outside this area is scarce, but significant, as five were discovered in the treasury at Persepolis (Schmidt 1957: pl. 79 n° 10) and one is present in a collection of arrowheads said to come from the battlefield at Marathon, now in the Karlsruhe Museum in Germany (Erdmann 1973, fig. 2). We know from Herodote (VI.113) that Saka archers were present at the center of the Achemenian troops during the battle. One object belongs to type F6, a variant with flat section wings and clearly marked barbs that is mainly present in southern Russia and western Kazakhstan but absent in the Near and Middle East. These types correspond to Jusupov's type VI dated by him in north-western Turkmenistan from the 4th to 2nd centuries, although on Near Eastern evidence we would suggest to add the 5th century as well.

Types F15 is represented by one object (n° 428 from site 222). This class has a wide geographical and chronological distribution (between the 7th and the 4th century) and cannot be used at a finer level. Masson (1959: fig. 12) would consider them as 5-4th century BC in Middle Asia. It is to be noticed that objects of this types were found in Afghanistan at Nad-i Ali in a 6-5th century context (Ghirshman 1939 pl. m n° 25,41,42) and, unstratified, at Mundigak (Casal 1961 fig. 140 n° 28).

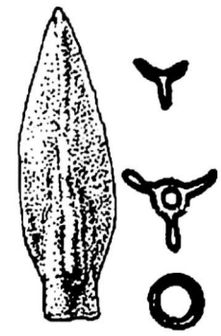


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Fig. 5 - Three flanged socketed arrowhead of type F15.

One object (21 from site 47) can be attributed to type F 17 and another (85 from site 66) to a less frequent variant of this type, F 18, to which badly worn n° 429 from site 38 can be related as well. Type F 17 is characterized by more or less developed wings of flat section with maximum width towards the 2/3rd of their length and a protruding conical socket that usually ends half way or less from the point. It is extremely interesting as associated to type F3 (1), it represents 3780 out of 3862 arrowheads found on the treasury at Persepolis, leading Schmidt (1957: 99) to consider them as the standard model in use in the Achemenid army. Apart from Persepolis, these objects are found in almost all Achemenid levels in the Near and Middle East, on the battlefields of Marathon (Erdmann 1973: fig. 1) and Thermopyles (Walter 1940: fig. 47) and in Egypt (see Cleuziou 1976: 195-196) (2). In Turkmenistan they exist in the corresponding levels at Erk-Kala (Usmanova 1963 pl. 33a, 2nd row, 10th and 11th from left). These objects can safely be dated between the 6th and 4th centuries, with a possible extension in the 3rd.

Five objects belong to type F2, characterized by a general conical shape, with usually rather thick section wings until the end of the socket, sometimes slightly protruding after it. This type is not found in the Near and Middle East, having its main distribution in Ukraine,

(1) Type F3 is not represented among the objects found in the prospection. It is similar to type F17, but without protruding socket.

(2) These objects even found its way to ... western France, as two of them are reported from a burial near Nantes in Britanny, associated to classical Greek arrowheads (Kleeman 1954: pl. I d,e). Middle Asian people were not the only mercenaries involved in the battlefields of the Near East.

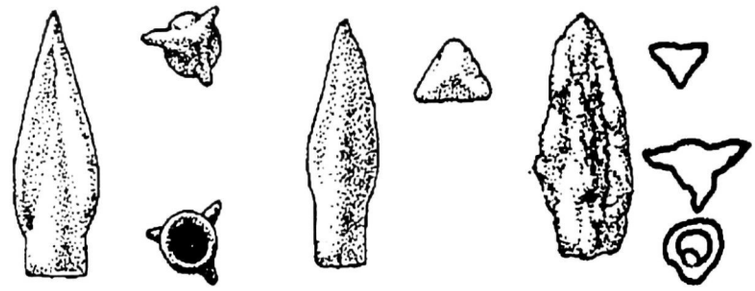


Fig. 6 - Three flanged socketed arrowheads of types F17 (n° 21) and F18 (n° 85, 38).

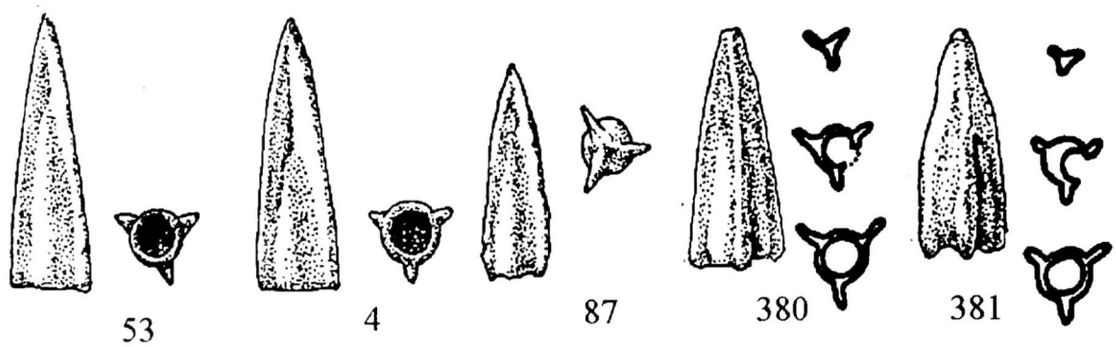


Fig. 7 - Three flanged socketed arrowheads of type F2.

southern Russia, Eastern Kazakhstan and, according to Yusupov, North-western Turkmenistan, where they form his type IX (and possibly VII), for which he proposes a date in the 3rd and 2nd centuries BC. In our own study we proposed to place the beginning of this group at an earlier date, possibly due to the fact that our definition of type F2 is too wide. We therefore will follow Yusupov's dating and consider these objects among the latest ones in our collection.

4. Four Winged Socketed Arrowhead

Object n° 356 from site 151 is unique and was never found in our studies mainly aimed at the Near and Middle East. Its general type is close to type F7, and it may be considered as a Middle Asian group, although even there it is rare and absent from publications.

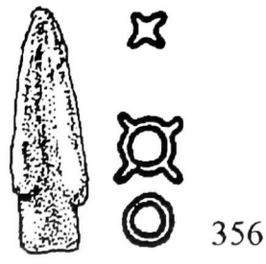


Fig. 8 - Four flanged socketed arrowhead.

5. Rhomboidal Points

Three objects are rhomboidal in section, with round or oval section socket, the edges of the only completely preserved one ending in small barbs. In our typology, such an object will fall in type H20. A similar object was found in the treasury at Persepolis (Schmidt 1957: pl. 76 n° 17) and they also exist East of the Aral Sea (Akishev and Kushaiev 1963: 117, Tolstov and Itina 1966: fig. 9, for instance). We proposed in our study a rather late date (4th-3rd centuries BC), although earlier occurrence cannot be excluded.



Fig. 9 -Rhomboidal points.

6. Conclusions

If we take the risk to schematize these chronological attributions, our material will fall into three groups.

To the earlier group will belong types G3, the only three-winged object with a stem, and all two winged socketed objects of types E1, E8 and E16. This group

was found on sites 46, 47, 50, 55 and at Takhirbai 1 and can mainly be dated from the 7th and 6th centuries BC.

The middle group would include types F6, F7, F14 and F17. It was found on sites 38, 47, 49, 86, 206 and 222, and can be dated from late 6th to 4th century BC.

The later group would include types F1, F2, and possibly H20. It was found on sites 37, 38, 39, 41, 47, 63, 64, 151 and 206, and can be dated between the 4th and 2nd centuries BC (Table 1).

All the sites of table 1 have been dated from periods Yaz II-III according to the pottery found, sites 50, 55 and Takhirbai 1 from our earlier group also including Yaz I material. At such a level of precision, a complete agreement between arrowheads and pottery chronology is not surprizing.

Bibliography

Akishev, K.A., Kushayev, G.A. (1963) *Drevnyaya kul'tura Sakov i usunei doliny reki Ili*. Alma Ata.

Boehmer, R.M. (1972) *Bogaz Köy, die Kleinfunde aus dem Grabungskampagnen 1931-39 und 1952-59*. Bogaz Köy-Hattusa VII, W.V.D.O.G. 87, Berlin.

Casal, J.-M. (1961) *Fouilles de Mundigak*, Memoires de la D.A.F.A. XVII, Klinksieck, Paris.

Cleuziou, S. (1974) *Les pointes de flèche en métal au Proche et Moyen-Orient, des origines à la période achéménide, étude typologique*, Thèse de III° cycle, Université de Paris I, Paris: 2 vol., VII, 423 pp., 97 pl., 26 tab., 6 cartes, 7 fig. in texte.

Cleuziou, S. (1976) A propos des pointes de flèches 'scythiques' au Proche et Moyen-Orient, in J. Deshayes (ed.), *Le plateau iranien et l'Asie centrale des origines à la conquête islamique*, CNRS, Paris: 187-99.

Dunand, M. (1958) *Fouilles de Byblos II*, 2eme partie, Maisonneuve, Paris.

Erdmann, E. (1973) Die sogenamte Marathonpfeilspitzen in Karlsruhe, *Archäologische Anzeiger*, 88/1, pp. 30-58.

Ghirshman, R. (1939) Fouilles de Nad-i Ali dans le Seistan afghan, rapport préliminaire, *Revue des arts asiatiques* XIII, pp. 10-27.

Kleeman, O. (1954) *Die Dreiflügeligen Pfeilspitzen in Frankreich, Studien zur Verbratung und historischen Aussage der Bronzenen Pfeilspitzen, Akademie der Wiseenschaften und der Literatur, Abhandlungen der Geistes und Sozial Wissenschaftliche Klasse fur Jahre* 1954 n° 4, Wiesbaden.

Kuz'mina, E.E. (1966) *Metallicheskiye izdeliya eneolita i bronzovogu veka v srednei Azii*, SVOD B 4 n° 9, Ak. Nauk SSSR, Moskva.

Masson, V.M. (1959) *Drevnezemledel'cheskaya kul'tura Margiany*, M.I.A. 73, Moskva.

Melyukova, A.I. (1964) *Vooruzheniye Skifov*, SVOD D 1-4, Ak. Nauk SSSR, Moskva.

Morgan, J. de (1900) *Mémoires de la Délégation en Perse I, fouilles à Suse en 1897-98 et 1898-99*, E. Leroux, Paris.

Piotrovski, B.B. (1950) *Karmir Blur I*, Erevan.

Rau, P. (1929) *Die Gräber der Frühen Eisenzeit im Unteren Wolgagebeit: Studien zur Chronologie der Skytischen Pfeilspitze, Mitteilungen der Zentralsmuseum der Aut. Sozial. Räte-Republik der Wolgadeutschen* vol. 4 n° 1, Pokrovsk.

Schmidt, E.F. (1957) *Persepolis II, Contents of the Treasury and other Discoveries* (OIP LXIX), Chicago.

Tolstov, S.P. and Itina, M.A. (1966) Saki nizov'yev Syr-daryi, *Sovetskaya Arkheologiya* 2, pp. 151-75.

Tuchelt, K. (1970) Didyma, Bericht über die Arbeiten 1969/70, *Istanbuler Mitteilungen* 21, pp. 45-108.

Usmanova, Z.I. (1963) Erk-Kala, *Trudy YuTAKE XII*, Ashkhabad, pp. 7-94.

Walter, O. (1940) Archäologische Funde in Griechenland von Frühjahr 1939 bis Frühjahr 1940, *Archäologische Anzeiger*: pp. 122-307.

Yusupov, Kh. (1987) Bronzoviye nakonechniki strel kochevnikov severo-zapadnogo Turkmenistana, *Izvestiya Ak Nauk Turkmenskoi* SSR 4, pp. 24-30.

	46	50	55	TH R-1	47	49	86	222	206	38	37	39	41	63	64	151
Early	X	X	X	X	X											
Middle					X	X	X	X	X	X						
Late					X				X	X	X	X	X	X	X	X

Table 1 - Table of occurrence.

		OBJECT		SIZE		TYPE	
n°	**Year**	**Site**	**Finding spot**	**Length**	**max Width***	**Cleuziou 1976**	**Jusupov 1987**
1	1990	37		4	1.7	F 6	VI
2	1990	47		2.9	1.5	F 7	VI
3	1990	46		3	1.1	E 16	II
4	1990	64	spot 108	3.3	1.2	F 2	IX
19	1990	47		3.6	1.7	F 7	VI
20	1990	47		3.5	1.3	E 16	II
21	1990	47		3.2	1.3	F 17	III
40	1990	47 West	spot 30	2.5	1.1	H 20	non ref
41	1990		spot 32	3.5	1.4	E 1	II
53	1990	63	spot 1	3.3	1.3	F 2	IX
85	1991	66	spot 8	2.9	1.2	F 18	III
86	1991	64	spot 138	4.1	1.6	E 16	II
87	1990	64	spot 108	2.6	1.2	F 2	IX
89	1991	64	spot 124	(1.7)	(1.1)	H 20	non ref
90	1991	64	spot 180	(1.7)	1.1	H 20	non ref
191	1992	86		3	1.2	F 7	III
193	1990		spot 133	4.4	1.1	E 8	II
194	1992		spot 119	3.1	1.1	F 7	VI
319	1993	55	surface	(3.3)	1.2	E 1	II
356	1993	151	surface	2.9	1.1	non ref	non ref
358	1993	151		2.8	1.1	F 1	VIII
369	1993	50	spot 1	5.5	1.1	G 3	non ref
376	1993	41	surface	2.9	1.5	F 1	VIII
377	1993	49	spot 32	3.3	1	F 7	VI
380	1993	39	spot 1	2.9	1.3	F 1	IX
381	1993	39	spot 16	2.7	1.2	F 2	IX
383	1993	206	spot 12	(2.8)	1	F 1	VIII
384	1993	206	spot 54	4	1.5	F 7	III
428	1993	222	surface	3.8	1.3	F 15	III
429	1993	38		(2.8)	1.3	F 18 (?)	III (?)
430	1993	THR-1	surface	3.6	1.5	E 1 (?)	II (?)

* - In the case of three winged objects, the maximum width is replaced by the diameter of the circle determined by the three wings at their maximum length.

Table 2 - List of the material matched with the typologies of Cleuziou (1976) and Yusupov (1987).

TRIAL-TRENCH AT SITE NO. 215

by B. Genito
with an appendix by R. Castelli, P. Mozzi

Introduction

A preliminary regional survey carried out within the "Archaeological Map of the Merv Oasis project" has shown how important detailed topographic information can be. An area of c. 20,000 km, containing nearly 800 reconnoitred sites, now provides us with an almost complete regional record. As a result, the development of settlements from the Bronze Age to the Partho-Sasanian period in Margiana has begun to emerge more clearly (1). However, for the Achaemenid period there are still few certain archaeological traces. The macroscopic cases of Gjaur-Kala and Erk-Kala furnish one exception, and at the latter site a British research mission has now been working for several years with the hope of obtaining, among other results, more precise chronological indications from soundings (Hermann, Masson and Khurbansakhatov 1993; Herrmann, Khurbansakhatov *et alii* 1994).

In this connection, one of the most significant discoveries made at the Merv Oasis by the Italian team consists of a line of sites that, for the sake of convenience we shall call "fortresses." All of them display occupation dating to the Yaz III period (5th-3rd centuries BC; AA.VV 1994; Genito in press a); and, spaced about 1.5 km apart, they form a line consisting, south to north, of sites 174, 172, 173, 215 and 237, located to the east of Takhirbai depe (Fig. 1). The significance of this putative alignment was confirmed by the presence, at site no. 237, of a neo-Babylonian style bulla, probably dating to late 6th century BC (Fig. 2; AA.VV. 1994; Collon in press; Genito in press a), and by the peculiar architectonic characteristics of sites 172, 173, 174 (all medium size depes), and 215, the subject of this discussion. To supplement the results of surface observations, it was, therefore, decided to test the chronological and planimetric consistency of these "fortresses" through excavation. Consequently, in the 1994 campaign, site 215 was selected. Unlike the others it had a rigorous layout, consisting of a quadrangular structure, with two parallel rows of walls, appearing more like a military camp than a fortress. It was perceived as being particularly significant also in view of its particular position in the midst of the desert, potentially controlling the North-East frontier line, and because of the abundance of typical pottery shapes and types of Yaz III period found on the surface (Figs. 3, 4, 5). The precise limits of this frontier during the late Iron Age have never been adequately analyzed from an archaeological point of view, even though historical information is available for the later periods. So, one hopes that detailed excavation of site 215, on top of the sondages already carried out and described below, will clarify the historical profile, the specific function and the detailed chronology of the site, shedding light on the broader issues just touched upon.

List of the pottery fragments shown on
Fig. 3
Open Forms

No. 8761 - (Surface) Rounded, slightly everted rim of a double carinated cup; red slipped common ware, medium texture; Dimensions: Diam. 29 cm; Width. 1 cm.; Yaz III period.

No. 8767 - (Surface) Square in section, flat, slightly protruding rim of a carinated cup; red slipped common ware, medium texture; Dimensions: Diam. 28.5 cm; Width. 1 cm.; Yaz III period.

No. 8772 - (Surface) Rim, with slightly oblique flat edge, of a broken profile cup; brown creamy slipped common ware; medium texture; Dimensions: Diam. 32 cm; Width. cm. 0.9; Yaz III period.

No. 8757 - (Surface) Oblique, slightly everted rim of truncated-cone cup; pink brownish slipped ware; fine texture; Dimensions: Diam. 31 cm; Width. cm. 0.9; Yaz III period.

No. 8770 - (Surface) Slightly sharpened rim of a large mouthed, low necked jar with a wavy profile and a

(1) Cf. Gubaev, Koshelenko and Novikov (1990a; 1990b), Koshelenko, Bader and Gaibov (1991) and Bader, Gaibov and Koshelenko (1992), mainly related to the archaeological definition of the early Mediaeval frontier line in Merv Oasis.

probable flat base; red slipped common ware; medium texture; Dimensions: Diam. 31 cm; Width. 1.4 cm.; Yaz III period.

No. 8389 - (Surface) Slightly sharpened rim of a large mouthed, biconical, low necked jar; buff cream slipped common ware; medium texture; Dimensions: Diam. 30 cm; Width. 1.7 cm.; Yaz III period.

Fig. 4

No. 8760 - (Surface) Pointed and strongly protruding rim of a large mouthed, low necked jar; red slipped common ware; medium texture; Dimensions: Diam. 42 cm; Width. 1.3 cm.; Yaz III period.

No. 8782 - (Surface) Pointed and strongly protruding rim of a large mouthed, low necked, globular jar; brown slipped common ware; medium texture; Dimensions: Diam. 31 cm; Width. 1 cm.; Yaz III period.

No. 8749 - (Surface) Rounded strongly protruding rim of a large mouthed, low necked, globular jar; cream slipped common ware; medium texture; Dimensions: Diam. 28 cm; Width. 1 cm.; Yaz III period.

No. 8748 - (Surface) Rounded strongly protruding rim of a large mouthed, low necked globular jar; red slipped ware; coarse texture; Dimensions: Diam. 24 cm; Width. 0.8 cm.; Yaz III period.

No. 8759 - (Surface) Slightly rounded rim of a large mouthed, low necked, globular jar; red slipped common ware; medium texture; Dimensions: Diam. 28 cm; Width. 0.7 cm.; Yaz III period.

No. 8755 - (Surface) Slightly bulging rim of a large mouthed, globular jar; red slipped common ware; medium texture; Dimensions: Diam. 27.5 cm; Width. 0.6 cm.; Yaz III period.

No. 8780 - (Surface) Convergent large rim of a large mouthed, globular jar; Dimensions: Diam. 26 cm; Width. 0.9 cm.; Yaz III period.

No. 8779 - (Surface) Slightly flaring large rim, square in section, of a large basin; red slipped coarse ware; medium texture; Dimensions: Diam. 40 cm; Width. 0.8 cm.; Yaz III period.

Closed Forms

Fig. 5

No. 8386 - (Surface) Pointed, strongly everted and protruding rim of a large mouthed, necked, globular jar; red slipped; common ware; medium texture; Dimensions: Diam. 20 cm; Width. 0.6 cm.; Yaz III period.

No. 8384 - (Surface) Rounded, strongly protruding rim of a necked, ovoid jar; red slipped common ware; medium texture; Dimensions: Diam. 12.5 cm; Width. 1.5 cm.; Yaz III period.

No. 8752 - (Surface) Slightly everted, bulging rim of a necked, globular jar; red slipped common ware; medium texture; Dimensions: Diam. 14 cm; Width. 1; Yaz III period.

No. 8754 - (Surface) Slightly everted rim of a high necked, globular jar; pink slipped common ware; medium texture; Dimensions: Diam. 13 cm; Width. 0.9 cm.; Yaz III period.

No. 8753 - (Surface) Slightly everted rim of a large mouthed, globular, small jar; brown slipped common ware; medium texture; Dimensions: Diam. 12 cm; Width. 0.6 cm.; Yaz III period.

No. 8391 - (Surface) Slightly everted rim of a large mouthed, globular, small jar; pink slipped common ware; medium texture; Dimensions: Diam. 10 cm; Width. 0.4 cm.; Yaz III period.

Test-Trench

The sondage was excavated in September 1994 on the eastern side of the site, the one that is best preserved. The area, in addition, was sufficiently far from the corners and from barbican structure (Fig. 6), as well as from the northern and southern sides where the entrances were possibly located. Although analysis is still in the preliminary stages, it has already produced a crop of interesting results. Above all, the sondage has confirmed the existence of a wall that is large enough to surround a military structure like the one we imagined (Fig. 7).

The trench 23 m long x 1 m wide was cut in the middle of the enclosure wall in order to see its inner and outer faces. 12 different stratigraphic units have been isolated (see list below), and they appear to be very regularly disposed. On the basis of these structural elements we can say that although the wall was rather narrow and – due to erosion – preserved only to a limited height, its original height must have been considerable. The inner consistency of the wall made out of *paksha* suggests clearly a seasonal use, confirming the existence of a camp and not of a fortress. The inner side, moreover, reveals a clear, hardpacked secondary living layer with pottery, animal bones and particularly coarse kitchen pottery (Stratigraphic Units 6 and 7 - Fig. 8).

The outer side, by contrast, shows clearly alternating levels of sand and clay, probably suggesting alternating periods of humidity and dry weather. SU's 4 and 3 are the ones related to the wall and suggest the possible existence of a platform used as a foundation as well as the destruction of the wall, which on the outer side shifts clearly in an elongated shaped way, but on the inner

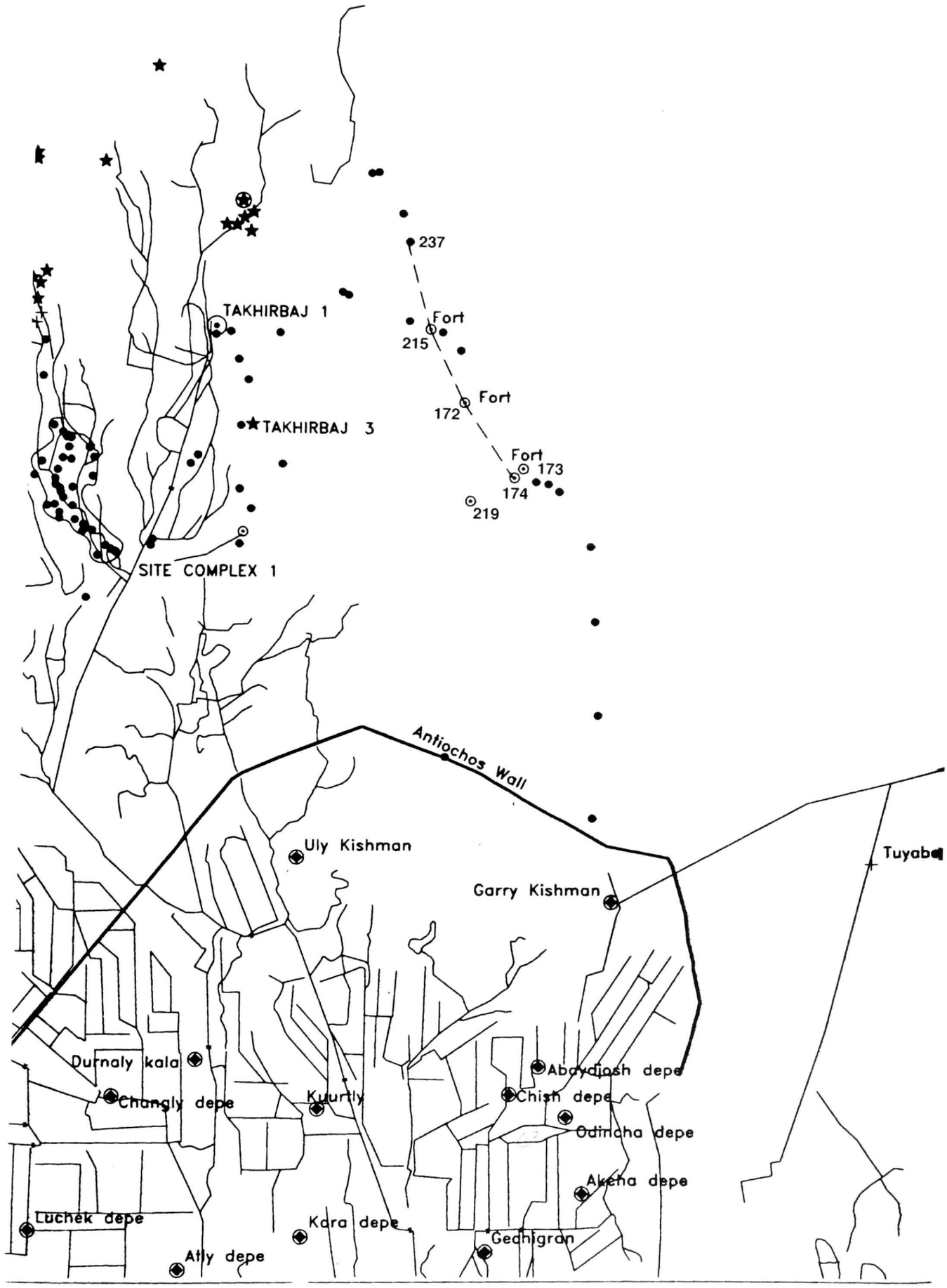


Fig. 1 - Detail from the northeast margins of the Merv oasis showing the line of fortresses: from the north are visible sites 237, 215, 172, 174, 173.

constitutes a compact quadrangular-shaped block above which is located SU 7. Very interesting from an archaeological and a geoarchaeological point of view are SU 2 (representing the top of the destruction layer), SU's 7 and 6 constituting a further and progressive mixing up of the different types of sands, and SU 10 the soil basement, which in some points of the section seems again to be followed by another level of sand. SU 8, just beneath the wall also looks interesting because it represents a buffer layer, at the moment not easily interpretable as either natural or artificial.

List of the pottery fragments shown in Fig. 5.

No. 1 - SU 7; Rim of a large basin; bulging and square in section, red slipped common ware; medium texture; Dimensions: Diam 26 cm.; Width 1.6 cm.; Yaz III period.

No. 2 - SU 7; Slightly inverted, pointed rim of a globular bowl; red slipped fine ware; fine texture; Dimensions: Diam 28 cm.; Width 1.6 cm.; Yaz III period.



Fig. 2 - Neo-Babylonian style bulla from site no. 237 (Dep. ISIAO).

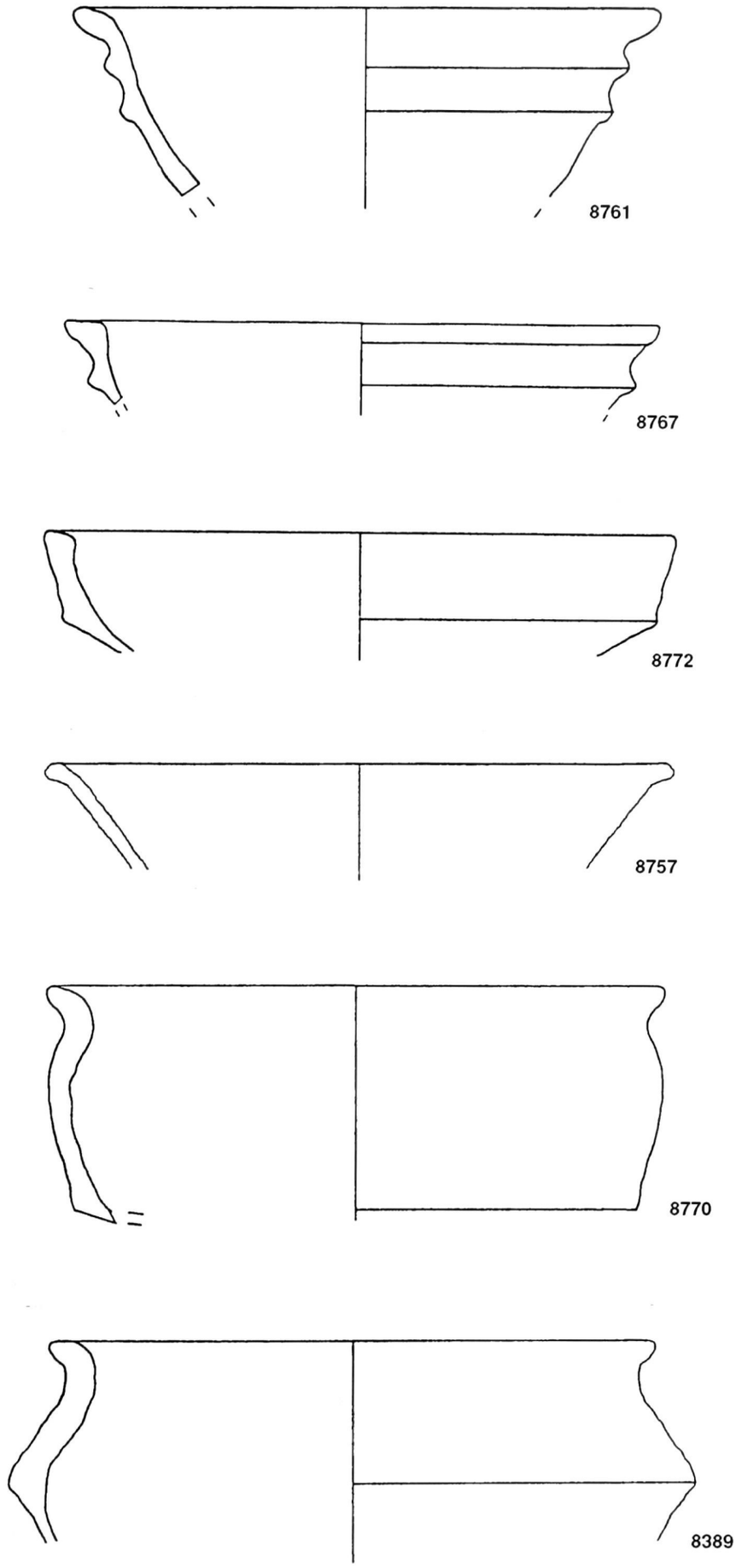


Fig. 3 - Open forms from Site no. 215 (surface) (by B. Genito) 1:2.

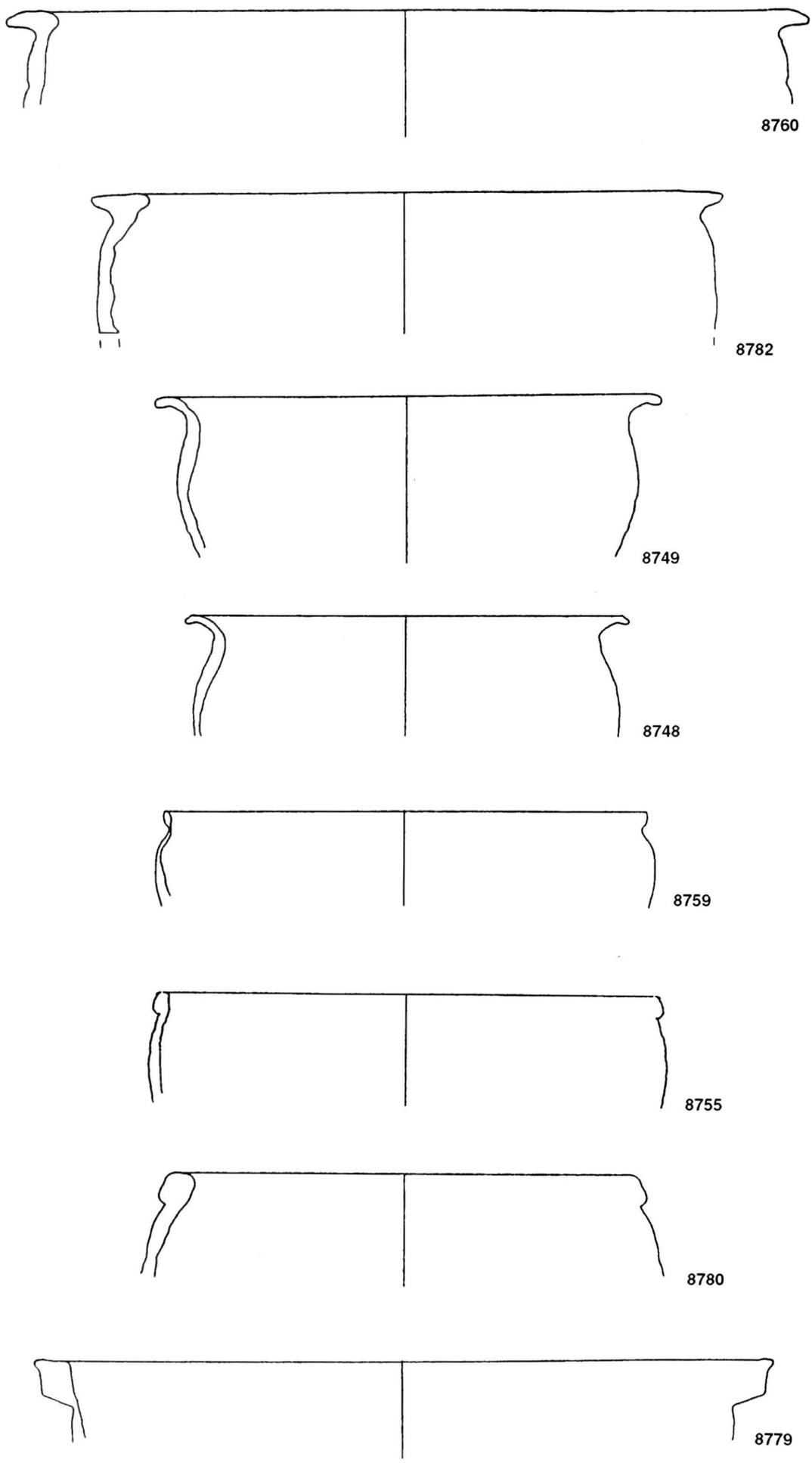


Fig. 4 - Open forms from Site no. 215 (surface) (by B. Genito) 1:2.

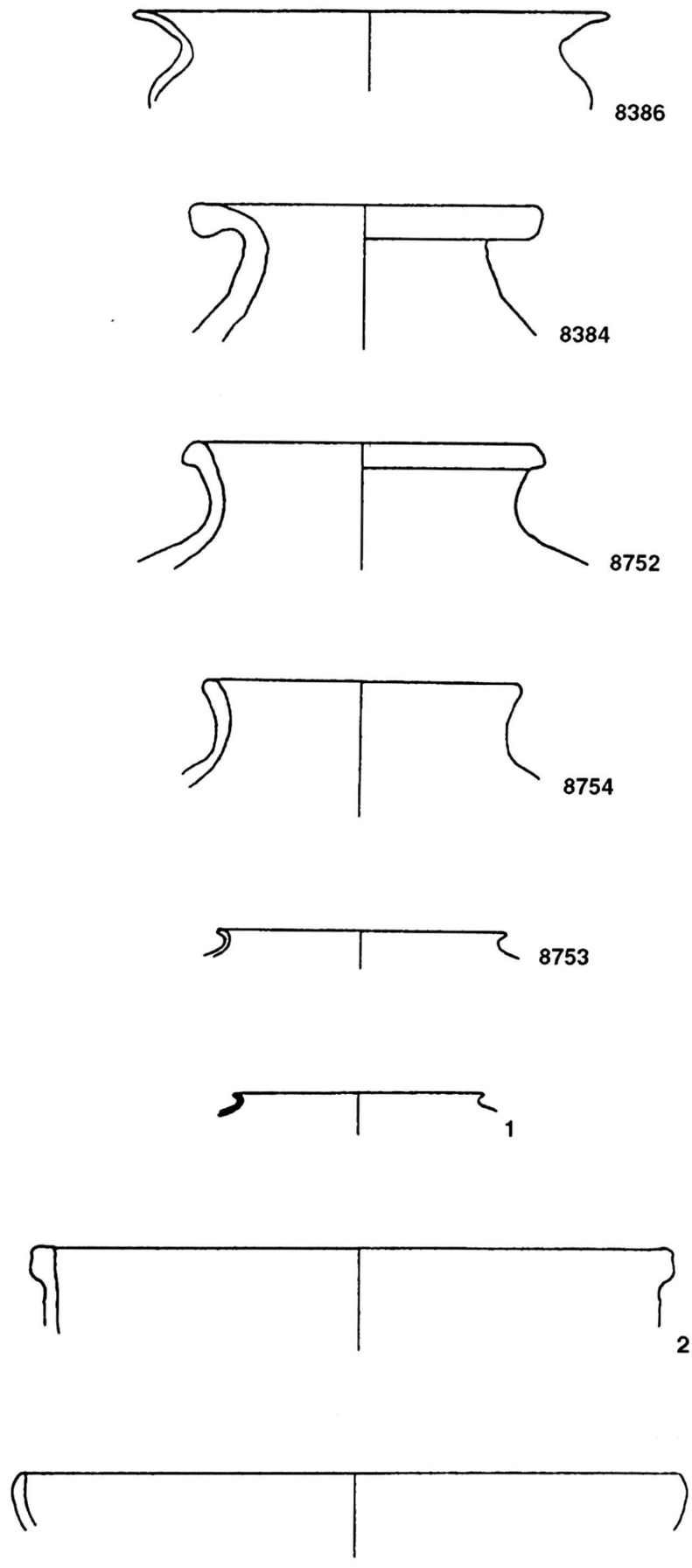


Fig. 5 - Closed forms from Site no. 215 (surface) and open forms from trial-trench of Site no. 215 (by B. Genito) 1:2.

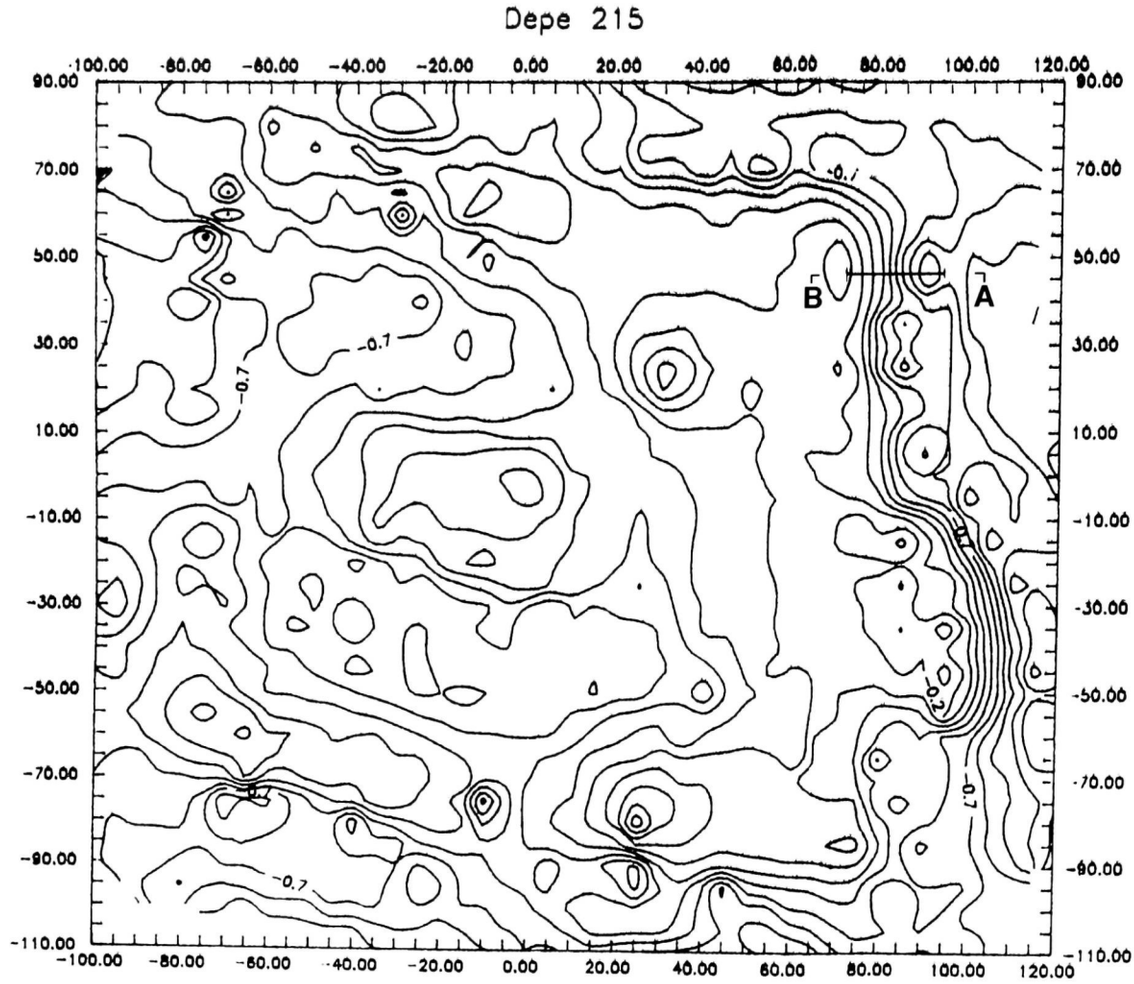


Fig. 6 - Site 215. 10 cm contour plan (by M. Mascellani) showing the section.



Fig. 7 - Section on site no. 215 (Dep.ISIAO) (by B. Genito).

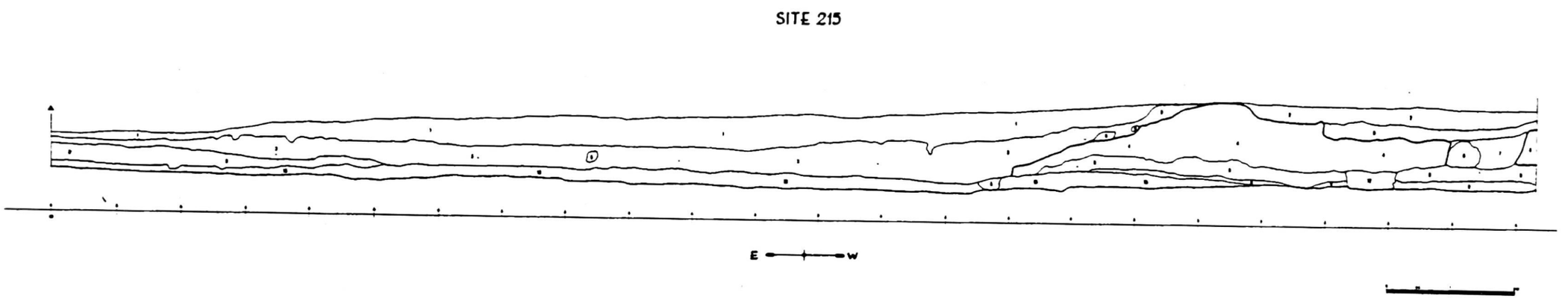


Fig. 8 - Section on site no. 215 (by B. Genito, R. Castelli, P. Mozzi, E. La Bianca) 1:10.

APPENDIX

SITE NO. 215
THE STRATIGRAPHIC UNITS

by R. Castelli and P. Mozzi

Description of the Units

S.U. 1: sand; 10YR 5/4 yellowish brown; poorly developed angular blocky; poorly evident concave cross lamination; common pores; common 1-2 mm wide fractures throughout the whole unit; common fine roots; lower abrupt linear boundary with S.U. 3.

S.U. 2: sand; 10YR 6/4 light yellowish brown; massive; common fine pores and cracks; common fine roots; lower linear clear boundary with S.U. 4; lower linear abrupt boundary with S.U. 5.

Within the sand there are many little blocks (from 1 to 4 cm large) with the following characteristics: silty clay texture, subangular blocky structure, very firm, with millimetric planar lamination often still visible.

S.U. 3:

West Side: loamy sand; 10YR 7/4 very pale brown; coarse angular blocky, poorly developed; very firm; many fine pores; few sherds and charcoal fragments.

Here the units consists in rithmic sets of layers some centimeters thick, some of which show a millimetric, wawy parallel and cross lamination, and others have no inner structure.

Common to many 1-3 cm loamy clay blocks (diminishing size and frequency moving Eastward away from the archaeological structure) with the following characteristics: 10YR 7/3, very pale brown; blocky subangular shape; very firm.

East Side: loamy clay; 10YR 7/4 very pale brown.

It differs from the west side because of:

- differences in texture (more silty)
- lack of structureless layers and ubiquitary finely laminated, wawy and sometimes convoluted layers.
- presence of just very few clayey blocks, usually of very small size.

The whole unit shows a wawy abrupt boundary with S.U. 8, and a linear abrupt boundary with S.U. 10 and S.U. 4.

S.U. 4: silt clay; 10YR 7/4 very pale brown. The unit consists of large (20-40 cm) angular, extremely firm blocks, with massive structure, common fine pores, few large (decimetric) voids and common cracks.

In the upper part of the unit the large blocks are broken up in centimetric, angular blocky fragments imbedded in sandy loamy matrix.

At the bottom of the unit, below the larger blocks, there is a 15-20 cm thick layer made of silty clay little blocks, still with evidences of inner planar lamination, showing a chaotic disposition.

Lower abrupt boundary.

S.U. 5: Silty sandy loam; planar laminated layers, few centimeters thick; 10YR 6/6 brownish yellow and 10YR 7/4 very pale brown; common ash levels, 5Y 7/2 light gray; massive; friable; many hard and friable, centimetric nodules; common charcoals, sherds and bone fragments, more abundant towards the internal part of the structure (West); linear abrupt boundary with S.U. 4 and S.U. 6 linear clear boundary with S.U. 7.

S.U. 6: pits of various shapes. The fillings have the following characteristics: fine sands; 10YR 7/3 very pale brown; massive; friable; common whitish efflorescences, probably of gypsum; in the larger pit at the western margin of the trench some millimetric charcoals bone and pottery fragments were found together with common little clay blocks.

Abrupt boundaries.

S.U. 7: sandy loam; 10YR 6/4 light yellowish brown; massive; friable; at the bottom of the unit there are many silty clay little blocks showing millimetric planar lamination; common millimetric gypsum nodules; linear abrupt boundaries with S.U. 3, S.U. 6 and S.U. 4.

S.U. 8: medium-fine sand; 10YR 6/6 brownish yellow; common little (1-2 mm) mottles, 7.5 YR 6/8 reddish yellow; massive; planar cross lamination; common fine pores; common whitish, friable calcium carbonate nodule, with various shapes, occurring at discontinuities (lamination, bioturbation) in the sedimentary body; lower linear abrupt boundary with S.U. 10, irregular abrupt with S.U. 9.

S.U. 9: fine sand; 10YR 7/4 very pale brown; few mottles, 7.5 YR 6/8 reddish yellow; massive friable; planar horizontal and cross lamination; common loamy sandy nodules, 10YR 7/4 very pale brown, hard, millimetrics; few large voids; lower linear abrupt boundary with S.U. 4.

S.U. 10: silty clay loam at the bottom of the unit, for a thickness of 10 cm, while the upper portion consists in sets of silty clay loam and silty sandy layers, each few centimetres thick; 10 YR 6/3 pale brown; many mottles, 7.5 YR 6/8 reddish brown; firm; many vertical, thin fractures; lower wawy abrupt boundary with S.U.

S.U. 11: fine-medium sand; 10 YR 6/6 brownish yellow; friable unexposed lower boundary.

S.U. 12: sets of sandy loam and loamy sands layers with concave cross lamination and a 2 cm thick, bi-concave sandy lens; 10 YR 7/3 very pale brown; many little, evident mottles, 7.5 6/8 reddish yellow; massive; firm; lower boundary unknown.

Interpretation of the Stratigraphic Units

The stratigraphic Units (S.U.) number 10, 9 and 8 are representative of sedimentation in an alluvial environment, probably with high underground water table, as shown by the common reddish yellow mottles. The poor outcropping of S.U. 11 did not allow an exaustive description, but it seems probable that also this sand deposit is of fluvial origin.

S.U. 9 is clearer in color than the other ones, possibly because of diffused pedogenetic carbonates and sulphate. Also the nodules found inside S.U. 8 and 9 are of pedogenetic origin, showing that some leaching and re-deposition of carbonates and sulphates has taken places.

S.U. 4 is an artificial structure built on the alluvial plain (S.U. 10 and 8, partly cutting S.U. 8). It consists in hard, large clay blocks (pakhsa ?) used for the construction of a thick wall or platform, with some analogies with other sites described elsewhere in the area, such as Takhirbai. The 20 cm thick layer with little caly blocks randomly distribution and located at the bottom of this unit could be either A preparation of the above structure, or the alluvial plain bedrock disturbed during the wall building. In both hypothesis the little blocks seem to be of natural origin, deriving from the drying up of surface clayey deposits, with mud cracks formation and consequent little loose blocks production: this can in fact explain the preservation of the inner fine sedimentary lamination. Of different origin Are the little blocks at the top of the unit, due to the degradation of the large, hard, massive clay blocks.

S.U. 3 and S.U. 2 are the debris due to the degradation of the artificial structure (S.U. 4) respectively on the outer (Eastern) and inner (Western) sides. In the S.U. 3 there are some differences moving further from the structure, mainly consisting in a fining of the matrix and in a diminishing of the number and dimensions of the little blocks (deriving from the crumbling of the larger structural "wall" blocks). This shows that at the outer foot of the structure the erosional and depositional processes were mainly gravitative, while in the distal reach sediments were transported and re-deposited also by water, probably in concomitance of occasional storms. The little blocks in S.U. 2 have the same characteristics of those at the bottom of S.U. 4, and are probably of the same origin.

S.U. 7 is a space left in between two large structural artificial elements, filled by fine sands and little, hard silty clay blocks.

S.U. 5 is an anthropic layer above S.U. 4; the presence of ash, bone and pottery fragments in little lenses shows that this area was used continuously for some time between the building of the artificial structure and its crumbling down.

S.U. 6 are probably abandoned animal dens.

S.U. 1 is an eolian sand deposit, showing incipient soil forming processes at the surface.

Conclusions

Schematically, the sequence of natural and anthropic events recognizable in the stratigraphic section of the trench is the following:

- Sedimentation of the alluvial plain through the deposition of sandy and finer sediments by river channels, probably anabranches of the Murghab anastomosing system (S.U. 10, 9, 8);
- Soil forming activity at the surface of the alluvial plain, at high underground water conditions (mottles) and in an environment characterized by alternate, probably seasonal, wet/dry cycles (leaching and re-deposition of carbonates and sulphates, mud cracks);
- Building of the wall/platform with large, hard, pressed clay blocks (pakhsa?) (S.U. 4 and 7), may be with the preparation of the bottom surface;
- Use of the artificial structure (S.U. 5);
- Degradation of the structure (S.U. 2 and 3), probably in a dry environment characterized by occasional storms (colluviation of the wall debris).

The stratigraphic series is closed by aeolian sands, deposited as an obstacle dune, showing a switch to dry conditions presumably very similar to the present day ones, which allowed dune migration.

On the top of the dune there is herbaceous and shrub desert vegetation, which helped in fixing the dune and led to the formation of a very thin soil with an A - C profile.

A CLAY SEALING FROM SITE 237

by D. COLLON

A sealing was found in 1993, on the surface at Site 237, during the joint survey of the Murghab Delta by the Institute of the Russian Academy of Science, the Istituto Italiano per il Medio ed Estremo Oriente (now Istituto Italiano per l'Africa e l'Oriente) and Turkmenistan State University. Site 237 is on the same line as a possible chain of Achaemenid forts and any dating evidence the sealing might provide is therefore important.

The sealing is fragmentary but the break is not recent (Fig. 1). It is a relatively flat piece of clay, rising to 1.1 cm in the centre; the shape is a rough rectangle with rounded corners measuring 3.95 x 3.3 cm; one corner (about a quarter of the sealing) is now missing. Near its left edge an oval stamp seal was impressed, of which the upper part survives.

On the flat back of the sealing is the clear impression of a textile, in a medium to coarse tabby (plain) weave. The yarn is spun in a Z direction for both warp and weft and there are approximately 12 threads per cm in the warp(?) and approximately 9 threads per cm in the weft(?). I am indebted to Miss Hero Granger-Taylor for this information. Near the edges of the sealing there are small, rectangular impressions, one about 0.9 x 0.15 cm, the other 0.2 (broken) x 0.3 cm. It is not clear what could have produced these impressions since they are too flat-bottomed and sharp-edged to have been made by string used to stitch a bundle together. Since they look most like the impressions of modern staples of different widths, they were perhaps made by flat metal fasteners, but although the textile looks slightly puckered alongside the complete "staple", there is no break in the weave and no indication that two edges of the textile were being clipped together.

The seal was probably a conoid, with an oval convex sealing surface, which was impressed in such a way that the right part was pushed into the clay fairly deeply whereas the left edge was not fully impressed and part of the design (one point of the crescent moon) is missing. The maximum width was probably around 1.8 cm, but due to the imperfect impression and shrinkage of the clay, the exact width is uncertain; the length would have been in the region of 2.5 cm but only 0.9 cm survives.

The design shows a bearded figure, facing left on the impression. Before him is a spear, point uppermost; above is a crescent moon. Behind is either the back of a chair or throne, perhaps with a textile hanging over it; in this case he would have been seated. Alternatively this could be the empty sleeve of a coat hanging over the man's shoulders but, if so, the feature has been misunderstood since it is too far back and detached from the body (cf. Roaf 1983, Pl. XXXIVb); in this case the figure would probably have been standing. The figure has a short, pointed beard. He raises one hand and holds a tight bunch of flowers in the other. On his head he wears a bulbous head-dress with a border round its lower edge and a band hanging down behind, beneath which his hair curls up in the nape of his neck. The lower part of his body is missing but in order to accommodate a seated figure (let alone a standing one) the seal must have been oval rather than circular.

The most distinctive feature of the seal is the bulbous head-dress of the figure which resembles that of the Medes. It also appears on a cylinder seal from Susa (Amiet 1972, No. 2181), worn by a figure who extends both hands to grasp the shaft of a spear. On the same seal is a figure in Babylonian diadem and dress, holding a sickle-sword behind him, grasping an inverted bull by its hindleg and resting one foot on its neck. Amiet (1973, No. 30, pp. 16-17) has suggested a date around 650 on the basis of Babylonian parallels although seals with a similar Babylonian scene were still being impressed on tablets dated to the second and tenth years of Nabonidus (554 and 546 BC) (Menant 1880, p. 27 No. 34; Delaporte 1923, Pl. 120;1, A. 776). Amiet also notes the absence of this type of head-dress on Ashurbanipal reliefs depicting the Battle of Til Tuba in 653, but equates it with the head-dress worn by the Elamite king Ummanaldash (Hubanhaltash III) in 644 (Amiet 1973, Pl. XIA) and suggests its introduction between those two dates. However, the same head-dress is worn by Elamite princes on a relief which was part of the "Garden Party" sequence in which Assurbanipal is shown feasting after the Battle of Til Tuba (Barnett 1976, Pl. LXIV). The bulbous head-dress, as depicted on Assyrian reliefs, has a border along the lower edge and a band hanging down the back.

The bulbous head-dress with band hanging behind, but without the border round the lower edge, is also worn by Medes on the reliefs at Persepolis (Schmidt 1953, Pls 51-2, 57-8, 72-4, 97101, 119, 121-23; Roaf

1983, pp. 108-9, 115-6, Pls XI, XXIV, XXXII-XXXIV, XXXVII-XXXVIII, XLVI-XLVIIA) some of whom hold bunches of flowers as on our sealing. These reliefs were probably mainly carved between 486 and 465 BC (Roaf 1983, p. 138 ff.). On impressions of the cylinder seal of Arsames, satrap of Egypt in the second half of the 5th century BC, a Mede wearing the bulbous head-dress, perhaps Arsames himself, spears enemies in a battle scene (Moorey 1978, p. 149 Fig. 8). A similar scene, on an undated Achaemenid cylinder seal from the Oxus Treasure, shows figures in Persian dress in conflict with enemies, all identically dressed and bare-headed except for one whose bulbous hat with border and band is depicted falling from his head (Moorey 1978, p. 149 Fig. 7). It should be noted, however, that on Greco-Persian gems, the majority of which date to the fifth century BC according to Boardman (1970, pp. 325-6), figures wear either the Persian tiara or the floppy hood but never the bulbous head-dress (Boardman 1970, e.g. Fig. 289 and Pls 829, 844, 876-7, 880).

A further dating criterion may be provided by the hair of the figure on our sealing; this curls up behind in a fair approximation of the hairstyle of the Medes on the Persepolis reliefs. The hair of the figure on the Susa cylinder seal is straight. A kneeling Mede, with his hair bunched beneath his bulbous head-dress, is depicted above the Egyptian cartouche on the base of the statue of Darius I found at Susa (Calmeyer 1988, Pl. 25); Roaf would date this monument towards the end of Darius' reign (i.e. not long before 486 BC; Roaf 1983, p. 147).

The Medes with bulbous head-dresses on the Persepolis reliefs are shown standing. Although they often hold flowers, the other hand is lowered. A seated figure holding flowers and raising one hand towards an approaching man who holds an upright spear appears on seal impressions on the Persepolis Fortification Tablets of two almost identical cylinder seals which may have belonged to the office of the royal miller and were used between 502 and 498 BC (Garrison 1992, Figs. 15-18). Neither figure wears a bulbous head-dress but our sealing may show an abbreviation of a similar scene, with only the spear shown and the spearman omitted because of the constraints of space on a stamp seal.

We therefore have a probable date range for our impression between c. 650 and 400 BC. The political situation would make it more likely that the sealing belonged to the latter part of this period.

Bibliography

Amiet, P. (1972) *Glyptique susienne* (MDAI 43), Paris.

Amiet, P. (1973) La Glyptique de la fin de l'Elam. *Arts Asiatiques*, 28, pp. 3-32.

Barnett, R. D. (1976) *Sculptures from the North Palace of Ashurbanipal at Nineveh*. London.

Boardman, J. (1970) *Greek Gems and Finger-rings*. London.

Calmeyer, P. (1988) Zur Genese altiranischer Motive X. Die Elamisch-Persische Tracht. *Archäologische Mitteilungen aus Iran*, 21, pp. 27-61.

Delaporte, L. (1923) *Musée du Louvre, Catalogue des cylindres orientaux* II *Acquisitions*. Paris.

Garrison, M. B. (1992) Seals and the Elite at Persepolis: Some Observations on Early Achaemenid Persian Art. *Ars Orientalis*, 21, pp. 1-29.

Menant, J. (1880) *Empreintes de cylindres assyro-chaldeens rélevées sur les contrats d'intérêt privé du Musée Britannique classés et expliqués* (Extrait des archives des missions scientifiques et litteraires III/6). Paris.

Moorey, P. R. S. (1978) The Iconography of an Achaemenid Stampseal acquired in the Lebanon. *Iran*, 16, pp. 143-54.

Roaf, M. (1983) *Sculptures and Sculptors at Persepolis* (=*Iran* 21). London.

Schmidt, E. (1953) *Persepolis* I. (OIP LXVIII), Chicago.



Fig. 1 - Sealing from surface of site 237, inv. 479.

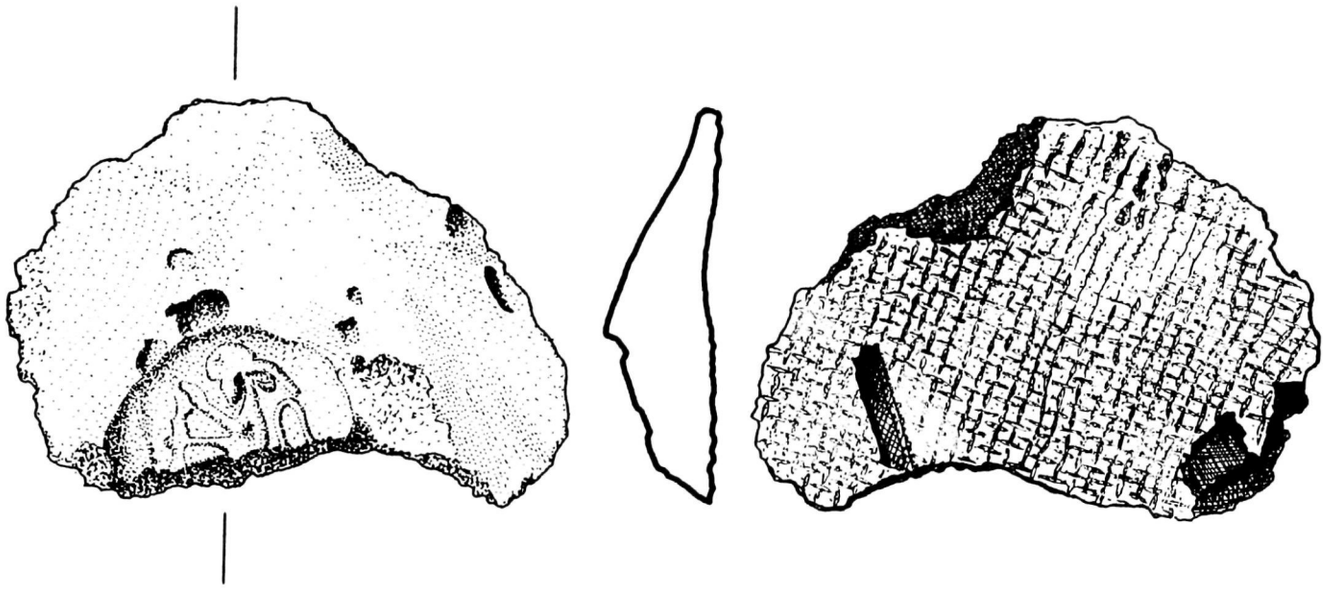


Fig. 2 - Sealing from surface of site 237, field drawing by H. David.

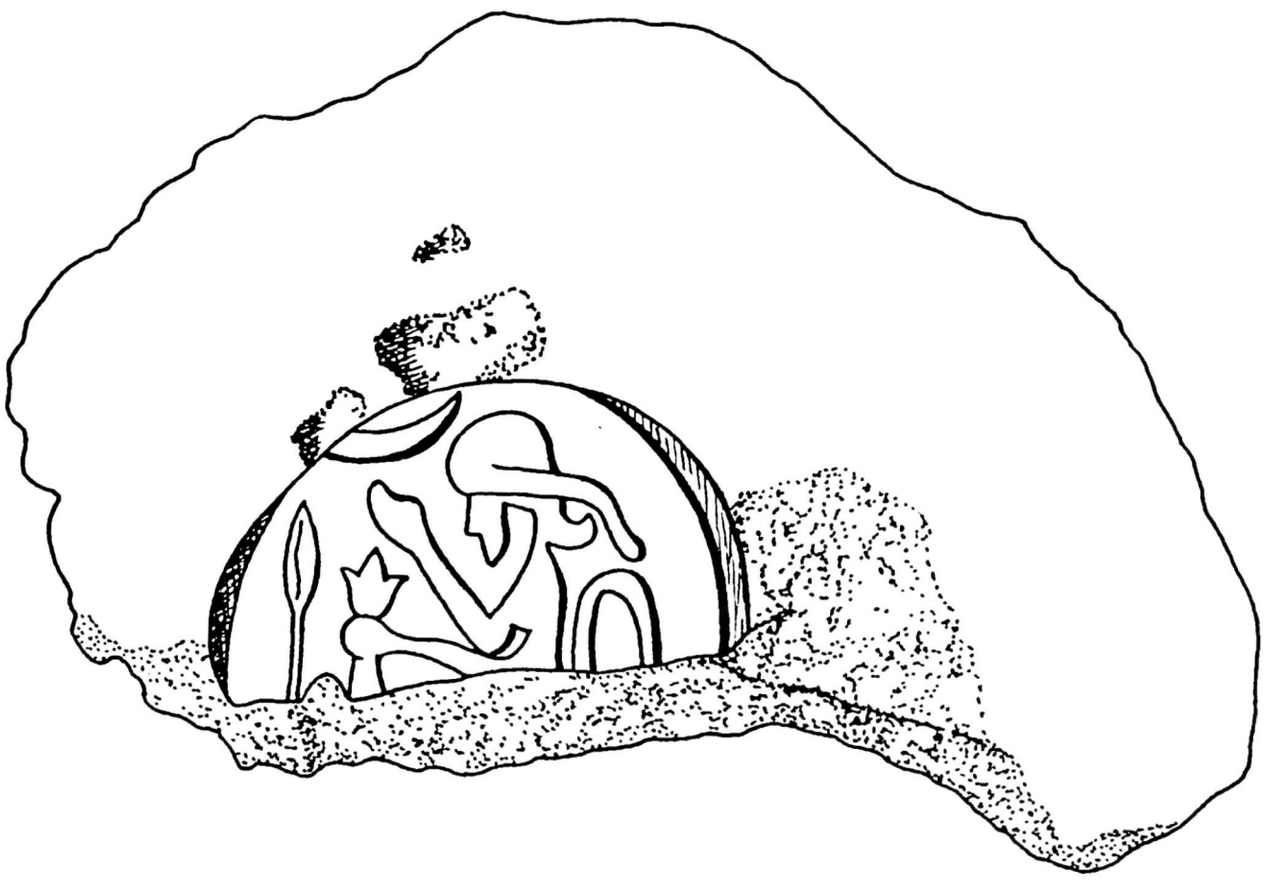


Fig. 3 - Sealing from surface of site 237, as interpreted and drawn by D. Collon.

LANGUAGE, ETHNICITY AND MIGRATION IN PROTOHISTORIC MARGIANA

by G. Erdosy

Introduction

Archaeological study of the ancient languages and cultures of Central Asia has a venerable history, thanks to the identification of the area by many linguists, Max Müller among them, as the original home of Indo-European speakers. Pumpelly's pioneering investigation of the site of Anau in 1903-4 was already driven by the belief that the "Aryan" forefathers of modern Europe were one of several waves of migrants issuing out of Central Asia in response to environmental pressures (Pumpelly 1908: XXV-XXVII). Fortunately, pleading inadequate evidence, Pumpelly quickly abandoned the "Aryans" to concentrate on explaining the origins of agriculture and on establishing Central Asia, especially the northern fringes of the Kopet-Dagh, as one of the cradles of civilisation, on an equal footing with Egypt or Mesopotamia. However, even the cursory description of his aims in the Introduction to his magnificent Anau Project shows that the guiding principles of research into palaeoethnicity were taking shape by the turn of the century. Above all, he already uses the terms "Aryan people", "Aryan languages" and "Aryan culture" indiscriminately, showing not only that "Aryan" has become shorthand for "Indo-European" but also that races, languages and culture were considered to be so closely linked as to be practically interchangeable. Further, a passing reference to Chinese accounts of red-haired and blue-eyed people on the northern borders of the Middle Kingdom shows that the Nordic "Aryan" stereotype was well on the way to being established even in the minds of sober scientists.

The subsequent misuse of the "Aryan" concept, leading to the horrors of World War II, was sufficient to push the question of an ancestral Indo-European home to the fringes of Western archaeology until the 1980s. This trend was reinforced both by the growing aversion of archaeologists to migrations and diffusion in the explanation of culture change, and by the difficulty of conducting fieldwork in Eastern Europe and Central Asia. Not so, however, in the (ex-)USSR and India, two countries where questions of palaeoethnicity carried contemporary relevance, and where much of the archaeological evidence was to be found. In the former one may point to the need to accommodate different nationalities in a single, expanding, polity and to an enduring interest in pan-Slavic origins and movements as crucial factors; combined with a linguistic consensus (1) about the ancestral home of Indo-European speakers falling within the European territories of the Soviet Union, these kept the question of the PIE homeland in the forefront of archaeological research. In the latter, attitudes to the concept of "Aryan invasions" have long been linked both to linguistic, ethnic and social divisions plaguing the country and to differing perceptions of its place in the world (2).

It is with the attitudes and achievements of Soviet archaeologists that we are principally concerned here. With the sudden accessibility of Central Asia and other areas pivotal to the emergence and dispersal of Indo-Iranian languages, it was decided that one part of the Italian contribution to studies of social change in ancient Margiana would be the re-examination of old attitudes, the construction of new models of social and linguistic change, and the acquisition of fresh data in this light. Although this paper, as well as the fieldwork that resulted from our deliberations (Cattani *infra*), are only preliminary offerings, they should provide stimulus for more extensive research on this vital and (in the West) long neglected problem. In what follows I shall provide a historical perspective on Soviet studies, offer alternative frameworks of interpretation, and attempt a revaluation of the Indo-Iranian problem to serve as a starting point for future work.

"Indo-Iranians" and Central Asia - Soviet Approaches

In its readiness to ascribe ethnic labels to archaeological cultures, Soviet (and post-Soviet) archaeology in

(1) Although see Renfrew (1987) and Gamkrelidze and Ivanov (1984), for alternative interpretations.

(2) This is not the place to discuss the matter which has been extensively dealt with in recent years – see Chakrabarti 1968, Shaffer 1984, Erdosy 1989, Kennedy 1992 and 1995. Suffice it to say that while early nationalists favoured the concept as it linked Indians to their European conquerors both racially and culturally, those of recent times prefer to demonstrate the indigenous origin of "Aryans".

general offers a striking contrast to Western attitudes, being more reminiscent of the early works of V. Gordon Childe (1926; 1929). It may be no coincidence that the latter were published just before links between Soviet and Western scholars began to fall victim (along with untold numbers of archaeologists themselves – Miller 1956) to Stalin's paranoia; left alone, surviving Soviet scholars combined the methods of the culture-historical school with those of Marxist analysis and in spite of fundamental contradictions involved in the procedure, and of the limitations of an imposed orthodoxy, achieved striking successes ([3]). Problems with their results abound all the same. For example, the blurred distinction between linguistic, ethnic, cultural and racial entities, which had already marred Pumpelly's thinking, figures prominently in Soviet studies of the archaeology of Indo-Europeans (*who represent a linguistic entity and nothing else*). Further, in explaining language and population dispersals, the existence of migrations is taken for granted, along with the powers of physical anthropology to isolate racial groups, and of linguistic palaeontology to produce an accurate image of cultural development paralleling the evolution of languages. Finally, their principal unit of archaeological analysis, namely Childe's (or, rather, Kossinna's) "archaeological culture" concept, has increasingly fallen into disfavour in the West (Hodder 1978; Shennan 1978; 1990) ([4]).

Restricting our gaze to studies in the Indo-European field, three important guiding principles may be noted. First, a reconstructed protolexicon, containing words for equines and wheeled vehicles, is generally appealed to in identifying the South Russian steppes (where these traits were first found) as the original home of IE speakers, a procedure also utilised by western scholars. Second, routes of dispersal are deduced by linking the PIE homeland with the historically documented distribution of IE languages, along with consideration of the latters' internal and external ([5]) relationships. It is because Central Asia falls between the South Russian steppes, Anatolia, Iran and the western borderlands of South Asia (areas where IE speakers are first documented) that it enters our picture: although it is no longer regarded as the PIE homeland, the patterns of dispersal suggested by an examination of individual Indo-Iranian languages still point to Bactria-Margiana as the area where the constituents of the language family emerged out of an undifferentiated proto-language. Third, archaeological traces of the postulated movements, at least of the Indo-Iranian speakers who are our principal concern here, are sought mostly in the spread of cultic and burial practices, the assumption being that "primitive" tribes are likely to adopt most elements of the material culture even of their conquered subjects, retaining only some rituals that constitute the core of their cultural identity. Although such an approach has, once again, been adopted in the West also, the monumental scale of Soviet fieldwork (both regionally and within individual sites) has created a particularly extensive database for the execution of such studies.

As regards results, perhaps the most widely shared scenario among archaeologists is described by Kuz'mina (1981; 1984), who sees links between the Timber-Grave and Andronovo cultures (in the South Russian steppes and in western Siberia and northern Kazakhstan, respectively) as evidence of the eastward spread of proto(?)-Indo-Iranian speakers in the early 2nd millennium BC, and the subsequent emergence of steppe pottery and steppe burial practices in Central Asia as reflections of their southward move (now in distinct waves), towards their present day homelands. According to her, it is in the Andronovo culture of c. 1700-900 BC, most extensively documented at the cemetery and settlement site of Sintashta in the southern Urals (Gening 1977; Gening *et al.* 1992), that numerous "Indo-Iranian" traits are significantly associated for the first time, including an economy combining pastoralism and agriculture, handmade ceramics, the use of horse-drawn war chariots, the cultic significance of the horse, the special status of charioteers, and fire and ancestor worship ([6]). She further suggests that the mixture of Indian and Iranian traits reflects the emergence of individual languages out of Proto-Indo-Iranian by this time. Indo-Iranian elements are then observed spreading to the Bactria-Margiana Archaeological Complex, manifested in the Togolok-21 temple dedicated to *soma/haoma*-worship (Sarianidi 1986b), in the highly symbolic layout of Bactrian fortified settlements (e.g. Sapalli tepe – Askarov 1977; Dashly-3 – Sarianidi 1979), and – later – in diverse burial practices in both Turkmenistan and southern Tadzhikistan (Khlopin 1987; Mandel'shtam 1968; Pyankova 1982, etc.).

From this perspective, ancient Margiana appears as an important staging area for the various groups of Indo-Iranian speakers on their way to their eventual homelands. This is corroborated by the linguistic evidence which sees the Proto-Indo Aryans coming through in the late 3rd/early 2nd millennium BC (cf.

([3]) It would, of course, be wrong to suggest that Soviet archaeologists were totally out of touch with post-Childean developments in the West – indeed, Klein's (1977) comment that Western archaeologists were even more ignorant of Soviet works is probably justified. As is frequently the case, however, in the absence of an extensive dialogue the attitudes of a few better informed archaeologists, principally in the metropolitan research centres of Moscow and Leningrad, were not reflected by the bulk of the work carried out in the field.

([4]) Although such nonsense as a "Painted Grey Ware people" has, by and large, been avoided, and cultural influences have been traced on the basis of more than just the movement of single artefacts.

([5]) Especially with Finno-Ugric and Dravidian speakers – see Harmatta 1992.

([6]) The hypothesis is supported by the argument that the historical successors of the Andronovo culture – the Scytho-Sarmatian tribes – were demonstrably Iranian speakers, although just where this leaves the Indo-Aryan constituent of the Indo-Iranian family is not discussed.

Burrow 1973), the Proto-Iranians in the late 2nd millennium BC, and the East Iranians at the beginning of the 1st millennium BC. Subsequent spread of more evolved languages, in waves, is linked to the appearance of "BMAC" artefacts and burial practices in Baluchistan and Sindh, (Hiebert and Lamberg-Karlovsky 1992), to be followed – less convincingly – by the emergence of the Gandhara Grave Culture (Dani 1967, Silvi Antonini and Stacul 1972, Tusa 1979); both are held to represent Indo-Aryan speakers. As for Iranian speakers, the spread of Grey Wares to northern Iran has been linked to them ([7]), and their subsequent expansion is traced in the Early Iron Age complexes of Daghestan (West Iranian) and Bactria-Margiana (East Iranian), which eventually enter the realm of recorded history under the Achaemenids of Persia.

In evaluating this scenario, we may note that of the three general propositions listed above, only the second – relating to the pivotal position of Bactria-Margiana in the dispersal of Indo-Iranian languages – is grounded firmly in empirical observation. As for wheeled vehicles, not only are there doubts about their presence in the PIE protolexicon (Coleman 1988), but we should also remember that the image of horse and chariot-riding "Indo-Europeans" has been gleaned mainly from early *Indo-Aryan* (i.e. Vedic and Mitanni) and *Iranian* (Scythian) linguistic and archaeological sources, and may have no bearing on the dispersal of speakers of other branches of the IE language family. The tracing of cultic practices across the landscape is equally misleading: as I have already remarked elsewhere, the distribution of cremations, fractional burials and traces of *soma/haoma* worship does not show either clear movements from one area to another, or clear association with particular "cultures" (Erdosy 1995). It appears, rather, that there was a wide diversity of ritual practices scattered over Central Asia and the Indo-Iranian Borderlands, from which newly emerging cultural groups could choose distinct, but *shifting* symbols of their ethnic/cultural identity. Finally, one may once again castigate the generally uncritical use of linguistic labels by archaeologists, the equally naive acceptance of archaeological constructs by linguists (e.g. Harmatta 1992), and the confounding of racial, ethnic, linguistic and cultural categories by all. To this day there is little consistency in the use of terms such as "Indo-European", "Indo-Iranian" and "Indo-Aryan", not to mention "Aryan" ([8]).

As regards substantive issues, acceptance of the model just outlined results in serious chronological problems. Above all, a reassessment of dates from Margiana would put the BMAC in the early 2nd millennium BC (Hiebert 1995), predating all but the earliest phases of the Andronovo culture, including the important finds from Sintashta. In view of this, the neat picture of an eastward migration of Indo-Iranian speakers (reflected in Timber Grave-Andronovo contacts) followed by a southward thrust (Andronovo-BMAC contacts) can no longer be accepted. It appears, in fact, that "Indo-Iranian" traits first emerged in Central Asia (and perhaps even on the Indo-Iranian Borderlands – cf. Erdosy 1995), and only subsequently in the Urals and Western Siberia, perhaps as a result of contacts around 1700-1500 BC (datable by the co-occurrence of Andronovo wares and Namazga VI pottery at numerous sites in the Murghab Delta – see Cattani, elsewhere in this volume). This reopens the question of whence the Indo-Iranian speakers came to Central Asia, to which Parpola's and – especially – Harmatta's models, based on a long chronology, appear to provide better answers (Parpola 1988, 1995; Harmatta 1992). In particular, there is some support for Harmatta's view that the Andronovo cultures represent a massive eastward (not westward) expansion of Iranian speakers, following the likely direction of the diffusion of Indo-Iranian cultic practices. However, as noted above, little evidence exists to support a strict correlation of cultic practices with ethnic or linguistic groups which likely used constantly shifting sets of material symbols to project their identity. Therefore, while contacts between Margiana and the surrounding areas have undoubtedly been demonstrated, few cogent reasons have been advanced to connect them to the spread of languages, on the one hand, and even fewer reasons have been given to explain why such movements should have taken place, on the other. Under such circumstances the Italian Mission's work, although not specifically focused on the problems of ethnogenesis, migrations and cultural change, has been directed towards two related aspects of the question of Indo-Iranian languages and their speakers: 1) the documentation, through fieldwork, of the spatial distribution of steppe artefacts in the of the Murghab Delta and 2) the construction of realistic models of cultural change, which could then be fitted to the results of historical linguistics. The results of the fieldwork undertaken will be presented by Maurizio Cattani elsewhere in this volume; my aim in the concluding part of this paper is to focus on the second task.

"Indo-Iranians" in Central Asia - the Italian Perspective

Since interest in the archaeology of Indo-European languages and their speakers has only recently picked up, after decades of neglect, there is little agreement on models of linguistic and cultural change. In general, we

([7]) As this is a paper dealing with Central Asia, a footnote is sufficient to highlight the fact that material traces of Indo-Aryan speakers have been particularly difficult to identify. While numerous parallels may be drawn between Old Indo-Aryan literature and the material culture of Central Asia, there have been few discovered between the former and South Asia, the present-day home of Indo-Aryan speakers.

([8]) This issue has been addressed recently in the South Asian context by a number of publications (Erdosy 1989, 1995; Parpola 1988, 1995; Deshpande 1995, Hook and Deshpande 1979).

may accept as our starting point Renfrew's dictum that we should replace the equation *language = race = (archaeological) culture* with *language change = socio-cultural change* (Renfrew 1990), even if we disagree with that author's specific conclusions regarding the origin and spread of Indo-European languages. In such a framework, patterns of change in both languages and material culture will be sought and correlated in a systematic way. Having already discussed this problem in the South Asian context (Erdosy 1995), however, I shall not repeat my remarks here but concentrate on the available information regarding the Late Bronze and Early Iron ages of Bactria-Margiana.

To begin with, one may reiterate the point that significant indications of contact abound between Bactria, Margiana and the surrounding territories both in the linguistic and the archaeological record. It is because they have been viewed in the light of preconceived notions regarding language dispersal, and tailored to meet existing models, that they need to be re-examined. Beginning with the linguistic evidence, I have already noted that Central Asia must have played a pivotal role in the origin and dispersal of Indo-Iranian languages. On the one hand, studies of contact with other proto-languages (principally Finno-Ugric; Harmatta 1992) suggests that Proto-Indo-Iranian spread here from the steppes of Eastern Europe ([9]). On the other, this was probably the area where the break-up of the Proto-Indo-Iranian family into its constituents – Indo-Aryan, Kafiri and Iranian – took place (cf. Burrow 1973). This is supported by the fact that the earliest documented Indo-Iranian languages appear in areas just to the south: Kafiri languages in the Hindukush and Indo-Aryan languages in Anatolia, Afghanistan and the Borderlands of South Asia by the mid-2nd millennium BC, and Iranian languages on the Iranian Plateau, as well as in Central Asia itself, early in the 1st millennium BC. Both the temporal succession and the fact that Iranian languages drove a wedge between areas where Indo-Aryan languages are spoken suggest, moreover, that the languages spread in waves, with Iranian coming at the end.

Turning to the archaeological evidence, material traces of interregional contacts are shown, first of all, by the widespread distribution of "Indo-Iranian" cultic and – especially – burial practices in Central Asia, the Urals and Western Siberia. These include such traits as cremations, fire worship, and horse, chariot and dog burials, although contrary to received wisdom they actually appear to have spread from the southwest to the northeast, and not viceversa. Further, there are significant concentrations of steppe ceramics on the northern fringes of Margiana, usually in the form of handmade vessels with incised decoration. As discussed by Maurizio Cattani (*infra*), such ceramics appear both in association with Namazga VI type ceramics of the settled oasis, confirming Masson's findings at Takhirbai 3 (Masson 1959), and in discrete concentrations, suggesting a high degree of interaction from the early 2nd millennium BC, and the integration of some steppe nomads into the settled population of the oases of Bactria and Margiana.

At the same time, a long history of contacts between Central Asia, Iran and the Borderlands of South Asia may also be documented, beginning in the 4th millennium BC, and culminating in at least limited population movements from Bactria and Margiana to the south in the late 3rd/early 2nd millennia BC (Hiebert and Lamberg-Karlovsky 1992). Such contacts continued into the late 2nd millennium BC, as shown by parallels between the painted pottery traditions of Pirak in Baluchistan and Yaz Tepe in Margiana, as well as by the widespread practice of building large and prominent platforms at central places.

So far so good. Unfortunately, as has been the case in South Asia, it is, at present, impossible to move from general observations of contacts and population movements to *specific correlations* between the patterns observed in the linguistic and the archaeological record. For one thing, while the linguistic evidence for the evolution and spread of languages is detailed, the archaeological evidence – as usual – not only suffers from an imprecise chronology, but is also capable of supporting a variety of interpretations. Further, even the impressive evolutionary sequence recovered from linguistic evidence (Harmatta 1992) can only be dated through analogy with historically observed rates of language change which, as Harmatta himself (1992: 366) admits, are unlikely to have been constant. What is worse, some of the dates in the scheme are, on the one hand, based on archaeological data – such as the domestication of the horse around 3500 BC (*ibid.*: 367), which is used to date the fourth stage – and, on the other, are offered as preliminary hypotheses for archaeological research (*ibid.*: 366), leading to the kind of circularity that has often been bemoaned in the field of Indo-European studies. For the moment, therefore, we must be content with modest, generalised conclusions, outlined above, even regarding the linguistic record, not to mention the archaeological evidence.

At the same time, I have already suggested that in order to trace and explain the emergence and spread of Indo-Iranian languages, we must go beyond matching patterns of movement in the linguistic and archaeological records, and identify the social forces underlying language spread and language change. We must also measure the degree to which the latter were actually accompanied by population movements since, as our experience in South Asia has shown us, even the wholesale spread of languages need not involve large-scale migrations (Erdosy 1995; Witzel 1995). It is at this

([9]) On a related point, we may add that the evolution of the Indo-Iranian protolexicon (also studied mostly with the aid of PII terms surviving as loan-words in Finno-Ugric languages) also reflects the successive inventions of horse domestication, chariot riding and horse riding, which are held to play such a pivotal role in the social evolution of Indo-Iranian speakers.

point that large-scale excavations and surveys carried out by Soviet and – more recently – Western scholars provide pertinent evidence. The basic outlines of cultural evolution are quite clear (Kohl 1984; Masson 1986, 1992; Tosi 1986). Around 2200 BC, with the decline of urban centres along the northern slopes of the Kopet-Dagh range, there is a shift of focus to the more easterly oases of Margiana and – later – Bactria. Here, in the Late Bronze Age (c. 1900-1700 BC; Hiebert 1995), an elaborate civilisation characterised by fortified central places, oasis agriculture, a high level of craftsmanship and extensive interregional contacts emerges, namely the Bactria-Margiana Archaeological Complex (BMAC). Although Masson (1992) would not assign the rank of state to the new political entities, perhaps because of their small size, lack of writing and general absence of administrative organisation, they are clearly complex polities with a strong agricultural base, bespeaking of craft specialisation and social stratification. Differential burials as well as the segregation of different communities in settlements (as at Sapalli-depe – Askarov 1977) are both attested. What is just as important, BMAC polities also enjoyed extensive contacts with the steppe nomads to the north and east, and these contacts – along with the acquisition of metallurgy and the technology of horsemanship – may have fostered the emergence of social distinctions and political divisions among the steppe tribes themselves. It is no coincidence that by c. 1500 BC, there are elaborate burials as well as fortified central places to be found in Kazakhstan and the Urals, along with increasing regional differentiation. By the Early Iron Age one begins to observe tombs of exceptional size and wealth from Taghisken (Askarov 1992) east of Lake Aral and Arzhan in Tuva, reflecting the stereotype of barbaric splendour later associated with Iranian speaking Scythian tribes stretching from Western Siberia to Eastern Europe. Finally, as already mentioned, BMAC artefacts have also been recovered in a vast area over the Indo-Iranian Borderlands, usually in the form of grave goods, indicating limited but discernible population movement from Central Asia towards the South.

The subsequent transition from the Late Bronze Age to the Early Iron Age is a complex phenomenon with much regional variation, going well beyond the addition of iron to the technological repertoire, which, in any case, took several centuries to bear fruit. In some areas there is a clear continuation of preceding traditions, as in Daghestan where an elaborate irrigation-based civilisation is found from the early 1st millennium BC onwards. Elsewhere, as in Khorasmia and the lower Zerafshan valley, the sedantarisation of steppe tribes may have been the crucial factor, although in other respects the archaeological record is continuous. Finally, in some areas such as Margiana there is considerable disruption. Not only are the central places of the Yaz I period characterised by monumental structures constructed on prominent platforms, which are quite without precedent ([10]), but most settlements are newly founded, in areas away from those previously preferred. The emergence of a painted, principally handmade, ceramic tradition with an extensive repertoire of geometrical designs represents another break in the culture sequence. However, in spite of such a break in evolution, it is the Yaz I complex which spreads over a wide area, in the context of evolving city states and urban centres. The construction of platforms may be observed as far afield as Tillya Tepe and Mundigak, while the painted pottery tradition extends to Pirak in Baluchistan and Susa in SW Iran (Sarianidi 1986a). Although the polities participating in this interactions sphere continue to be small scale until the emergence of the Achaemenid empire, there is no doubting the intensity of interaction, even if a Peer Polity Interaction model (Renfrew and Cherry 1986), rather than tribal movements (Sarianidi 1987), are invoked to account for the widespread uniformity in material culture. Unfortunately, this crucial period is as yet poorly dated. While there is evidence that the preference of Soviet scholars for a short chronology (900-650 BC for Yaz I – Masson 1959: 61) may no longer be acceptable, Kohl's date of 1500 BC for the beginning of the Early Iron Age (Kohl 1984, 230; cf. Hiebert 1995) could use further support from radiocarbon dates before it is fully accepted ([11]).

In relating these developments to the spread of Indo-Iranian languages, the following general points may be noted:

1) The cultural evolution of Central Asia in the Late Bronze and Early Iron ages may be represented as a ramp (following Adams 1966). No dark ages, precipitated by invasions are apparent from the archaeological record, and social complexity progresses from the chiefdoms of the BMAC through the incipient city-states of the Early Iron Age to the urban centres of the Achaemenid and post-Achaemenid periods. That there are periods of considerable political reorganisation, especially in the late 2nd millennium BC, need not alter this conclusion, although such episodes of upheaval may provide pointers in our search for language spread and language change.

2) On a related note, the interaction of Central Asia with areas to the north has a long history, and likewise shows little evidence of confrontation. A more fruitful symbiosis appears to have existed between settled agriculturalists and steppe nomads than has generally been assumed. This is particularly evident in historical

([10]) The largest of them, at Yaz-depe, contains a monumental structure (Masson 1959); our excavations at Takhirbai-depe have uncovered a similar structure, although erosion has prevented us from exploring in detail the buildings surmounting it.

([11]) Only two dates can presently be cited in support of a long chronology: one of 3150±90 BP from Yaz I and one of 3050±120 BC from Dalverdzin-depe (both quoted with a half-life of 5568 years). A further date of 2850±60 BC from Kuchuk-depe may be used to support either a short or a long chronology.

periods, and has already necessitated the reinterpretation of "defensive" structures along the borders of Margiana. Features such as the "Antiochus Wall," the fortress at Gebekly, and a line of possibly Achaemenid fortresses along the eastern margins of our survey area, appear to channel – and thus control – trade between metropolitan areas and the nomadic hinterland, to judge by the finds of seals, sealings and bullae. Such structures thus serve to unite, rather than divide the "desert (well, steppe) and the sown" (Tosi, *infra*), and may provide models for earlier fruitful interaction between the two major ecological zones of Central Asia. It cannot be a coincidence that – as already remarked – the two areas show parallel trajectories of socio-cultural evolution from the Late Bronze Age onwards, showing their closely interlinked fortunes.

3) As for the interaction sphere with the Indo-Iranian world, this also has a long history, dating back to the 4th millennium BC, even if the movement of populations was probably restricted to the early 2nd millennium BC. It is at that time, that BMAC artefacts – in funerary contexts – spread to the south, perhaps accompanied by Indo-Aryan languages, but that is not our primary concern here. We may add, however, that the interaction sphere continued to exist in the Early Iron Age, as shown by the already noted spread of Yaz I cultural features to Afghanistan and Baluchistan. The spread of certain burial customs from Bactria into S. Tadzhikistan at the end of the millennium (Mandel'shtam 1968; Litvinski and Pyankova 1992) may be cited as a related phenomenon.

It must be quite clear from the foregoing, that while strong evidence exists for the spread of languages and certain "Indo-Iranian" religious concept and funerary rituals, this is not matched by evidence for population movements. It is true that the latter have been notoriously difficult to extract from the archaeological record, but given the wealth of documentation available we should have been able to find traces of movement, as indeed has been done in the case of the BMAC funerals in otherwise indigenous, Iranian, contexts. Nor can we fall back on the traditional explanation for lack of evidence, namely that "primitive" migrating tribes carried little of their own material culture with them apart from ceremonial objects and customs. Such an argument may be countered on both theoretical grounds – i.e. there are no prescribed classes of objects for the expression of ethnic group affiliations – and empirical grounds – namely that cultic practices and religious symbols appear to move from south to north, and not in the direction hitherto assumed. Finally, recent research in Central Asia has already demolished the myth of barbarism woven around the – possibly – Indo-Aryan speaking peoples who are seen to move into South Asia from their homes in Bactria and Margiana; it is likely that once the results of the extensive research carried out by Soviet scholars become accessible to Western archaeologists (i.e. are translated into English), the stereotype of the steppe nomads will likewise be modified.

In the meantime, however, we are left with no satisfactory explanations to replace the traditional paradigms, no simple and elegant solutions from the archaeologists' side to compliment the certainly elegant schemes of language spread and language change constructed on the back of historical linguistics. About all we can say is that the conditions for such processes were certainly present in protohistoric Central and South Asia, with an extensive and enduring interaction sphere providing ample channels of communication where ideas, languages – and, yes, occasionally even people – could move freely. It only remains now for archaeologists to elaborate their understanding of social and cultural change, before returning to the linguistic evidence. And perhaps the greatest desideratum is a clearer understanding of spatial relationships, the one area of archaeological research that has been seriously neglected by Soviet scholarship ([12]). It is here that the Italian contribution will be of particular significance; the purpose of the present paper was merely to state some of our guiding principles, and it will be left to Maurizio Cattani to sketch our – preliminary – results as well as our programme for the future.

Bibliography

Adams, R.M. (1966) *The Evolution of Urban Society: Early Mesoamerica and Prehispanic Mexico*. Chicago, Aldine.

Askarov, A.A. (1977) *Sapallitepa*. Tashkent.

Askarov, A.A. (1992) The Beginning of the Iron Age in Transoxiana. *History of the Civilisations of Central Asia. Volume I: The Dawn of Civilisation: Earliest Times to 700 BC*, ed. by A.H. Dani and V.M. Masson, 441-458. Paris.

Biscione, R. (1981) Centre and Periphery in Late Protohistoric Turan: the Settlement Pattern. *South Asian Archaeology 1979*, ed. by H. Härtel, 203-213. Berlin.

Burrow, T. (1973) The Proto-Indoaryans. *Journal of the Royal Asiatic Society* NS 2, 123-140.

Chakrabarti, D.K. (1968) The Aryan Hypothesis in Indian Archaeology. *Indian Studies Past and Present*, 4, 333-358.

Childe, V.G. (1926) *The Aryans*. Oxford.

Childe, V.G. (1929) *The Danube in Prehistory*. Oxford.

Coleman, R. (1988) Review of Renfrew's *Archaeology and Language*. *Current Anthropology*, 29, 449-453.

Dani, A.H. (1967) Timargarha and Gandhara Grave Culture. *Ancient Pakistan*, 3.

Deshpande, M.M. (1995) Vedic Aryans, Non-Vedic Aryans and Non-Aryans: Judging the Linguistic Evidence of the Veda. *The Indo-Aryans of South Asia: Language, Material Culture and Ethnicity*, ed. by G. Erdosy, 67-84. Berlin and New York.

Erdosy, G. (1989) Ethnicity in the Rigveda and its Bearing on the Problem of Indo-European Origins. *South Asian Studies*, 5, 35-47.

Erdosy, G. (1995) Language, Material Culture and Ethnicity: Theoretical Perspectives. *The Indo-Aryans of South Asia:*

([12]) Not surprisingly, if one considers that cartography in the USSR and its satellites was considered to be akin to intelligence gathering until recently.

Language, Material Culture and Ethnicity, ed. by G. Erdosy, 1-31. Berlin and New York.

Gamkrelidze, T. and Ivanov, V. (1984) *Indoevropeiski Yazyk i Indoevropeitsy*. Tbilisi.

Gening, V.F. (1977) The Cemetery of Sintashta and the Problem of the Early Indo-Iranians. *Sovetskaya Arkheologiya*, 4, 53-73.

Gening, V.F., Zdanovitch, G.B. and Gening, V.V. (1992) *Syntashta. Archaeological Monuments of the Aryan Peoples in the Ural-Kazakhstan Steppe* (in Russian). Chelyabinsk.

Harmatta, J. (1992) The Emergence of the Indo-Iranians: the Indo-Iranian Languages. *History of Civilisations of Central Asia, Volume I: The Dawn of Civilisation: Earliest Times to 700 BC*, ed. A.H. Dani and V.M. Masson, 357-378, Paris.

Hiebert, F.T. (1995) South Asia from a Central Asian Perspective (3500-1750 BC). *The Indo-Aryans of South Asia: Language, Material Culture and Ethnicity*, ed. by G. Erdosy, 192-205. Berlin - New York.

Hiebert, F.T. and Lamberg-Karlovsky, C.C. (1992) Central Asia and the Indo-Iranian Borderlands. *Iran*, 30, 1-14.

Hodder, I. (ed.) (1978) *The Spatial Organisation of Culture*. London.

Hook, P.E. and Deshpande, M.M. (ed.) (1979) *Aryan and Non-Aryan in India*. Ann Arbor, Karoma Publishers, Inc. & Centre for South and Southeast Asian Studies, University of Michigan.

Kennedy, K.A.R. (1992) Biological Anthropology of Human Skeletons from Harappa: 1928 to 1988. *The Eastern Anthropologist*, 45.1-2: 55-86.

Kennedy, K.A.R. (1995) Have Aryans been Identified in the Protohistoric Skeletal Record from South Asia? Biological Anthropology and Concepts of Ancient Races. *The Indo-Aryans of South Asia: Language, Material Culture and Ethnicity*, ed. by G. Erdosy, 32-66. Berlin - New York.

Klein, L. (1977) A Panorama of Theoretical Archaeology. *Current Anthropology* 18, 1-43.

Khlopin, I. (1987) Excavations in the Sumbar Valley and their Importance for Central and Western Asia. *Information Bulletin of the IASCCA* 12: 19-29.

Kohl, P.L. (1984) *Central Asia: Palaeolithic Beginnings to the Iron Age*. Paris.

Kuz'mina, E.E. (1981) The Origin of the Indo-Iranians in the Light of Recent Archaeological Data. *Ethnic Problems of the History of Central Asia in the Early Period (2nd Millennium BC)*, ed. M.S. Asimov, B.A. Litvinski, L.I. Miroshnikov and D.S. Rayevski, 101-125. Moscow.

Kuz'mina, E.E. (1984) Classification and Periodisation of Andronovo Cultural Community Sites. *Information Bulletin of the IASCCA* 9: 23-46.

Litvinski, B. and Pyankova, L. (1992) Pastoral Tribes of the Bronze Age in the Oxus Valley. *History of Civilisations of Central Asia, Volume I: The Dawn of Civilisation: Earliest Times to 700 BC*, ed. A.H. Dani and V.M. Masson, 379-394, Paris.

Mandel'shtam, A.M. (1968) *Pamyatniki epokhi bronzy v juzhnom Tadzhikistane*. Materialy i Issledovaniya po Arkheologii SSSR, no. 145. Leningrad.

Masson, V.M. (1959) *Drevnezemledel'cheskaya Kultura Margiany*. Leningrad.

Masson, V.M. (1986) Central Asia in the Early Iron Age: Dynamics of Cultural, Social and Economic Development. *Information Bulletin of the IASCCA* 9: 59-68.

Masson, V.M. (1992) The Decline of the Bronze Age Civilisation and the Movement of Tribes. *History of Civilisations of Central Asia, Volume I: The Dawn of Civilisation: Earliest Times to 700 BC.*, ed. A.H. Dani and V.M. Masson, 337-356, Paris.

Miller, M. (1956) *Archaeology in the USSR*. New York.

Parpola, A. (1988) The Coming of the Aryans to Iran and India and the Cultural and Ethnic Identity of the Dasas. *Studia Orientalia* 64, 195-302.

Parpola, A. (1993) Margiana and the Aryan Problem. *Information Bulletin of the IASCCA* 19: 41-62.

Parpola, A. (1995) The Problem of the Aryans and the Soma: the Archaeological Evidence. *The Indo-Aryans of South Asia: Language, Material Culture and Ethnicity*, ed. by G. Erdosy, 353-381 Berlin and New York.

Pumpelly, R.W. (1908) *Excavations at Anau*. Washington.

Pyankova, L. (1982) Southwest Tadjikistan in the Bronze Age. *Information Bulletin of the IASCCA* 1: 35-46.

Renfrew, A.C. (1987) *Archaeology and Language: the Puzzle of Indo-European Origins*. London.

Renfrew, A.C. (1990) Archaeology and Linguistics: Some Preliminary Issues. *When Worlds Collide*, ed. by T.L. Markey and J.C. Greppin, 15-31. Ann Arbor.

Renfrew, A.C. and Cherry, J.F. (ed.) (1986) *Peer Polity Interaction and Socio-political Change*. Cambridge.

Sarianidi, V.I. (1979) *Drevniye Zemledel'tsi Afghanistana*. Moskva.

Sarianidi, V.I. (1986a) Early Iron Age Painted Ware Culture of South-Western Asia. *Information Bulletin of the IASCCA* 9: 4-22.

Sarianidi, V.I. (1986b) Le complexe cultuel de Togolok-21 en Margiane. *Arts Asiatiques* 41: 5-21.

Sarianidi, V.I. (1987) South-West Asia: Migrations, the Aryans and Zoroastrians. *Information Bulletin of the IASCCA* 13: 44-56.

Shennan, S.J. (1978) Archaeological "Cultures": an Empirical Investigation. *The Spatial Organisation of Culture*, edited by I. Hodder, 113-139. London.

Shennan, S.J. (1989) Introduction: Archaeological Approaches to Cultural Identity. *Archaeological Approaches to Cultural Identity*, edited by S.J. Shennan, 1-32. London.

Shaffer, J.G. (1984) The Indo-Aryan Invasions: Cultural Myth and Archaeological Reality. *The Peoples of South Asia*, edited by J.L. Lukacs, 74-90. New York.

Silvi Antonini, C. and Stacul, G. (1972) *The Protohistoric Graveyards of Swat*. Rome.

Tosi, M. (1986) Early States of Middle Asia. *Oriens Antiquus* 25: 153-187.

Tusa, S. (1979) The Swat Valley in the 2nd Millennium BC: the Question of Marginality. *South Asian Archaeology 1977*, ed. by M. Taddei, 675-695. Naples.

THE ACHAEMENIDS IN THE HISTORY OF CENTRAL ASIA

by B. GENITO

1. STATE OF ART

History and Archaeology are closely related disciplines although there are frequent cases where differences and contradictions between their separate classes of data are striking. However there are instances when their combination is quite possible. Iran of the Achaemenid times (6th-4th centuries BC) appears to belong mainly to the former group of cases, where the archaeological documentation and the historical data are very difficult to reconcile (Genito in press a). The coming of the Achaemenid, an event strongly influencing the historical record of Ancient Near East, appears hardly recognizable from an archaeological point of view (1). The peculiar feature of the archaeological documentation is the extensive macroscopic architectonic and figurative evidence, concentrated in Fars, on the one hand, and the sporadic presence of ordinary settlements anywhere, on the other (for the Median period cf. Sancisi-Weerdenburg 1979; 1985; 1990; Genito 1986; in press b; Muscarella 1987; 1994; for the Achaemenid period cf. Haerinck 1984; 1987; Moorey 1985; Genito 1987a). And while reconstructing the figurative language and the ideological message of the ruling family is simple, it is also totally insufficient for understanding the period.

As a reflex of the political hegemony of the Achaemenids, Melikian-Chirvani recently (1993) tried to demonstrate the existence of an internationalization of the artistic style over the whole territory of the Achaemenid Empire. Notwithstanding his efforts, the results achieved from such a perspective of research are unconvincing, being largely based on the analysis of unprovenancéd artistic objects from the antiquarian market. The reason for the absence of such an imperialization or internationalization of Achaemenid culture could be considered as due to the short duration of the "Imperial" phase, and this interpretative criterion seems to have been followed by Vogelsang (1992a, 10), who regarding the Medes, says that if they had had more time at their disposal they would have produced more artistic remains. In my opinion (Genito in press b) the duration of a state-level social organization itself depends on the degree of complexity reached; as a result, the paucity of recognisable Median and Achaemenid remains can just as easily be ascribed to inadequate socio-political complexity, already reflected in the short – if spectacular – life of these empires, taking always into consideration the possibility of important future discoveries.

Within the historical reconstruction of ancient Iran the three dynastic partitions of Achaemenid, Arsacid and Sasanian were, of course, fundamental. The archaeological data, however, cannot easily be constrained within ethno-cultural co-ordinates, let alone fitted into a scheme of dynastic succession, except for the macroscopic architectonic evidence of such sites as Persepolis (Schmidt 1953; 1957; 1970), Pasargade (Stronach 1978), Naqsh-i Rustam, Bisutun or Susa (Perrot 1985), and their related epigraphic finds (Rossi 1981; 1984; 1986). For some classes of archaeological remains it may also be possible to begin to distinguish the Achaemenid (or for later times the Arsacid and the Sasanian) character from the Iranian, but hitherto only a few isolated contributions have been proposed in this perspective (e.g. Moorey 1985, for the Achaemenids and Gawlikowski 1979, for the Parthians). Even if such efforts were successful, the material remains of the

(1) The fact is self evident, and many scholars have evidenced it from different view-points; the question, in my opinion, can also go back to the very beginning of archaeological research in Iran. It is not my intention here to outline the ways in which, since the last century, the history of the archaeological research in Iran developed, but it is a fact that other Near Eastern countries like Egypt, Iraq, Syria, Palestine and Israel were largely preferred to Iran as object of research. Although the discoveries of archaeological monuments in Iran by explorers, geographers, diplomats and travellers date back at least to the 18th century, and the identification of the trilingual inscriptions of Persepolis and Pasargade by Grotefend to 1802, the birth of archaeological research can be dated only to the 1930s with the Persepolis expeditions of the Oriental Institute of Chicago, signalling the end of the French monopoly. While excavations at Hasanlu, Tall-i Malyan, Tepe Yahya, and in Sistan have revealed the enormous potential of Iranian Archaeology, no one of these excavations, outside Persepolis, Pasargade and Susa, are related to the Achaemenid period.

so-called "capitals" of Persepolis ([2]) Pasargade and Susa, however impressive, would not compensate for the general scarcity of other sets of data.

What is more, the surviving standing remains, including the famous sculptural relieves of Persepolis (Roaf 1974; 1983) and Pasargade (Stronach 1978), do not constitute, *strictu sensu*, traces of towns or settlements, but, according to most of the scholars (cf. Root 1979; 1980), rather express the materialization of the legitimizing ideology of the Achaemenid rule over a multi-ethnic context. How that ideology really functioned and even whether such an ideology of a state-dynastic structure was translated and adopted within different parts of the Empire are very hard questions to answer from an archaeological point of view. The levels generally explored by the archaeologists, in fact, do not allow one to see many elements of that royal ideology; nor do they give any clear idea of the structure of the administrative system that connected the lower, social level with the higher, political one, as has been clearly demonstrated by Sancisi-Weerdenburg (1990, 267). The presence of epigraphic materials (on architectural features, seals, vessels, tablets; in all 9000 lexematic occurrences of the so-called Old Persian) (Rossi 1984), attests, to be sure, to the existence of centralized administrative power, but does not provide elements for reconstructing either its real geo-political consistency or its social structure. The tablets, found mainly in the Treasury at Persepolis (Hallok 1969; 1973; 1978; 1985), although providing specific economic information, at the moment do not give sufficient evidence of the life of the various groups of peoples living under the rule of the Achaemenids.

The "Imperial" and the "Dynastic" characters in Ancient Iran are, thus, only visible in a few cases of specific architectural-territorial units, and not on a larger scale, unlike the case for other Imperial entities in the ancient world. To sum up, what one can know of the Achaemenids in Iran are fundamental aspects of their ideology, ethnos and language, as seen from dynastic inscriptions, and what is totally unknown concerns their living system and the relationship between them and other Iranian tribes. One cannot recover, for example, how many of the inhabitants of the Empire were Iranians or Indo-European speakers, what the relationship was between the ruling family and the rest of the population, and how life was conducted within the enormous territory of the Empire. And, what is more, while one can, barely, delineate the satrapies into which, according to the historical tradition, the Empire was subdivided, their placement within the overall socio-political system cannot at present be understood: are they really to be considered Achaemenized or Iranized, or are they simply under the political control, perhaps tributary in character, of an Iranian family of rulers.

Iran during the rule of the Achaemenid family is, thus, practically unknown (Sancisi-Weerdenburg 1990, 263) and this appears particularly evident for the eastern areas where there is a nearly complete absence of archaeological evidence referable with certainty to the Achaemenids ([3]). There is only a single exception, represented by Dahan-i Ghulaman, a large settlement site uncovered in Sistan (Scerrato 1962; 1966) which, according to the current interpretation (Genito 1987a), reveals clear traces of town-planning with planimetric and urbanistic characteristics typical of a centralized power system, though not specifically referable to the Achaemenid dynasty. If one adds to this traces of a consistent and solemn religious life present in the town, in public buildings as well as within domestic areas (Scerrato 1979; Genito 1987b), one can say that Dahan-i Ghulaman, though not completely investigated, is well fitted to an urban character of a state nature and remains one of very few excavated settlements in Iran belonging in whole or in part to the Achaemenid period (Genito 1990).

All the questions mentioned above remain without an uncontested answer even after half a century of archaeological research. However, this is not the place to study all the archaeological remains spread over the entire, enormous territory of the Achaemenid Empire. It would be more opportune, instead, to collect archaeological data on a micro-regional scale, in order to define some of the characteristics of the Empire and this is what we have began to do in the Merv Oasis (*infra*). With regard to the archaeological definition of an Empire, however, it would be very useful to discuss some of the common socio-political characteristics shared by other ancient Empires with the Achaemenian. This approach, already proposed by Sancisi-Weerdenburg (1990, 269) but never really put into practice, would allow us, in my opinion, to measure the degree of socio-political complexity of the Achaemenid Empire, as has been done for other great Imperial formations at their highest point of development, such as the Roman, the Chinese and the Byzantine. It would, thus, be possible to examine the origin, evolution, socio-economic and political nature, and ideological and religious beliefs of better documented Empires of similar territorial extent, to achieve basic elements of comparison. These are at present open questions, although many contributions have recently been proposed by Vogelsang, Briant, and others.

To compare common trends of different, but homogeneous state-levels may, therefore, be very fruitful and will also contribute to the historical reconstruction of the ways and modes in which such political formations developed. Looking at the architectonic, urban and material culture of, for example, the Roman Empire one

([2]) Apart from the fundamental contributions of Schmidt some promizing results were collected also by Tilia (1978) and Sumner (1986) in an important project on the Persepolis Plain; unfortunately these results remain isolated and, at the present time, represent the only archaeological and topographic data from the area.

([3]) For this aspect see the very important introduction of Vogelsang to his volume (1992a), where out of 315 pages only 55 are dedicated to the archaeological evidence.

can immediately realize that it left an incredible amount of archaeological data easily identifiable as Roman, in contrast to the scarcity of remains even in Iran that can be firmly identified as Achaemenid. While one hardly can say that Palestine, Egypt or Bactria were Achaemenized or Iranized, one can easily assert that the Iberian peninsula, North Africa or Pannonia were Roman, culturally as well as politically. Needless to say, such a comparative analysis must go deeper, and be based on a more detailed level of research. The great differences between the Roman and the Achaemenid Empires do not prevent one from considering them, however, as representing, in their respective cultural and historical contexts, the result of a particular economic, political and socio-anthropological process ([4]).

One thing is certainly clear: there is no correspondence between the enormous geopolitical extent of the Achaemenid Empire, as documented by historical sources and the material culture recognized in its territories; Hyrcania (Vogelsang 1988a) and the northeast frontier regions, areas of particular concern here, are good examples of this (Vogelsang 1989) ([5]), as few "Achaemenid" remains have ever been uncovered there (Vogelsang 1988a, 121). It thus appears from the archaeological evidence that the historical process that led to the formation of the Achaemenid State in Iran did not involve cultural homogenisation, but, rather, left specific regional, cultural characteristics practically intact. This is becoming more and more evident (Cattenat and Gardin 1977) and may also characterise later times (Haerinck 1983). It is hardly surprising, therefore, that a heated scientific debate has arisen about the controversial meaning of ancient sources (Genito in press a), a problem whose solution will come only through the complete re-analysis of existing field data as well as the acquisition of new information (Haerinck 1989).

What, then, was the reason behind the regionalizing character of Achaemenid political power? What impeded, especially within the more distant satrapies of the Empire, a strong Achaemenid cultural presence? To answer these questions one must, above all, identify levels of material culture, some dynastic (e.g. Achaemenid) in character, others ethnic (e.g. Iranian), and yet others political, with the common ground being their chronological attribution to the 6th-4th centuries BC. These three levels, inseparable from each other, in fact find logical correspondence in the socio-anthropological evolutionary line of Kinship-Tribe-Chiefdom-State. Thus a family, once belonging to a tribal clan, was an important part of the great political transformation that led, in a very short time, the Iranian plateau to an epochal Imperial change. This change, as well as the various levels of identity it produced, appears clearly in the royal attributes of the formula "I am Darius Great King ... king in Persia ... son of Vishtapa, grandson of Arshema, an Achaemenid", where family, Tribe/Ethnos and Political sphere appear in regular succession ([6]) (Fig. 1). The first of these stages initiated, and the second actually carried through, that immense process which transformed and overwhelmed the former socio-political organization of the Iranian tribes and the political equilibrium on the Iranian plateau and its surrounding areas.

In this respect it is important to analyze to what extent the dynasty of the Achaemenids retained its original tribal character, before transforming itself completely in a state direction at the level of clan-kinship identity (Vogelsang 1992, 10; Genito in press a; in press b). An answer to this question may help to resolve the enormous, often insurmountable, difficulties of interpretation regarding the first Iranian imperial dynasty. One possible explanation may be that a clan or tribal group, as the Achaemenid probably was, rapidly seized extensive political power, imposing rules and collective behaviour on multi-ethnic social structures. The prevailing family-system of the dynasty – still of nomadic type, i. e. based on the principles of "lineality" and "locality" – was then gradually extended with the creation of tributary relations ([7]). This grandiose

([4]) As is known, the Roman Empire has been characterized by the majority of the scholars as depending on a slave mode of production, while the Achaemenid Empire was said to be supported by a state mode of production in a way connected to the famous Asiatic mode of production (Tökei 1975). The only aspect which those two political entities seem to share is the intrinsic value of a superstate political control.

([5]) The question has been debated many times by different scholars and one of the Achaemenid workshops in Groningen has just been dedicated to the Centre and the Periphery of the Empire (Sancisi-Weerdenburg and Kuhrt 1990). However, in spite of the contributions of Cattenat and Gardin (1977), who for the first time examined the relationship between the Achaemenid Empire and Central Asia on the basis of the material culture of the time, and of Moorey (1985) or Vogelsang (1986; 1988; 1989; 1992), the task is still open and it is difficult to undervalue the historical consistency of the Achaemenid Empire.

([6]) Precisely because the contents of many Achaemenid texts consist of fixed formulas it is not surprizing that the evolution of political systems on the plateau finds full correspondence in the logical sequence of expressions used by the royal inscriptions of the Achaemenids. It is clear, nevertheless that for a non specialist to relate the linguistic data with archaeological or socio-anthropological data remains problematic. See, however, for the Achaemenid period, Rossi (1981, final schema) and, for the Median, Brown, who in different papers (1979; 1986; 1988; 1990) put clearly in evidence the sociol anthropological change north-west Iran underwent at that time.

([7]) The social stages of evolution from tribe to State formulated by Service (1962) and Fried (1967), deal with the origin of the State (Claessen and Skalnik 1978; 1981), but unfortunately the archaeological indicators of an Empire are not easy to be singled out. To this perspective, although related to Late Prehistoric Europe, see the contribution of Gibson and Geselowitz (1988), especially as far as "archaeological correlates" are concerned. The main social process occurring in the Iranian Plateau is related to the extension of the social base, allowing groups of conquered peoples to survive while acknowledging the principle of supremacy and royalty imposed by the victors. At the top of the social pyramid,

socio-political transformation inevitably produced an élite capable of directing it in accordance with precise, newly-created ideological rules. At a lower level, by contrast, there was possibly a continuity of traditional productive activity that had been flattened to such an extent as to be no longer perceptible and revealing no sign of political and dynastic "imperialization" ([8]).

Due to contemporary political conditions, of course, archaeological research into the pre-Achaemenid and Achaemenid periods in the last two decades has been mainly concentrated in Central Asia, so much so that, paradoxically, we now have more data from peripheral areas of the Empire than from its center (Vogelsang 1988, 1989). Increased archaeological activity in the former Soviet republics of Turkmenistan and Uzbekistan, in particular, has provided an enormous amount of data still waiting to be fully analyzed and discussed ([9]). Although a general model of the socio-economic integration of former village communities has been followed (Masson and Sarianidi 1972; Biscione 1977; Kohl, Biscione and Ingraham 1982; Young 1985), it is difficult to know if the trends it specifies may be considered internal or external to the origin and the formation of the Achaemenid Empire (Francfort 1979). Specific studies of material culture (Cattenat and Gardin 1977), general reviews of the archaeological data of the period (Cleuziou 1985; Genito 1987a; 1990), and contributions fully devoted to comparing archaeological with historical data (Vogelsang 1985; 1986; 1987; 1988a; 1988b; 1989; 1992a; 1992b), have now made possible a discussion on the scarcity of archaeological documentation, on one hand, and the very ample historic valency of the Empire, on the other.

From this perspective, it would be particularly significant to draw attention to analyses of archaeological remains in the peripheral areas of the Achaemenid Empire by an "Archaeology" that I have elsewhere indicated as that of the "Iranian Empires" (Genito in press a, n. 4) ([10]). This must be made in spite of the lack of any past investigation capable of shedding light on the role played by dynastic Empires ([11]), in which priority was given precisely to the way these Empires were formed and grew, i.e. to their delineation in the archaeological record. However, this methodological perspective has been associated more closely with the historical-chronological and ethno-cultural dimensions than with the archaeological ([12]). Further, the different hypotheses advanced up to now about the nature and the character of the Achaemenid State have been based mainly on historical data (for a summary of mainstream opinions, see Vogelsang 1992 a) which has favoured a centralizing interpretation, as opposed to the regionalizing viewpoint emerging from the archaeological record (Fig. 2). Both views are, in fact, acceptable, in my opinion, because the different socio-political aspects stressed were probably simultaneously present in the Achaemenid political system.

In the context just discussed, the Merv Oasis offers a fascinating case-study, promoting a re-interpretation of one of the most important frontier areas of the Empire (Genito in press a). The work started in 1989 had amongst its main aims, in fact, the verification, on a micro-regional scale of the transformations, detectable

precisely as in the case of nomadic populations, a "royal" clan, descent within which would be ensured by the exclusive father/son relationship, represents supreme power and the prerogative of the entire dominant clan (Genito in press a). An archaeological definition of these political entities cannot avoid investigating their formation processes. In this perspective, the 6th century BC for the Achaemeniad is the crucial chronological timespan but, unfortunately, up to little archaeological research has been done in relation to the formative processes of the empire.

([8]) The question, historically very delicate, is particularly important for the social evolution of the people living in the plateau. The extended kin, the social unit of a typical nomadic context in Eurasia between the 1st millennium BC and the 1st millennium AD (Krader 1955a; 1955b) could certainly survive partly or completely during the rule of the dynastic families in Iran. This element could confirm the very lack of Iranian dynastic presence in the material assemblage of the whole plateau. One would be with the Achaemenid dynasty in presence of a state or supra-state social organization still preserving, at the highest political level, its traditional consanguineous lineage.

([9]) The principal contribution on these aspects remains the book edited by Koshelenko (ed. 1985) as far as the historical times are concerned.

([10]) In this perspective, see the contributions of Eisenstadt (1963; 1967), on the basis of which ancient Iran can be interpreted as a pre-industrial political Empire during the three dynastic ages of the Achaemenids, Parthians and Sasanians; see also the section entitled "The Emergence of Empires (1st Millennium BC - 1st Millennium AD) in the Actes du Seminaire CNRS/NSF de Bellevaux (24-29 juin 1985) published in *Palaeorient*, 11/2 (Empires 1985) although it is dedicated only to southwest Iran. One entire volume of *World Archaeology* (23/3 - 1992) was also dedicated to the Archaeology of Empires, including Assyria, Rome, Han China, the Carolingians, the Inkas and the Aztecs; no contribution was, unfortunately, dedicated to Iran. The relation between empires and frontiers in the ancient world, independent of geographical areas has some common aspects to be considered and evaluated (Genito in press c). The relevant bibliography on this question is particularly large; see the contributions of Miller and Steffen (1977), Norton (1977), Osborne and Rogerson (1978), De Atley and Findlow (1984) and, for a methodological approach, the volume of Green and Perlman (1985).

([11]) The archaeological traces of dynastic valency in Ancient Iran have never been sufficiently investigated. Though very difficult to be detected, a dynastic archaeological characterization would be particularly significant. It seems very important to me to cite here the presence of three types of archaeological constructions which Briant (1985, 247) saw as fundamental in order to talk about satraps in a given territory: 1. towns ensured by sources; 2. fortresses or fortified centres; 3. residences or palaces of rulers.

([12]) Jacobson (1987) and Tosi (1994) have tried to provide evidence of this trend, the former on the basis of the interpretation of funerary remains between the Late Bronze Age and Early Iron Age in Siberia, and the second from a more socio-anthropological perspective within more general considerations about the formation process of a pastoral economy.

at archaeological level, that the area underwent from the 7th to the 5th century BC.

2. The Eastern Frontier of the Achaemenid Empire: the Sources

The term Margus-Marw (ethnic margava) is one of the names omitted in the Greek list of satrapies, as, according to the inscription of Bisutun (38-39), it was a subdivision belonging to the satrapy of Bactria. In the hymn to Mithra (Yasht 10, 14) "margum, harevam, gavam" (i.e. Marw, Herat and Gava) ([13]) are mentioned as possibly three subdivisions of Bactria which, before the reorganization of Darius, represented eastern Iran. In the Videvdad (I, 5-7), the three parts of the satrapy are likewise enumerated: "Gava home of the Sogdians, Marw the strong, Bacl the beautiful". According to other sources, Margiana was a rich oasis, protected all around by sandy deserts; later, the wine of the area seems to have become very famous (Strabo XI.10, 2; Herzfeld 1968, 324). Since Marw was included in the satrapy, Bactria stretched along the Oxus up to the place where a large surplus of water was located (in the present-day Chardzou). In this way the watershed between the Oxus and Iaxartes, rather than the Oxus itself, constituted the northern boundary of the satrapy; the southern one being the Hindukush range. In the Avestan passage one can also see that Margu (Marv or Margiana) formed part of the territory of Areia-Haraiva (i.e. Herat and its environs on the Hari-Rud) whereas under Darius it was, instead, part of Bactria.

Western authors knew little or nothing about the eastern extent of Iran, including the Merv oasis, under the Medes and Cyrus; nevertheless, none of the classical authors contradicts Ctesias' story of the Bactrians submitting to Cyrus after he married Astyages' daughter. Legendary as it is, the story would mean that Bactria also belonged to the Median Empire, and this seems to be confirmed by the fact that the Persians used the form Bacl to denote that satrapy (Herzfeld 1968, 324). That this eastern part really belonged to the Achaemenid Empire would seem also to be confirmed by the fact that the Saka from the Iaxartes may have taken part already in the conquest of Nineveh. In addition, the fact that Amorges fought on Cyrus' side against Croesus and the Derbikes, and the foundation of Cyreschate in Ferghana both support the assertion that Cyrus' new conquests went beyond the older Iaxartes frontier. Berossus, furthermore, places the war in which Cyrus was killed in the land of the Daha, while Ctesias' Derbissoi/Derbikes and Herodotus' more legendary Massagetae would all belong to the steppes east of the Caspian and west of Hvarazmis, areas located outside the Achaemenid Empire. The Parikanoi in Ferghana, the lapis mines of Minjan in Sugda, Dardistan near Chitral, delineate clearly the northeastern boundary of empire, which reached the Pamirs, the natural watershed between Chinese Turkistan and the western regions. Finally, the names Paktyike, Kaspapyros and Kaspeiroi seem modelled upon official Iranian names corresponding to the Indian originals: the great Indian desert on the left bank of the easternmost tributary of the Indus constituted also the boundary of the Achaemenid Empire. For the post-Achaemenid time it is known that Alexandria of Margiana (the present Merv) was founded by Alexander the Great in 328 BC., and was reconstructed by Anthiochus I Soter, son of Seleucus I, between 293 and 281, under the name of Anthiochia (Pliny, NH.VI, 46-47) ([14]).

3. Historical Background

Central Asia has been considered by most scholars, though with different emphases, as the homeland of several Indo-European peoples, including the Iranians ([15]). One of its southern corridors, present-day Turkmenistan, has also been seen as one of the routes of the Indo-Iranians who, crossing the Kopeth-Dagh, reached the Iranian plateau ([16]). From the 6th century BC to the 7th

([13]) Gava is the Pahlavi translation "dast, plain"; perhaps to be connected with the. Greek gua, guia, "arable land" (Herzfeld 1968, p. 324).

([14]) Very important is the following passage of Pliny "Sequitur regio Margiane apricitatis inclutae, sola in eo tractu vitifera, undique inclusa montibus amoenis, ambitu stadiorum M-D, difficilis aditu propter harenosas solitudines per CXX p., et ipsa contra Parthiae tractum sita. In qua Alexander Alexandriam condiderat (in 328 BC), qua diruta a barbaris Antiochus Seleuci filius eodem loco restituit Syrianam interfluente Margo, qui corrivatur in Zotha lacu; maluerat illam Anthiochiam appellari (293-281). Urbis amplitudo circumitur stadiis LXX. In hanc Orodes Romanos Crassiana clade captos deduxit (This is referring to the 1000 Romans made prisoner by the Parthian King Orodes II, after Crassus' defeat at Carrhae in 53). Ab huius excelsis per iuga Caucasi protenditur as Bactros usque gens Mardorum fera, sui iuris".

([15]) The already complex question of the origins of the Indo-Europeans becomes at the archaeological level a much more complicated task. The question has been dealt with many times by different scholars, for example, Harmatta (1983) Renfrew (1987) or Mallory (1989).

([16]) A multitude of hypotheses have been advanced in this regard. Young (1965; 1967) tried to trace the coming of the Iranians in the Iranian plateau by dividing the Iron Age in northwest Iran in three different periods, of which the last, Iron III (7th-6th) appeared in his opinion as the only complex possibly related to them, since Iron IV was clearly associated with the Achaemenids. Ghirshman (1977), by contrast, hypothesized two different routes for the coming of the Iranians, one through the Caucasus and the other through the Kopeth-Dagh; unfortunately his views were never confirmed in the archaeological record, and have been severely criticized. Young returned to the question again (in 1985), but he did not cite new evidence. Finally, the ideas of Medvedskaja (1977a; 1977b; 1982; 1988), elaborated during the last twenty years, are partly acceptable as far as they relate to the archaeological evidence for the arrival of the Indo-Europeans, but not so when she distorts the archaeological context in order to fit it with the historical sources. Her latest contribution (1988) has been particularly strongly criticized by Dyson and Muscarella (1989).

century AD the whole area north-east of that chain represented an enormous frontier area. However, long before that, at least as early as the 4th-3rd Millennium BC, Bactria, Sogdiana, Khorasmia and Margiana already constituted historical-cultural entities, being areas of extensive migration and settlement. While it has been possible to take for granted that these areas represented internal or peripheral regions of the Achaemenid Empire, it now appears essential to confirm this hypothesis in the archaeological record ([17]), especially in light of excavations at the sites of Gjaur-Kala and Erk-Kala in Merv (Usmanova 1963; 1969a; 1969b; 1970; 1976; 1978; 1979; Usmanova and Filanovich 1979; Usmanova, Filanovich and Koshelenko 1985; Gorjaeva and Rtveladze 1989). These have contributed new light to the archaeological history of the area, although the definition of the nature of the Achaemenid Empire and its geo-political limits continues to be based on the ambiguous perspective of historical sources (Gnoli 1989, 14; *idem* in press, 5) ([18]).

To this day, of course, the most significant archaeological evidence of the relations between the Achaemenid Empire and Central Asia is found on the staircases of the apadana in Persepolis: side by side with groups of people from the central and western parts of the Empire (Thracians, Lydians, Phrygians, Babylonians, Medes, and so on) one sees Central Asian peoples (Bactrians, Khorasmians, Scythians, Margians and Sodgians) and even Indians. However, it is necessary to recall that this photographic encyclopaedia is unique for practically all the imperial Iranian periods, and that its relationship to historical reality is far from being completely understood, even after countless studies. Although the Central Asian delegations are depicted as being nomadic, based on their physiognomy, dresses and belongings, it is not always clear who and what they actually represented (Vogelsang 1992b) in spite of the "Saka," "Khorasmian," and other labels attached to them in later times. All the same, constant nomadic presence in Central Asia is not a disputable fact, and the archaeological equipment of the nomadic peoples, characterized as they are by the so-called "Animal-Style," reveal lines of contiguity between "nomadic-pastoral" and "agricultural-sedentary" communities of Iranians inside the Achaemenid Empire and later ages (Alexander 1980).

References

Alexander, S.M. (1980) The Influence of Achaemenian Persia on the Jewellery of the Migration Period in Europe. Schmandt-Besserat, D. (ed.) *Ancient Persia: The Art of an Empire.* pp. 87-97. Undena.

Biscione, R., (1977) The Crisis of Central Asia Urbanization in 2nd Millennium B.C. and Villages as an Alternative System, *Le Plateau iranien et l'Asie Centrale des origines à la conquête islamiques*, Deshayes, J., (ed.), pp. 113-127, Paris.

Briant, P. (1985) La Bactriane dans l'empire Achéménide. L'Etat central achéménide en Bactriane, *L'archéologie de la Bactriane Ancienne, Actes du Colloque franco-soviétique, Dushanbe (U.R.S.S.), 27 octobre - 3 novembre 1982.* pp. 243-251. Paris.

Briant, P. (1993) L'histoire polithique de l'Empire Achéménide: problèmes et méthodes (à propos d'un ovrage de M.A. Dandamaev). *Revue des études anciennes,* 95, 3-4, pp. 399-423. Paris.

Briant, P. (1994) L'histoire Achéménide: Sources, Méthodes, Raisonnement et modèles, *Topoi, 4,* pp. 109-130.

Brown, St.C. (1979) *Kinship to Kingship: Archaeological and Historical Studies in the Neo-Assyrian Zagros, Ph.D., diss.* University of Toronto.

Brown, St.C. (1986) Media and Secondary State Formation in the Neo-Assyrian Zagros: An Anthropological Approach to an Archaeological Problem, *Journal of Cuneiform studies*, 38, 2 figs pp.107-119.

Brown, St. C. (1988) The Mêdikos Logos of Herodotus and the Evolution of the Median State, *Achaemenid History III, Method and Theory,* pp.71-86. Leiden.

Brown, St.C. (1990) Media in the Achaemenid Period: The Late Iron Age in Central West Iran, *Achaemenid History, IV, Centre and Periphery, Proceedings of the Groningen 1986 Achaemenid History Workshop.* Sancisi-Weerdenburg, H. & Kuhrt, A., (ed.), pp. 63-76, Leiden.

Cattenat, A. and Gardin, J.C. (1977) Diffusion comparée de quelques genres de poterie caractèristique de l'époque Achéménide sur le plateau iranien et en Asie Centrale, *Le Plateau Iranien et l'Asie Centrale des Origines à la Conquête Islamique*, pp. 225-148. Paris.

Claessen, H.J.M. and Skalník, P. (1978) *The Early State.* The Hague-Paris-New York.

Claessen, H.J.M. and Skalnik, P. (1981) *The Study of the State.* Den Haag.

Cleuziou, S. (1985) L'Age du Fer à Tureng Tepe (Iran) et ses relations avec l'Asie centrale, *Actes du Colloque franco-soviétique, L'Archéologie de la Bactriane Ancienne Dushambe (U.R.S.S.), 27 octobre- 3 novembre 1982. Éditions du CNRS,* pp. 175-185. Paris.

De Atley, S.P. and Findlow, F.J. (ed.) (1984) *Exploring the Limits. Frontiers and Boundaries in Prehistory. BAR International Series 223.* Oxford.

Diakonov, M.I. (1985) Media, *Cambridge History of Iran*, II, pp.36-148, Cambridge.

Dyson, jr. R. H. and Muscarella, O.W. (1989) Constructing the Chronology and Historical Implications of Hasanlu IV, *Iran*, 27, pp. 1-27. London.

([17]) Though these areas have already been subjected to extensive archaeological research, very few imperial characteristics have been uncovered within them and other related regions (Koshelenko (ed.) 1985, 204-350); imperial boundaries of dynastic Iran, thus, have never been clearly delineated.

([18]) The scientific debate on the formation, nature and development of the Achaemenian Empire has been more ample than that on other issues, but unfortunately the reconstruction of Iranian society at the time is still far too incomplete. The situation seems very different within the rest of the Empire. The existence of regional characteristics for material culture within imperial Iran has long been recognized for the Achaemenid Age and is now generally accepted by most scholars. See, for example, Briant (1993; 1994) regarding the political systems of the Achaemenids, a subject I shall deal with elsewhere.

Eisenstadt, S. (1963) *The Political System of Empires*. New York.

Eisenstadt, S. (1967) *The Decline of Empires*. Englewood Cliff.

Empires (1985) The Emergence of Empires (1st Millennium B.C. - 1st Millennium A.D.), Actes du Semimaire CNRS/NSF de Bellevaux (24-29 juin 1985), *Paléorient*, 11/12, pp. 57-82. Paris.

Francfort, H.P. (1979) *Les fortifications en Asie Centrale de l'âge du Bronze à l'époque Kouchane*. Paris.

Fried, M.H. (1967) *The Evolution of Political Societies*. New York.

Gawlikowski, M. (1979) L'art "parthe" et l'art "arsacide", *Akten des VII. Internationalen Kongresses für Iranisches Kunst und Archäologie, München, 7-10. September 1976. Archäologische Mitteilungen aus Iran, Erganzungsband 6, Berlin*. pp. 323-326. Berlin.

Genito, B. (1986) The Medes, a Reassessment of the Archaeological Evidence, *East and West*, 36, Nos. 1-3 (September), pp. 11-81. Rome.

Genito, B. (1987a) Una città achemenide tra centro e periferia dell'impero, *Oriens Antiquus*, XXV, 3-4, pp. 287-317. Roma.

Genito, B. (1987b) Altari a gradini nell'Iran antico, Gnoli, G. & Lanciotti, L. (ed.), *Orientalia Iosephi Tucci Memoriae Dicata*, pp. 475-484. Rome.

Genito, B. (1990) The Most Frequent Pottery Types at Dahan-i Ghulaman and their Spatial Variability, *South Asian Archaeologists*, 1987, ed. by . Taddei, pp. 587-604. Rome.

Genito, B. (1996 a) The Iranian Empires and Central Asia: an Archaeological Perspective, Accademia Nazionale dei Lincei Atti dei Convegni Lincei 127, *La Persia e L'Asia centrale da Alessandro al X secolo,* in collaborazione con l'IsMEO, Rome 9-12 November 1994, pp. 401-421. Rome.

Genito, B. (1996 b) *The Material Culture of the Medes: Limits and Perspectives in the Archaeological Research, Un ricordo che non si spegne*, Scritti di docenti e collaboratori dell'Istituto Universitario Orientale di Napoli in memoria di Alessandro Bausani, pp. 103-118. Napoli

Genito, B. (in press c) The Scythians and the Frontiers of the Achaemenid Empire, *The Origins of the Civilizations in the Mediterranean Europe*. Palermo.

Ghirshman, R. (1977) *L'Iran et la Migration des Indo-Aryens et des Iraniens*. Leiden.

Gibson, D.B. and Geselowitz, M.N. (1988) *Tribe and Polity in Late Prehistoric Europe*. New York-London.

Gnoli, G. (in press) Iranic Identity as a Historical Problem: the Beginnings of a National Awareness Under the Achaemenians. *Atti del Convegno della Scuola Orientale*. Roma.

Gnoli, G. (1989) *The Idea of Iran, Serie Orientale Roma LXII*, Roma.

Goryaeva, V.D. and Rtveladze, E.V. (1989) *Trudy YuTAKE, XIX, Drevni Merv*. Ashkhabad.

Green, S. W. and Perlman, S. M. (1985) *The Archaeology of Frontiers and Boundaries*. London-New York.

Haerinck, E. (1983) *La céramique en Iran pendant le période Parthe*. Gent.

Haerinck, E. (1984) L'Iran meridional, des Achemenides jusqu'à l'avènement de l'Islam. Bilan des recherches, Arabie orientale, *Mésopotamie et Iran méridional de l'âge du fer au début de la période islamique*, pp. 299-306. Paris.

Haerinck, E. (1987) La Neuvieme Satrapie: Archéologie confronte Histoire? Sancisi-Weerdenburg, H. (1987) *Achaemenid History I, Sources, Structures and Synthesis*, pp. 139-145. Leiden.

Haerinck, E. (1989) The Achaemenid (Iron Age IV) Period in Gilan, Iran, De Meyer, L. de Haerinck, E. (ed.) *Archaeologica Iranica et Orientalis. Miscellanea in honorem Louis Vanden Berghe*, pp. 455-474. Gent.

Hallock, R.T. (1969) *Persepolis Fortifications Tablets* (OIP, Vol. 92), The University of Chicago. Chicago.

Hallock, R.T. (1973) The Persepolis Fortifications Archive, *Orientalia*, NS, 42, pp. 320-323.

Hallock, R.T. (1978) Selected Fortifications Texts, *Cahiers de la Délégation Archéologique Française en Iran*, 8, pp. 109-136. Paris.

Hallock, R.T. (1985) The Evidence of the Persepolis Tablets, Gershevitch, I. (ed.) (1985) *The Cambridge History of Iran, Vol. 2, The Median and the Achaemenian Periods*, pp. 588-609. Cambridge.

Harmatta J. (1983) Proto-Iranians and Proto-Indians in Central Asia in the 2nd Millennium B.C. (Linguistic Evidence), *Etnicheskie problemy istorii central'noi Azii v drevnosti c II tysyacheletie do n.e.*, pp. 75-83. Moskva.

Herzfeld, E. (1968) *The Persian Empire*. Wiesbaden.

Jacobson, E. (1987) *Burial Ritual, Gender and Status. Papers on Inner Asia*, no. 7. Bloomington.

Kohl, P.L., Biscione, R. and Inghrahan, M.L. (1982) Implications of Recent Evidence for the Prehistory of Northwestern Iran and Southwestern Turkmenistan, *Iranica Antiqua*, 17, pp. 1-20. Gent.

Koshelenko, G.A. (ed.) (1985) *Drevneishiye Gosudarstva Kavkaza i Srednei Azii*. Moskva.

Krader, L. (1955a) Principles and Structures in the Organization of the Asiatic Steppe-Pastoralist, *Southwestern Journal of Anthropology*, 11, 2, pp. 67-92. Albuquerque.

Krader, L. (1955b) Ecology of Central Asian Pastoralism, *Southwestern Journal of Anthropology*, 11, 4, pp. 302-326. Albuquerque.

Mallory, J.P. (1989) *In Search of the Indo-Europeans*. London.

Medvedskaya, I.N. (1977a) Mogil'nik kaitarye-novyj pamyatnik rannezheleznogo veka irana, *Sovetskaja Archeologiya*, 1, pp. 169-175. Moskva.

Medvedskaya, I.N. (1977b) Ob "iranskoi" prinadlezhnosti seroi keramiki rannezheleznogo veka Irana, *Vestnik Drevnei istorii*, 2, 140, pp. 93-105. Moskva.

Medvedskaya, I.N. (1982) *Iron Age in Iran, British Archaeological Report, International Series*, London.

Medvedskaya, I.N. (1988) Who destroyed Hasanlu IV, *Iran*, 26, pp. 1-15. London.

Melikian-Chirvani, A.S. (1993) The International Achaemenid Style, *Bulletin of the Asia Institute, N.S., 7*, pp. 111-130.

Miller, D.H. and Steffen, J. O. (ed.) (1977) *The Frontiers Comparative Studies*. Norman.

Moorey, P.R.S. (1985) The Iranian Contribution to Achaemenid Material Culture, *Iran*, 23, pp. 21-37. London.

Muscarella, O.W. (1987) Median Art and Medizing Scholarship, *Journal of Near Eastern Studies*, 46, 2, pp. 109-127. Chicago.

Muscarella, O. W. (1994) Median Art, *Achaemenid History VIII*, Sancisi-Weerdenburg (ed.) *Achaemenid History. Proceedings of the Groningen Achaemenid History Workshop*, Leiden.

Norton, W. (1977) A Conceptual Framework for the Process of Frontier Settlement, *Comparative Frontier Studies: An Interdisciplinary Newsletter*. 11. Norman.

Osborne, B. and Rogerson, C.M. (1978) Conceptualizing the Frontier Process: Development or dependency, *Comparative Frontier Studies: An Interdisciplinary Newsletter*. 11. Norman.

Perrot, J. (1985) Suse à la periode achéménide, *Palaeorient*, 11, 2, 1, fig. pp. 67-69. Paris.

Renfrew, C. (1987) *Archaeology and Language*. London-New York.

Roaf, M. (1974) The Subject Peoples on the Base of the Statue of Darius, *Cahiers de la Délégation Archéologiques Française en Iran*, pp.73-160. Paris.

Roaf, M. (1983) *Sculptures and Sculptors at Persepolis, Iran*, XXI. London.

Root, M.C., (1979), *The King and Kingship in Achaemenid Art*. Leiden.

Root, M.C. (1980) The Persepolis Perplex: Some Prospects Borne of Retrospect, *Ancient Persia: The Art of an Empire*, Schmandt-Besserat, D., (ed.), pp. 5-14. Malibu.

Rossi, A.V. (1981) La varietà linguistica nell'Iran Achemenide, *AIΩN, Annali del Dipartimento di Studi del Mondo Classico e del Mediterraneo Antico, Sezione Linguistica*, 3, pp. 141-196. Napoli.

Rossi, A.V. (1984) Glottonimia ed etnonimia nell'Iran Achemenide, *AIΩN, Annali del Dipartimento di Studi del Mondo Classico e del Mediterraneo Antico, Sezione Linguistica*, 6, pp. 39-65. Napoli.

Rossi, A.V. (1986) I materiali iranici, *Rivista Biblica*, 34, pp. 55-72. Bologna.

Sancisi-Weerdenburg and Kuhrt, A. (eds.) (1990) *Achaemenid History, IV, Centre and Periphery. Proceedings of the Groningen 1986 Achaemenid History Workshop*. Leiden.

Sancisi-Weerdenburg, H. (1979) Medes en perzen. Op het brekvlak tussen Archeologie en Geschiedenis. *Lampas. Tijdschrift voor Nederlandse Classici*, XII, 3, pp. 208-22.

Sancisi-Weerdenburg, H. (1985) What about the Median Empire?, *Fifth Achaemenid History Workshop*, pp.1-17, Groningen.

Sancisi-Weerdenbug, H. (1990) The Quest for an Elusive Empire, Sancisi-Weerdenburg & Kuhrt, A. (eds.) (1990) *Achaemenid History, IV, Centre and Periphery. Proceedings of the Groningen 1986 Achaemenid History Workshop*. pp. 263-274. Leiden.

Scerrato, U. (1962) A Probable Achaemenid Zone in Persian Sistan, *East and West*, N.S. 13/2-3, pp. 186-197. Rome.

Scerrato, U. (1966) Excavations at Dahan-i Ghulaman (Seistan-Iran), First Preliminary Report (1962-1963), *East & West*, N.S., 16, 1-2, pp. 9-30. Rome.

Scerrato, U. (1979) Evidence of Religious Life at Dahan-i Ghulaman, Sistan, *South Asian Archaeology* 1977, pp. 709-735, Naples.

Schmidt, E. (1953) *Persepolis I. Structure, Reliefs, Inscriptions*. Chicago.

Schmidt, E. (1957) *Persepolis II. Contents of the Treasure and Other Discoveries*. Chicago.

Schmidt, E. (1970) *Persepolis III. The Royal Tombs and Other Monuments*. Chicago.

Sekunda, N. (1991) Achaemenid Settlements in Caria, Lycia and Greater Phrygia, Weerdenburg and Kuhet, A. (eds.) *Achaemenid History, IV, Centre and Periphery, Proceedings of the Groningen 198 Achaemenid History Workshop*, pp. 83-143. Leiden.

Service, E. (1962) *Primitive Social Organization*. New York.

Stronach, D. (1978) *Pasargadae*. London.

Sumner, (1986) Achaemenid Settlement in the Persepolis Plain, *American Journal of Archaeology*, 90, pp. 3-31.

Tilia, A.B. (1978) A Survey of Achaemenian Sites in the Northeastern Part of the Marvdasht Plain, Tilia, A.B., Tilia, G. (eds.) *Studies and Restorations at Persepolis and Other Sites of Fars II (IsMEO Reports and Memoirs)*, 17, pp. 73-91. Rome.

Tökei, F. (1975) *Az azsiai termelési mod kérdéséhz*. Budapest.

Tosi, M. (1994) The Egualitarian Foundation of Steppe Empires, Genito, B. (ed.) *The Archaeology of the Steppes: Work Methods and Strategies*, pp. 651-666. Naples.

Usmanova, E.I. (1963) Erk-kala, *Trudy YuTAKE*, XII. Ashkhabad.

Usmanova, E.I. (1969a) Erk-Kala-gorodishche Starogo Merva pory antichnosti i rannego srednevekovya (K istorii razvitiya drevnikh gorodov Srednei Azii) *Avtoref. kand. dis.*, Tashkent.

Usmanova, E.I. (1969b) Novye dannye k arkheologicheskoi stratigrafii Erk-kaly, *Trudy YuTAKE*, XIV, Ashkhabad.

Usmanova, E.I. (1970) K voprosy o vremeni slozheniya pervogo gorodskogo tsentra na territorii Merva, *Nauchn. tr. Tashkent Gosudarstvennogo Universiteta*, 392, pp. 28-32. Tashkent.

Usmanova, E.I. (1976) Izuchenie krepostnoi steny i buddiiskogo pamyatnika v Merve, *Sbornik nauchn. tr. Tashkent Gosudarstvennogo Universiteta*, 517, pp.11-15, Tashkent.

Usmanova, E.I. (1978) Osobennosti drevnei fortifikatsii Merva, *Sbornik nauch. tr. Tashkent. Gosudarstvennogo Universiteta*, 556, pp.15-24. Tashkent.

Usmanova, E.I. (1979) Novye dannye k istorii slozheniya gorodskogo tsentra na territorii Merva, *Problemy antichnoi istorii i kul'tury*, 2, pp. 415-420, Erevan.

Usmanova, E.I. and Filanovich, M.I. (1979) Arkheologicheskiye kompleksy Erk-Kaly i Gyaur-Kaly: osnova periodizatsii gorodskoi kul'tury antichnogo Merva, *Antichnaya Kul'tura Srednei Azii i Kazakhstana, TD VNS*, pp.26-31. Tashkent.

Usmanova, Z.I., Filanovich, M.I., Koshelenko, G.A. (1985) Koshelenko, G.A. (ed.) Margiana, *Drevneishiye Gosudarstva Kavkaza i Srednei Azii*, pp. 226-242. Moskva.

Vogelsang, W. (1985) Early Historical Arachosia in South-East Afghanistan, *Iranica Antiqua*, 20, pp. 55-98. Gent.

Vogelsang, W. (1986) Four Short Notes on the Bisutun Text and Monuments, *Iranica Antiqua*, 21, pp. 121-140. Gent.

Vogelsang, W. (1987) South-East Afghanistan and the Borderlands in the Early Historical Period, *Newsletter for Baluchistan Studies*, III, Napoli.

Vogelsang, W. (1988a) Some Observations on Achaemenid Hyrcania. A Combination of Sources, *Achaemenid History III Method and Theory*, pp. 121-135. Leiden.

Vogelsang, W. (1988b) A Period of Acculturation in Ancient Gandhara, *South Asian Studies*, 4, pp. 103-113.

Vogelsang, W. (1989) Peripheral Remarks on the Persian Achaemenid Empire, De Meyer, L. de Haerinck, E. (ed.) *Archaeologica Iranica et Orientalis. Miscellanea in honorem Louis Vanden Berghe*, pp. 543-548. Gent.

Vogelsang, W. (1992a) *The Rise and Organization of the Achaemenid Empire. The Eastern Iranian Evidence*. Leiden/New York/Koln.

Vogelsang, W. (1992b) Gandharans, Bactrians, and Scythians: Who was Who in the Sixth Century B.C.?, Maxwell, T.S. (ed.) *Eastern Approaches, Essays on Asian Art and Archaeology*, pp. 1-15. Delhi.

Young, T.C. (1965) A Comparative Ceramic Chronology for Western Iran 1500-500 B.C., *Iran*, 3, pp.53-85. London.

Young, T.C. (1967) The Iranian Migration into Zagros, *Iran*, 5 pp. 11-34. London.

Young, T.C. (1985) Early Iron Age Revisited: Preliminary Suggestions for the Re-Analysis of Old Constructs, *De l'Indus aux Balkans, Récueil à la mémoire de Jean Deshayes*, pp. 361-378, Paris.

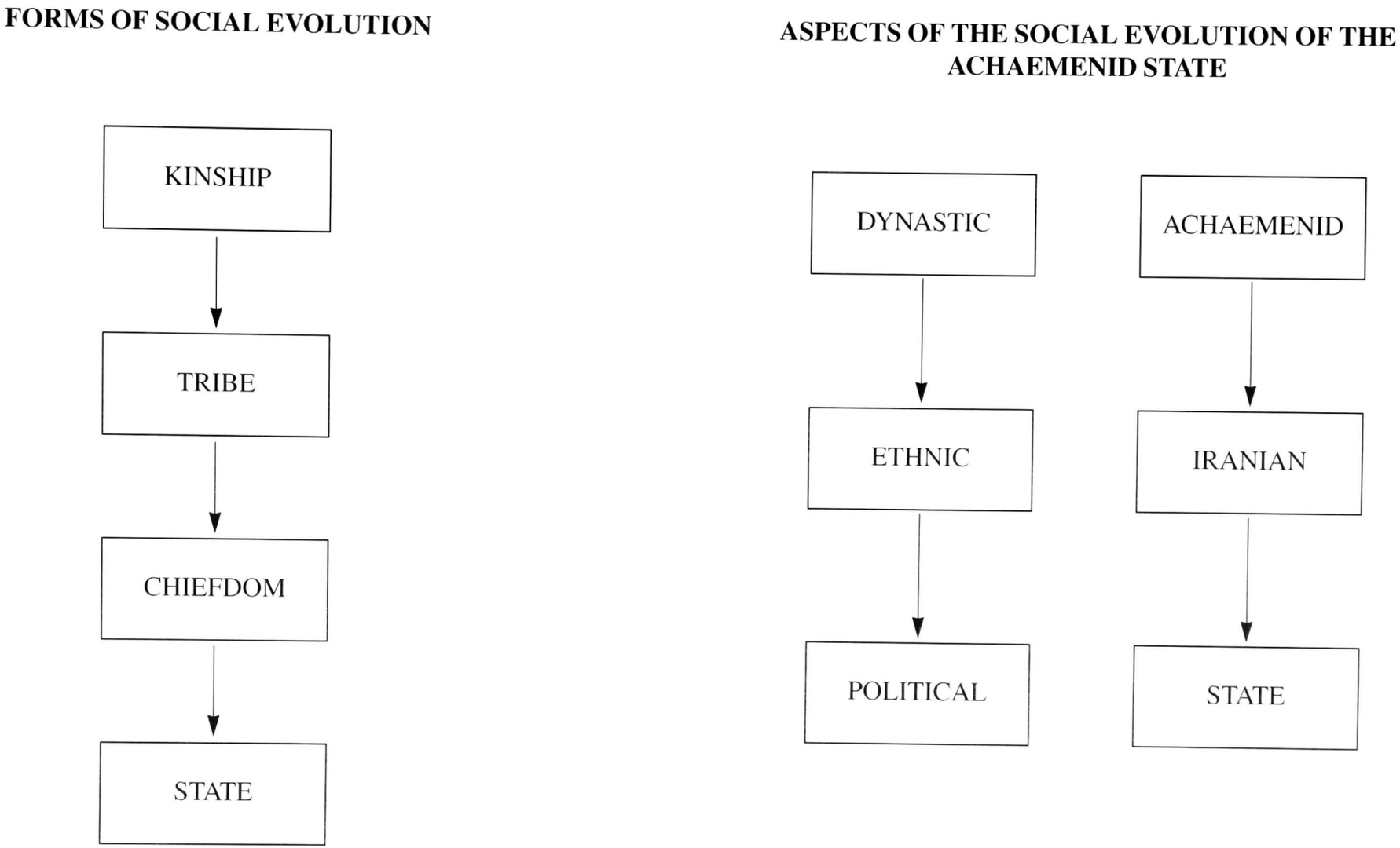


Fig. 1- Schematic representation of the Familiar, Ethnic and Political levels of the Achaemenid period.

MAIN THEORIES ABOUT THE NATURE OF THE ACHAEMENID STATE

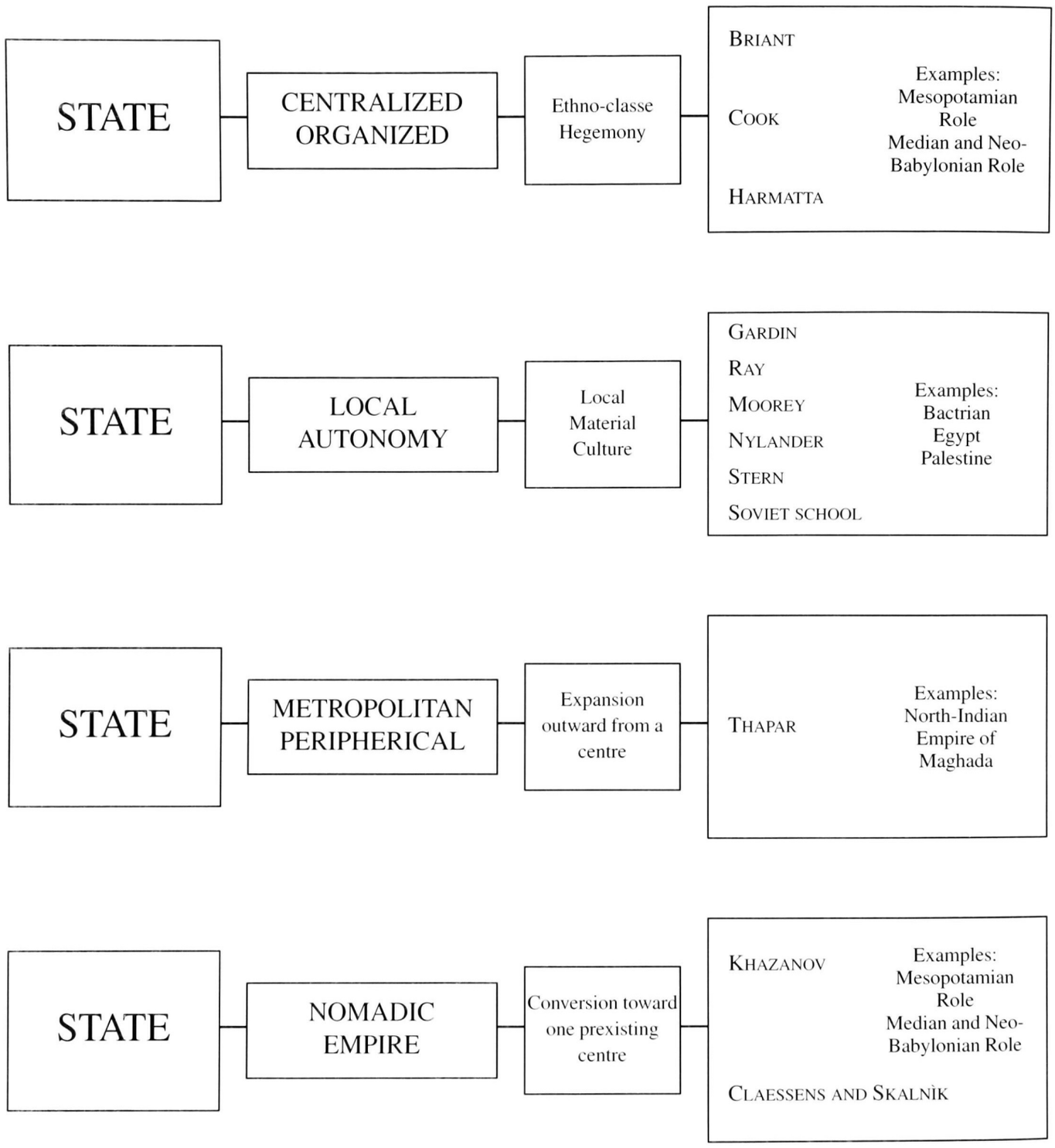


Fig. 2 - Schematic synthesis of the principal theories regarding the political nature of the Achaemenid State.

SURVEY OF THE "ANTIOCHUS' WALL" PRELIMINARY REPORT ON THE 1993-1994 CAMPAIGNS

by A. Bader, P. Callieri, T. Khodzhaniyazov
with an appendix by D. Angelucci and M. Cremaschi

Introduction

One of the main objectives of the study of the northern frontier of the Merv oasis in post-Achaemenid times was to survey the so-called "Antiochus' wall", long stretches of which emerge from the plain on the E, NE, NW and W fringes of the oasis. Investigated by Soviet archaeologists of YuTAKE in 1946 and in 1960, it was first identified with the wall, 1.500 stadia long, which according to the Greek geographer Strabo the Seleucid king Antiochus I Soter had built around Margiana; this thesis was then questioned and a dating to the Sasanian period suggested (Bader, Gaibov and 'Koshelenko 1995).

The structure came again to the attention of researchers during the surveys carried out by the Joint Italo-Russian-Turkmenian Archaeological Mission in 1991 and 1992 with the help of satellite images and aerial photographs, in which the wall's plan is very clearly visible.

History of Investigations

The existence of a fortification all around mediaeval Merv has been known since long thanks to the Arab text of al-Istakhrı (10th century) who described traces of a long wall (already in decay) named *ar-ray*, which enclosed the town of Merv as well as its *rustaks* and villages (*MITT* 1939, 173). Already in the Twenties V.V. Barthold had suggested that these could represent traces of the wall built by order of Antiochus I Soter and described by Strabo, XI. 10, 2 (Barthold 1927: 7). However, the exact location of the wall as well as its archaeological study became object of research only later.

It was in 1929 that M. Masson registered for the first time an information given by local people of the Bairam-Ali area about ruins of a big rampart running in the desert round the N part of the Merv oasis (Masson 1971: 15-16; Vyazigin 1949: 262). Turkmens called this very eroded wall *Chil* (in Turkmenian, "a boundary", i.e. a dam marking a frontier between two fields) or *Khilyaki Chil*. According to a local legend, the second name was given to the wall in memory of a "non-Turkmenian warrior" called Khilyaki (or Gilyaki) who was said to have come to the Merv oasis with the special aim of capturing Sultan Sanjar – the great king of the Seljukid dynasty and one of the greatest rulers of Merv, whose imposing and magnificent mausoleum is still preserved in the territory of mediaeval Merv. To ensure that Sultan Sanjar could not escape, Khilyaki is said to have ordered the construction of a wall all around the oasis.

Naturally, in the legend the dimensions of the wall were extremely exaggerated: it was said to run through the desert to the Piedmont of Kopet-Dagh and beyond up to Kaka or even up to the present Ashkhabad, after joining the so-called "*Merz* rampart" of the Piedmont region (see *infra*; Merezhin 1978: 12). According to the most ambitious version, the wall was going from Margiana down to the Caspian sea and joining there another *chil* in Iran (perhaps an allusion to the Alexander's wall in the Gorgan valley of North-Eastern Iran: see Kiani 1982a, 1982b; Huff 1981a, 1981b).

It is however likely that the information registered by M. Masson in 1929 concerns in fact not the northern wall (normally supposed in the literature to be that of Antiochus), but the southern one which runs around the Gyaur-Kala suburb and rural vicinity and is called till now Gilyakin-Chilburj by local inhabitants (see *infra*).

Anyway, the legend recorded by M. Masson and its correspondence to the Arab sources encouraged very much the early researchers of the rampart. In 1932, M. Masson had an occasion to identify the traces of a long rampart to the N of Bairam-Ali on newly-taken aerial photos of Merv oasis: the total length of the stretch identified on the photos was around 22 km (Masson 1971: 16).

In 1935, the famous archaeologist from Ashkhabad, A.A. Marushchenko, who carried out preliminary surveys in the N part of the Merv oasis, identified for the first time on the surface the ruins of a wall, about 30 km to the N of Bairam-Ali. The results of Marushchenko's survey were never published, but in 1939 he communicated his discovery to M. Masson (Vyazigin 1949: 261).

In 1946, the year when YuTAKE began its activity in Turkmenistan, an archaeological team headed by S.A. Vyazigin was sent to the N part of the Merv oasis for a survey of this wall. The work of this team resulted in the discovery of remains of a wall, to the N of Bairam-

Ali. Very eroded ruins of the rampart were attested near the sites of Old Kishman and New Kishman, and near the Kattakar-Yab canal. The total extension of the rampart ascertained in 1946 was 30 km; the main part of it (about 22 km) was located to the NW of Bairam-Ali, and a smaller section (about 8 km), to the NNE of this town (Vyazigin 1949: 261 ff.).

According to Vyazigin's description, the rampart did not look like an uninterrupted line but consisted of a row of prolonged hills, 10-15 m long and 1.5-3 m high, alternating with lower stretches 5-10 m long and only 0.5-1 m high. The width of the rampart in its highest points was up to 20 m, whereas in a few places the wall was already completely destroyed. A small trench excavated in one of the best preserved parts of the rampart carried out by Vyazigin's team showed that the wall was built of *pakhsa* with a preserved width of 5.2 m and a preserved heigth of 1.9 m. After his survey and test excavations, Vyazigin published a detailed description of all the parts of the wall which he and his team had been able to trace (see Vyazigin 1949: 262-267; and cf. 274-275), but unfortunately he did not publish either a single photo or at least a plan of the wall (though the last one is mentioned in the text, p. 262).

In 1950, four years after Vyazigin's study on the North of the oasis, M. Masson discovered very poorly preserved remains of the wall with abundant pottery of the Hellenistic and Parthian periods (*antichnost'*) around it in the NW part of the oasis, 1.5 km to the N of Munon-depe (Masson 1971: 16). Later on Masson recorded the wall in two other places: to the S of Yaz-depe and near Khurmuzfarrah (Uly Kishman) ruins (Merezhin 1978: 1-12).

After these first investigations, Galina Pugachenkova in 1958 could already publish in her fundamental work about the history of architecture of South Turkmenistan a short synthesis on "Antiochus' wall" where she put the stress on the traditional, purely local character of the *pakhsa* technique used in this construction said to be ordered by a Hellenistic ruler (Pugachenkova 1958: 27-28). Unfortunately, also in Pugachenkova's wonderful and well-enough illustrated book one does not find any plan or photo of the wall.

In 1960, the study of the wall was resumed by a small team under the direction of L.N. Merezhin. Besides the parts fixed before, this expedition discovered the remains of the wall near Odunchi-Depe (Odynchi-Depe), to the SE of Goebekli-Depe, near Munon-Depe and not far from Kosh-Depe. Moreover, a new cross-section was cut through the wall to the NW of Kushmeikhan (Old Kishman) (Merezhin 1978: 12): of this, unfortunately, there is no graphic documentation, and even the description is very brief.

In this second section, the *pakhsa* wall had a width of 4 m and a preserved height of 1.5 m. Slightly raised areas (up to 3-4 m in height and 6 m in diameter) were supposed to represent remains of the towers. Even in the places where the wall elevation had been completely razed, the wall was distinguishable thanks to a wide light strip on the surface of desert, devoid of vegetation. The total length of the wall traces investigated by Merezhin's team was about 70 km all around the N part of the Merv oasis (Merezhin 1978: 13-15; Masson 1971: 16).

As M. Masson, Merezhin attested also "pottery of the early *antichnost'*"(i.e. the Hellenistic and early Parthian periods) along the wall, but not in its section; however, of this no description neither image was given. No information was recorded about the possible gates in the wall, but a few towers were identified in hillocks up to 4 m high and 6 m in diameter.

Unfortunately, after several years of YuTAKE investigation on the "Antiochus' wall" no map of its ruins was published. The only available plan was the one of M. Masson's short notice of 1971 (Masson 1971: 15), extremely schematic and without scale. The two sections of the wall studied by YuTAKE in 1946 (S.A. Vyazigin) and 1960 (L.N. Merezhin) remain also published in a summarized form, and with no graphic or photographic documentation.

Anyway, apart from the preliminary survey of the wall by A.A. Marushchenko which however remained unpublished, YuTAKE must be credited with the discovery of the "Antiochus' wall".

Increasing agricultural activity provoked a very rapid destruction of the wall, especially in its W and NW parts. When 20 years after YuTAKE, the Joint Italo-Russian-Turkmenian mission organized by the IsMEO (Rome), the Institute of Archaeology (Moscow) and the State University of Turkmenistan (Ashkhabad) carried out a new survey of the wall, its destruction had become so massive that in most of the places surveyed by YuTAKE the traces of the wall were distinguishable only with the help of aerial photos and satellite images, almost impossible to find out from the surface. We managed however to make a survey of the best preserved part of the wall and to cut a few cross-sections through its presumed stretches (*infra*).

Classical Authors on the Wall of Margiana

The main information on a regional fortification in Margiana, generally associated with the so-called "Antiochus' wall", is given by Strabo (XI. 10, 2):

> "Margiana is similar to this country [i.e. Aria], although its plain is surrounded by deserts. Admiring its fertility, Antiochus Soter enclosed a circuit of fifteen hundred stadia with a wall (τείχει περιέβαλε κύκλον ἔχοντι χιλίων καὶ πεντακοσίων σταδίων) and founded a city Antiocheia. The soil of the country is well suited to the vine; at any rate, they say that a stock of the vine is often found which would require two men to girth it, and that the bunches of grapes are two cubits".

It can be interesting to confront this text to the description of Margiana given by Pliny the Elder (*N.H.* VI, 46-47):

> "Next comes the Margiana country, famous for its sunny climate – it is the only district in that region where the vine is grown; it is shut in all round by a beautiful ring of mountains, fifteen hundred stadia in circuit [*ambitu stadiorum MD*], and is difficult to access on account of sandy desert stretching for a distance of hundred twenty miles; and it is itself situated opposite to the region of Parthia. In Margiana Alexander had founded a city bearing his name, which was destroyed by the barbarians, but Antiochus son of Seleucus re-established a Syrian city on the same site, intersected by the river Margus, which is canalized into Lake Zotal; he had preferred that the city should be named after himself. Its circuit measures seventy stadia. This is the place to which the Roman prisoners taken in the disaster of Crassus where brought by Orodes".

There are several coincidences in these two texts (see their compared analysis in Bader, Gaibov and Koshelenko 1995). The fact of particular interest is the same distance of "1500 stadia" present in both texts: according to Plinius, that was the circumference of the region, whereas Strabo thought it to be the length of the wall surrounding the oasis.

Coincidences of the two texts are likely to result from the usage of one and the same written source, very probably Apollodorus of Artemita, by both authors, as neither Strabo nor Plinius never visited Margiana. Plinius' information therefore seems to represent a non-direct confirmation of Strabo's text about Antiochus' wall around the oasis of Margiana.

Problems of Chronology

Strabo's mention of a rampart erected all around the fertile lands of Margiana by order of Antiochus I Soter (Strabo XI. 10, 2) has suggested the attribution of the long wall discovered in the N part of the Merv oasis to this Seleucid king (Barthold 1927; Vyazigin 1949; Pugachenkova 1958; Koshelenko 1963, 64; Masson 1971; Merezhin 1978).

If really so, "Antiochus' wall" would represent one of the very few monuments of Hellenistic Age in Margiana, a region where up to now tangible evidence of this period is almost absent (see for this problem Bader, Gaibov and Koshelenko 1994; Callieri 1996).

However, till now no attempt to base the dating of the wall on firm archaeological ground has been successful. Surface material collected near the wall (*infra*) can not be associated as such to the wall itself; all the cross-sections cut through the wall till now gave no significant finds for dating (*infra*). From the architectural point of view, a plain wall made of *pakhsa* blocks does not show features which can suggest its date: this type of construction seems to have been extremely popular in Margiana and in general in South Turkmenistan from the early historic period until the Middle Ages (and in some regions till the early 20th century), with no significant modifications, as far as it is possible to guess from the extremely decayed structures.

In the first cross-section of a well-preserved part of the "Antiochus' wall" (5.4 km to the NE of the Kattakar-Yab canal crossing the wall from the SE) carried out by S.A. Vyazigin's team, 8 very small fragments of pottery were reported to have been found inside the wall, in the *pakhsa* blocks and under the foundations (Vyazigin 1949: 267). All the fragments were 5-7 mm thick, orange in colour, well-fired and covered with white slip on the outside, but extremely small; besides, the absence of rims or other relevant features reduces their significance for dating. At present this collection is lost.

The orange colour of the sherds, their high-quality firing and the presence of white slip, mentioned by Vyazigin, characterize pottery from a long timespan, between the middle Iron Age (Yaz II or Yaz III) and the late-Parthian period.

The sherds found in the core of the wall, as well as those found under the foundations, give only a *terminus post quem*: particularly, the presence of Yaz-period sherds in an area rich of Yaz-period sites suggests that at least the sherds found in the core of the wall are likely to come from the clay used for the wall construction.

During his survey, Vyazigin collected at various places of the surface along the wall more fragments of pottery (Vyazigin 1949: 265-266). Among them, early sherds of the above-mentioned types have been reported, together with later forms, Sasanian as well as Islamic (blue and green glaze). On the whole, Vyazigin dated most of the surface material to the 11th-13th century AD (*ibid.*: 265).

Finally, on the surface near the NW side of the wall (1 km to the SW from its crossing with the Kattakar-Yab canal) two terracotta fragments were found by Vyazigin's team (*ibid.*: 265-266). Only one of these fragments, representing a nude male figure, is illustrated with a photo (*ibid.*: fig. 1, 2); Vyazigin considered it to be "an imitation of the sculptures of the Hellenistic epoch" (*ibid.*: 266). The second terracotta object, very poorly preserved, was described briefly; a "Hellenistic date" was suggested for this object as well (*ibid.*: 266).

The former of these two terracottas, which in its rendering shows Hellénistic features, has actually an exact counterpart in a figurine from Erk-Kala dated to the 3rd century AD (see Pugachenkova 1962: 150-51, fig. 22; Usmanova 1963: 78, fig. 38). Even though the dating of the Erk-Kala figurine, which was found in an Early Sasanian context, but in the clay of a buttress, is likely to be earlier than its context, the association of the figurine found by Vyazigin with the "Antiochus' wall" itself is not proved.

In 1960, L.N. Merezhin with his team cut a new cross-section through the wall to the NW of Kushmeikhan (Old Kishman; Merezhin 1978: 13). Unfortunately, Merezhin's report, which conforms to Vyazigin's work, is extremely sketchy, since his main concern was the identification of the wall remains on a larger scale; no

graphic documentation concerning the section was in fact published.

Merezhin reported along the wall "pottery of the early *antichnost'*" (*ibid.*: 15; with no other detail nor illustration), but not a single sherd was found in the wall section. Even from Merezhin's incomplete description it is possible to date the pottery collected by his team on a rather safe ground to the Yaz Iron Age series: red-ware, well-fired fragments (this time, with no mention of slip) of big jars and large vessels with a *podkos* on the base, i.e. with the most characteristic element of Yaz II/III ceramic complex (see Masson 1959; Sarianidi and Koshelenko 1985).

In M. Masson's publication of 1971 (Masson 1971: 16) we have one more short mention of pottery of "the Hellenistic and Parthian period (= *antichnost'*)" recorded by him in 1950 on the ground near the wall in the NW part of the oasis, 1.5 km to the N of Munon-depe (with no further detail nor sketch). We have unfortunately no idea if the pottery is associated to the wall or to one of the settlements of the wide Munon-depe region, ranging from the Iron Age to the 11th-13th centuries AD.

Recently A. Bader, V. Gaibov and G. Koshelenko suggested to date the "Antiochus' wall" to the Sasanian period, probably to the 5th century (for details see Bader, Gaibov and Koshelenko, 1995; for analogous Sasanian walls, see Kiani 1982a, 1982b; Huff 1981a, 1981b, 1993; Boucharlat 1987; Kudryavtsev 1982, etc.).

Due to the lack of firm tangible evidence for the wall's dating (as we have seen, the terracotta figurine from the surface collection of S.A. Vyazigin has no reliable association to the wall), a historical-ecological research has been realised in order to prove that the wall should be dated to the early Mediaeval epoch.

In 1991, thanks to the combined use of satellite images, aerial photos and observations made from a helicopter flight, the wall was traced once more in the northern part of the oasis, from the area to the SE of Kushmeikhan (Old Kishman) to the region SE of Goebekli-Depe. Participation in the research of B. Marcolongo made possible a complex palaeo-ecological study of the region of the "Antiochus' wall", fitting in with the results of the previous archaeological surveys of northern Margiana (see Bader, Gaibov and Koshelenko 1994; Koshelenko, Bader and Gaibov 1994; Koshelenko, Gubaev, Gaibov and Bader 1994).

While compiling the archaeological map of Margiana, the N part of the modern Merv oasis has been investigated in detail including the monuments which are situated quite near the wall. According to this study, this part of the oasis was very scarcely settled in the Hellenistic period. Among the most important monuments, Chilburj (Gaibov, Koshelenko and Novikov 1990) appeared only in the Parthian period, as well as the sites of Changly (Koshelenko, Bader and Gaibov 1991), Durnali (Bader, Gaibov and Koshelenko, 1996) and Uly Kishman (Bader, Gaibov, and Koshelenko, in press). The fortress of Kyrk-Depe also seems to have been founded only in the late Parthian period. For the monuments where the first structures go back to the Yaz III period like Goebekli-Depe (Gubaev, Koshelenko and Novikov 1990a, b) and Munon-depe, as well as Garry Kishman (Bader, Gaibov and Koshelenko 1992), the Hellenistic period seems to have marked a decline. The N part of the oasis and the area of the "Antiochus' wall" would have not seen a considerable occupation in Hellenistic time (Bader, Gaibov and Koshelenko 1994).

It should be remarked that till now well-documented archaeological material of the Hellenistic period has been recorded prevailingly in the area of Merv town, at Erk-Kala (Usmanova 1963, 1969, 1989), Gyaur-Kala (Filanovich 1974, 1989; Tashkhodzhaev 1963) and their surroundings, i.e. only in the central part of the oasis.

In this case, the "Antiochus' wall" would have surrounded a region with no considerable human occupation at that time (cf. Strabo's text, XI. 10, 2).

Rather than accepting the construction of the so-called "Antiochus' wall" in a very scarcely settled region, Bader, Gaibov and Koshelenko deem more reasonable to suppose that it was built in a later period.

Since, however, there is no reason to doubt the information given by Strabo, probably the other wall presently named *Gilyakin-Chilburj*, encircling a much more limited area around Merv, could be the Hellenistic wall built up by order of Antiochus I Soter (for details, see Bader, Gaibov and Koshelenko 1995).

This wall was described in the 19th century as being mediaeval (Zhukovski 1894: 111, 114-115). It was studied by YuTAKE only once, in 1947 (Alkhamova 1953: 404-412, fig. 1-9; see also Pugachenkova 1958: 42; 1986: 60; Koshelenko 1966: 76-77; 1986: 147). By that time, remains of the wall were still preserved to the NW, N and NE of Merv (Fig. 21), whereas its S part had already been completely destroyed (this wall is therefore usually located according to the plan made by V.A. Zhukovski in the years 1890s: Zhukovski 1894: pl. 3).

The Gilyakin-Chilburj wall, up to 6-7 m wide and probably even more in some places, is built of *pakhsa*, the thickness of the blocks being on the average 70-80 cm. On the basis of the archaeological material found along its remains, as well as of the size of some bricks discovered during its exploration (42 x 42 x 12-14 cm), the wall has been attributed to the Parthian period (Alkhamova 1953: 405-6, 408). Subsequently, it continued probably to be in use, but in the 10th century it was already of no importance. This wall seems to be mentioned, along with the northern one, by al-Istakhrī who left a description of two walls in the Merv oasis (*MITT*, 173; for this and also for Syriac sources about Gilyakin-Chilburj, see Bader, Gaibov and Koshelenko 1995: footnote 23).

Regional Walls in South Turkmenistan

The study of pre-Islamic fortifications in Central Asia has been the object of several works (see, in addition to the works referred to in this article, Levina 1949; Young 1955; Kuz'mina and Pevzner 1956; Le Berre and Schlumberger 1964; Voronina 1964; Turgunov 1968; Shishkina 1970; Leriche 1974; Kozlovski and Nekrasova

1976; Shishkina 1976; Pugachenkova 1978; Sabirov 1978; Suleimanov and Turubekov 1978; Whitehouse 1978; Masson 1979; Turubekov 1979; Lapirov-Skoblo 1981; Turubekov 1982; Dolgorukov 1984; Pugachenkova 1984; Chichkina 1986; Rtveladze 1986, 1990; Turgunov 1986; Bernard *et al.* 1990, 1992).

Regional defence structures surrounding suburbs ("enceintes supplémentaires de faubourg", Francfort 1979: 28) as well as longer regional walls surrounding all the cultivated lands of oases (Koshelenko 1986: 147) have been revealed in several places. In the Samarkand oasis the regional wall is preserved till now and is called *Kampyr Duval* (or *Divari Kiyamat*, *Kampyr Devor*; see Mukhamedov 1961; Masson 1971: 14; Pugachenkova 1976: 140; Koshelenko 1986: 147). In the Bukhara oasis a similar wall is known under the name of *Kampyryak* and has been studied mainly by Kh. Mukhamedov in the Fifties (Mukhamedov 1961; cf. later studies: Pugachenkova 1976: 137 ff.; Pugachenkova 1986: 59 ff., figs. 279, 280). In Ferghana a long wall has been located between Kanibadam and Makhram (particularly in the regions of Tashlak and Niyazbek: see Masson 1971: 14). In the Kashka-darya valley, a wall in the region of the mediaeval town of Kesh (later Kitab) was investigated by M.E. Masson in 1963 (see Masson 1971). A wall encircling the Balkh oasis is still well-enough preserved, especially to the N of present Zayan village (see Pugachenkova 1976: 137 ff.). In the NW part of the Chirchik valley, similar walls have been traced between the mountains and Syr-darya river and between Chinaz and Kauncha (Masson 1971: 14). Also at several other Central Asian sites lesser remains of similar structures are known. However, the exact dating of almost all these walls remains an open question, mainly because of the scarcity or complete absence of finds undoubtedly associated to them. On the basis of the comparison with the wall traditionally said to be built by Antiochus in Margiana (the object of the present study), G.A. Pugachenkova suggested that most of these Central Asian walls could go back to the same epoch (Pugachenkova 1976: 140-141; see also Koshelenko 1986: 147). However, as we shall see, the "Antiochus' wall" itself can not be dated, so that it is likely that many of the walls quoted by Pugachenkova may belong to later times (*infra*).

One of the few fortifications which can be safely dated to the Hellenistic age, the 2nd or the 1st century BC, is that at the northern border of Bactria, the so-called "Iron Gates" near the Uzbek Derbent: a preliminary investigation carried out here by a Franco-Uzbek archaeological mission has provided reliable material evidence dating this structure, which strengthen for about 10 km the natural barrier dividing Bactria from Sogdia, to the period of the Graeco-Bactrian kings. This frontier remained probably in use with the Kushans, and was again reinforced in the 6th century AD (Rapin and Raxmanov 1997).

An important "typological" comparison for the "Antiochus' wall" is offered by the very long regional wall, at least 170 km, investigated in the Gorgan valley, the ancient province of Hyrcania, in present-day NE Iran (Kiani 1982a: 73-79; 1982b). This wall, named *Kyzyl Alan* or *Sadd-e Eskandar,* bounded to the N the Gorgan valley and has been considered as founded in the Parthian period (around the 2nd-1st century BC, see Huff 1981a: 105-110; 1981b: 125-139; 1993: 45-61; cf. Kiani 1982b: 38), though the actual archaeological evidence does not seem to go back beyond late Sasanian times (Boucharlat 1987: 45).

At Derbent, near the Caspian Gates (see Kudryavtsev 1982), a wall of a similar type, though built in stone, was erected in the 6th century AD, probably under the Sasanian king Khusraw I.

In Margiana, leaving aside early observations about the architecture made by travellers and amateurs of antiquities (see Masson 1980), a first scientific approach to the study of architecture and fortifications was carried out by the Russian orientalist V.A. Zhukovski (Zhukovski 1894), followed 10 years later by the American mission of 1904 directed by Raphael Pumpelly (see Huntington 1908).

After the long pause in studies caused by the revolution and civil war (during which however a serious work was published by V.V. Barthold: Barthold 1927), in 1937 the investigation in Margiana was resumed by A.A. Marushchenko on Erk-Kala and Gyaur-Kala (the report remains unpublished, see Masson 1980) and B. Piotrovski on Erk-Kala (Piotrovski 1949).

After the Second World War, the South Turkmenistan Complex Archaeological Expedition (YuTAKE) was founded under the direction of Mikhail Masson (1946), and a large-scale systematic exploration of the antiquities in Merv oasis began.

Regarding the fortifications, YuTAKE activity was concentrated mainly on the Erk-Kala and Gyaur-Kala ramparts (see Filanovich 1974, 1989), but important surveys on the Parthian fortresses in the N half of the oasis were carried out as well (for main results, see Durdyev 1959; Koshelenko 1963; Pugachenkova 1952, 1958, 1986). YuTAKE was the first mission to carry out investigations of the two regional walls existing in Merv oasis, i.e. the Gilyakin-Chilburj wall (Alkhamova 1953) and the Antiochus' wall (Vyazigin 1949; Merezhin 1978).

Beginning with 1980, these investigations were resumed by the Joint mission of the Moscow Institute of Archaeology and the Universities of Ashkhabad and Moscow (publications on architectural problems: Bader, Gaibov and Koshelenko 1992, 1994, 1995, 1996; Bader, Gaibov and Koshelenko in press; Gaibov, Koshelenko and Novikov 1990; Gubaev, Koshelenko and Novikov 1990a, b; Koshelenko 1986; Koshelenko, Bader and Gaibov 1991; Koshelenko, Bader and Gaibov 1994; Koshelenko, Gubaev, Gaibov and Bader 1994).

Finally, in 1989 the Joint Italo-Russian-Turkmenian mission organized by the IsMEO (Rome), the Institute of Archaeology (Moscow) and the State University of Turkmenistan (Ashkhabad) started investigations in the northern part of Merv oasis, where three regional walls are attested (see *infra*).

In the Piedmont of Kopet-Dagh, a structure more than 200 km long has been investigated. This structure, generally considered a wall and named by local people *val Merz*, is until present well-visible in some places and runs along the mediaeval limits of cultivated lands in the province of Etek, the northern piedmont plain along the Kopet-Dagh. From the region to the E of Baba Durmaz railway station, two parallel (and probably not contemporary) very ruined "ramparts" are running till the Kaushut railway station; beginning with Kaushut, only one rampart is distinguishable. After Dushak station, the structure turns to the SE in the direction of Serakhs oasis (Masson 1971: 13). Few years ago, a cross-section of the *val Merz* was studied by S. Loginov (Ashkhabad Institute of History) and A. Gubaev (Ashkhabad State University), but the results of their investigations are published only in a very preliminary and schematic way. A recent survey of the area by an Italian team has however found enough evidence to advance the hypothesis that the structure was not a wall but a canal (Marcolongo and Mozzi, in press): such a function fits much better than that of a wall with the position of the structure, in the Piedmont plain.

The 1993-1994 Survey

The Surface Survey

On aerial photographs the so-called "Antiochus' wall" is represented by a narrow line, paler in colour than the surrounding plain, with a very regular plan made up of long linear stretches connecting so as to form an inverted U shape, which encircles at least the N limit of the oasis, where the artificial levelling of the soil needed for cotton fields has not yet been carried out (Fig. 1). Even here the comparison of aerial photographs taken in 1972 with those taken in 1991 shows the rapid expansion of fields, which has already resulted in the razing of the central sectors of the E and W sides.

The N part of the E side of the wall, actually oriented SSE to NNW, is visible for about 4 km to the N of the cultivated area and ends at about 2 km NE of the site of Garry Kishman (Kushmeikhan); its minimum distance from the site is 1.7 km. The corner with the NE side is visible, but immediately after the corner the wall's traces disappear from the surface for a distance of about 2 km; again clearly visible at a distance of about 1.5 km to the N of Garry Kishman, the wall runs SE to NW for about 6.9 km, then turning to the WSW. The NW side is 3.2 km long, approaching to within 3 km of the site of Uly Kishman (Khurmuzfarrah); the wall then turns to the SW and continues for about 13.5 km before disappearing in cultivated fields (Fig. 2).

The surface survey was limited to the E and NE sides of the wall. In the former, the traces visible on the aerial photographs correspond to an intermittent strip, about 10-15 m wide, of compact clay mixed with sand, devoid of bushes, at the level of the plain. In a shallow section created by water erosion it was possible to ascertain that this surface layer of clay and sand has a thickness of about 40 cm, and covers a layer of sand about 5 cm thick; below is a layer of clay 10 cm thick and then again sand. No significant concentration of surface pottery has been noticed anywhere along the explored stretch. It has not been possible to carry out any excavation here in order to expose at least the upper interface of the wall.

On most of the NE side, on the contrary, the wall emerges from the plain to a maximum height of 1-1.5 m and the average width of its collapsed top is 10-15 m (Fig. 3). A few elevations, which had been thought to represent ancient towers, are instead likely to be not associated to the wall, as the trial trench dug in 1994 on one of them has shown (see *infra*). No significant concentration of surface finds was noticed on the wall top, and the rare potsherds scattered on both sides of the wall range from the Yaz III period to the Islamic Age; a site with prevailing Yaz III sherds (209) was located just to the NE of the wall but shows no relation to it.

The Trial-trench on Site 248

For understanding the wall's structure, a cut obtained by a bulldozer across the wall's width was judged the most suitable method, in terms of relations between time and possible results. For this purpose, the southern end of the NE side was selected (precisely 114 m to the NW of the end of this side), where the surface survey had shown the wall's preserved height to be maximum (site 248) (Fig. 3). Here a narrow trench, perpendicular to the wall and with a 35° E inclination from the N, 22 m long, was excavated: due to the limited width removable by the available machine (only 0.75 m), only on one side of the trench was it possible to keep a section regularly cut: the other side had to be destroyed in order to widen the trench and improve the accessibility to the section itself. In 1994 a short stretch of the wall, 5 m long, adjacent to the section, was excavated, with the aim of exposing the structure and verify the stratigraphic reading proposed in 1993 (Fig. 14).

The trial-trench shows a wall built in *pakhsa*, preserved for a maximum height of 1.2 m, with a cumbered upper interface and both sides sloping down with a rather marked inclination; no moat was evidenced along the outer face (Fig. 5). The wall is built without any foundation trench, on a layer of levelling (Stratigraphic Unit [S.U.] 22 and 26), made up of compact clay with patches of stratified clay splinters. To the N of this is a layer of clay splinters (S.U. 21) which can be interpreted as a *takyr* level contemporary to the wall. Below the clay levelling, to the S are two silt layers (S.U. 23 and 24) which apparently have no relationships with the natural stratigraphy of the area, characterized by aeolian sand and *takyr* (S.U. 29, 31-34), and which therefore could be explained as deriving from the levelling of earlier structures in clay: the analysis of samples collected from the trench will allow the testing of this hypothesis. To the N of the wall, the clay levelling and *takyr* cover a layer of

sand with clay (S.U. 27) and a layer of sand (S.U. 28) filling a wide and shallow pit (S.U. 30) in the aeolian sand of the natural stratigraphy, which has yielded potsherds and charcoals (Fig. 6; see *infra*).

A socle, 7.5 m wide and 0.6 m thick, supports the wall's superstructure, projecting on both sides (Fig. 7); the socle is made up by a base layer of *pakhsa*, 0.3 m thick (S.U. 19, which in the core of the structure is so well joined to the layer above as to result in a single thicker layer), and by a second layer of pakhsa of the same thickness, respectively on the N face (S.U. 14) and on the S face (S.U. 15). On the N face of the wall, the socle projects 1.4 m from the wall, and shows a slightly sloping N face (Fig. 8); on top of it are parallel layers of clay sediments (S.U. 5) sloping from S to N, accumulated at the foot of the proper wall, which confirm the original thickness of the socle. On the S face of the wall, the S limit of the socle is almost vertical, but is not parallel to the wall and has an irregular profile, so that the socle's projection varies from 1 m to 1.35 m (Fig. 9).

In the body of the wall (Fig. 10), the junction (S.U. 16) between the base layer, here 0.6 m thick, and the second layer of *pakhsa* (S.U. 13) is clearly visible, having a thickness of about 1 cm. The N and S sloping faces of the wall are very damaged, with the *pakhsa* broken in small blocks (S.U. 6 and 7), whereas the upper interface has been hardened by the use of the structure as a road, with two very compact side bands, corresponding to the tracing of the wheels, and a central band of brittle *pakhsa* with marked evidence of water erosion (S.U. 8) (Fig. 11).

Two layers of very compact stratified clay splinters with sand cover directly the clay levelling in the areas in front of the wall (S.U. 11 and S.U. 12), up to the level of the socle's surface; they have the same geological nature as the wall itself but are discontinuous due to the exposure to surface (with presence of structure deriving from soil formation processes) and are likely to represent the collapse of the wall. On top of the northern one (S.U. 11), leaning against the N socle, is a block of *pakhsa*, reflecting perhaps an episode of rebuilding (S.U. 10). S.U. 11, in particular, overlaps the *takyr* of S.U. 21.

On the S, the wall is then covered by a thick layer of compact sand (S.U. 3), whereas on the N is first a layer of compact clayey sand (S.U. 4) and then a layer of sand (S.U. 2) which at the junction with the brittle *pakhsa* of S.U. 6 leaves place to sandy silt with brittle clay (S.U. 1) covering also the upper negative interface of the wall (S.U. 9).

The trial-trench has not yielded pottery associated to the wall, neither in the layers of collapse and sand accumulation, nor in the *pakhsa* of the wall itself. The absence of pottery in the *pakhsa* may be explained by the distance of the wall from the nearest settlements and would suggest that the clay needed for construction was taken from local sources, perhaps the beds of (now buried) rivers visible in the aerial photographs.

A few fragments of hand-modelled Yaz I pottery, however, were recovered in the layer of clayey sand S.U. 28, along with other traces of human activity as charcoal fragments, suggesting the presence of a Yaz I settlement not far from the area of the trench, at a level of about 0.5-0.7 m from the present surface (Fig. 12).

Trial-trenches on Sites 275 and 276

Two more test trenches were excavated in 1994 on what was supposedly the "Antiochus' wall". The first site, 275, about 3.3 km to the NW of site 248, was chosen for its somehow circular profile (Fig. 14) which could hide one of the "towers" mentioned by Vyazigin. The area, whose surface layers yielded Yaz-III and Sasanian potsherds (Fig. 13), was cleaned and subsequently a quarter of its core was excavated (Figs. 15, 16). A thin layer of solid clay with "globular" structure, probably the collapse of a *pakhsa* structure, rests on a horizontal levelling directly upon layers of sand alternating with clay lenses in a very complex succession (Figs. 17, 18). This points to the existence there only of a very late (Mediaeval or XVIII-XIX century?) and poor structure, having nothing in common to the "Wall". On the N-S sections, both to the SE and the NW (Fig. 19), the stratigraphy seems to point to the existence of a canal cut in the sand, with shallow and wide bottom, filled by several superimposed clayey sediments.

On site 276, 300 m to the SE of 275, a trial-trench only 1 m wide across the supposed top of the "wall" revealed only a clay collapse of scarce thickness (20 cm) in the N part of the trench, which could represent what remains of a *pakhsa* structure (Fig. 20). However, the extension of this collapse is much inferior to that noticed at site 248.

Functional Interpretation

As regards the function of the so-called "Antiochus' wall", the evidence brought to light after the two short campaigns is not yet enough to propose a well-grounded interpretation and requires a considerable amount of guesses, stressing the need for further investigations.

The absence of any relevant clay structure in site 275 shows that in order to investigate the long structure mere surface survey is not an adequate methodology, suggesting instead to carry on *sondages* in all the stretches which a more accurate scanning of the aerial photographs through various techniques may point out as bearing better preserved traces of the stucture; indeed, site 275 had been selected among several shallow elevations recognized through the surface survey on the line of the "Wall" as recognized on the aerial photographs, the same line of site 248 where instead a solid structure was brought to light.

On the basis of the evidence given by the three sites 248, 275 and 276, we have the need to explain the complete absence of the "Wall" in 275 and the small dimensions of the clay collapse in 276. We could think of bad preservation in the last two sites, even though a

simple destruction would not be enough and a complete removal of the clay for other purposes should be supposed for 275. Or, perhaps, 275 could have represented a gate in the wall.

These two hypotheses seem the less partial interpretations. If not for the lack of comparisons in Central Asia and the Middle East, we would have been tempted to advance also the hypothesis that instead of a wall we would be in presence of an aqueduct-canal: a built structure in 248 which could have received water from the river-bed running at a short distance from the site through a wheel, and that gradually could have sloped down to become, at the distance of 3.3 km from 248, a canal dug in the sand, as the clay sediments in 275 could suggest. Indeed, the calculation of the slope between the preserved top of the "wall" in 248 and the bottom of the "canal" in 275 gives a slope of 0.65%°, slightly more that the slope of today's canal in Margiana (0.55%°). However, no similar systems are known in Central Asia or the Middle East, and the profile of the "canal" in 275 seems to have a direction different from that of the "wall", bending from SE to WNW instead of to NW.

For the moment, the interpretation of the structure as a wall seems more plausible, even though it should be confirmed by further evidence. As regards this function, its interpretation depends on understanding the chronology of all the elements which make up the wall's environment. The geoarchaeological reading of the aerial photographs has pinpointed several ancient river-beds in the area between the NE side of the wall and the site of Garry Kishman to the E, where the wall is absent (on the evolution of irrigation and settlement patterns in Margiana see Koshelenko, Gubaev, Gaibov and Bader 1994). These river-beds are flat, recognisable as color spots, clearly visible and therefore probably rather recent. If the river-beds were contemporary with the wall, it would be evident that the wall was complemented by the presence of water as an obstacle to free access to the oasis.

In the second instance, the presence, at the centre of the area where the wall is absent, of the fortified settlement of Garry Kishman, dated to the Achaemenid and Seleucid periods, with a lesser frequentation in the early Parthian period (Bader, Gaibov and Koshelenko 1992: 231-37, 249), and of a large fortress dated to the late Parthian period almost adjacent to it (*ibid.*: 236-37), could not be coincidental, if we accept the possibility that the fortified settlement or the fortress and the wall are contemporary. In this case the function of the wall would have been to drive anybody coming from the steppe towards the fortified sites.

We cannot, however, exclude the possibility that the wall was existing prior to the river-beds and to the fortified sites, and that its partial destruction was in fact caused by the river; the presence of the succeeding fortified sites in that spot, thus, could be attributed to the availability of water.

A third possibility, that the wall is posterior to both the fortified sites and river, is also to be kept present.

In any case, the only objective interpretation of such a wall is that it represents a barrier between the oasis and the surrounding steppe, with several possible functions: military, environmental, economic.

A military function is primarily connected to the need of keeping the nomads out of the oasis. In the wider context of the eastern frontier of Iran, however, this "*limes*" represents also a stronghold in the military control of the steppe: as Chinese history shows, a true defence from the nomads was obtained there only when the political authority was strong enough to carry out military expeditions beyond the frontier and did not rely only on the passive defence given by the wall (Lattimore 1962: 485). The interpretation in this case is linked to the political history of the period to which the structure could belong.

The environmental function, that of providing protection from the sands menacing cultivation (see Bernard and Francfort 1979: 134), is rather unlikely due to the intrinsic negative effect that a wall should have on sand accumulation in the presence of strong winds as in the case of the steppe. Besides, the direction of the prevailing winds in the area is constantly from the N and NE, while the wall encircles the oasis all around. The defence of cultivations from cattle also does not seem likely on such a large scale.

The economic function is suggested not only by the intrinsic possibilities that such a structure offers for the control of trade (see Lattimore 1962: 483 for a similar analysis of the Chinese Great Wall), but also by the evidence offered in Margiana by the fortress of Goebekli-Depe, built outside the NW side of the "Antiochus' wall" and excavated by the Russian team of G. Koshelenko. In the fortress of Goebekli hundreds of clay sealings were discovered, pointing to the importance of the frontier between oasis and steppe for trade control: even though the fortress of Goebekli is placed outside the wall, we may suppose that among the functions of the "*limes*", the economical one could be prevailing, particularly if wall and fortresses were contemporary. However, the evidence of Goebekli, a site which ends with the late 4th century AD, would not be consistent with an economic function if the wall would date to late Sasanian time.

Graphical Reconstruction

The preservation of the so-called "Antiochus' wall" is such that, accepting its function as a wall, a reconstruction of its elevation is not self-evident. It is however helpful to refer to a comparative analysis of fortifications in Central Asia.

None of the ancient fortifications built in mud bricks or *pakhsa* is preserved to its original height, so that the relation between thickness and height is not known. Early-Islamic *rabat*, as for example the one near Changly, still almost entirely preserved in its elevation, represents an interesting evidence: here the proportion between thickness and height is *c.* 1:4 (Koshelenko, Bader and Gaibov 1991). In the traditional manor-houses built in the area, until the beginning of 20th century, the ratio is 1:4.5, 1:5 and even more. However, also in this respect it is important to consider the difference between a single building or complex, on one side, and a regional

wall, on the other: a height of *c.* 16 m, calculated on the ratio of 1:4, seems improbable considering the substantial length of the Wall.

The examination of some of the defence structures of Margiana, as well as of Bactria and Khorasmia, reveals aspects which are similar to the "Antiochus' wall". At Gyaur-Kala the wall of the Seleucid period, with a thickness at the base of 6.60 m, is preserved for a maximum height of 7.40 m; at the base of the wall, on both faces are two socles, about 2 m wide, meant to avoid erosion and in the same time to prevent the use of battering-rams; the wall has a sloping profile in the lower 2.70 m of its elevation, then tends to be vertical. In the Parthian period the wall stands on a platform 5 m high, its thickness reaches 10 m and is preserved for about 6-6.50 m in elevation (Tashkhodzhaev 1963: 107). Also, at Old Nisa the wall, which is 8-9 m thick at the base, shows the socle at its foot; the original height has been estimated as 15-18 m (Pugachenkova 1952: 219-22). At Ai Khanum the first stage of the N rampart, dated to the Seleucid period, in mud bricks, has a base thickness of about 8 m, and is preserved for a maximum height of 8.7 m (Leriche 1986b: 53); the main difference with the "Antiochus' wall", apart from the presence of square projecting towers, is the absence of the socle. A very interesting scheme is that of the wall around Balkh oasis, recently investigated and attributed to the end of the Graeco-Bactrian period (Pugachenkova 1976: 137-47; Bernard and Francfort 1979: 134; Leriche 1986b: 94): on a projecting socle 1.5 m high and 4.3 m thick, is the wall, with loopholes, only 1.9 m thick, but reinforced on its outer face at regular intervals (≅ 20 m) by pilasters 2.3 m wide and projecting 1.2 m: a comparison with this wall is at the moment impossible since we have not the plan of any stretch of "Antiochus' wall". In the walls of Khorasmia of the "Kanghyui" (4th BC-1st AD) and "Kushan" (1st-4th AD) periods the socle, in *pakhsa* or bricks, is a constant feature (Khodzhaniyazov 1981: 45). The presence of the projecting socle is the only element which seems to link the "Antiochus' wall" with Gyaur-Kala, Old Nisa, Balkh and Khorasmia.

Knowing the inclination of a wall's faces is essential for the reconstruction of its elevation, given the thickness at the base. The inclination is relevant to the wall's endurance to impact and shocks, but implies a proportionally greater thickness at the base. Given the thickness at the base as in our case, the necessary height for the wall to be functional (and which function?) will depend on the inclination of the faces, which furthermore are not necessarily identical. Also in this case a comparative study is helpful. The average inclination of the external face of *pakhsa* walls in the early historic period Margiana is c. 75°, as in Merv, but there is a tendency in later walls to become almost vertical.

Chronology

As to the dating of the wall, no tangible evidence has come from the excavation or from surface collection. The few sherds of hand-modelled Yaz I pottery from the clayey sand below the wall represent only a rather obvious *terminus post quem*.

The attribution to the Achaemenid and Seleucid periods of the fortified settlement of Garry Kishman (Bader, Gaibov and Koshelenko 1992: 234, 249) and to the late-Parthian – early-Sasanian period of the fortress adjacent to it (Bader, Gaibov and Koshelenko 1992), becomes relevant if we accept that the wall is contemporary with the fortified sites. The possible hints to an earlier structure below the wall, besides, offered by the preliminary geoarchaeological study and yet to be confirmed, would find a counterpart in the existence of Parthian and possibly earlier levels in Goebekli (Gubaev, Koshelenko and Novikov 1990b: 55), the only fortress of the "*limes*" extensively excavated up to now.

Lack of comparative information on the dynamics of erosion of Turkmenian depes has made it impossible working out a model considering the ratio between preserved wall's height and width and profile of the collapsed *pakhsa*, based on Kirkby and Kirkby 1976, which could have offered at least some hints for a chronological understanding.

An element which has relevance to the chronology is the study of the site distribution in the oasis in the different historic periods. In the area of the "Antiochus' wall" several Iron Age settlements have been located, beginning from Yaz I but particularly from the Yaz II and Yaz III periods: at one site, the wall seems to cross the settlement and divide it into two parts. Remains of the Sasanian period, however, extend also beyond the wall.

According to the interpretation of the historical sources recently proposed by Bader, Gaibov and Koshelenko (1995; see *supra*), the "Antiochus' wall" would belong to the late Sasanian period, with its counterparts in the similar structures built in the Gorgan plain (Alexander's wall) or at the Caspian Gates (Derbent): the exterior position of the Goebekli fortress, which seems to have been abandoned before the beginning of the 5th century, would point to this dating. The wall built by the Seleucid king should instead be sought in the wall known by the Turkmenians as Gilyakin-Chilburj, encircling the immediate suburbs of Old Merv. Even though this interpretation seems very likely, it is based on a purely historical approach with neither secure nor fresh evidence for dating.

A particular problem for the comparative approach is represented by the dating of the "Alexander's wall", itself problematic. The structure, traditionally dated to the Sasanian period, was then brought back to the Parthian period, around the 2nd-1st century BC, by two authors based on two independent arguments. But while the archaeological evidence produced in favour of such dating (Kiani 1982a; 1982b: 38) does not seem well-grounded, and seems instead to agree with a Sasanian dating (see Boucharlat 1987: 45), without however excluding a possible Parthian phase yet unrecorded, the geographical evidence, based on the study of the variations of the Caspian Sea levels (Huff 1981a, b; 1993: 58), would

clearly exclude a Sasanian dating. Besides, the comparison with the *Sadd-e Eskandar*, "Alexander's wall", in the Gorgan plain, running from the Caspian sea for more than 150 km eastwards, is tenable only as regards the general character of a long regional wall. "Alexander's wall" was provided with at least thirty-six forts, each of them of imposing measurements with walls strengthened by towers (*ibid.*), while, at least in the surface survey, no towers are present in the "Antiochus' wall".

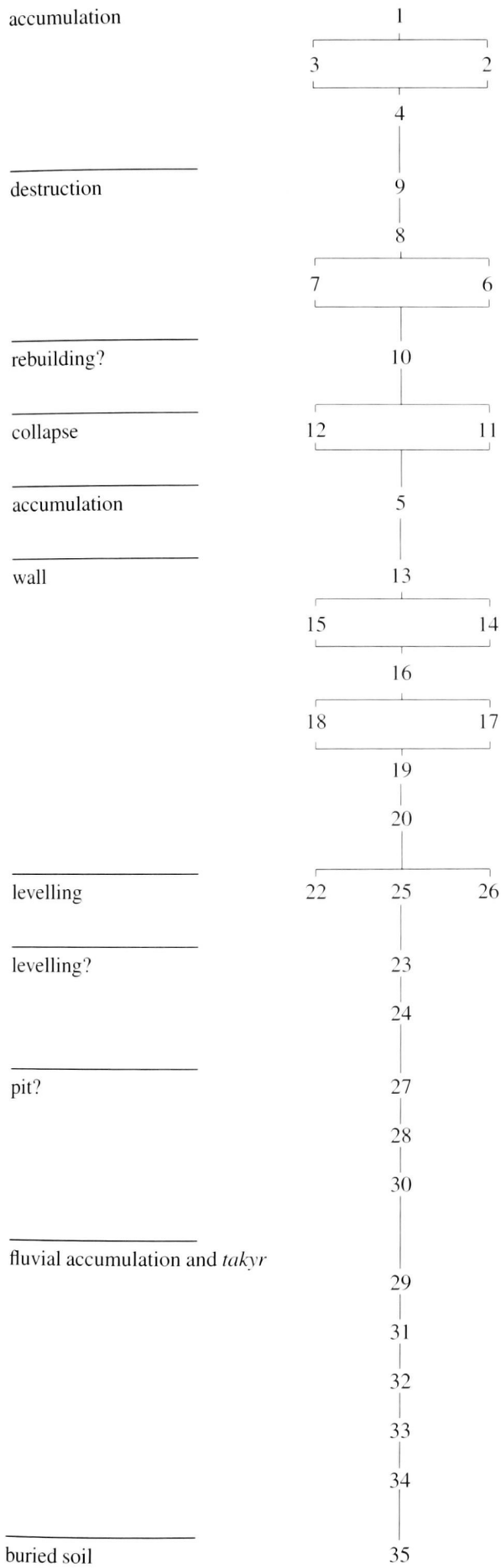
The Gilyakin-Chilburj (Fig. 21) has been almost totally razed. A very short stretch (ca. 400 m) of clay rampart at a short distance to the N of Sultan-Kala, surveyed during the last campaign, could represent all that is left of it (Fig. 22). This wall is about 5 m thick and 2 m high, with sloping sides; in a shallow cut created by water erosion it has been possible to ascertain that its surface layer consists of clay not so compact as *pakhsa*. The Gilyakin-Chilburj, as we have seen (see *supra*), was investigated in 1947 by the YuTAKE, even though published information on its plan and its structure is rather poor. The wall, preserved in height for about 3 m, was built in blocks of *pakhsa* 70-80 cm high and had a base thickness of about 6-7 m. The chance find, in occasion of the destruction of a stretch of this wall, of a coin, still unpublished but preliminary identified as Parthian (A. Annaev, personal communication; S. Loginov, personal communication), could represent an important chronological evidence, if the association of the coin to the wall could be proved.

The third regional wall of Margiana, half-way between the former two, has been detected for a stretch of about 550 m in E-W direction, turning then to NW for 350 m more. Even though preservation is as bad as in the other two walls, here the N slope is steeper than the S one, where the accumulation seems bigger. Also for this wall, no find connected to it was recorded (Fig. 23).

Comparing the Gilyakin-Chilburj with the "Antiochus' wall" explored by us, in spite of the about 800 years of difference in dating postulated by Bader, Gaibov and Koshelenko, we notice a very similar structure: probably the common type of structure used in long walls, where the use of bricks would have been extremely burdensome.

This evidence suggests that the chances of dating any wall built in *pakhsa* are really scanty, in the absence of artefacts clearly associated to the structures. And given the character of regional walls built at the limit of the settled area, the possibility to come on such evidences are rather exiguous. Any new archaeological research, not only on the "Antiochus' wall" but also on the short preserved stretch of the Gilyakin-Chilburj, will have to focus on this slender hope.

STRATIGRAPHIC DIAGRAM OF M 248



LEGEND

1. Layer of sandy silt mixed with clay from the wall's destruction.
2. Layer of sand accumulated to the N of the wall; boundary with S.U. 1 is not sharp.
3. Layer of sand accumulated to the S of the wall; boundary with S.U. 1 is not sharp.
4. Layer of compact clayey sand.
5. Series of parallel sediments, sloping northwards, accumulated at the base of the wall, on top of northern socle.
6. Brittle *pakhsa* at the top of the wall, N face.
7. Brittle *pakhsa* at the top of the wall, S face.
8. Brittle *pakhsa* at the top of the wall, centre.
9. Upper negative interface of the wall, hardened by transit of vehicles.
10. Layer of *pakhsa* standing on the collapse (reconstruction?).
11. Collapse of the wall to N.
12. Collapse of the wall to S.
13. Body of the wall, 2nd layer of *pakhsa*.
14. Northern socle, 2nd layer of *pakhsa*.
15. Southern socle, 2nd layer of *pakhsa*.
16. Junction between *pakhsa* layers in the body of the wall.
17. Junction between the base layer and the northern socle 2nd layer.
18. Junction between the base layer and the southern socle 2nd layer.
19. Base layer (of the body of the wall and of socle).
20. Base level of the wall.
21. Layer of brittle clay: *takyr* contemporary with the wall?
22. Layer of silty clay levelling below the wall and surrounding areas.
23. Layer of silty sand.
24. Layer of sandy silt, with bio-perturbation, compact, with superficial harder lens.
25. Lens of clayey sediment.
26. Layer of clay levelling below the wall and surrounding areas.
27. Layer of sand with clay: filling of pit?
28. Layer of sand, with potsherds and charcoal: filling of pit?
29. Layer of sand with clay (from the above layers?).
30. Negative interface of pit?
31. Layer of sand, with lenses and marked bio-perturbation.
32. Level of *takyr*.
33. *Takyr*, compact.
34. Layer of sand.

[35. Buried soil: not in section, investigated through sondage].

APPENDIX

Geoarchaeology of the "Antiochus' wall"

by D. E. Angelucci and M. Cremaschi

Introduction

This short contribution takes into account the geoarchaeology of the so-called "Antiochus' wall"; the geoarchaeological approach is employed in order to reconstruct the geomorphological and environmental context of the area of the monument and its evolution, and to provide useful information for its intepretation. The data derive from the field description which was carried out during the 1993 and 1994 campaigns.

Field Data

Description of the units

The profile here described was surveyed in the section of M 248. The units are briefly described from top to bottom and the correspondence with the field stratigraphic unit names (S.U., excavation Bader, Callieri and Khodzhaniyazov) is given in brackets; colour definition follows the Munsell notation system.

Unit 1 (S.U. 1): sandy silt, medium subangular blocky, discontinuous parallel lamination, abrupt lower boundary.

Unit 2 (S.U. 2, 3, 4): sand, 10YR5/4-6, loose, no sedimentary structures.

Unit 3 (S.U. 11, 12): sandy silty loam, 10YR7/3, massive, slightly hard, on average 10 cm thick;

Unit 4 (SU 13 to 20) horizontal alternation of layers of silty clayey loam, 10YR7/4, massive, hard, very discontinuous weak lamination which locally becomes involuted, only a few cm thick; the boundaries between the layers are usually sharp, sometimes slightly wavy; the sequence as a whole has an abrupt lower boundary.

Unit 5 (S.U. 22): silty clayey loam, 10YR7/4, well developed fine platy structure, low porosity, hard, abrupt wavy lower boundary.

Unit 6 (S.U. 23): sandy silty loam, 10YR7/4, weakly developed fine subangular blocky, low porosity, hard, abrupt smooth lower boundary.

Unit 7 (S.U. 24): sandy silt, very light, 10YR7/4, massive, low porosity, slightly hard, few continuous infillings in biogalleries, clear smooth lower boundary.

Unit 8 (S.U. 28): fine sand, 10YR6/4, moderately packed, moderately sorted, low porosity, lose, common continuous infillings in biogalleries, weakly distinct discontinuous fine cross and parallel lamination; common charcoal fragments and potsherds; a thin CaCO3 layer is present at the top; abrupt smooth lower boundary.

Unit 9 (S.U. 33): silty clay, 10YR7/4, very low porosity, slightly hard, few fine iron-manganese oxide impregnations, almost well distinct continuous vey fine parallel lamination, abrupt smooth lower boundary.

Unit 10 (S.U. 34): fine sand, 10YR-2.5Y6/4 with few fine reddish brown mottles, moderately packed, moderately sorted, low porosity, loose, few fine iron-manganese oxide impregnations, almost well distinct continuous parallel and cross lamination (inclined laminae dip southward at low angle), abrupt smooth lower boundary.

Unit 11 (S.U. 35 pp): clayey silty loam, 10YR7/4, well developed medium angular blocky, very low porosity which is mostly formed of very fine channels, no roots, hard, common very fine iron-manganese oxide impregnations, weak discontinuous fine parallel (horizontal) lamination, lower boundary clear.

Unit 12 (S.U. 35 pp): alternation between (fine) sandy loam/silty loam with fine parallel lamination, lower boundary not reached.

Explanation of the sequence

According to the field data collected, the upper part of S.U. 35 represents the weakly developed A horizon of a buried soil profile, the parent material of which is composed of low energy alluvial sediments (lower part of S.U. 35). The features observed – the organic matter enrichment, the presence of a well developed pedality, the occurrence of iron-manganese impregnations – are typical for alluvial environment and indicate that soil formation occurred in a wetter context than the present one; the high amount of clay of the parent material has lead to the development of slight vertic properties which are suggested by the low porosity and the absence of open planar voids.

Even the overlying S.U. 34 and 33 are most probably related to an alluvial environment, as their moderate sorting, colour, sedimentary structures and slight hydromorphic features suggest.

S.U. 28 can be due to cultural processes: the presence of artefacts and ecofacts suggest its formation as a man-made accumulation, probably in order to prepare the subsoil and/or levelling the area before the wall construction, although some reworking probably took place originating the discontinuous lamination. S.U. 24 is a weakly developed soil horizon which developed at the top of the sandy unit; the intense bioturbation observed suggests that humid environment wa still existing at this time.

All the S.U. which compose the mid-upper part of the sequence, from 24 to 13, are related to the wall; the lower ones exhibit a platy structure which derives from their compaction. After the wall construction aeolian sand appeared soon after the wall construction and is present in the collapsed pakhsa of the wall. The further erosion of the wall is a younger process and determined its shape, which is now stable under the present climatic context, as the development of a soil profile at its top (S.U. 1 to 4) indicates.

Discussion

The most striking evidence which is suggested by the pedo-sedimentary record is that the environmental context of the site had changed before and after the wall

construction. The units underneath the wall have been formed in an alluvial context, indicating a wetter environment than the present one, probably due to the local fluviatile activity; the presence of sand in the collapsed clay of the wall, and the earlier sediments which lay over the collapse are instead due to aeolian deposition in arid environment.

The data suggest that this environmental change happened rather suddenly: at the top of the alluvial sequence no soil profile which could indicated an important stable phase and interruption in the sedimentation was observed; furthermore, aeolian sand is present in the first layers of collapse of the wall.

The dating and explanation of this evidence can not be found in the cross-section itself - unless more data are collected – but can be linked to the regional geomorphological evolution. Cremaschi (this volume) states that the whole area of the 'Murghab delta' was affected by a relevant environmental modification which lead to the desertification of a previously existing alluvial system. The age of this event is not yet defined, and at any rate it can not be presumed that it occurred at the same time on the whole area; radiocarbon dating suggests that in the Gonur area the alluvial system was still active during the 2nd millennium BC. Archaeological dating from the wall, if possible, may give a more precise chronological indication for this event.

However, the wall construction appears to be related to the environmental change, probably as a result of the environmental stress.

References

Alkhamova, Z.A. (1953) Polevoi otchet VIII otryada YuTAKE po izucheniyu rabada gorodishcha Starogo Merva. *Trudy YuTAKE* II, pp. 404-12. Ashkhabad.

Bader, A., Gaibov, V. and Koshelenko, G. (1992) Materials for an Archaeological Map of the Merv Oasis: Köne Kishman. *Mesopotamia*, XXVII, pp. 225-50.

Bader, A., Gaibov, V. and Koshelenko, G. (1994) The Northern Periphery of the Merv Oasis (from Achaemenid Period to the Mongol Conquest). *Silk Road Art and Archaeology*, 3, pp. 51-70.

Bader, A., Gaibov, V. and Koshelenko, G. (1995) Walls of Margiana. *In the Land of the Gryphons (Monografie di Mesopotamia)*. pp. 39-50. Firenze.

Bader, A., Gaibov, V. and Koshelenko, G. (1996) Studies for the Archaeological Map of the Merv Oasis: Durnali Area. *Bulletin of the Asia Institute*. n.s., 8.

Bader, A., Gaibov, V. and Koshelenko, G. (in press) New Materials for an Archaeological Map of the Merv Oasis: Uly Kishman. *Mesopotamia*.

Barthold, V.V. (1927) *Istoriya kul'turnoi zhizni Turkestana*. Leningrad.

Bernard, P. and Francfort, H.-P. (1979) Nouvelles découvertes dans la Bactriane Afghane. *Annali IUO* 39/1, pp. 119-48.

Bernard, P., Grenet, F., Isamiddinov, M. *et alii* (1990) Fouilles de la mission franco-soviétique à l'ancienne Samarcand (Afrasiab): première campagne, 1989. *CRAI*, 1990, pp. 356-83.

Bernard, P., Grenet, F., Isamiddinov, M. *et alii* (1992) Fouilles de la mission franco-ouzbèque à l'ancienne Samarkand (Afrasiab): deuxième et troisième campagnes (1990-1991). *CRAI*, 1992, pp. 275-311.

Bivar, A.D.H. and Fehèrvari, G. (1966) The Wall of Tammisha. *Iran* IV, pp. 35-50.

Boucharlat, R. (1987) Période IV: le fort sassanide. *Fouilles de Tureng tepe, I, Les périodes sassanides et islamiques*, pp. 25-49. Paris.

Callieri, P. (1996) Margiana in the Hellenistic Period: Problems of Archaeological interpretation. In E. Acquaro (ed.), *Alle soglie della classicità. Il Mediterraneo tra tradizione e innovazione. Studi in onore di Sabatino Moscati*, II, Pisa-Roma, pp. 569-578.

Chichkina, G.V. (1986) Les remparts de Samarcande à l'époque hellénistique. In P. Leriche, H. Tréziny (ed.), *La fortification dans l'histoire du monde grec*, Actes du colloque international, pp. 71-78. Paris.

Dolgorukov, V.S. (1984) Oboronitel'nye sooruzheniya Dil'berdzhina. *Drevnyaya Baktriya*, 3, pp. 58-92. Moskva.

Durdyev, D. (1959) Kyrk-depe (Otchet o raskopkakh 1955-1957 godov). *Trudy Instituta istorii, arkheologii i etnografii Akademii Nauk Turkmenskoi SSR* V, pp. 123-35. Ashkhabad.

Filanovich, M.I. (1974) Gyaur-Kala. *Trudy YuTAKE* XV, pp. 15-139. Ashkhabad.

Filanovich, M.I. (1989) Istoriko-kul'turniye arkheologicheskiye tablitsy po gorodishchu Gyaur-Kala v Starom Merve, *Trudy YuTAKE* XIX, *Drevni Merv*, pp. 62-121. Ashkhabad.

Francfort, H.-P. (1979) *Les fortifications en Asie Centrale de l'Age du Bronze à l'époque Kouchane*. Paris.

Frye, R. N. (1977) The Sasanian System of Walls for Defense. In M. Rosen-Ayalon (ed.), *Studies in Memory of G. Wiet*, pp. 7-15. Jerusalem.

Gaibov, V., Koshelenko, G. and Novikov, S. (1990) Chilburj. *Bulletin of the Asia Institute*, n.s. 4/1, pp. 21-36.

Gubaev, A., Koshelenko, G. and Novikov, S. (1990b) Archaeological Exploration of the Merv Oasis. *Mesopotamia* XXV, pp. 51-60.

Gubaev, A., Koshelenko, G and Novikov, S. (1990a) Arkheologicheskiye issledovaniya v Mervskom oazise. *Vestnik drevnei istorii*, 3, pp. 117-26.

Huff, D. (1981a) Der Alexanderwall, eine Grenzbefestigung zwischen Iran und Turan. *Architectura-Zeitschrift für Geschichte der Baukunst* 11, pp. 105-10.

Huff, D. (1981b) Zur Datierung des Alexanderwall. *Iranica Antiqua* XVI, pp. 125-39.

Huff, D. (1993) Architecture Sassanide. *Splendeur des Sassanides. L'empire Perse Entre Rome et la Chine [224-642]*, pp. 45-61. Bruxelles.

Huntington, E. (1908) Description of the Kurgans of the Merv Oasis. In R. Pumpelly (ed.), *Explorations in Turkestan*, I, Washington 1908.

Khodzhaniyazov, G. (1981) Istoriya razvitiya fortifikatsii antichnogo Khorezma. *Sovetskaya arkheologiya*, 2, pp. 43-57.

Kiani, M. Y. (1982a) Excavation of the Defensive Wall of the Gurgan Plain, a Preliminary Report. *Iran* XX, pp. 73-81.

Kiani, M. Y. (1982b) *Parthian Sites in Hyrcania. The Gurgan Plain (AMI*, Ergänzungsband 9). Berlin.

Kirkby, A. and Kirkby, M.J. (198.) Geomorphic Processes and the Surface Survey of Archaeological Sites in Semi-Arid Areas. In D.A. Davidson, M.L. Shackley (ed.), *Geoarchaeology: Earth Science and the Past*, pp. 229-53. London.

Koshelenko, G.A. (1963) Parfyanskaya fortifikatsiya. *Sovetskaya arkheologiya*, 2, pp. 57-73.

Koshelenko, G.A. (1966) *Kul'tura Parfii*. Moskva.

Koshelenko, G.A. (1986) La fortification de l'Orient hellénistique. Remarques préliminaires. In P. Leriche and H. Tréziny (ed.), *La fortification dans l'histoire du monde grec*, Actes du colloque international, pp. 143-48. Paris.

Koshelenko, G., Bader, A. and Gaibov, V. (1991) Materials for an Archaeological Map of Margiana: the Changly Region. *Mesopotamia* XXVI, pp. 165-86.

Koshelenko, G., Bader, A. and Gaibov, V. (1994) Archaeological Studies in Turkmenistan. *Ancient Civilizations from Scythia to Siberia* I/3, pp. 273-88. Leiden.

Koshelenko, G.A., Gubaev, A., Gaibov, V. and Bader, A. (1994) Mervski oazis: dinamika sistem rasseleniya i irrigatsii. *Vestnik drevnei istorii*, 4, pp. 78-91.

Kozlovski, V.A. and Nekrasova, E.G. (1976) Stratigraficheski shurf na tsitadeli drevnego Termeza. *Baktriyskiye drevnosti*, pp. 30-39. Leningrad.

Kudryavtsev, A.A. (1982) *Drevni Derbent*. Moskva.

Kuz'mina, E.E. and Pevzner, S.B. (1956) Oboronitel'nye sooruzheniya gorodishcha Koi Kobad Shah. *Kratkiye Soobshcheniya Instituta Istorii Material'noi Kul'tury* 64, pp. 77-84. Moskva.

Lapirov-Skoblo, I.S. (1981) Gorodskie ukrepleniya. *Gorodishche Toprak-Kala*, pp. 56-72. Moskva.

Lattimore, O. (1962) *Studies in Frontier History. Collected Papers 1928-1958* (École Pratique des Hautes Études - Sorbonne - Sixième section: Sciences économiques et sociales. Le monde d'Outre-mer passé et présent, troisième série, Essais VI). Paris.

Le Berre, M. and Schlumberger, D. (1964) Observations sur les remparts de Bactres. *Monuments préislamiques d'Afghanistan* (MDAFA XIX), pp. 65-104. Paris.

Leriche, P. (1974) Aï Khanoum: un rempart hellénistique en Asie Centrale. *RA*, 2, pp. 231-70.

Leriche, P. (1986a) Fortifications grecques: bilan de recherches au Proche et Moyen-Orient. In P. Leriche, H. Tréziny (ed.), *La fortification dans l'histoire du monde grec*, Actes du colloque international, pp. 39-49. Paris.

Leriche, P. (1986b) *Fouilles d'Aï Khanoum. V. Les remparts et les monuments associés* (MDAFA XXIX). Paris.

Levina, V.A. (1949) Stena i bashnya Staroi Nisy. *Trudy YuTAKE* I, pp. 133-46. Ashkhabad.

Marcolongo, B. and Mozzi, P. (in press) Holocene Geomorphological Evolution of the Eastern Kopet-Dagh Piedmont Plain (Turkmenistan). A Preliminary Geoarchaeological Perspective. *Kratkie Soobshcheniya Instituta Istorii Material'noi Kul'tury*.

Masson, M.E. (1971) Margianskaya stena Antiokha. *Pamyatniki Turkmenistana* 2 (12), pp. 13-16.

Masson, M.E. (1980) Kratki ocherk po istorii izucheniya gorodishch Starogo Merva do 1946 goda. *Trudy YuTAKE* XVII, pp. 10-37. Ashkhabad.

Masson, V.M. (1959) *Drevnezemledel'cheskaya kul'tura Margiany*. Moskva-Leningrad.

Masson, V.M. (1979) Fortifikatsiya Srednei Azii v bronzovom veke. *Etnografiya i arkheologiya Srednei Azii*, pp. 28-34. Moskva.

Maurer Trinkaus, K. (1981) *The Partho-Sassanian Frontier: Settlement in the Damghan Plain, Iran*. Ann Arbor University Microfilms no. 82-08047.

Maurer Trinkaus, K. (1984) Boundary Maintenance Strategies and Archaeological Indicators, in S.P. De Atley, F.J. Findlow (eds.), *Exploring the Limits: Frontiers and Boundaries in Prehistory* (BAR Int. S., 223), pp. 35-49. Oxford.

Merezhin, L.N. (1978) Obsledovaniye rayonnoi steny III veka do n.e. vokrug Margiany (Polevoi otchet IV otryada YuTAKE). *Trudy YuTAKE* XVI, pp. 11-15. Ashkhabad.

MITT (1939) *Materialy po istorii turkmen i Turkmenii*, I: S.L. Volin, A.A. Romaskevich, A.Ju. Yakubovski (eds), *VII-XV veka. Arabskiye i persidskiye istochniki*. Moskva-Leningrad.

Mukhamedov, Kh. (1961) *Iz istorii drevnikh oboronitel'nykh sten vokrug oazisov Uzbekistana. Stena "Kanpyrai" drevnebukharskogo oazisa*, Avtoreferat dissertatsii. Tashkent.

Piotrovski, B.B. (1949) Razvedochnye raboty na Gyaur-kale v Starom Merve. *Materialy YuTAKE* I, pp. 35-41. Ashkhabad.

Pugachenkova, G.A. (1952) Parfyanskiye kreposti Juzhnogo Turkmenistana. *Vestnik Drevnei Istorii*, 2, pp. 215-25.

Pugachenkova, G.A. (1958) *Puti razvitiya arkhitektury Yuzhnogo Turkmenistana pory rabovladeniya i feodalizma*. Moskva.

Pugachenkova, G.A. (1962) Koroplastika Drevnego Merva. *Trudy YuTAKE* XI, pp. 117-73. Ashkhabad.

Pugachenkova, G.A. (1976) K poznaniyu antichnoi i rannesrednevekovoi arkhitektury Severnogo Afganistana. *Drevnyaya Baktriya, Materialy Sovetsko-afganskoi ekspeditsii 1969-1973 godov*, pp. 127-62. Moskva.

Pugachenkova, G.A. (1978) Ukrepleniya Nizhnego goroda. *Dalverzin-tepe - Kushanski gorod na yuge Uzbekistana*. Tashkent.

Pugachenkova, G.A. (1984) Raskopki yuzhnykh gorodskikh vorot Dil'berdzhina. *Drevnyaya Baktriya*, 3, pp. 93-111. Moskva.

Pugachenkova, G.A. (1986) Caractères de l'architecture défénsive antique en Asie Centrale (A la lumière des recherches les plus récentes). In P. Leriche, H. Tréziny (ed.), *La fortification dans l'histoire du monde grec*, Actes du colloque international, pp. 57-69. Paris.

Rapin, C. and Raxmanov, Sh. (1997) Sur la route de Samarkand à Balkh: les Portes de Fer près de Derbent. *La Timouride*, in press.

Rtveladze, E.V. (1986) Bactrian Fortification: Genesis and Evolution in their Social and Cultural Aspects. In P. Leriche, H. Tréziny (ed.), *La fortification dans l'histoire du monde grec*, Actes du colloque international, pp. 323-28. Paris.

Rtveladze, E.V. (1990) On the Historical Geography of Bactria-Tokharistan. *Silk Road Art and Archaeology* 1, pp. 1-34.

Sabirov, K.S. (1978) K izucheniyu oboronitel'nykh sooruzheni antichnogo goroda Er Kurgana. *Obshchestvennye nauki v Uzbekistane*, 6, pp. 43-49.

Sarianidi, V.I. and Koshelenko, G.A. (1985) Mervski oazis. *Drevneishiye gosudarstva Kavkaza i Srednei Azii (Arkheologiya SSSR)*, pp. 181-84. Moskva.

Shishkina, G.V. (1970) Drevneishaya oboronitel'naya stena Samarkanda. *Obshchestvennye nauki v Uzbekistane*, 9.

Shishkina, G.V. (1976) Severnye vorota drevnego Samarkanda. *Istoriya i kul'tura narodov Srednei Azii*, pp. 99-104. Moskva.

Suleimanov, R.Kh. and Turubekov, M. (1978) Etapy razvitiya fortifikatsionnoi sistemy Er Kurgana, *Istoriya material'noi kul'tury Uzbekistana* 14, pp. 60-67. Tashkent.

Tashkhodzhaev, Sh.S. (1963) Razrez gorodskoi steny Gyaur-Kaly, *Trudy YuTAKE* Vol. XII, pp. 95-118. Ashkhabad.

Turgunov, B.A. (1968) Priyemy fortifikatsii antichnogo Chaganiana, *Sovetskaya arkheologiya*, 1, pp. 39-45.

Turgunov, B.A. (1986) Les fortifications de Dalverzin-tepe. P. Leriche, H. Tréziny (ed.), *La fortification dans l'histoire du monde grec*, Actes du colloque international, pp. 283-88. Paris.

Turubekov, M. (1979) Osnovnye etapy razvitiya vneshnei oboronitel'noi steny drevnego Samarkanda po dannym raskopa 27 na zapadnom fase Afrasiaba, *Vsesoyuznoye*

nauchnoye soveshchaniye "Antichnaya kul'tura Srednei Azii i Kazakhstana". Tashkent.

Turubekov, M. (1982) Tsitadel' Erkurgana, *Istoriya material'noi kul'tury Uzbekistana* 17, pp. 51-60. Tashkent.

Usmanova, Z.I. (1963) Erk-Kala (po materialam YuTAKE 1955-1959 godov), *Trudy YuTAKE* XII, pp. 20-95. Ashkhabad.

Usmanova, Z.I. (1969) Novye dannye k arkheologicheskoi stratigrafii Erk-Kaly, *Trudy YuTAKE* XIV, pp. 13-55. Ashkhabad.

Usmanova, Z.I. (1989) Razrez krepostnoi steny Erk-Kaly Starogo Merva, *Trudy YuTAKE* XIX, *Drevni Merv*, pp. 21-61. Ashkhabad.

Vyazigin, S.A. (1949) Stena Antiokha Sotera vokrug Drevnei Margiany, *Trudy YuTAKE* Vol. I, pp. 260-75. Ashkhabad.

Voronina, V.L. (1964) Iz istorii sredneaziatskoi fortifikatsii, *Sovetskaya arkheologiya*, 2, pp. 260-75.

Whitehouse, D. (1978) Excavations at Kandahar, 1974. *Afghan Studies* I, pp. 9-40.

Young, R. (1955) The South Wall of Balkh-Baktra. *American Journal of Archaeology* 59, pp. 267-76.

Zhukovski, V.A. (1894) Drevnosti Zakaspiyskogo kraya. Razvaliny Starogo Merva, *Materialy po arkheologii Rossii, izdavayemye Imperatorskoi Arkheologicheskoi Komissiei, XVI*, pp. 111, 114-15, pl. 3. St. Petersburg.

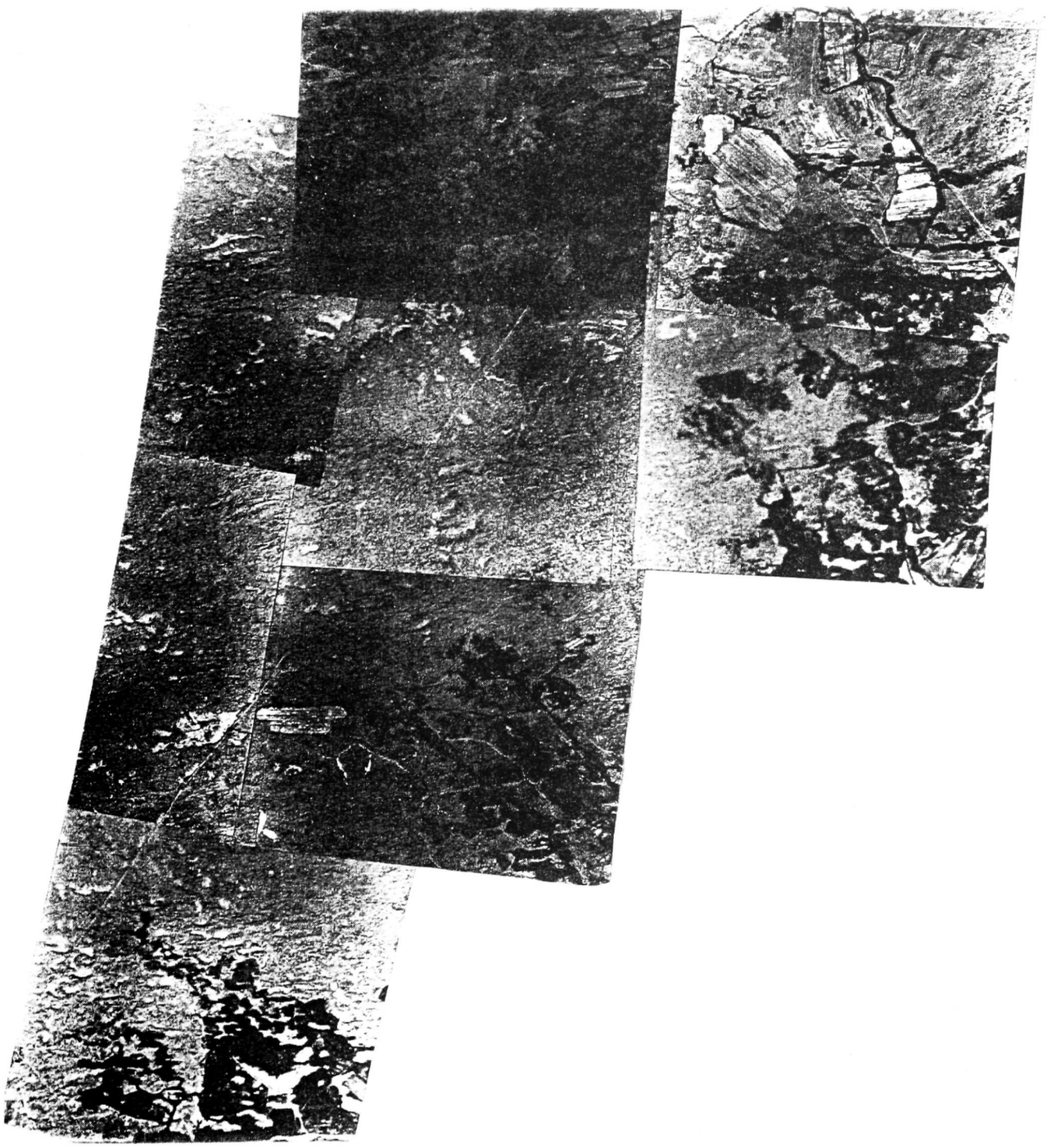


Fig. 1 - An aerial view of the NE limit of Merv oasis: the narrow, pale line represents the so-called "Antiochus' wall".

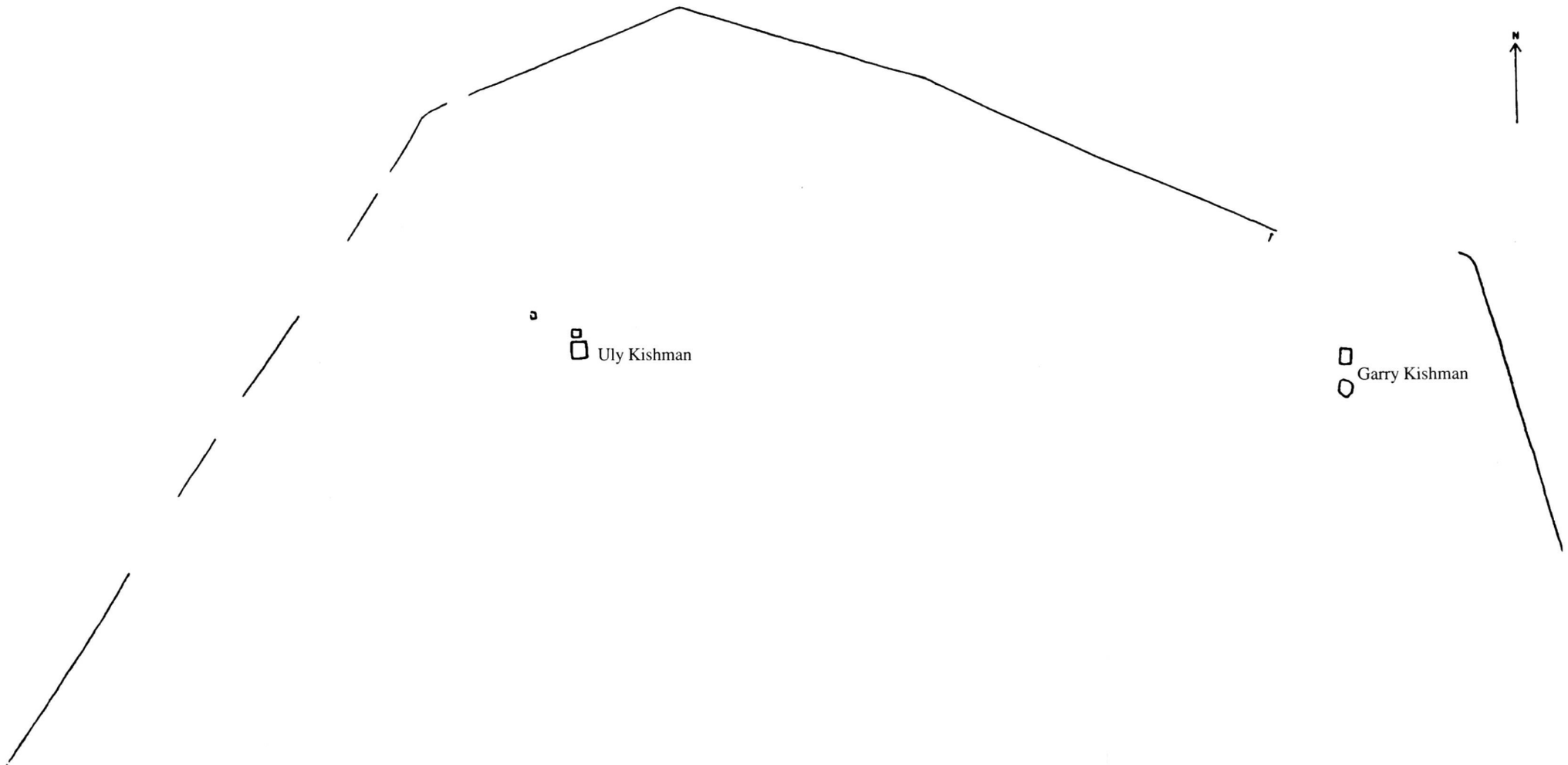


Fig. 2 - A schematic plan of the N part of the so-called Antiochus' wall, showing its relationship with the sites of Uly Kishman and Garry Kishman, as well as the position of site 248 (scale 1:70,000).



Fig. 3 - Site 248, collapsed surface of the wall.

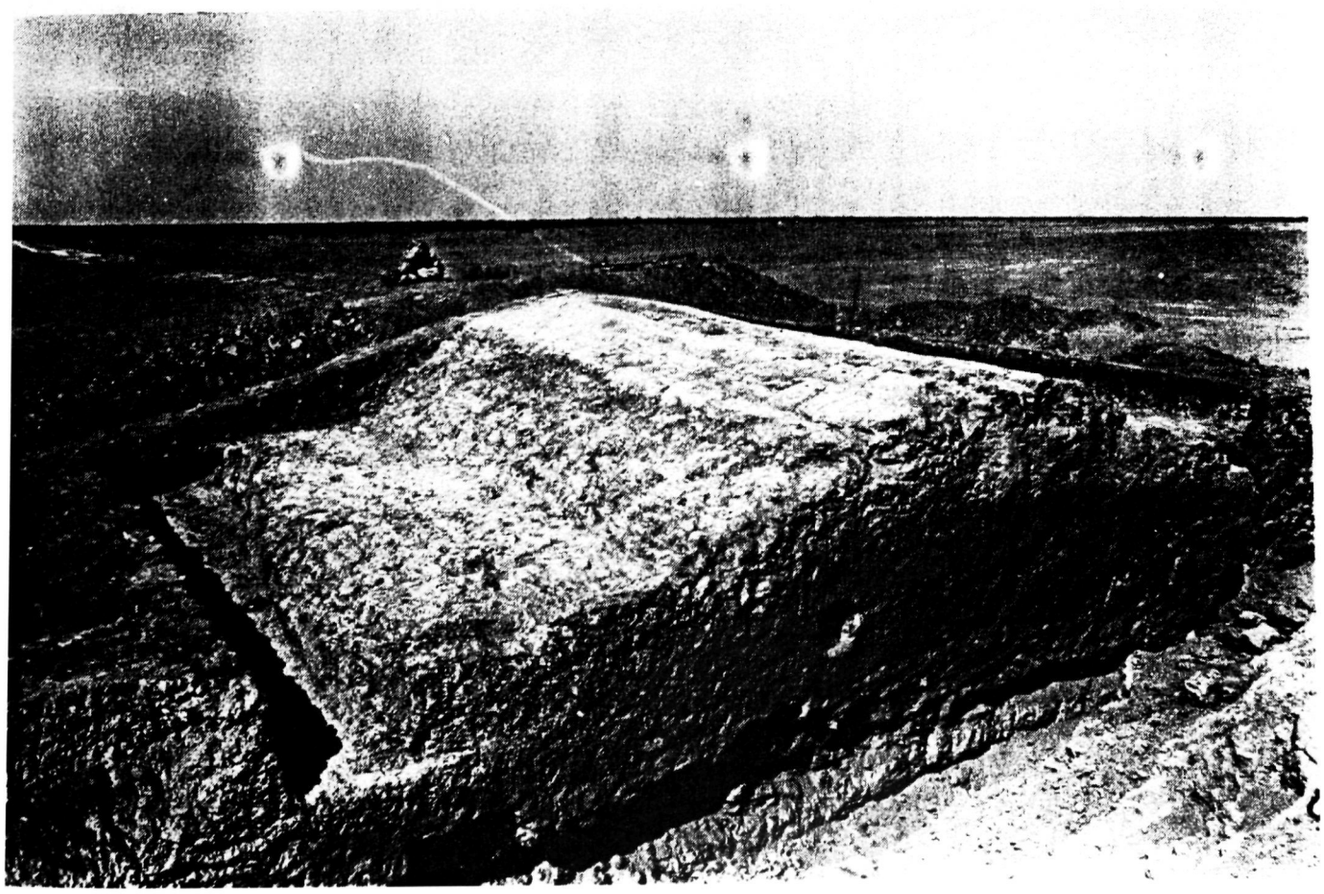


Fig. 4 - General view of the trench at site 248, from SW.

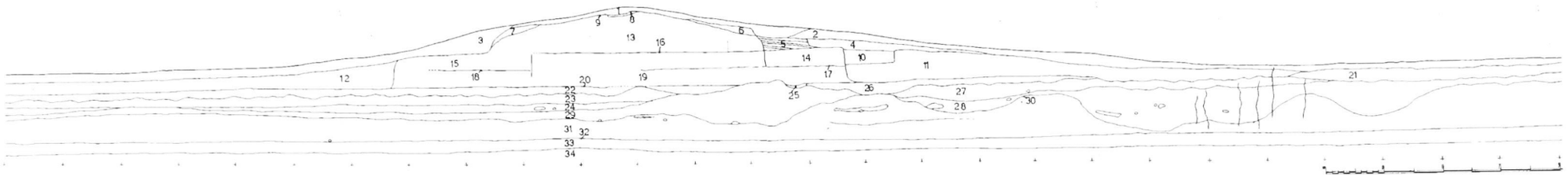


Fig. 5 - The cross-section of the wall at site 248: for the description of the stratigraphic units, see stratigraphic diagram and legend.

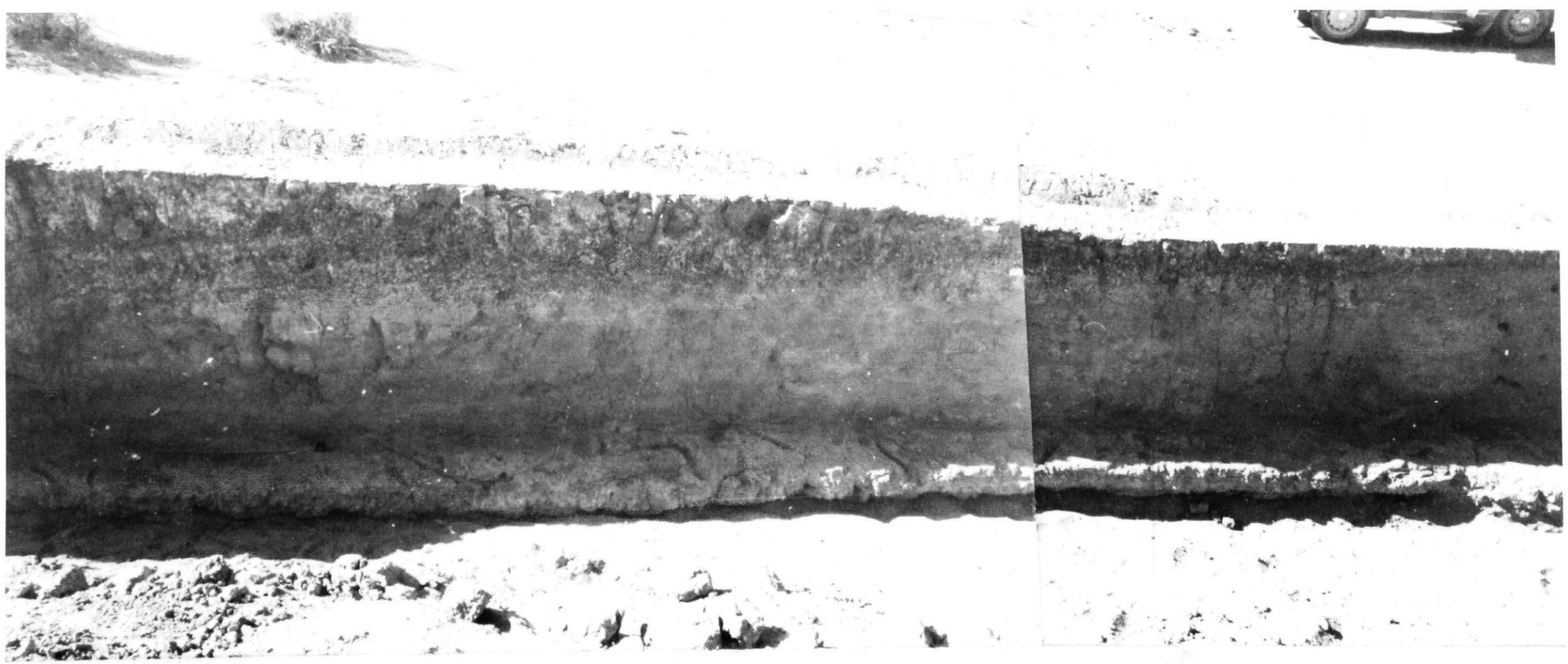


Fig. 5 - Stratifications to the N of the wall.

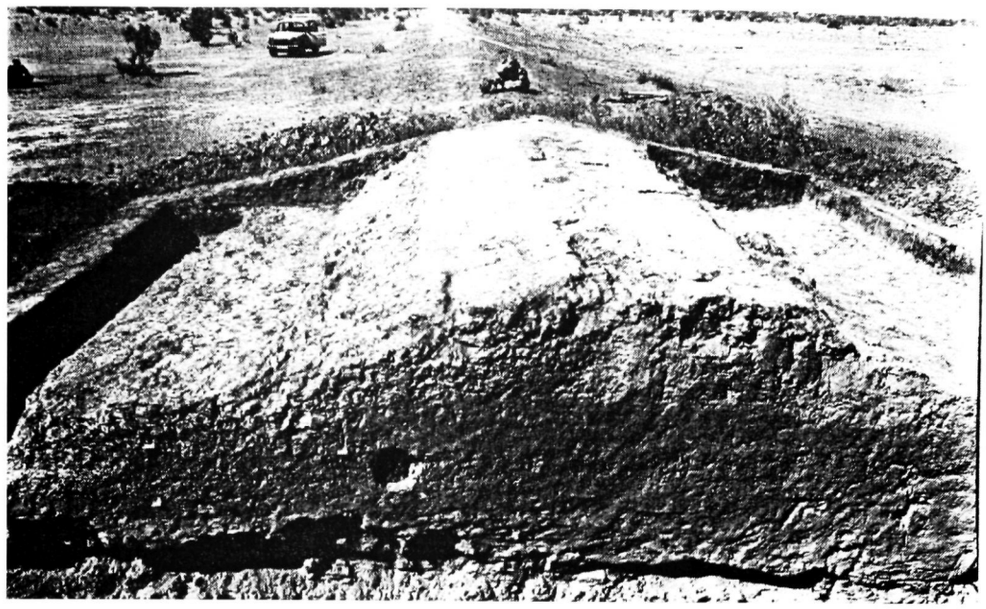


Fig. 7 - The section of the wall, showing the two socles.



Fig. 8 - The N socle, view from N.

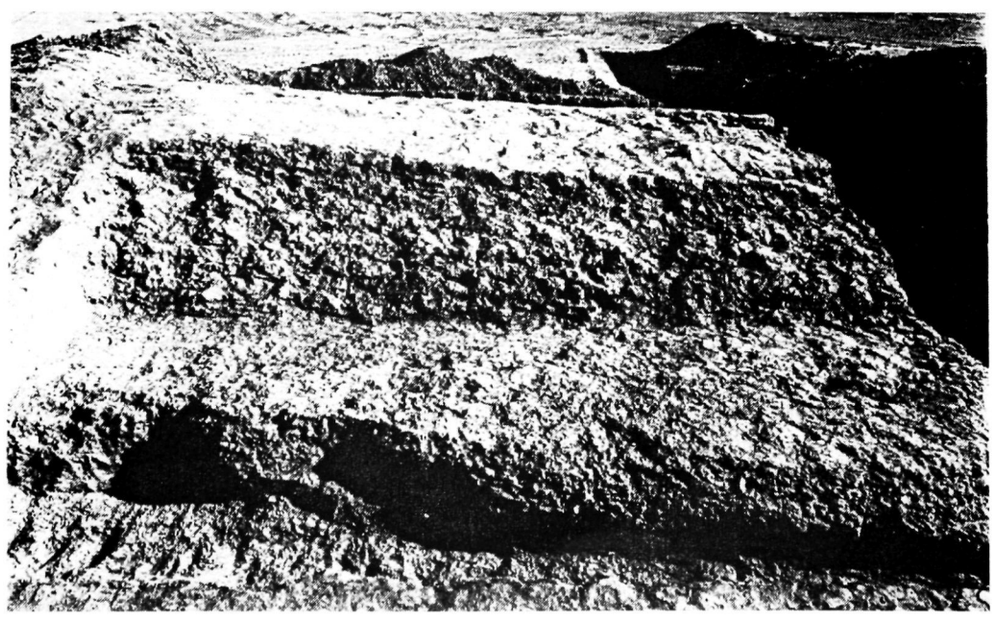


Fig. 9 - The S socle, view from S.



Fig. 10 - The body of the wall.

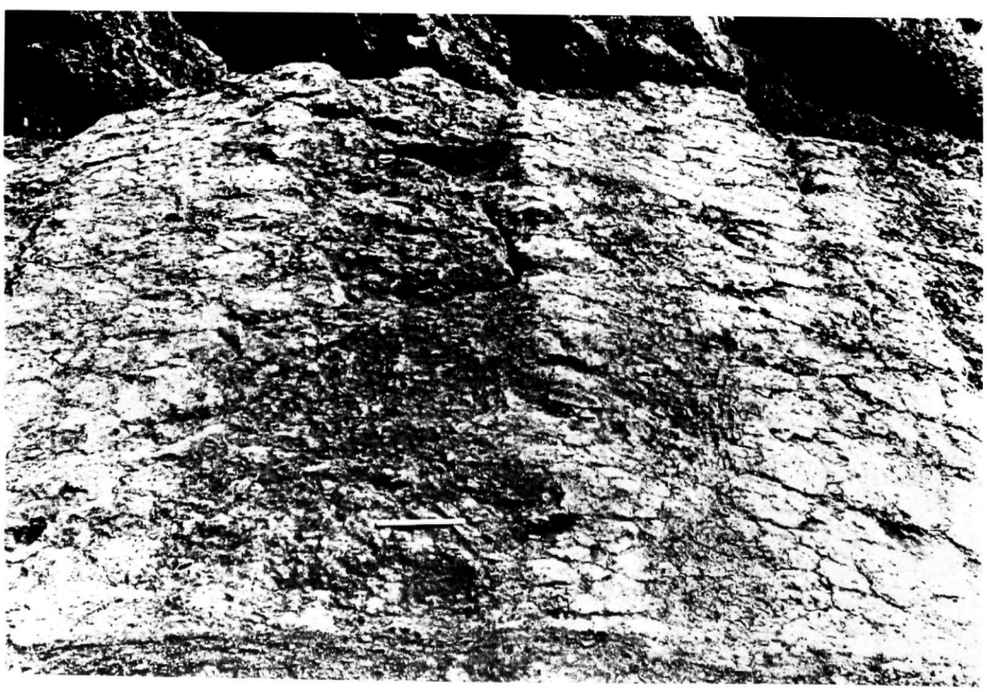


Fig. 11 - The preserved top of the wall.

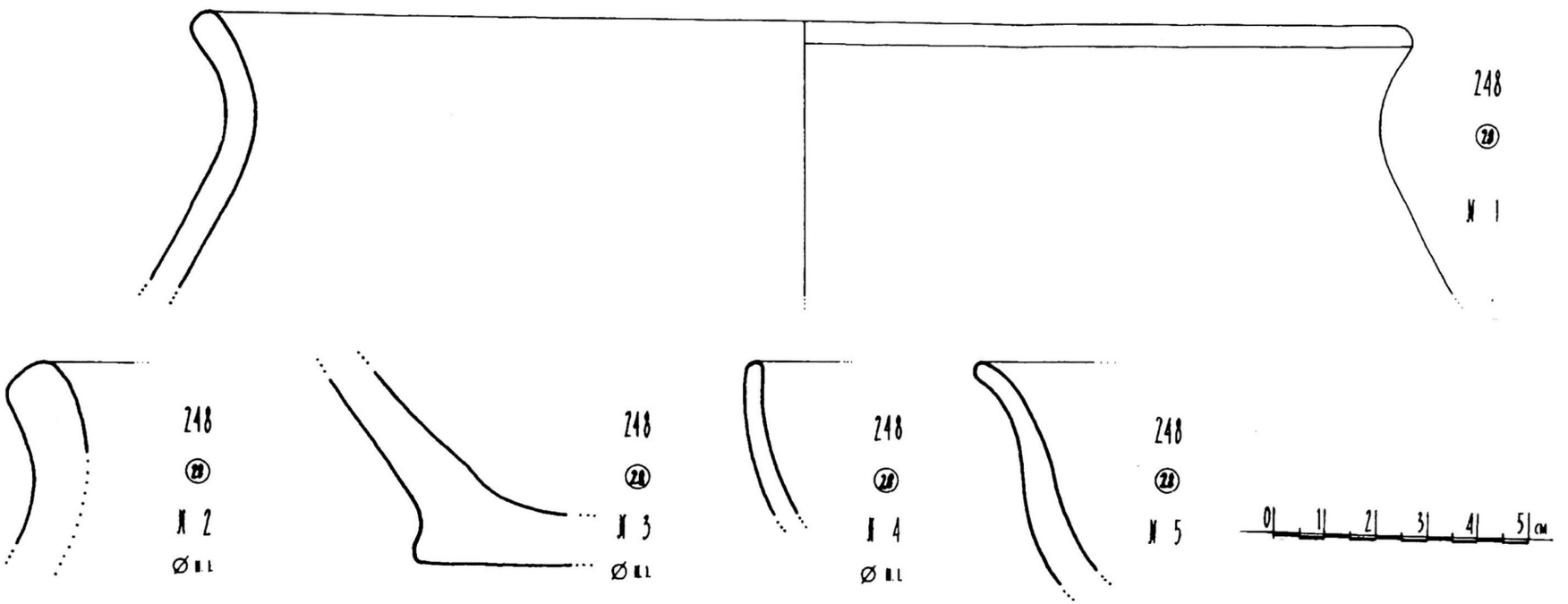


Fig. 12 - Yaz I potsherds from S.U. 28.

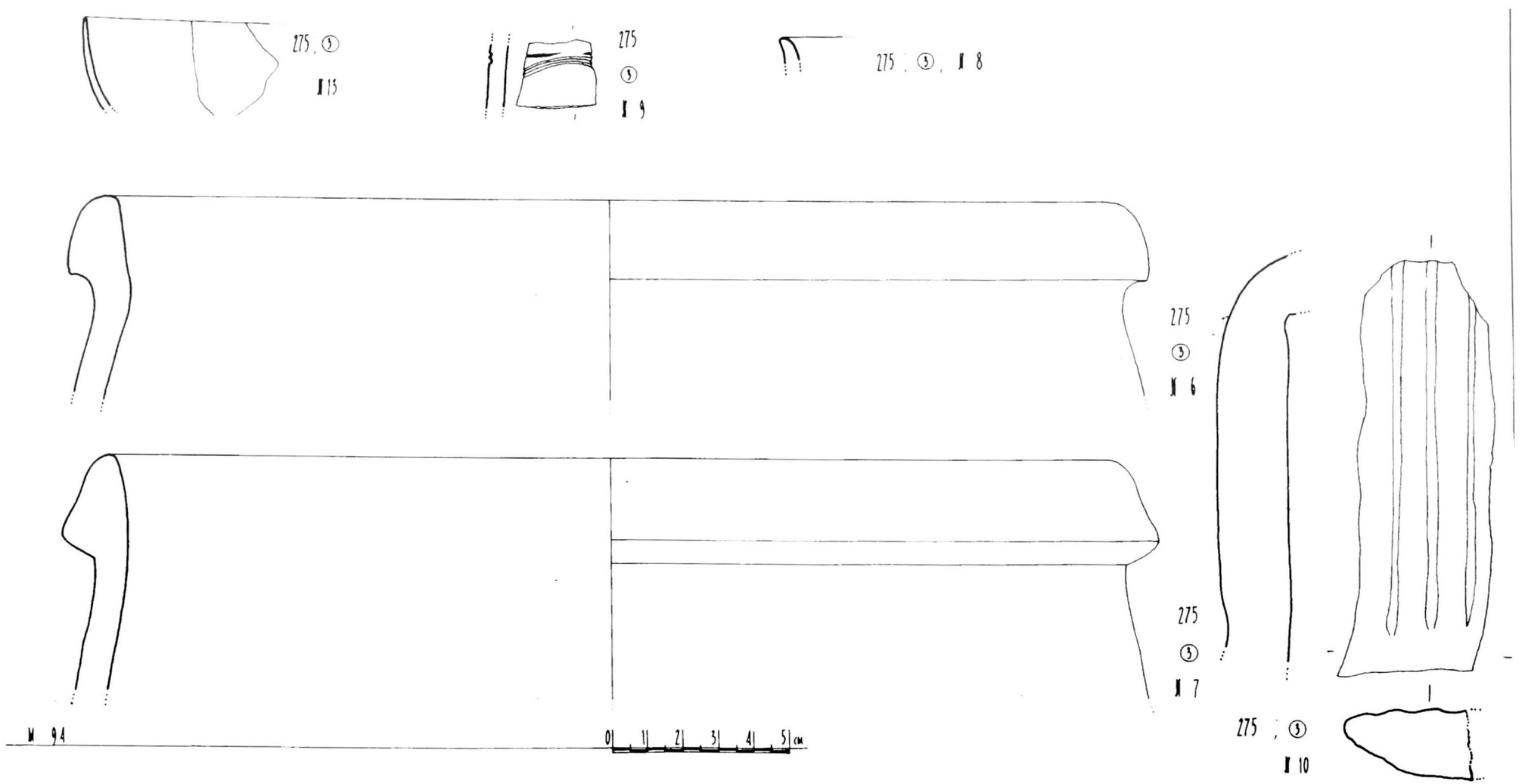


Fig. 13 - Potsherds from surface layer at site trench 275.

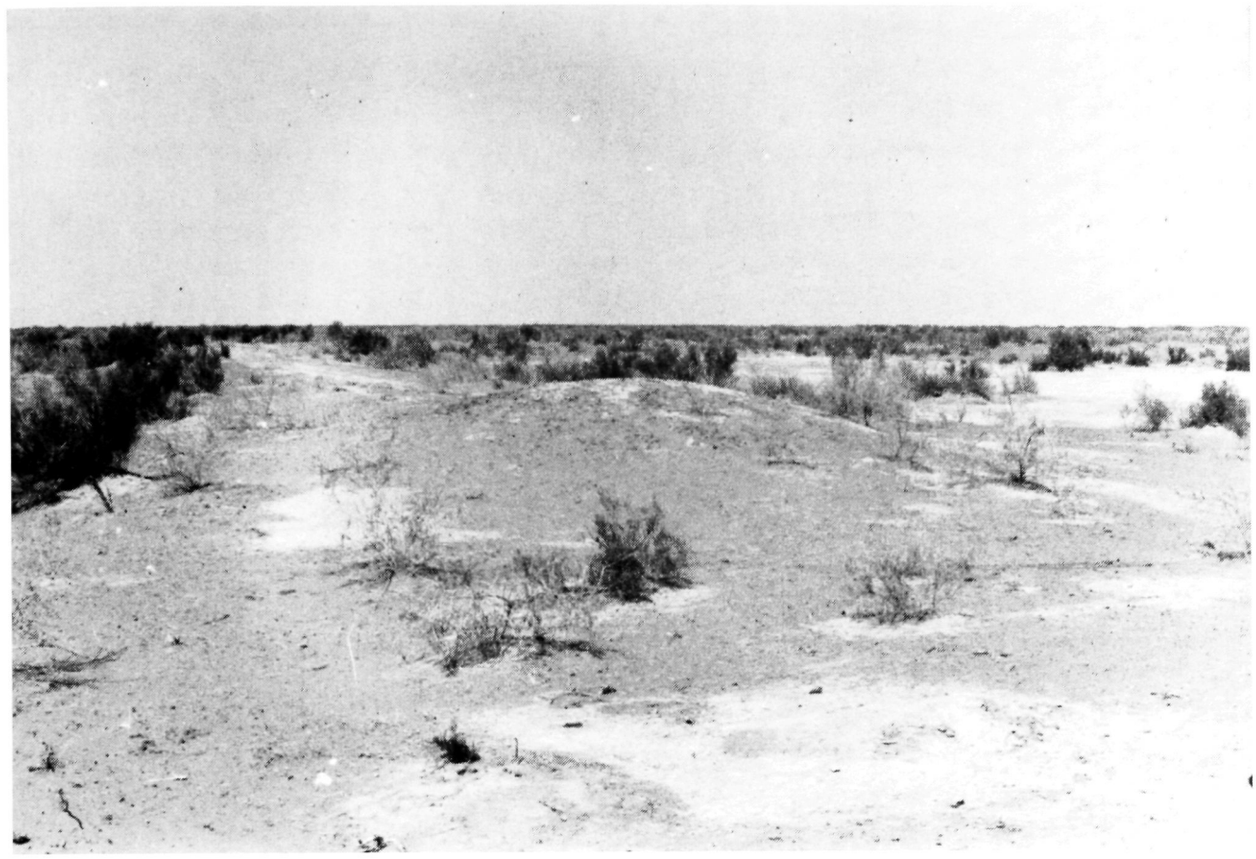


Fig. 14 - The area of site 275 before the test trench.

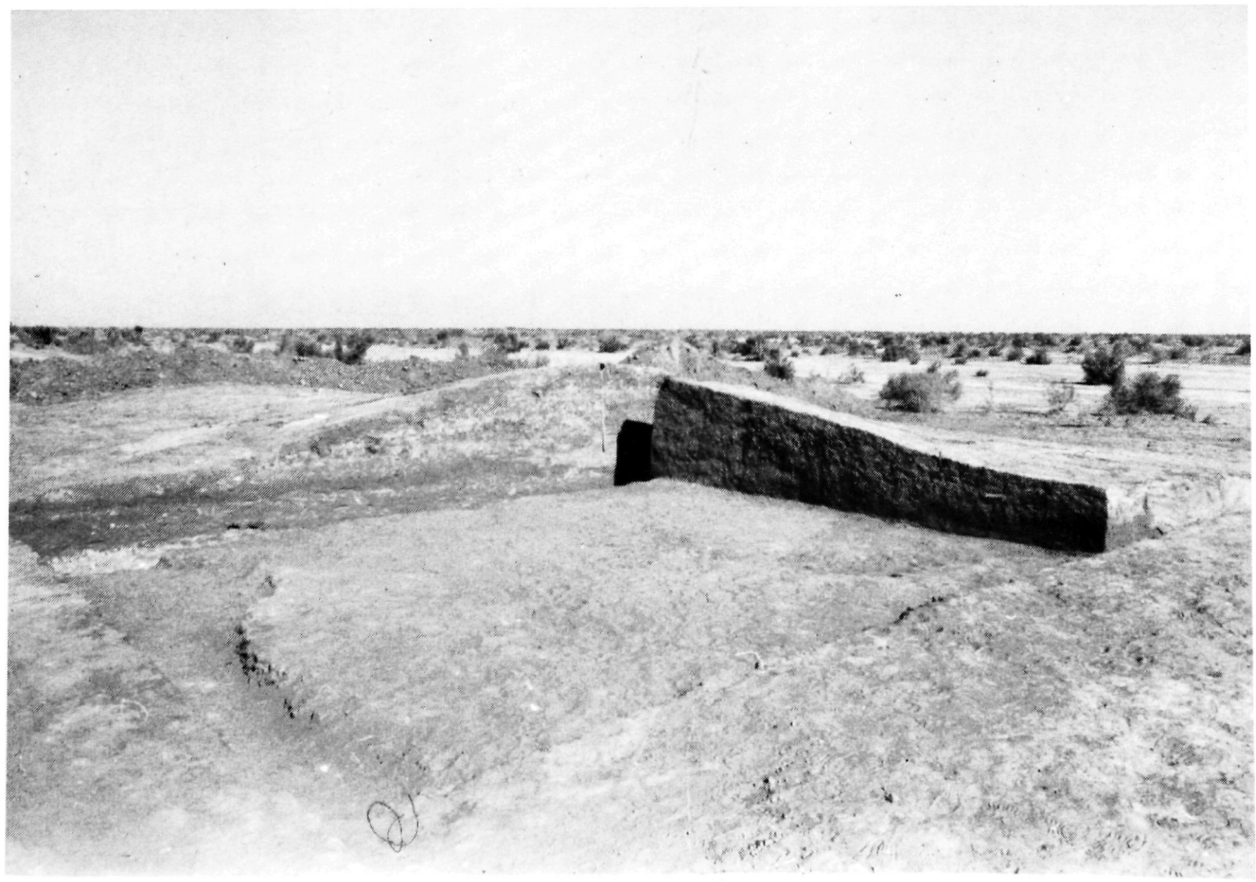


Fig. 15 - Test trench at site 275: view from SE.

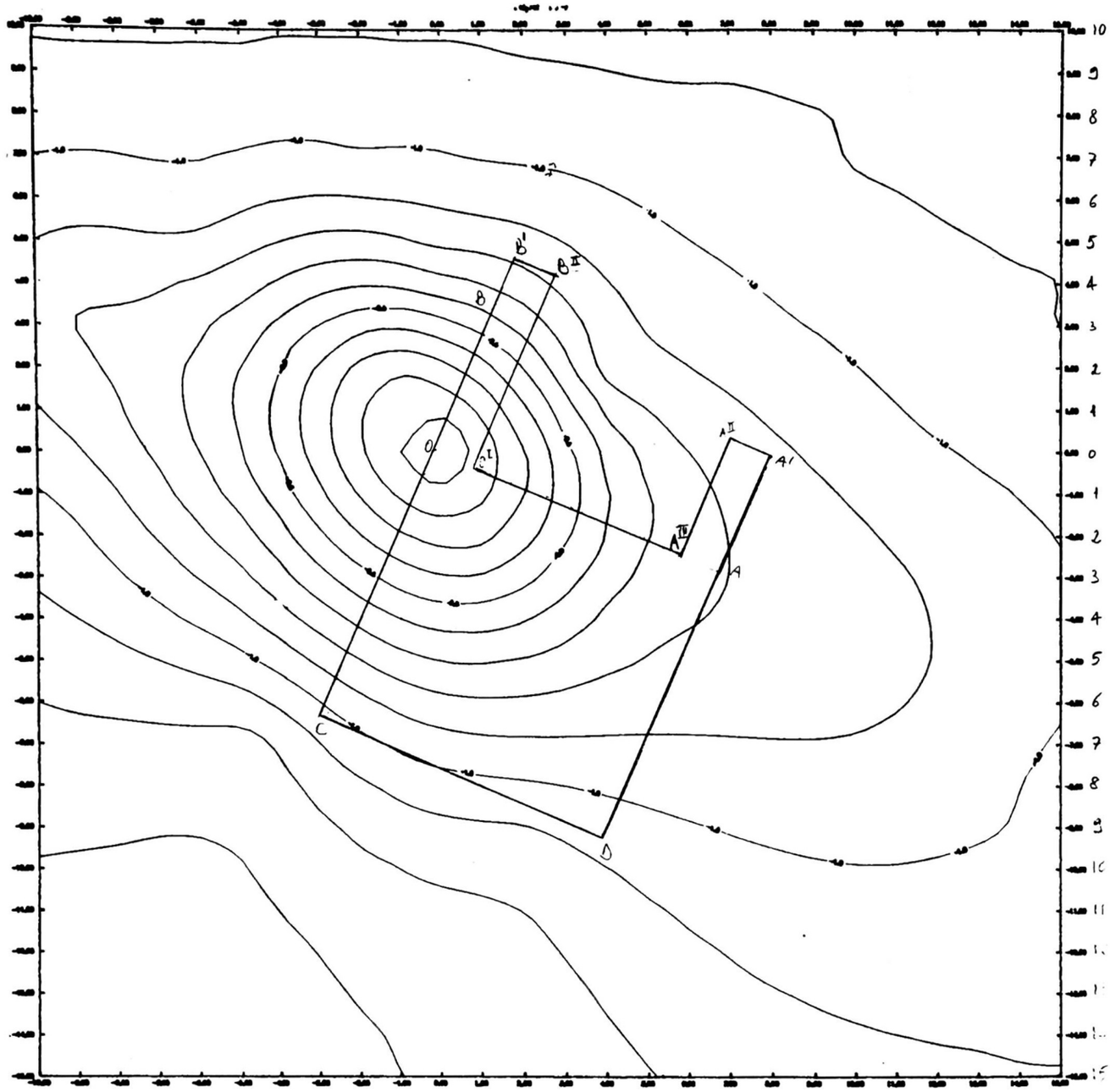


Fig. 16 - Site 275: plan of the surface level, with limits of the test trench.

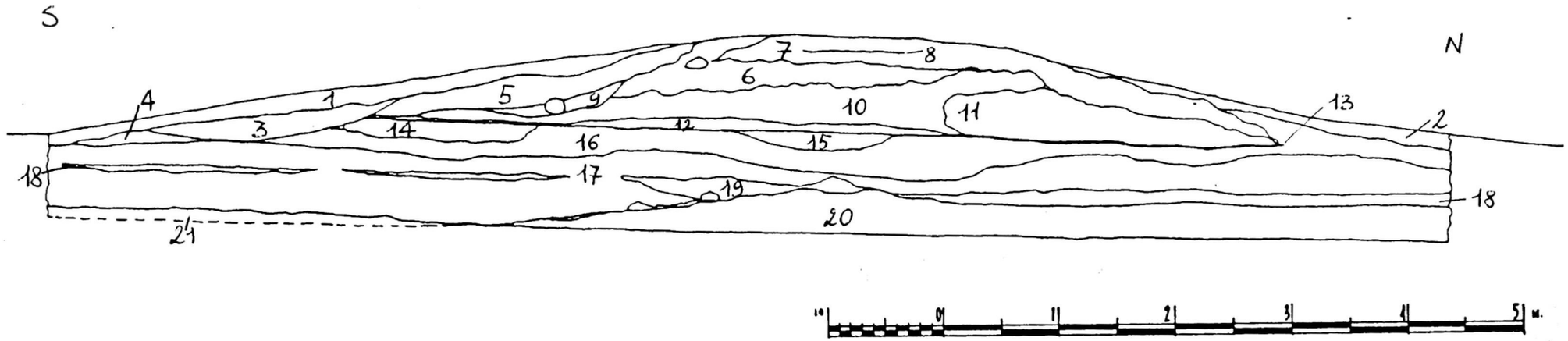


Fig. 17 - Test trench at site 275: the W section (C-B).
Legend: 1,2: sand; 3: brittle clayey sand; 4: sand with clay; 5: sand with brittle clay; 6: clayey sand; 7: brittle clayey sand; 8: floor (?); 9: sand with clay, with some lamination; 10: purer clay with sand; 11: clay with sand; 12: clay; 13: floor level (?); 14: solid sandy clay; 15: sand; 16: sand with clay; 17: sand; 18: sand with clay; 19: clayey sand; 20: sand.

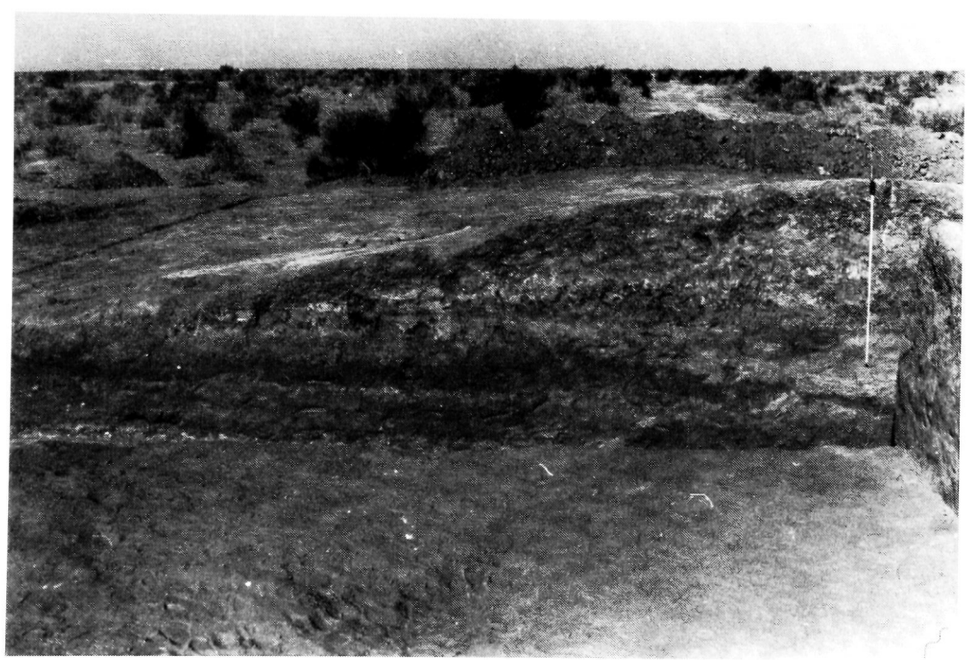


Fig. 18 - Test-trench at site 275: view of the S part of the W section.

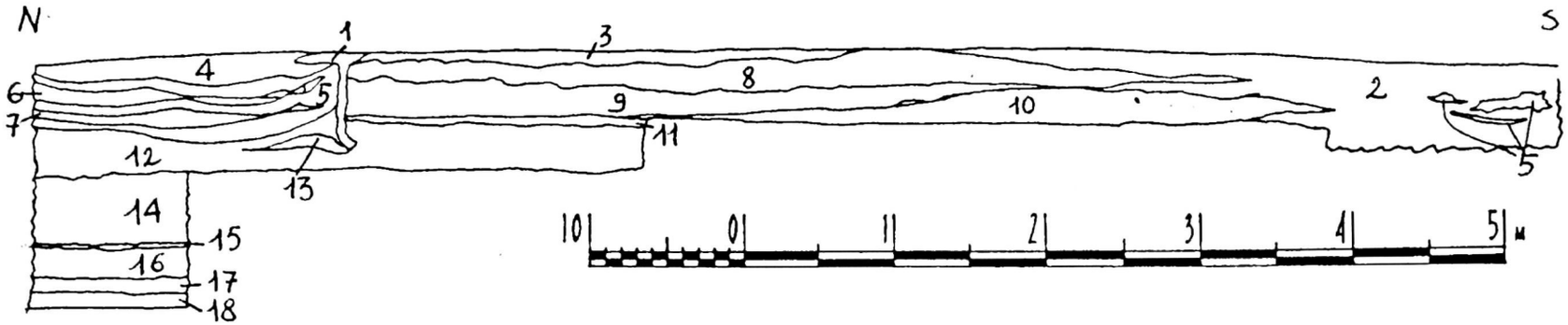


Fig. 19 - Test trench at site 275: the E section (A^1-D).
Legend: 1: clay; 2: sand; 3: harder clayey sand; 4: sand; 5: clayey sand; 6,7: sand; 8: clayey sand; 9: sand; 10, 11: clayey sand; 12: sand; 13: clay; 14: clay; 15: hard clay; 16: clay; 17: clayey sand; 1 08: pure sand.

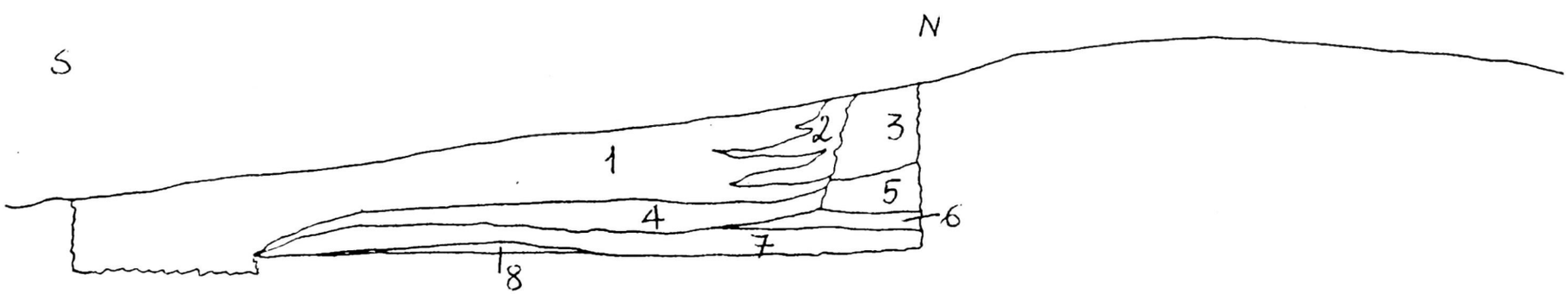


Fig. 20 - Test trench at site 276: the W section.
Legend: 1: sand; 2: clayey sand; 3: clay, rather brittle; 4: clayey sand; 5: clay with sand; 6: pure sand; 7: sand; 8: clayey sand.

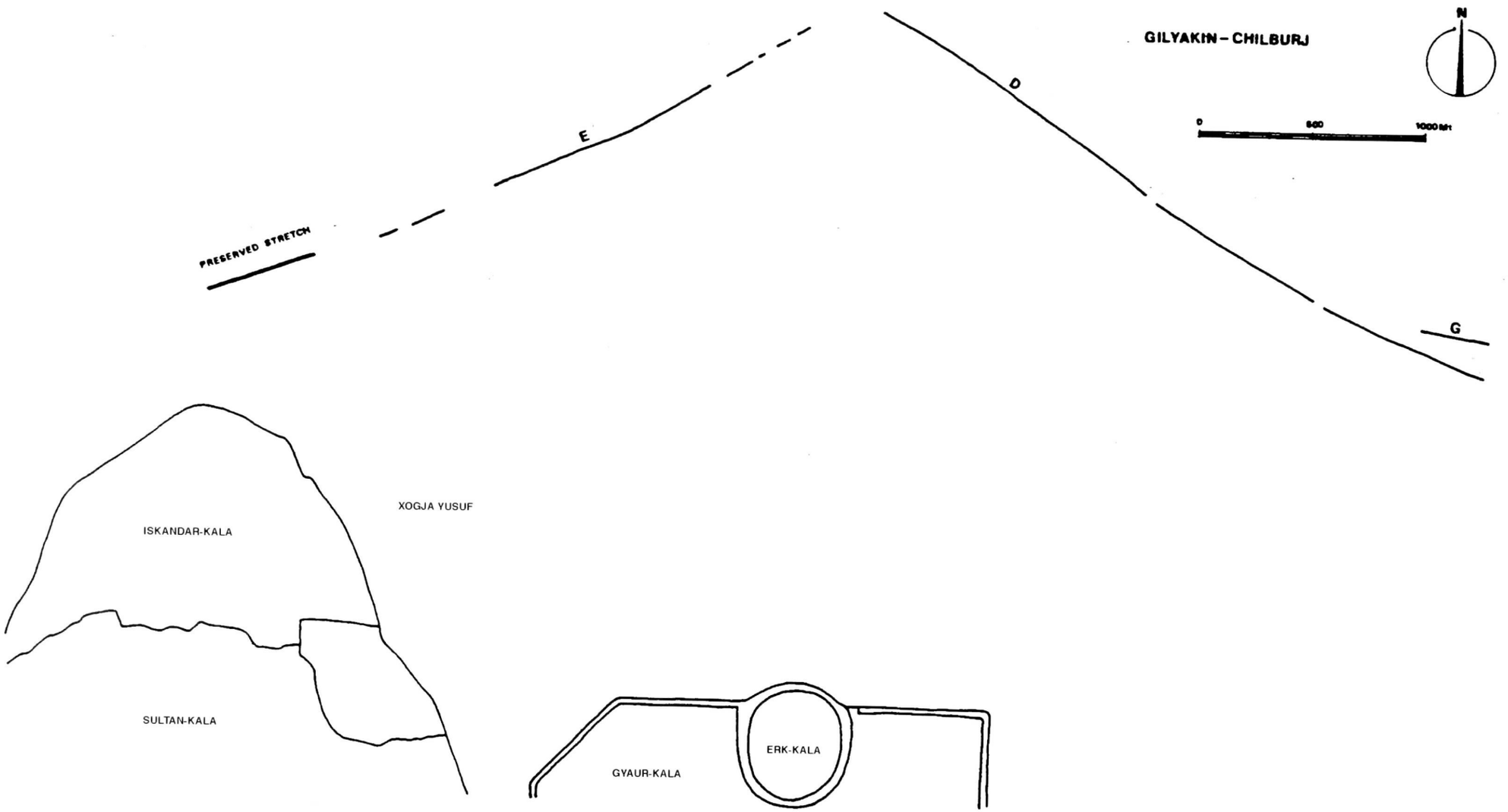


Fig. 21 - Gilyakin-Chilburj: schematic plan after early aerial photographs, with the indication of the preserved stretch.

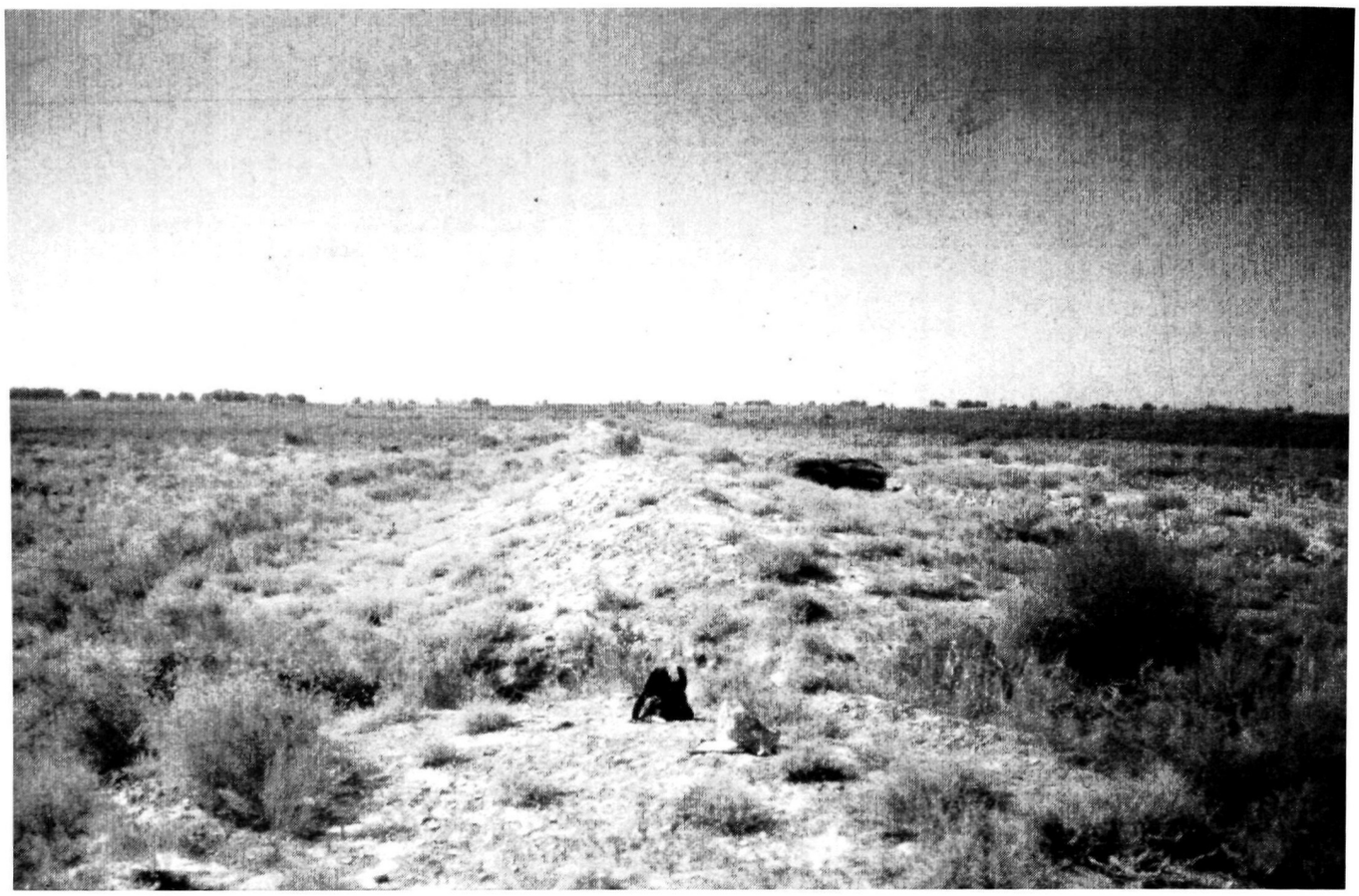


Fig. 22 - Gilyakin-Chilburj: the preserved stretch to the N of Sultan-Kala.



Fig. 23 - Site 514: preserved stretch of a wall.

THE SELEUCID PERIOD

by A. BADER, V. GAIBOV AND G. KOSHELENKO

The Seleucid period in the Merv oasis covers a time from 328 BC (the year when Alexander the Great put the oasis under his control) to the reign of the Parthian king Phraates II (138-128 BC), when the Parthians occupied Margiana after a long struggle. This period can be subdivided into four stages, of which the period of Seleucid control forms only a part:

(1) 328-323 BC: The time when the oasis was under the authority of Alexander the Great;

(2) 326-c. 308/306 BC: "The Dark Age" from the death of the Macedonian king to the inclusion of Margiana into the structure of the Seleucid state;

(3) 308/306-c. 250 BC: The time when the Merv oasis formed a part of the Seleucid state, terminated by the Greco-Bactrian invasion, probably at the very beginning of the Greco-Bactrian kingdom;

(4) 250-138/128 BC: The Greco-Bactrian period, down to the Parthian conquest just referred to above.

Unfortunately, the archaeological record does not allow us to follow such a detailed chronological classification and consequently we have to consider this period as a single unit, when dealing with settlement patterns. In spite of this limitation, and the rapid destruction of archaeological sites in the central area of the Merv Oasis, which was the focus of Hellenistic occupation, several important trends can be observed in the settlement patterns of Hellenistic Margiana (Hellenistic being, really, a much more accurate term than Seleucid, although one with greater cultural bias built into it).

First of all, the inhabited territory moved considerably to the south in comparison with the previous period. This phenomenon cannot be considered a completely new one: a similar drift to the south, in direction of the sources of Murghab, had been attested from the very beginning of human colonisation in the Merv oasis. The Hellenistic pattern, thus, merely continues earlier trends in the Murghab Delta, although it may be noted that the southward drift of sites largely terminated in this period.

The second feature is historically very important, as it goes counter to earlier as well as later trends. It consists of a sharp reduction in the inhabited and cultivated territory, attested neither before, nor since this time. From our point of view this fact could have two main sides (apart from the poor conditions of site reservation, that have already been alluded to):

(1) Absolute reduction in the number of inhabitants and, accordingly, a reduction in the number of settled places. This is not an isolated phenomenon in Seleucid Margiana – on the contrary, it seems to be quite typical all over the Near East in Hellenistic times. In particular, something similar is attested to in southern Mesopotamia ([1]) and in the Susa region ([2]).

(2) Higher concentration of population in a more limited territory. This is unambiguously traceable in the archaeological record, and coincides chronologically with the enormous growth of the two central places of the ancient Merv oasis, Gyaur-Kala (site no 603 on the general map) and Erk-Kala (site no 602). We do not know precisely either the density of population in that time or the number of inhabitants of the enormous "twin city", but it is clear that such large settlements never existed in the Merv oasis before Hellenistic times.

Naturally, the population of the city of Alexandria-Antiochia in Margiana should be provided with living products from the territory of the oasis – it would be impossible to import the enormous quantity of foodstuffs required from the outside; we have to remember that the Merv oasis was an isolated cultivated area in the Murghab delta surrounded by desert on all sides. It is extremely difficult now to define exactly the borders of agricultural territory in Hellenistic Margiana. Neither our field researches nor the study of written sources help very much to solve the problem. Besides the above mentioned Erk-Kala and Gyaur-Kala, and two segments of the Gilyakin-Chilburj wall (sites 475 and 684 on the general map), only two sites can be dated from the Hellenistic period in a secure way. They are, (1) an anonymous settlement not far to the north from Erk-Kala and Gyaur-Kala (site n° 497 on the general map) and (2) the important

([1]) Mc Adams R. and Nissen H. J., *The Uruk Countryside. The Natural Setting of Urban Societies*. Chicago-London 1972, pp. 55-58.

([2]) Novikov S.V., *Jugo-zapadnyj Iran v antichnoje vremja. Ot Aleksandra Makedonskogo do Ardashira I*, Moskva 1989, pp. 135-136.

fortress of Alan-depe in the southernmost part of the oasis (site n° 944 on the general map).

Such a small number of sites attributable indisputably to the Hellenistic period confirms the fact of a reduction of cultivated and inhabited areas, but one has to take into consideration the fact that the territory around Gyaur-Kala and Erk-Kala remained the most settled and cultivated area of the Merv oasis from the Hellenistic time to the present. As a result of human activity, particularly the recent use of heavy machinery, most of the archaeological sites of the area, including even a considerable number of mounded sites, have been damaged or destroyed. The ruins of modest constructions typical to the suburbs of Erk-Kala and Gyaur-Kala seem to have been abolished already in the Middle Ages, so their traces are practically impossible to find now. According to the information of local people, a lot of small depes existed in the region until the 1940s (some of them even up to the 1960s), but have been completely demolished since that time. Some of them surely were of the Hellenistic period.

Finally, it is necessary to pay attention to the fact that on the territories of both Gyaur-Kala and Erk-Kala, which existed undoubtedly in the Seleucid time, although archaeological materials of this epoch have been found only in deep sondages. As far as we can judge now, after almost a century of investigations of these sites by different missions, on all territory of Gyaur-Kala and Erk-Kala there is no place where the layers of Hellenistic period would be close to the modern surface. The same is true of several other sites of the Merv oasis which we date now from Parthian, Sasanian or Arab epochs: at the base of some of these depes one can expect earlier layers including these of the Seleucid time. Unfortunately, only a very small part of the sites of Margiana are excavated till now.

All these reasons force us to believe that the usual way of defining an the inhabited territory by fixing the number and distribution of the sites relating to one and the same epoch is not fruitful in case of the Seleucid Margiana. It seems to us that in the definition of the minimum oasis territory in the Hellenistic period we should be guided by the rampart called Gilyakin-Chilburj by the local people. In the section "Hellenistic Margiana" we tried to show that this poorly preserved rampart represents in fact the remains of the wall which was constructed in Margiana on the order of Antiochus I Soter when he governed the east provinces of Seleucid state on behalf of his father Seleucos Nikator. Alan-depe (site n° 944), a big fortress near the modern Iolatan weir, which seems to correspond more or less to the southernmost ancient dam on the Murghab, was surely located outside the so-called "Antiochus' wall". The reason for the existence of this fortification is quite clear: it is located in a key position closing all access to the southern part of the Merv oasis, where the Murghab valley was very narrow, so that such a fortress could easily control all the circulation along it. This part of the valley did not change a lot from geological point of view and nowadays one can see spectacular ruins in the middle of it, as well as the enormous dunes of Kara-Kum desert (*berki*, sometimes 20 m high) which can be seen c. 1,5 km away to the east, and c. 3 km to the west.

If our idea of the Hellenistic period in Margiana is correct, the settlement patterns in the Merv oasis of this period should be characterised by the following main features:

(1) The inhabited and cultivated territory was sharply reduced in comparison with the previous period and covered mainly a part of the oasis surrounded by the wall now called Gilyakin-Chilburj;

(2) This territory, however, included a huge city, Antiochia in Margiana, well known from ancient sources, and now represented by the sites of Erk-kala and Gjaur-kala; this fact allows us to think that the considerable reduction of the inhabited area was not accompanied by a catastrophic reduction of the total oasis population, but rather by considerable population agglomeration;

(3) On the territory which at this point can be considered the agricultural hinterland of the city (within the limits of the Gilyakin-Chilburj rampart) a number of variants of settled places could coexist: ordinary villages like site site n° 497, separate homesteads (naturally poorly preserved because of their modest dimensions), and so on.

THE PARTHIAN PERIOD

by A. Bader, V. Gaibov, A. Gubaev and G. Koshelenko

The Parthian period covers in the Merv oasis the time from the reign of Phraates II (138-128 BC) to the middle of the 3rd century AD. This long epoch can be subdivided into two stages:

(1) The time from the Parthian conquest to the years 30-40 AD. In this period, Margiana remained an integral part of the Parthian empire and very probably was governed by the satraps appointed by the kings of the Arsacid dynasty.

(2) The period from 30/40 AD to c. 250 AD, marked by the increasing autonomy of Margiana, now governed by a local dynasty, probably a secondary branch of the Arsacid royal family. This autonomy was even carried over into the reign of the first of the Sasanian kings, Ardashir I, as an anonymous "king of Merv" is attested in the coinage of Margiana at that time. Soon afterwards, however, under the second Sasanian king Shapur I, the autonomous position of Margiana reached its end.

The settlement patterns of the Parthian period in Margiana differ considerably from the preceding, Hellenistic time. First of all, the total number of sites erected and inhabited in this period sharply increased. While Hellenistic materials are attested in a secure way on only 6 sites of the oasis, Parthian materials have been found on 70. Since the focus of occupation remained in the same area, conditions of preservation cannot be responsible for this development. And although the submergence of Hellenistic remains under extensive Parthian and Sasanian deposits remains a factor, we should note that rapid population growth was a common feature of all the territories under Parthian control. Thus, one can observe the same picture in Parthyene in the Piedmont of Kopet-Dagh (1) as well as in northern Iran (2) and southern Mesopotamia (3).

The city of Antiochia in Margiana (Merv) continued its existence in the Parthian period and seemed to prosper under the Arsacids and their local successors. However, the majority of sites datable to the Parthian period were newly-founded (not surprising if one considers that possibly as few as 6 settlements were available for resettlement). Naturally, the foundation of so many new sites was accompanied by considerable expansion of the settled and cultivated area. The spread of cultivated lands to the north is the most characteristic feature of the Parthian period, and reverses to some extent the trends of the preceding centuries, but expansion to the west and southwest took place as well. Moving beyond the limits of already cultivated territories to the east can also be traced, but only to a limited extent. One may also surmise that the spread of cultivated lands in the desert areas surrounding the Merv oasis requested the elaboration of new irrigation systems and the erection of new dams.

Among the settlements of the Parthian time the main type is represented by the fortified sites of Chilburj (site n° 1 on the general map), Geobekly-depe (site n° 2), Durnali-kala (site n° 3), Changly-depe (site n° 4), Sychannyk or Chichanlyk (site n° 9), Kara-depe (site n° 11), Munon-depe (site n° 13) and others. The total number of the fortified sites of this type excels 30. All of them are characterised by (1) a regular (or nearly regular) geometrical plan, usually square or rectangular, very rarely circular; (2) a well-developed system of fortification; and (3) considerable dimensions (Changly-depe: 0,65 ha, Kara-depe: 0,8 ha, Geobekly-depe: 1 ha, Sychannyk: 1,45 ha, Durnali-kala: 2,6 ha, Munon-depe: 2,7 ha, Chilburj: 5,2 ha) (4).

These particularities of the Parthian fortified sites in Margiana seem to allow one to suppose that the enlargement of the oasis territory was not a chaotic but a well-planned process, very probably organised and controlled by the central authority. We cannot say, at present, if this authority resided with the Parthian Arsacid "government" itself, or with the local semi-

(1) Pilipko V.N., Severnaya Parfiya, in *Drevneishiye gosudarstva Kavkaza I Srednei Azii (Arkheologiya SSSR)*, Moskva 1985, p. 212.

(2) See Gaibov V.A., O gorodakh Severnogo Irana selevkidskogo i parfyanskogo vremeni, in *Bosporski Sbornik*, Issue 6, Moskva 1995, p. 77.

(3) Mc Adams R. McC. and Nissen H. J., *The Uruk Countryside. The Natural Setting of Urban Societies*. Chicago-London 1972, p. 58.

(4) For comparison: the area of Erk-Kala is c. 13,8 ha, of Gyaur-Kala - 374,4 ha.

independent rulers of Margiana. The spread of cultivated territories to the north, west and east was followed immediately by the creation of a well developed system of fortified settlements and fortresses probably populated mainly by farmers. The attempts to interpret these fortified places as small towns (with all the usual functions) ([5]) do not seem to be very convincing.

The second main type of site is that of very small rural settlements, normally with no fortifications. The usual dimensions of these sites are 400-2000 m^2, for example site n° 4 of the general map measures 400 m^2, site n° 573 900 m^2 and site n° 575 1600 m^2. This type of settlement is also characterised by a geometrically regular plan, but other information about it is very scarce. Some kind of primitive fortifications is attested in a few cases, but until one of these settlements is excavated we will not be in a position to say more.

Finally, a third type of settled place in Parthian Margiana is represented by the unique case of Djin-depe, excavated in the early 1960s ([6]), but unfortunately destroyed since then. This site is large enough to be central place, but has no fortifications and seems to have acted as a regional handicraft centre. Certainly, the number of ceramic kilns excavated in Djin-depe is surely excessive for such a modest settlement ([7]), but in the absence of detailed that is all we can say.

([5]) See for instance: Pugachenkova G.A., *Puti razvitiya arkhitektury Yuzhnogo Turkmenistana pory rabovladeniya I feodalizma*, Moskva 1958, p. 29 sq.

([6]) Koshelenko G.A., Raskopki na poselenii Djin-depe v 1961 godu, in *Kratkiye soobshcheniya Instituta arkheologii (KSIA)*, Issue 95, Moskva 1963.

([7]) See Merezhin L.N., K kharakteristike keramicheskikh pechei perioda rabovladeniya I rannego srednevekovya v Mervskom oazise, in *Trudy YuTAKE*, Vol. XI, Ashkhabad 1962; Koshelenko G.A., Op. cit.

THE SASANIAN PERIOD

by A. Bader, V. Gaibov, A. Gubaev and G. Koshelenko

The Sasanian period in Margiana extends from the middle of the 3rd till the middle of the 7th century AD. The history of the Merv oasis under the Sasanid rule is very complicated, with the 3rd century being particularly difficult. Very probably, in the 3rd and early 4th centuries AD the city of Merv and all the oasis formed a part of the Kushan province of the Sasanian empire. In any case, we know the coin emissions of the Kushano-Sasanian rulers minted by the Merv court, though the exact time of their rule and their succession still make an object of discussions.

After the 4th century AD, Merv became the main base of the Sasanians during their long wars with the Central Asian nomads – Hionits, Hephtalites and Turks. As a result of its strategic position, it was attacked several times during these wars. Later, when Bactria-Tokharistan became the main area of military activity of the Sasanian kings, Merv lost some of its importance and prosperity, although it enjoyed a more peaceful time.

Finally, Merv is the place where the history of the Sasanians is terminated: according the most trustworthy version of the last years of existence of this dynasty, it was here that the last Sasanian monarch died at the moment of appearance of the Arab troops.

The settlement pattern in the Merv oasis of the Sasanian period can be characterised by three main features.

(1) First of all we have to note the striking uniformities of site distribution and irrigation systems in the Parthian and Sasanian epochs – the direct continuity between these two periods is very clear. Most of the sites of the Arsacid time (55 of the total number of 70 Parthian sites investigated by our mission) did exist in the first half of the Sasanian epoch. In a number of cases when Parthian sites were abandoned (especially in the second half of the Sasanid period) new Sasanian settlements were created in the vicinity of their ruins.

In view of this continuity it is not surprising that the old historical centre of the oasis, the "twin cities" of Gyaur-Kala and Erk-Kala with their suburbs, maintained its leading position in the life of Margiana.

(2) The second particularity of the Sasanian period in the Merv oasis is the progressive increase in the number of sites within the limits of the oasis, combined with a lack of expansion in the boundaries of the oasis itself. Therefore, although the settlement pattern of the Parthian period continued its existence under the Sasanians, population density increased considerably. While we surveyed 70 Parthian sites in the oasis, the number of Sasanian sites reached 138 (see the general map). By contrast, the enlargement of the absolute territory of the oasis was small, limited to the western and the eastern extremities of its territory, where some new settlements and fortresses appeared.

As far as we can judge now, no major irrigation canals were excavated in Sasanian times. On the other hand, most of the canals and small *aryks* inherited from the Parthian period were reconstructed, cleaned several times and maintained in a good condition. A lot of new small canals of local importance were also added to the old irrigation system – in such a way old grid of canals supplied with water newly-founded sites. The continuity of the canal system reinforces the continuity of settlement patterns.

(3) The third particular feature of the settlement pattern of Sasanian Merv is the presence of an important regional wall which surrounded practically the entire oasis. The wall seems to have been erected in the middle of the Sasanian era. Its remains were attested on the northern extremity of the modern oasis a few times ([1]), but before our studies it was always identified with the famous "Antiochus' wall," which is known from the written sources (e.g. Strabo XI.10,2) and is said to have been constructed on the order of the Seleucid king Antiochus I Soter ([2]). Recently we have devoted to this subject a special article where we tried to re-examine the problem on the basis of the results of our surveys together with a new study of the classical sources (see, in addition,

([1]) See Vyazigin S.A., Stena Antiokha Sotera vokrug drevnei Margiany, in *Trudy YuTAKE*, Vol. I, Ashkhabad 1949; Merezhin L.N., Obsledovaniye rayonnoi steny III veka do n.e. vokrug Margiany (polevoi otchet IV otryada YuTAKE), in *Trudy YuTAKE*, Vol. XV, Ashkhabad 1962.

([2]) About the sources and history of investigation, see Bader A., Gaibov V., Koshelenko G., Walls of Margiana, in *In the Land of the Gryphons. Papers on Central Asian Archaeology in Antiquity*, ed. by A.Invernizzi. Firenze 1995.

the paper by A. Bader, P. Callieri and T. Khodzhaniyazov in this volume). In conclusion we proposed to date the rampart in the northern part of the Merv oasis to the middle of Sasanian period, as it was the case with a lot of similar regional walls erected by that time in different parts of the Sasanian empire ([3]).

The typology of the Sasanian sites of Margiana has some specific features as well. Among them the most important are the following.

(1) At the beginning of the Sasanian era, in the 3rd-4th centuries Ad, the old types of settled places existed with no considerable change.

(2) The first serious changes took place later, in the 5th-6th centuries AD, when several unfortified settlements, of varying size and importance, were founded around the fortified sites characteristic of the Parthian period. Such settlements are attested near Durnali-kala (n° 3 of the general map), Changly-depe (n° 4), etc. ([4]). A settlement of this kind was investigated by our mission near the Chilburj fortress in 1980, where we traced it and tried to study a part of it in our cleanings and sondages ([5]). Unfortunately, since that time new planning of cotton fields and pastures around the site destroyed completely the ancient settlement. As this situation is very typical for the central part of the oasis, we can expect a greater number of Sasanian settlements near the big Parthian fortified sites to have existed, with many destroyed by modern agricultural activity.

The creation of these unfortified settlements near the important fortresses seems to show clearly the tendency of the conversion of these sites into the small towns which appeared in Margiana for the first time in the Sasanian period, although the true urbanisation of the Merv oasis took place only in the Arab period.

(3) One more new element in the typology of sites in the Sasanian period was the apparition of the so-called "feudal castles" (called *keshks* by the local people). The picturesque ruins of these can be seen all over the oasis, but the main part of them is concentrated in the centre, near the city of Merv (represented by the ruins of Erk-Kala and Gyaur-Kala). Near some of these "castles" the traces of unfortified settlements are attested. Unfortunately, none of these "keshks" has been scientifically excavated. Our idea of them is based, therefore, on surface observations and analogies with similar architectural monuments in the other Central Asian historical provinces ([6]).

([3]) *Ibid.*

([4]) Bader A., Gaibov V., Koshelenko G., Materials for the Archaeological Map of Margiana: the Changly Region, in *Mesopotamia*, Vol. XXVI, 1991.

([5]) Koshelenko G., Gaibov V., Novikov S., Chilburj, in *Bulletin of the Asia Institute*, Vol. 4, Pt. I, 1990.

([6]) See Gubaev A., Koshelenko G., Krestyanstvo Srednei Azii v epokhu rannego srednevekovya, in *Istoriya krestyanstva*, Vol. I, Moskva 1987, pp. 188-213.

THE MEDIAEVAL PERIOD

by A. Bader, V. Gaibov, A. Gubaev and G. Koshelenko

Merv and its prosperous oasis continued to play an important role in the political and economical history of the Middle East in Mediaeval times. As early as the middle of the 7th century they were conquered by Arab troops and became the main base for Arab military enterprises in different regions of Central Asia. It was also in Merv that the Abbasids started their movement before assuming power. Later the principal strife between Ghaznavids and Seljukids also took place in Merv; and this city subsequently played a central role in the life of the Seljuk state. Finally, the Merv oasis was included into the Khorezmshah state, which ruled it until the Mongol invasion.

The Mongol conquest, as elsewhere, was a real catastrophe for both the city and the entire oasis. The Mongols destroyed the barrages on the Murghab river, as a result of which the delta which had been cultivated for millenia was practically deserted. The city of Merv was also abandoned by the main part of its population. After that time Merv never reached its former position, with only a short period of resurrection attested in the Timurid epoch, in the XVth century.

The materials of both surveys and excavations collected till now are so rich and diversified that it is very difficult to synthesize them into a general scheme of the dynamics of settlement patterns in the Mediaeval Merv oasis, until further studies are conducted. The observations which we present in this section intend in fact to form only a general approach to the problem and concern only the pre-Mongol period.

(1) Among the most important events which influenced site distribution in the oasis, we have to mention the decline of the old capital of Margiana from the Early Iron Age till the Arab conquest – the "twin cities" of Erk-Kala and Gyaur-Kala. Some activity inside the enormous ramparts of the old city is attested in Mediaeval times as well, but the new capital was founded to the west of it shortly after the Arab conquest. Now the impressive ruins of this new city are called Sultan-kala by the local people, and its principal fortifications are present on our general map as site site n° 620. Successive extensions of the town territory resulted in the apparition of huge suburbs; as a result, some of the town quarters outside the Sultan-Kala were surrounded with additional walls: the northern of them is called now Iskander-kala (site n° 623 on the general map), the southern Kichik Sultan-kala (site n° 674 on the map; see also sites nn° 675, 622, 341, 621, 343).

(2) As in the preceding Parthian and Sasanian periods, an essential continuity of settlement patterns is attested to: of a total of 138 attested to in the Sasanian Merv oasis, 62 continued to exist in the Middle Ages. In addition, a number of new settlements were also founded, just in vicinity of the abandoned Sasanian sites, as in the previous period.

(3) The total area of the Merv oasis did not increase much in comparison to the Sasanian period. On the one hand, some new lands were cultivated and settled to the west of the old oasis, on the other, the north-western most part of the Sasanian oasis seems to have been abandoned after the Arab conquest.

(4) By contrast, the absolute number of sites increased considerably: we surveyed 314 Mediaeval sites in the central and northern parts of the oasis as opposed to only 138 for the Sasanian epoch. This suggests a considerable increase in population density.

(5) Attested already at the beginning of the Sasanian epoch, the tendency to intensify agricultural activity within the limits of the old oasis is very well traceable after the Arab conquest as well. In the Middle Ages every little bit of the oasis territory that was possible to irrigate, cultivate and/or use as pasture land seems to have been in use.

(6) A very important feature of the Mediaeval period in the Merv oasis is urbanisation. Having begun already in the Sasanian period, this process reached its zenith in the Middle Ages in Merv province. That was the time that the towns were formed in regions like Dingli Kishman (Mediaeval town of Kushmeikhan), Uly Kishman (town of Hurmuzffarrah), Kelteminara, and many others.

(7) Simultaneously, a lot of new "villages" appeared, in the guise of enormous, but unfortified settlements located normally along canals of regional or local importance. They often measured several hectares in area.

(8) Other types of sites attested to – for the first time – in the Middle Ages include:

(a) large and well-fortified homesteads ("castles") seen till now all over the oasis and called *keshks* by the local people.

(b) small farmsteads, normally also fortified and often represented on the surface by a single tower called ding by the local inhabitants.

The first type of construction seems to represent the centres of feudal domains, and are sometimes surrounded by the unfortified settlements which were probably populated by the people depending on them. The second type must be survivals of isolated households of Mediaeval peasants.

(c) Beside these site types, the early Arab rabats are the most characteristic. All of them date to immediately after the Arab conquest, and represent small fortresses where Arab garrisons were installed. They were not as well fortified as the usual fortresses of the previous periods and probably were not intended to withstand a serious siege. After the consolidation of Arab military and administrative power in Merv, such kinds of fortifications lost completely their importance and were abandoned or re-used. For instance, the rabat of Durnali region, presently under investigation ([1]) was occupied by a local landlord and was rebuilt into a feudal castle.

(d) Beside the rabats, typical Mediaeval caravanserais also appeared on the frontiers of the Merv oasis after the Arab conquest.

(e) Finally, a lot of new *mazar* (shrine)-type constructions were founded after the islamization of Merv.

([1]) See Bader A., Gaibov V., Koshelenko G., Studies for the Archaeological Map of the Merv Oasis: Durnali area, in *Bulletin of the Asia Institute*, New Series, Vol. 8, 1996.

MERV, MARGIANA, MERV OASIS: A COMPARISON OF THE CONCEPTS

by A. BADER, V. GAIBOV, A. GUBAEV AND G. KOSHELENKO

Not so much attention is paid in the modern scientific literature to the problem of localisation of the historical-geographical province which was called Margiana by the Greek and Roman ancient authors. In a lot of publications this problem is considered to be solved and the denominations Mouru-, Margush, Margiana, Merv oasis, Merv are used for one and the same region of ancient Central Asia. The works of V.I.Sarianidi give an eloquent example of such an approach. He writes, for instance:

"Avestan Mouru-, Margush country of Behistun inscription, antique Margiana, mediaeval Merv, - these are the names of one and the same historical province located, as proved by academician V.V.Struve, in the basin of ancient delta of Murghab river, deep in the south-east part of Kara-Kum desert" (1).

Three statements are postulated in this phrase of Prof. Sarianidi. The first of them concerns the continuity of the names Mouru - Margush - Margiana - Merv. This thesis does not cause particular doubts though (as we will try to show some later) there are certain nuances necessary to take into account.

The second (historical-geographical) and the third (historiographic) statements of Prof. Sarianidi seem to be much less apparent. Prof. Sarianidi does not give any reference while speaking about the possible localisation of Margush-Margiana-Merv, but it is clear of the context that he means two articles of the late Prof. Struve: "Rebellion in Margiana at the time of Darius I (after the data of Behistun inscription)" and "Homeland of Zoroastrism". The first of them has been published for the first time in 1949 in the "Materials of South-Turkmenistan archaeological complex mission" (Materials of YuTAKE) and was twice reprinted in 1949 and in 1968 (2); the second one has been first published in 1948 in the collection of "Soviet oriental studies" (vol. V) and reprinted twenty years later, in 1968 (3).

Unfortunately, in despite of Sarianidi's statement the localisation of Margiana is not studied in these articles. On the contrary, Prof. Struve uses in his works the equation Margiana = Merv oasis = modern Merv oasis without any reference or any study of sources neither literature on the problem: for him it is something absolutely obvious and not requiring any proof.

The historical-geographical thesis of Prof. Sarianidi consists in the statement that Margiana was placed in the lower flow (i.e. in the region of ancient delta) of Murghab river. But this thesis seems to be practically self-obvious to the majority of modern researchers, so V.I.Sarianidi has a number of predecessors in this field (4).

However, it is necessary to remember that till not so long ago the most widely spread localisation of Margiana was the upper flow of Murghab, esp. the region of Merverud (5). The majority of modern researchers forgot completely this localisation, but sometimes even in the recent works we meet the backwashes of this old conception (6).

(1) Sarianidi V.I. 1994. *Margiana in the Ancient East*, Information Bulletin, IASCCA, 19, p. 6.

(2) Struve, V.V. Vosstaniye v Margiane pri Darii I (po dannym Bekhistunskoi nadpisi), *Materialy YuTAKE*. Vyp. 1. Ashkhabad 1949; republished in: *Vestnik drevnei istorii*. 1949. no. 2, and in: Struve V.V. *Etyudy po istorii Severnogo Prichernomor'ya, Kavkaza i Srednei Azii*. Leningrad 1968.

(3) Struve V.V. Rodina zoroastrizma, *Sovetskoye vostokvedeniye*. Vol. V. Moskva-Leningrad 1948; later published in the same miscellaneous volume: Struve V.V. *Etyudy po istorii Severnogo Prichernomor'ya, Kavkaza i Srednei Azii*. Leningrad 1968.

(4) See for example: Masson M.E. Narody i oblasti yuzhnoi chasti Turkmenistana v sostave Parfyanskogo gosudarstva, *Trudy YuTAKE*. Vol. V. Ashkhabad 1955, p. 25; Masson V.M. *Drevnezemledel'cheskaya kul'tura Margiany*. Moskva-Leningrad 1959, p. 6 (*Materialy i issledovaniya po arkheologii SSSR*. No 73); Gafurov B.G. *Tadzhiki. Drevneishaya, drevnyaya i srednevekovaya istoriya*. Moskva 1972, p. 45; Diakonov M.M. *Ocherk istorii drevnego Irana*. Moskva 1961, p. 63; *Ocherki istorii zemledeliya i agrarnykh otnosheni v Turkmenistane*. Ashkhabad 1971, p. 58; *Arkheologiya SSSR. Drevneishiye gosudarstva Kavkaza i Srednei Azii*. Moskva 1985, p. 226; Pugachenkova G.A. *Iskusstvo Turkmenistana s drevneishikh vremen do 1917 goda*. Ashkhabad 1967, p. 26; Frye R. *Naslediye Irana*. Moskva 1972, p. 186.

(5) Ritter A.K. *Iran*. St. Petersburg 1874. See also Khlopin I.N. *Istoricheskaya geografiya yuzhnykh oblastei Srednei Azii (antichnost' i srednevekov'ye)*. Ashkhabad 1983, p. 103.

(6) Khlopin I.N. Op. cit. P. 102. We agree with I.N. Khlopin in assuming that the territory of Margiana should include not only the delta but all the basin of Marg (Murghab) river. Unfortunately, Khlopin put his hypothesis in a wrong

All these reasons force us again to raise again the problem of localisation of Margiana and its borders in different epochs together with the interrelation of the terms like Merv, Merv oasis, Margiana.

We shall note first of all that the term "Merv oasis" is modern and is used only in the geographical literature of XIX-XX centuries; no one of the ancient authors did know it. This term concerns the watered territories developed for modern agriculture which are located in the modern delta of Murghab and surrounded by the sandy desert of Kara-Kum. So, the main attention should be paid to other terms, first of all to the term "Margiana" with its historical forms Mouru-, Margush.

As far as we know, the first mention of this region is attested in the Mihr-Yasht of Avesta where it is described as "Mouru which is in Kharaiva" (7). Unfortunately, the text contains no detail for an exact localization of Mouru country. It is however possible to suppose that together with the other countries mentioned in the text it should be located in the zone settled by the East-Iranian tribes (8).

The famous list of countries preserved in the First fragard of Vendidat does not help very much to precise the exact geographical position of Mouru country. It is characterised as follows: «...Third, the best of the countries and living places I, Ahuramazda, created Margiana (9) strong, belonging to Arta. Then in a counter-balance the prejudicial Anghro-Mainyo created "maryda" and "vitusha"» (10). As well as in the previous text, Mouru country is mentioned among the lands populated by the East-Iranian peoples (11), its nearest neighbours on the list are "Gava, populated by Sogdians" and "Bactria, magnificent, (bearing) the banner highly".

The text of Behistun inscription of the Achaemenid king Darius I shows that by that time the country of Margush made part of the Bactrian satrapy in the administrative structure of Persian empire (12). This fact confirms once more that the two countries were located alongside one another.

Thus, the early Iranian tradition gives only the most general orientation for the localisation of the country of Mouru-Margush-Margiana; all the hypothesis concerning its exact place in that period are based on the data of later sources projected to the more ancient times.

The situation changes beginning with the moment when Margiana was included into the sphere of interest of Greek and Roman historians and geographers. Their writings contain precious information enabling more precise and reliable localisation of Margiana and definition of its borders in different periods of history.

First of all, we shall try to find out the answers to two most important questions. The first of them concerns the natural borders of Margiana as a special historical-geographical area. As we said before, the majority of the researchers place Margiana together with Margush and Mouru- within the limits of the Murghab delta. However, that is not completely true. We have serious reasons to think that not only the delta of Murghab with the Merv oasis, but also all the middle flow of this river up to the Piedmont of the Turkmenian Khorasan were making parts of Margiana country. Mediaeval sources show clearly-enough that the frontier between the areas of Merv and Merverud (the last one is usually identified to Meruchak in Afghanistan [13]; in certain periods it was subjected to Merv [14]) run approximately in the same place where the modern State frontier between Turkmenistan and Afghanistan is located. According to al-Masudi, the boundary between Merv and Merverud areas passed near Kukin village (15) between al-Karinein and Khausan villages belonging the first one to the Merv area, and the second one – to the Merverud region (16). The distance between Merv and al-Karinein is said to be "four days of route", and from Merv up to Merverud – "six days of route" (17).

This picture attested in mediaeval epoch very probably reflects much more ancient situation. Very often the modern researchers studying the history of Margiana do not pay attention to some important facts

historical context. According to him, the country of Margush of the Achaemenid times was located in the northern piedmont of the Paropamisos, the modern Meruchak region. This was area which was done to the wide by Dadarshich, satrap of Bactria, after the order of Achaemenid king Darius I. According to I.N. Khlopin, this resulted in moving of the oasis to the north, to the region which did not play according to him any noticeable role in the political history of Central Asia before the Achaemenids. Khlopin believed that the process of gradual moving was long and came to the end only when Antiochus founded the city of Antiochia Margiana in the middle of Murghab delta. However, this picture contradicts all what we know about early Margiana.

(7) Apart from the classical translation of Ilya Gershevitch, see the Russian translation by I.M. Steblin-Kamenski: *Avesta. Izbrannye gimny.* Transl. and Commentary by Prof. I.M. Steblin-Kamenski. Dushanbe 1990. P. 57.

(8) Cm. Gnoli G. Zoroaster's Time and Homeland. A Study on the Origins of Mazdeism and Related Problems. Naples 1980.

(9) In the original text: Mouru.

(10) See the new Russian translation by S.P. Vonogradova: *Khrestomatiya po istorii drevnego Vostoka.* Pt. II. Ed. by M.A. Korostovtsev, I.S. Katsnel'son, V.I. Kuzishchin. Moskva 1980, p. 70.

(11) See: Gnoli G. Zoroaster's Time and Homeland.

(12) Kent R. *Old Persian. Text, Grammar, Lexicon.* New Haven 1953; Dandamayev M.A. *Iran pri pervykh Akhemenidakh (VI v. do n.e.).* Moskva 1963, pp. 262-269

(13) See: *Catalogue des sites archéologiques d'Afghanistan,* par W. Ball avec la collaboration de J.-Cl. Gardin. Tome I. Paris 1982, pp. 180-181, No 711 (with bibliography); Khlopin I.N. *Istoricheskaya geografiya* .. p. 73. Another possible identification of Merverud is Bala-Murghab (Catalogue des sites... p. 47, no. 98). But the distance between these two sites is so small that it has no considerable influence on our reconstructions.

(14) According to al-Makdisi. See: *Materialy po istorii turkmen i Turkmenii.* Vol. I: VII-XV c. AD. *Arabskiye i persidskiye istochniki.* Ed. by S.L. Volin, A.A. Romaskevich & A.Yu. Yakuboski. Moskva-Leningrad 1939, pp. 184- 191.

(15) According to the editors of the manusripts, two more readings, Laukar and Levker, are possible as well.

(16) *Materialy po istorii...* p. 73.

(17) Ibid. p. 177.

contained by the ancient written tradition. First of all, almost all the classical writers who described Margiana functioned of the idea that the territory of this country included the mountain regions or that the mountains represented the natural limits of it. As far as the nearest mountain system is located to the south from the Murghab delta, the conclusion seems to be natural that in classical times Margiana included not only the Merv oasis but also the territories along the middle flow of Murghab up to its exit from mountains.

The most detailed description of the area under question is given by Ptolemy (Ptol. VI, 10) ([18]) who's text does not leave any doubts that the limits of Margiana on the south passed in the Sarifa mountains (διὰ τῶν Σαριφῶν ὀρεῶν) behind which was located the province of Area. Ptolemy specified also that Margiana included the region to the south from the place of the confluence of two rivers, Margos (Μάργος, modern Murghab) and another river the name of which is unfortunately not mentioned but which is said to have its source in the same Sarifa mountains and which therefore can not be anything else than the river Kushka.

The information of Strabo is also indisputable. In his description of Margiana and Aria he proved that these countries were partially surrounded by mountains, but a part of their population lived on the plains (Strabo, XI, 10,1) ([19]). According to Strabo, these mountains were called Παραχοάθρας and represented a part of the mountain system which was named Tauros by the Greek geographers and which occupied a huge area from Area to Armenia (Strabo, XI, 8,1). In the modern geographical nomenclature this mountain range is called Turkmenian Khorasan. The mountains as the naturals limits of Margiana are mentioned also by Pliny (Plin. Nat. Hist. VI, 46-47) ([20]), Ammian Marcellin (Amm. Marcell. XXIII, 6,54 and 56) ([21]) and Martian Capella (Martianus Capella, VI, 691) ([22]). Solin precised a little the geographical situation: he spoke about the mountains surrounding Margiana "like a theatre" (Solin. 48, 1-3) ([23]).

Thus, we have all the reasons to approve that according to a number of ancient authors Margiana included in the classical times not only the territory of Murghab delta but also all the middle flow of this river up to the mountain spurs. As we said above, similar ideas are characteristic of the mediaeval period as well. The old term "Margiana" was replaced in the Middle Ages with the new one, "the area of Merv" or just "Merv". Anyway, we believe that such an idea of the historical province of Margiana-Merv reflected a reality which existed a very long time, probably since the epoch when the country was still named Mouru.

Unfortunately, the middle flow of Murghab is not yet investigated archaeologically well-enough. However, the surveys conducted there provided us with some material enabling to reconstruct (at least in a general way) the history of this part of Margiana - Merv.

First of all we have to note that the middle flow of Murghab was inhabited systematically at the same time when the delta of this river was populated, though some Neolithic sites are attested here. The excavations of Takhta-Bazar burial ground located 32 km SE of the modern Takhta-Bazar town confirm this ([24]). The sites of the subsequent periods were surveyed on the Middle Murghab during several campaign ([25]). Achaemenid, Parthian and Sasanian were attested here together with numerous sites of a mediaeval time, among which special attention was drawn to the famous Takhta-Bazar grottoes.

Summing up our observations we can approve that from the point of view of ancient and mediaeval writers Mouru - Margush - Margiana - Merv region represented certain geographical and, very probably, political unity during the most part of its long history. It covered a territory along the Middle and Lower Murghab, from the Piedmont of the Turkmenian Khorasan down to the delta of Murghab in Kara-Kum desert.

The second problem which we would like to consider in the present short chapter is the problem of correlation between the geographical and political borders of Margiana at some stages of its history. We

([18]) See: Ptolemaios Geographie 6,9-21. Ostiran und Zentralasien. Teil I. Griechischer Text neu herausgegeben und ins Deutsche ¸bertragen von Italo Ronca. Rom 1971.

([19]) Strabon. *Géographie*. Tome VIII (Livre XI). Texte Établi et traduit par F. Lassere. Paris 1975; The Geography of Strabo. With an English translation by H. L. Jones. In Eight Volumes. Vol. V. Cambridge (Mass.)-London 1969.

([20]) Pline l'Ancien. Histoire naturelle. Livre VI. Partie 2. Texte Établi, traduit et commenté par J. André et J. Filliozat. Paris 1980; Pliny. *Natural History in Ten Volumes*. Vol. II (Libri III-VII). With an English Translation by H. Rackham. London-Cambridge (Mass.) 1969.

([21]) Ammianus Marcellinus. With an English Translation by J. Rolfe. Cambridge (Mass.) 1972; Ammien Marcellin. Histoire. Tome IV (Livres XXIII-XXV). Première partie. Texte Établi et traduit par J.Fontaine. Paris 1971.

([22]) Martianus Capella. Edidit Adolfus Dick. Addenda et corrigenda iterum adiecit J. Préaux. Lipsiae 1978.

([23]) C. Iulii Solini Collectanea rerum memorabilium. Iterum recensuit Th. Mommsen. Berolini 1895.

([24]) Udeumuradov B. *Altyn-Depe i Margiana: svyazi, khronologiya, proiskhozhdeniye*. Ashkhabad 1993, pp. 71-79.

([25]) Adykov K. Torgovo-pochtovaya doroga iz Merva na Merverud, *Izvestiya AN Turkmenskoi SSR. Seriya obshchestvennykh nauk*. 1962. no. 3; Gubaev A., Lyapin A., Yusupov Kh. Arkheologicheskaya razvedka v Takhta-Bazarskom rayone, *Karakumskiye drevnosti*. Vyp. VII. Ashkhabad 1978; Pugachenkova G.A. Arkheologicheskaya rekognostsirovka oblasti srednego Murgaba (iz rabot YuTAKE 1955 goda), *Izvestiya AN Turkmenskoi SSR. Seriya obshchestvennykh nauk*. 1958. No. 6; Udeumuradov B. Obnaruzheniye novykh pamyatnikov v doline Murgaba, *Merv v drevnei i srednevekovoi istorii Vostoka. Tezisy dokladov nauchnogo seminara*. Ashkhabad 1990; Id. Juzhnye provintsii Margiany v drevnosti i srednevekov'ye, *Merv v drevnei i srednevekovoi istorii Vostoka V. Merv drevni-Mary sovremennyi. Tezisy dokladov nauchnoi konferentsii*. Mary 1994; Yusupov Kh. Arkheologicheskoye issledovaniye Takhta-Bazarskogo rayona, *Karakumskiye drevnosti*. Vyp. V. Ashkhabad 1977.

have to appeal to the classical sources once again. In Ptolemy's work cited above it is said: "Margiana has a border on the west with Hyrcania" (Ptol. Geogr. VI, 10, 1), the same idea is repeated in Ptolemy's description of Hyrcania which is said to be located eastwards of Margiana (Ptol. Geogr. VI, 9, 1). Similar information we find in the text of Ammian Marcellin (Ammian. Marcell. XXIII, 6, 54). Pliny's data correspond well to the statements of Ptolemy and Ammian: in his enumeration of the peoples (from west to east) Pliny put Margianians immediately after the Hyrcanians (Plin. Nat. Hist. VI, 46).

It is important to note that in earlier sources the western limits of Margiana are designated in a different way. For instance, in the famous "Parthian Stations" of Isidore of Charax the countries enumerated to the west of Margiana are: Astauene after Hyrcania, after that Parthyene, then, Apavarkticene and finally Margiana (Isid. Charax. Mans. Parth. 10-14) ([26]). Slightly different picture is drawn by Strabo. After the mention of Tauros mountains which formed in the mind of the Greeks a unique mountain range stretching from the Minor Asia to India and including Kopet-Dagh, Strabo enumerated the peoples which lived along it in a following way: "...By the north from them Gels, Kadusians and Amards and some Hyrcanians live; then the tribes of the Parthians, Margianians Arians" (Strabo. XI, 8, 1).

Thus, we have two different pictures. According to one of them, Hyrcanians were the direct neighbours of the Margianians on west (Pliny, Ptolemy, Ammian Marcellin). According to the second, between Margianians and Hyrcanians other peoples were living. Here also one can see two variants. First of them is represented with the "Parthian Stations" of Isidore of Charax where Astauene, Parthyene and Apavarkticene were placed between Margiana and Hyrcania. The second version is attested in Strabo's "Geography": only Parthia is located between Hyrcania and Margiana.

The distinction between these two last variants probably can be explained as follows: Astauene, Parthyene and Apavarkticene could represent separate satrapies ([27]). It is well-known that the satrapies of Parthian time covered normally quite small areas ([28]), in contrast to the system of huge satrapies of the Achaemenids and in continuation of the practice introduced by the Seleucids ([29]). At the same time in Parthian epoch they were making part of larger administrative units which were called *shahrs* and headed by the shahrdars ([30]). We think that Parthia could form one of such *shahrs*. So, Isidore of Charax who prepared a relatively detailed itinerary named three small satrapies in the northern Piedmont of Kopet-Dagh where Parthian "Royal Way" passed. On the contrary, Strabo left a more general description of the region without dealing with the small-sized administrative units, that is why he mentioned only a larger unit - *shahr* of Parthia.

The distinction between the two main ideas of the limits of Margiana is of a different character. It is not a difference in nuances, but an essential difference: all the political and administrative units north of Kopet-Dagh between Hyrcania and Margiana disappeared. First of all, we have to pay attention to the chronological distinctions. Isidore of Charax lived at the end of the Ist cent. BC Strabo was a contemporary of the Roman emperor August, i.e. lived at the end of Ist cent. BC and at the beginning of the Ist cent. AD Pliny lived a little later, from 23 to 79 AD Ptolemy's activity dates to the II-nd cent. AD Finally, the life and work of Ammian Marcellin should be dated to 330-400 AD.

Thus, in the interval between Strabo and Pliny some considerable political changes took place. Probably, these changes are connected with the beginning of the process of disintegration of the great Parthian empire and creation of separate semi-independent kingdoms and domain which could result in redistribution of the territories between them ([31]).

It is well-known that Hyrcania had a very significant autonomy if was not completely independent from the central Parthian government. This fact is confirmed in particular by the embassies send from this area to Rome which is described by the sources ([32]). Already a long time ago the opinion was stated that Margiana could also reach the status of separate independent formation in the Ist cent. AD which seems to be confirmed by the local coin

([26]) Parthian Stations by Isidore of Charax. An Account of the Overland Trade Routes between the Levant and India in the first Century BC. The Greek text with a translation and commentary by W.H. Schoff. Chicago 1976.

([27]) About these three regions as satrapies see: Masson M.E. Narody i oblasti..., p. 42.

([28]) About the Parthian satrapies see: Frye R.N. The History of Ancient Iran. München 1984. P. 225; Diakonov I.M., Livshits V.A., *Dokumenty iz Nisy I v. do n.e. Predvaritel'nye itogi raboty*. Moskva 1960. P. 23; Idd. Novye nakhodki dokumentov v Staroi Nise, *Peredneaziatski sbornik. II. Deshifrovka i interpretatsiya pis'mennostei Drevnego Vostoka*. Moskva 1966, pp. 142-143.

([29]) Tarn W.W. Seleucid-Parthian Studies (Proceedings of the British Academy. Vol. 16). 1930; Masson M.E. Narody i oblasti... p. 42; Diakonov M.M. *Ocherk istorii*....p. 195; Lukonin V.G. *Drevni i rannesrednevekovyi Iran*. Moskva 1987. p. 134. One has to remember that according to Strabo (Strabo XVI, II, 4 - with a reference to Posidonius) under the Seleucids a small part of Syria, the so-called Seleucidia region, was divided into four satrapies.

([30]) About larger administrative units governed by the shahrdars whose position probably corresponded to that of the Achaemenid satraps or of the Sasanian ostandars, see: Frye R. N., The History... p. 225; and Lukonin V.G. *Drevni i rannesrednevekovyi Iran*... p. 138. It is not excluded that in our case the region could be governed by a marzban instead of a shahrdar. About the marzbans in Nisa inscriptions see: D'yakonov M.M. *Ocherk istorii*... pp. 196, 390; Bader A. Parthian Ostraca from Nisa: some Historical Data, *La Persia e l'Asia Centrale da Alessandro al X secolo*. Atti del Convegno internazionale. Accademia Nazionale dei Lincei and IsMEO, 1994 (in press).

([31]) Pliny wrote that Parthian empire in reality did not represent a uniform state but consisted of 18 kingdoms (Plin. Nat. Hist. VI, 112).

([32]) Frye R.N. The History... pp. 240, 243.

emissions ([33]). However, this thesis found its complete confirmation only after the publication of the article by V.N.Pilipko who investigated this local Margiana mint in details ([34]). The first local emissions in Margiana date of the reign of Artabanus II (series II in Pilipko's publication) ([35]).

Thus, in Ist century AD both Hyrcania and Margiana have reached large autonomy within the Parthian state. It is possible to assume that the new status of these provinces could result in the displacing of the Parthian governors of the territories to the north of Kopet-Dagh. This change should find reflection in the written sources (Pliny, Ptolemy, Ammian Marcellin). It is very important that the achievement of a large autonomy by Margiana and the change geo-political situation in a region to the north of Kopet-Dagh coincide almost exactly. We have the direct proofs that at least a part of these territories have passed under the control of Margiana in the first centuries AD. The archaeological investigations carried out in the east part of Kopet-Dagh Piedmont, in Kaka region (ancient territory of Apavarkticene) did not reveal other coins than Merv emissions for all the period from the beginning of Ist cent. AD down to the final fall of Parthian state in IIIrd century ([36]). Sometimes an assumption was stated that this fact testifies only to a strong influence of Margiana to Apavarkticene ([37]), but we think that it can testify the inclusion of the north part of Apavarcticene along north Kopet-Dagh into the Margiana possessions in the first centuries AD.

If it was so, we have an opportunity to trace at this time the difference between geographical and political concepts of Margiana. Geographically Margiana included the territories on the Middle and Lower Murghab, but politically it included a part of the Piedmont of Kopet-Dagh as well.

([33]) Masson M.E. Novye arkheologicheskiye dannye po istorii rabovladel'cheskogo obshchestva na territorii Yuzhnogo Turkmenistana, *Vestnik drevnei istorii*. 1953. No. 1, p. 146; Id. *Narody i oblasti...* p. 32.

([34]) Pilipko V.N. Parfyanskie bronzovye monety so znakom П pod lukom, *Vestnik drevnei istorii*. 1980 No. 4.

([35]) Ibid. P. 123.

([36]) Loginov S.D. Materialy k istorii denezhnogo obrashcheniya Apavarktikeny, *Izvestija AN Turkmenskoi SSR. Seriya obshchestvennykh nauk*. 1986. No.4

([37]) Ibid. P. 40; Pilipko V.N. Yaryk-depe, *Karakumskiye drevnosti*. Vyp. 7. Ashkhabad 1978.

INTRODUCTORY NOTES TO THE SITE LIST

The main aim of the present report is to present the archaeological sites found from 1980, when the Institute of Archaeology of the USSR Academy of Sciences began the survey work in the central and northern sector of Merv Oasis (Margiana of the Classical sources, now the Mary Velajet of Turkmenistan), up until October 1996. The sites so far registered in our list are 958.

Beside the 1:200.000 general map, the Site List is accompanied by one 1:100.000 map of the central section, detailing the northern limits of the Merv Oasis in Classical time, where the Joint Project was focused in the beginning by the IARAN/IsMEO/ TGU agreements.

The List represent a draft of the official document which will be presented to the State Authorities of Turkmenistan to plan all administrative and private operation concerning protected areas and to accompany the application for Merv and its territory to the UNESCO World Heritage.

In order to provide the critical information as soon as possible the sites database is presented in a simplyfied format, mainly to accompany the CAD maps, with few key entries in the following order:

1. **Site number on the general map**;
2. **Denomination** (with alternatives wherever appropriate). To facilitate the identification of sites, we preferred to keep traditional local terms, currently used in the literature, such as: *keshk*, *ding*, *kala*, *depe*, *ark*, *shahristan*, *rabat*, *caravanserai*, *khovuz*, and *sardoba*;
3. **Morphological type of the site**;
4. **Dimension of the site**, expressed in square meters. Whenever considered more appropriate to a better understanding of the site, linear measurements have also been given according to the maximum extension of surface indicators along the two main axis. Of course the level of precision of linear measurements of sites exposed by surface erosion within the same region and under very similar environmental conditions is to be finalised to an uniform principle of scale. It is not important to be precise *per se*, but to ensure the means of understanding the orders of magnitude and functional repartitions. The aim is allow the use of all conceptual and technical instruments provided to settlement archaeology by statistics and human geography. This way our site list can be further elaborated by any reader with a fair degree of confidence for rank/size analyses and other analytical procedures.
5. **UTM coordinates** (N,E). Until 1991 sites geographical coordinates were derived from 1:10.000 and 1:100.000 base maps made available by the Soviet Authorities through the Institute of Archaeology and the Turkmen State University (TGU). In September 1992 the expedition was equipped with a Trimble GPS-1000 and later by several other GPS commercial models. Whenever possible, sites previously recorded were repositioned. At present, some 90% of all sites have been positioned by GPS. In general several points were taken for each site by walking around their visible contours. Few peripheral sites and some of those heavily disturbed by agricultural intensification were recorded as single point. A few sites are still unrecorded, as specified by the List. All coordinates are given according to the UTM lattice. If a trigonometric point marker is present on a site, the GPS data always relate to its position. In case of a lack of topographic signs on the site, however, the GPS coordinates indicate the point of maximum elevation, not at the geometrical centre of the site.
6. **Field number**. It is given whenever originally recorded in a previous site list. It refers in particular to the fieldwork carried out by the Institute of Archaeology and TGU until the beginning of the Joint Project in 1990.
7. **Description**. Combining the efforts of many years of work by different individuals, quite expectably, this entry is the most uneven. We kept it in this preliminary form also to record the historical progress of the project made by a complex aggregation of different approaches. The lack of any description may be determined by poverty of evidence or by the shortage of fieldwork ability. Descriptions of the shape and size of sites strictly relate to their contemporary appearance, with no effort at extrapolating their original state. The two can diverge considerably, due to human as well as natural factors, especially for settlements of the earlier periods located in the desert, and for some of the later settlements with shallow elevation.

8. **Chronology**. The assessment is given using the traditional periodisation of Masson 1959, with some refinements explained in the relative texts. As regards sites of the so-called Yaz III period, especially sites of the latest phase of this period, we cannot automatically consider them to be truly Hellenistic. Particularly doubtful in relation to this dating are sites 79, 86, 141, 440, 444, 447, 451, 452, 455, 456, 457, 459, 461, 462, 463 and 947. On the other hand, sites of the Hellenistic period (at least within the Giljkin Chilburj rampart) should be much more numerous than the survey suggests. We have not determined yet reliable criteria for identifying the majority of Hellenistic settlements in surface surveys, and, at the same time, we have not yet conducted enough excavations to make up for this deficiency. As for the Seleucid period, it witnessed, above all, a reduction of cultivated territory, combined with a simultaneous intensification of agricultural activity over the actually cultivated land. Therefore, it is not surprising that we could put on our list only five sites with secure Sleeked attributions to this period (sites n. 475, 497, 602, 603, 684). Finally, a few among the sites surveyed by the IRAN/TGU teams were originally described in previous reports as "having Yaz II, and perhaps later, materials and probably belonging, to the transitive period to Parthian time" on our list they are dated as "Late Yaz III".

Catalogue of Sites

Site n°: 1
Denomination: Gongrot-depe
Type: tepe with square plan
Dimensions: 12 x 12; Total surface: 144
UTM: 4183907, 419529
Field n°: 6
Chronology: Sasanian

Site n°: 2
Denomination: Sychannyk (Chichanlyk)
Type: undetermined with square plan
Dimensions: 120 x 120; Total surface: 14400
UTM: 4184579, 419566
Field n°: 9
Chronology: Parthian, Sasanian

Site n°: 3
Denomination: unknown
Type: undetermined with square plan
Dimensions: 35 x 35; Total surface: 1225
UTM: 4193381, 426129
Field n°: 16
Chronology: Parthian, Sasanian

Site n°: 4
Denomination: unknown
Type: undetermined with square plan
Dimensions: 20 x 20; Total surface: 400
UTM: 4192756, 426123
Field n°: 17
Chronology: Parthian, Sasanian

Site n°: 5
Denomination: Akcha-depe 2
Type: tepe with square plan
Dimensions: 90 x 90; Total surface: 8100
UTM: 4195531, 427908
Field n°: 20
Chronology: Sasanian

Site n°: 6
Denomination: Il-Khazar keshk
Type: keshk with square plan
Dimensions: 20 x 20; Total surface: 400
UTM: 4167411, 421591
Field n°: 27
Chronology: Medieval

Site n°: 7
Denomination: Khan-kala
Type: kala with irregular plan
Dimensions: 12 x 12; Total surface: 144
UTM: 4166328, 422520
Field n°: 28
Chronology: Medieval

Site n°: 8
Denomination: Jurnek-depe 2
Type: tepe with square plan
Dimensions: 30 x 30; Total surface: 900
UTM: 4167323, 418304
Field n°: 30
Chronology: Sasanian

Site n°: 9
Denomination: Pat-depe
Type: tepe with irregular plan
Dimensions: 50 x 40; Total surface: 2000
UTM: 4166550, 419608
Field n°: 31
Chronology: Sasanian

Site n°: 10
Denomination: Sulu-kala (Suwli-kala)
Type: kala with square plan
Dimensions: 40 x 42; Total surface: 1680
UTM: 4171616, 416302
Field n°: 38
Chronology: Medieval

Site n°: 11
Denomination: anonymous keshk
Type: keshk with square plan
Dimensions: 18 x 18; Total surface: 324
UTM: 4167610, 412232
Field n°: 45
Chronology: Medieval

Site n°: 12
Denomination: anonymous
Type: undetermined with irregular plan
Dimensions: 1000 x 500; Total surface: 500000
UTM: 4177497, 421696
Field n°: 52
Chronology: Medieval

Site n°: 13
Denomination: Karam-keshk (Kharam-keshk; Garam-keshk)
Type: keshk with rectangular plan
Dimensions: 14 x 17; Total surface: 238
UTM: 4176953, 424580
Field n°: 53
Chronology: Medieval

Site n°: 14
Denomination: Eres-kala
Type: kala with square plan
Dimensions: 56 x 56; Total surface: 3136
UTM: 4184994, 418993
State of preservation at the moment of survey: bad
Field n°: 548
Chronology: Medieval

Site n°: 15
Denomination: Akcha-kala
Type: kala, with square plan
Dimensions: 100 x 50; Total surface: 5225
UTM: 4189832, 429728
Field n°: 19
Chronology: Medieval

Site n°: 16
Denomination: anonymous kala
Type: kala with square plan
Dimensions: 33 x 33; Total surface: 1089
UTM: 4184320, 424518
Field n°: 59
Chronology: Sasanian

Site n°: 17
Denomination: anonymous kala
Type: kala with square plan
Dimensions: 42 x 45; Total surface: 1890
UTM: 4184320, 425422
Field n°: 60
Chronology: Medieval

Site n°: 18
Denomination: anonymous kala
Type: kala with square plan
Dimensions: 75 x 75; Total surface: 5625
UTM: 4185626, 425162
Field n°: 61
Chronology: Sasanian

Site n°: 19
Denomination: Jakke-per (Jak-kiper; Ekeper)
Type: undetermined with square plan
Dimensions: 15 x 15; Total surface: 225
UTM: 4178601, 425287
Field n°: 63
Chronology: Medieval

Site n°: 20
Denomination: Big Epte-Murad-kala
Type: kala with irregular quardangle plan
Dimensions: 96 x 89 x 184 x 96; Total surface:12000
UTM: 4179547, 428749
Field n°: 64
Chronology: Sasanian; Medieval

Site n°: 21
Denomination: Small Epte-Murad-kala
Type: kala with rectangular plan
Dimensions: 44 x 35; Total surface: 1540
UTM: 4178820, 428765
Field n°: 65
Chronology: Medieval

Site n°: 22
Denomination: anonymous keshk
Type: keshk with rectangular plan
Dimensions: 15 x 8; Total surface: 120
UTM: 4178811, 428381
Field n°: 66
Chronology: Medieval

Site n°: 23
Denomination: anonymous kala (Pushti-kala)
Type: kala with rectangular plan
Dimensions: 50 x 68; Total surface: 3400
UTM: 4183008, 426180
Field n°: 69
Chronology: Medieval

Site n°: 24
Denomination: unknown
Type: undetermined with square plan
Dimensions: 36 x 36; Total surface: 1296
UTM: 4183002, 424977
Field n°: 70
Chronology: Sasanian

Site n°: 25
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 150 x 50; Total surface: 7500
UTM: 4182840, 424763
Field n°: 71
Chronology: Medieval

Site n°: 26
Denomination: Kara-depe II
Type: tepe with square plan
Dimensions: 80 x 90; Total surface: 7200
UTM: 4189180, 421911
Field n°: 73
Chronology: Sasanian

Site n°: 27
Denomination: Apiklan
Type: undetermined with square plan
Dimensions: 20 x 20; Total surface: 400
UTM: 4186186, 419890
Field n°: 75
Chronology: Sasanian; Medieval

Site n°: 28
Denomination: Atly-depe
Type: tepe with square plan
Dimensions: 21 x 25; Total surface: 525
UTM: 4188224, 418493
Field n°: 76
Chronology: Sasanian; Medieval

Site n°: 29
Denomination: unknown
Type: undetermined with square plan
Dimensions: 40 x 40; Total surface: 1600
UTM: 4185896, 427808
Field n°: 79
Chronology: Sasanian; Medieval

Site n°: 30
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 400 x 300; Total surface: 120000
UTM: 4186237, 427800
Field n°: 80
Chronology: Medieval

Site n°: 31
Denomination: anonymous kala
Type: kala with rectangular plan
Dimensions: 150 x 210; Total surface: 31500
UTM: 4184947, 428065
Field n°: 81
Chronology: Early Iron Age; Parthian period; Medieval

Site n°: 32
Denomination: anonymous keshk
Type: keshk with rectangular plan
Dimensions: 40 x 20; Total surface: 800
UTM: 4185116, 427833
Field n°: 82
Chronology: Medieval

Site n°: 33
Denomination: unknown
Type: undetermined with round plan
Dimensions: 200 x 200; Total surface: 40000

UTM: 4194590, 422318
Field n°: 83
Chronology: Early Iron Age

Site n°: 34
Denomination: anonymous settlement
Type: undetermined with oval plan
Dimensions: 600 x 300; Total surface: 180000
UTM: 4194590, 422318
Field n°: 84
Chronology: Early Iron Age; Parthian, Sassanian

Site n°: 35
Denomination: Ak-depe
Type: tepe with oval plan
Dimensions: 20 x 26; Total surface: 520
UTM: 4196166, 404092
Field n°: 86
Chronology: Parthian, Sassanian

Site n°: 36
Denomination: unknown
Type: tepe
Dimensions: 50 x 50; Total surface: 2500
UTM: 4196878, 404061
Field n°: 87
Chronology: Sasanian

Site n°: 37
Denomination: unknown
Type: LLdA;
Dimensions: W 90 x 40; Total Surface W: 3063; Dimensions: E 250 x 60 m; total surfaceE: 15000
UTM: 4157604, 4208783
The site composed by two parts, the western and the eastern, both located, on the basis of the scatter of pottery fragments, not high on the plain level, formed by two adjacent dispersion zones with a total surface of 4372 Random sampling.51 In the site it was possible to determine Areas A, B, C, D, well identified on the basis of the concentration of specific archaeological materials. Area D was characterized by a concentration of fragments of large jars, suggesting a storage function.
Most significant objects found:
Inv. n. 1: 3-barbed arrowhead, bronze;
Inv. n. 9: bead rough-out, calcite?
Chronology: Yaz II? Yaz III

Site n°: 38;
Denomination: unknown
Type: EdA;
Dimensions: 160 x 100; Total Surface 15050
UTM: 4155240, 4208957
The site, high on the plain, has been identified by the accumulation of archaeological strata and by scatter of pottery fragments. A random sampling was made and was determined a grid of 64 square 5 x5, in 12 of whom, chosen with random numbers, was made a total collection. Later was made a control transect oriented N-W, always with squares 5 x5, with a total sampling of the materials). On the site was identified a pottery-making area, with pottery slags and the remains of a kiln that was cleaned and plotted; another area, with a remarkable concentration of large jars, had storage functions, and a third area was characterized by a strong concentration of fragments of pottery pipes.
Most significant objects found on the Site n°:
Inv. no. 4: 3-barbed arrowhead, bronze;
Inv. no. 5: ring, bronze;
Inv. no. 6: strip fragment, bronze;
Inv. no. 7: strip fragment, bronze;
Inv. no. 8: bead rough-out, lapis lazuli;
Inv. no. 10: rectangular bead, turquoise;
Inv. no. 13: rectangular bead, turquoise;
Inv. no. 12: etched bead, carnelian;
Inv. no. 14: whorl, pottery;
Inv. no. 15: grinder-hammerstone, limestone;
Inv. no. 36: fragment, aragonite;
Inv. no. 59: scraper, basalt;
Inv. no. 68: whetstone, marlstone.
Chronology: Yaz II? Yaz III
Area 38 N of type EdA;
Dimensions: 100 x 40; Total Surface: 2873
Chronology: Yaz II-III

Site n°: 39
Denomination: anonymous
Type: EdA;
Dimensions: 90 x 40; Total Surface: 3388
UTM: 4107781, 4209654
This area, found in the SW corner of the large 119 site-area, which was discovered last year, is approximately 90 NS x 40 EW. It is located North of site no. 100 and consists of two parts: first a quadrangular outer area, and second a slightly elevated central part. As usual, the former presents a lighter scatter of pottery including many diminutive sherds, while the latter is densely covered. The boundaries of this scatter are clear except to the W, where it merges with a large scatter subsequently defined as site 50 (In fact, the southern part of the previously defined site 119 presents an almost continuous scatter of pottery, within which the isolation of individual areas must be somewhat arbitrary). The area, bisected by a low, irregular ridge, oriented EW, is also bounded by a low sand dune to the East and North and by vegetation to the Southeast. Detailed survey was conducted, in the course of which 58 artefacts (amongst which pottery fragments, one possibly inscribed (Spot no. 15), iron slag and several millstones) were collected, and their location mapped. The most significant artefacts include:
Inv. no. 380: bronze arrowhead;
Inv. no. 381: bronze arrowhead;
Inv. no. 382: bronze arrowhead;
Inv. no. 194: bronze arrowhead;
Inv. no. 405: a calcite bead;
Inv. no. 406: a bronze ring;
Inv. no. 407: a rod iron.
Chronology: Yaz III

Site n°: 40
Denomination: anonymous
Type: LLdA;
Dimensions: 60 x 30; Total Surface: 2268
UTM: 4107340, 4209827
This small, open area is also included in the previously defined site 119. It is found NW of site 39. As usual, the scatter of pottery is densest in the center. Once again we collected and mapped the location of several artefacts, particularly millstones, along with one turquoise bead and one fragment of iron slag.
Chronology: Yaz III, Parthian-Sasanian

Site n°: 41
Denomination: anonymous

Type: EdA;
Dimensions: 125 x 100; Total Surface: 9605
Chronology: LBA?; Yaz III; Late Yaz III?
UTM: 4107829, 4209943
The area is just NW of site 40 and presents a very irregular outline with a slightly elevated central part with the highest concentration of pottery. A detailed survey has been conducted and numerous artefacts identified. The latter include millstones, pottery slag, one aragonite bead rough-out (No. Inv. 368; Spot no. 36), and many large fragments of iron slag and ore. The presence of the latter would suggest some industrial activity in this part of Site 119. A iron rod fragment (No. Inv. 366) and chalcedony flake (No. Inv. 367), a bronze arrowhead (No. Inv. 376), a siltstone (No Inv.370) have been found.

Site n°: 42
Denomination: anonymous
Type: LLdA;
Dimensions: 30 x 40; Total Surface: 913
UTM: 4208803, 415252
The site, not high on the plain level, has been identified only because of the pottery scatter, inside a clayey hollow.
Chronology: Yaz II-III

Site n°: 43
Denomination: anonymous
Type: LLdA;
Dimensions: 100 x 50; Total Surface: 5111
UTM: 4208721, 415020
The Site, not high on the plain level, has been identified only because of the pottery scatter, inside a clayey hollow.
Objects found on the Site n°:
Inv. no. 16: grinder, granite.
Chronology: Undetermined

Site n°: 44
Denomination: anonymous
Type: LLdA;
Dimensions: 150 x 40; Tǫtal Surface 6821
UTM: 4208548, 415397
The site, aligned to the S of site 38, is characterized by a pottery scatter of medium density, partly cut by a path. Not high on the plain level, it has been identified only because of the pottery scatter. The pottery gathered was divided in northern half and southern half.
Chronology: Yaz II?; Yaz III

Site n°: 45
Denomination: anonymous
Type: LLdA;
Dimensions: 60 x 50; Total Surface: 2793
UTM: 4208398, 415392
The site, not high on the plain level, has been identified only because of the pottery scatter, and is characterized by fragments of large jars. Remarkable concentration of querns and grindstones. The materials have been exposed by a deep plowing.
Objects found on the Site n°:
Inv. no. 73: millstone, sandstone;
Inv. no. 74: millstone, sandstone.
Chronology: Yaz III

Site n°: 46
Denomination: anonymous
Type: Tepe 2;
Dimensions: 180 x 100; Total Surface: 13575
SW 46 x 46 Total Surface SW 230775
UTM: 4210370, 416058
High on the plain level, with a wide basis, the tepe is appro ximately circular, incised by plowing, extended in NW-SE direction. On the top there are traces of a sondage, perhaps made in the Fifties or in the Sixties. There was found a fragment of Andronovo-type pottery.
Objects found on the Site n°:
Inv. no. 3: 2-barbed arrowhead, bronze;
Inv. no. 11: bead, turquoise;
Inv. no. 17: potsherd, Andronovo type.
Chronology: Yaz II; Yaz III

Site n°: 47 E;
Denomination: anonymous
Type: EdA;
Dimensions: 130 x 90; Total Surface: 9573
UTM: 4210028, 415688
Area: 47 W of type EdA
Dimensions: 260 x 140; Total Surface 33451
Total Surface: 47 E + 47 W 43024
Chronology: Yaz II-III

Site n°: 47 S;
Denomination: anonymous
Type: LLdA
Dimensions: 90 x 22; Total Surface: 2453;
UTM: 4210028, 4156881
The two parts of the site are divided by a contemporary canal, and the western portion was partially covered by sand. On the two sides of the site have been made transects, one the prosecution of the other, 5 wide, with a total length of 270, with total collection of surface material. Metal working is witnessed by a remarkable presence of iron slags. One fragment of LBA stand-foot pottery
Objects found on the Site n°:
Inv. no. 2: 3-barbed arrowhead, bronze;
Inv. no. 19: 3-barbed arrowhead, bronze;
Inv. no. 21: 3-barbed arrowhead, bronze;
Inv. no. 39: 3-barbed arrowhead, bronze;
Inv. no. 42: 3-barbed arrowhead, bronze
Inv. no. 18: whetstone, limestone;
Inv. no. 20: 2-barbed arrowhead, bronze;
Inv. no. 40: 2-barbed arrowhead, bronze;
Inv. no. 22: rod fragment, bronze;
Inv. no. 24: rod fragment, bronze;
Inv. no. 23: strip, bronze;
Inv. no. 28: strip, bronze;
Inv. no. 29: strip, bronze;
Inv. no. 25: bangle fragment, bronze;
Inv. no. 26: ring, bronze;
Inv. no. 27: ring, bronze;
Inv. no. 38: ring, bronze;
Inv. no. 44: ring, bronze
Inv. no. 30: polisher, potsherd;
Inv. no. 31: pendant, lapis lazuli;
Inv. no. 32: bead, turquoise;
Inv. no. 33: bead, lapis lazuli;
Inv. no. 34: object fragment, glass paste;
Inv. no. 35: potsherd with incised signs;
Inv. no. 37: blade fragment, bronze;
Inv. no. 43: blade fragment, bronze;
Inv. no. 45: blade fragment, bronze;
Inv. no. 41: arrowhead, laurel-leaf shape, bronze;
Inv. no. 46: biconical projectile, terracotta

Inv. no. 60: quern fragment, sandstone;
Inv. no. 61: quern fragment, sandstone;
Inv. no. 62: quern fragment, sandstone;
Inv. no. 63: quern fragment, sandstone;
Inv. no. 66: quern fragment, sandstone;
Inv. no. 67: quern fragment, sandstone;
Inv. no. 69: quern fragment, sandstone;
Inv. no. 70: quern fragment, sandstone;
Inv. no. 72: quern fragment, sandstone;
Inv. no. 64: polisher, limestone;
Inv. no. 71: polisher, limestone;
Inv. no. 65: polisher, sandstone.
Chronology: LBA?; Yaz II-III

Site n°: 48
Denomination: anonymous
Type: LLdA;
Dimensions: 270 x 225; Total Surface 54072
UTM: 4209232, 4157315
The site, not high on the level of the plain, has been identified only because of the pottery scatter, of low density.
Objects found on the Site n°:
Inv. no. 76: polisher-hammerstone, diorite;
Inv. no. 77: chisel fragment, bronze;
Inv. no. 78: rod, bronze;
Inv. no. 79: bead, turquoise;
Inv. no. 80: bead, turquoise.
Chronology: Yaz II?; Yaz III

Site n°: 49
Denomination: anonymous
Type: EdA/Tepe 2;
Dimensions: 260 m x 90; Total Surface: 18668
UTM: 4209938, 4110821
Like site 41, this area has preserved traces of a mound, which here was sufficiently high to warrant the drawing of a contour plan. The elevated central part was densely covered by ceramics; detailed survey also registered 46 artefacts, which included - in addition to millstones and slag - one fragment of an alabaster vessel (Spot no. 5), a blade of iron (Inv. 385; Spot no. 17) a bronze blade (No. Inv.395; spot no. 18), two bronze arrowheads (No. Inv. 377; Spots no. 32; 378; spot no. 40), one bronze rod (No. Inv. 401; spot no. 26), one Andronovo sherd (Spot no.29) and some turquoise flakes. A turquoise bead (No. Inv. 375; spot n.10) a bead in aragonite (No. Inv. 402; spot no. 39) have been also collected.
Chronology: LBA? Yaz III

Site n°: 50
Denomination: anonymous
Type: EdA + Scatter;
Dimensions: 400 x 140; Total Surface: 66612
UTM: 4106092, 4209943
Large flat area abutting on Site 39 to the south, and on Site 41 to the east. Once again, it has an elevated central part with a dense scatter and a lighter scatter towards the periphery. Detailed survey, limited to the central area, has mapped 45 artefacts on the surface. These include one tanged bronze arrowhead (No. Inv. 369; spot no. 1), two flakes of lapis lazuli (spots nos. 2 and 4), one fragment of a bronze blade (No. Inv. 371) and a turquoise bead (No. Inv.372; spot no. 21), and several millstones and fragments of pottery slag. The pottery slag is concentrated in a limited area, which may indicate the presence of a kiln. A perforated disk in pottery (No. Inv. 373; spot no. 28) another turquoise bead (No. Inv. 374) a limestone pestle (No. Inv. 453; spot no. 50) have been collected.
Chronology: Yaz II; YazIII; Late Yaz III

Site n°: 51
Denomination: anonymous
Type: EdA;
Dimensions: 60 x 50; Total Surface: 1827
UTM: 4209847, 4104644
Small, elevated area, separated from Site 50 only by a narrow band of plough-furrows. 9 artefacts have been found, including one unfinished turquoise bead (No. 7), millstones and fragments of pottery slag. The area should probably be included in Site 50.
Chronology: Yaz II-III

Site n°: 52
Denomination: anonymous
Type: Scatter;
UTM: 4209102, 4154612
Small concentration of pottery southwest of site 51, partially covered by a dune. Only a few sherds were collected.
Chronology: Yaz II?-III

Site n°: 53
Denomination: anonymous
Type: Scatter;
UTM: 4209218, 4154178
Small concentration of pottery in an open area east of site 39, and south of Site 49. Only some pottery was collected and no detailed survey was conducted.
Chronology: Yaz III

Site n°: 54
Denomination: anonymous
Type: EdA;
Dimensions: 140 x 100; Total Surface: 10712
UTM: 4210102, 4110918
Slightly elevated area just north of Site 49, and similar in character to it. It is surrounded by a broad, flat area. It covers a large area on both sides of a road leading from Tepe 90 to the Durnaly Canal. Detailed survey of the central area recorded and mapped 80 artefacts, including large quantities of pottery and, particularly, iron slag. In addition fragments of iron blade (No. Inv. 399; spot no.7; 400; spot no.3) some fragments of iron ore (spots nos. 41 and 46), one frit bead (No. Inv. 398; spot no. 8), one fragment of a bronze ring (No. Inv. 397; spot no. 14), one fragment of aragonite object (No. Inv. 396; spot no. 15), one bronze arrowhead (No. Inv. 379; spot no. 78), millstones, turquoise flakes and one turquoise bead (spot no. 70) were also found. Spots nos. 49, 29, 76, 48, 10, 75, 20, 71, 77, 42, 26, 6, 1 have been selected as iron sample to be analyzed.
Chronology: Yaz II-III

Site n°: 55
Denomination: anonymous
Type: Tepe 1;
Dimensions: apro x. 100 x 76; Total surface: 33540
Chronology: LBA; Yaz III;
UTM: 4210327, 413742
Main tepe with flat areas to its S. extension named 126, 127, not densely covered in pottery. It is surrounded by several flat areas with concentrations of pottery, in the road running southward till the area of site no. 128.

Site n°: 56
Denomination: anonymous

Type LLdA;
Dimensions: 300 x 80; Total Surface: 32369
East: Type: LLdA;
Dimensions: 48 x 15; Total Surface 686
UTM: 4209517, 415244
The site, not high on the plain level, has been identified only because of the pottery scatter, of high density. On the site was made a transect 5 wide and 20 long with total collection of surface materials.
Objects found on the Site n°:
Inv. no. 48: bead, turquoise;
Inv. no. 49: blade fragment, bronze;
Inv. no. 50: bracelet fragment, bronze;
Inv. no. 51: ring, bronze;
Inv. no. 52: ring, bronze;
Inv. no. 56: polisher, steatite;
Inv. no. 57: mortar fragment, sandstone.
Chronology: Yaz III

Site n°: 57
Denomination: anonymous
Type: Scatter;
Dimensions: 230 x 130; Total Surface: 25129
UTM: 4210154, 411302
Large open area just NE of Site 54, with a light scatter of pottery. 22 artefacts have been collected, including several flakes of turquoise and lapis lazuli, one turquoise bead (No. 16), some bronze fragments, one iron blade (No. 10) and millstones.
Chronology: Yaz II; Yaz III

Site n°: 58
Denomination: anonymous
Type: LLdA;
Dimensions: 110 x 35; Total surface 3957
UTM: 4209719, 415369
The site, not high on the plain level, has been identified only because of the pottery scatter.
Objects found on the Site n°:
Inv. no. 75: quernstone, sandstone.
Chronology: Yaz II-III

Site n°: 59
Denomination: anonymous
Type: LLdA;
Dimensions: 130 x 70; Total surface 5813
UTM: 4210597, 415712
The site, not high on the plain level, has been identified only because of the pottery scatter.
Objects found on the Site n°:
Inv. no. 55: potsherd with rectangular mark, pottery.
Chronology: Yaz III; Late Yaz III

Site n°: 60
Denomination: anonymous
Type: LLdA;
Dimensions: 190 x 50; Total Surface 8123
UTM: 4210606, 415060
The site, not high on the plain level, has been identified only because of the pottery scatter.
Objects found on the Site n°:
Inv. no. 47: whetstone, peridotite?
Chronology: Yaz II-III

Site n°: 61
Denomination: anonymous
Type: LLdA;
Dimensions: 100 x 50; Total Surface 5000
UTM: 4154805, 4210731
The Site, not high on the plain level,has been identified only because of the pottery scatter.
Objects found on the Site n°:
Inv. no. 61: hammerstone, limestone.
Chronology: Yaz III

Site n°: 62
Denomination: anonymous
Type: LLdA;
Dimensions: 70 x 50; Total Surface 3615
UTM: 4210930, 415244
The site, high on the plain, low, almost circular tepe, with steep slopes on N and W sides. It is characterized by a strong concentration of pottery wasters and remains of pottery kilns, ald also the amount of querns is remarkable.
Objects found on the Site n°:
Inv. no. 58: quern, peridotite;
Inv. no. 81: pounder-hammerstone, diorite;
Inv. no. 82: quernstone, sandstone;
Chronology: Yaz III

Site n°: 63
Denomination: anonymous
Type: LLdA;
Dimensions: 100 x 70; Total Surface 3147
UTM: 4210930, 415654
The site, not high on the plain level, has been identified only because of the pottery scatter.
Objects found on the Site n°:
Inv. no. 53: 3-barbed arrowhead, bronze;
Inv. no. 83: mortar fragment, sandstone.
Chronology: Yaz III

Site n°: 64;
Denomination: Takhirbaj depe, Takhirbaj 1, THR-1
Type: Tepe 1;
Site no.65 (LLDA ??) + Site no.66 (LLDA??):
Dimensions: N 50 x 60; S 100 x 25; Total surface 4716
UTM: 4213663, 419776
These three sites have been kept as a unified living system, whereas Takhirbaj tepe, elevated 10 over a plain, could represents the main central place for an apro ximate Dimensions of 110 x 100 and the sites nos. 65 and 66, respectively to South/West and South/East, are, instead possibly interpratable as peripherical centers. Takhirbaj 1, already object of research by soviet scholars in the fifties (Masson, 1959), though indicated by Sarianidi (1989) as object of trial-trenches of Masson in 1953, which never did he really mention, is located in a wide cultivated area with cotton fields. The site is constituted by a central mound, high and a flat surrounding area, with a dispersion of archaeological materials on the surface; the tepe is elongated-shaped and North/South oriented with its oval-shaped top rather flat. The area has already been touched by the agricultural activity and everywhere there are deep and modern breakings in the soil and traces of recent plough furrows; to north/west a large part is still almost intact not yet touched by modern activity and presents free vegetation with plants prikly alagi cameloru The whole surface of the tepe is full of modern traces of camions and bulldozers and of two parallel breakings, 30 c deep. Nearby to the site there is a system of channels with fragmites and a small set of houses, sheds and water-channels constituting an outpost for agricultural activity. The height and the position of Takhirbaj, indicated on

the soviet map (Military Map 1:100.000) as "Bugar Takhirbaj" gives the impression of a real fortified site; this impression is strongly evidenced by the graphyc representation into computer of the contour lines every 50 c which also provide evidence of some structural elements, may be towers, in the corners. The whole surface of the tepe is full of archaeological remains, pottery, stone, metal etc., in a very fragmentary shapes; no structural remains are clearly visible on the whole area of the tepe and some big fragments of cylindrical-conical jars on the top, partially broken by a modern channel, provide evidence of an industrial activity. The very high presence of fragmentary and scattered pottery and the consequent lack of diagnostic rims and bases makes the surface collection very hard and difficult. The area of dispersion of the pottery fragments is generally much wider to north/west than to the rest; immediately beyond the area of vegetation the dispersion of pottery completely stops. The datation of the pottery fragments goes back mainly to the Achaemenian period (Yaz II-III horizon); the presence of Yaz I pottery (900-800 BC) found also in the southern edge, goes against Sarianidi (1981) who had noted it only to the north/eastern side. The site is much rich of bronze, turquoise fragments, splinters and unfinished objects. Up till now Takhirbaj represents the richest site investigated by the Italian Archaeological Mission with more than 150 archaeological spots. A certain amount of lapislazuli fragments have also been collected in the south-western sector, just between the flat area and the sloping western edge of the tepe (see below). After a preliminary a systematic surface collection the opening of two transets, one longer, East/West oriented 170 long, the other, smaller, North/South oriented on the the top of the tepe, only 10 long allows a more systematic collection of the materials inside the grid. The surface of the flat northern/western area is less rich than the tepe, and it is full instead of a much more fragmentary pottery. The north-eastern part is almost sterile. Amongst the most significant materials collected we should mention 6 arrowheads (Bronze) (Inv. no. 86, 87, 88, 89, 90, 182), a needle (Bronze) (Inv. no. 93) a ring (Bronze) (Inv.no.92), a fragment of ring (Terracotta) (Inv.no.113), an ostrakon with two signs (Pottery) (Inv.no.114), a figurine zoomorphic (Terracotta) (Inv.no.117), two bead cylinder (Turquoise) (Inv.no. 126, 127), a blocklet with decoration buttresses (Bronze) (Inv.no.183), a door socket fragment (Gray Limestone) (Inv.no. 180).
Chronology: Yaz I-II-III

Site n°: 65
Denomination: Takhirbaj 1
Area S:
Type: LLdA;
Dimensions: 67 x 22; Total Surface: 1376
Area N:
Type: LLdA
Dimensions: 280 x 180; Total Surface: 51997
UTM: 4213504, 419653
The area of the site, located immediately to north-west of the tepe, is now very disturbed with many traces of mechanical breakings of the soil. The presence of agricultural activity is limited to north and a channel is present to south toward Takhirbaj. In the center of the site over a small elevation traces of of kiln wasters and of structural remains give evidence of an industrial activity. To south-west much less quantity of pottery fragments is present on the surface. An asystematic collection of materials is preliminarly effected and some spots are also individuated. A transet with small squares 1 x 1 allows a collection of materials through alternate squares; this choose is effected in order to have a more precise statistical indication in a area where the distributrion of the archeological material is rather unifor Amongst the most significant materials collected we should mention a Knife (Bronze) (Inv.no. 184), a quernstone (Sandstone) (Inv.no. 176) a conical pendant (Lapislazuli) (Inv.no.), a biconical bead (Lapislazuli) (Inv.no.124) a disk-shaped bead (Chalcedony) (Inv.no.121).
Chronology: Yaz I-II-III

Site n°: 66;
Denomination: Takhirbaj 1
Type: Tepe 2;
Dimensions: 300 x 80; Total Surface: 29586
UTM: 4213539, 420093
The site is located to east of the Takhirbaj. It is constituted by a large flat area to north and a small low elevation to south, possibly a tepe. A fragmentary skull is found in the northern part of the flat area, where not a big quantity of pottery is found. Traces of plough furrows and a small recent holes over the tepe provide evidence of a very fragmentary large jar. A transet 2 x 5 long is effected in this part, north-south oriented and the as in the no. 65 the collection of the materials is made in alternate squares. On the southern edge of the tepe there are fragments of turquoise, an arrowhead of the scythian type (cf. no. Inv. 85). The chronological horizon of the pottery collected dates back to Yaz II/III. In a square (no.), 27 fragments of Yaz 1 (900-800 BC) have been also found. Nearby, to south-west, a flat area, separated by the first by a small channel, is present and it is almost empty of any archaeological material. Amongst the most significant materials collected we should mention a polygonal scraper (Chert) (Inv.no.181), an arrowhead (Bronze) (Inv.no.85).
Chronology: Yaz I-II-III

Site n°: 67
Denomination: Takhirbaj 4
Type: Tepe 2;
Dimensions: 400 x 110; Total Surface: 56200
UTM: 4217188, 420443
surface 80.000 First identified by aereal survey with elicopter the 18th and 19th September the site should be identified with Takhirbaj 4 (Sarianidi 1981). The site, rather elevated and NS oriented, full of pottery on the surface, is surrounded by cultivated areas, where the materials completely disappear. The site is constituted by a large area with at least two elevations; the northern one with fragmentary wall remains NS - EW oriented just on the top, and the southern with a very high concentration of ash, dark earth, and some overfired remains, burning clay and wasters kiln, led one to hypotheDimensions the presence of industrial activities in a separate area. The pottery fragments collected in the whole area belong to Namazga VI horizon, i.e. LBA. The surface of the site is very dusty and it has not been possible to find metal, stone fragments. Amongst the most significant materials collected we should mention a door socket fragment (Fine gray Sandstone) (Inv. no.), a figurine zoomorphic (Terracotta) (Inv. no. 116), a rim sherd of bowl (Steatite) (Inv. no.168).
Chronology: LBA

Site n°: 68
Denomination: unknown
Type: undetermined with round plan
Dimensions: 20 x 20; Total Surface: 400
UTM: 4198237, 405828
Chronology: Sasanian

Site n°: 69
Denomination: anonymous
Type: Site/Kiln;
Dimensions: 156 x 192; Total Surface: 23443.
UTM: 4216539, 4201993
The site has been individuated on the way to look for the site no. 67, when installing a topographic point between Takhirbaj 1 and the site no. 67. Many traces of overfired remains and of wasters kiln are present. In the area very close to the sites of last year along the channel to the south, the following sites have been identified:
Chronology: LBA

Site n°: 70;
Denomination: anonymous
Type: Scatters 2;
Dimensions: 140 x 60; Total Surface: 7810
UTM: 4208403, 4157637
The site, nearby to no. 37, and to the trigonometric point, is now divided by a street in two parts, the first one, to east and the second to west. The cultural horizon of the pottery is Yaz III. Amongst the most significant materials collected we should mention a whorl from rounded potsherd (Pottery) (Inv.no.109).
Chronology: Yaz III

Site n°: 71
Denomination: anonymous
Type: Scatters 2;
Dimensions: 190 x 80; Total Surface: 11515
UTM: 4208234, 4160340
At east of the site no.70, this site presents in the surface a large dispersion of pottery fragments and it is full of sand. One dune divides in two parts the site, partially also disturbed by a street. An iron slag has been found and the pottery belongs to the Yaz III horizon. Amongst the most significant materials collected we should mention a rimsherd with fork-shaped incised sign (Pottery) (Inv.no.119).
Chronology: Yaz III

Site n°: 72
Denomination: anonymous
Type: LLdA;
Dimensions: 115 x 80; Total Surface: 6309
UTM: 4208085, 4162849
The site presents a great dispersion of materials, quern stones and two areas of concentration of pottery with fragmentary large jars in the area nearby to the site no. 71. The presence of very strange and unusually large bricks, perhaps belonging to a courtyard, and of a presence of small quern-stones in association with small spindle-whorls and large fragmentary walls of jars, gives evidence of a significant site. Amongst the most significant materials collected we should mention 4 whorls/wheels (Terracotta and Pottery) (Inv. nos. 110, 106, 107, 108) a quernstone (Inv. no. 171) a millstone (Inv. no.172).
Chronology: Yaz III

Site n°: 73
Denomination: anonymous
Type: Scatters 2;
Dimensions: 170 x 40; Total Surface: 5134
UTM: 4208090, 4160822
Chronology: Yaz III

Site n°: 74
Denomination: anonymous
Type: Scatters 2;
Dimensions: 125 x 45; Total Surface: 4978
UTM: 4207993, 4160388
Amongst the most significant materials we should mention an iron slag (Inv.no. 170).
Chronology: Yaz III

Site n°: 75
Denomination: anonymous
Type: Scatters 2;
UTM: 4207993, 4160400
Chronology: Yaz III

Site n°: 76
Denomination: anonymous
Type: Scatters 2;
Dimensions: 40 x 30; Total Surface: 1472
UTM: 4168302, 4207564
This site together with the following is located along the channel coming form the area of the sites nos. 37 and 70. Only few pottery remains are present.
Chronology: Yaz III

Site n°: 77
Denomination: anonymous
Type: Scatters 2;
Dimensions: 40 x 30; Total Surface: 1219
Chronology: Yaz III
UTM: 4207492, 4169364
The site presents only a very small area divided in two parts by a street.

Site n°: 78
Denomination: anonymous
Type: Scatters 2.
Dimensions: 80 x 50; Total Surface: 2999
UTM: 4207680, 4167098
The site, which has a smaller extension beyond the street, closer to the channel, presents only some pottery slags.
Chronology: Yaz III

Site n°: 79
Denomination: unknown
Type: irregular
Dimensions: 60 x 70 Total Surface: 4200
Field n°: 107
Type: Scatters 2;
Dimensions: 200 x 100; Total surface 19678
UTM: 4202732, 403547
The flat open area is consituted by two sectors (Eastern and Western) both triangular in shape, and presents some pottery; dense scatter of pottery is only present in the takir on the east side. The area is bounded by a small channel on the east, and disturbed by a ploughed field to the west. Much of the site may be under a sand dune and obscured by cultivation. There is a small derelict drilling station to the West of it.
Chronology: Early Iron Age

Site n°: 80
Denomination: anonymous
Type: LLdA;
Dimensions: 100 x 500; Total surface: 37967
UTM: 4202879, 401913
The site is constituted by a flat open area to the south of the northern Uc-Tepe, and contiguous with it; it is divided into two halves (northern and southern) by an unpaved road running

from Uc Tepe towards East. A thin scatter of pottery has been also found between southern end of site and the middle Uc-Tepe mound. Dense scatter of pottery in takir, with occasional interference of sand dune. Thin scatter between S. end of site and the middle Uc-Tepe mound. Four fragments of bronze have been also found and a fragment of turquoise.
Chronology: Yaz I; Yaz II; Yaz III

Site n°: 81
Denomination: anonymous
Type: Scatters 2;
Dimensions: 80 x 20; Total Surface: 2595
UTM: 4202323, 402357
Small open area 500 south of the same road which bisects site no. 80, separated by a sand dune. It is NE of the central Uc-Tepe mound, and may also be reached from there by a path. Only small concentrations of pottery and three fragments of turquoise. Site is bounded by cultivated fields and its true extent may thus be underestimated. It is also obscured by sand dunes.
Chronology: Yaz II; Yaz III

Site n°: 82
Denomination: anonymous
Type: LLdA.
Dimensions: 170 x 100; Total surface: 18993
UTM: 4202212, 402612
The site is located NE of middle Uc-Tepe, and just to the North of a small canal running East of the latter. It is an open area much disturbed by vegetation and crossed by a path running from south to north. Occasionally with heavy concentration of pottery the site is, as usual, obscured by sand dunes. 2 fragments of turquoise have been also found.
Chronology: Yaz II; Yaz III

Site n°: 83
Denomination: anonymous
Type: Tepe 2;
Dimensions: apro x. h. 1.50; Dia 80 x 90; Total surface: 8257
UTM: 4204440, 406336
The tepe is constituted by a small mound with dense scatter of pottery, surrounded by cultivated fields. It is located along a channel running N, then NW from just East of a Baluch village, and marked by a line of trees. Surface recently much trampled by heavy machinery; dense scatter on top of the mound but obscured by cultivation along the periphery, may extend into the cultivated fields.
Chronology: Yaz III

Site n°: 84
Denomination: anonymous
Type: Tepe 2;
Dimensions: apro x. h. 2.00; Dia 52 x 26; Total surface: 2502
UTM: 404868,4204981
Small tepe surrounded by cultivated fields, along the north side of a recently dug canal running E-W. Dense scatter on mound; elsewhere, along the periphery, it is disturbed by cultivation.
Chronology: Yaz III

Site n°: 85
Denomination: anonymous
Type: Tepe 2;
Dimensions: 105 x 77; Total surface: 6004
UTM: 4205263, 405049
Small tepe now completely bulldozed away and surrounded by cultivated fields. Densest concentration of pottery is along the periphery of the ex-tepe, and on top. Lighter scatter in cultivated fields whose Dimensions has not been measured.
Chronology: Yaz II-III

Site n°: 86
Denomination: anonymous
Type: LLdA;
Dimensions: 486 x 300; Total surface: 122377
UTM: 4204794, 403138
Open area with dense concentration of pottery. It is around a derelict drilling station and just East of a large compressor NE of Uc-Tepe. The site is largely undisturbed except for the drilling station and roads. Dense in patches, especially on the South side. On the East it is disturbed by the road, the drilling station and sand dunes. Bronze and turquoise fragments and a bronze arrowhead (inv. N° 191, Yaz III perdiod) have been found. Between the no. 79 and no. 86, to the north of the unpaved road running from Uc tepe to East, there are some areas with dense scatter of pottery not yet identified as sites.
Chronology: Undetermined

Site n°: 87
Denomination: anonymous
Type: LLdA;
Dimensions: 243 x 155; Total surface: 37080
UTM: 4206539, 402900
Open area much disturbed by vegetation, just south of prominent drilling rig, and north of major EW canal. It extends over a considerable area, but with only a few areas of heavy concentration of pottery now visible.
Chronology: Undetermined

Site n°: 88
Denomination: anonymous
Type: LLdA;
Dimensions: 374 x 150; Total surface: 48898
UTM: 4206672, 404038
Open area with a small barren mound with an oval shaped scatter of pottery to its S., along the East side of a small canal. Some open areas along the road, but most of the site is, or has recently been, cultivated. Dense only in area along the road; elsewhere obscured by cultivation.
Chronology: Undetermined

Site n°: 89
Denomination: anonymous
Type: LLdA;
Dimensions: 360 x 360; Total Surface: 101736
UTM: 4209493, 413263
Open area crossed by road leading from site no. 90, densely covered in pottery. It is separated from site 90 by a canal but is probably associated with it along with sites 91-98 and 117. It is NW of the tepe 90. Dense cover of pottery all around the area. Site no. 91 is probably a northern extension of it.
Chronology: Undetermined

Site n°: 90
Denomination: anonymous
Type: Tepe 1.
Site n°: apro x. h. 5.00; diam 130 x 90; Total surface: 12192.
UTM: 4209296, 412619
Main area with three flat areas named 90N, 90NW and 90W densely covered in pottery. It is surrounded by several flat areas with concentrations of pottery, as well as by small mounds (92, 94) and further flat sites in a radius of ca. 500 The site is essentially undisturbed except in flat areas. Finds include 2 bronze seal fragments, 1 lapis bead, 1 stone bead, one stone

spindle whorl, fragments of bronze, lapis and turquoise.
Chronology: Yaz III

Site n°: 91
Denomination: anonymous
Type: LLdA;
Dimensions: apro x. 0.00 0.00; Total surface: 12192
UTM: 4209666, 412394
Small open area northeast of site 89 with a high concentration of sherds of large jars. It is probably, in fact, a part of site no. 89, and located in an area as yet uncultivated.
Chronology: Undetermined

Site n°: 92
Denomination: anonymous
Type: Tepe 2;
Dimensions: apro x. h. 3.00; Dia 68 x 113 Total surface: 6557
UTM: 4208950, 412626
Small eroded tepe with a large flat area extending towards the canal to the South with high concentration of pottery just south of site 90. It has several concentrations of fragments of very large jars. Surface is disturbed by road, but a large flat area (92 S) is still preserved. Dense concentration of large pottery jars.
Chronology: Undetermined

Site n°: 93
Denomination: anonymous
Type: LLdA;
Dimensions: apro x. 247 x 127; Total surface: 31369.
UTM: 4209032, 412587
Open area bisected and cut through by N-S channel running down to Sovkhoz Turkmenistan. Main part of the site is to the West, but there is pottery also east of the channel. The site has been cultivated and is quite disturbed by vegetation. Occasionally dense scatter of pottery, especially in areas not disturbed by cultivation.
Chronology: Undetermined

Site n°: 94
Denomination: anonymous
Type: Tepe 2;
Dimensions: apro x. h. 3.00; 48 x 94; Total surface: 4351
UTM: 4209032, 412592
Small tepe just SW of site 90 and probably associated with it; is almost completely destroyed by machine excavation and a road running just north of it. Has dense concentration of sherds of large jars. Dense scatter of pottery.
Chronology: Undetermined

Site n°: 95
Denomination: anonymous
Type: EdA;
Dimensions: apro x. 255 x 170; Total surface: 40000
UTM: 4209281, 412470
Large open area with dense concentration of pottery to the west of site 90 and probably associated with it. Site is largely undisturbed by cultivation, but it is bounded by a road on the Northeast. The same road runs along sites 92, 117, 96 and 97, 99, 100.
Chronology: Undetermined

Site n°: 96
Denomination: anonymous
Type: LLdA;
Dimensions: apro x. 76 x 297; Total surface: 61865
UTM: 4208897, 412341
Small open area to the west, flat site ca. 500 west of site 90. Cut in half by road, but pottery from 2 sides have not been separated; it has an extension to the west. Pottery not as dense as in 95, and partially covered by dune.
Chronology: Undetermined

Site n°: 97
Denomination: anonymous
Type: Scatters 2;
UTM: 4209306, 411897
Open area, large takir partially covered in sand with highest concentration of pottery on the North side. It is just north of the road running from Site 90 to the west.
Chronology: Undetermined

Site n°: 98
Denomination: anonymous
Type: LLdA;
Dimensions: apro x. h. 0.50; 347 x 197; Total surface: 47346
UTM: 4209655, 412277
Open area slightly elevated with very high concentration of pottery to the NW of site 90 and North of the road. Essentially undisturbed. One bronze blade, a bronze arrowhead (fragmentary), a turquoise bead, 2 whetstones, 1 fragmentary blade, fragments of bronze and turquoise have been found.
Chronology: Undetermined

Site n°: 99
Denomination: anonymous
Type: Scatters 2;
Dimensions: apro x.75.00 x 60.00; Total surface 4500
UTM: 4209074, 411427
Open area cut in half by road about 1.5 km west of tepe 90. Only sporadic concentrations of pottery especially in the takir along the road. Sporadic concentration of pottery; some fragments of vitrified bricks were also found.
Chronology: Undetermined

Site n°: 100
Denomination: anonymous
Type: Tepe 2;
Dimensions: apro x. h. 0.50; 91 x 43; Total surface: 2633
UTM: 4209065, 411439
Small tepe (?) with flat takyr around, mostly destroyed by the road, but still with a high concentration of pottery both here and in the flat areas. It is about 2 k west of mound 90, along the road. Thin scatter of pottery all the way to the canal to the South. Scatter of pottery disturbed by sand dunes and possibly by cultivation in the past. One turquoise bead has been found.
Chronology: Yaz II

Site n°: 101
Denomination: anonymous
Type: Scatters 2;
UTM: appro x. Position, 4206796, 410943
Open area with sporadic scatter of pottery with only a few areas of concentration. It is NW of the Sovkhoz and running up to the channel to the North. Much disturbed by roads, cultivation, vegetation and animals. Generally is present a thin scatter of pottery.
Chronology: Undetermined

Site n°: 102
Denomination: anonymous
Type: LLdA;
Dimensions: apro x. 123 x 40; Total surface: 4125

UTM: 4205153, 409574
Open area, small in Dimensions north of canal and road leading south of bridge to the Baluch village, surrounded by cultivated fields and is also disturbed by canals and sand dunes. Only one small area of concentration of pottery in a takhir to the north of a sand dune. A slag from potter's kiln has been also found.
Chronology: Undetermined

Site n°: 103
Denomination: anonymous
Type: LLdA;
Dimensions: apro x. 150 x 80; Total surface 12000
UTM: 4204889, 409353
Open area, even but medium dense concentration of pottery in an already cultivated area. It is at the intersection of two channels, just to the West of site 102. Would probably have had dense concentration of pottery but is much disturbed by cultivation. One grinder fragment has been found.
Chronology: Undetermined (Iron Age)

Site n°: 104
Denomination: anonymous
Type: Scatters 2;
UTM: 4206141, 406936
Open area, flat takyr with small concentration of pottery just Northwest of the Baluch shrine, almost completely destroyed by the road running across it.
Chronology: Undetermined (Iron Age)

Site n°: 105
Denomination: anonymous
Type: Scatter 2;
Dimensions: apro x. 110 x 110; Total surface: 9499
UTM: 4206858, 407114
Extended area site, but now disturbed by a road to the South and by cultivation to the North. In spite of this the scatter of pottery is dense and the site appears to have been very large. Only the S. part has been measured with a diameter of 110 The site is just North of a major East-West channel which cuts across the Western half of the survey area. A grinder fragment has been found. Along the road in the fields to the N-NE an area called 105 N has been identified.
Chronology: Undetermined (Iron Age)

Site n°: 106
Denomination: anonymous
Type: LLdA;
Dimensions: apro x. 73 x 167; Total surface: 10826
UTM: 4204870, 406903
Open area bisected by an E-W canal, but no separation was made in the pottery and now is disturbed by a canal, and also by road leading North from Baluch village. To the north of the canal the vegetation is dense and obscures the pottery. In a small uncultivated patch to the South the scatter is very dense, however. A possible kiln in NW corner is indicated by concentration of overfired bricks.
Chronology: Undetermined (Iron Age)

Site n°: 107
Denomination: anonymous
Type: Scatters 2;
Dimensions: apro x. 30 x 190; Total surface: 5700
UTM,4207132, 407222
Extended area site just north of prominent line of trees marking an E-W canal. Essentially undisturbed except by a sheep-pen in the east and by a channel in the South; occasional dense scatter of pottery.
Chronology: Undetermined (Iron Age)

Site n°: 108
Denomination: anonymous
Type: LLdA;
Site n°: apro x. 20 x 10; Total surface 200
UTM: 4207266, 407959
Open area with small concentration of pottery along the intersection of two roads just south of prominent line of trees mentioned above. Probably a site but very little is now visible due to cultivation and thorny vegetation. Only a few sherds have been collected.
Chronology: Undetermined (Iron Age)

Site n°: 109
Denomination: anonymous
Type: Scatters 2;
UTM: appro x. Position, 4207262, 408266
Extended area site with thin scatter of pottery over a very large area without any significant areas of concentration except in a few takirs. It is southeast of the line of trees also bounding sites 107 and 108, and north of the major E-W canal. One painted Yaz I rim has been found from one of the open areas.
Chronology: Undetermined

Site n°: 110
Denomination: anonymous
Type: Scatters 2;
UTM: 4207004, 408232
Open area SE of 108 and at the intersection of 2 roads (one leading from 108 and the other from the channel). Remains mingled with roof tiles and rubbish of recent encampment. Only one significant area of concentration of pottery.
Chronology: Yaz III ?

Site n°: 111
Denomination: anonymous
Type: Scatters 2;
UTM: appro x. Position, 4207853, 411582
Open area very disturbed on N side of a channel, marked by a low ridge and surrounded by cultivated fields. In the line of the main road leading North from Sovkhoz Turkmenistan, through 2 channels. Only a thin scatter of pottery, but the site is disturbed by cultivation.
Chronology: Undetermined

Site n°: 112
Denomination: anonymous
Type: Scatters 2;
UTM: appro x. Position, 4208009, 412524
Open area NE of 111 and along the N-S channel running N of the Sovkhoz, and north of the second line of E-W channels. Although the site is entirely cultivated, there is an even scatter of pottery without any significant concentration.
Chronology: Undetermined

Site n°: 113
Denomination: anonymous
Type: Scatters 2;
UTM: appro x. Position, 4208171, 411744
Extended area site, very large takir with scatter of pottery. North of third line of channels and to the right of the bridge. Small area of concentration.
Chronology: Undetermined

Site n°: 114
Denomination: anonymous
Type: Scatters 2;
UTM: appro x. Position, 4208171, 411464
Open area once again practically destroyed by the road and by recent ploughing. It still has a thin scatter of pottery with occasional concentration in the few remaining takir. It is north of the third channel and to the left of the bridge. Occasional patches of concentration.
Chronology: Undetermined

Site n°: 115
Denomination: anonymous
Type: LLdA;
Dimensions: apro x. 100 x 77; Total surface 7700
UTM: appro x. Position, 4208290, 411638
Large open area, takir full of pottery probably even larger but is obscured by sand dunes and cultivation. The site is just to the South of the fourth E-W channel, along whose north side is site 100. Dense concentration of pottery in takir, and also in the small area labelled 115 E. Main concentration to the W. another area to the East across cultivated fields.
Chronology: Undetermined

Site n°: 116
Denomination: anonymous
Type: Scatters 2;
Dimensions: apro x.100.00 x 70.00; Total surface 7000
UTM: appro x. Position, 4208308, 411897
Extended area site and two open areas to the S. and SE, partially open and partially cultivated, East of 115 and still South of the fourth line of channels. Dense scatter of pottery except where disturbed by cultivation. The open areas ca. 200 m to S and SE are considered part of this site. Dense scatter of pottery in 116; less dense in 116 S and 116 SE.
Chronology: Yaz I; Yaz II

Site n°: 117
Denomination: anonymous
Type: LLdA.
Dimensions: apro x. 144 x 41; Total surface: 5000
UTM: 4208757, 412669
Open area with dense scatter of pottery along road running from 116 across the channel to 93 and meeting the road running west of site 92. Site undisturbed except for the road, but is covered by the occasional sand dune. The site is south of tepe 90, and is part of the continuous distribution of pottery around it (sites 89, 91-98 and 117). Two small turquoise fragments have been found.
Chronology: Undetermined

Site n°: 118
Denomination: anonymous
Type: Scatters 1;
UTM: appro x. Position, 4210879, 411747
Open area with a concentration of pottery in takir surrounded by sand dunes. It may be part of the monster site 119, whose true extent was not at that time known. Dense scatter of pottery in takir.
Chronology: Undetermined

Site n°: 119
Denomination: anonymous
Type: LLdA;
Dimensions: 150 x 24 ??; Total Surface: 4732 (?).
UTM: 4211081, 411661
Large, flat area surrounded by sand dunes with a low density of pottery on the surface. Detailed survey was done but only pottery and no other artefacts were collected.
Chronology: Undetermined

Site n°: 120
Denomination: anonymous
Type: Scatters 2;
Dimensions: apro x. h. 2.00; 100 x 200; Total surface: 20000
UTM: 4209087, 414700
Open area + 120 S (a concentration of pottery in takir to the S), low tepe (?) Site on and around a small mound topped by Kazakh camp. It is just West of Site 38 of Site complex 1, and 1 km SE of Tepe 55. Where undisturbed, the concentrations of pottery are quite high. Canal being dug across it at present. Dense patches in undisturbed areas.
Chronology: Undetermined

Site n°: 121
Denomination: anonymous
Type: Scatters 2;
UTM: 4209087, 414145
Open area, with patches of pottery on the South slope of a sand dune south of Site 120 S. Probably a large site now obscured by sand dune. A grinder fragment has been found.
Chronology: Undetermined

Site n°: 122
Denomination: anonymous
Type: Scatters 2;
Dimensions: apro x. h. 0.50; 50 x 100; Total surface: 5000
UTM: not recorded
Open area, low mound ? with concentrations of pottery on and around a sand dune West of site 120. Area around the dune also contains pottery but is much disturbed by cultivation.
Chronology: Undetermined

Site n°: 123
Denomination: anonymous
Type: Scatters 2;
UTM: not recorded
Open area with concentration of pottery in a takir West of site 122. Site probably extends into the cultivated area around the takir, but the disturbance of the cultivation makes it difficult to find its boundaries.
Chronology: Undetermined

Site n°: 124
Denomination: anonymous
Type: LLdA;
Dimensions: apro x. 490 x 150; Total surface: 54536
UTM: 4210103, 414822
Huge open area with vast concentration of pottery over a large area NW of site complex 1 and North of site 120. Undisturbed by cultivation. Some grinder fragments possibly Yaz I period pottery, and bronze fragment have been found.
Chronology: Yaz I?

Site n°: 125
Denomination: anonymous
Type: LLdA;
UTM: not recorded
Open area with high concentration of pottery northwest of site 125. Undisturbed.
Chronology: Undetermined

Site n°: 126
Denomination: anonymous
Type: LLdA;
Dimensions: apro x. 160 x 80; Total surface: 13040
UTM: not recorded
Open area with a high concentration of pottery in takirs along road between tepe 55 and tepe 90. Its northern boundary separated from site 55 only by sand dunes. Indeed, there is an almost continuous scatter of pottery south of tepe 55 up to tepe 90 (sites 126-128). There is a reduced concentration of pottery even in the formerly cultivated areas East of the road.
Chronology: Undetermined

Site n°: 127
Denomination: anonymous
Type: LLdA;
Dimensions: apro x. 121 x 64; Total surface: 7396
UTM: 4209364, 413498
Open area with a further high concentration of pottery in takirs south of site 126, and separated from it by a few sand dunes.
Chronology: Undetermined

Site n°: 128
Denomination: anonymous
Type: LLdA;
Dimensions: apro x. 500 x 250; Total surface: 123406
UTM: 4208868, 413498
Huge open area very large stretching eastward from the road connecting tepe 55 with tepe 90. Enormous density of pottery including some very large sherds. Occasionally disturbed by sand dunes but still very prominent. Some grinder fragments, turquoise beads, lapis and bronze fragments have been found.
Chronology: Undetermined

Site n°: 129
Denomination: Atliyatan
Type: Tepe 1;
Dimensions: apro x. h. 3.00; 130 x 140; Total surface: 16220
UTM: 4209712, 409734
Tepe surrounded by cultivated fields and tall stands of reeds. It is at the intersection of two canals W of tepe 90 and site 119. Not a very dense scatter of pottery perhaps disturbed by heavy machinery. A pottery slag has been found. A flat area to the south is 129 S, separated by a channel from 129. To the east should be 129 E also.
Chronology: Yaz I-II

Site n°: 130
Denomination: anonymous
Type: Tepe 2;
Dimensions: apro x. h.1.50; 648 x 183; Total surface: 8528
UTM: 4212135, 4083918
Central tepe with surrounding flat area, oval shaped, of 280 x 160 with dense scatter of pottery. It is on a road leading North of Atliyatan towards the complex of tepe 131-134. Eastern end of site cut off by small channel. A very dense concentration of pottery, except where disturbed by the road is present. A bronze ring and a turquoise fragment have been found. A quite extended flat area intensively covered by pottery has been found just to N of the large Brigade to the North of Atliyatan, but it has been not yet identified as a site.
Chronology: Yaz III

Site n°: 131
Denomination: anonymous
Type: Tepe 1;
Dimensions: apro x. h. 3.50; 112 x 41; Total surface: 7645
UTM: 4213149, 4078147
Tepe surrounded by canals, and about 4km NW of Atliyatan, connected by a direct road, running past a brick building with an antenna on top, which is more easily visible from the South than the tepe itself. Site has survey tower on top. The mound is surrounded by a flat area especially to its south; dense scatter of pottery both on the tepe and in the flat areas. Two turquoise beads and bronze and turquoise fragments have been found.
Chronology: Undetermined

Site n°: 132
Denomination: anonymous
Type: Tepe 1;
Dimensions: apro x.h. 4.00; 140 x 220; Total surface: 20112
UTM: 4215177, 4077681
Tepe directly north of 131, about 1 k from it, surrounded by large flat area (possible even low mounds) also very rich in pottery. Undisturbed, located on the east side of a canal. Dense scatter of pottery. A fragmentary base of alabaster vessel some bronze and turquoise fragments have been found.
Chronology: Undetermined

Site n°: 133
Denomination: anonymous
Type: Tepe 1;
Dimensions: apro x.h. 3.00; 115 x 2340; Total surface: 15930
UTM: 4214675, 4071072
Tepe surrounded by cultivated fields which obscure its outlines. It is densely covered with pottery. A bronze arrowhead has been found.
Chronology: Undetermined

Site n°: 134
Denomination: anonymous
Type: Tepe 1;
Dimensions: apro x. h. 4.00; 133 x 340; Total surface: 43485
UTM: 4214796, 4053201
Prominent tepe topped by survey tower and surrounded by flat area 350 NS x 150 EW. There is a major NS canal along its Eastern side. Site is as yet undisturbed. Some small mounds are distributed around the main one dense scatter both on mound and flat areas.
Chronology: Yaz I; Yaz II; Yaz III

Site n°: 135
Denomination: anonymous
Type: Tepe 2;
Dimensions: apro x. h. 0.50; 173 x 206;Total surface: 28589
UTM: 4211120, 4106259
Tepe with cultivated area to the South strewn with pottery recently cultivated but presently fallow area to its south also rich in sherds. Just to the South of a channel, and NE of Atliyatan. Dense scatter of pottery everywhere; bronze fragments and a turquoise triangular shaped pendant have been found.
Chronology: Yaz III

Site n°: 136
Denomination: anonymous
Type: Scatters 1;
Dimensions: apro x. 100 x 213; Total surface: 15438
UTM: 4210647, 409688
Large Extended area site much trampled by animals but still rich in pottery. It is directly N. of Atliyatan, at the bridge crossing the Durnaly canal. Dense scatter of pottery especially

in undisturbed areas.
Chronology: Undetermined

Site n°: 137
Denomination: anonymous
Type: LLdA;
Dimensions: apro x. 221 x 97; Total surface: 17039
UTM: 4210594, 410249
Open area mostly obscured by sand dunes, but with dense concentration of pottery. It is along the road leading from site 119 to the bridge across the Durnaly canal to site 136 and Atliyatan.
Chronology: Undetermined

Site n°: 138
Denomination: anonymous
Type: Tepe 1;
Dimensions: apro x. 50 m x 54; Total surface: 2255
UTM: 4207746, 399624
Chronology: Yaz III; Late Yaz III

Site n°: 139
Denomination: anonymous
Type: Tepe 1;
Dimensions: apro x. 170 x 54; Total surface: 6136
UTM: 4207446, 399609
Chronology: Yaz II; Yaz III

Site n°: 140
Denomination: anonymous
Type: Tepe 2.
Dimensions: apro x.154 x 95; Total surface: 11836
UTM: 4213996, 407349
Chronology: Yaz II; Yaz III

Site n°: 141
Denomination: Ajra-depe (Ajrak-depe)
Type: tepe 2 with oval plan
Dimensions: apro x. 30 x 45; Total surface: 597
UTM: 4203893, 410099
Field n°: 105
Chronology: Early Iron Age Yaz II-III

Site n°: 142
Denomination: anonymous
Type: Scatter;
Dimensions: 213 x 101; Total Surface: 16616
UTM: 4210008, 411177
Undulating area with a dense concentration of pottery in the center, SW of site 57, separated from it by a high dune of sand. To the north it merges with sites 143 and 54. Twenty-two artefacts were recorded, including several turquoise flakes, one turquoise bead (Spot no. 19), and the usual array of millstones.
Chronology: Yaz II; Yaz III

Site n°: 143
Denomination: anonymous
Type: Scatter
Dimensions: 40 x 140; Total Surface: 6877
UTM: 4210222, 411147
Open area north of Site 142, and crossed by a road. The presence of over 60 turquoise flakes and of one finished bead in the northeastern corner, and of a large nodule of turquoise in the southwest corner, of the site suggests industrial activity. Other finds include one flake of carnelian and a few millstones.
Chronology: Yaz II-III

Site n°: 144
Denomination: anonymous
Type: LLdA;
Dimensions: 200 x 130; Total Surface: 27142
UTM: 4218173, 4166596
Bronze Age site with large scatter of pottery.
Chronology: LBA

Site n°: 145 (Togolok 1.8)
Denomination: anonymous
Type: EdA;
Dimensions: 75 x 230; Total Surface: 14731
UTM: 4218790, 4128617
Small elevated site with high density of pottery; pottery slag are also present.
Chronology: LBA

Site n°: 146
Denomination: anonymous
Type: LLdA;
Dimensions: 160 120; Total Surface: 20350
UTM: 4210611, 4143220
Shallow on low terrace 41 sq m of fragmentary large jar (Iron Age).
Chronology: Undetermined

Site n°: 147
Denomination: anonymous
Type: Spot;
UTM: 4210572, 4141122
Chronology: Undetermined

Site n°: 148
Denomination: anonymous
Type: Tepe 2 + LLdA;
Dimensions: 380 x 400; Total Surface: 120074
UTM: 4212366, 4149145
Concentration of pottery on the western part. Medium density of pottery.
Chronology: Yaz III

Site n°: 149
Denomination: anonymous
Type: LLdA;
Dimensions: 70 x 40; Total Surface: 2190
UTM: 4213321, 4149905
Medium density of pottery.
Chronology: Yaz III

Site n°: 150
Denomination: anonymous
Type: LLdA;
Dimensions: 280 x 100; Total Surface: 20662
UTM: 4147191, 4214265
Completely covered by dunes; low density of pottery.
Chronology: Yaz II; Yaz III

Site n°: 151
Denomination: anonymous
Type: LLdA;
Dimensions: 330 x 250; Total Surface: 79315
UTM: 4214265, 4148719
Completely covered by dunes low density of pottery. Two bronze arrowheads (Nos. Inv. 356, 358) have been found.
Chronology: LBA; Yaz I; Yaz II; Yaz III

Site n°: 152
Denomination: anonymous
Type: LLdA;
Dimensions: 140 x 70; Total Surface: 6367
UTM: 4214051, 414860
Completely covered by dunes low density of pottery.
Chronology: LBA; Yaz I

Site n°: 153
Denomination: anonymous
Type: LLdA
Dimensions: 200 x 100; Total Surface: 26233
UTM: 4214851, 414805
Slightly elevated area; medium density of pottery. A bronze arrowhead (No. Inv. 357) a bronze square piece (No. Inv. 390) have been found.
Chronology: Yaz III; Late Yaz III

Site n°: 154
Denomination: anonymous
Type: Spot + LLdA;
Dimensions: 70 x 50; Total Surface: 3315
Site n°: 154 N
Type:
Dimensions:
Chronology: LBA-Yaz III
UTM: 4215057, 414621
Namazga VI; Medium low density of pottery.
Chronology: LBA

Site n°: 155
Denomination: anonymous
Type: Tepe 2 + LLdA;
Dimensions: 460 x 150; Total Surface: 69148
UTM: 4215220, 415001
A sling-stone by terra-cotta (No. Inv. 355) a bead rough-out in aragonite (No. Inv. 354), a blocklet of chalcedony (No. Inv. 359) and a diorite millstone have been collected.
Chronology: LBA; Yaz I; Yaz II; Yaz III; Late Yaz III

Site n°: 156
Denomination: anonymous
Type: LLdA;
Dimensions: 1, 70 x 15 m; Total Surface: 2225; 2, 50 x 50; Total surface: 2246; 3, 50 50; Total surface: 2405
UTM: 4218270, 414718
Practically divided in three parts, much covered by sand dunes; medium to low density.
Chronology: LBA; Yaz III

Site n°: 157
Denomination: anonymous
Type: LLdA;
Dimensions: 150 x 60; Total Surface: 8393
UTM: 4209887, 418999
Very scarce scatter of pottery in a cultivated area.
Chronology: Undetermined

Site n°: 158
Denomination: anonymous
Type: EdA;
Dimensions: 230 x 50; Total Surface: 8397
UTM: 4210157, 410488
Small elevated area north of Site 50, elongated in a N-S direction. It had recently been occupied by a sheep-pen and is consequently much disturbed. It is cut by a road to the north and by a canal to the west. Detailed survey of the central area yielded 26 artefacts, including a turquoise plaquette (No. Inv. 403; Spot no. 15), one flake of lapislazuli (Spot no. 11) and several millstones. Sherds of two large storage jars, apparently laid on their sides, were found in situ (Spot no. 18). A bronze ring (No. Inv. 404; Spot no. 2) has been also found.
Chronology: Yaz III; Late Yaz III

Site n°: 159
Denomination: anonymous
Type: EdA;
Dimensions: 90 x 100; Total Surface: 8231
UTM: 4210372, 410430
Slightly elevated area NW of Site 158, separated from it by the above-mentioned canal; another canal cuts the site to the west-northwest. A central area with high concentration of pottery has been isolated and surveyed in detail and 18 millstones and fragments of pottery slag were recorded.
Chronology: Undetermined

Site n°: 160
Denomination: anonymous
Type: EdA;
Dimensions: 200 x 90; Total Surface: 18362
UTM: 4210108, 410588
Large, slightly elevated area just N of Site 41, and NE of Site 50; the distribution of pottery is practically uninterrupted and thus the boundaries of these 3 sites are arbitrarily determined. Two areas of dense concentration were isolated in the central and southeastern parts. 36 artefacts have been collected, including millstones, pottery slag, one flake of lapis lazuli (Spot. no. 16), one bead of turquoise (No. Inv. 408; Spot no. 17), one plaquette of turquoise (No. Inv. 409; Spot no. 19) and one bronze ring (No. 18) and a basalt pestle (No. Inv. 454; Spot no. 36).
Chronology: Yaz II; Yaz III

Site n°: 161
Denomination: anonymous
Type: Scatter;
Dimensions: 60 x 60; Total Surface: 2530
UTM: 4210224, 411396
Small open area, NE of Site 57, with which it is contiguous. The scatter of pottery was uniform but light. Detailed survey yielded 8 artefacts, including flakes of turquoise, one fragment of lapis lazuli (Spot no. 5), pottery slag and millstones.
Chronology: Yaz II (?); Yaz III

Site n°: 162
Denomination: anonymous
Type: Scatter;
Dimensions: 120 x 40; Total Surface: 3555
UTM: 4210348, 411302
Small open area, NW of Site 57 and bounded on the W and SE by sand-dunes, and on the N by plough-furrows. It is also bisected by a road. Although the outline of the scatter was plotted, no artefacts were found during the survey.
Chronology: Yaz III

Site n°: 163
Denomination: anonymous
Type: Scatter;
Dimensions: 70 50; Total Surface: 2987
UTM: 4210475, 411183
Small flat area to the NW of Site 162, separated from it by a recently cultivated (but presently fallow) field. Seven artefacts

have been collected, including one turquoise flake and several millstones.
Chronology: Yaz II; Yaz III

Site n°: 164
Denomination: anonymous
Type: Scatter;
UTM: 4210302, 411454
Small open area partially covered by sand, with occasional concentrations of pottery. As it was limited in area, its outlines were not drawn, and no artefacts (except pottery) were collected.
Chronology: Yaz I (?); Yaz II

Site n°: 165
Denomination: anonymous
Type: Scatter;
Dimensions: 50 x 30; Total Surface: 1540
UTM: 4209695, 411712
Small, slightly elevated area, partially covered by sand. It is SE of Site 164 and less than 1 km NW of Tepe 90. Although the outlines of the site were drawn, no artefacts (not even pottery) were collected.
Chronology: Yaz II-III

Site n°: 166
Denomination: anonymous
Type: Scatter
Dimensions: 46 x 66; Total Surface: 1650
UTM: 4209750, 411876
Station 104 between Takhirbaj e Site Complex 1.
Chronology: Undetermined

Site n°: 167
Denomination: anonymous
Type: EdA;
Dimensions: 110 x 70; Total Surface: 7340
UTM: 4206226, 416120
Cut off by dunes and road; low medium density of scatter of pottery.
Chronology: Undetermined

Site n°: 168
Denomination: anonymous
Type: LLdA;
Dimensions: 170 x 40; Total Surface: 6295
Chronology: Undetermined
UTM: not recorded
Medium low density scatter of pottery; some millstones.

Site n°: 169
Denomination: Abadjosh
Type: undetermined with square plan
Dimensions: 100 x 100; Total surface: 10000
UTM: 4191860, 429167
Field n°: 328
Chronology: Sasanian; Medieval

Site n°: 170
Denomination: (Uc tepe 10)
Type: Tepe 1;
Dimensions: 90 x 55; Total Surface: 4390
UTM: 4192616, 402044
Tepe completely disturbed by two big canals; very low density of pottery, the top hill has been already excavated by Masimov and Udeomuradov; in the excavation and in the exposed edges of the canal there are many Yaz 1 coarse pottery sherds.
Chronology: Yaz I; Yaz II

Site n°: 171
Denomination: anonymous
Type: Tepe 2;
Dimensions: 100 x 40; Total Surface: 3262
UTM: 4212787, 420354
Low density of scatter of pottery also with Yaz 1 pottery.
Chronology: Yaz I; Yaz III

Site n°: 172
Denomination: anonymous
Type: Tepe 1;
Dimensions: 260 x 150; Total surface: 5371
UTM: 4211585, 426501
Massive square-shaped tepe with a large area around. Together with site 215, 237 and 173 and 174 it looks like a fortress. The top is constituted probably by a rectangular construction whose corner are more visible. High density of pottery has been identified on it with a consistent Yaz III horizon. A large quantity of iron slag has been found in the eastern side still rather elevated above the plain. This elevation continues also to the SE and W side. The rims of three large jars, interred and probably still complete are visible in the flat area SE of the tepe where also the head of an animal figurine (terracotta) has been found. Also a bronze seal (Namazga VI) and a large horizontal knot-handle have been found.
Chronology: LBA; Yaz III; Late Yaz III

Site n°: 173
Denomination: anonymous
Type: Tepe 1;
Dimensions: 300 x 150; Total Surface: 34689
UTM: 4209822, 428089
Large scatter of pottery everywhere. The site is cut off from the following by the same road running to the North to 172, 215 and 237 a serpentinite fragmentary vessel (?) stone (No. Inv. 456) has been collected.
Chronology: Yaz II

Site n°: 174
Denomination: anonymous
Type: Tepe 1;
Dimensions: 200 x 100; Total Surface: 24375
UTM: 4209561, 427883
Large scatter of pottery everywhere. High concentration of pottery slag particularly to the South. Some fragmentary bronzes, a copper slag.
Chronology: Yaz I?

Site n°: 175
Denomination: anonymous
Type: Tepe 1;
Dimensions: 87 x 388; Total Surface: 12839
UTM: 4228453, 415832

Site n°: 175. 2
Type: Tepe 1;
Dimensions: 204 x 178; Total surface: 29287
Chronology: LBA

Site n°: 175. 3
Type: LLdA;
Dimensions: 147 x 72; Total surface: 12628
Chronology: LBA

Large complex of Bronze Age with high density of pottery and remains of a pottery kiln.
Chronology: LBA

Site n°: 176
Denomination: Kelleli 1
Type: Destroyed Tepe;
Dimensions: 220 x 280; Total Surface: 41282
UTM: 4252913, 382166
Excavated by Masimov. Completely destroyed by modern diggings.
Chronology: BA

Site n°: 177
Denomination: Kelleli 3
Type: Tepe;
Dimensions: 216 x 238; Total Surface: 39748
UTM: 4255592, 378937
Excavated by Masimov.
Chronology: BA ?

Site n°: 178
Denomination: Kelleli 4
Type: Tepe;
Dimensions: 314 x 208; Total Surface: 29668
UTM: 4256361, 380181
Chronology: BA

Site n°: 179
Denomination: Taip 1
Type: Tepe 1;
Dimensions: 237 x 234; Total Surface: 33236
UTM: 4235023, 389348
Chronology: LBA

Site n°: 179.1
Type: Tepe 1;
Dimensions: 66 x 53; Total surface: 3365
UTM: 4234985, 389360
Bronze Age large settlement, disturbed by modern construction on the hill top.
Chronology: BA; LBA

Site n°: 180
Denomination: Taip 1 South
Type: Tepe 1
Dimensions: 433 x 195; Total Surface: 75153
UTM: 4234487, 389371
Large site S of Taip with pottery kilns and high density of potsherds.
Chronology: LBA

Site n°: 181
Denomination: Chopli
Type: Tepe 1;
Dimensions: 170 x 115; Total Surface: 18956
UTM: 4224096, 392381
Tepe with medium to high concentration of Iron Age pottery, surrounded by cultivated fields; many millstones have been collected.
Chronology: Yaz II; Yaz III (?)

Site n°: 182
Denomination: anonymous
Type: LLdA;
Dimensions: 190 x 40; Total Surface: 7353
UTM: 4210161, 419233
Very scarce scatter of pottery in a cultivated area.
Chronology: LBA; Yaz I

Site n°: 183
Denomination: anonymous
Type: Scatter;
Dimensions: 80 x 50; Total surface: 3469
UTM: 4209225, 420368
Very scarce scatter of pottery in a cultivated area.
Chronology: Yaz II; Yaz III; Late Yaz III

Site n°: 184
Denomination: anonymous
Type: Tepe 1;
Dimensions: 130 x 130; Total surface: 14292
UTM: 4208085, 420466
Large tepe in a cultivated area with high density of Yaz III pottery.
Chronology: Yaz III

Site n°: 185
Denomination: anonymous
Type: LLdA;
Dimensions: 900 x 150; Total surface: 141751
UTM: 4207836, 420487
Very large site with slight elevations; there are present areas with high density of pottery are separated other with less dense spread. A fragment of bronze strip has been found (ring ?).
Chronology: LBA; Yaz III; Sasanian

Site n°: 186 N
Denomination: anonymous
Type: LLdA;
Dimensions: 169 x 90 m; Total surface: 8875

Site n°: 186 E
Type: LLdA;
Dimensions: 105 x 112; Total surface: 3516

Site n°: 186 W
Type: LLdA;
Dimensions: 80 x 50; Total surface: 7649
UTM: 4208639, 420661
Flat site on sand dunes, probably the continuation of the former surrounding site 184.
Chronology: Yaz II; Yaz III

Site n°: 187
Denomination: anonymous
Type: Tepe 2
Dimensions: 330 x 90; Total surface: 30555
UTM: 4209822, 421541
Double tepe with high concentration of Namazga VI and Yaz I pottery.
Chronology: LBA; Yaz I?; Yaz II; Yaz III; Late Yaz III

Site n°: 188
Denomination: Takhirbaj 3, THR-3
Type: LLdA;
Dimensions: 1000 x 1000; Total surface: 811000
UTM: 4211587, 420652
Tahirbaj 3. Excavated by Masson; Namazga VI pottery. Millstone, Terracotta Ring (Pot stand).
Chronology: LBA; Yaz I

Site n°: 189
Denomination: Takhirbaj 3
Type: LLdA;
Dimensions: 170 x 10; Total surface: 2711
Chronology: LBA;
UTM: 4210929, 420390
Likely the western part of Takhirbaj 3 according to Masson. One complete, perforated terra-cotta disc.

Site n°: 190
Denomination: Togolok 1
Type: Tepe 1;
Dimensions: 301 x 290; Total surface: 75914
UTM: 4219113, 412174
Large settlement, minimum height of 7 One 10 x10 sounding made by Sarianidi. According to P'iankova, levels contemporaneous with Kelleli were reached at the bottomm The surface is very rich. On the southeastern edge, towards an old "well", Cremaschi while looking at the surface found a complete pot inside which were a copper pin and ring. Pin and ring were collected, pot protected and left in situ. 2 Millstones have been found. A perforated flint disc (No. Inv. 345) and a bronze arrow head (No. Inv. 349) have been found.
Chronology: BA; LBA

Site n°: 191
Denomination: Togolok 1
Type: LLdA;
Dimensions: 100 x 65; Total surface: 4719
UTM: 4218983, 412327
Small flat settlement south east of 1.1., on the other side of the "well". Numerous pottery slags, probably a pottery production workshop.
Chronology: BA; LBA

Site n°: 192
Denomination: Togolok 21?
Type: Tepe 2;
Dimensions: 367 x 133; Total surface: 31576
UTM: 4218411, 412535
Low settlement (2 or less) with large excavation of a "temple" by Sarianidi. Large "field" of pottery from the excavations on the western side. Millstone and Pottery slag.
Chronology: BA; LBA

Site n°: 193
Denomination: anonymous
Type: Tepe;
Dimensions: 447 x 145; Total surface: 33729
UTM: 4217228, 413361

Site n°: 193 E
Dimensions: 140 x 130; Total surface: 12376

Site n°: 193 W
Dimensions: 100 x 450; Total Surface: 13907
Large settlement, two kilometres south of 1.1. The highest part to the north is ca. 5 high and there was a 2 x 2 sounding on the top. To the south is an elongated extension, rather low (less than 2). Pottery on the surface is abundant.
Chronology: LBA; Yaz I; Yaz II

Site n°: 194
Denomination: anonymous
Type: Kiln;
Dimensions: 350 x 50; Total surface: 13907
UTM: 4217618, 413383
Elongated flat settlement, NE of A.1. Numerous pottery slags. A small piece of calcite was also found (No. Inv. 365).
Chronology: BA; LBA

Site n°: 195
Denomination: anonymous
Type: Kiln;
Dimensions: 127 x 128; Total surface: 12376
UTM: not recorded
Flat settlement. Very abundant pottery slags and overfired sherds, rubefied sediments and ashes. The whole site was certainly a pottery production workshop.
Chronology: BA; LBA

Site n°: 196
Denomination: Togolok 21
Type: Tepe 1;
Dimensions: 180 x 95; Total surface: 18111
UTM: 4217917, 411802
Large settlement with fortress excavated by Sarianidi. The walls of the inner "castle" have been restored on ca 1 height. The circular "altar" to the NE is still visible and the "haoma jars" are still there, broken at the bottom Surface completely disturbed by the excavations.
Chronology: LBA

Site n°: 197
Denomination: anonymous
Type: LLdA (?);
Dimensions: 150 x 69; Total surface: 6576
UTM: 4218302, 411775
Large flat settlement with many overfired sherds and pottery slags, certainly a pottery production workshop. A kiln has been excavated on the western edge. It is still well preserved, ca 0.9 x 1.4, almost 1m deep but the bottomm was full of shrubs and not observed. The kiln was built with bricks of an appro ximate Dimensions ca. 35 x20 x10. A second kiln was excavated on the north eastern corner, and two 2 X2 soundings on the southern part.
Chronology: LBA

Site n°: 198
Denomination: anonymous
Type: Kiln;
Dimensions: 70 x 17; Total surface: 925
UTM: 4219214, 412731
Flat area, certainly a pottery production workshop. A 2 x 2 sounding, completely filled now, mainly yielded pottery slags judging by the earth surrounding the sounding.
Chronology: LBA

Site n°: 199
Denomination: anonymous
Type: Kiln;
Dimensions: 217 x 90; Total surface: 16315
UTM: 4219214, 412731
Large flat area with extremely abundant pottery slags, burnt pieces of kilns and overfired pottery. One of the kilns was excavated and although the sounding (3 x 3 m) is almost filled in, it seems very similar to that observed on 21.1. All the area is a large pottery production workshop. Outside the northern tip of the site, another pottery kiln was excavated, that has been individualized in the GPS survey, but clearly belongs to the site. A big bronze nail (No. Inv. 361), a vessel fragment in marble (No. Inv. 363) and a polished object in calcite (No. 364)

have been found.
Chronology: LBA

Site n°: 200
Denomination: anonymous
Type: Kiln;
Dimensions: 200 x 45; Total surface: 6820
UTM: 4219539, 412612
Small flat site, two excavations on pottery kilns. Pottery production workshop.
Chronology: LBA

Site n°: 201
Denomination: anonymous
Type: EdA;
Dimensions: 63 x 29; Total surface: 1281
UTM: 4220190, 412373
Low site (c. 2) almost completely covered by a barkhan. Usual indicators of pottery production seem absent. The site may have been more extended than the sand allows to see.
Chronology: LBA

Site n°: 202
Denomination: anonymous
Type: EdA;
Dimensions: 44 x 80; Total surface: 2421
UTM: not recorded
Small, slightly elevated area surrounded by sand dunes and located just beyond a new canal going from Site Complex 1 to the Durnaly Canal. The scatter of pottery is low to medium in density. Detailed survey has been conducted and 11 millstones were found.
Chronology: Yaz III; Parthian-Sasanian

Site n°: 203
Denomination: anonymous
Type: Tepe 2;
Dimensions: Total surface: 61890
UTM: 4211144, 411448
Large flat area with a dense scatter of pottery around a shallow mound with an even higher concentration of ceramics. The area is located NE of Site 202 and is surrounded by dunes on the W side and by plough furrows on the South. Detailed survey was conducted mainly on the central mound, where 29 objects were found. The latter included 1 lapis fragment (Spot no. 2), some bronze fragments, and a single turquoise flake (Spot no. 22), in addition to several millstones. A iron blade fragment (No. Inv. 417; Spot no. 5) has been also found. Another area with a relatively large quantity has also been found to the south. The site is abutting on Site 204, which is to the North.
Chronology: Yaz I; Yaz II; Yaz III?

Site n°: 204
Denomination: anonymous
Type: EdA;
Dimensions: 240 x 85; Total surface: 33654
UTM: 4211380, 411280
Very large flat area with a high concentration of pottery, with a particularly high density near a shallow central mound. The site is practically continuous with Site 205 (to the E). Detailed survey registered 109 findspots, including millstones, 1 grooved lapis bead (No. 13) and a large number of turquoise flakes (more than 50), concentrated especially in the NE part of the site. The significance of such a large number of flakes and unfinished beads is not yet clear, although an industrial area is perhaps indicated by the Two turquoise beads (Nos. Inv. 42 and 413; Spots no. 101) a blue frit segmented bead (No. Inv. 414; Spot no.80) and a bronze rod fragment (No. Inv. 415; Spot no. 54), a blocklet of vitrified flint (No. Inv. 416; Spot. no. 8), have been also collected.
Chronology: Yaz II; Yaz III

Site n°: 205
Denomination: anonymous
Type: LLdA;
Dimensions: 70 x 40; Total surface: 1904
UTM: 4210579, 116371
Small flat area, partially covered by sand with a low density of ceramics. It is cut by the newly dug canal and some ceramics were found in situ in the walls of the canal. Although the limits of the site were delineated and pottery was collected, no other artefacts have been found.
Chronology: Yaz I; Yaz II

Site n°: 206
Denomination: anonymous
Type: EdA;
Dimensions: 350 x 150; Total surface: 38669
UTM: 4211515, 411376
Very large, slightly elevated site with a very high density of pottery, particularly at the center, decreasing sharply to the north. The area is practically contiguous with Site 204. Detailed survey, in the central area, registered 59 findspots, among which 2 bracelets of bronze (Spots nos. 2 and 29), 1 stone vessel fragment (Spot no. 5), several iron fragments, 2 bronze arrowheads (Spots nos. 12 and 54), 1 small bronze bell (Spot no. 36), and several millstones. A point flaring from round section rod in iron (No. Inv. 418; Spot no.53), three bronze bangle fragments (No. Inv. 449; Spot no. 2; 450; Spot no.13; 451; Spot no.29), a conical bronze object perforated on top (No. Inv. 452; Spot no. 36) wall fragment from soapstone vessel (No. Inv. 459; Spot no. 5) a iron tube (No. Inv. 461; Spot no. 1)
Chronology: Yaz III

Site n°: 207
Denomination: anonymous
Type: Tepe 2;
Dimensions: 190 x 115; Total surface: 20527
UTM: 4207849, 418807
Tepe with medium concentration of pottery cut by a canal in the western part and disturbed by cultivation in the southern.
Chronology: Undetermined

Site n°: 208
Denomination: anonymous
Type: LLdA;
Dimensions: 320 x 130; Total surface: 36535
UTM: 4210658, 413421
Very large, flat area with a high concentration of ceramics near the center. It is partially covered by sand dunes and disturbed by two roads running across it. Detailed survey located 47 findspots, with a high concentration of pottery slag near the center, and the usual millstones. It is located very close to the tepe no.55.
Chronology: Yaz III; Late Yaz III

Site n°: 209
Denomination: anonymous
Type: LLdA;
Dimensions: 200 x 60; Total surface: 11400

UTM: 4201804, 425975
Small flat area on the outer part of Antiochus's wall; low density of artifacts.
Chronology: Yaz III

Site n°: 210
Denomination: anonymous
Type: LLdA;
Dimensions: 200 x 40; Total surface: 9468
UTM: 4200195, 430001
Flat area with a very low density of sherds.
Chronology: Yaz III

Site n°: 211
Denomination: anonymous
Type: LLdA;
Dimensions: 600 x 300; Total surface: 185335
UTM: 4203043, 430066
Flat area with a medium to low density of sherds bisected by sanddunes. One millstone has also been found.
Chronology: Late Yaz III; Parthian-Sasanian

Site n°: 212
Denomination: anonymous
Type: EdA (?);
Dimensions: 1000 x 600; Total surface: 594771
UTM: 4205979, 429957
Complex large site with many slow elevations bisected by sanddunes; large jars, iron, pottery slag, one lapislazuli fragment (No. Inv. 425), a bronze object (No. Inv. 426), a bronze bangle (No. Inv. 427) a bronze blade (No. Inv. 431) millstone, iron slag, an sandstone object (No. Inv. 432) have been also collected.
Chronology: Yaz I; Yaz III; Late Yaz III; Parthian-Sasanian

Site n°: 213
Denomination: anonymous
Type: EdA (?);
Dimensions: 2000 x 700; Total surface: 945235
UTM: 4208302, 429555
Very complex large site with many slow elevations bisected by sanddunes. Pottery slag.
Chronology: Yaz III

Site n°: 214
Denomination: anonymous
Type: EdA;
Dimensions: 350 x 200; Total surface: 48844
UTM: 4213066, 426266
Area with two small elevations; there are also some terra-cotta slabs.
Chronology: Yaz III; Late Yaz III

Site n°: 215
Denomination: anonymous
Type: Fortress, Tepe;
Dimensions: 140 x 150; Total surface: 20190
UTM: 4213585, 425577
Large elevated square-shaped site with dense scatter of pottery. The architectonic characteristics of the monument allows one to consider it as a fortress. There are different areas of concentration of surface materials among which bricks and terra-cotta slabs. The main part of pottery belongs to Yaz II-III horizon with a consistent part of tardive materials, i.e. Parthian and Sasanian with the characteristic large vertical handle, monochrome and bichrome glazed pottery. The monument is located 2.5 km ca. to NW from site 237 and 2.5 km to SE from the site 172. The general plan presents to its SE side a quadrangular extension and has, as it has been also recognized from a plane, a kind of two curtain wall. The low building looks like a fortress and can be connected with a general defensive line against the steppe area. A pottery sherd with mark and a small boiling sherd have been also found. A whetstone pebble of flint (No. Inv. 435) a blade fragment of iron (No. Inv. 436) a bronze ring (No. Inv. 443).
Chronology: Yaz III; Late Yaz III

Site n°: 216
Denomination: anonymous
Type: LLdA;
Dimensions: 170 x 120; Total surface: 16803
UTM: 4213830, 425028
Small area with high density of sherds and bricks surrounded by sanddunes. A bronze bangle has been also found.
Chronology: Undetermined

Site n°: 217
Denomination: anonymous
Type: LLdA;
Dimensions: 300 x 70; Total surface: 16223
UTM: 4209170, 429012
Flat site with medium to low density of sherds.
Chronology: Yaz III

Site n°: 218
Denomination: anonymous
Type: LLdA;
Dimensions: 120 x 100; Total surface: 16659
UTM: 4209366, 428806
Flat site with medium density of sherds.
Chronology: Late Yaz III

Site n°: 219
Denomination: anonymous
Type: Tepe 1;
Dimensions: 130 x 60; Total surface: 7745
UTM: 4209453, 426677
Small steep-sided tepe in the middle of a flat area covered by a quite dense scatter of sherds. The monument almost circular has probably been a tower inside the military system of frontier defense. Among the finds one carnelian bead not yet perforated (No. Inv. 440) and a polisher stone have been collected.
Chronology: Yaz III; Late Yaz III

Site n°: 220
Denomination: anonymous
Type: EdA;
Dimensions: 140 x 170; Total surface: 24656
UTM: 4209440, 428451
Area with two small elevations characterized by a bead-making atelier and some pottery slag on the southern part. A bronze strip (No. Inv. 220) a bronze ring (No. Inv. 438) have been also collected.
Chronology: Yaz III

Site n°: 221
Denomination: anonymous
Type: EdA;
Dimensions: 40 x 50; Total surface: 1771
UTM: 4213527, 425881
Slightly elevated area with medium to low density of pottery.

A bronze bangle (No. Inv. 433) has been also collected.
Chronology: Yaz III

Site n°: 222
Denomination: anonymous
Type: LLdA (?);
Dimensions: 130 x 80; Total surface: 11099
UTM: 4216799, 424750
Small area of emerging pottery sherds in sanddunes. Kiln and lumps of burnt clay have been also found. A bronze arrowhead has been also found (No. Inv. 428).
Chronology: Yaz III; Late Yaz III

Site n°: 223
Denomination: anonymous
Type: EdA;
Dimensions: 280 x 90; Total surface: 28914
Area: 223 E
Type: Spot (PN 125);
UTM: 4217893, 423909
Slightly elevated low to medium density of pottery cut by sanddunes. Iron slag. A bronze ring (No. Inv. 437) has been also collected.
Chronology: Late Yaz III

Site n°: 224
Denomination: anonymous
Type: EdA;
Dimensions: 140 x 90; Total surface: 16507
UTM: 4214556, 423334
Elevated area with high concentration of pottery sherds. The area is practically bisected by sanddunes. A chalcedony bead (No. Inv. 439) a bronze fragment (No. Inv. 441) a flat piece of bronze (No. Inv. 442). two soapstone fragments of vessels (No. Inv. 445, 446), a perforated shell fragment (No. Inv. 447) have been also collected.
Chronology: Undetermined

Site n°: 225
Denomination: anonymous
Type: EdA;
Dimensions: 220 x 50; Total surface: 8988
UTM: 4214693, 423196
Small elevated area with medium density of pottery. One Andronovo sherd has been also found.
Chronology: Yaz III; Late Yaz III

Site n°: 226
Denomination: anonymous
Type: LLdA;
Dimensions: 64 x 64 m; Total surface: 3251
UTM: 4213495, 421468
Small flat area with dense scatter of pottery exclusively belonging to Yaz I horizon. A bronze rivet (No. Inv. 448) has been also found.
Chronology: LBA; Yaz I

Site n°: 227
Denomination: anonymous
Type: LLdA + EdA;
UTM: 4212891, 420632
Dimensions: 400 x 80; Total surface: 32715
One slightly elevated area with medium to high scatter of pottery, located along the eastern side of a canal of the Ashabad eastern bypass. A bronze plaque (No. Inv. 444) with Yaz I to the South (LLdA;) and Yaz II-III to the North.
Chronology: Late Yaz III; Parthian-Sasanian

Site n°: 228
Denomination: anonymous
Type: LLdA;
Dimensions: 130 x 50; Total surface: 5792
UTM: 4209541, 416315
Flat area with medium density of pottery.
Chronology: Yaz III

Site n°: 229
Denomination: anonymous
Type: Spot;
UTM: 4209931, 416267
Small area 30 x 30 m with low density of pottery in a cultivated field.
Chronology: Undetermined

Site n°: 230
Denomination: anonymous
Type: LLdA;
Dimensions: 120 x 50; Total surface: 5685
UTM: 4210052, 416368
Area in a flat plough takyr with low to medium density of pottery.
Chronology: Undetermined

Site n°: 231
Denomination: anonymous
Type: EdA;
Dimensions: Total surface:
UTM: 4219397, 419222
Slightly elevated area with medium density of Yaz III and later pottery and pottery slag.
Chronology: Yaz III

Site n°: 232
Denomination: anonymous
Type: LLdA + EdA;
Dimensions: 247 x 68; Total surface: 15647
UTM: 4220834, 418110
Very large site of Bronze Age just before the bridge to the Gonur brigade with a small mound in the southern part; high density of pottery with pottery slags.
Chronology: LBA; Yaz II-III

Site n°: 233
Denomination: anonymous
Type: EdA;
Dimensions: 119 x 77; Total surface: 7761
UTM: 4226291, 416311
Slightly elevated area with low density of pottery, cut off by a canal in the western part. One Andronovo sherd has been also found.
Chronology: LBA

Site n°: 234
Denomination: anonymous
Type: Tepe 1;
Dimensions: 355 x 144; Total surface: 52647
UTM: 4229365, 422843
Jakiper tepe (cf. Masson 1959); many pottery kilns with a medium to high density of pottery and pottery slag.
Chronology: Sasanian and Islamic

Site n°: 235
Denomination: anonymous
Type: EdA;
Dimensions: Total surface:
UTM: 4231488, 423643
Two small pottery kilns with some Sasanian and mediaeval pottery.
Chronology: Sasanian and Islamic

Site n°: 236
Denomination: anonymous
Type: Tepe 2 (?)
Dimensions: 60 x 30; Total surface:1545
UTM: 4227794, 422760
Many scatters of pottery emerging from sanddunes; Late Bronze Age pottery and Andronovo type sherds have been found.
Chronology: LBA

Site n°: 237
Denomination: anonymous
Type: EdA;
Dimensions: 230 x 70; Total surface: 20957
UTM: 4215990, 424932
Large slightly elevated site with different areas with concentration of pottery. In one of these areas a fragmentary clay bulla of probably neo-babylonian style has been found very close to a rim of jar. The object in this site, a probably defensive outpost in the same line of the other fortress-sites (215, 172, 173, 174) allow one to suggest a particular importance of the area even in administrative control.
Chronology: Yaz II-III

Site n°: 238
Denomination: anonymous
Type: LLdA;
Dimensions: 250 x 30; Total surface: 13139
UTM: 4193947, 403531
Flat area with medium density of pottery, small elevations in the southern part with Yaz 1 materials.
Chronology: Yaz I; Yaz II

Site n°: 239
Denomination: anonymous
Type: Spot
Dimensions: Total surface:
UTM: 4193391, 402922
Pottery kiln with Yaz I pottery.
Chronology: Yaz I

Site n°: 240
Denomination: anonymous
Type: EdA;
Dimensions: 150 x 90; Total surface: 13833
UTM: 4193081, 402618
Slightly elevated site (Tepe?) with medium density of pottery; a biconical stone projectile and a fragment of a white stone vessel.
Chronology: LBA; Yaz I

Site n°: 241
Denomination: anonymous
Type: Tepe 1;
Dimensions: 80 x 50; Total surface: 3093
UTM: 4194315, 403655
A circular tepe surrounded by cultivation with medium to high density of pottery disturbed in the northern side by a modern trench. One frasgmert of incised coarse ware of steppe tradition (Andronovo)
Chronology: Yaz III; Late Yaz III

Site n°: 242
Denomination: anonymous
Type: Tepe 2
Dimensions: 90 x 90; Total surface: 7286
UTM: 4192693, 404861
Two small elevated areas in the SW corner of a modern Kazakh village and surrounded by cultivated fields. The surface is densely disturbed with medium to low density.
Chronology: Yaz II; Yaz III

Site n°: 243
Denomination: anonymous
UTM: not recorded
Chronology: Sasanian; Islamic

Site n°: 244
Denomination: anonymous
UTM: not recorded
Chronology: Yaz I; Yaz III?; Sasanian ?

Site n°: 245
Denomination: anonymous
UTM: not recorded
Chronology: LBA;Yaz I?; Sasanian

Site n°: 246
Denomination: anonymous
UTM: not recorded
Chronology: Yaz III; Sasanian

Site n°: 247
Denomination: anonymous
UTM: not recorded
Chronology: Sasanian; Islamic

Site n°: 248 (Trench on the Antiochus Wall)
Chronology: Yaz I

Site n°: 249 (Kellagi).
Denomination: anonymous
Type: Scatter;
Dimensions: Dia 30 c.; Total surface: 700 ?
UTM: not recorded
Low density scatter of pottery. Bronze Age with four potsherds of "Andronovo" ware type. Also some Islamic period pottery is documented.
Chronology: BA; Islamic

Site n°: 250
Denomination: anonymous
Type: LLdA;
Dimensions: 190 x 80; Total surface: 15357
UTM: 4207689, 417896
Flat takyr south of site 207, partially covered by cultivation, with medium to low density of pottery. A mace head (No. Inv. 322) has been also found.
Chronology: Yaz III

Site n°: 251
Denomination: anonymous
Type: LLdA;

Dimensions: 170 x 150; Total surface: 24876
UTM: 4216650, 420416
Flat takyr, partially covered by sand dunes, with some areas of Namaga VI pottery and two Andronovo-type sherds.
Chronology: LBA; Sasanian

Site n°: 252
Denomination: anonymous
Type: EdA;
Dimensions: 250 170; Total surface: 43657
UTM: 4216805, 420669
Large slightly elevated site consisting of pottery kilns and areas of overfired bricks. Mainly Namazga VI pottery has been collected and few late (Parthian?) large vertical handles.
Chronology: LBA; Parthian

Site n°: 253
Denomination: anonymous
Type: EdA;
Dimensions: 100 x 30; Total surface: 3712
UTM: 4216805, 420721
The site consists in a small elevated area with brick kiln. No sherds have been collected. The pro ximity of this site to the 252, 67 and 69 sites suggest the identification with a Namazga VI kiln.
Chronology: LBA

Site n°: 254
Denomination: Akcha depe
Type: tepe
Dimensions: 272 x 282; Total surface: 46494
UTM: not recorded
Thin scatter of pottery of Yaz II-III.
Chronology: Yaz II-III

Site n°: 255
Denomination: Uch-depe South
Type: tepe with irregular plan
Dimensions: 40 x 30; Total surface: 1200
UTM: 4202366, 402381
Field n°: 201
Chronology: Early Iron Age

Site 256
Denomination: Uch-depe Centre
Type: tepe 1with square plan
Dimensions: 100 x 90; Total surface: 9000
UTM: 4203290, 401794
Field n°: 200
Chronology: Early Iron Age

Site n°: 257
Denomination: Uch-depe North
Type: tepe1 with square plan
Dimensions: 80 x 70; Total surface: 5600
UTM: 4203482, 401623
Field n°: 199
Chronology: Early Iron Age

Site n°: 258
Denomination: Aravali Depe
Type: Tepe 1;
Dimensions: 100 x 90; Total surface: 8169
UTM: 4198734, 377265
Low density of scatter of pottery. To SE-NW are also present other small elevations. The cultural horizon from the pottery collected is Yaz II. One Yaz I painted rim and one rim of Sasanian Age are also found.
Chronology: Yaz I-II; Sasanian

Site n°: 259
Denomination: Kushbeghe
Type: Tepe 2;
Dimensions: Diam 30 c.; 40 20; Total surface: 8169
UTM: 4205813, 374600
Small Dimensions tepe, 4 m ca. high. Low scatter of pottery mainly in the flat area around.
Chronology: Yaz III

Site n°: 260
Denomination: Turgaj Complex
Type: Tepe 2
Dimensions: 200 x 40 m; Total surface: 10848
Coord UTM: 4177416, 391603
Large Dimensions tepe, 2 m ca high; many others architectural features are also found. The whole complex seems to belong to Parthian and Sasanian time and it seens to be extended further of the channel and it can be part of a inner larger settlement where the central point could be the tepe. May be it is a Ribat or a town. Some tin-glazed pottery sherds of Islamic period are also found.
Chronology: Partho-Sasanian

Site n°: 261
Denomination: Turgai tepe
Type: Tepe 1;
Dimensions: 160 x 90; Total surface: 12822
Coord: 4177734, 391203
Large Dimensions tepe strictly connected with the 260 site of which it can represent the citadel. Low density of scatter of pottery. The pottery collected mainly belongs to Sasanian time, but there is also some earlier and later Medieval fragments.
Chronology: Partho-Sasanian

Site n°: 262
Denomination: Kynchagan Tepe
Type: Tepe 2;
Dimensions: 100 x 70; Total surface: 4857
Coord: 4187402, 390111
Small Dimensions tepe with low density of scatter of pottery, almost completely covered by vegetation. The site is situated about 5 km from the turning point of the route runnng to West. Parthian period.
Chronology: Parthian

Site n°: 263
Denomination: anonymous
Type: undeterrmined
UTM: not recorded
One fragment of incised coarse ware (Andronovo)
Chronology: LBA; Yaz1?

Site n°: 264
Denomination: Serdar'jab
Type: Scatter;
Dimensions: Total surface:
UTM: not recorded (Cf. map 1:100.000; 5-41-89)
In a section along trench canal, 1 fireplace in front excavated from the palaeosoil at -3 m from the present plain. Bronze Age with some Andronovo-type pottery sherds.
Chronology: BA

Site n°: 265
Denomination: anonymous
Type: undetemined
UTM: not recorded
North of Gonur/ cf. map flat site W. High density; it comes to light x 50 cm along the canal; Bronze + Yaz I/II (?). A restorated vessel from 93.
Chronology: BA; Yaz I-II

Site n°: 266
Denomination: anonymous
Type:
UTM: not recorded
Canal North of Garry Kishman; covered site from 2 to 5 kms of site 309.
Chronology: Yaz III

Site n°: 267 (Jassi Tepe)
Denomination: anonymous
Type: Tepe 1;
Dimensions: 150 x 120; Total surface: 13708
UTM: 4175186, 398673
Large Dimensions tepe, 5 c. high, completely surrounded by cotton fields. Low density of scatter of pottery dating from Sasanian to Medieval.
Chronology: Yaz III; Late Yaz III; Parthian-Sasanian

Site n°: 268
Denomination: anonymous
Type: Tepe 1;
Dimensions: 93 x 93;Total surface: 6960
UTM: 4173084, 396657
Medium Dimensions tepe, 3 m ca high. Low density of scatter of pottery of Parthian Sasanian time. A flat area around shows clear indications of modern graves and very few pottery fragments of the same period.
Chronology: Parthian-Sasanian

Site n°: 269
Denomination: Koshadja S
Type: Tepe 1;
Dimensions: 100 x 90;Total surface: 6911
UTM: 4180844, 396612
Large Dimensions quadrangular-shaped depe 1, about 4 m high, surrounded by cotton fields located just in the northern end of the sovkhoz Soviet Turkmenistan. Parthian Sasanian, located just beside a modern cenetery near the sovkhoz. The sloping edges and the top are covered by vegetation. Medium density of scatter of pottery (Parthian-Sasanian time). Also on the top there are some modern graves.
Chronology: Late Yaz III; Parthian-Sasanian

Site n°: 270
Denomination: Koshadja N
Type: Tepe 1;
Dimensions: 130 x 100 m; Total surface: 10163
UTM: 4182012, 396405
Chronology: Late Yaz III; Parthian-Sasanian

Site n°: 271
Denomination: Kara Tepe
Type: Tepe 1;
Dimensions: 150 x 140 m; Total surface: 16154
UTM: 4182015, 385234
Chronology: Undetermined

Site n°: 272
Denomination: Dashli tepe, 1, Middle
Type: Tepe 2;
Dimensions: 70 x 60; Total surface: 3376
UTM: 4200864, 374511
Medium Dimensions tepe, 3 m. c. high, covered almost totally by vegetation, located along the route apro ximately between Aravali and Kushbeghe. The chronology of the pottery collected ranges between Yaz III time.
Chronology: Yaz III

Site n°: 273
Denomination: Dashli tepe, 2, Northern
Type: Tepe 2;
Dimensions: Total surface:
UTM: 4201793, 374818
Very destroyed mound, hardly recognizable on the right side of the route running northward from Lenin Ely to Gaz Station. The chronology of the pottery collected ranges between Yaz II-III.
Chronology: Yaz II

Site n°: 274
Denomination: Dashli Tepe 3 Southern
Type: Tepe 2;
Dimensions: Total surface:
UTM: 4197905, 375395
Very large Dimensions tepe, 3 m ca high, partly destroyed by two parallel routes runnning NS. The pottery collected ranges between Yaz II-III.
Chronology: Yaz III

Site n°: 275
Denomination: anonymous
Type: Tower
Dimensions: Total surface:
UTM:
Trial Trench on supposed tower on the Anthiocus wall. Located 2,5 km NW of site no 148.
Chronology: Yaz III; Parthian-Sasanian

Site n°: 276
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 150 x 100; Total surface: 15000
UTM: 4216054, 439284
Field n°: 434
Chronology: Medieval

Site n°: 277
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 300 x 250; Total surface: 75000
UTM: 564215818, 431342
Field n°: 433
Chronology: Sasanian (?); Medieval

Site n°: 278
Denomination: Kelteminara, south- eastern settlement
Type: undetermined with irregular plan
Dimensions: 150 x 1300; Total surface: 195000
UTM: 4138377, 413508
Field n°: 432
Chronology: Medieval

Site n°: 279
Denomination: Kelteminara, eastern kala
Type: kala with square plan
Dimensions: 50 x 50; Total surface: 2500
Field n°: 431
UTM: 4138870, 413764
Chronology: Medieval

Site n°: 280
Denomination: anonymous
Type:
Dimensions: 201 x 221; Total surface: 37319
Chronology: Undetermined
UTM: 4221142, 417434

Site n°: 281
Denomination: Kelteminara, eastern settlement
Type: undetermined with irregular plan
Dimensions: 100 x 1200; Total surface: 120000
UTM: 4138962, 414205
Field n°: 430
Chronology: Medieval

Site n°: 282
Denomination: anonymous
Type: Undetermined
Dimensions:158 x 231; Total surface: 30561
UTM: 4221483, 416989
Chronology: Undetermined

Site n°: 283
Denomination: anonymous
Type: Scatter LdA;
Dimensions: 52 x 70; Total surface: 4257
UTM: 4223359, 417038
High density scatter of pottery. Late Bronze Age and Yaz I. Painted Yaz I sherds are present.
Chronology: LBA; Yaz I

Site n°: 284
Denomination: anonymous
Type: Undetermined
Dimensions: 101 x 316; Total surface: 29277
UTM: 4225239, 415652
Chronology: Undetermined

Site n°: 285
Denomination: Egri Bogaz 1
Type: Tepe 2;
Dimensions: 135 x 163; Total surface: 20287
UTM: 4245488, 400257
In 1980 Masimov did a test-trench 2 m x 2 m wide discovering a 1.20 deep archaeological deposit. Now the site is partially under plough. The pottery collected belongs to Namazga V horizon.
Chronology: BA; LBA

Site n°: 286
Denomination: Egri Bogaz 2
Type: Tepe 2;
Dimensions: 99 x 160; Total surface: 11487
UTM: 4245193, 400957
Also here in 1980 Masimov did a test-trench (now not any more visible) 2 m x 2 m wide discovering a 1.20 m deep archaeological deposit. Now the site is partially under plough. The pottery collected belongs to Namazga V horizon.
Chronology: BA; LBA

Site n°: 287
Denomination: Egri Bogaz 3
Type: Tepe 2;
Dimensions: Total surface:
UTM: 4244255, 402025
Very low site completely covered by ploughing furrows. The chronological horizon is Namazga V and partially VI.
Chronology: BA; LBA

Site n°: 288
Denomination: Egri Bogaz 4
Type: Tepe 1;
Dimensions: 326 508; Total surface: 134814
UTM: 4250329, 396279
Tepe high 4-5 c., with a large flat area around; the site is almost covered by dune and it is visible only on the part cut by gas pipeline.
Chronology: BA; LBA

Site n°: 289
Denomination: Kara-Jurme (Kakly-depe), shakhristan
Type: tepe with square plan
Dimensions: 150 x 150; Total surface: 22500
UTM: 4164486, 410412
Field n°: 150
Chronology: Medieval

Site n°: 290
Denomination: Kelteminara, rabat
Type: undetermined with rectangular plan
Dimensions: 140 x 130; Total surface: 18200
UTM: 4138976, 413026
Field n°: 427
Chronology: Medieval

Site n°: 291
Denomination: Kelteminara, southern settlement
Type: undetermined with irregular plan
Dimensions: 40 x 60; Total surface: 2400
Field n°: 428
UTM: 4138563, 413647
Chronology: Medieval

Site n°: 292
Denomination: Kelteminara, north- eastern settlement
Type: undetermined with irregular plan
Dimensions: 400 x 150; Total surface: 60000
UTM: 4139249, 413688
Field n°: 429
Chronology: Medieval

Site n°: 293
Denomination: Kelteminara, shakhristan
Type: undetermined with rectangular plan
Dimensions: 290 x 270; Total surface: 78300
UTM: 4138683, 413296
Field n°: 426
Chronology: Sasanian, Medieval

Site n°: 294
Denomination: Khodja Jusuf mausoleum
Type: mausoleum with rectangular plan
Dimensions: 50 x 70; Total surface: 3500
UTM: 4169539, 426789

State of preservation at the moment of survey: restored
Field n°: 203
Chronology: Medieval

Site n°: 295
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 80 x 100; Total surface: 8000
UTM: not recorded
State of preservation at the moment of survey: bad
Field n: 130
Chronology: Medieval

Site n°: 296
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 100 x 100
UTM: not recorded
Field n: 122
Chronology: Sasanian; Medieval

Site n°: 297
Denomination: Kelteminara, depe
Type: tepe with rectangular plan
Dimensions: 115 x 125; Total surface: 14375
UTM: 4138957, 413483
Field n°: 425
Chronology: Parthian (?), Sasanian, Medieval

Site n°: 298
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 300 x 400; Total surface: 120000
UTM: not recorded
Field n°: 93
Chronology: Medieval

Site n°: 299
Denomination: Yaz-depe
Type: tepe 2
Dimensions: 520 x 280
UTM: 4194921, 411141
Field n°: 47
Chronology: Early Iron Age

Site n°: 300
Denomination: anonymous
Type: Tepe 2;
Dimensions: Total surface:
UTM: 4223946, 409473
Low tepe with large flat area around with medium scatter of pottery. Late Bronze Age ?
Chronology: LBA

Site n°: 301
Denomination: anonymous
Type: Scatter LdA;
UTM: 4235749, 442482
Low density scatter of pottery.
From drawings different chronology: LBA, Yaz 1
Chronology: Yaz III

Site n°: 302
Denomination: anonymous
Type: Pottery Kilns
Dimensions: Total surface: 2931
UTM: 4217297, 419268
The structures are located to the West of site no 67.
Chronology: Undetermined

Site n°: 303
Denomination: anonymous
Type: Scatters LdA
Dimensions: Total surface:
UTM: 4228049, 422460
Low density scatter of pottery with coarse ware (Andronovo ?) between sand dunes north of 236 Bronze Age site.
Chronology: LBA;Yaz I

Site n°: 304
Denomination: anonymous
Type: Scatter LdA;
UTM: not registered
Low density scatter of pottery.
Chronology: Unetermined

Site n°: 305
Denomination: Dzin Tepe
Type: Tepe 2;
Dimensions: 90 x 80; h. 3,5; Total surface: 6462
UTM: 4178831, 399446
Low-middle density of pottery among which some fragments of glazed potsherds have been also found. A flat area is located around to the west, partly disturbed by agricultural works. To SE also a small elevation is present with scatter of pottery. Mrs Pugachenkova published in Jutake some terracotta figurines and architectural feature. Parthian Sasanian time.
Chronology: LBA?; Partho-Sasanian;

Site n°: 306
Denomination: anonymous
Type: Scatter LdA;
Dimensions: 15 x 15; Total surface: 230
UTM: 4204892, 424583
Low density scatter of pottery of Bronze, Parthian, and Islamic Age.
Chronology: late Yaz III;

Site n°: 307
Denomination: anonymous
Type: Tepe 2
Dimensions: 70 x 70; h. c. 2 or 3; Total surface: 6231
UTM: 4206218, 424431
Chronology: Late Yaz III; Parthian-Sasanian

Site n°: 308
Denomination: anonymous
Type: Scatter HdA buried
UTM: 4208594, 422889
The site is buried below eolian sand and it lies at the top of a fine grain textured fluviatile sequence. Late Bronze Age
Chronology: LBA;

Site n°: 309
Denomination: anonymous
Type: Scatter;
UTM: 4201461, 429958
Low density scatter of pottery
Chronology: Undetermined

Site n°: 310
Denomination: anonymous

Type: Scatter;
Dimensions: Dia 400 c.; Total surface:
UTM: 4199621, 431665
High Density area. Yaz III
Chronology:Yaz III;

Site n°: 311=55.3
Denomination: anonymous
Type: Buried;
UTM: 4210215, 412666
Pluristratified sites ranging from Bronze to Iron Age. Sherds and bones are included in a fluviatile sequence
Chronology: BA-IA;

Site n°: 312=193
Denomination: anonymous
Type: Tepe 2;
Dimensions: h 4 x Diam 150; Total surface::
UTM: 4270089, 377162
Chronology: BA;

Site n°: 313
Denomination: anonymous
Type: Scatter;
UTM: 4246700, 434444
Low density of scatter of pottery
Chronology: undetermined

Site n°: 314
Denomination: anonymous
Type: Scatter;
Dimensions: Total surface::
UTM: 4247064, 435012
Low density of pottery; also material of Islamic Age
Chronology: Islamic

Site n°: 315
Denomination: anonymous
Type: Kiln;
UTM: 4219089, 431233
Chronology: Medieval

Site n°: 316
Denomination: anonymous
Type: Tepe 2 ?
Dimensions: 150 x 70; Total surface:
UTM: 4208333, 429235
Chronology: Late Yaz III

Site n°: 317
Denomination: anonymous
Type: Scatter;
Dimensions: Total surface::
UTM: 4270089, 377162
Low density scatter of pottery. Bronze Age ?
Chronology: BA

Site n°: 318
Denomination: anonymous
Type: Scatter;
Dimensions: Total surface:
UTM: 4274614, 368090
Low Density of scatter of pottery.
Chronology: Yaz III?

Site n°: 319
Denomination: anonymous
Type: Scatter;
Dimensions: Total surface:
UTM: 4279630, 370694
Low Scatter of pottery. Bronze Age with one Andronovo-type sherd ?
Chronology: BA

Site n°: 320
Denomination: anonymous
Type: Scatter;
Dimensions: Total surface:
UTM: 4283362, 373880
Low Density scatter of Pottery. Partho-Sasanian and medieval
Chronology: Partho-Sasanian; Islamic

Site n°: 321
Denomination: anonymous
Type: Scatter;
Dimensions: 20 x 10; Total surface: 357
UTM: 4216271, 420187
High density of Scatter. Andronovo between sand dunes south of site no. 69.
Chronology: LBA; Andronovo

Site n°: 322
Denomination: anonymous
Type: Scatter HdA;
Dimensions: Total surface:
UTM: 4215716, 420160
High density of scatter of pottery. Some fragments of incised coarse ware (Andronovo) between sand dunes south of site no. 69.
Chronology: LBA, Yaz I

Site n°: 323
Denomination: anonymous
Type: Scatters HdA
Dimensions: 184 x 194; Total surface: 21250
UTM: 4206122, 414378
High density areas of pottery in the center of two sand dunes.
Chronology: Yaz III

Site n°: 324
Denomination: anonymous
Type: Scatters HdA;
Dimensions: Total surface:
UTM: 4210536, 427461
High Density area cleared by the road located 1.5 km N of 173.
Chronology: Yaz III

Site n°: 325
Denomination: anonymous
Type: Scatters HdA;
Dimensions: 50 x 50 m; Total surface: 2553
UTM: 4213387, 426492
High density area pottery partially covered by sand dunes.
One Andronovo potsherd with incised decoration has been collected.
Chronology: Late Yaz III

Site n°: 326
Denomination: anonymous
Type: HdA;
Dimensions: 50 x 50; Total surface: 1567

UTM: 4213734, 427206
High density area on an elevated ridge; rare wheel-made Bronze Age pottery and a large amount of Andronovo-type sherds. Some fire clay blocks have been also found probably belonging to architectural features.
Chronology: LBA, Yaz I?

Site n°: 327
Denomination: anonymous
Type: Scatters LdA;
Dimensions: Total surface:
UTM: 4213829, 427326
Very low density area. Bronze Age with very few Andronovo pottery sherds.
Chronology: LBA; Andronovo

Site n°: 328
Denomination: anonymous
Type: EdA;
Dimensions: 50 x 40; Total surface: 2119
UTM: 4212681, 427443
High density of sherds in a small elevated area between steppe sand dunes.
Chronology: Late Yaz III; Parthian-Sasanian

Site n°: 329
Denomination: anonymous
Type: Scatter HdA;
Dimensions: 150 x 90; Total surface: 10700
UTM: 4215670, 419999
One fragment of common ware with incised decoration of Takhirbaj 3 tradition.
Chronology: LBA; Yaz I

Site n°: 330
Denomination: anonymous
Type: Scatter LDA;
Dimensions: 100 x 50; Total surface: 4906
UTM: 4216588, 419706
Chronology: LBA; Andronovo

Site n°: 331
Denomination: anonymous
Type: Scatter LDA;
Dimensions: 60 x 30; Total surface: 1578
UTM: 4216517, 419788
Very low density of Andronovo-type sherds in a flat area between sand dunes. Not far from site 330 and separated only by sand dunes; they could be considered as an unique site.
Chronology: Andronovo

Site n°: 332
Denomination: anonymous
Type: Scatter LdA + Scatter HdA;
Dimensions: 200 60; Total surface: 11626
UTM: 4215382, 419876
The site is composed by two parts separated by a modern takyr; the northern LDA belongs to LBA and the southern belongs to Yaz 1 horizon with one Andronovo-type pottery sherd.
Chronology: LBA; Andronovo; Yaz I

Site n°: 333
Denomination: anonymous
Type: Scatter HdA;
Dimensions: 100 x 60; Total surface: 4779
UTM: 4215797, 420408
High density of hand-made sherds with incised decoration of Andronovo type in a flat area almost completely covered by sand dunes. Rare wheel-made sherds belong to late Bronze age.
Chronology: LBA; Andronovo

Site n°: 334
Denomination: anonymous
Type: Scatter HdA;
Dimensions: 90 x 70; Total surface: 5291
UTM: 4215891, 420428
High density of hand-made sherds with incised decoration of Andronovo-type in a flat area between sand dunes. Some fired clay fragments have been uncovered, probably belonging to structural features.
Chronology: Andronovo

Site n°: 335
Denomination: anonymous
Type: Scatter LdA;
Dimensions: 40 x 30; Total surface: 100
UTM: 4216350, 420410
Low density of Bronze Age wheel-made pottery sherds and few hand-made sherds with engraved decoration of Andronovo-type. The area is flat and coveed by sand dunes.
Chronology: LBA; Andronovo

Site n°: 336
Denomination: anonymous
Type: Scatter HdA;
Dimensions: 150 x 50; Total surface: 5784
UTM: 4216031, 420521
Engraved decoration of Andronovo-type and few wheel-made Late Bronze age sherds scattered in a flat area.
Chronology: LBA; Andronovo

Site n°: 337
Denomination: anonymous
Type: Scatter LdA;
Dimensions: Total surface:
UTM: 4215803, 420757
Isolated Andronovo-type pot sherds in a flat area between sand dunes.
Chronology: Andronovo

Site n°: 338
Denomination: anonymous
Type: Scatter HdA;
Dimensions: 70 x 50; Total surface: 2778
UTM: 4215694, 420711
High density of hand-made sherds with engraved decoration of Andronovo type and few wheel-made Late Bronze Age sherds in a flat area.
Chronology: Andronovo

Site n°: 339
Denomination: anonymous
Type: Scatter HdA;
Dimensions: 120 30; Total surface: 3593
UTM: 4215780, 420589
High density of hand-made sherds with engraved decoration of Andronovo type in a flat area between sand-dunes.
Chronology: Andronovo

Site n°: 340
Denomination: anonymous

Type: Scatter HdA;
Dimensions: 500 x 130; Total surface: 50999
UTM: 4219065, 418939
High density of Late Bronze Age and Yaz I sherds in a flat area between sand dunes. Most of the pottery is coarse ware smothed and gray in colour characteristic of Yaz I. painted pottery has been also uncovered.
Chronology: LBA; Yaz I

Site n°: 341
Denomination: anonymous
Type: Scatter LdA;
Dimensions: 20 x 50; Total surface: 982
UTM: 4215434, 420597
High density of hand-made sherds with engraved decoration of Andronovo type in a flat area between sand-dunes.
Chronology: Andronovo

Site n°: 342
Denomination: anonymous
Type: Scatter LdA;
Dimensions: 40 x 20; Total surface: 769
UTM: 4215420, 420544
Low density of hand-made sherds with engraved decoration of Andronovo type in a flat area between
sand-dunes. Some fired clay fragments have been uncovered.
Chronology: Andronovo

Site n°: 343
Denomination: anonymous
Type: Scatter LdA;
Dimensions: 90 x 70; Total surface: 4444
UTM: 4216325, 420488
Chronology: LBA

Site n°: 344
Denomination: anonymous
Type: Scatter LdA;
UTM: 4216118, 420741
Very low density of Andronovo type sherds in flat area between sand dunes.
Chronology: Andronovo

Site n°: 345
Denomination: anonymous
Type: Scatter LdA;
UTM: 4216045, 421287
Very low density of Andronovo type sherds in flat area between sand dunes.
Chronology: Andronovo

Site n°: 346
Denomination: anonymous
Type: Scatter LdA;
Dimensions: 40 x 30; Total surface: 441
Chronology: Andronovo
UTM: 4216284, 421598
High density of hand-made sherds with engraved decoration of Andronovo type in a flat area between sand-dunes.

Site n°: 347
Denomination: anonymous
Type: Scatter LdA;
Chronology: Andronovo
UTM: 4217946, 419604
Isolated coarse ware fragments, Andronovo-type and engraved decoration of Andronovo-type without decoration in a flat area.

Site n°: 348
Denomination: anonymous
Type: Scatter LdA;
Dimensions: 15 x 30; Total surface: 282
UTM: 4216483, 421606
High density of hand-made sherds with engraved decoration of Andronovo type in a flat area between sand-dunes.
Chronology: Andronovo

Site n°: 349
Denomination: anonymous
Type: Scatter HdA;
Dimensions: 60 x 30; Total surface: 1464
UTM: 4216483, 421677
High density of hand-made sherds with engraved decoration of Andronovo type in a flat area between sand-dunes.
Chronology: LBA

Site n°: 350
Denomination: anonymous
Type: Scatter LdA;
UTM: 4216104, 421477
Very low density of Andronovo-type sherds in a flat area between sand dunes.
Chronology: Andronovo

Site n°: 351
Denomination: anonymous
Type: Scatter LdA;
UTM: 4215735, 421460
Very low density of Andronovo-type sherds in a flat area between sand dunes.
Chronology: Andronovo

Site n°: 352
Denomination: anonymous
Type: Scatter LdA;
Dimensions: 70 x 40; Total surface: 2637
UTM: 4217217, 421493
Chronology: Andronovo

Site n°: 353
Denomination: anonymous
Type: Scatter LdA;
UTM: 4215707, 421595
Low density of Andronovo-type sherds with engraved decoration in a flat area between sand.
Chronology: Andronovo

Site n°: 354
Denomination: anonymous
Type: Scatter LdA;
UTM: 4215894, 420800
Low density of Andronovo-type sherds with engraved decoration of Andronovo type in a flat area between sand.
Chronology: Andronovo

Site n°: 355
Denomination: anonymous
Type: Scatter LdA;
UTM: 4217143, 421423
Very low density of Andronovo-type sherds in a flat area between sand.

Chronology: Andronovo

Site n°: 356
Denomination: anonymous
Type: Tepe 2;
Dimensions: 300 x 150; Total surface: 51616
UTM: 4209778, 426753
Low tepe, 1.5 m high ca, located to SW of 173 and 173 on the same line of 219. A small flat area is all around. Some fragments of Bronze and turquoise have been also found among which a fragmentary pin (No Inv. ?????). High density of scatter of pottery mainly belonging to Yaz II-III. One smaller mound is also located to the N.
Chronology: Yaz III

Site n°: 357
Denomination: anonymous
Type: Scatters;
Dimensions: 140 100; Total surface: 9676
UTM: 4204587, 426005
LDA area with Yaz II-III pottery, located along the canal running Northward from Takhirbaj to Garry Kishman.
Chronology: Yaz II-III

Site n°: 358
Denomination: anonymous
Type: Scatter;
Dimensions: 450 150; Total surface: 72138
UTM: 420105, 428118
LDA with mainly Partho-Sasanian pottery along the channel running NW SE.
Chronology: Parthian-Sasanian

Site n°: 359
Denomination: anonymous
Type: EDA;
Dimensions: 500 x 170; Total surface: 68937
UTM: 4203493, 428400
Low density area with Yaz II-III and some engraved potsherd. Very large area with high density of pottery mainly belonging to Yaz II-III; some rims, probably Yaz I are also present.
Chronology: Yaz II?; Yaz III

Site n°: 360
Denomination: anonymous
Type: Tepe 2;
Dimensions: Total surface: 17427 s.q.
UTM: 4210294, 426686
Three small mounds EW oriented on the same line with very late Medieval pottery among which "graffita" and glazed pottery numerous overfired and pottery slags belonging probably to kilns.
Chronology: Medieval

Site n°: 361
Denomination: anonymous
Type: Scatter;
UTM: 4210236, 426299
Very small takyr with very low density of scatter of pottery located to W of 360.
Chronology: Yaz III

Site n°: 362
Denomination: anonymous
Type: Spot;
Dimensions: Total surface:
UTM: 4210272, 426223
Spot with sasanian pottery.
Chronology: Sasanian

Site n°: 363
Denomination: anonymous
Type: Tepe 2;
Dimensions: 170 104; Total surface: 15766
UTM: 4210263, 426043
High density of pottery mainly belonging to Yaz III horizon.
Chronology: Late Yaz III

Site n°: 364
Denomination: anonymous
Type: Scatters LdA;
Dimensions: 400 x 120; Total surface: 52563
UTM: 4210162, 424078
Almost completely located under a large dune.
Chronology: Undetermined

Site n°: 365
Denomination: anonymous
Type: Scatter;
Dimensions: Total surface:
UTM: 4210045, 422985
LDA with mainly sasanian pottery.
Chronology: Sasanian

Site n°: 366
Denomination: anonymous
Type: Scatters LdA;
Dimensions: 360 x 120; Total surface: 36343
UTM: 4210028, 422018
Just located in front of the canal running to Takhirbaj.
Chronology: Yaz III

Site n°: 367
Denomination: anonymous
Type: Scatters;
Dimensions: Total surface: 8436
UTM: 4209594, 422544
Chronology: LBA; Yaz II-III

Site n°: 368
Denomination: anonymous
Type: undetermined
Dimensions: 78 x 333; Total surface: 21354
UTM: not recorded
Chronology: Late Yaz III

Site n°: 369
Denomination: anonymous
Type:
Dimensions: 120 x 101; Total surface: 8323
UTM: not recorded
Chronology: LBA; Yaz II

Site n°: 370
Denomination: anonymous
Type: LLdA;
Dimensions: 20 x 60; Total surface: 1786
UTM: 4210110, 427220
Large flat area located NW of 174, partially covered by sand and vegetation.
Chronology: Yaz II-III

Site n°: 371
Denomination: anonymous
Type: LLdA;
Dimensions: 90 70; Total surface: 7319
UTM: 4210195, 427108
Flat area very close to W of 370, partially covered by sand and vegetation. The chronological horizon is Yaz III.
Chronology: Yaz III

Site n°: 372
Denomination: anonymous
Type: LLdA;
Dimensions: 100 x 70; Total surface: 7515
UTM: 4210115, 426991
Flat area very close to E of 371.
Chronology: Late Yaz III

Site n°: 373
Denomination: anonymous
Type: LLdA;
Dimensions: 50 x 50; Total surface: 1790
UTM: 4210730, 425976
Very large area Middle density of scatter of pottery.
Chronology: Late Yaz III?

Site n°: 374
Denomination: anonymous
Type: Spot;
Dimensions: Total surface:
UTM: 4212205, 421326
Small area.
Chronology: Yaz II-III

Site n°: 375
Denomination: anonymous
Type: Spot;
Dimensions: Total surface:
UTM: 4212205, 421098
Very few pottery sherds with one painted.
Chronology: Yaz I

Site n°: 376
Denomination: anonymous
Type: Tepe;
Dimensions: 62 x 130; h 2 c.; Total surface: 6421
UTM: 4216267, 412731
Large mound to W of Togolok, partially covered by sand and cultivated fields; medium density of pottery of Bronze Age; in the center there are many pottery slags with overfired bricks belonging probably to a kiln.
Chronology: BA

Site n°: 377
Denomination: anonymous
Type: EdA;
Dimensions: 149 x 204; Total surface: 24973
UTM: 4219573, 415062
Large site with high density of pottery of Bronze Age located on the road coming from 193 to North. Many pottery slags of probably kilns. One Bronze pin (Inv. no.), one spindle whorl (Inv. no) and one fragmentary steatite seal. Different distinct areas with concentration of pottery costitute the site and in one of them there are modern trenches.
Chronology: BA

Site n°: 378
Denomination: anonymous
Type: EdA;
Dimensions 30 162; Total surface: 4936
UTM: 4219768, 415114
Large site, located just North of 377 with high density of pottery.
Chronology: BA

Site n°: 379
Denomination: anonymous
Type: LLdA;
Dimensions 647 x 282; Total surface: 138197
UTM: 4208010, 399956
Large site partly levelled and crossed by a canal.
Chronology: Yaz II-III

Site n°: 380
Denomination: anonymous
Type: EdA +Tepe 2;
Dimensions 460 x 264; Total surface: 81880
UTM: 4210224, 398958
Very large site partly levelled with a medium Dimensions tepe also.
Chronology: Yaz II-III

Site n°: 381
Denomination: anonymous
Type: Tepe 2;
Dimensions 200 x 70; Total surface: 9785
UTM: 4211948, 398680
Chronology: Yaz I-II

Site n°: 382
Denomination: anonymous
Type: LLdA;
Dimensions 156 x 83; Total surface: 10605
UTM: 4212456, 397805
Chronology: Yaz II

Site n°: 383=435
Denomination: anonymous
Type: Tepe 2+ EdA;
Dimensions 587 x 122; Total surface: 76891
UTM: 4215266, 399111
Drawings with n° 383
Chronology: Yaz I; Yaz II; Yaz III

Site n°: 384
Denomination: anonymous
Type: LLdA;+ EdA;
Dimensions 342 x 257; Total surface: 82068
UTM: 4217096, 397117
Yaz I e Namazga VI and Yaz II-III
Chronology: LBA; Yaz I-III

Site n°: 385
Denomination: anonymous
Type: Tepe 2;
Dimensions 289 x 184; Total surface: 37859
UTM: 4216864, 396796
Chronology: Yaz II-III

Site n°: 386
Denomination: anonymous
Type: EdA;

Dimensions 162 x 80; Total surface: 10906
UTM: 4218313, 395368
Chronology: Yaz II-III

Site n°: 387
Denomination: anonymous
Type: EdA;
Dimensions 320 x 177; Total surface: 50838
UTM: 4220123, 394586
Chronology: Yaz II-III

Site n°: 388
Denomination: Adam Bassin; Water Basin
Type: Tepe 2
Dimensions: 448 x 315; Total surface: 83209
UTM: 4219795, 395622
Tepe partially destroyed by ploughing activity. High density of pottery very large with other 5 small mounds.
Chronology: Yaz II-III

Site n°: 389
Denomination: anonymous
Type: Tepe 2 + EdA;
Dimensions: 103 x 73; Total surface: 8360
UTM: 4221860, 394586
Very large site partially destroyed to the eastern part; high density of pottery.
Chronology: Yaz III

Site n°: 390
Denomination: anonymous
Type: Tepe 2;
Dimensions: 271 x 70; Total surface: 18548
UTM: 4222778, 394498
High density of pottery partly destroyed on the southern part. Also one Namazga V sherd has been found.
Chronology: Yaz II-III

Site n°: 391
Denomination: anonymous
Type: EdA;
Dimensions: 207 x 95; Total surface: 17141
UTM: 4222656, 393856
Large site very rich in pottery. The late period seems to concentrate in the center.
Chronology: Yaz I; Yaz II; Yaz III

Site n°: 392
Denomination: Adam Basin IV
Type: Tepe 2;
Dimensions: 251 x 132; Total surface: 36094
UTM: 4227412, 392869
Very large site high density of pottery with fields around.
Chronology: LBA

Site n°: 393
Denomination: part of original Adam Basin IV
Type: Tepe 2;
Dimensions: 166 x 77; Total surface: 9337
UTM: 4227246, 393477
Site partly destroyed into West where a large amount of pottery slags and traces of kilns have been also found.
Chronology: LBA

Site n°: 394
Denomination: Adam Basin V
Type: Tepe + EdA;
Dimensions: 272 x 170; Total surface: 34959
UTM: 4227777, 395282
Very large site with high density of pottery surrounded by dunes.
Chronology: LBA

Site n°: 395
Denomination: Adam Basin V
Type: Tepe 2 + EdA;
Dimensions: 227 x 80; Total surface: 17492
UTM: 4227733, 395470
Chronology: LBA

Site n°: 396
Denomination: anonymous
Type: EdA;
Dimensions: 231 x 95; Total surface: 16894
UTM: 4221306, 394044
Large site with high density of pottery.
Chronology: Yaz I; Yaz II; Yaz III

Site n°: 397
Denomination: anonymous
Type: Tepe 2 (?);
Dimensions: 164 x 35; Total surface: 5473
UTM: 4207332, 401672
Tepe 5 m ca high surrounded by fields and located around 2 km NE from Uc tepe village; Low density of scatter of pottery.
Chronology: Yaz III

Site n°: 398
Denomination: anonymous
Type: Tepe 2 + EdA;
Dimensions: 180 x 77; Total surface: 11046
UTM: 4206495, 401553
Tepe in the West side, high not more than 2 m ca, located around 1 km N-NE from Uc tepe village, surrounded and partly destroyed by fields, canals and sand.
Chronology: Yaz III

Site n°: 399
Denomination: anonymous
Type: Tepe 2 (?);
Dimensions: 194 x 124; Total surface: 17942
UTM: 4207572, 399278
Tepe, 1.5 high c., now surrounded and destroyed by fields and located 2 km N-NW from Uc tepe village.
Chronology: Yaz III

Site n°: 400 (= ex 138)
Denomination: anonymous
Type:
Dimensions:
UTM:
Chronology: LBA

Site n°: 401 (= ex 139)
Denomination: anonymous
Type EdA;
Dimensions: Height 1; Total surface:
UTM: not recorded
Located SE from site 400, around 1,5. k Middle part almost destroyed by fields surrounding it to S and W together with

dunes.
Chronology: LBA

Site n°: 402
Denomination: anonymous
Type: Tepe 2;
Dimensions: 127 x 116; Total surface: 12722
UTM: 4210842, 397621
Tepe 4 c. high surrounded by fields; high density of scatter of pottery located 5 km N-NW from Uc tepe village.
Chronology: Yaz II; Yaz III

Site n°: 403
Denomination: anonymous
Type: Tepe 2 + EdA; (N part);
Dimensions: 47 x 48; Total surface: 2410
UTM: 4211101, 397362
Tepe 3 high c., surrounde by fields high density of scatter of pottery and located about 300 m N from the former site.
Chronology: Yaz III

Site n°: 404
Denomination: anonymous
Type: Tepe 2 + EdA;
Dimensions: 295 x 213; Total surface: 64991
UTM: 4214226, 395636
Very large Tepe, 2.5 high c., with high density of scattere of pottery, surrounded by fields to the East
and by sand to the West.
Chronology: Yaz II; Yaz III

Site n°: 405
Denomination: Taip 9
Type: Tepe 2 + EdA;
Dimensions: 414 x 120; Total surface: 46587
UTM: 4232595, 391319
Very large site with high density of scatter of pottery, divided in two parts by sands. The Tepe, 2.5 high is located to the East and is completely surrounded by sand dunes.
Chronology: MBA; LBA

Site n°: 406
Denomination: Adzi Kui
Type: Tepe 2 + EdA;
Dimensions: 195 x 277; Total surface: 37632
UTM: 4231957, 402212
Very large site (3.5 ha. c.) with high density of pottery; it is divided in three parts, the first one in the center is a fortification (h. 3.5), the second SW and third E (1.5 high ?). In the NE of the site there is three modern water basins.
Chronology: LBA; Yaz?

Site n°: 407
Denomination: anonymous
Type: EdA;
Dimensions: 40 x 221; Total surface: 8252
UTM: 4232273, 402100
Large site (1.5 ha) located 300 m N of the former site, 1 m high ca; high density of pottery. There are 1
kiln in the center and two or three in the North suggesting an industrial activity.
Chronology: MBA

Site n°: 408
Denomination: anonymous
Type: EdA;
Dimensions: Total surface:
UTM: 4231255, 402366
Three years ago there were small sites which is absolutely destroyed by fields. At that time it was 0.5
high and square 0.25 ha. There are traces of two walls of 30 with perhaps two towers.
Chronology: MBA;LBA

Site n°: 409
Denomination: anonymous
Type: Tepe 2;
Dimensions: 174 x 64; Total surface: 9868
UTM: 4231888, 401548
Large site, 2 high c., with high density of pottery located west about 50 from 406. There are also traces of fortification walls of 100 x 100 c.
Chronology: MBA

Site n°: 410
Denomination: anonymous
Type: EdA;
Dimensions: 246 x 229; Total surface: 41035
UTM: 4230260, 400606
Large site divided in two parts by dunes and partly destroyed by fields in N. It is surrounded by dunes in the N and fields in the S. High density of pottery.
Chronology: LBA; Yaz I?

Site n°: 411
Denomination: anonymous
Type: LdA;
Dimensions: Total surface:
UTM: 4230799, 400506
Small site with diameter 20 c. surrounded by sand; high density of pottery.
Chronology: LBA

Site n°: 412
Denomination: Adzi Kui 8
Type: Tepe 2 + EdA;
Dimensions: 522 x 233; Total surface: 85774
UTM: 4233279, 400773
Very large site with high density of pottery, 2.5 high, destroyed by fields and surrounded by dunes and part of the site is under dunes. There are traces of the excavations of Sarianidi.
Chronology: LBA

Site n°: 413
Denomination: Adzi Kui, 2, 3, 4 (according to Masimov)
Type: Tepe 2 + EdA + LLdA;
Dimensions: 497 x 250; Total surface: 70754
UTM: 4228451, 402600
Very large site, partly destroyed on S by a canal and fields, 2 high c., high density of pottery.
Chronology: LBA

Site n°: 414
Denomination: anonymous
Type: Tepe 2;
Dimensions: h. 4.5; Total surface: 3.5 ha.
UTM: not recorded
Very compacted tepe fotographed by Tosi in 1994 (Adam Basan ?). Three years ago a gold was found. The site had been dug by a tractor. High density of pottery surrounden by the desert.
Chronology: LBA

Site n°: 415
Denomination: anonymous
Type: EdA;
Dimensions: height 1,2 c.; Total surface:
UTM: not recorded
Small site located east of Site n°: 414 at about 5 kms. with high density of pottery surrounded by dunes.
Chronology: LBA

Site n°: 416
Denomination: anonymous
Type: EdA;
Dimensions: high no more than 0.6; Total surface:
UTM: not recorded
High Density of pottery and surrounded by desert (N, E and S) and fields (W) Main part of the site is destroyed by fields, especially W and S.E.
Chronology: LBA

Site n°: 417 (??? Atlijatan ??? see Site n°: 129)
Denomination: anonymous
Type: Tepe 2;
Dimensions: high about 4; Total surface:
UTM: not recorded
The tepe is surrounded by desert and to south by fields and canals. High density of pottery. The southern part is covered by vegetation. One sherd of pottery (a foot) is collected from Western part of the site.
Chronology: LBA; Yaz II; Yaz III

Site n°: 418
Denomination: anonymous
Type: LLdA;
Dimensions: 130 10; Total surface: 16804
UTM: 4230801, 401954
The site is surrounded by desert and partly covered by sand dunes.
Chronology: MBA; LBA

Site n°: 419
Denomination: anonymous
Type: Tepe 2
Dimensions: 100 x 150; Height 1,5/2; Total surface: 15986
UTM: 4226606, 402736
Surrounded by agricultural fields; southern side partly destroyed. On the E side there is a channel. An area of 3 hectares has been excavated. One Brick (???) of 32 x 16 x 6.5 c has been collected.
Chronology: LBA; Yaz II-III

Site n°: 420
Denomination: anonymous
Type: LLdA;
Dimensions: height 0.25 c.; Total surface:
UTM: 4226677, 403255
Small site covered by pottery, partly by sand dunes.
Chronology: LBA

Site n°: 421
Denomination: anonymous
Type: Tepe 2;
Dimensions: 130 180; h. 2.5; Total surface: 17588
UTM: 4225001, 403943
Surrounded by desert and from eastern side by a channel. The souhern half is a LLdA.
Chronology: MBA; LBA

Site n°: 422
Denomination: anonymous
Type: Tepe 2;
Dimensions: 70 x 50; h. 2; Total surface: 3293
UTM: 4220977, 403860
The main part is destroyed by fields and surrounded by fields also.
Chronology: LBA

Site n°: 423
Denomination: anonymous
Type: Tepe 2;
Dimensions: 150 x 70; h. 2; Total surface: 13093
UTM: 4220857, 403808
On the southern part LLdA.
Chronology: LBA

Site n°: 424
Denomination: anonymous
Type: Tepe 2 + EdA;
Dimensions: 300 x 180; h.2; Total surface: 32026
UTM: 4220763, 403652
EdA on the SW part. In the western side there are kilns with rectangular shape.
Chronology: LBA

Site n°: 425
Denomination: anonymous
Type: LLdA;
Dimensions: 100 50; h. 0.6; Total surface: 6579
UTM: 4220932, 404972
Together with the sites nos. 422, 423, 424, 425 it forms a group in a large takyr area and is located EW of Adam Basan.
Chronology: LBA

Site n°: 426
Denomination: anonymous
Type: LLdA;
Dimensions: Total surface: 3000
UTM: 4219992, 402670
Pottery is mainly on the surface of takyr and dune; surrounded by desert.
Chronology: LBA

Site n°: 427
Denomination: anonymous
Type: LLdA;
Dimensions: Total surface: 4000
UTM: 4220088, 403182
Surrounded by desert with Pottery on takyr partly covered by sand.
Chronology: LBA

Site n°: 428
Denomination: anonymous
Type: EdA;
Dimensions: 200 x 170; h. 0.5; Total surface: 33229
UTM: 4220742, 402278
Surrounded by desert; kilns are located on the western side;
Chronology: MBA; LBA

Site n°: 429
Denomination: anonymous
Type: EdA;

Dimensions: 200 170; h. 1; Total surface: 21726
UTM: 4220736, 402053
Surrounded by desert; kilns are located in the NW and S part.
Chronology: LBA

Site n°: 430
Denomination: anonymous
Type: Tepe 2;
Dimensions: 200 x 100; h. 3; Total surface: 19428
UTM: 4221322, 401885
Partly covered by dunes. Kilns are located on the S side.
Chronology: LBA

Site n°: 431
Denomination: anonymous
Type: Tepe 2, partly LLdA;
Dimensions: 60 150; h. 2; Total surface: 11426
UTM: 4221605, 401752
Partly covered by sand dunes. On the western side it is surrounded by a irrigation canal.
Chronology: LBA

Site n°: 432
Denomination: anonymous
Type: LLdA;
Dimensions: 250 100; Total surface: 31331
UTM: 4223516, 401860
Partly covered by sand.
Chronology: MBA; LBA

Site n°: 433
Denomination: anonymous
Type: Tepe 2;
Dimensions: 140 x 230; h. 3; Total surface: 42242
UTM: 4220488, 400658
Large site, not very much covered by sand dunes.
Chronology: LBA

Site n°: 434
Denomination: anonymous
Type: Tepe 2 + EdA;
Dimensions: 100 x 150; h. 1.5; Total surface: 15543
UTM: 4214561, 400413
Large site surounded by desert on the N and W side; on the S and E by fields.
Chronology: Yaz II; Yaz III

Site n°: 435
Denomination: anonymous
Type: Tepe 2 on the N part + EdA on the southern;
Dimensions: 300 x 150; Total surface: 47982
UTM: 4215368, 399178
Surrounded by desert on the W side, by fields on N, E, S; on the top of the tepe there is a trigapoint. Chronology is varying from Yaz 1 material on S side with painted pottery with different colour (red, brown and black) and geometric decoration and Yaz II.
Chronology: Yaz I; Yaz II

Site n°: 436
Denomination: anonymous
Type: LLdA;
Dimensions: Dia 30; Total surface:
UTM: 4215344, 399175
Surrounded desert, partly covered by sand dunes; apro ximately 4 km from Adzi Kui 1.
Chronology: LBA

Site n°: 437
Denomination: anonymous
Type: LLdA;
Dimensions: 130 100; Total surface: 130 x 100
UTM: 4229885, 407150
Almost completely covered by sand and surrounded by desert; a kiln is located on the W side.
Chronology: LBA

Site n°: 438
Denomination: anonymous
Type: EdA;
Dimensions: 150 60; Total surface: 18128
UTM: 4220318, 409336
Almost destroyed by agricultural activity; on the southern side it is partly covered by sand and surrounded by desert; on the NE and W it is surrounded by fields.
Chronology: LBA

Site n°: 439
Denomination: anonymous
Type: undetermined with irregular plan
Dimensions: 60 x 90; Total surface: 5400
UTM: 4200362, 402843
Field n°: 90
Chronology: Early Iron Age

Site n°: 440
Denomination: anonymous
Type: undetermined with oval plan
Dimensions: 250 x 300; Total surface: 75000
UTM: 4200665, 602621
Field n°: 91
Chronology: Early Iron Age

Site n°: 441
Denomination: anonymous settlement
Type:undetermined with oval plan
Dimensions: 250 x 200; Total surface: 50000
UTM: 4193751, 403942
Field n°: 92
Chronology: Early Iron Age; Parthian period

Site n°: 442
Denomination: Big Eres-kala
Type: kala with oval plan
Dimensions:73 x 75; Total surface: 5500
UTM: 4193751, 403942
Field n°: 94
Chronology: Early Iron Age; Parthian period

Site n°: 443
Denomination: Small Eres-kala
Type: irregular quadrangle
Dimensions: 25 x 36; Total surface: 900
UTM: 4182392, 410053
Field n°: 95
Chronology: Medieval

Site n°: 444
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 200 x 100; Total surface: 20000
UTM: 4182273, 410458

Field n°: 96
Chronology: Early Iron Age

Site n°: 445
Denomination: anonymous settlement
Type: undetermined with quadrangular plan
Dimensions: 500 x 550; Total surface: 275000
UTM: 4189331, 411841
Field n°: 97
Chronology: Sasanian

Site n°: 446
Denomination: anonymous settlement
Type: undetermined with quadrangular plan
Dimensions: 500 x 300; Total surface: 15000
UTM: 411676, 4189169
Field n°: 98
Chronology: Sasanian

Site n°: 447
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 50 x 30; Total surface: 1500
UTM: 4201799, 402689
Field n°: 101
Chronology: Early Iron Age

Site n°: 448
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 150 x 150; Total surface: 22500
UTM: 4201368, 402176
Field n°: 102
Chronology: Parthian, Sasanian

Site n°: 449
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 30 x 100; Total surface: 3000
UTM: 4201410, 405996
Field n°: 103
Chronology: Early Iron Age; Parthian period

Site n°: 450
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 500 x 300; Total surface: 15000
UTM: 4201087, 402319
Field n°: 104
Chronology: Early Iron Age; Parthian period

Site n°: 451
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 80 x 180; Total surface: 14400
UTM: 4204548, 409223
Field n°: 105
Chronology: Early Iron Age

Site n°: 452
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 50 x 90; Total surface: 4500
UTM: 4203758, 402317
Field n°: 108
Chronology: Early Iron Age

Site n°: 453
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 50 x 90; Total surface: 4500
UTM: 4203758, 402317
Field n°: 109
Chronology: Early Iron Age

Site n°: 454
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 350 x 550; Total surface: 192500
UTM: 4189344, 402888
Field n°: 110
Chronology: Early Iron Age

Site n°: 455
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 210 x 170; Total surface: 28900
UTM: 4190126, 402092
Field n°: 111
Chronology: Early Iron Age

Site n°: 456
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 270 x 200; Total surface: 54000
UTM: 4189526, 403507
Field n°: 112
Chronology: Early Iron Age

Site n°: 457
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 90 x 80; Total surface: 7200
UTM: 4201704, 401738
Field n°: 113
Chronology: Early Iron Age

Site n°: 458
Denomination: anonymous settlement
Type: undetermined with oval plan
Dimensions: 90 x 65; Total surface: 5850
UTM: 4202114, 402005
Field n°: 114
Chronology: Early Iron Age

Site n°: 459
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 475 x 300; Total surface: 142500
UTM: 4201973, 402218
Field n°: 115
Chronology: Early Iron Age

Site n°: 460
Denomination: anonymous settlement
Type: undetermined with oval plan
Dimensions: 250 x 450; Total surface: 112500
UTM: 4204039, 401844
Field n°: 116
Chronology: Early Iron Age

Site n°: 461
Denomination: anonymous settlement

Type: undetermined with irregular plan
Dimensions: 300 x 450; Total surface: 135000
UTM: 4204164, 401491
Field n°: 117
Chronology: Early Iron Age

Site n°: 462
Denomination: anonymous settlement
Type: undetermined with quadrangular plan
Dimensions: 300 x 250; Total surface: 75000
UTM: 4204759, 401069
Field n°: 120
Chronology: Early Iron Age

Site n°: 463
Denomination: anonymous settlement
Type: undetermined with oval plan
Dimensions: 200 x 100; Total surface: 20000
UTM: 4205372, 409283
Field n°: 121
Chronology: Early Iron Age

Site n°: 464
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 150 x 70; Total surface: 10500
UTM: not recorded
Field n°: 123
Chronology: Early Iron Age

Site n°: 465
Denomination: anonymous ding
Type: ding with square plan
Dimensions: 5 x 5; Total surface: 25
UTM: 4181256, 411812
Field n°: 124
Chronology: Medieval

Site n°: 466
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 350 x 400; Total surface: 140000
UTM: 4181497, 409136
Field n°: 125
Chronology: Early Iron Age; Medieval

Site n°: 467
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 150 x 80; Total surface: 12000
UTM: 4181026, 409405
Field n°: 126
Chronology: Early Iron Age

Site n°: 468
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 400 x 150; Total surface: 60000
UTM: 4180366, 410444
Field n°: 127
Chronology: Medieval

Site n°: 469
Denomination: anonymous settlement
Type: undetermnined with irregular plan
Dimensions: 200 x 160; Total surface: 32000
UTM: 4181555, 414355
Field n°: 128
Chronology: Medieval

Site n°: 470
Denomination: Burun-kala (Erez-kala)
Type: kala with rectangular plan
Dimensions: 160 x 220; Total surface: 35200
UTM: 4177682, 409523
Field n°: 131
Chronology: Medieval

Site n°: 471
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 400 x 400; Total surface: 160000
UTM: 4179580, 406347
Field n°: 132
Chronology: Medieval

Site n°: 472
Denomination: Dashly-depe (Tashli-depe)
Type: undetermined with oval plan
Dimensions: 30 x 20; Total surface: 600
UTM: 4177207, 406419
Field n°: 133
Chronology: Early Iron Age; Sasanian

Site n°: 473
Denomination: unknown
Type: undetermined with irregular plan
Dimensions: 5 x 5; Total surface: 25
UTM: not recorded
Field n°: 134
Chronology: Sasanian

Site n°: 474
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 120 x 90; Total surface: 10800
UTM: 4178113, 403433
Field n°: 137
Chronology: Early Iron Age

Site n°: 475
Denomination: Giljakin-Chilburj, fragment of the wall
Type: straight line
Dimensions: 150 m length
UTM: 4171154, 425976
Field n°: 140
Chronology: Hellenistic (?); Parthian

Site n°: 476
Denomination: Gunch-depe
Type: tepe with round plan
Dimensions: 30 x 30; Total surface: 900
UTM: 4174131, 427087
Field n°: 142
Chronology: Medieval

Site n°:477
Denomination: unknown
Type: undetermined with oval plan
Dimensions: 20 x 30
UTM: 4200067, 402596
Field n°: 89

Chronology: Early Iron Age; Parthian period

Site n°: 478
Denomination: Kutlam
Type: undetermined with rectangular plan
Dimensions: 40 x 35; Total surface:1400
UTM: 4174846, 443553
Field n°: 145
Chronology: Sasanian

Site n°: 479
Denomination: unknown
Type: undetermined with rectangular plan
Dimensions: 100 x 70; Total surface: 7000
UTM: 4174213, 435652
Field n°: 146
Chronology: Parthian (?), Sasanian

Site n°: 480
Denomination: unknown
Type: undetermined with rectangular plan
Dimensions: 80 x 60; Total surface: 4800
UTM: 4170663, 436429
Field n°: 147
Chronology: Parthian, Sasanian

Site n°: 481
Denomination: Ak-depe
Type: tepe with rectangular plan
Dimensions: 25 x 30; Total surface: 750
UTM: 4166781, 418460
Field n°: 148
Chronology: Sasanian

Site n°: 482
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 500 x 100; Total surface: 50000
UTM: 4171749, 416039
Field n°: 153
Chronology: Sasanian; Medieval

Site n°: 483
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 120 x 40; Total surface: 4800
UTM: 4172678, 414363
Field n°: 156
Chronology: Medieval

Site n°: 484
Denomination: Kelleli-depe
Type: tepe with irregular plan
Dimensions: 60 x 40; Total surface: 2400
Chronology: Medieval
UTM: 4168145, 423608
Field n°: 157

Site n°: 485
Denomination: Waryk-depe
Type: tepe with irregular plan
Dimensions: 35 x 20; Total surface: 7000
UTM: 4168186, 423337
Field n°: 158
Chronology: Medieval

Site n°: 486
Denomination: Adji-depe
Type: tepe with irregular plan
Dimensions: 120 x 30; Total surface: 3600
UTM: 4167813, 423645
Field n°: 159
Chronology: Medieval

Site n°: 487
Denomination: unknown
Type: undetermined with round plan
Dimensions: 100 x 100; Total surface: 10000
UTM: not recorded
Field n°: 160
Chronology: Sasanian; Medieval

Site n°: 488
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 50 x 40; Total surface: 2000
UTM: 4168082, 421295
Field n°: 161
Chronology: Medieval

Site n°: 489
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 400 x 100; Total surface: 40000
UTM: 4170446, 422987
Field n°: 162
Chronology: Medieval

Site n°: 490
Denomination: Shekhitli-depe
Type: irregular plan
Dimensions: 40 x 25; Total surface: 1000
UTM: 4170894, 422550
Field n°: 163
Chronology: Medieval

Site n°: 491
Denomination: Small Dau-kala (Small Dew-kala)
Type: kala with rectangular plan
Dimensions: 40 x 30; Total surface: 1200
UTM: 4172973, 422166
Field n°: 164
Chronology: Medieval

Site n°: 492
Denomination: Depeli
Type: undetermined with round plan
Dimensions: 30 x 30; Total surface: 900
UTM: 4172491, 422121
Field n°: 165
Chronology: Medieval

Site n°: 493
Denomination: unknown
Type: undetermined with irregular plan
Dimensions: 70 x 60; Total surface: 4200
UTM: 4172915, 423140
Field n°: 166
Chronology: Medieval

Site n°: 494
Denomination: Southern Juzgaly

Type: undetermined with oval plan
Dimensions: 50 x 30; Total surface: 1500
UTM: 4169572, 423986
Field n°: 167
Chronology: Medieval

Site n°: 495
Denomination: Northern Juzgaly
Type: undetermined with square plan
Dimensions: 150 x 150; Total surface: 22500
UTM: 4169830, 423791
Field n°: 168
Chronology: Sasanian; Medieval

Site n°: 496
Denomination: unknown
Type: undetermined with oval plan
Dimensions: 60 x 50; Total surface: 3000
UTM: 4171024, 428842
Field n°: 169
Chronology: Medieval

Site n°: 497
Denomination: unknown
Type: undetermined with oval plan
Dimensions: 60 x 50; Total surface: 3000
UTM: 4170526, 417102
Field n°: 170
Chronology: Medieval

Site n°: 498
Denomination: anonymous kala
Type: kala with rectangular plan
Dimensions: 20 x 30; Total surface: 600
UTM: 4170781, 427202
Field n°: 173
Chronology: Sasanian; Medieval

Site n°: 499
Denomination: anonymous keshk
Type: undetermined with rectangular plan
Dimensions: 7 x 12; Total surface: 84
UTM: 4169838, 430867
Field n°: 174
Chronology: Medieval

Site n°: 500
Denomination: unknown
Type: undetermined with rectangular plan
Dimensions: 130 x 70; Total surface: 7592
Dimensions: 60 x 50
UTM: 4179166, 433834
Field n°: 304
Chronology: Sasanian

Site n°: 501
Denomination: unknown
Type: spot
UTM: 4177088, 430421
Chronology: undetermined

Site n°: 502
Denomination: Odynchi-depe (Odyncha-depe)
Type: tepe with quadrangular plan
Dimensions: 135 x 153; Total surface: 20655
UTM: 4178765, 429126
Field n°: 62
Chronology: Sasanian; Medieval

Site n°: 503
Denomination: (Odynchi depe)
Type: tepe with rectangular plan
Dimensions: 170 x 140; Total surface: 26197
UTM: 4181834, 428447
Chronology: Undetermined

Site n°: 504
Denomination: Top-depe
Type: tepe with rectangular plan
Dimensions: 52 x 40
UTM: 4181693, 420208
Dimensions: 40 x 70; Total surface: 3683
Field n°: 7
Chronology: Sasanian

Site n°: 505
Denomination: Dujechocken (Dujuchakyn)
Type: undetermined rectangular plan
Dimensions: 85 x 145
UTM: 4179263, 420152
Dimensions: 140 x 100; Total surface: 16287
Field n°: 8
Chronology: Sasanian

Site n°: 506
Denomination: Kharoba Koshuk (Garam keshk, Kharam keshk)
Type: keshk, rectangular plan
Dimensions: 55 x 10
UTM: 4178922, 420284
Dimensions: 20 x 80 m; Total surface: 2682
Field n°: 10
Chronology: Sasanian

Site n°: 507
Denomination: Eteklan-depe (Apaiklan-depe, Etekli-depe)
Type: tepe with rectangular plan
Dimensions: 60 x 70; Total surface: 5088
UTM: 4177774, 421397
Field n°: 51
Chronology: Sasanian; Medieval

Site n°: 508
Denomination: Gujrukli-depe 2 (Kurukli-depe 2; Chirkej-depe)
Type: tepe with square plan
Dimensions: 60 x 150; Total surface: 13178
UTM: 4179067, 424542
Field n°: 67
Chronology: Sasanian; Medieval

Site n°: 509
Denomination: Kuli-depe (Guli-depe; Khouli-depe, Saul-depe)
Type: tepe with irregular quardangle plan
Dimensions: 55 x 100; Total surface: 6920
UTM: 4179736, 425965
Field n°: 68
Chronology: Sasanian

Site n°: 510
Denomination: Gujli-depe (Guli-depe; Kujuly-depe)
Type: tepe with square plan

Dimensions: 100 150; Total surface: 12448
UTM: 4185057, 425991
Field n°: 58
Chronology: Sasanian; Medieval

Site n°: 511
Denomination: Suwli-depe (Suli-depe; Souli-depe)
Type: tepe with rectangular plan
Dimensions: 110 x 80; Total surface: 10228
UTM: 4185289, 423239
Field n°: 57
Chronology: Sasanian

Site n°: 512
Denomination: Sychanly-depe (Dauali-depe)
Type: tepe with rectangular plan
Dimensions: 85 x 60. Total surface: 5100
UTM: 4183384, 420744
Dimensions: 110 x 90; Total surface: 11181
Field n°: 5
Chronology: Sasanian

Site n°: 513
Denomination: anonymous kala
Type: kala with irregular plan
Dimensions: 80 x 60; Total surface: 4800
UTM: 4174959, 428497
Field n°: 144
Chronology: Sasanian; Medieval

Site n°: 514
Denomination: portion of the wall of mediaeval Merv suburb
Type: town wall with irregular plan
Dimensions (length, m): 700
UTM: 4174960, 428011
Field n°: 241
Chronology: Medieval

Site n°: 515
Denomination: unknown
Type: undetermined with irregular plan
Dimensions: 25 x 35; Total surface: 875
UTM: 4174875, 428595
Field n°: 350
Chronology: Medieval

Site n°: 516
Denomination: Gunesh-depe (Chish-depe)
Type: tepe with rectangular plan
Dimensions: 30 x 100; Total surface: 3606
UTM: 4176705, 425706
Field n°: 143
Chronology: Parthian, Sasanian

Site n°: 517
Denomination: unknown
Type: undetermined with quadrangular plan
Dimensions: 60 x 40; Total surface: 2354
UTM: 4171549, 424899
Chronology: Undetermined

Site n°: 518
Denomination: Gosha-depe
Type: undetermined with irregular plan
Dimensions: 600 x 110; Total surface: 66000
UTM: 4171656, 424790
Field n°: 141
Chronology: Parthian, Sasanian

Site n°: 519
Denomination: Djynly-depe (Mergen-depe)
Type: tepe with square plan
Dimensions: 50 x 50; Total surface: 2500
UTM: not registered
Field n°: 138
Chronology: Parthian, Sasanian

Site n°: 520
Denomination: Luchek-depe
Type: tepe with rectangular plan
Dimensions: 40 x 60
UTM: 4189076, 414438
Dimensions: 40 x 50; Total surface: 2100
Field n°: 12
Chronology: Early Iron Age, Parthian

Site n°: 521
Denomination: Munon-depe
Type: rectangular
Dimensions: 180 x 150
UTM: 4189046, 411699
Field n°: 13
Chronology: Parthian, Sasanian

Site n°: 522
Denomination: anonymous kala
Type: square
Dimensions: 95 x 97; Total surface: 15000
UTM: 4188402, 411726
Field n°: 99
State of preservation at the moment of survey: bad
Chronology: Medieval

Site n°: 523
Denomination: anonymous keshk
Type: keshk with square plan
Dimensions: 10 x 10; Total surface: 100
UTM: 4188282, 412219
Field n°: 99
Chronology: Medieval

Site n°: 524
Denomination: anonymous ding
Type: ding with square plan
Dimensions: 6 x 6; Total surface: 36
UTM: 4188163, 412470
Field n°: 339
Chronology: Medieval

Site n°: 525
Denomination: anonymous ding
Type: ding with square plan
Dimensions: 6 x 6; Total surface: 36
UTM: 4188094, 412368
Field n°: 340
Chronology: Medieval

Site n°: 526
Denomination: Suli keshk
Type: keshk with square plan
Dimensions: 40 x 50; Total surface: 2100
UTM: 4183174, 416324

Field n°: 72
Chronology: Medieval

Site n°: 527
Denomination: Kyrk-depe
Type: tepe, with square plan
Dimensions: 300 x 350; Total surface: 112184
UTM: 4176677, 415081
Field n°: 23
Chronology: Parthian period

Site n°: 528
Denomination: Chilburj
Type: undetermined with rectangular plan
Dimensions: 200 x 260; Total surface: 27596
UTM: 4175820, 412986
Field n°: 1
Chronology: Parthian, Sasanian; Medieval

Site n°: 529
Denomination: keshk Deshikli-oj
Type: keshk with square plan
Dimensions: 15 x 15; Total surface: 225
UTM: 4174624, 413421
Field n°: 39
Chronology: Medieval

Site n°: 530
Denomination: anonymous depe
Type: tepe with oval plan
Dimensions: 60 x 40; Total surface: 2400
Field n°: 40
Chronology: Sasanian
UTM: 4174478, 413440

Site n°: 531
Denomination: unknown
Type: undetermined with round plan
Dimensions: 40 x 40
UTM: 4174366, 413512
Field n°: 41
Chronology: Sasanian; Medieval

Site n°: 532
Denomination: anonymous kala
Type: kala with rectangular plan
Dimensions: 150 x 100; Total surface: 16575
UTM: 4167217, 408331
Field n°: 42
Chronology: Medieval

Site n°: 533
Denomination: Penapir-kala
Type: kala with rectangular plan
Dimensions: 120 x 70; Total surface: 7075
UTM: 4168811, 411585
Field n°: 44
Chronology: Medieval

Site n°: 534
Denomination: Durnali, ding
Type: ding with square plan
Dimensions: 8 x 8; Total surface: 64
UTM: 4193239, 419456
Field n°: 319
Chronology: Medieval

Site n°: 535
Denomination: Durnali, keshk
Type: keshk with square plan
Dimensions: 15 x 15; Total surface: 225
UTM: 4193362, 419550
Field n°: 320
Chronology: Medieval

Site n°: 536
Denomination: Durnali, rabat
Type: undetermined with square plan
Dimensions: 45 x 45; Total surface: 2025
UTM: 4193236, 419313
Dimensions: 70 x 100; Total surface: 6871
Field n°: 321
Chronology: Medieval

Site n°: 537
Denomination: Durnali-kala
Type: kala with square plan
Dimensions: 153 x 183; Total surface: 27999
Dimensions: 200 x 200; Total surface: 55030 m
UTM: 4193855, 419232
Field n°: 3
Chronology: Parthian, Sasanian

Site n°: 538
Denomination: Changly-depe
Type: tepe with round plan
Dimensions: 90 x 90; Total surface: 7433
UTM: 4192670, 416802
Field n°: 4
Chronology: Parthian, Sasanian

Site n°: 539
Denomination: keshk Besh Agyz
Type: rectangular
Dimensions: 22 x 20
UTM: 4191868, 417984
State of preservation at the moment of survey: good
Dimensions: 230 x 10; Total surface: 2300
Field n°:
Chronology: Medieval

Site n°: 540
Denomination: Changly, rabat ("kala")
Type: rectangular
Dimensions: 41 x 74
Field n°:
Chronology: Medieval
UTM: 4192109, 417369
State of preservation at the moment of survey: good
Dimensions: 80 40; Total surface: 3159

Site n°: 541
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 250 x 350; Total surface: 87500
UTM: 4127882, 445093
Field n°: 424
Chronology: Sasanian (?), Medieval

Site n°: 542
Denomination: Sr depe
Type: tepe with square plan
Dimensions: 90 x 90

UTM: 4187579, 416160
State of preservation at the moment of survey: good
Dimensions: 150 x 140; Total surface: 18975
Field n°: 11
Chronology: Parthian, Sasanian

Site n°: 543
Denomination: Uly Kishman, shakhristan
Type: undetermined with rectangular plan
Dimensions: 180 x 170; Total surface: 30600
UTM: 4198909, 421963
Field n°: 334
Chronology: Medieval

Site n°: 544
Denomination: Uly Kishman, depe (Khurmuzfarrah)
Type: tepe with square plan
Dimensions: 110 x 130; Total surface: 14300
UTM: 4199043, 421899
Field n°: 85
Chronology: Parthian, Sassanian

Site n°: 545
Denomination: Uly Kishman, ding
Type: ding with square plan
Dimensions: 8 x 8; Total surface: 64
UTM: 4198894, 421782
Field n°: 336
Chronology: Medieval

Site n°: 546
Denomination: Uly Kishman, North caravanserai
Type: caravanserai with rectangular plan
Dimensions: 150 x 50; Total surface: 7500
UTM: 4199226, 421478
Field n°: 335
Chronology: Medieval

Site n°: 547
Denomination: Uly Kishman, keshk
Type: keshk with rectangular plan
Dimensions: 8 x 15; Total surface: 120
UTM: 421425, 4198068
Field n°: 337
Chronology: Medieval

Site n°: 548
Denomination: Kurtly
Type: undetermined with square plan
Dimensions: 105 x 105
UTM: 4192161, 422442
Dimensions: 80 x 100; Total surface: 9675
Field n°: 14
Chronology: Sasanian; Medieval

Site n°: 549
Denomination: Kurtly, settlement
Type: undetermined with irregular plan
Dimensions: 1050 x 700; Total surface: 735000
State of preservation at the moment of survey: bad
Field n°: 325
Chronology: Medieval

Site n°: 550
Denomination: Kurtly, keshk
Type: keshk with square plan
Dimensions: 15 x 15; Total surface: 225
UTM: 4191869, 422806
Field n°: 347
Chronology: Medieval

Site n°: 551
Denomination: Kurtly, caravanserai
Type: caravanserai with rectangular plan
Dimensions: 50 x 40; Total surface: 2100
UTM: 4191526, 422696
Field n°: 326
Chronology: Medieval

Site n°: 552
Denomination: Kurtly, caravanserai (?)
Type: rectangular
Dimensions: 35 x 30; Total surface: 1050
UTM: 4191436, 422695
Field n°: 349
Chronology: Medieval

Site n°: 553
Denomination: Masdjid as-Sagit mosque (mosque of Kurtly)
Type: mosque with square plan
Dimensions: 42 x 42; Total surface: 1764
Chronology: Medieval
UTM: 4191871, 422440
Field n°: 327
Chronology: Yaz III

Site n°: 554
Denomination: Demirli-depe
Type: tepe with square plan
Dimensions: 170 x 100; Total surface: 14212
UTM: 4186796, 428330
Field n°: 78
Chronology: Sasanian; Medieval

Site n°: 555
Denomination: Gechigran (Gichigran)
Type: undeterrmined with square plan
Dimensions: 60 x 50; Total surface: 3400
UTM: 4188322, 427060
Field n°: 77
Chronology: Sasanian; Medieval

Site n°: 556
Denomination: Akcha-depe 1
Type: tepe, with square plan
Dimensions: 100 x 50; Total surface: 5225
UTM: 4189832, 429728
Field n°: 18
Chronology: Sasanian

Site n°: 557
Denomination: Abadjosh or Abajtash-depe (Abajdjosh-depe, Ubajdosh-depe)
Type: square
Dimensions: 130 x 180; Total surface: 23575
UTM: 4191860, 429167
Field n°: 15
Chronology: Sasanian; Medieval

Site n°: 558
Denomination: Shakal-kala (Shakal-depe)
Type: kala with square plan

Dimensions: 100 x 50; Total surface: 4600
UTM: 4183791, 415799
Field n°: 74
Chronology: Sasanian; Medieval

Site n°: 559
Denomination: Dew-kala (Dau-kala)
Type: kala with rectangular plan
Dimensions: 180 x 300; Total surface: 35162
UTM: 4173328, 421411
Field n°: 26
Chronology: Parthian period; Medieval

Site n°: 560
Denomination: Porsi-kala
Type: kala with irregular quardangle plan
Dimensions: 400 x 400; Total surface: 160000
UTM: 4169792, 421136
Field n°: 139
Chronology: Medieval

Site n°: 561
Denomination: Porsi-keshk (Parsu-keshk, Porsu-keshk)
Type: keshk with square plan
Dimensions: 20 x 20; Total surface: 400
UTM: 4169392, 421632
Field n°: 25
Chronology: Medieval

Site n°: 562
Denomination: Churnok-depe (Jurnek-depe)
Type: tepe, with square plan
Dimensions: 30 x 30; Total surface: 900
UTM: 4168592, 421878
Field n°: 24
Chronology: Sasanian

Site n°: 563
Denomination: Djin-depe
Type: undetermined with rectangular plan
Dimensions: 100 x 60; Total surface: 6000
UTM: 4163303, 417925
Field n°: 152
Chronology: Parthian period

Site n°: 564
Denomination: Geok-depe
Type: tepe with square plan
Dimensions: 190 x 200; Total surface: 38000
Dimensions: 170 x 130; Total surface: 18700
UTM: 4163684, 414062
Field n°: 344
Chronology: Parthian, Sasanian; Medieval

Site n°: 565
Denomination: Gujrukli-depe 1 (Kurukli-depe 1; Kurukly-depe 1)
Type: tepe with rectangular plan
Dimensions: 100 x 30; Total surface: 3587
UTM: 4185127, 417437
Field n°: 55
Chronology: Sasanian

Site n°: 566
Denomination: Gosha-depe nord
Type: tepe with quadrangular plan
Dimensions: 100 x 90; Total surface: 6100
UTM: 4173265, 418820
Chronology: Medieval

Site n°: 567
Denomination: Gosha-depe (Shajli-depe)
Type: tepe with rectangular plan
Dimensions: 130 x 90; Total surface: 13875
UTM: 4173264, 418820
Field n°: 46
Chronology: Medieval

Site n°: 568
Denomination: Naur-depe (Nowruz-depe)
Type: tepe with rectangular plan
Dimensions: 130 x 100; Total surface: 13200
UTM: 4171626, 417052
Field n°: 34
Chronology: Parthian, Sasanian

Site n°: 569
Denomination: Ajlow-depe
Type: tepe with irregular plan
Dimensions: 200 x 130; Total surface: 22140
UTM: 4172441, 415114
Field n°: 154
Chronology: Sasanian

Site n°: 570
Denomination: Kichidanik-depe
Type: tepe with square plan
Dimensions: 140 x 90; Total surface: 11275
UTM: 4171396, 416209
Field n°: 33
Chronology: Medieval

Site n°: 571
Denomination: anonymous keshk
Type: keshk with rectangular plan
Dimensions: 7 x 8; Total surface: 56
UTM: 4171081, 417335
Field n°: 332
Chronology: Medieval

Site n°: 572
Denomination: Jagly-depe
Type: tepe with rectangular plan
Dimensions: 50 x 80; Total surface: 3487
UTM: 4170718, 417457
Field n°: 35
Chronology: Parthian, Sasanian

Site n°: 573
Denomination: unknown
Type: undetermined with square plan
Dimensions: 30 x 30; Total surface: 900
UTM: 4170373, 417715
Field n°: 36
Chronology: Parthian period

Site n°: 574
Denomination: Soli-shan
Type: undetermined with rectangular plan
Dimensions: 150 x 60; Total surface: 9000
UTM: 4170084, 418161
Field n°: 37

Chronology: Medieval

Site n°: 575
Denomination: Khovesli-depe
Type: tepe with square plan
Dimensions: 40 x 40; Total surface: 1350
UTM: 4170342, 417158
Field n°: 32
Chronology: Parthian, Sasanian

Site n°: 576 (Oulija Depe)
Denomination: Owlija-depe
Type: tepe with irregular plan
Dimensions: 500 x 350; Total surface: 175000
UTM: 4173274, 413279
Field n°: 155
Chronology: Medieval

Site n°: 577
Denomination: Kara-Jurme (Kakly-depe), ark
Type: round
Dimensions: 150 x 150
UTM: 4164382, 410465
Field n°: 149-150
Chronology: Parthian, Sasanian

Site n°: 578
Denomination: Marymkhan-kala
Type: kala with rectangular plan
Dimensions: 200 x 350; Total surface: 70000
UTM: 4166468, 406158
Field n°: 151
Chronology: Medieval

Site n°: 579
Denomination: homestead Jekeper
Type: undetermined with square plan
Dimensions: 50 x 50; Total surface: 2500
UTM: 4177808, 410286
Field n°: 43
Chronology: Medieval

Site n°: 580
Denomination: Big Nagim-kala (Nigman-kala)
Type: kala with square plan
Dimensions: 45 x 45; Total surface: 2025
UTM: 4172504, 408722
Field n°: 43
Chronology: Sasanian; Medieval

Site n°: 581
Denomination: Small Nagim-kala (Small Nigman-kala)
Type: kala with rectangular plan
Dimensions: 9 x 5,5; Total surface: 45
UTM: 4172869, 408438
Field n°: 135
Chronology: Sasanian; Medieval

Site n°: 582
Denomination: Tapur-depe (Kum-kala; Kum-depe)
Type: tepe with irregular plan
Dimensions: 465 x 240; Total surface: 111600
UTM: 4172242, 404895
Field n°: 136
Chronology: Medieval

Site n°: 583
Denomination: Geobekly-depe
Type: tepe with square plan
Dimensions: 100 x 100; Total surface: 10000
Dimensions: 180 x 90; Total surface: 16125
Coords: 4195758, 411225
Field n°: 2
Chronology: Early Iron Age; Parthian, Sasanian

Site n°: 584
Denomination: Dingli Kishman, mediaeval homestead in the town
Type: homestead with rectangular plan
Dimensions: 70 x 50; Total surface: 3500
UTM: 4197602, 430320
Field n°: 314
Chronology: Medieval

Site n°: 585
Denomination: Dingli Kishman, minaret
Type: minaret with round plan
Dimensions: 6 x 6; Total surface: 36
UTM: 41917526, 430530
Field n°: 315
Chronology: Medieval

Site n°: 586
Denomination: Dingli Kishman, fortress
Type: fortress with rectangular plan
Dimensions: 185 x 150
Dimensions: 130 x 50; Total surface: 5075
UTM: 4197953, 430579
UTM: 4191325, 428700
Field n°: 312
Chronology: Parthian period

Site n°: 587
Denomination: Dingli Kishman, depe (Kojne Kishman, Staryj Kishman, Kushmejkhan)
Type: tepe, with square plan
Dimensions: 210 x 130; Total surface: 28912
UTM: 4194325, 430440
Field n°: 22
Chronology: Sasanian; Medieval

Site n°: 588
Denomination: town wall of Dingli Kishman (Kushmejkhan), NE portion
Type: town wall with irregular plan
Dimensions (length, m): 200
UTM: 4198040, 430973
UTM: 4202619, 423424
Field n°: 353
Chronology: Medieval

Site n°: 589
Type: Scatter
UTM: 4200039, 428922
Chronology: Undetermined

Site n°: 590
Type: undetermined
Dimensions: 154 x 50; Total surface: 6462
UTM: 4201066, 427303
Chronology: Yaz III

Site n°: 591
Type: undetermined
Dimensions: 130 x 100; Total surface: 11250
UTM: 4201467, 426523
Chronology: Yaz I; Yaz II

Site n°: 592=209
Type: undetermined
Dimensions: 400 x 100 m; Total surface: 27975
UTM: 4201718, 425984
Chronology: Late Yaz III

Site n°: 593
Type: undetermined
Dimensions: 60 x 10; Total surface: 325
UTM: 4202975, 423210
Chronology: Undetermined

Site n°: 594
Type: undetermined
Dimensions: 140 x 90; Total surface: 7125
UTM: 4202783, 423691
Chronology: Late Yaz III

Site n°: 595
Type: undetermined
UTM: 4201359, 425122
Chronology: Yaz II

Site n°: 596
Type: undetermined
UTM: 4201190, 425395
Chronology: Late Yaz III; Parthian-Sasanian

Site n°: 597
Type: undetermined
UTM: 4200615, 426025
Chronology: Yaz III; Late Yaz II

Site n°: 598
Type: undetermined
UTM: 4200545, 426355
Chronology: Yaz III

Site n°: 599
Type: undetermined
UTM: 4200705, 426640
Chronology: Yaz III

Site n°: 600
Denomination: Alikper Kharabasy
Type: undetermined, with rectangular plan
Dimensions: 300 x 20; Total surface: 51375
UTM: 4195152, 427047
Field n°: 21
Chronology: Medieval

Site n°: 601
Denomination: Sultan Sandjar mausoleum
Type: mausoleum with square plan
Dimensions: 30 x 50; Total surface: 2025
UTM: 4168983, 426236
Field n°: 343
Chronology: Medieval

Site n°: 602
Denomination: Erk-kala
Type: tepe 1 with round plan
Dimensions: 600 x 320; Total surface: 161039
UTM: 4169335, 428743
Field n°: 48
Chronology: Early Iron Age; Hellenistic, Parthian, Sasanian

Site n°: 603
Denomination: Gjaur-kala
Type: town with square plan
Dimensions: 1850 x 1940; Total surface:
UTM: 4167828, 428766
Field n°: 49
Chronology: Early Iron Age; Hellenistic, Parthian, Sasanian

Site n°: 604
Denomination: Bjash Pendje keshk (Beshbarmak)
Type: keshk with square plan
Dimensions: 5 x 5; Total surface: 25
UTM: 4169543, 425471
Field n°: 204
Chronology: Medieval

Site n°: 605
Type: undetermined
UTM: 4197947, 433061
Chronology: Sasanian; Islamic

Site n°: 606
Type: undetermined
Dimensions: 340 x 300; Total surface: 58678
UTM: 4199325, 431963
Chronology: Late Yaz III

Site n°: 607
Type: Spot
UTM: 4200089, 431714
Chronology: Yaz III; Late Yaz III

Site n°: 608
Type: Undetermined
Dimensions: 270 x 200; Total surface: 50198
UTM: 4198947, 431626
Chronology: Yaz III; Late Yaz III

Site n°: 609
Type: Undetermined
Dimensions: 400 x 150; Total surface: 56668
UTM: 4202280, 431978
Chronology: Undetermined

Site n°: 610
Type: Spot
UTM: 4199503, 432967
Chronology: Late Yaz III

Site n°: 611
Type: Undetermined
Dimensions: 100 x 150; Total surface: 21056
UTM: 4200213, 433668
Chronology: Islamic

Site n°: 612
Type: Spot
UTM: 4200366, 439481

Chronology: Islamic

Site n°: 613
Type: undetermined
Dimensions: Total surface:
UTM: 4200521, 430475
Chronology: Undetermined

Site n°: 614
Type: undetermined
Dimensions: Total surface:
UTM: 4183525, 445669
Chronology: Yaz III

Site n°: 615
Type: undetermined
Dimensions: 150 x 50; Total surface: 5194
UTM: 446389.06,4196788.04
Chronology: Islamic

Site n°: 616
Denomination: Imam-kala
Type: kala with rectangular plan
Dimensions: 100 x 50; Total surface: 6678
UTM: 4169182, 424693
Field n°: 206
Chronology: Parthian-Sasanian, Medieval

Site n°: 617
Denomination: Garam-khana
Type: undetermined with rectangular plan
Dimensions: 100 x 50; Total surface: 6678
UTM: 4169048, 424827
State of preservation at the moment of survey: good
Field n°: 207
Chronology: Medieval

Site n°: 618
Denomination: Big Kyz-kala
Type: kala with rectangular plan
Dimensions: 37 x 43; Total surface: 1591
UTM: 4168041, 425317
Field n°: 192
Chronology: Medieval

Site n°: 619
Denomination: Akcha-depe
Type: tepe with rectangular plan
Dimensions: 85 x 65; Total surface: 5525
UTM: 4167886, 419346
Field n°: 29
Chronology: Parthian, Sasanian

Site n°: 620
Denomination: Sultan-kala
Type: kala with irregular plan
Dimensions: 2100 x 2000; Total surface: 3728395
UTM: 4168023, 425697
Field n°: 50
Chronology: Medieval

Site n°: 621
Denomination: Shakhrijar-ark
Type: undetermined with irregular quadrangle
Dimensions: 300 x 600 x 400 x 500; Total surface: 30000
UTM: 4170178, 426670
Field n°: 342
Chronology: Medieval

Site n°: 622
Denomination: Kabul-khana in Shakhrijar-ark
Type: undetermined with rectangular plan
Dimensions: 100 x 70; Total surface: 7465
Dimensions: 22 x 8; Total surface: 176
UTM: 4169873, 426889
State of preservation at the moment of survey: good
Field n°: 196
Chronology: Medieval

Site n°: 623
Denomination: Iskander-kala (Northern appendix to Sultan-kala)
Type: kala with irregular plan
Dimensions: 1500 x 1700; Total surface: 2550000
UTM: 4170581, 425609
Field n°: 193
State of preservation at the moment of survey: good
Chronology: Medieval

Site n°: 624
Denomination: Mamun-keshk
Type: rectangular
Dimensions: 50 x 150; Total surface: 1531
UTM: 4170081, 427605
State of preservation at the moment of survey: very bad
Field n°: 204
Chronology: Medieval

Site n°: 625
Denomination: unknown
Type: undetermined with rectangular plan
Dimensions: 80 x 60; Total surface: 4800
UTM: 4170375, 427382
Field n°: 345
Chronology: Sasanian; Medieval

Site n°: 626
Denomination: anonymous keshk
Type: keshk with rectangular plan
Dimensions: 17 x 12; Total surface: 204
UTM: 4170475, 427346
Field n°: 172
Chronology: Medieval

Site n°: 627
Denomination: anonymous keshk
Type: keshk with rectangular plan
Dimensions: 9 x 11; Total surface: 99
UTM: 4170545, 427410
Field n°: 171
Chronology: Medieval

Site n°: 628
Denomination: "Bajram-Ali Necropolis"
Type: cemetery with irregular plan
Dimensions: 100 x 100; Total surface: 10000
UTM: 4167931, 423818
Field n°: 238
Chronology: Parthian, Sasanian

Site n°: 629
Type: undetermined

Dimensions: 280 x 180; Total surface: 39000.
UTM: 4216890, 404249
Chronology: Yaz I

Site n°: 630
Type: spot
UTM: 4235267, 401830
Chronology: LBA; Yaz I?

Site n°: 631
Type: Spot
UTM: 4232332, 399886
Chronology: LBA

Site n°: 632
Type: undetermined
Dimensions: Total surface:
UTM: not recorded
Chronology: LBA

Site n°: 633
Type: undetermined
UTM: not recorded
Chronology: Sasanian?

Site n°: 634
Type: undetermined
UTM: not recorded
Chronology: LBA

Site n°: 635
Type: undetermined
UTM: not recorded
Chronology:

Site n°: 636
Type: undetermined
UTM: not recorded
Chronology:

Site n°: 637
Type: undetermined
Dimensions: Total surface:
UTM: not recorded
Chronology: LBA

Site n°: 638
Type: Eda
Dimensions: 980 x 440; Total surface: 281592.
UTM: 4210240, 422855
Chronology: LBA

Site n°: 639
Type: undetermined
UTM: not recorded
Chronology: LBA

Site n°: 640
Type: undetermined
UTM: not recorded
Chronology: undetermined

Site n°: 641
Type: undetermined
UTM: not recorded
Chronology: LBA?

Site n°: 642
Type: undetermined
UTM: not recorded
Chronology: undetermined

Site n°: 643
Type: undetermined
Dimensions: Total surface:
UTM: not recorded
Chronology: MBA; LBA

Site n°: 644
Type: undetermined
Dimensions: Total surface:
UTM: not recorded
Chronology: undetermined

Site n°: 645
Type: undetermined
UTM: not recorded
Chronology: LBA

Site n°: 646
Type: undetermined
UTM: not recorded
Chronology: LBA; Yaz I

Site n°: 647
Type: Eda
Dimensions: 450 x 216; Total surface: 65000.
UTM: 4208869, 423475
Chronology: LBA

Site n°: 648
Type: undetermined
UTM: not recorded
Chronology: LBA

Site n°: 649
Type: Spot
UTM: 4209459, 423490
Chronology: Undetermined

Site n°: 650
Type: undetermined
Dimensions: 130 x 90; Total surface: 8927.
UTM: 4209858, 422964
Chronology: LBA

Site n°: 651
Type:Scatter
Dimensions: 112 x 67; Total surface: 5690.
UTM: 4209819, 422914
Chronology: LBA

Site n°: 652
Type: Spot
UTM:,4209819, 422914
Chronology: Undetermined

Site n°: 653
Type: Spot
UTM: 4212109, 422267
Chronology: Undetermined

Site n°: 654
Dimensions: 384 x 225 or 1470 x 1300;
Total surface: from map is 81324 o 1184087
Type: Lda
UTM: 4233756, 430211
Chronology: Undetermined

Site n°: 655
Type: undetermined
Dimensions: Total surface: 2400.
UTM: 4234842, 431043
Chronology:

Site n°: 656 (Aucin1)
Type: tepe
Dimensions: 344 x 140; Total surface: 35488.
UTM: 4238895, 430734
Chronology: LBA

Site n°: 657
Type: lda
Dimensions: 474 x 80; Total surface: 22528.
UTM: 4238963, 424954
Chronology: LBA

Site n°: 658
Type: spot
UTM: 4237364, 420282
Chronology: LBA

Site n°: 659
Type: spot
UTM: 4236397, 418718
Chronology: LBA

Site n°: 660
Denomination: unknown
Type: undetermined with square plan
Dimensions: 20 x 20; Total surface: 400
UTM: 4167641, 431390
Field n°: 178
Chronology: Sasanian; Medieval

Site n°: 661
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 150 x 180; Total surface: 27000
UTM: 4167804, 431555
Field n°: 179
Chronology: Sasanian; Medieval

Site n°: 662
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 30 x 70; Total surface: 2100
UTM: 4168061, 431849
Field n°: 180
Chronology: Medieval

Site n°: 663
Denomination: unknown
Type: undetermined with oval plan
Dimensions: 150 x 70; Total surface: 10500
UTM: 4166758, 431460
Field n°: 181
Chronology: Medieval

Site n°: 664
Denomination: anonymous keshk
Type: undetermined with rectangular plan
Dimensions: 10 x 30; Total surface: 300
UTM: 4167561, 428956
Field n°: 182
Chronology: Medieval

Site n°: 665
Denomination: khowuz (sardoba)
Type: undetermined with round plan
Dimensions: 23 x 23; Total surface: 529
UTM: 4167474, 428075
Field n°: 183
Chronology: Medieval

Site n°: 666
Denomination: khowuz (sardoba)
Type: undetermined with round plan
Dimensions: 10 x 10; Total surface: 100
UTM: 4166523, 426730
Field n°: 184
Chronology: Medieval

Site n°: 667
Denomination: khowuz (sardoba)
Type: undetermined with round plan
Dimensions: 15 x 15; Total surface: 225
UTM: 4167065, 427410
Field n°: 185
Chronology: Medieval

Site n°: 668
Denomination: keshk-i Myrat
Type: undetermined with rectangular plan
Dimensions: 13 x 26; Total surface: 338
UTM: 4167244, 427167
Field n°: 186
Chronology: Medieval

Site n°: 669
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 300 x 100; Total surface: 30000
UTM: 4166695, 427416
Field n°: 187
Chronology: Medieval

Site n°: 670
Denomination: Abdulla-khan-kala
Type: undetermined with square plan
Dimensions: 700 x 700; Total surface: 490000
UTM: 4165221, 426520
Field n°: 188
Chronology: Medieval

Site n°: 671
Denomination: Bajram-Ali-khan-kala
Type: undetermined with trapezeoid plan
Dimensions: 300 x 310; Total surface: 93000
UTM: 4165049, 425850
Field n°: 189
Chronology: Medieval

Site n°: 672
Denomination: unknown

Type: undetermined with rectangular plan
Dimensions: 40 x 30; Total surface: 1200
UTM: 4168943, 425353
Field n°: 190
Chronology: Medieval

Site n°: 673
Denomination: anonymous depe
Type: tepe with oval plan
Dimensions: 40 x 60
UTM: 4144599, 425541
Field n°: 377
Chronology: Medieval

Site n°: 674
Denomination: Kichik Sultan-kala (Southern appendix to Sultan-kala)
Type: kala with irregular plan
Dimensions: 1000 x 1750; Total Surface: 1750000
UTM: not recorded
Field n°: 194
Chronology: Medieval

Site n°: 675
Denomination: Akhmed-Zamchi mausoleum
Type: mausoleum with square plan
Dimensions: 6 x 6; Total Surface: 36
UTM: not recorded
Field n°: 195
Chronology: Medieval

Site n°: 676
Denomination: Jassy-depe (Ak-depe, Akcha-kala)
Type: kala with square plan
Dimensions: 100 x 100; Total surface: 1000
Field n°: 56
Chronology: Sasanian

Site n°: 677
Denomination: unknown
Type: undetermined with rectangular plan
Dimensions: 20 x 35; Total surface: 700
UTM: not recorded
Field n°: 197
Chronology: Early Iron Age; Parthian period

Site n°: 678
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 120 x 170; Total surface:
UTM: 4188376, 405423
Field n°:
Chronology: Early Iron Age

Site n°: 679
Denomination: Kurtly mosque
Type: mosque with rectangular plan
Dimensions: 30 x 40; Total surface: 1200
UTM: 4192060, 422799
Field n°: 348
Chronology: Medieval

Site n°: 680
Denomination: palace in Shakhrijar-ark
Type: undetermined with rectangula plan
Dimensions: 45 x 39; Total surface: 1755
UTM: 4199395, 421410
Field n°: 338
Chronology: Medieval

Site n°: 681
Denomination: Mukhammed ibn-Zeid mausoleum
Type: mausoleum with rectangular plan
Dimensions: 15 x 17; Total surface: 255
UTM: 424762, 4170011
Field n°: 205
Chronology: Medieval

Site n°: 682
Denomination: Uly Kishman, West caravanserai
Type: caravanserai with square plan
Dimensions: 60 x 60; Total surface: 3600
Dimensions: 150 x 50; Total surface: 6862
UTM: 4199395, 421410
Field n°: 338
Chronology: Medieval

Site n°: 683
Denomination: Uly Kishman, settlement
Type:undetermined with irregular plan
Dimensions: 1600 x 1150; Total surface: 1840000
UTM: 4199040, 421900
Field n°: 333
Chronology: Medieval

Site n°: 684
Denomination: Giljakin-Chilburj, fragment of the wall
Type: hearth wall
Dimensions (length, m): 120
UTM: 4172128, 427354
Field n°: 208
Chronology: Hellenistic (?); Parthian

Site n°: 685
Denomination: Jaratoz-baba
Type: undetermined with square plan
Dimensions: 4 x 4; Total surface:
UTM: not registered
Field n°: 209
Chronology: Medieval

Site n°: 686
Denomination: Sakhabalar (mausoleums of askhabs)
Type: mausoleum with irregular plan
Dimensions: 19 x 26; Total surface: 494
UTM: not registered
Field n°: 210
Chronology: Medieval

Site n°: 687
Denomination: Kyz-bibi (Gyz-bibi)
Type: undetermined with square plan
Dimensions: 7 x 7,5; Total surface: 50
UTM: 4168728, 425212
Field n°: 211
Chronology: Medieval

Site n°: 688
Denomination: anonymous kala
Type: kala with rectangular plan
Dimensions: 70 x 30; Total surface: 2100
UTM: 4171525, 431744

Field n°: 212
Chronology: Parthian, Sasanian

Site n°: 689
Denomination: unknown
Type: undetermined with round plan
Dimensions: 60 x 70; Total surface: 4200
UTM: 4172979, 433481
Field n°: 213
Chronology: Parthian, Sasanian

Site n°: 690
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 150 x 400; Total surface: 60000
UTM: 4173779, 433119
Field n°: 214
Chronology: Medieval

Site n°: 691
Denomination: unknown
Type: undetermined with irregular plan
Dimensions: 190 x 140; Total surface: 26600
UTM: 4180738, 430853
Field n°: 215
Chronology: Medieval

Site n°: 692
Denomination: anonymous kala
Type: kala with rectangular plan
Dimensions: 120 x 60; Total surface: 7200
UTM: 4180413, 430281
Field n°: 216
Chronology: Medieval

Site n°: 693
Denomination: anonymous
Type: undetermined with rectangular plan
Dimensions: 20 x 40; Total surface: 800
UTM: 4177090, 430426
Field n°: 217
Chronology: Parthian, Sasanian; Medieval (?)

Site n°: 694
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 100 x 400; Total surface: 40000
UTM: 4180843, 430201
Field n°: 218
Chronology: Medieval

Site n°: 695
Denomination: unknown
Type: undetermined with irregular plan
Dimensions: 40 x 150; Total surface: 6000
UTM: 4180867, 429983
Field n°: 219
Chronology: Medieval

Site n°: 696
Denomination: unknown
Type: undetermined with round plan
Dimensions: 50 x 50; Total surface: 2500
UTM: 4180958, 429814
Field n°: 220
Chronology: Medieval

Site n°: 697
Denomination: unknown
Type: undetermined with oval plan
Dimensions: 80 x 100; Total surface: 8000
UTM: 4180915, 429548
Field n°: 221
Chronology: Medieval

Site n°: 698
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 400 x 150; Total surface: 600000
UTM: 4180592, 429406
Field n°: 222
Chronology: Medieval

Site n°: 699
Denomination: anonymous keshk
Type: undetermined with square plan
Dimensions: 15 x 15; Total surface: 225
UTM: 4177088, 430421
Field n°: 223
Chronology: Medieval

Site n°: 700
Type:
Dimensions: Total surface:
UTM: 4234664, 389923
Chronology: LBA

Site n°: 701
Type:
Dimensions: Total surface:
UTM: 4234370, 390703
Chronology: LBA

Site n°: 702
Type:
Dimensions: Total surface:
UTM:,4233918, 391362
Chronology: LBA

Site n°: 703
Type:
Dimensions: Total surface:
UTM: 4233571, 390742
Chronology: LBA

Site n°: 704
Type:
Dimensions: Total surface:
UTM: 4231519, 417896
Chronology: LBA

Site n°: 705
Type:
Dimensions: Total surface:
UTM: 4233702, 392563
Chronology: LBA

Site n°: 706
Type:
Dimensions: Total surface:
UTM: 4233864, 393204
Chronology: LBA

Site n°: 707
Type:
Dimensions: Total surface:
UTM: 4232714, 397536
Chronology: LBA

Site n°: 708
Type:
Dimensions: Total surface:
UTM: 4232317, 397969
Chronology: LBA

Site n°: 709
Type:
Dimensions: Total surface:
UTM: 4232080, 398443
Chronology: LBA

Site n°: 710
Type:
Dimensions: Total surface:
UTM: 4231450, 418143
Chronology: LBA

Site n°: 711
Type:
Dimensions: Total surface:
UTM: 4231658, 418580
Chronology: LBA

Site n°: 712
Type:
Dimensions: Total surface:
UTM: 4231228, 418857
Chronology: LBA

Site n°: 713
Type:
Dimensions: Total surface:
UTM: 4251760, 385527
Chronology: LBA

Site n°: 714
Type:
Dimensions: Total surface:
UTM: 4251946, 386405
Chronology: LBA

Site n°: 715
Type:
Dimensions: Total surface:
UTM: 4251223, 391047
Chronology: LBA

Site n°: 716
Type:
Dimensions: Total surface:
UTM: 4250908, 393455
Chronology: LBA

Site n°: 717
Type:
Dimensions: Total surface:
UTM: 4250711, 392084
Chronology: LBA

Site n°: 718
Type:
Dimensions: Total surface:
UTM: 4250065, 392116
Chronology: LBA

Site n°: 719
Type:
Dimensions: Total surface:
UTM: 4250771, 390842
Chronology: LBA

Site n°: 720
Type:
Dimensions: Total surface:
UTM: 4250733, 395933
Chronology: LBA

Site n°: 721
Type:
Dimensions: Total surface:
UTM: 4242445, 402811
Chronology: LBA

Site n°: 722
Type:
Dimensions: Total surface:
UTM: 4242250, 403060
Chronology: LBA

Site n°: 723
Type:
Dimensions: Total surface:
UTM: 4241587, 403893
Chronology: LBA

Site n°: 724
Type:
Dimensions: Total surface:
UTM: 4241516, 406642
Chronology: LBA

Site n°: 725
Type:
Dimensions: Total surface:
UTM: 4241490, 406834
Chronology: LBA

Site n°: 726
Type:
Dimensions: Total surface:
UTM: 4241166, 407527
Chronology: LBA

Site n°: 727
Type:
Dimensions: Total surface:
UTM: 4240855, 413495
Chronology: LBA

Site n°: 728
Type:
Dimensions: Total surface:
UTM: 4240171, 416430
Chronology: LBA

Site n°: 729
Type:
Dimensions: Total surface:
UTM: 4238553, 416279
Chronology: LBA

Site n°: 730
Type:
Dimensions: Total surface:
UTM: 4235339, 415816
Chronology: LBA

Site n°: 731
Type:
Dimensions: Total surface:
UTM: 4234528, 416135
Chronology: LBA

Site n°: 732
Type:
Dimensions: Total surface:
UTM: 4251124, 386948
Chronology: LBA

Site n°: 733
Type:
Dimensions: Total surface:
UTM: 4251103, 409200
Chronology: LBA

Site n°: 734
Type:
Dimensions: Total surface:
UTM: 4250200, 409545
Chronology: LBA

Site n°: 735
Type:
Dimensions: Total surface:
UTM: 4252473, 409930
Chronology: LBA

Site n°: 736
Type:
Dimensions: Total surface:
UTM: 4252393, 410438
Chronology: LBA

Site n°: 737
Type:
Dimensions: Total surface:
UTM: 4252521, 412987
Chronology: LBA

Site n°: 738
Type:
Dimensions: Total surface:
UTM: 4252528, 413352
Chronology: LBA

Site n°: 739
Type:
Dimensions: Total surface:
UTM: 4248712, 410315
Chronology: LBA

Site n°: 740
Type:
Dimensions: Total surface:
UTM: 4246324, 412831
Chronology: LBA

Site n°: 741
Type:
Dimensions: Total surface:
UTM: 4243094, 415525
Chronology: LBA

Site n°: 742
Type:
Dimensions: Total surface:
UTM: 4242312, 415810
Chronology: LBA

Site n°: 743
Type:
Dimensions: Total surface:
UTM: 4245483, 416172
Chronology: LBA

Site n°: 744
Type:
Dimensions: Total surface:
UTM:
Chronology: LBA

Site n°: 745
Type:
Dimensions: Total surface:
UTM: 4234314, 413290
Chronology: LBA

Site n°: 746
Type:
Dimensions: Total surface:
UTM: 4234886, 400638
Chronology: LBA

Site n°: 747
Type:
Dimensions: Total surface:
UTM: 4235007, 400593
Chronology: LBA

Site n°: 748
Type:
Dimensions: Total surface:
UTM: 4250600, 412574
Chronology: LBA

Site n°: 749
Type:
Dimensions: Total surface:
UTM:
Chronology: LBA

Site n°: 750
Type:
Dimensions: Total surface:
UTM:
Chronology: LBA

Site n°: 751
Type:
Dimensions: Total surface:
UTM: 4252472, 413533
Chronology: LBA

Site n°: 752
Type:
Dimensions: Total surface:
UTM: 4251843, 413585
Chronology: LBA

Site n°: 753
Type:
Dimensions: Total surface:
UTM: 4250388, 396258
Chronology: LBA

Site n°: 753
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 60 x 35; Total surface: 2100
UTM: 4177280, 421766
Field n°: 240
Chronology: Medieval

Site n°: 754
Denomination: unknown
Type: undetermined with oval plan
Dimensions: 70 x 150; Total surface: 10500
UTM: 4176854, 427978
Field n°: 242
Chronology: Medieval

Site n°: 755
Denomination: unknown
Type: undetermined with triangular plan
Dimensions: 110 x 150; Total surface: 16500
UTM: 4176860, 427563
Field n°: 243
Chronology: Sasanian; Medieval

Site n°: 756
Denomination: unknown
Type: undetermined with trapezeoid plan
Dimensions: 30 x 100; Total surface: 3000
UTM: 4177627, 428462
Field n°: 244
Chronology: Medieval

Site n°: 757
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 200 x 50; Total surface: 10000
UTM: 4177843, 428738
Field n°: 245
Chronology: Medieval

Site n°: 758
Denomination: unknown
Type: undetermined with oval plan
Dimensions: 20 x 15; Total surface: 300
UTM: 4177487, 428523
Field n°: 246
Chronology: Medieval

Site n°: 759
Denomination: unknown
Type: undetermined with irregular plan
Dimensions: 50 x 120; Total surface: 6000
UTM: 4177374, 428667
Field n°: 247
Chronology: Sasanian (?); Medieval

Site n°: 760
Denomination: unknown
Type: undetermined with round plan
Dimensions: 20 x 20; Total surface: 400
UTM: 4178003, 428510
Field n°: 248
Chronology: Medieval

Site n°: 761
Denomination: unknown
Type: undetermined with round plan
Dimensions: 25 x 25; Total surface: 625
UTM: 4180986, 428989
Field n°: 249
Chronology: Medieval

Site n°: 762
Denomination: unknown
Type: undetermined with round plan
Dimensions: 80 x 40; Total surface: 3200
UTM: 4180986, 428989
Field n°: 250
Chronology: Medieval

Site n°: 763
Denomination: unknown
Type: undetermined with round plan
Dimensions: 30 x 30; Total surface: 900
UTM: 4180905, 429181
Field n°: 251
Chronology: Medieval

Site n°: 764
Denomination: unknown
Type: undetermined with oval plan
Dimensions: 70 x 50; Total surface: 3500
UTM: 4180665, 429029
Field n°: 252
Chronology: Medieval

Site n°: 765
Denomination: unknown
Type: undetermined with irregular plan
Dimensions: 150 x 70; Total surface: 10500
UTM: 4181405, 428712
Field n°: 253
Chronology: Early Iron Age; Medieval

Site n°: 766
Denomination: unknown
Type: undetermined with round plan
Dimensions: 25 x 25; Total surface: 625
UTM: 4181660, 428611
Field n°: 254
Chronology: Medieval

Site n°: 767
Denomination: unknown

Type: undetermined with rectangular plan
Dimensions: 70 x 50; Total surface: 3500
UTM: 4180404, 423252
Field n°: 255
Chronology: Sasanian

Site n°: 768
Denomination: unknown
Type: undetermined with irregular plan
Dimensions: 30 x 25; Total surface: 700
UTM: 4177670, 421148
Field n°: 256
Chronology: Sasanian (?); Medieval

Site n°: 769
Denomination: anonymous settlement
Type: undetermined with rectangular plan
Dimensions: 50 x 40; Total surface: 2000
UTM: 4180376, 423512
Field n°: 257
Chronology: Medieval

Site n°: 770
Denomination: unknown
Type: undetermined with irregular plan
Dimensions: 40 x 45; Total surface: 1800
UTM: 4181491, 424566
Field n°: 258
Chronology: Medieval

Site n°: 771
Denomination: unknown
Type: undetermined with oval plan
Dimensions: 15 x 20; Total surface: 300
UTM: 4180433, 422356
Field n°: 259
Chronology: Medieval

Site n°: 772
Denomination: unknown
Type: undetermined with irregular plan
Dimensions: 10 x 10; Total surface: 100
UTM: 4180346, 422567
Field n°: 260
Chronology: Medieval

Site n°: 773
Denomination: unknown
Type: undetermined with irregular plan
Dimensions: 15 x 20; Total surface: 300
UTM: 4180463, 422175
Field n°: 261
Chronology: Medieval

Site n°: 774
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 40 x 30; Total surface: 1200
UTM: 4180506, 421947
Field n°: 262
Chronology: Medieval

Site n°: 775
Denomination: unknown
Type: undetermined with oval plan
Dimensions: 30 x 35; Total surface: 1050
UTM: 4180033, 424618
Field n°: 263
Chronology: Medieval

Site n°: 776
Denomination: unknown
Type: undetermined with oval plan
Dimensions: 70 x 30; Total surface: 2100
UTM: 4180894, 425749
Field n°: 264
Chronology: Medieval

Site n°: 777
Denomination: unknown
Type: undetermined with irregular plan
Dimensions: 300 x 100; Total surface: 30000
UTM: 4181034, 425572
Field n°: 265
Chronology: Medieval

Site n°: 778
Denomination: unknown
Type: undetermined with irregular plan
Dimensions: 150 x 80; Total surface: 12000
UTM: 4181235, 425508
Field n°: 266
Chronology: Medieval

Site n°: 779
Denomination: anonymous kala
Type: undetermined with rectangular plan
Dimensions: 60 x 45; Total surface: 2700
UTM: 4182185, 426385
Field n°: 267
Chronology: Sasanian; Medieval

Site n°: 780
Denomination: anonymous kala
Type: undetermined with rectangular plan
Dimensions: 70 x 100; Total surface: 7000
UTM: 4182307, 426781
Field n°: 268
Chronology: Sasanian; Medieval

Site n°: 781
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 300 x 200; Total surface: 60000
UTM: 4182307, 426781
Field n°: 269
Chronology: Medieval

Site n°: 782
Denomination: anonymous kala
Type: undetermined with rectangular plan
Dimensions: 70 x 120; Total surface: 8400
UTM: 4182651, 426923
Field n°: 270
Chronology: Sasanian; Medieval

Site n°: 783
Denomination: unknown
Type: undetermined with oval plan
Dimensions: 17 x 25; Total surface: 425
UTM: 4183241, 426119
Field n°: 271

Chronology: Medieval

Site n°: 784
Denomination: unknown
Type: undetermined with irregular plan
Dimensions: 30 x 25; Total surface: 750
UTM: 4183543, 426241
Field n°: 272
Chronology: Medieval

Site n°: 785
Denomination: unknown
Type: undetermined with round plan
Dimensions: 20 x 20; Total surface: 400
UTM: 4183732, 426552
Field n°: 273
Chronology: Medieval

Site n°: 786
Denomination: unknown
Type: undetermined with oval plan
Dimensions: 24 x 20; Total surface: 480
UTM: 4182388, 427134
Field n°: 274
Chronology: Medieval

Site n°: 787
Denomination: unknown
Type: undetermined with oval plan
Dimensions: 14 x 20; Total surface:
UTM: 4181826, 425993
Field n°: 275
Chronology: Medieval

Site n°: 788
Denomination: unknown
Type: undetermined with oval plan
Dimensions: 14 x 20; Total surface: 280
UTM: 4181826, 425993
Field n°: 276
Chronology: Medieval

Site n°: 789
Denomination: unknown
Type: undetermined with irregular plan
Dimensions: 30 x 35; Total surface: 1050
UTM: 4181587, 426339
Field n°: 277
Chronology: Medieval

Site n°: 790
Denomination: unknown
Type: undetermined with irregular plan
Dimensions: 45 x 30; Total surface: 1350
UTM: 4181495, 426643
Field n°: 278
Chronology: Medieval

Site n°: 791
Denomination: anonymous keshk
Type: undetermined with rectangular plan
Dimensions: 15 x 30; Total surface: 450
UTM: 4182244, 423245
Field n°: 279
Chronology: Medieval

Site n°: 792
Denomination: unknown
Type: undetermined with round plan
Dimensions: 20 x 20; Total surface: 400
UTM: 4180791, 427314
Field n°: 280
Chronology: Medieval

Site n°: 793
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 500 x 150; Total surface: 75000
UTM: 4179808, 426778
Field n°: 281
Chronology: Medieval

Site n°: 794
Denomination: anonymous keshk
Type: keshk with rectangular plan
Dimensions: 20 x 16; Total surface: 320
UTM: 4179685, 426310
Field n°: 282
Chronology: Medieval

Site n°: 795
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 40 x 250; Total surface: 10000
UTM: 4179365, 426500
Field n°: 283
Chronology: Medieval

Site n°: 796
Denomination: anonymous keshk
Type: undetermined with rectangular plan
Dimensions: 18 x 14; Total surface: 252
UTM: 4179319, 425987
Field n°: 284
Chronology: Medieval

Site n°: 797
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 30 x 70; Total surface: 2100
UTM: 4178846, 425501
Field n°: 285
Chronology: Medieval

Site n°: 798
Denomination: unknown
Type: undetermined with irregular plan
Dimensions: 20 x 20; Total surface: 400
UTM: 4179075, 425459
Field n°: 286
Chronology: Medieval

Site n°: 799
Denomination: anonymous kala (Djynny-kala)
Type: undetermined with rectangular plan
Dimensions: 25 x 100; Total surface: 2500
UTM: 4178799, 424863
Field n°: 287
Chronology: Medieval

Site n°: 800
Type:

Dimensions: Total surface:
UTM: 4212395, 420291
Chronology: LBA
Field n°:

Site n°: 801
Type:
Dimensions: Total surface:
UTM: 4212486, 420438
Chronology: LBA

Site n°: 802
Type:
Dimensions: Total surface:
UTM: 4212043, 420361
Chronology: LBA

Site n°: 803
Type:
Dimensions: Total surface:
UTM: 4211929, 420608
Chronology: LBA

Site n°: 804
Type:
Dimensions: Total surface:
Chronology: LBA
UTM: 4211929, 420623

Site n°: 805
Type:
Dimensions: Total surface:
UTM: 4213208, 420401
Chronology: LBA

Site n°: 806
Type:
Dimensions: Total surface:
UTM: 4212615, 420498
Chronology: LBA

Site n°: 807
Type:
Dimensions: Total surface:
UTM:
Chronology: LBA

Site n°: 808
Type:
Dimensions: Total surface:
UTM: 4212372, 420715
Chronology: LBA

Site n°: 809
Type:
Dimensions: Total surface:
UTM: 4212114, 420639
Chronology: LBA

Site n°: 810
Type:
Dimensions: Total surface:
UTM: 4212058, 420697
Chronology: LBA

Site n°: 811
Type:
Dimensions: Total surface:
UTM: 4210718, 421533
Chronology: LBA

Site n°: 812
Type:
Dimensions: Total surface:
UTM: 4210700, 421474
Chronology: LBA

Site n°: 813
Type:
Dimensions: Total surface:
UTM: 4210847, 421592
Chronology: LBA

Site n°: 814
Type:
Dimensions: Total surface:
UTM: 4211163, 421478
Chronology: LBA

Site n°: 815
Type:
Dimensions: Total surface:
UTM: 4211978, 421369
Chronology: LBA

Site n°: 816
Type:
Dimensions: Total surface:
UTM: 4211960, 421281
Chronology: LBA

Site n°: 817
Type:
Dimensions: Total surface:
UTM: 4216102, 421365
Chronology: LBA

Site n°: 818
Type:
Dimensions: Total surface:
UTM: 4214578, 422155
Chronology: LBA

Site n°: 819
Type:
Dimensions: Total surface:
Chronology: LBA
UTM: 4212433, 412935

Site n°: 820
Type:
Dimensions: Total surface:
Chronology: LBA
UTM: 4213114, 413264

Site n°: 821
Type:
Dimensions: Total surface:
Chronology: LBA
UTM: 4214422, 412021

Site n°: 822
Type:
Dimensions: Total surface:
UTM: 4217819, 412613
Chronology: LBA

Site n°: 823
Type:
Dimensions: Total surface:
UTM: 4217431, 412594
Chronology: LBA

Site n°: 824
Type:
Dimensions: Total surface:
UTM: 4216723, 413040
Chronology: LBA

Site n°: 825
Type:
Dimensions: Total surface:
UTM:
Chronology: LBA

Site n°: 826
Type:
Dimensions: Total surface:
UTM: 4219559, 410732
Chronology: LBA

Site n°: 827
Type:
Dimensions: Total surface:
UTM: 4219540, 410790
Chronology: LBA

Site n°: 828
Type:
Dimensions: Total surface:
UTM: 4219574, 411039
Chronology: LBA

Site n°: 829
Type:
Dimensions: Total surface:
UTM: 4218686, 411073
Chronology: LBA

Site n°: 830
Type:
Dimensions: Total surface:
UTM: 4218402, 410003
Chronology: LBA

Site n°: 831
Type:
Dimensions: Total surface:
UTM: 4218407, 409579
Chronology: LBA

Site n°: 832
Type:
Dimensions: Total surface:
UTM: 4219237, 409735
Chronology: LBA

Site n°: 833
Type:
Dimensions: Total surface:
UTM: 4243596, 381113
Chronology: LBA

Site n°: 834
Type:
Dimensions: Total surface:
UTM: 4243131, 380404
Chronology: LBA

Site n°: 835
Type:
Dimensions: Total surface:
UTM: 4215693, 387080
Chronology: LBA

Site n°: 836
Denomination: anonymous kala
Type: kala with irregular plan
Dimensions: 8 x 14; Total surface: 112
UTM: 4180965, 428844
Field n°: 224
Chronology: Medieval

Site n°: 837
Denomination: anonymous kala
Type: kala with irregular plan
Dimensions: 40 x 19; Total surface: 760
UTM: 4181173, 428867
Field n°: 225
Chronology: Medieval

Site n°: 838
Denomination: anonymous tepe
Type: tepe with irregular plan
Dimensions: 8 x 30; Total surface: 240
UTM: 4164063, 409483
Field n°: 226
Chronology: Medieval

Site n°: 839
Denomination: Khalnazarbaj-depe
Type: tepe with rectangular plan
Dimensions: 25 x 35; Total surface: 875
UTM: 4180679, 431158
Field n°: 227
Chronology: Parthian, Sasanian

Site n°: 840
Denomination: unknown
Type: undetermined with irregular plan
Dimensions: 50 x 300; Total surface: 15000
UTM: 4179824, 431152
Field n°: 228
Chronology: Parthian period; Medieval

Site n°: 841
Denomination: unknown
Type: undetermined with oval plan
Dimensions: 120 x 150; Total surface: 18000
Chronology: Medieval
UTM: 4177635, 428789
Field n°: 229

Site n°: 842
Denomination: anonymous kala
Type: undetermined with rectangular plan
Dimensions: 20 x 35; Total surface: 7000
UTM: 4177262, 428877
Field n°: 230
Chronology: Medieval

Site n°: 843
Denomination: anonymous kala
Type: undetermined with rectangular plan
Dimensions: 50 x 35; Total surface: 1750
UTM: 4177262, 428877
Field n°: 231
Chronology: Medieval

Site n°: 844
Denomination: anonymous kala
Type: kala with square plan
Dimensions: 30 x 30; Total surface: 900
UTM: 4177262, 428877
Field n°: 232
Chronology: Medieval

Site n°: 845
Denomination: unknown
Type: undetermined with irregular plan
Dimensions: 50 x 200; Total surface: 10000
UTM: 4177262, 428344
Field n°: 233
Chronology: Medieval

Site n°: 846
Denomination: anonymous settlement
Type: undetermined with oval plan
Dimensions: 50 x 110; Total surface: 5500
UTM: 4176855, 427980
Field n°: 234
Chronology: Medieval

Site n°: 847
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 60 x 100; Total surface: 6000
UTM: 4176891, 428550
Field n°: 235
Chronology: Medieval

Site n°: 848
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 150 x 250; Total surface: 37500
UTM: 4176855, 427980
Field n°: 236
Chronology: Medieval

Site n°: 849
Denomination: unknown
Type: undetermined with irregular plan
Dimensions: 150 x 60; Total surface: 9000
UTM: 4176724, 428932
Field n°: 237
Chronology: Medieval

Site n°: 850
Denomination: unknown
Type: undetermined with irregular plan
Dimensions: 20 x 100; Total surface: 2000
UTM: 4178035, 421898
Field n°: 238
Chronology: Medieval

Site n°: 851
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 300 x 1000; Total surface: 300000
UTM: 4178906, 425066
Field n°: 288
Chronology: Medieval

Site n°: 852
Denomination: unknown
Type: undetermined with irregular plan
Dimensions: 30 x 25; Total surface: 750
UTM: 4179002, 424470
Field n°: 289
Chronology: Medieval

Site n°: 853
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 500 x 100; Total surface: 50000
UTM: 4177217, 427400
Field n°: 290
Chronology: Medieval

Site n°: 854
Denomination: Ishak-owlija depe
Type: tepe with irregular plan
Dimensions: 150 x 60; Total surface: 9000
UTM: 4168099, 434358
Field n°: 291
Chronology: Medieval

Site n°: 855
Denomination: unknown
Type: undetermined with irregular plan
Dimensions: 40 x 100; Total surface: 4000
UTM: 4168106, 433409
Field n°: 292
Chronology: Medieval

Site n°: 856
Denomination: anonymous settlement
Type: undetermined with square plan
Dimensions: 100 x 30; Total surface: 3000
UTM: 4168106, 433409
Field n°: 293
Chronology: Medieval

Site n°: 857
Denomination: unknown
Type: undetermined with irregular plan
Dimensions: 120 x 80; Total surface: 9600
UTM: 4169556, 433575
Field n°: 294
Chronology: Medieval

Site n°: 858
Denomination: anonymous settlement
Type: undetermined with trapezeoid plan
Dimensions: 150 x 100; Total surface: 15000

UTM: 4169556, 433575
Field n°: 295
Chronology: Medieval

Site n°: 859
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 150 x 25; Total surface: 3750
UTM: 4172084, 431096
Field n°: 296
Chronology: Medieval

Site n°: 860
Denomination: anonymous kala
Type: kala with symmetrical pentagon plan
Dimensions: 70 x 60; Total surface: 4200
UTM: 4183856, 422998
Field n°: 297
Chronology: Medieval

Site n°: 861
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 30 x 80; Total surface: 2400
UTM: 4183856, 422998
Field n°: 298
Chronology: Medieval

Site n°: 862
Denomination: caravanserai near Suwli-depe
Type: caravanserai with rectangular plan
Dimensions: 52 x 30; Total surface: 1560
UTM: 4186419, 423810
Field n°: 299
Chronology: Medieval

Site n°: 863
Khudojnazar
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 400 x 250; Total surface: 100000
UTM: 4186630, 423579
Field n°: 300
Chronology: Medieval

Site n°: 864
Denomination: unknown
Type: undetermined with round plan
Dimensions: 40 x 40; Total surface: 1600
UTM: 423579, 4186630
Field n°: 301
Chronology: Medieval

Site n°: 865
Denomination: Khudojnazar mausoleum
Type: mausoleum with square plan
Dimensions: 11 x 11; Total surface: 121
UTM: 423924, 4185927
Field n°: 302
Chronology: Medieval

Site n°: 866
Denomination: unknown
Type: undetermined with oval plan
Dimensions: 60 x 80; Total surface: 4800
UTM: 4186565, 425133
Field n°: 303
Chronology: Medieval

Site n°: 867
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 60 x 150; Total surface: 9000
UTM: 4179166, 433834
Field n°: 305
Chronology: Sasanian

Site n°: 868
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 30 x 120; Total surface: 3600
UTM: 4179166, 433834
Field n°: 306
Chronology: Sasanian

Site n°: 869
Denomination: anonymous settlement near Owlija BoboniYaz Ishan
Type: undetermined with rectangular plan
Dimensions: 90 x 110; Total surface: 9900
UTM: 4181393, 420646
Field n°: 307
Chronology: Medieval

Site n°: 870
Denomination: unknown
Type: undetermined with oval plan
Dimensions: 20 x 30; Total surface: 600
UTM: 4181634, 420851
Field n°: 308
Chronology: Medieval

Site n°: 871
Denomination: anonymous settlement
Type: undetermined with oval plan
Dimensions: 100 x 110; Total surface: 11000
UTM: 4174449, 413188
Field n°: 310
Chronology: Medieval

Site n°: 872
Denomination: anonymous ding
Type: ding with rectangular plan
Dimensions: 3,2 x 4,6; Total surface: 16
UTM: 4167155, 421329
Field n°: 329
Chronology: Medieval

Site n°: 873
Denomination: anonymous ding
Type: ding with square plan
Dimensions: 5 x 5,5; Total surface: 27,5
UTM: 4166952, 421478
Field n°: 33
Chronology: Medieval

Site n°: 874
Denomination: anonymous ding
Type: ding with square plan
Dimensions: 4,3 x 4; Total surface: 17,2
UTM: 4166856, 421779
Field n°: 331

Chronology: Medieval

Site n°: 875
Denomination: unknown
Type: undetermined with irregular plan
Dimensions: 50 x 70; Total surface: 3500
UTM: 4166647, 424644
Field n°: 346
Chronology: Sasanian; Medieval

Site n°: 876
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 300 x 500; Total surface: 150000
UTM: 4181715, 428539
Field n°: 351
Chronology: Medieval

Site n°: 877
Denomination: unknown (Chummek-depe)
Type: tepe with rectangular plan
Dimensions: 60 x 45; Total surface: 2700
UTM: 4143159, 440494
Field n°: 354
Chronology: Sasanian; Medieval

Site n°: 878
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 350 x 250; Total surface: 87500
UTM: 4166711, 437196
Field n°: 355
Chronology: Medieval

Site n°: 879
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 150 x 300; Total surface: 45000
UTM: 4167517, 437377
Field n°: 356
Chronology: Parthian, Sasanian; Medieval

Site n°: 879
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 150 x 300; Total surface: 45000
UTM: 4167517, 437377
Field n°: 356
Chronology: Parthian, Sasanian; Medieval

Site n°: 880
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 400 x 500; Total surface: 200000
UTM: 4169298, 439413
Field n°: 357
Chronology: Medieval

Site n°: 881
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 150 x 300; Total surface: 45000
UTM: 4172248, 444556
Field n°: 358
Chronology: Medieval

Site n°: 882
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 100 x 200; Total surface: 20000
UTM: 4172517, 445050
Field n°: 359
Chronology: Medieval

Site n°: 883
Denomination: Elim-depe West
Type: tepe with rectangular plan
Dimensions: 90 x 80; Total surface: 7200
UTM: 4147265, 423982
Field n°: 372
Chronology: Parthian, Sasanian; Medieval

Site n°: 884
Denomination: Imam Kazym mazar (Odjorli mazar)
Type: undetermined with irregular plan
Dimensions: 8,5 x 11; Total surface: 93,5
UTM: 4150106, 445967
Field n°: 360
Chronology: Medieval

Site n°: 885
Denomination: unknown
Type: tepe with irregular quadrangle plan
Dimensions: 130 x 120 x 140 x 125; Total surface: 16250
UTM: 4159100, 424833
Field n°: 361
Chronology: Sasanian; Medieval

Site n°: 886
Denomination: anonymous kala
Type: kala with irregular plan
Dimensions: 20 x 10; Total surface: 200
UTM: 4162260, 423919
Field n°: 362
Chronology: Medieval

Site n°: 887
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 500 x 75; Total surface: 37500
UTM: 4162376, 423921
Field n°: 363
Chronology: Sasanian; Medieval

Site n°: 888
Denomination: anonymous depe
Type: tepe with irregular plan
Dimensions: 30 x 25; Total surface: 7500
UTM: 4162714, 423789
Field n°: 364
Chronology: Medieval

Site n°: 889
Denomination: Kyzyl Gumbez mazar
Type: undetermined with rectangular plan
Dimensions: 7 x 4,5; Total surface: 30
UTM: 4162795, 423668
Field n°: 365
Chronology: Medieval

Site n°: 890
Denomination: anonymous keshk

Type: keshk with rectangular plan
Dimensions: 3 x 5,5; Total surface: 17
UTM: 4162465, 423694
Field n°: 366
Chronology: Medieval

Site n°: 891
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 150 x 200; Total surface: 30000
UTM: 4157360, 424784
Field n°: 367
Chronology: Medieval

Site n°: 892
Denomination: Khan-depe
Type: tepe with irregular plan
Dimensions: 200 x 80; Total surface: 16000
UTM: 4157246, 424774
Field n°: 368
Chronology: Medieval

Site n°: 893
Denomination: unknown
Type: tepe with square plan
Dimensions: 75 x 75; Total surface: 5625
UTM: 4149169, 424444
Field n°: 369
Chronology: Parthian, Sasanian

Site n°: 894
Denomination: Babadjan-depe
Type: tepe with square plan
Dimensions: 85 x 85; Total surface: 7225
UTM: 4148831, 421831
Field n°: 370
Chronology: Sasanian; Medieval

Site n°: 895
Denomination: Elim-depe East
Type: tepe with irregular plan
Dimensions: 120 x 170; Total surface: 20400
UTM: 4147247, 424178
Field n°: 371
Chronology: Parthian, Sasanian; Medieval

Site n°: 896
Denomination: anonymous settlement of Elim-depe region
Type: undetermined with irregular plan
Dimensions: 700 x 400; Total surface: 280000
UTM: 4147342, 424046
Field n°: 373
Chronology: Sasanian; Medieval

Site n°: 897
Denomination: unknown
Type: tepe with irregular plan
Dimensions: 25 x 30; Total surface: 7500
UTM: 4147057, 424487
Field n°: 374
Chronology: Medieval

Site n°: 898
Denomination: anonymous settlement
Type: undetermined with oval plan
Dimensions: 70 x 120; Total surface: 8400
UTM: 4147448, 425444
Field n°: 375
Chronology: Medieval

Site n°: 899
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 150 x 40; Total surface: 6000
UTM: 4146240, 425668
Field n°: 376
Chronology: Medieval

Site n°: 900
Denomination: Dekh Mastak depe
Type: tepe with square plan
Dimensions: 80 x 80; Total surface: 6400
UTM: 4144604, 425574
Field n°: 378
Chronology: Parthian, Sasanian

Site n°: 901
Denomination: settlement of Dekh Mastak region
Type: undetermined with irregular plan
Dimensions: 1000 x 400; Total surface: 400000
UTM: 4144612, 425304
Field n°: 379
Chronology: Medieval

Site n°: 902
Denomination: unknown
Type: tepe with irregular plan
Dimensions: 150 x 220; Total surface: 33000
UTM: 4145496, 428265
Field n°: 380
Chronology: Parthian period; Medieval

Site n°: 903
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 50 x 25; Total surface: 750
UTM: 4145285, 429171
Field n°: 381
Chronology: Medieval

Site n°: 904
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 250 x 300; Total surface: 75000
UTM: 4153143, 405988
Field n°: 382
Chronology: Medieval

Site n°: 905
Denomination: Geok-depe
Type: tepe with rectangular plan
Dimensions: 250 x 200; Total surface: 50000
UTM: 4149692, 408307
Field n°: 383
Chronology: Parthian, Sasanian; Medieval

Site n°: 906
Denomination: Kujrukli-depe
Type: tepe with rectangular plan
Dimensions: 220 x 280; Total surface: 61600
UTM: 4153743, 410225
Field n°: 384

Chronology: Parthian, Sasanian

Site n°: 907
Denomination: Chish-depe
Type: tepe with rectangular plan
Dimensions: 115 x 100; Total surface: 11500
UTM: 4156119, 411354
Field n°: 385
Chronology: Sasanian; Medieval

Site n°: 908
Denomination: Depeli
Type: undetermined with rectangular plan
Dimensions: 30 x 60; Total surface: 180
UTM: 4157345, 412602
Field n°: 386
Chronology: Medieval

Site n°: 909
Denomination: Depeli, settlement
Type: undetermined with irregular plan
Dimensions: 100 x 250; Total surface: 25000
UTM: 4157354, 412580
Field n°: 387
Chronology: Medieval

Site n°: 910
Denomination: unknown
Type: tepe with rectangular plan
Dimensions: 30 x 35; Total surface: 1050
UTM: 4148348, 409094
Field n°: 388
Chronology: Parthian, Sasanian

Site n°: 911
Denomination: unknown
Type: tepe with square plan
Dimensions: 75 x 75; Total surface: 5625
UTM: 4146367, 411197
Field n°: 389
Chronology: Parthian, Sasanian

Site n°: 912
Denomination: unknown
Type: tepe with irregular plan
Dimensions: 180 x 160; Total surface: 28800
UTM: 4145005, 408875
Field n°: 390
Chronology: Medieval

Site n°: 913
Denomination: Dingli-depe
Type: tepe with square plan
Dimensions: 100 x 100; Total surface: 10000
UTM: 4143874, 408793
Field n°: 391
Chronology: Parthian, Sasanian; Medieval

Site n°: 914
Denomination: unknown
Type: tepe with rectangular plan
Dimensions: 45 x 40; Total surface: 1800
UTM: 4145285, 409111
Field n°: 392
Chronology: Medieval

Site n°: 915
Denomination: Chilim-depe
Type: tepe with irregular
Dimensions: 90 x 60; Total surface: 3600
UTM: 4145091, 412616
Field n°: 393
Chronology: Parthian, Sasanian

Site n°: 916
Denomination: settlement of the Chilim-depe region
Type: undetermined with irregular
Dimensions: 200 x 250; Total surface: 50000
UTM: 4145070, 412475
Field n°: 394
Chronology: Parthian, Sasanian

Site n°: 917
Denomination: Burun-kala, ding
Type: ding with irregular plan
Dimensions: 2 x 1,5; Total surface: 00
UTM: 4161510, 406314
Field n°: 395
Chronology: Medieval

Site n°: 918
Denomination: anonymous settlement of Burun-kala region
Type: undetermined with irregular plan
Dimensions: 50 x 200; Total surface: 10000
UTM: 4161799, 406217
Field n°: 396
Chronology: Parthian, Sasanian

Site n°: 919
Denomination: Burun-kala, fortress
Type: kala with rectangular plan
Dimensions: 240 x 100; Total surface: 24000
UTM: 4161037, 407233
Field n°: 397
Chronology: Medieval

Site n°: 920
Denomination: unknown
Type: tepe with irregular plan
Dimensions: 40 x 50; Total surface: 2000
UTM: 4162865, 415259
Field n°: 398
Chronology: Sasanian, Medieval

Site n°: 921
Denomination: Shor-depe
Type: tepe with square plan
Dimensions: 40 x 40; Total surface: 1600
UTM: 4158921, 417815
Field n°: 399
Chronology: Sasanian, Medieval

Site n°: 922
Denomination: Ak-depe
Type: tepe with rectangular plan
Dimensions: 40 x 45; Total surface: 1800
UTM: 4158202, 420257
Field n°: 400
Chronology: Sasanian

Site n°: 923
Denomination: Saul-depe (Sul-depe)

Type: tepe with square plan
Dimensions: 100 x 100; Total surface: 10000
UTM: 4160383, 417525
Field n°: 401
Chronology: Parthian, Sasanian

Site n°: 924
Denomination: unknown (Shakal-depe)
Type: tepe oval plan
Dimensions: 35 x 45; Total surface: 1575
UTM: 4160354, 409633
Field n°: 402
Chronology: Medieval

Site n°: 925
Denomination: unknown
Type: tepe with square plan
Dimensions: 90 x 90; Total surface: 8100
UTM: 4159227, 409501
Field n°: 403
Chronology: Parthian, Sasanian

Site n°: 926
Denomination: Chemche-depe
Type: tepe with rectangular plan
Dimensions: 65 x 90; Total surface: 5850
UTM: 4140861, 404719
Field n°: 404
Chronology: Parthian, Sasanian; Medieval

Site n°: 927
Denomination: anonymous keshk
Type: keshk with square plan
Dimensions: 15 x 15; Total surface: 225
UTM: 4139104, 412260
Field n°: 405
Chronology: Sasanian; Medieval

Site n°: 928
Denomination: anonymous rabat
Type: undetermined with rectangular plan
Dimensions: 100 x 70; Total surface: 7000
UTM: 4139049, 412268
Field n°: 406
Chronology: Medieval

Site n°: 929
Denomination: Julbars-depe
Type: tepe with irregular plan
Dimensions: 80 x 100; Total surface: 8000
UTM: 4146549, 416702
Field n°: 407
Chronology: Parthian, Sasanian

Site n°: 930
Denomination: Talkhatan-baba, mosque
Type: mosque with rectangular plan
Dimensions: 10 x 18; Total surface: 180
UTM: 4140977, 426519
Field n°:408
Chronology: Medieval

Site n°: 931
Denomination: unknown in the Talkhatan-baba region
Type: undetermined with irregular plan
Dimensions: 80 x 65; Total surface: 5200
UTM: 4139845, 426784
Field n°: 409
Chronology: Medieval

Site n°: 932
Denomination: Talkhatan-baba, southern mazar
Type: undetermined with rectangular plan
Dimensions: 5 x 6; Total surface: 30
UTM: 4136451, 432100
Field n°: 410
Chronology: Medieval

Site n°: 933
Denomination: Talkhatan-baba, settlement
Type: undetermined with irregular plan
Dimensions: 300 x 150; Total surface: 45000
UTM: 4136345, 432161
Field n°: 411
Chronology: Medieval

Site n°: 934
Denomination: Jassy-depe
Type: tepe with rectangular plan
Dimensions: 80 x 90; Total surface: 7200
UTM: 4148899, 405635
Field n°: 412
Chronology: Parthian, Sasanian

Site n°: 935
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 50 x 30; Total surface: 1500
UTM: 4148869, 405465
Field n°: 413
Chronology: Sasanian, Medieval (?

Site n°: 936
Denomination: Chish-depe
Type: tepe with rectangular plan
Dimensions: 50 x 35; Total surface: 1750
UTM: 4147763, 402784
Field n°: 414
Chronology: Medieval

Site n°: 937
Denomination: Shekhitli-depe
Type: tepe with rectangular plan
Dimensions: 120 x 90; Total surface: 10800
UTM: 4146549, 400784
Field n°: 415
Chronology: Parthian, Sasanian

Site n°: 938
Denomination: anonymous settlement near Shekhitli-depe
Type: undetermined with irregular plan
Dimensions: 350 x 500; Total surface: 175000
UTM: 4146612, 400638
Field n°: 416
Chronology: Parthian, Sasanian; Medieval

Site n°: 939
Denomination: Kyzylmurad-depe
Type: tepe with irregular plan
Dimensions: 130 x 130; Total surface: 16900
UTM: 4145284, 398180
Field n°: 417

Chronology: Medieval

Site n°: 940
Denomination: anonymous settlement near Kyzylmurad-depe
Type: undetermined with irregular plan
Dimensions: 250 x 100; Total surface: 25000
UTM: 4145339, 398387
Field n°: 418
Chronology: Medieval

Site n°: 941
Denomination: Jassy-depe
Type: tepe with rectangular plan
Dimensions: 100 x 120; Total surface: 12000
UTM: 4140916, 392559
Field n°: 419
Chronology: Medieval

Site n°: 942
Denomination: anonymous settlement near Jassy-depe
Type: undetermined with irregular plan
Dimensions: 300 x 750; Total surface: 225000
UTM: 4140882, 392908
Field n°: 420
Chronology: Medieval

Site n°: 943
Denomination: Kosha-depe
Type: tepe with square plan
Dimensions: 50 x 50; Total surface: 2500
UTM: 4140526, 396660
Field n°: 421
Chronology: Medieval

Site n°: 944
Denomination: Alan-depe
Type: tepe with rectangular plan
Dimensions: 50 x 35; Total surface: 1750
UTM: 4127757, 445380
Field n°: 422
Chronology: Hellenistic (?), Parthian, Sasanian

Site n°: 945
Denomination: unknown
Type: tepe with rectangular plan
Dimensions: 170 x 110; Total surface: 18700
UTM: 4127763, 445204
Field n°: 423
Chronology: Parthian, Sasanian (?)

Site n°: 946
Denomination: anonymous keshk
Type: keshk with rectangular plan
Dimensions: 9 x 12; Total surface: 108
UTM: 4169002, 430798
Field n°: 175
Chronology: Medieval

Site n°: 947
Denomination: unknown
Type: undetermined with irregular plan
Dimensions: 150 x 200; Total surface: 30000
UTM: 4170047, 430510
Field n°: 176
Chronology: Early Iron Age; Sasanian; Medieval

Site n°: 948
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 150 x 140; Total surface: 21000
UTM: 4167924, 431086
Field n°: 177
Chronology: Sasanian;

Site n°: 949
Denomination: anonymous settlement
Type: undetermined with irregular plan
Dimensions: 60 x 50; Total surface: 3000
UTM: 4167924, 431086
Field n°: 309
Chronology:Medieval

Site n°: 950
Denomination: Dingli Kishman, settlement
Type: undetermined with irregular plan
Dimensions: 800 x 1300; Total surface: 1040000
UTM: 4167924, 431086
Field n°: 309
Chronology: Early Iron Age

Site n°: 951
Denomination: Dingli Kishman, fortress
Type: fortress with rectangular plan
Dimensions: 185 x 150; Total surface: 27750
UTM: 4167924, 431086
Field n°: 312
Chronology:Medieval

Site n°: 952
Denomination: Dingli Kishman, shakhristan
Type: undetermined with irregular plan
Dimensions: 1100 x 900; Total surface: 990000
UTM: 4167924, 431086
Field n°: 309
Chronology:Medieval

Site n°: 953
Denomination: Dingli Kishman, Southern caravanserai
Type: caravanserai with rectangular plan
Dimensions: 70 x 50; Total surface: 3500
UTM: 4167924, 431086
Field n°: 316
Chronology: Medieval

Site n°: 954
Denomination: Dingli Kishman, SE caravanserai
Type: caravanserai with irregular plan
Dimensions: 210 x 80; Total surface: 16800
UTM: 4167924, 431086
Field n°: 317
Chronology:Medieval

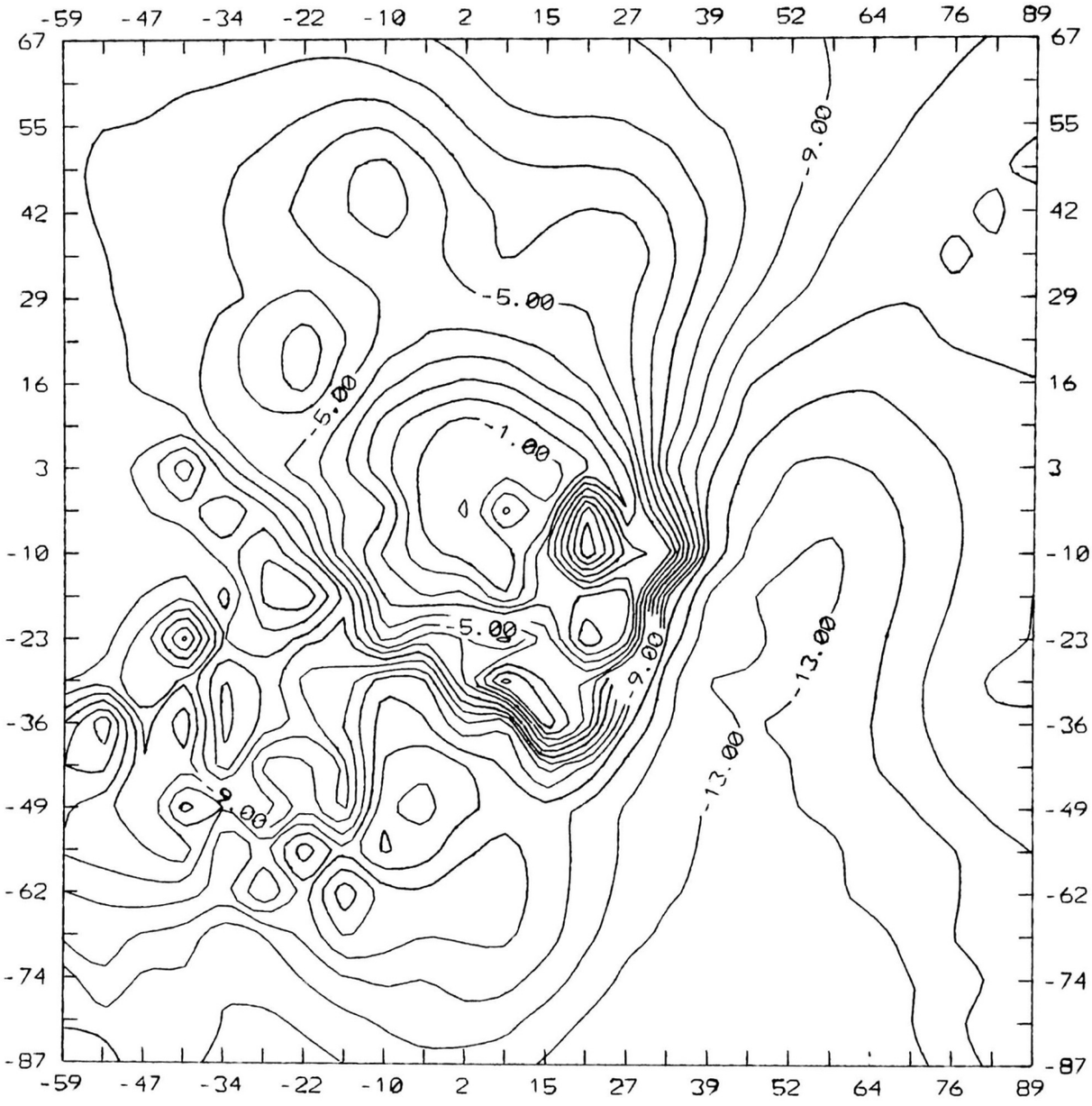
Site n°: 955
Denomination: Durnali, settlement
Type: undetermined with irregular plan
Dimensions: 900 x 900; Total surface: 810000
UTM: 4167924, 431086
Field n°: 317
Chronology:Medieval

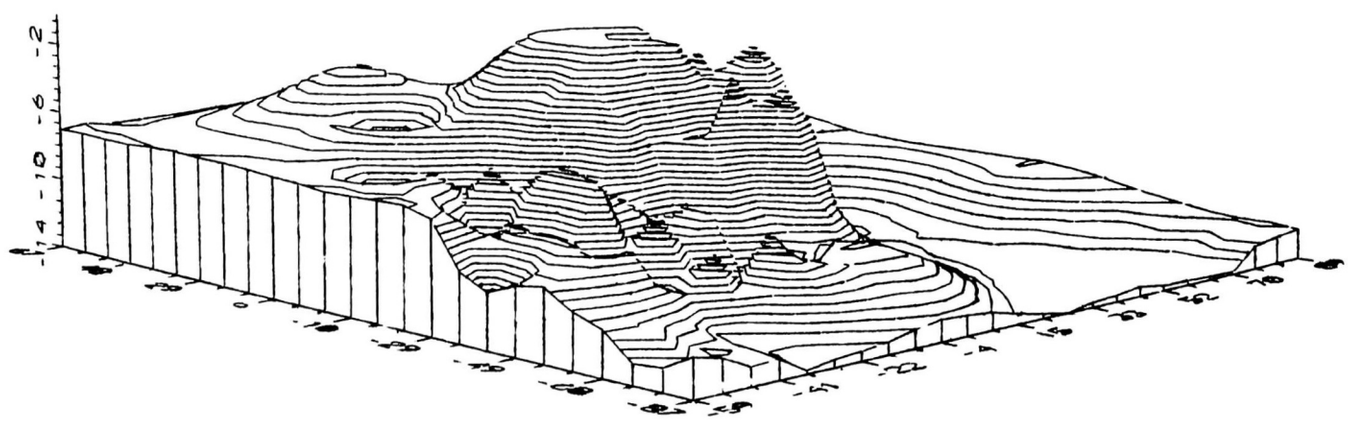
Site n°: 956
Denomination: Changly, settlement

Type: undetermined with irregular plan
Dimensions: 900 x 1500; Total surface: 1350000
UTM: 4192670, 416802
Field n°: 322
Chronology: Sasanian; Medieval

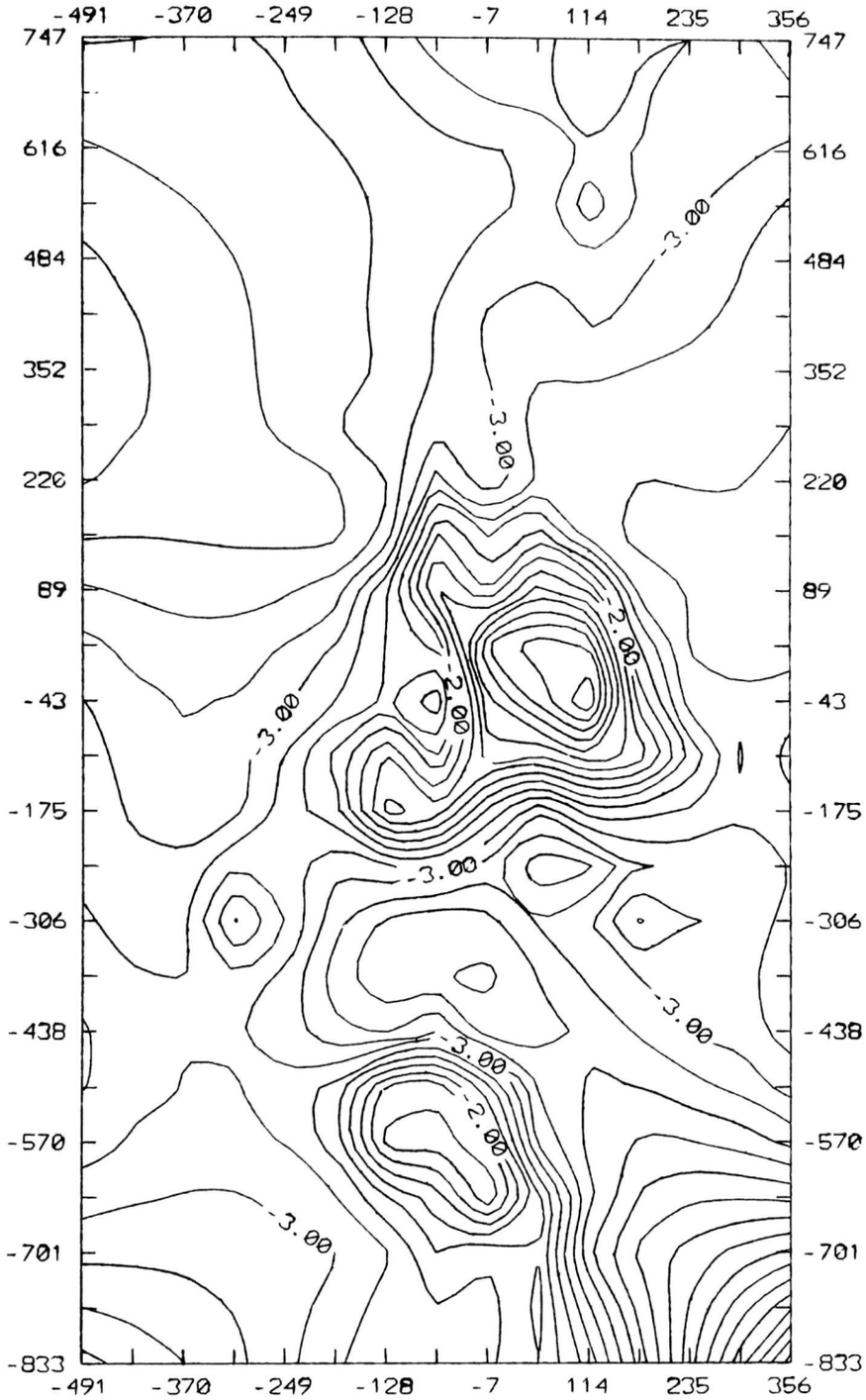
Site n°: 958
Site n°: 959
Site n°: 960
Site n°: 961
Site n°: 962
Site n°: 963
Site n°: 964
Site n°: 965
Site n°: 966

ARAVALLI TEPE





GONUR TEPE


-491
-370
-249
-128
-7
114
235
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352
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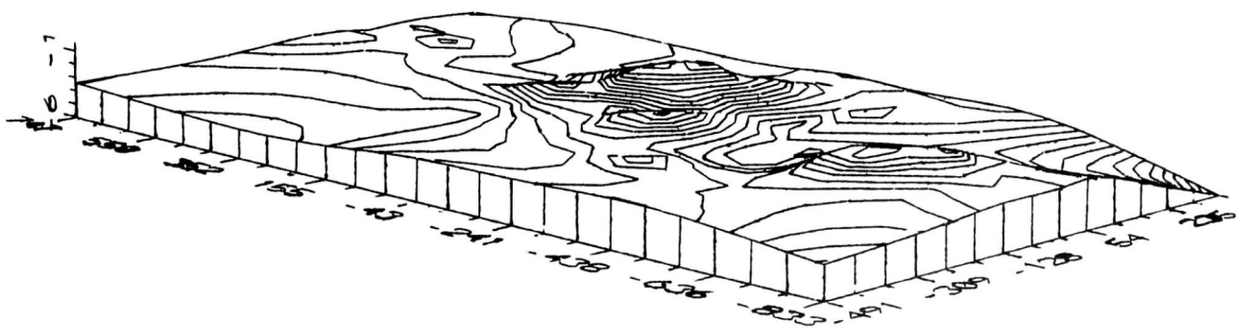
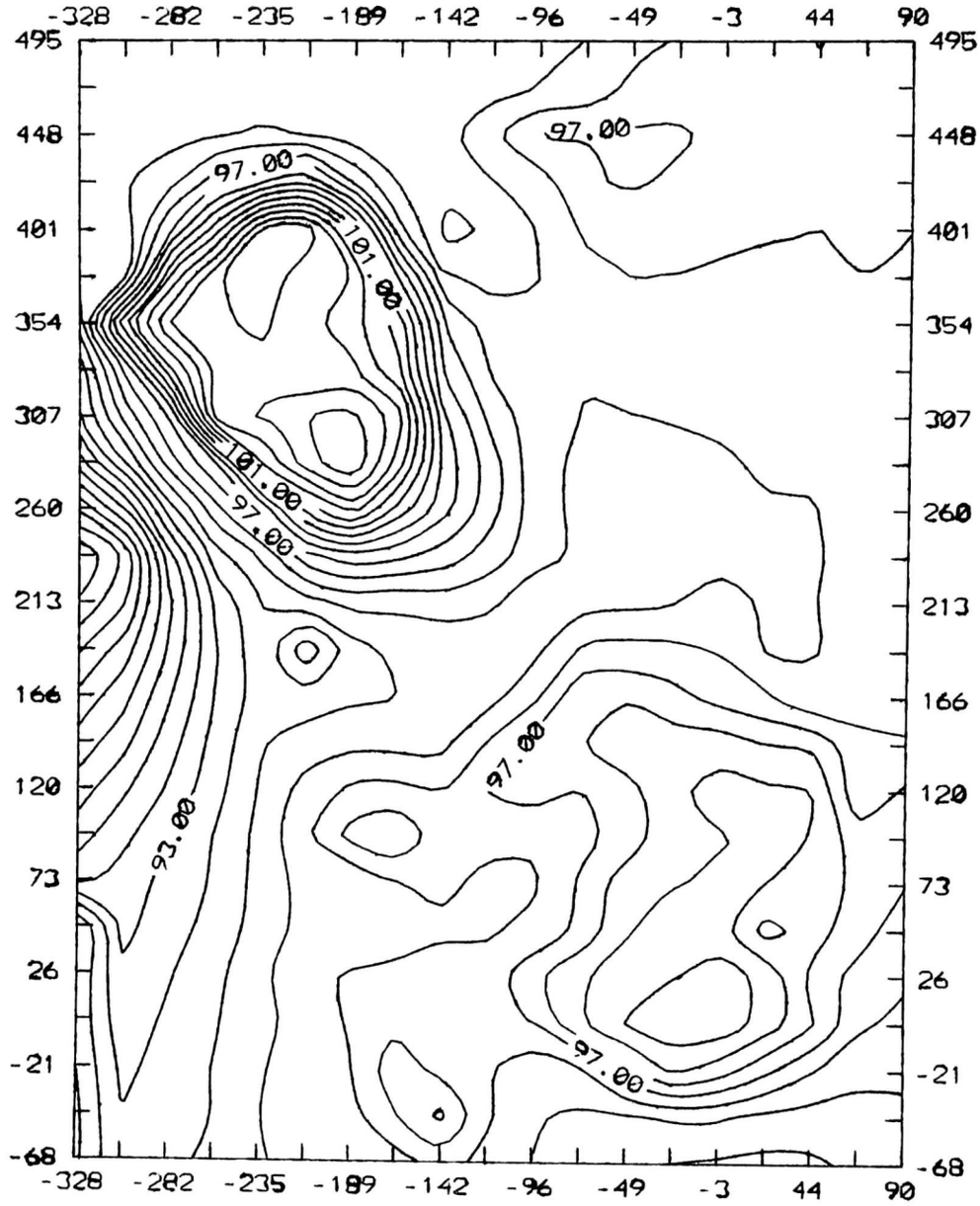
-43
-175
-306
-438
-570
-701
-833
-3.00
-2.00



YAZ TEPE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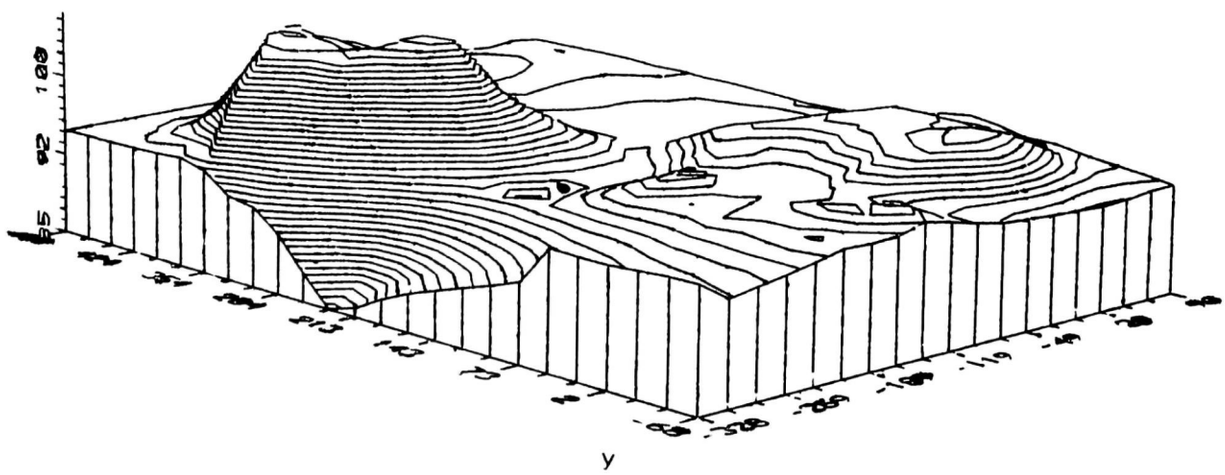
495 448 401 354 307 260 213 166 120 73 26 -21 -68
97.00
101.00
93.00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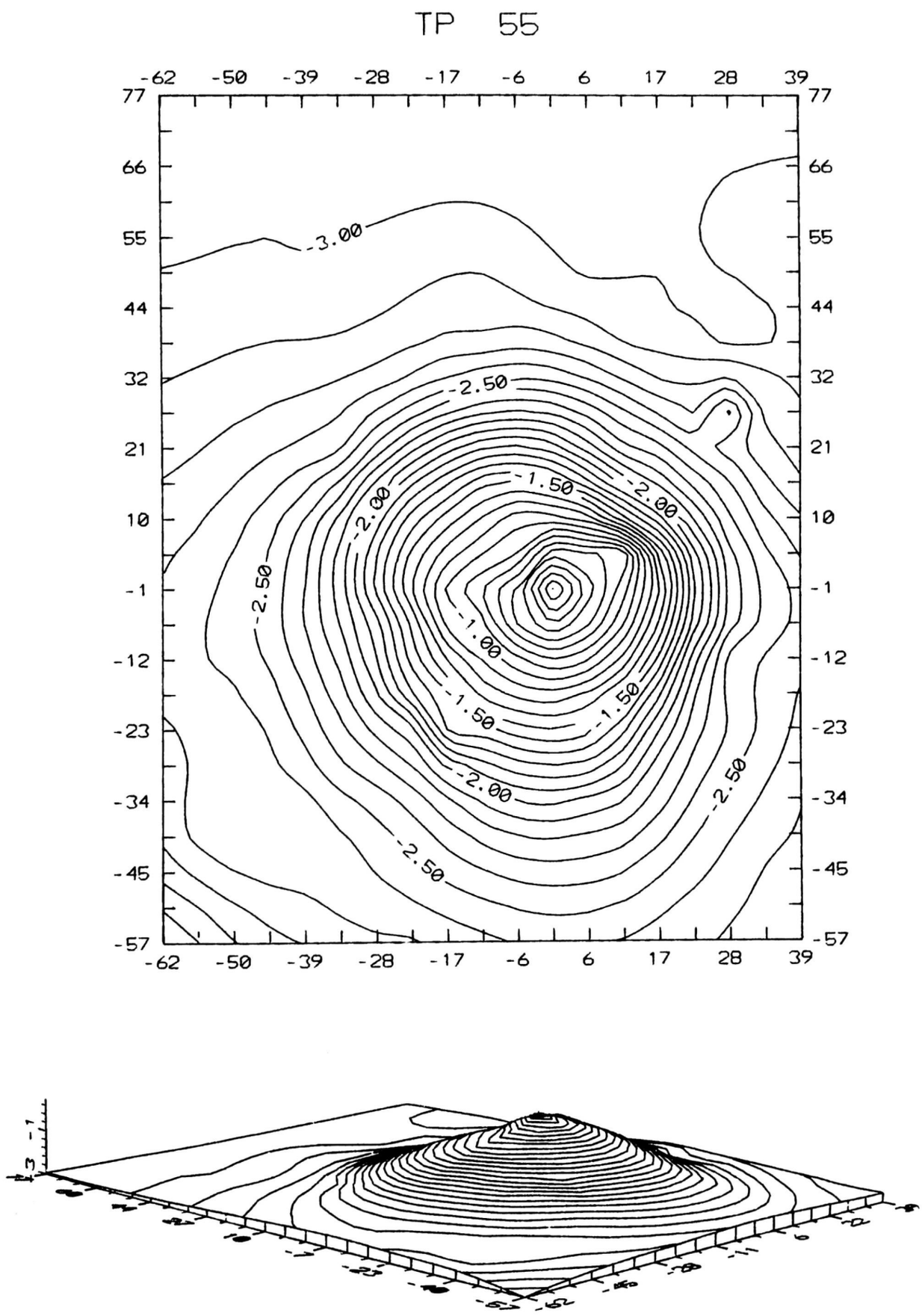
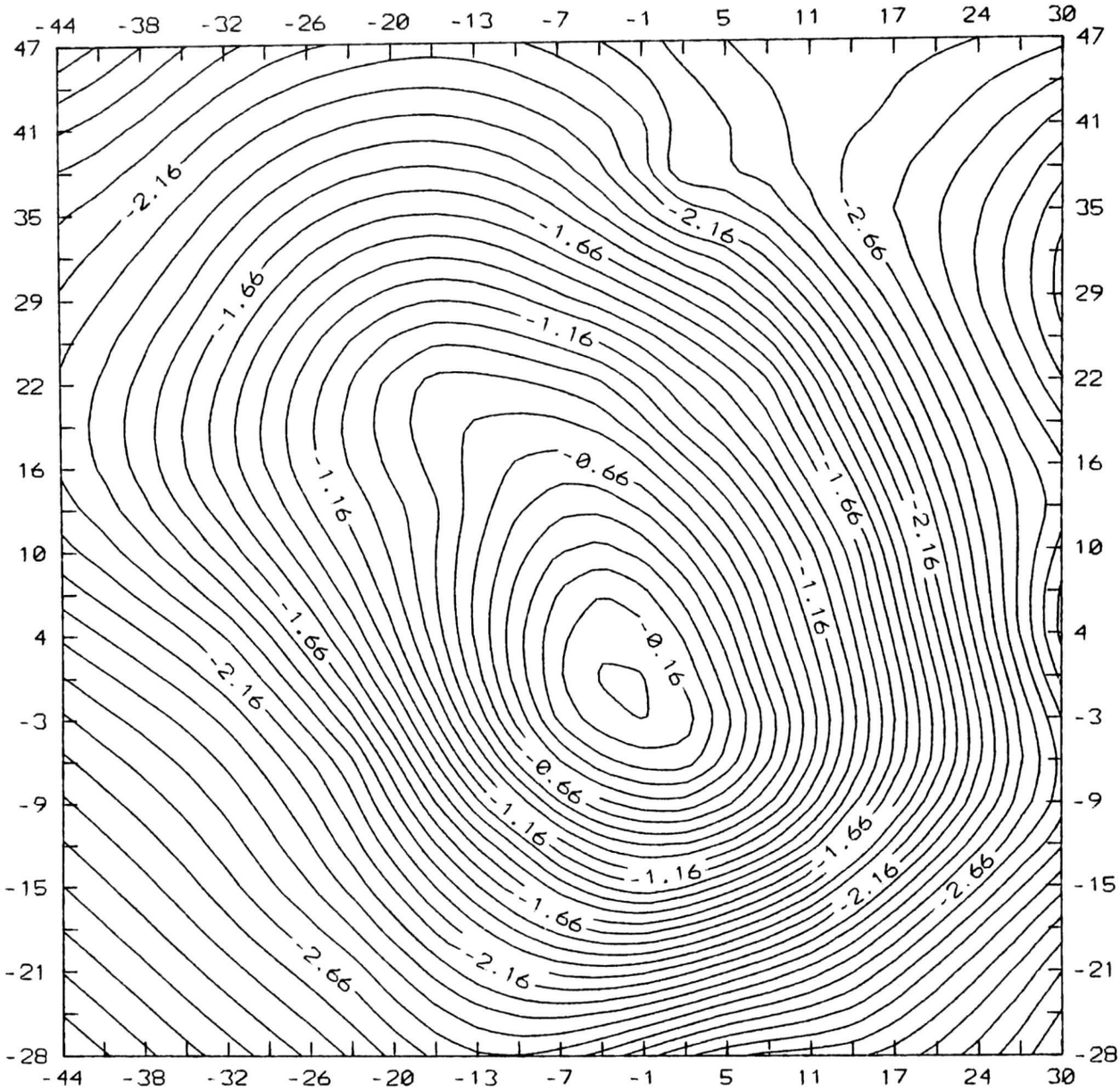

TP 55
-62 -50 -39 -28 -17 -6 6 17 28 39
77 66 55 44 32 21 10 -1 -12 -23 -34 -45 -57
-3.00
-2.50
-2.00
-1.50
-1.00

TP 83


-44 -38 -32 -26 -20 -13 -7 -1 5 11 17 24 30
47 41 35 29 22 16 10 4 -3 -9 -15 -21 -28
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-1.16
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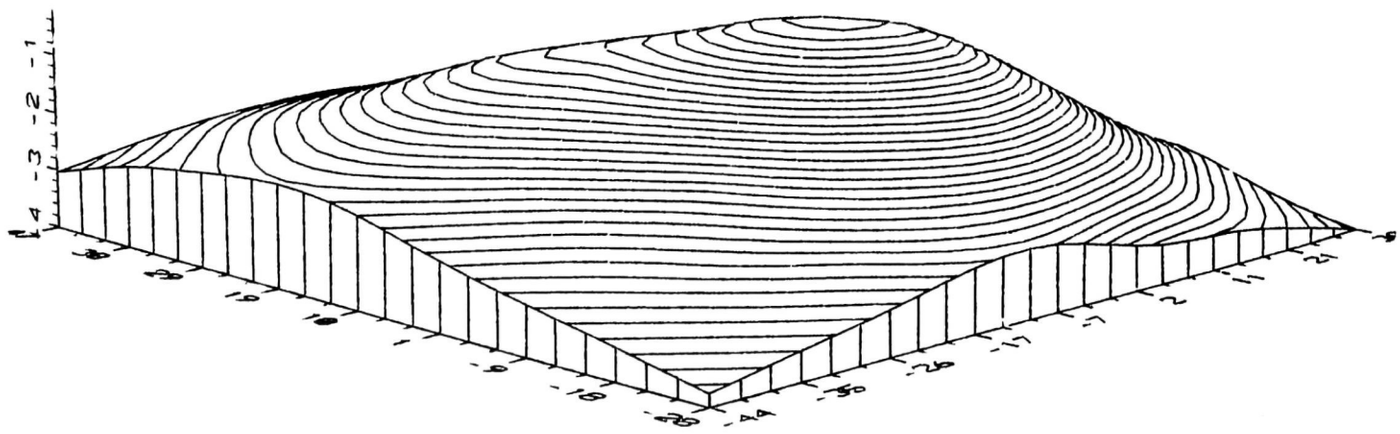
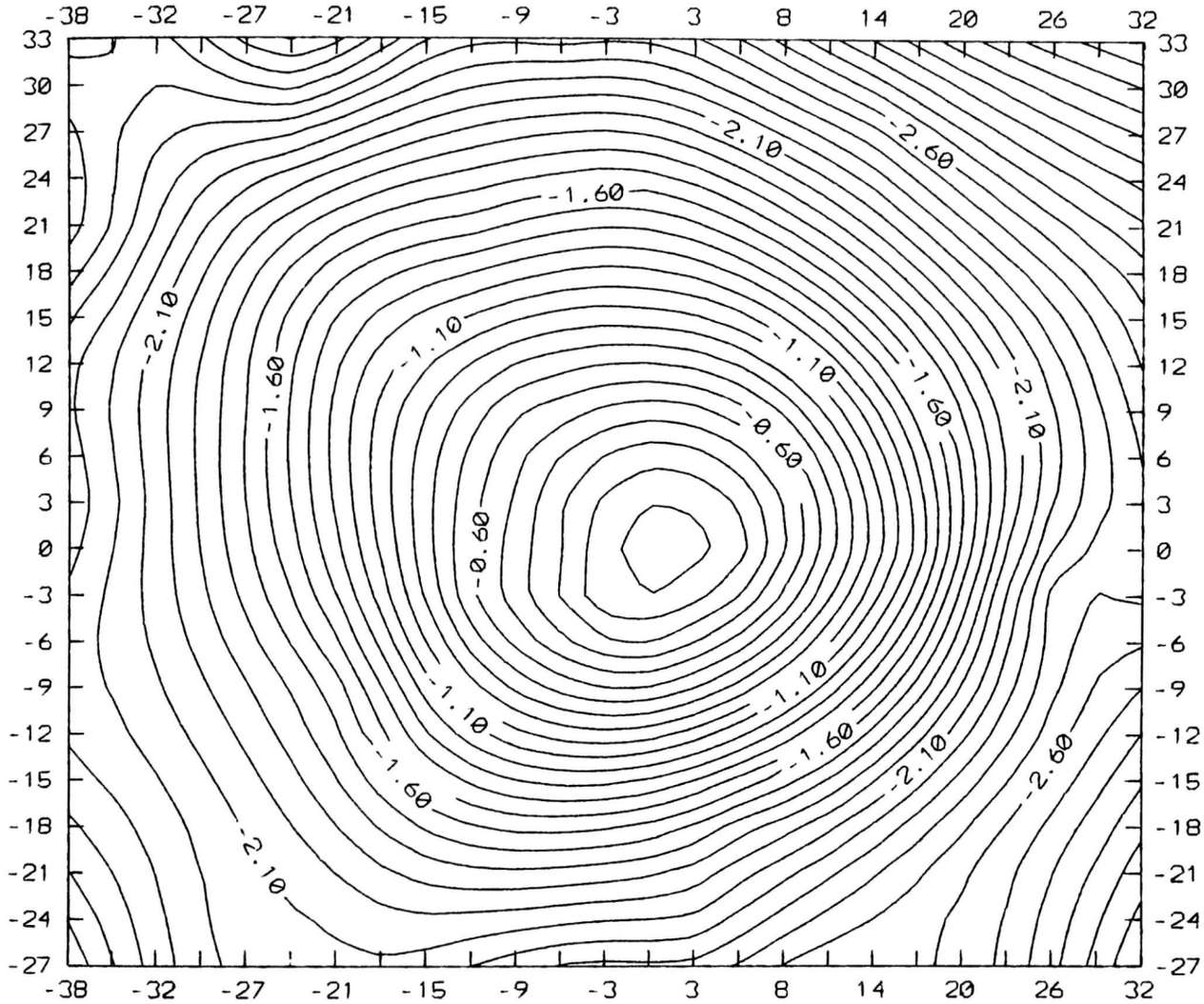
-0.16
-2.66



TP 84


-38 -32 -27 -21 -15 -9 -3 3 8 14 20 26 32
33 30 27 24 21 18 15 12 9 6 3 0 -3 -6 -9 -12 -15 -18 -21 -24 -27
-2.10
-2.60
-1.60
-2.10
-1.10
-1.10
-1.60
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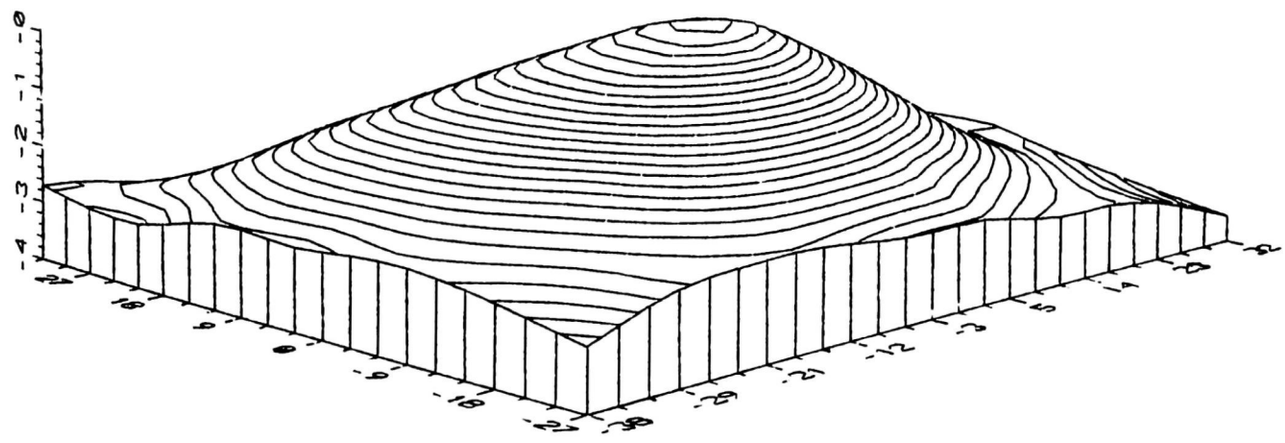
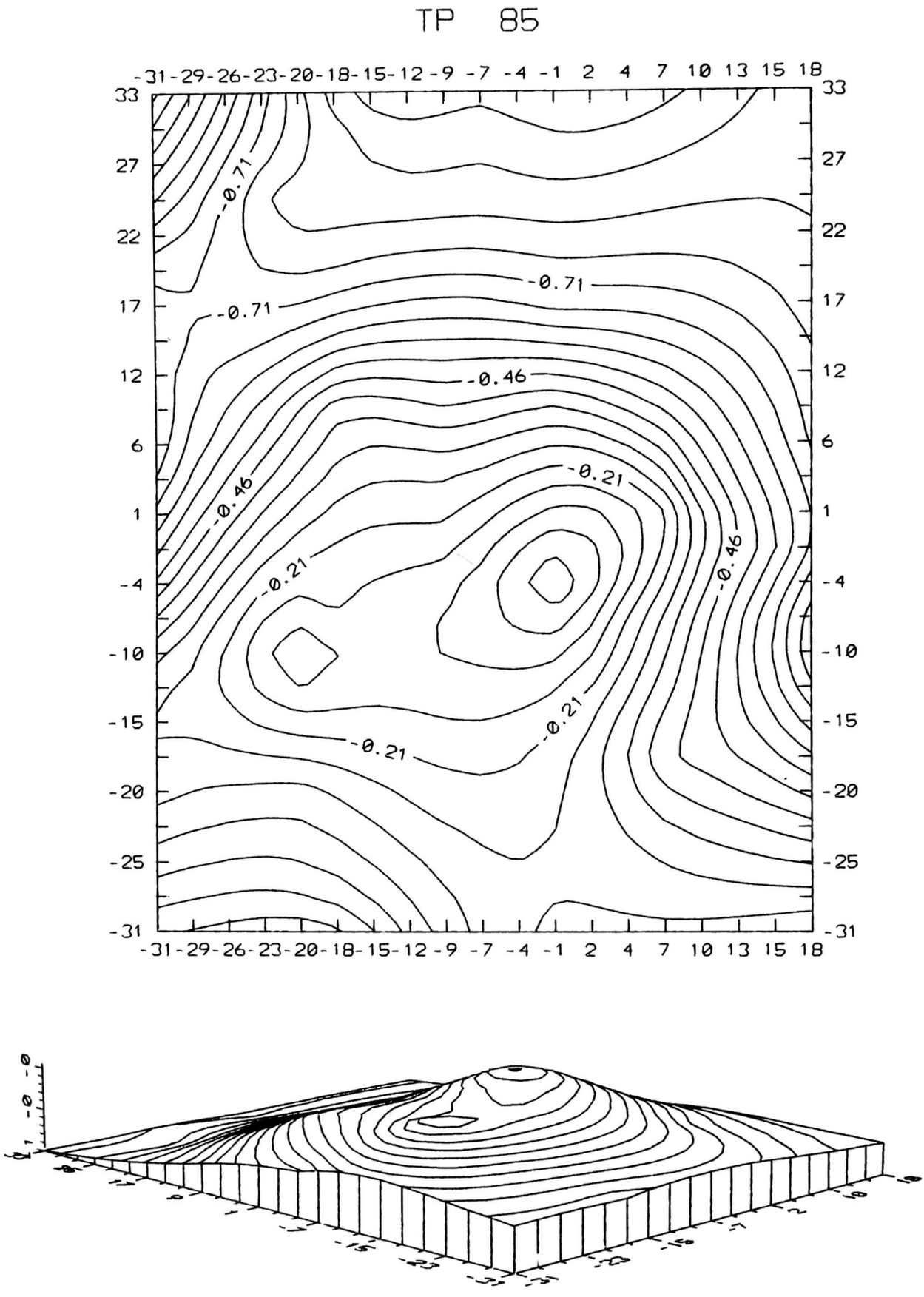
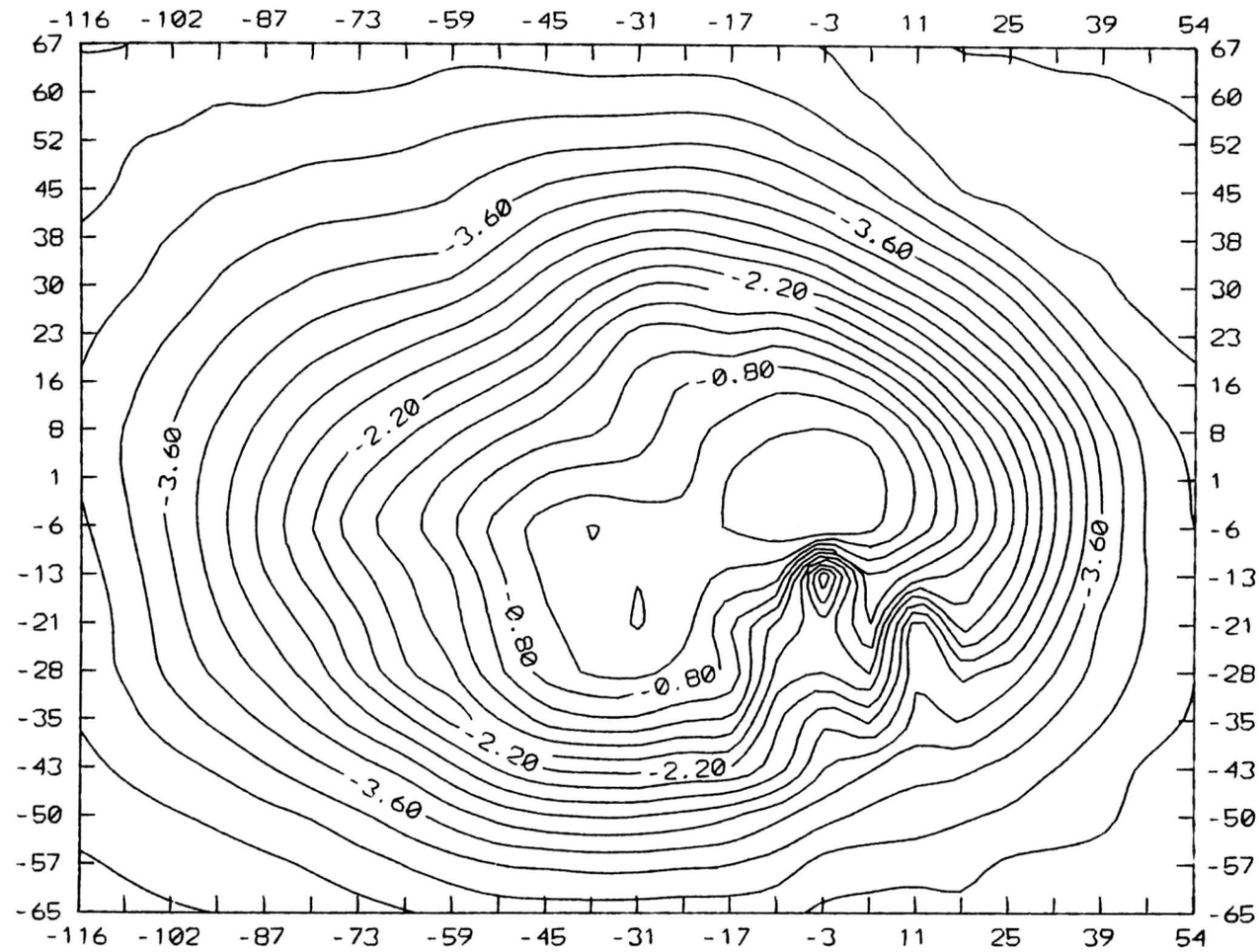
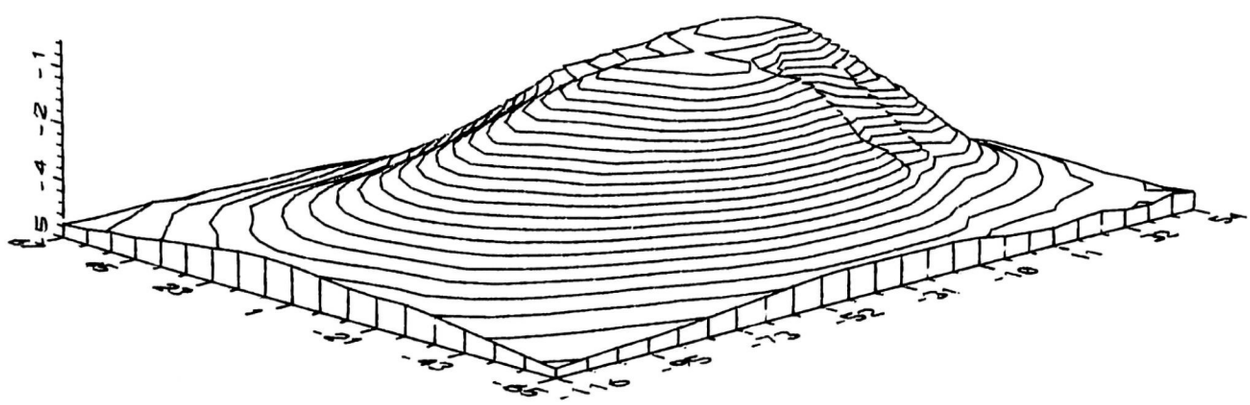
-2.10



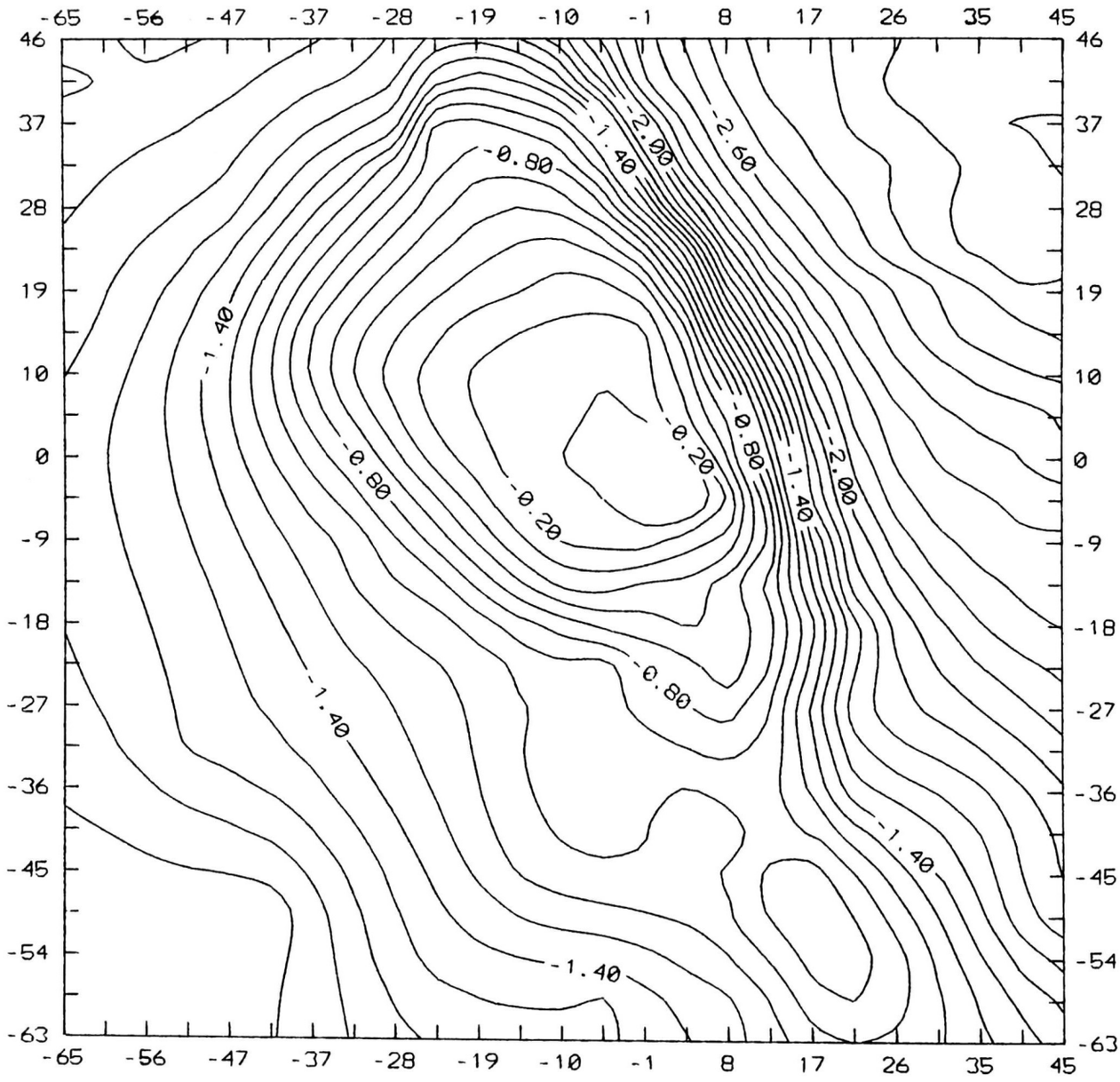

TP 85
-31 -29 -26 -23 -20 -18 -15 -12 -9 -7 -4 -1 2 4 7 10 13 15 18
33
27
22
17
12
6
1
-4
-10
-15
-20
-25
-31
-0.71
-0.46
-0.21

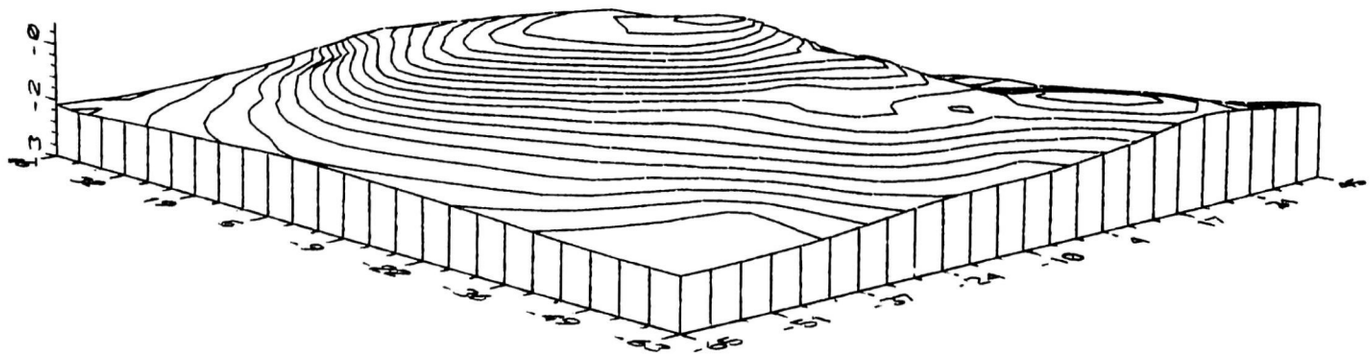
TP 90


-116 -102 -87 -73 -59 -45 -31 -17 -3 11 25 39 54
67 60 52 45 38 30 23 16 8 1 -6 -13 -21 -28 -35 -43 -50 -57 -65
-3.60
-2.20
-0.80

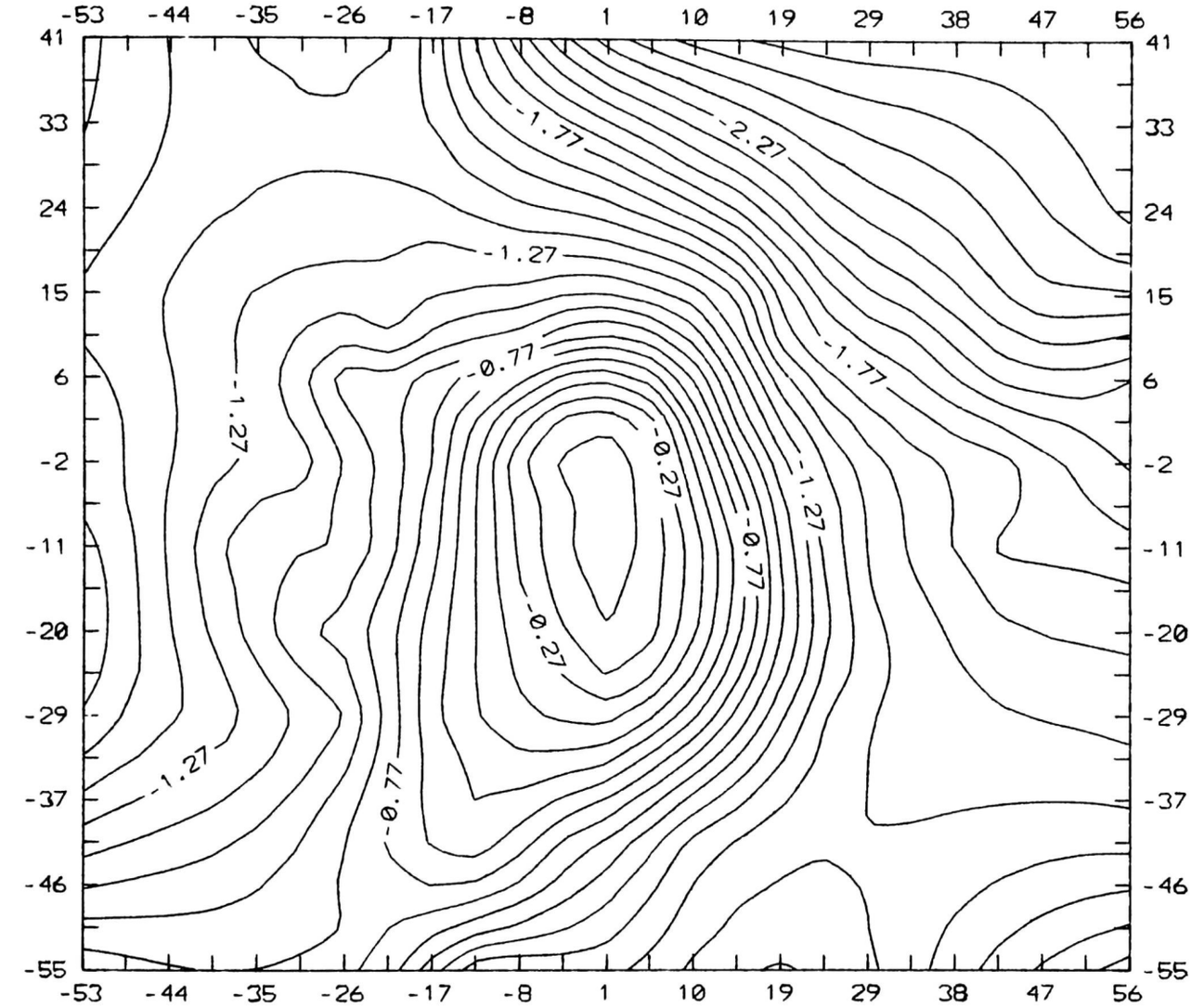


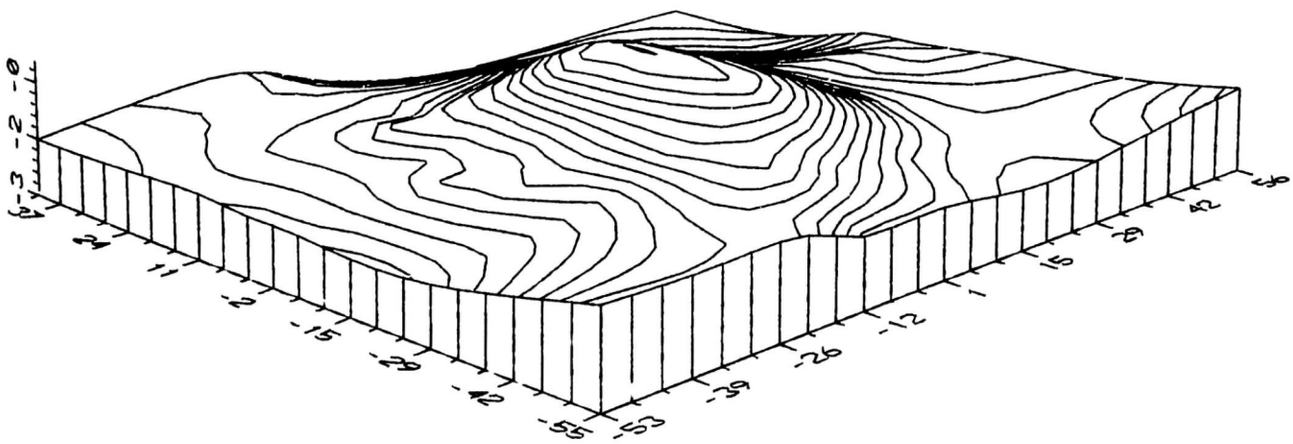
TP 92


-65 -56 -47 -37 -28 -19 -10 -1 8 17 26 35 45
46 37 28 19 10 0 -9 -18 -27 -36 -45 -54 -63
-0.80
-1.40
-2.00
-2.60
-0.20

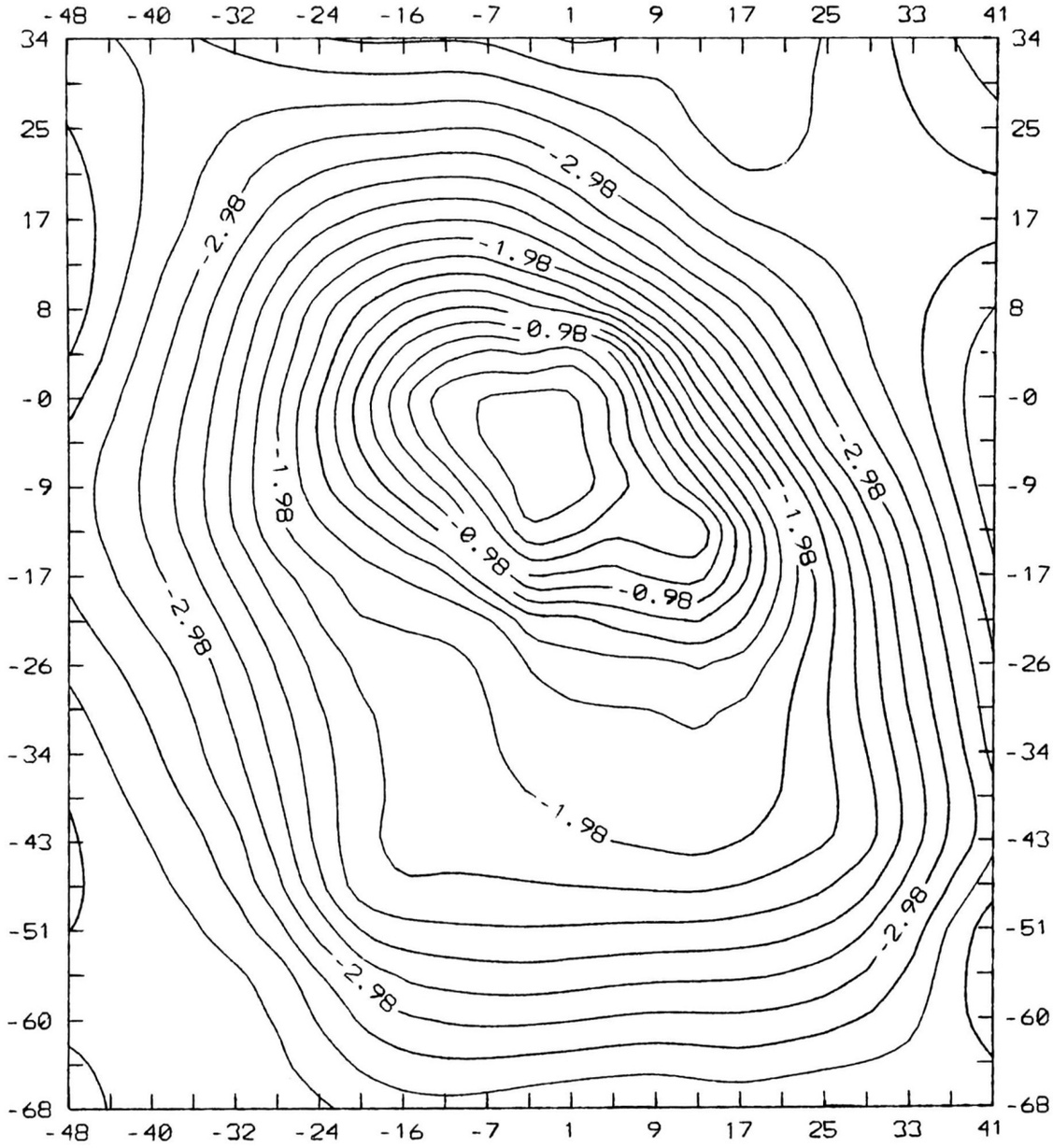


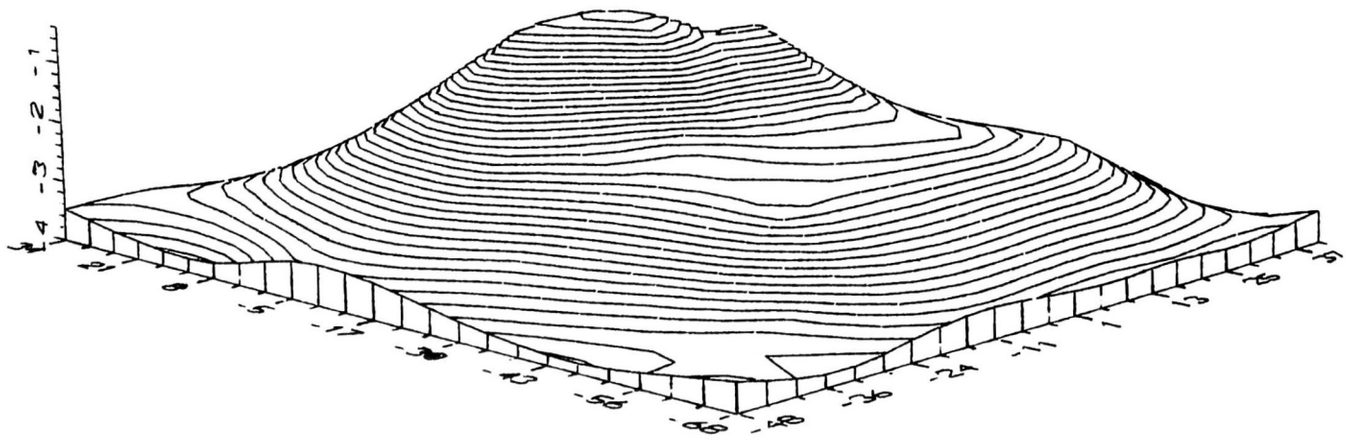
TP 94


-53 -44 -35 -26 -17 -8 1 10 19 29 38 47 56
41 33 24 15 6 -2 -11 -20 -29 -37 -46 -55
-1.77
-2.27
-1.27
-0.77
-0.27

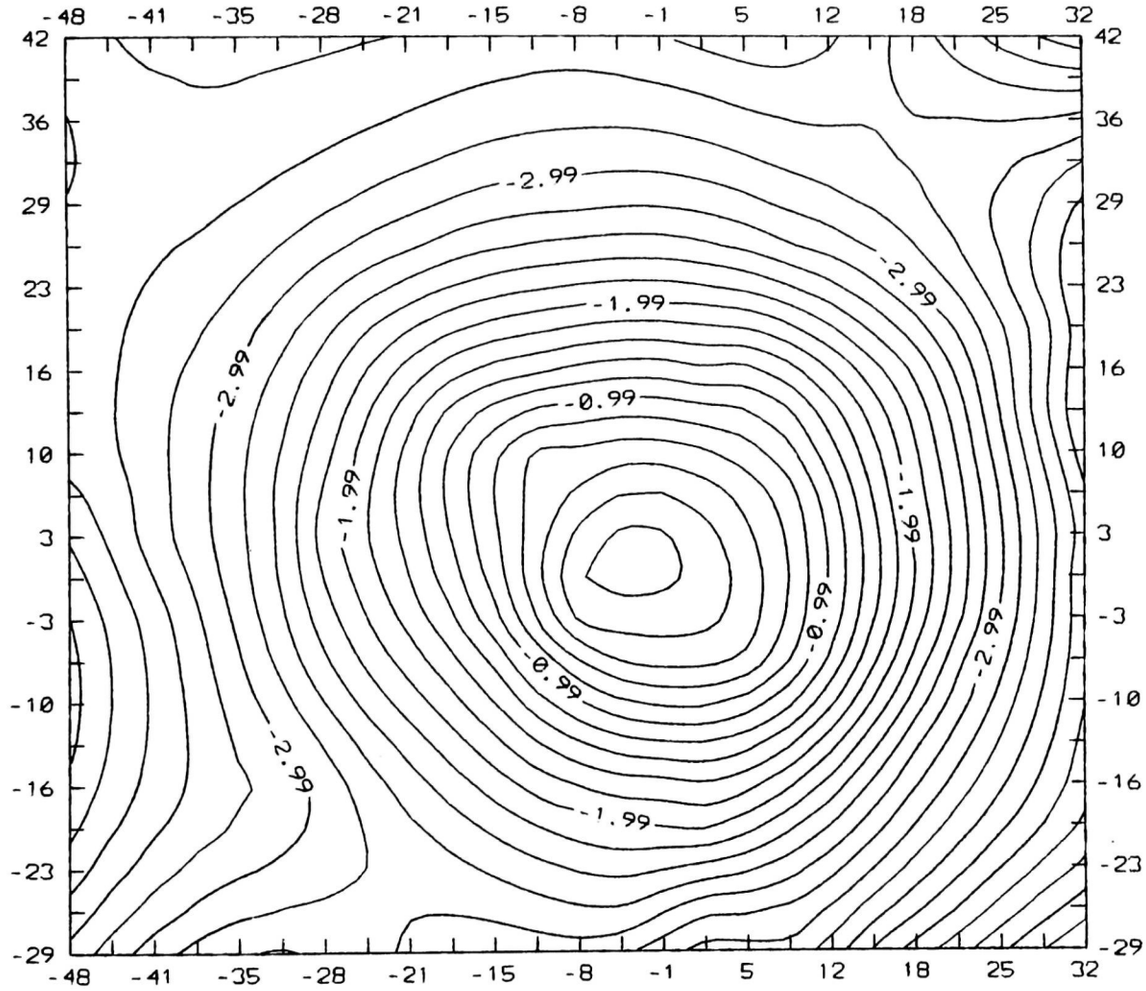


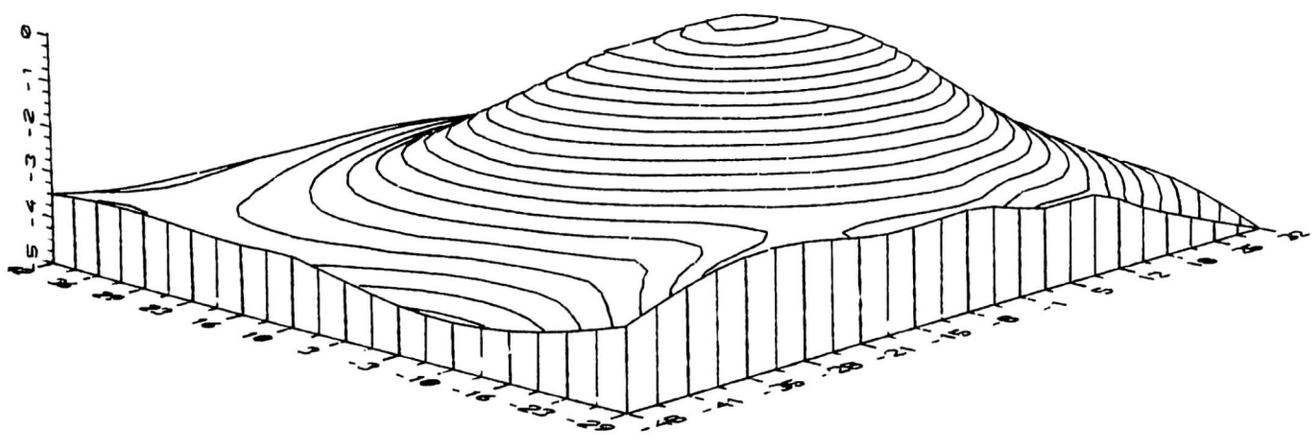
TP 129


-48 -40 -32 -24 -16 -7 1 9 17 25 33 41
34 25 17 8 -0 -9 -17 -26 -34 -43 -51 -60 -68
-2.98
-1.98
-0.98

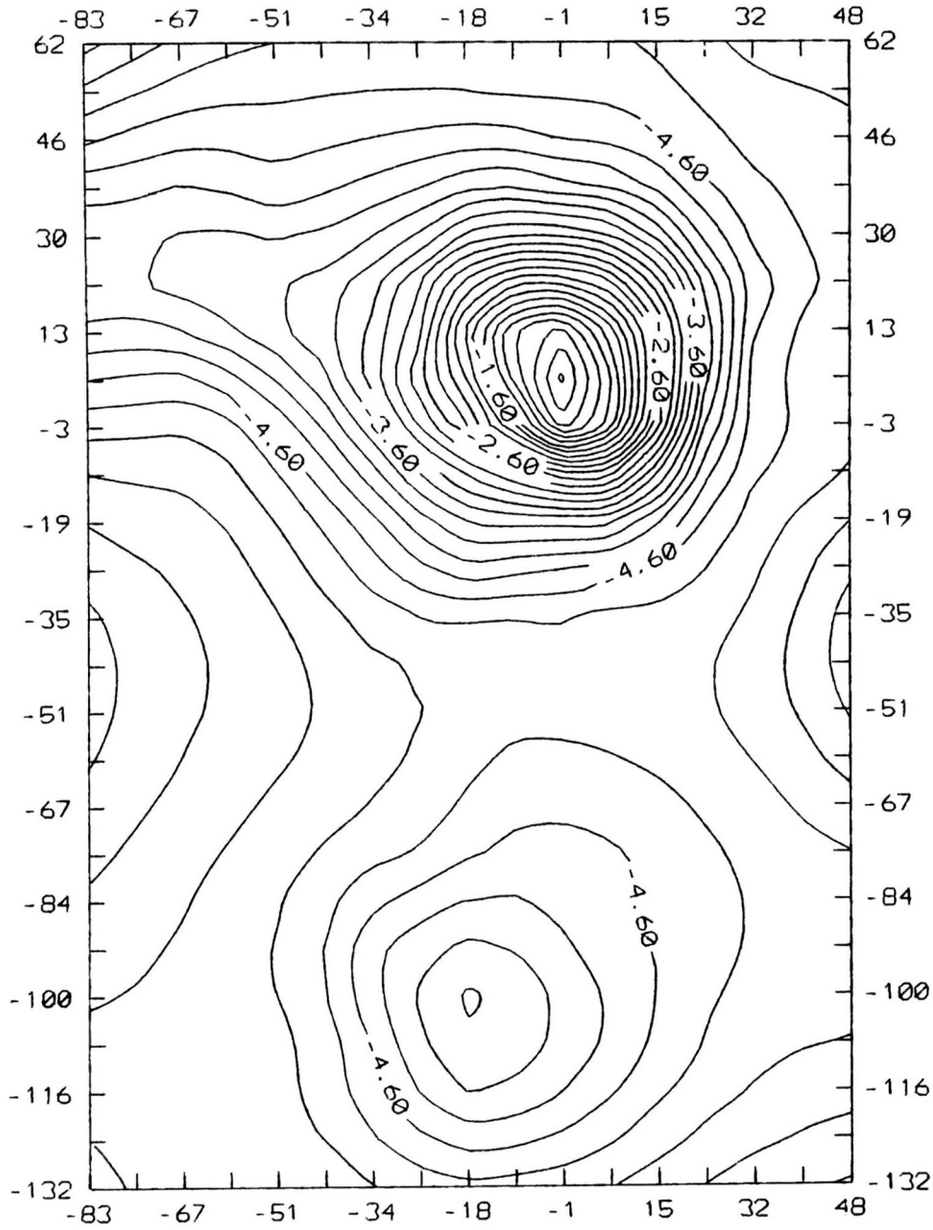


TP 131


-48 -41 -35 -28 -21 -15 -8 -1 5 12 18 25 32
42 36 29 23 16 10 3 -3 -10 -16 -23 -29
-2.99
-1.99
-0.99



TP 132


-83 -67 -51 -34 -18 -1 15 32 48
62 46 30 13 -3 -19 -35 -51 -67 -84 -100 -116 -132
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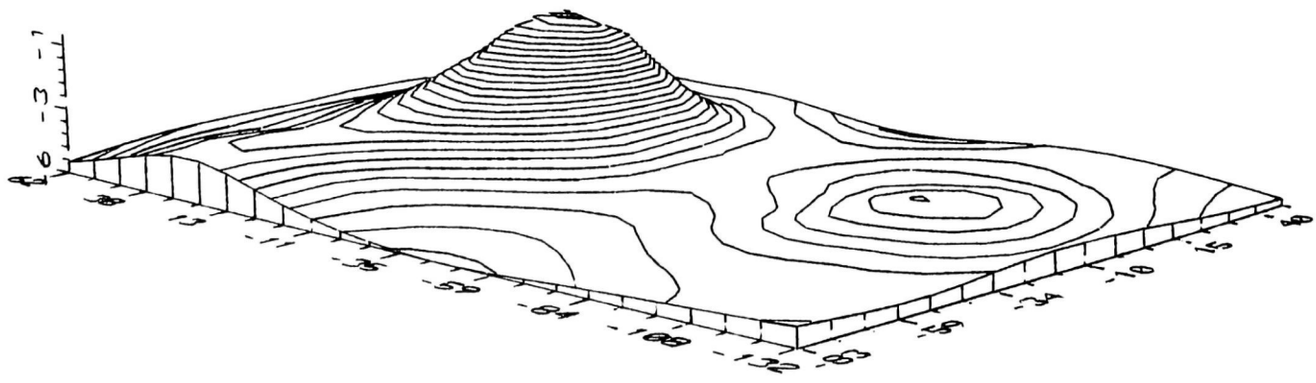
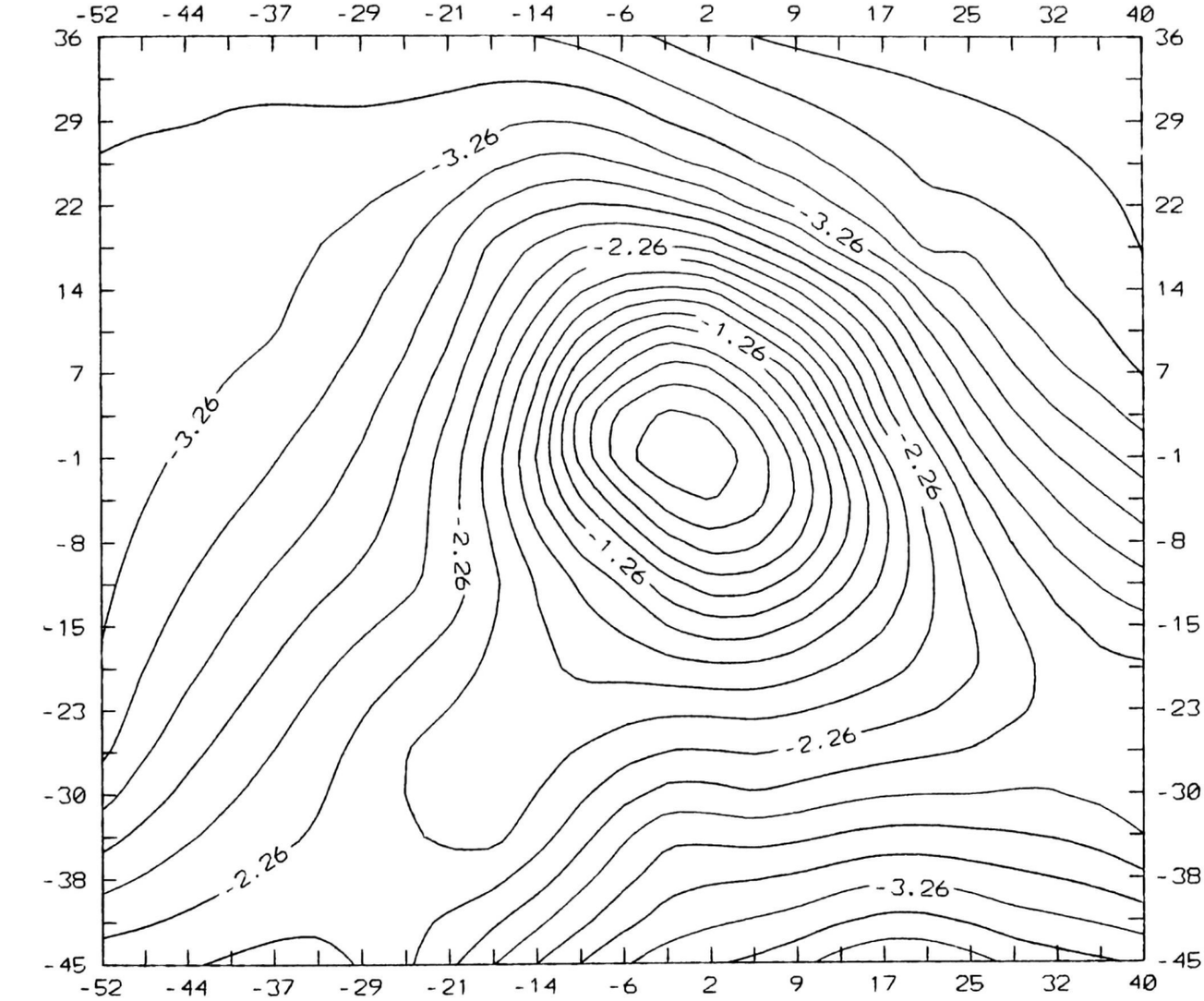
-4.60
-4.60
D



TP 133


-52 -44 -37 -29 -21 -14 -6 2 9 17 25 32 40
36 29 22 14 7 -1 -8 -15 -23 -30 -38 -45
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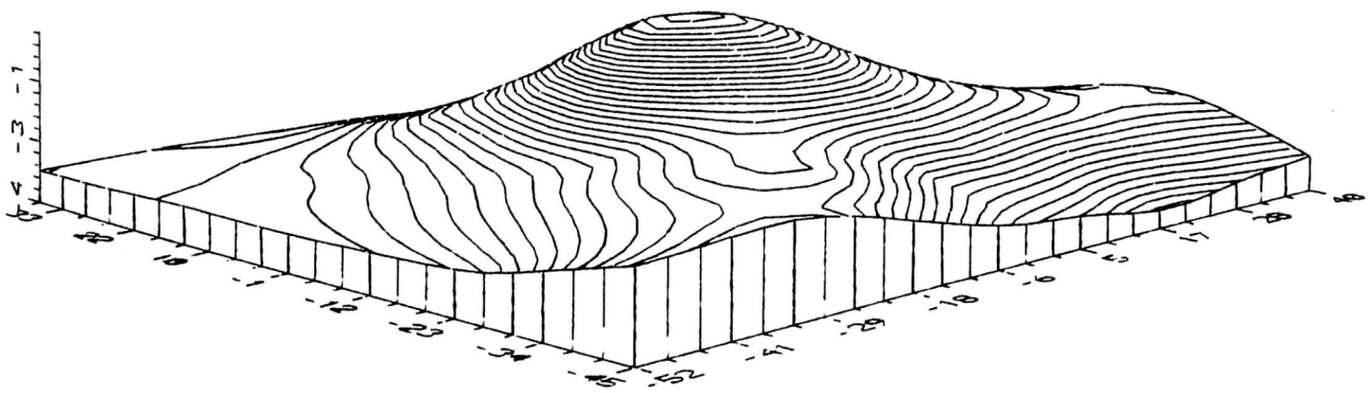
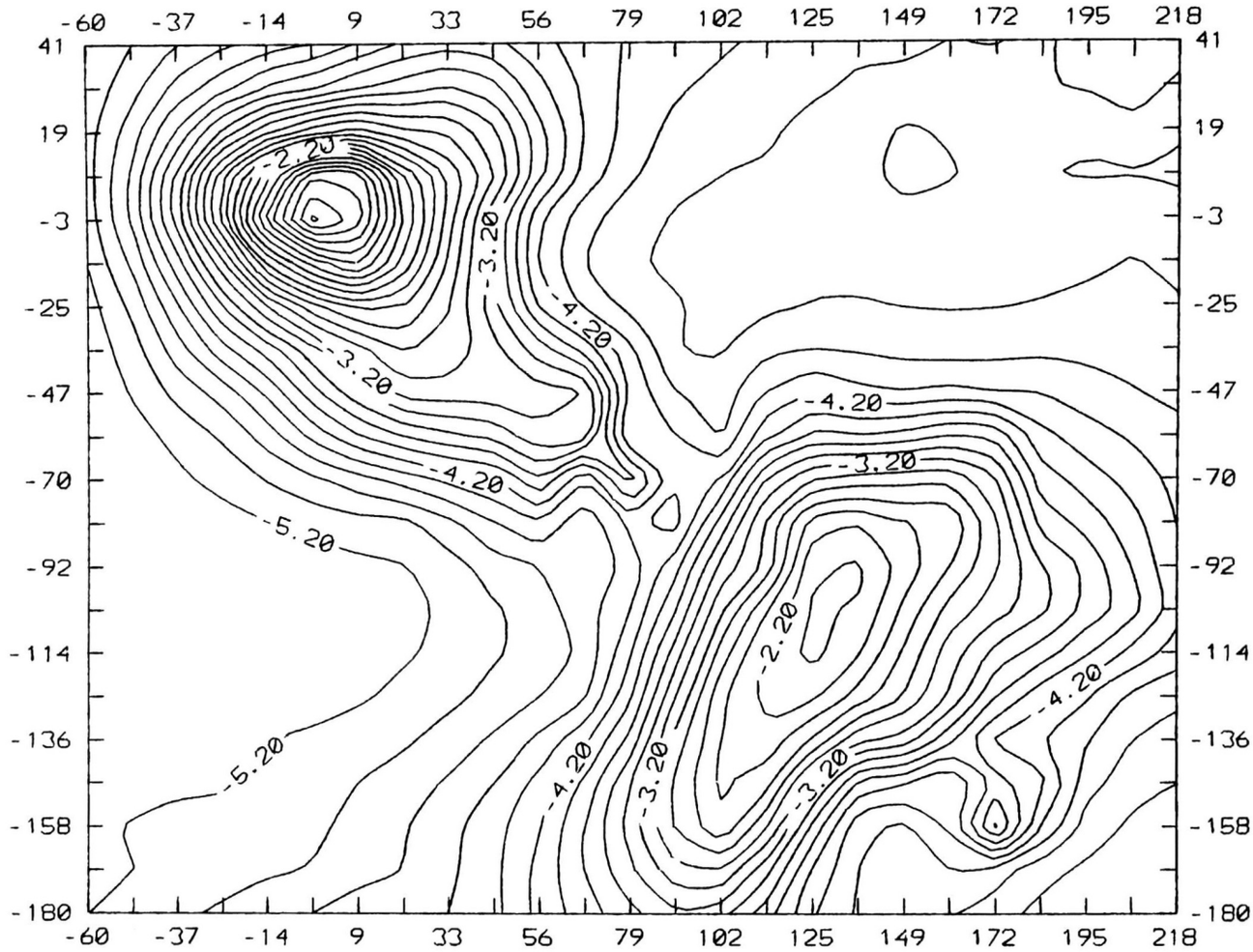
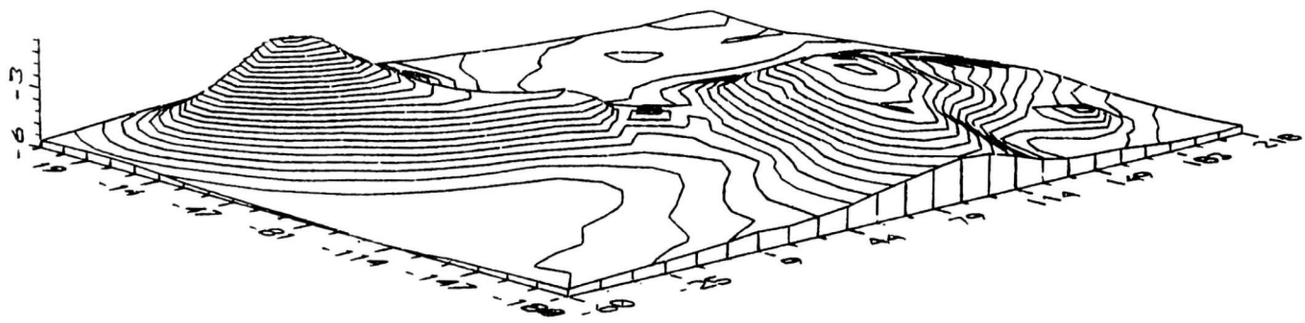
-2.26
-1.26

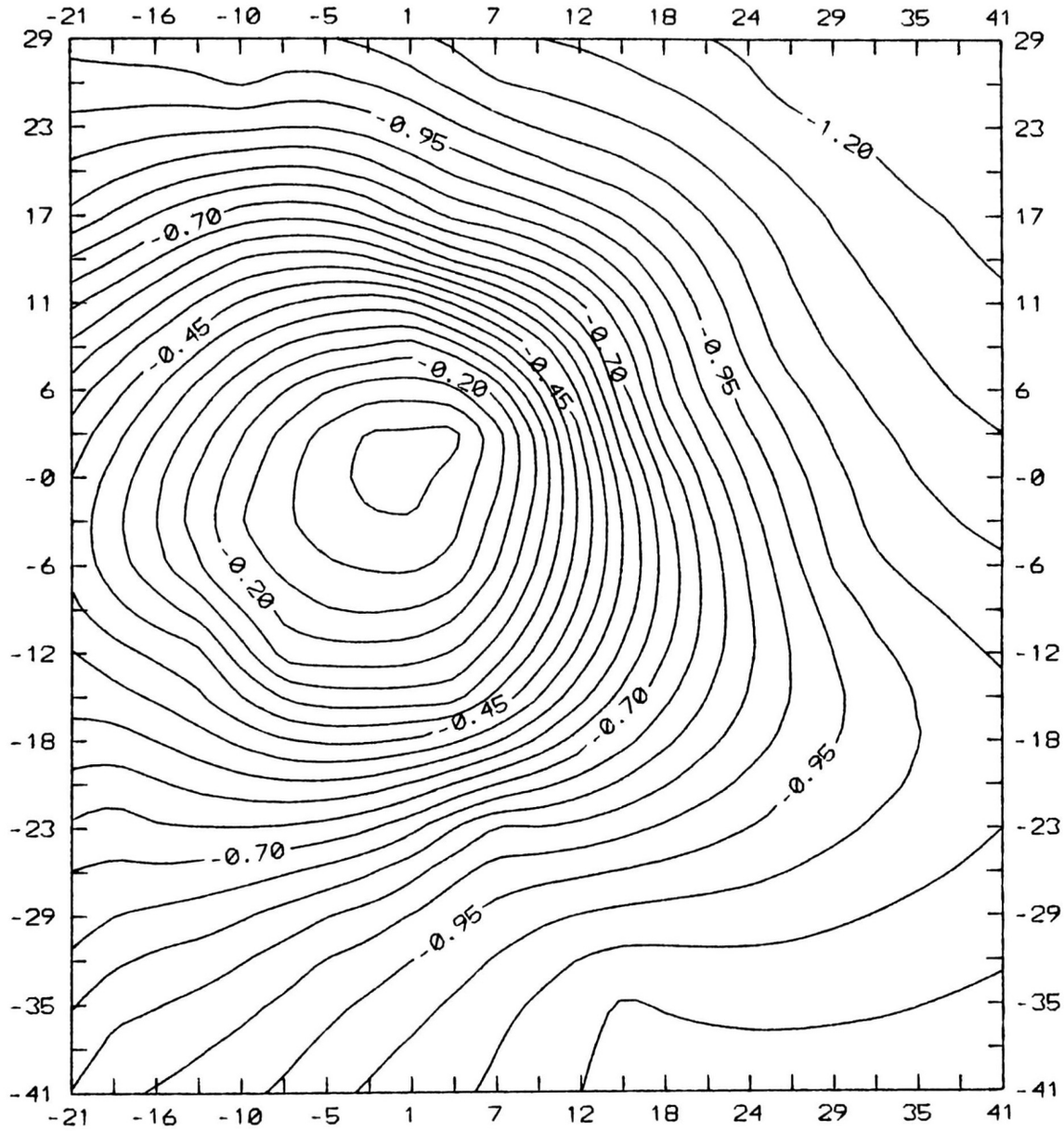


TP 134


-60 -37 -14 9 33 56 79 102 125 149 172 195 218
41 19 -3 -25 -47 -70 -92 -114 -136 -158 -180
-2.20
-3.20
-4.20
-5.20



TP 135


-21 -16 -10 -5 1 7 12 18 24 29 35 41
29 23 17 11 6 -0 -6 -12 -18 -23 -29 -35 -41
-0.95
-1.20
-0.70
-0.45
-0.20
-0.70
-0.45
-0.20
-0.95
-0.45
-0.70
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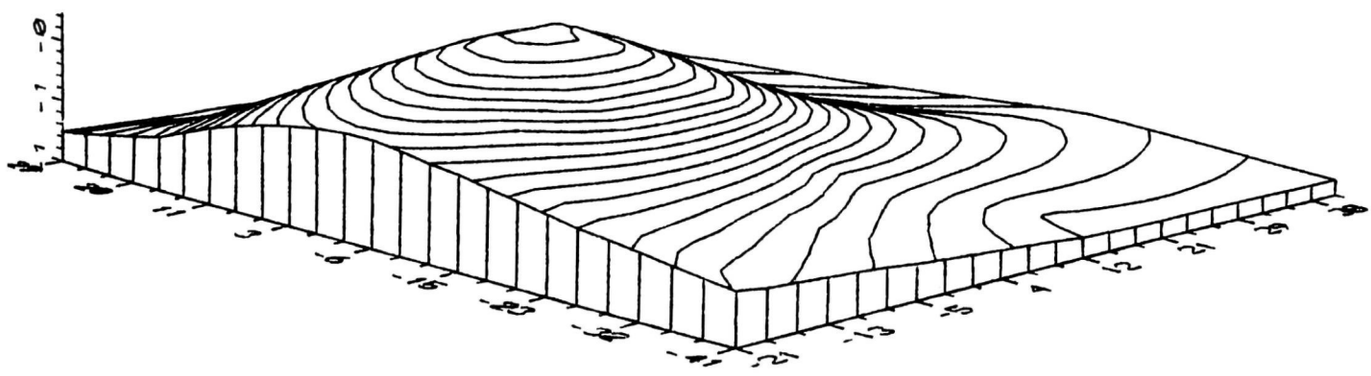
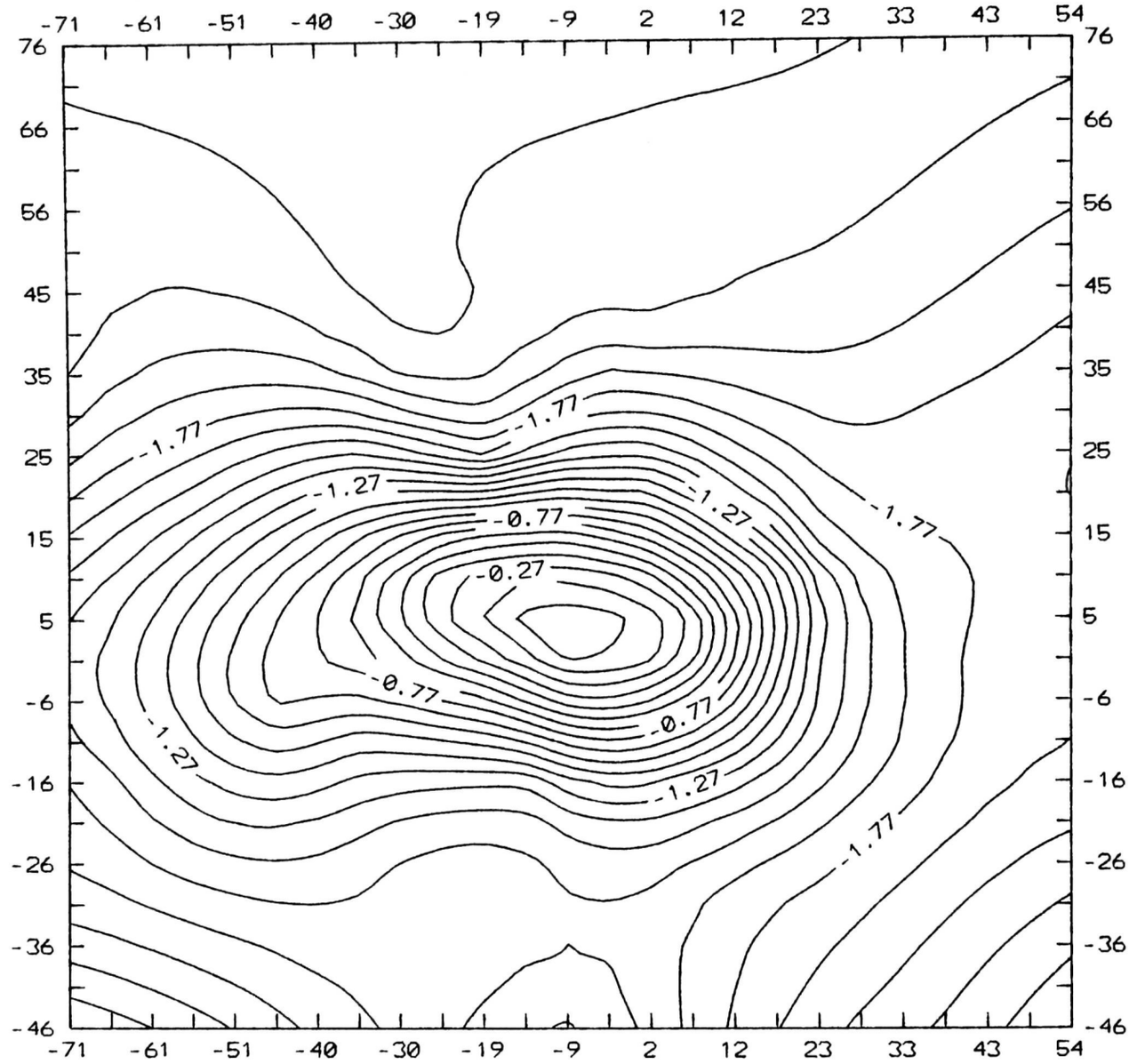
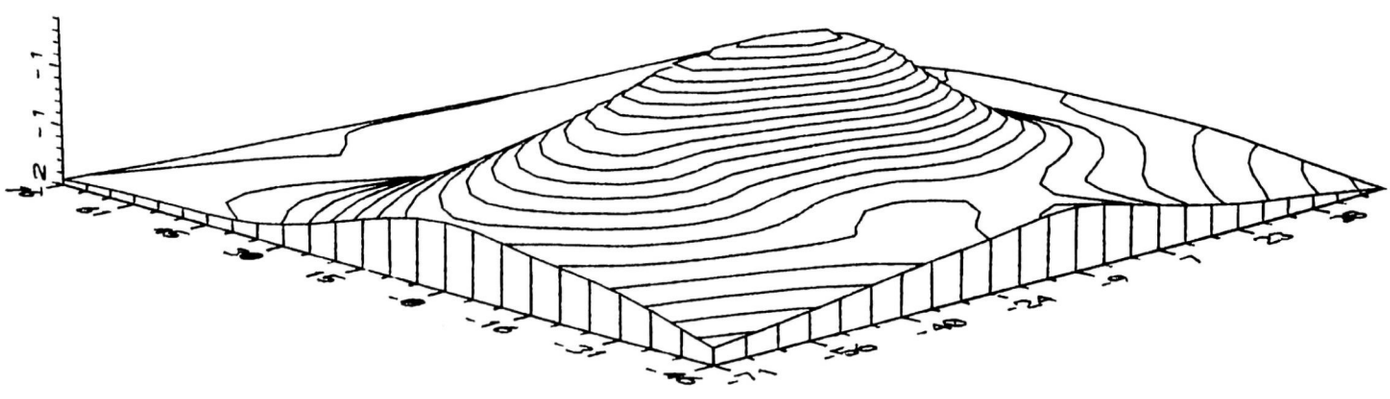
-0.70
-0.95

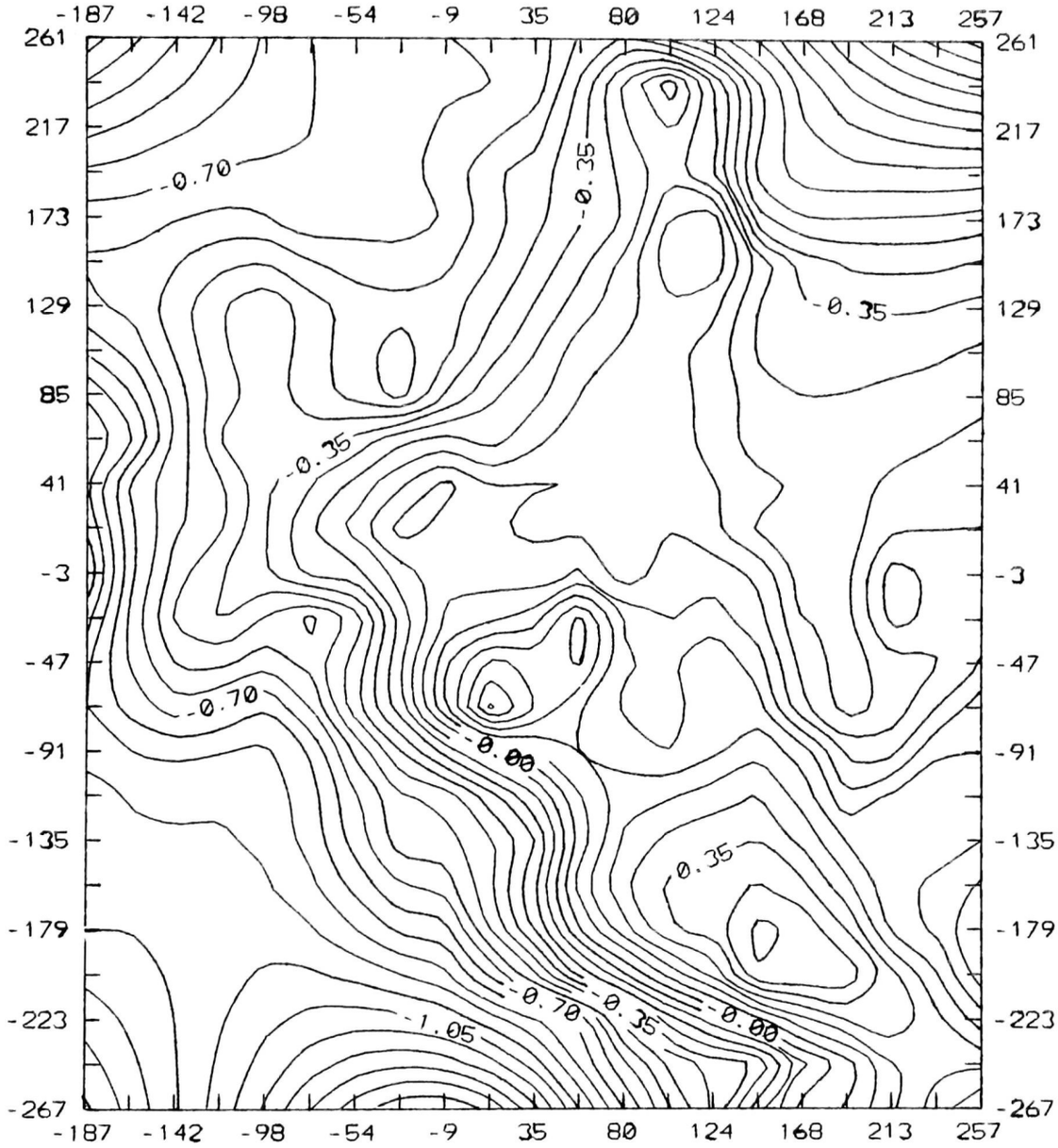


TP 140


-71 -61 -51 -40 -30 -19 -9 2 12 23 33 43 54
76 66 56 45 35 25 15 5 -6 -16 -26 -36 -46
-1.77
-1.27
-0.77
-0.27



TP 148


-187 -142 -98 -54 -9 35 80 124 168 213 257
261 217 173 129 85 41 -3 -47 -91 -135 -179 -223 -267
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-0.35
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-0.70
-0.00
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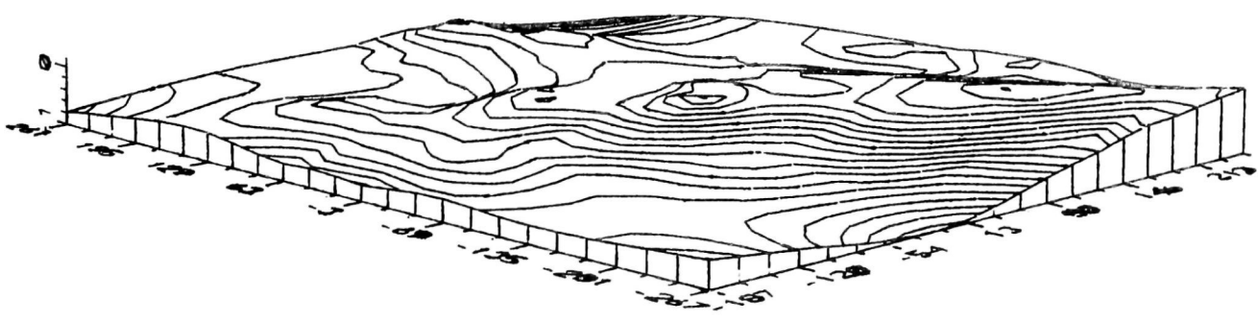
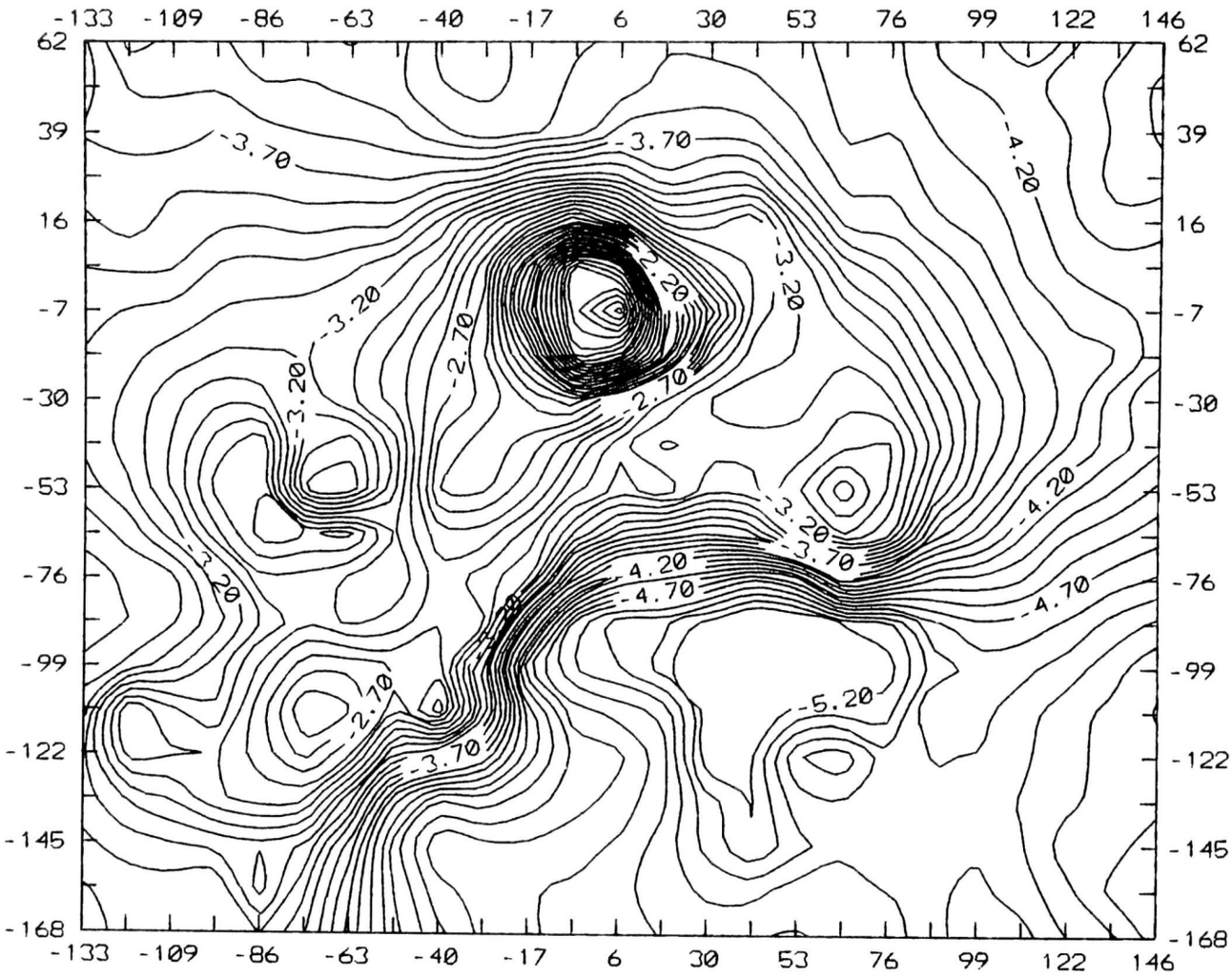
-0.00
-1.05



TP 172


-133 -109 -86 -63 -40 -17 6 30 53 76 99 122 146
62 39 16 -7 -30 -53 -76 -99 -122 -145 -168
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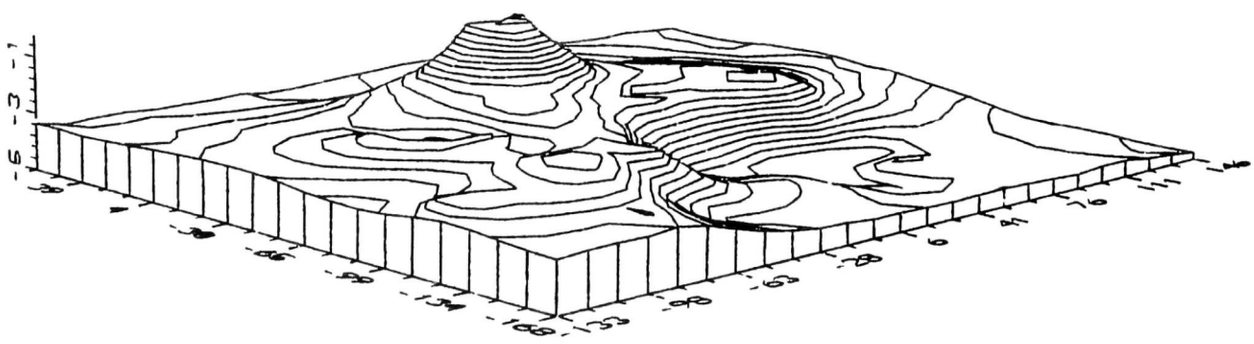
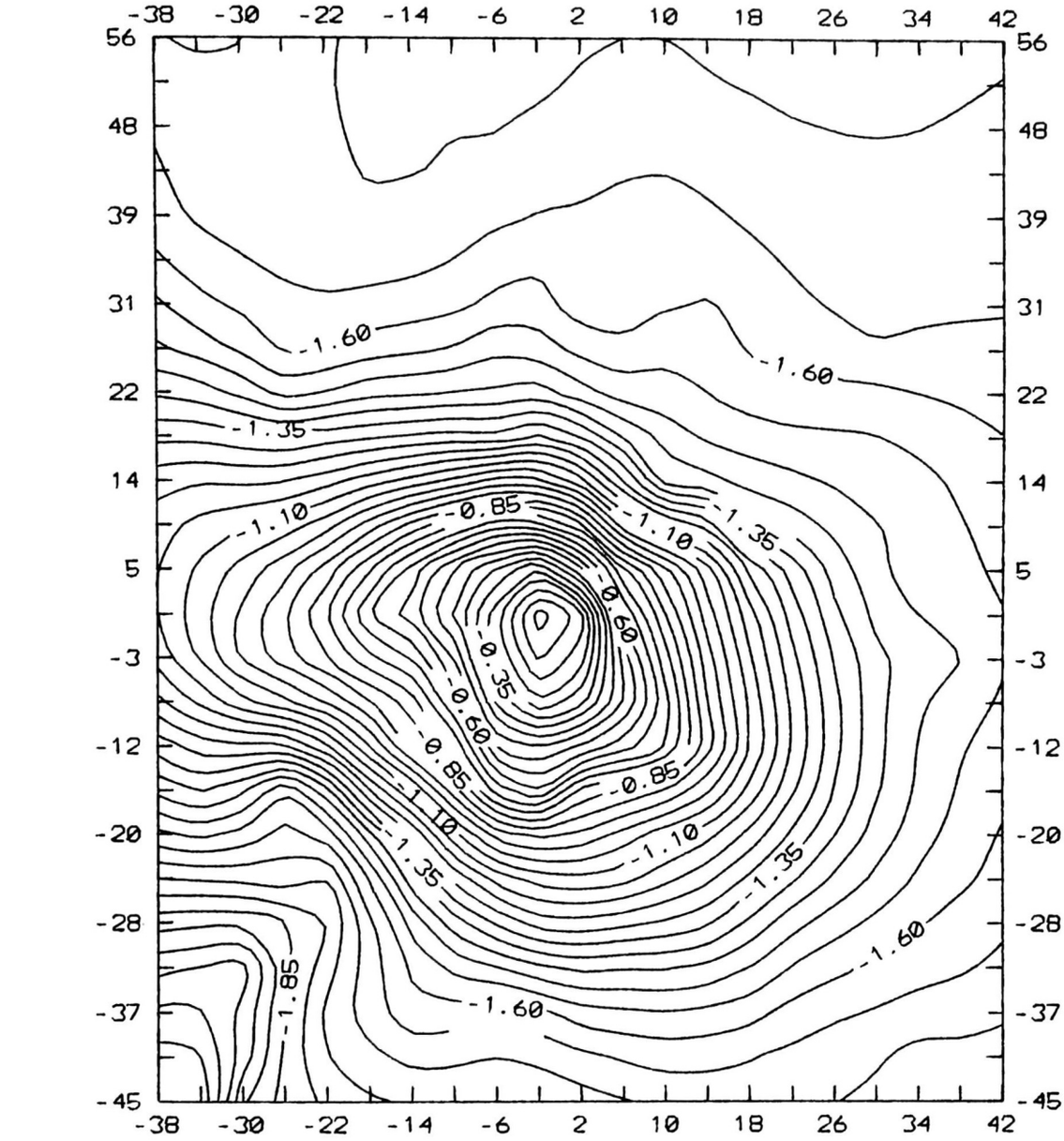
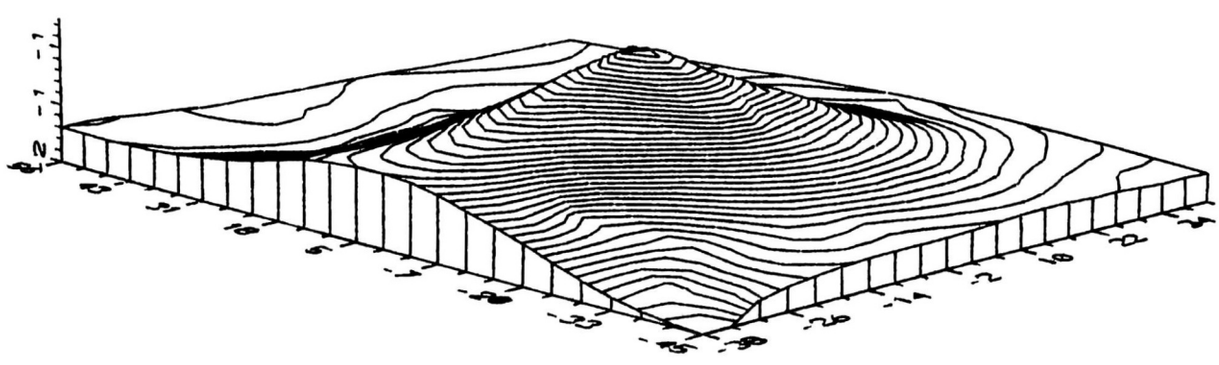
-2.70
-2.20
-4.20
-4.70
-5.20

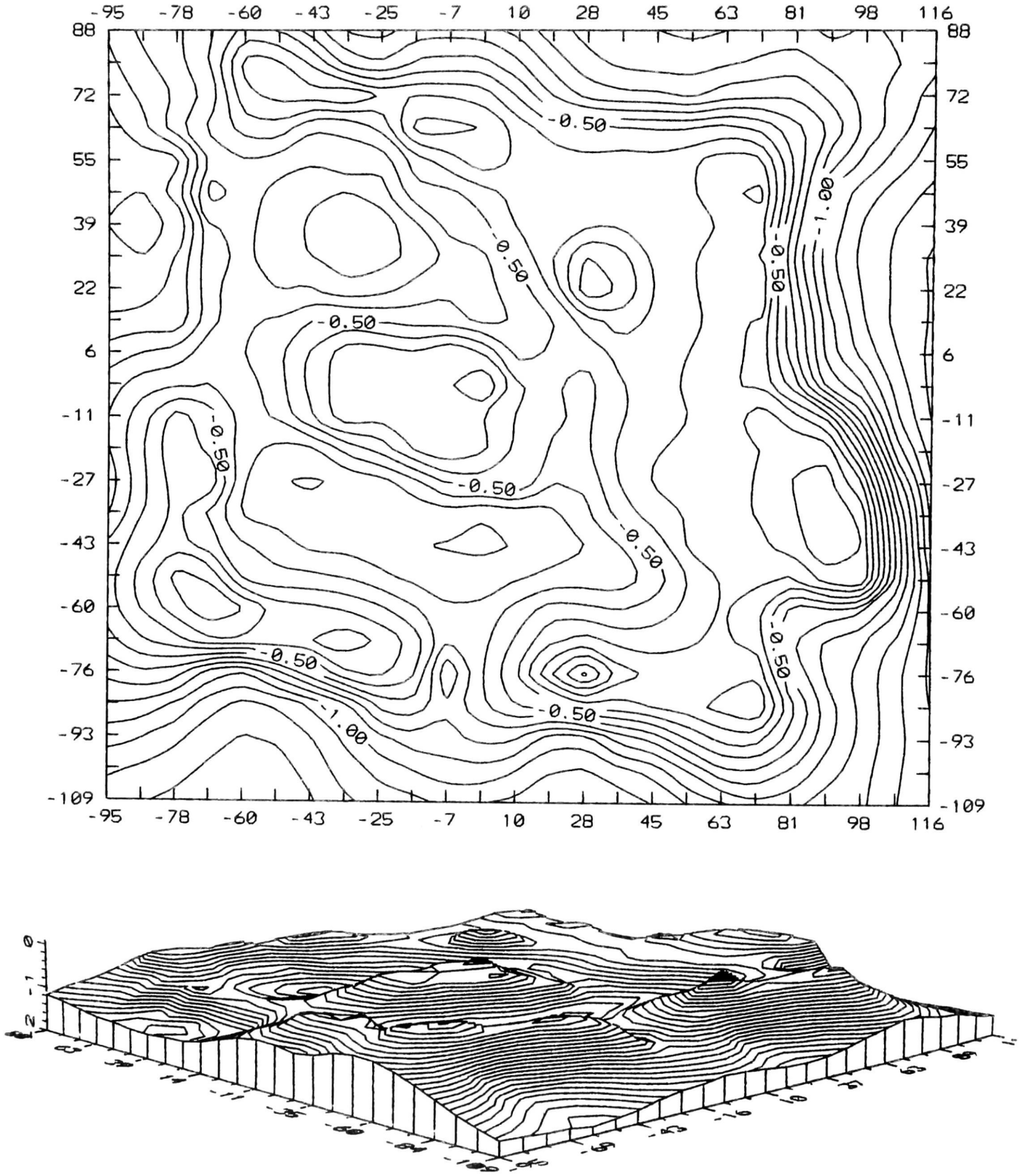


TP 207

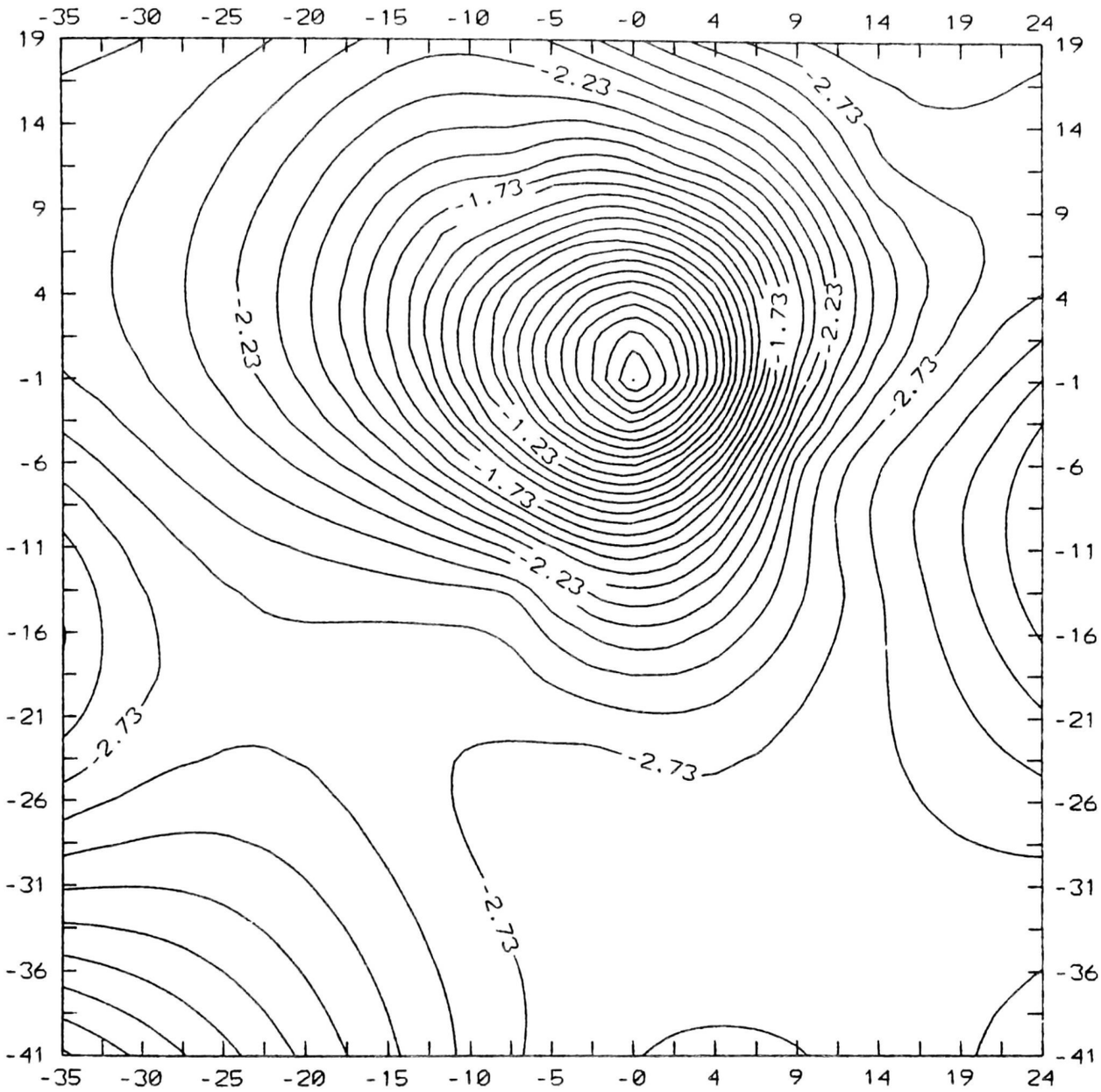

-38 -30 -22 -14 -6 2 10 18 26 34 42
56 48 39 31 22 14 5 -3 -12 -20 -28 -37 -45
-1.60
-1.35
-1.10
-0.85
-0.60
-0.35
-1.85
D

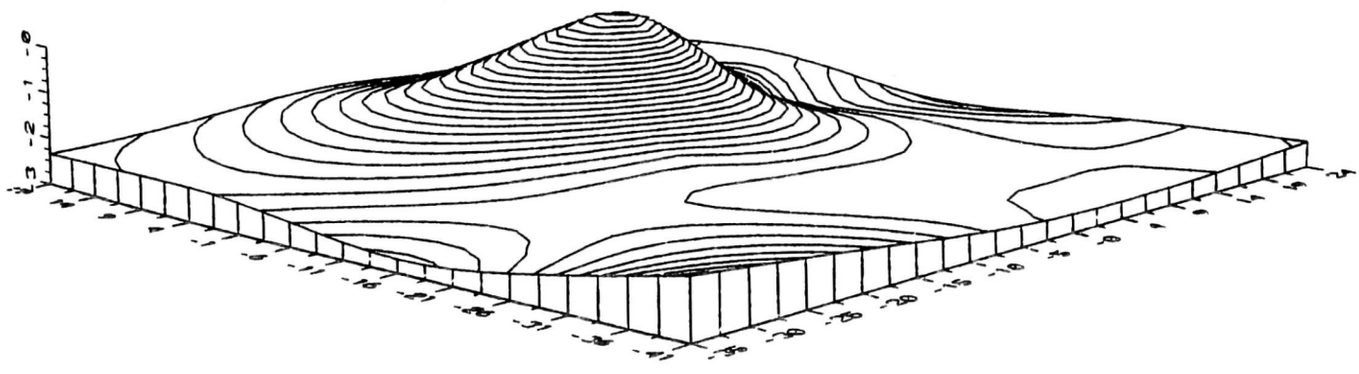


TP 215

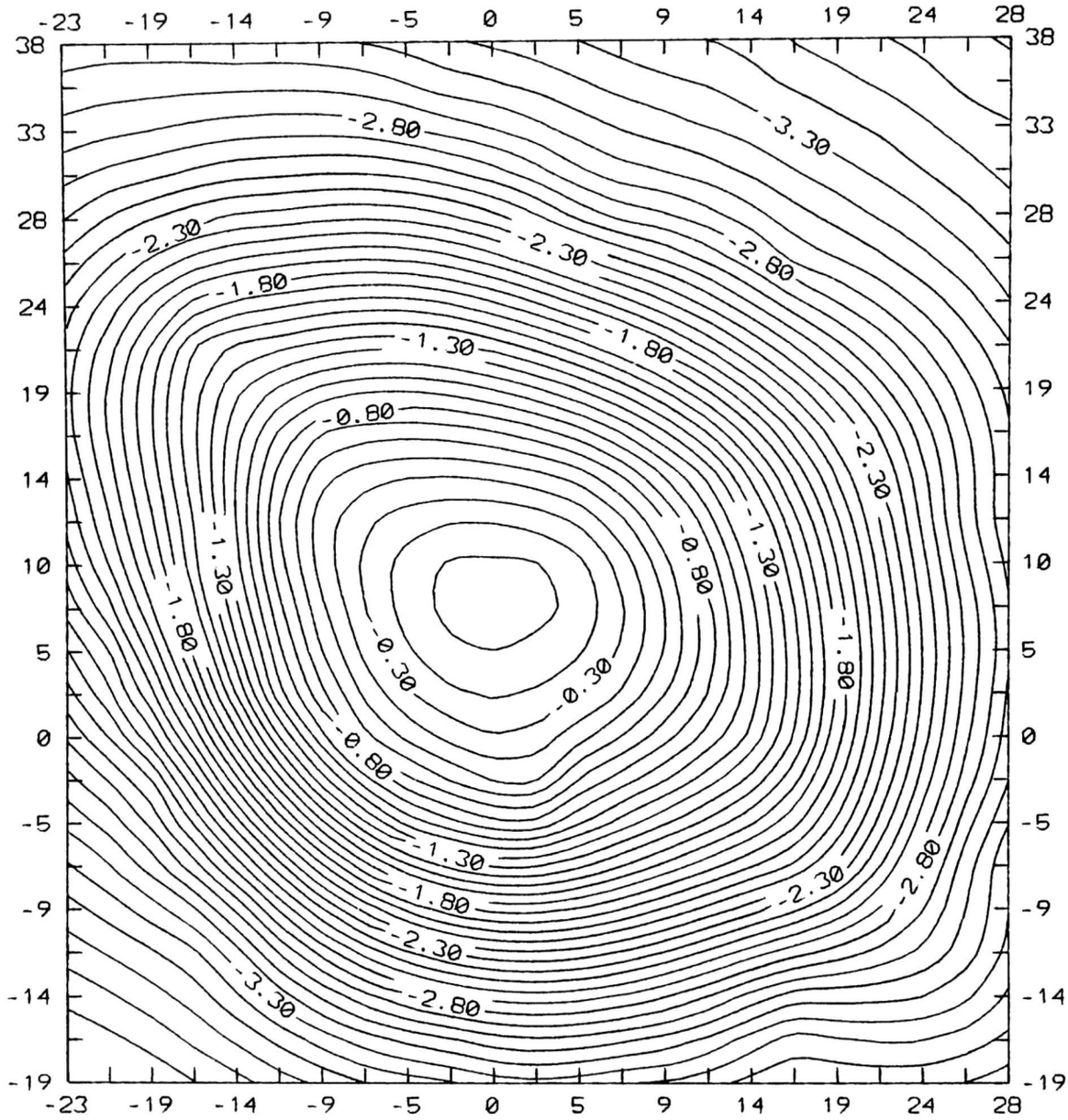

-95 -78 -60 -43 -25 -7 10 28 45 63 81 98 116
88 72 55 39 22 6 -11 -27 -43 -60 -76 -93 -109
-0.50
-1.00

TP 219


-35 -30 -25 -20 -15 -10 -5 -0 4 9 14 19 24
19 14 9 4 -1 -6 -11 -16 -21 -26 -31 -36 -41
-2.23
-2.73
-1.73
-1.23



TP 255


-23 -19 -14 -9 -5 0 5 9 14 19 24 28
38 33 28 24 19 14 10 5 0 -5 -9 -14 -19
-0.30
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-1.30
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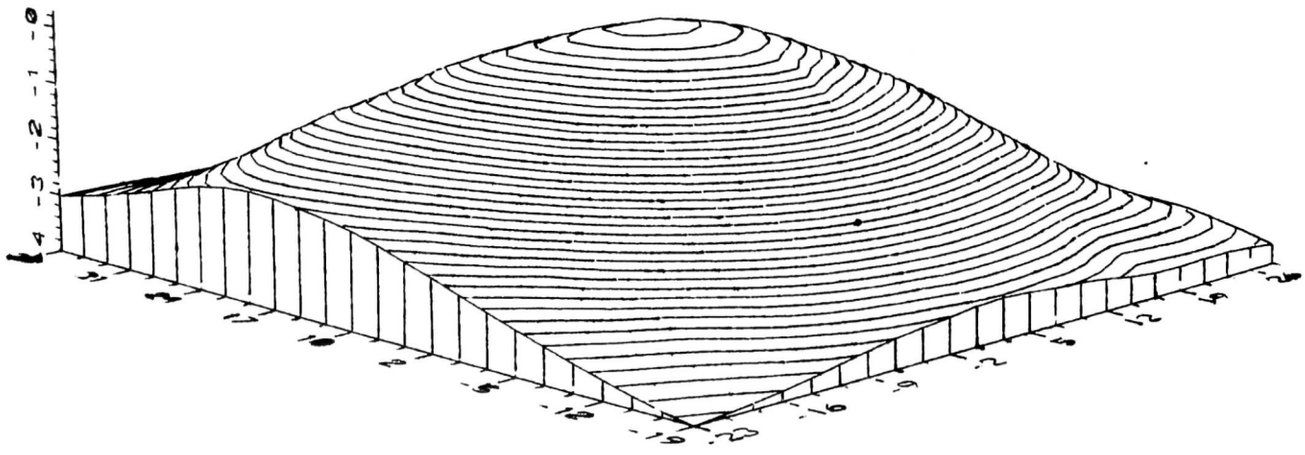
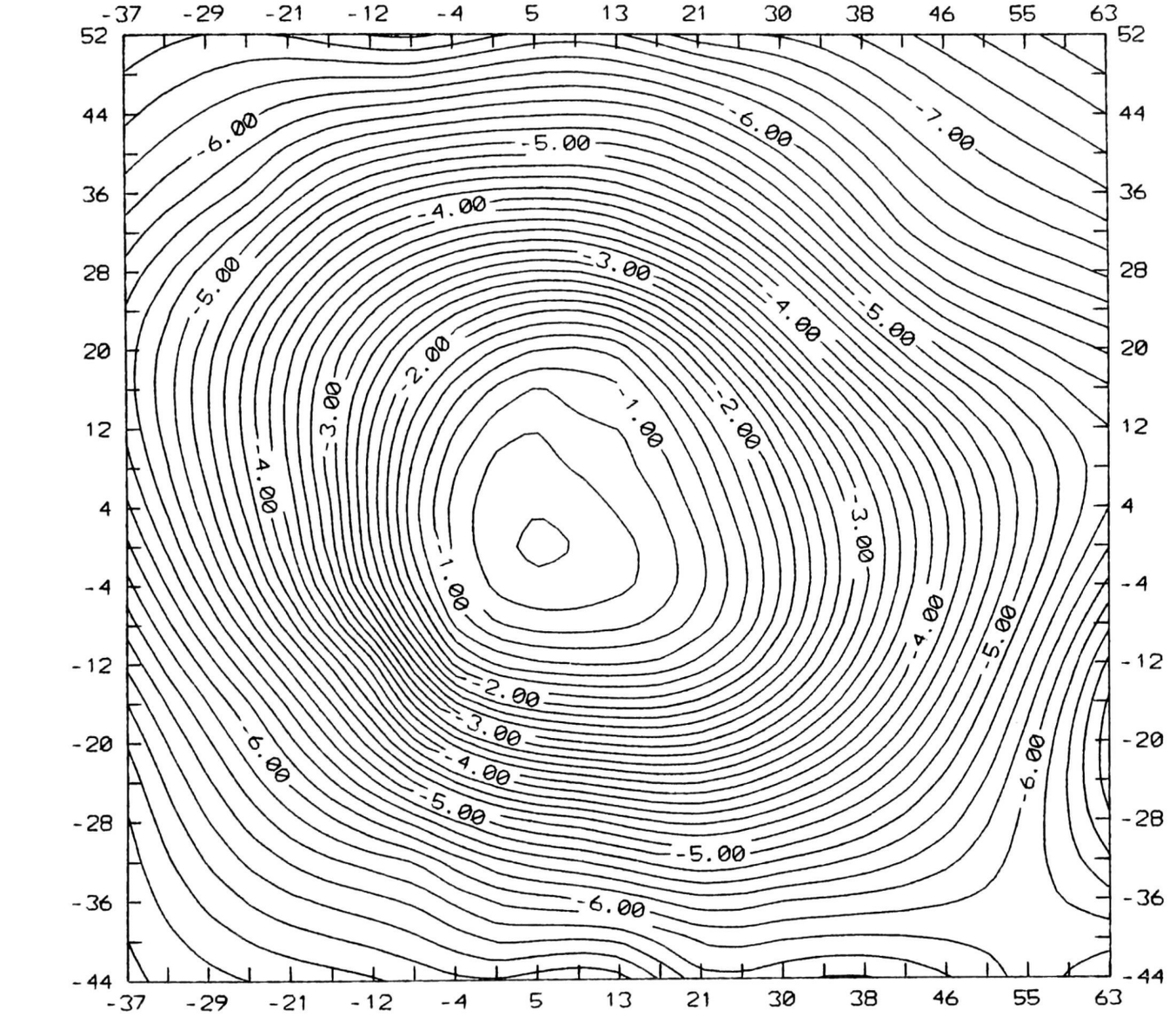
-2.30
-2.80
-3.30



TP 256


-37 -29 -21 -12 -4 5 13 21 30 38 46 55 63
52 44 36 28 20 12 4 -4 -12 -20 -28 -36 -44
-1.00
-2.00
-3.00
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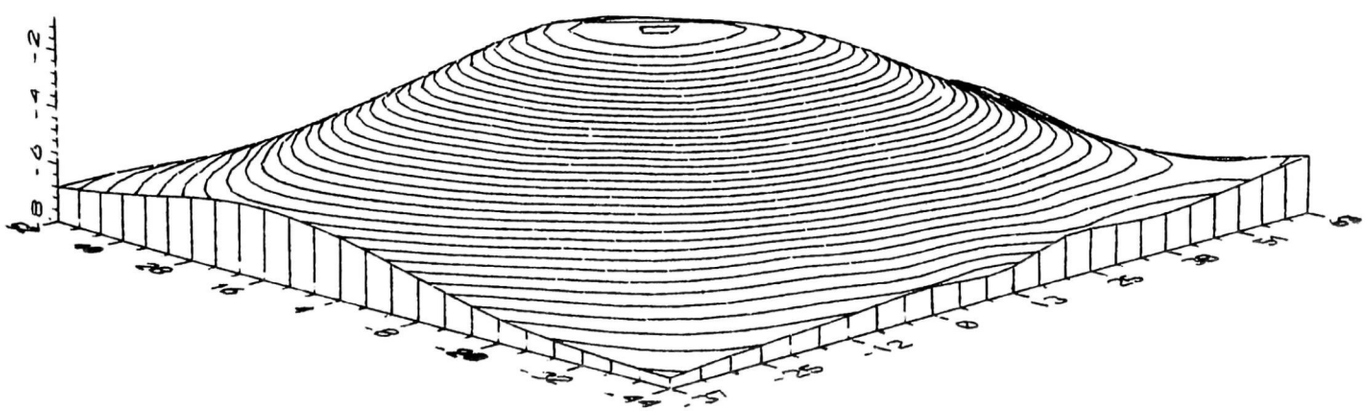
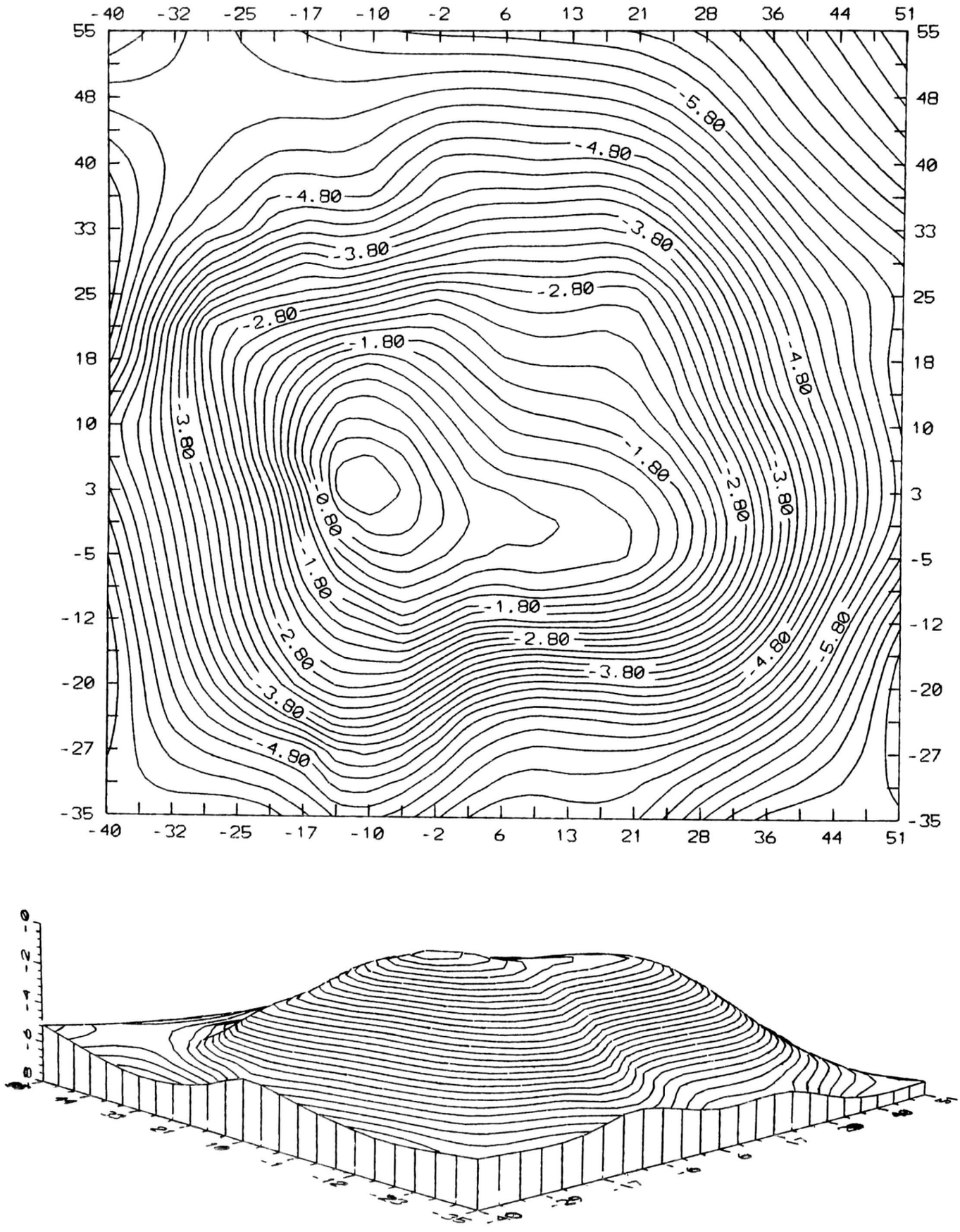
-5.00
-6.00
-7.00



TP 257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55 48 40 33 25 18 10 3 -5 -12 -20 -27 -35
-5.80
-4.80
-4.80
-3.80
-3.80
-2.80
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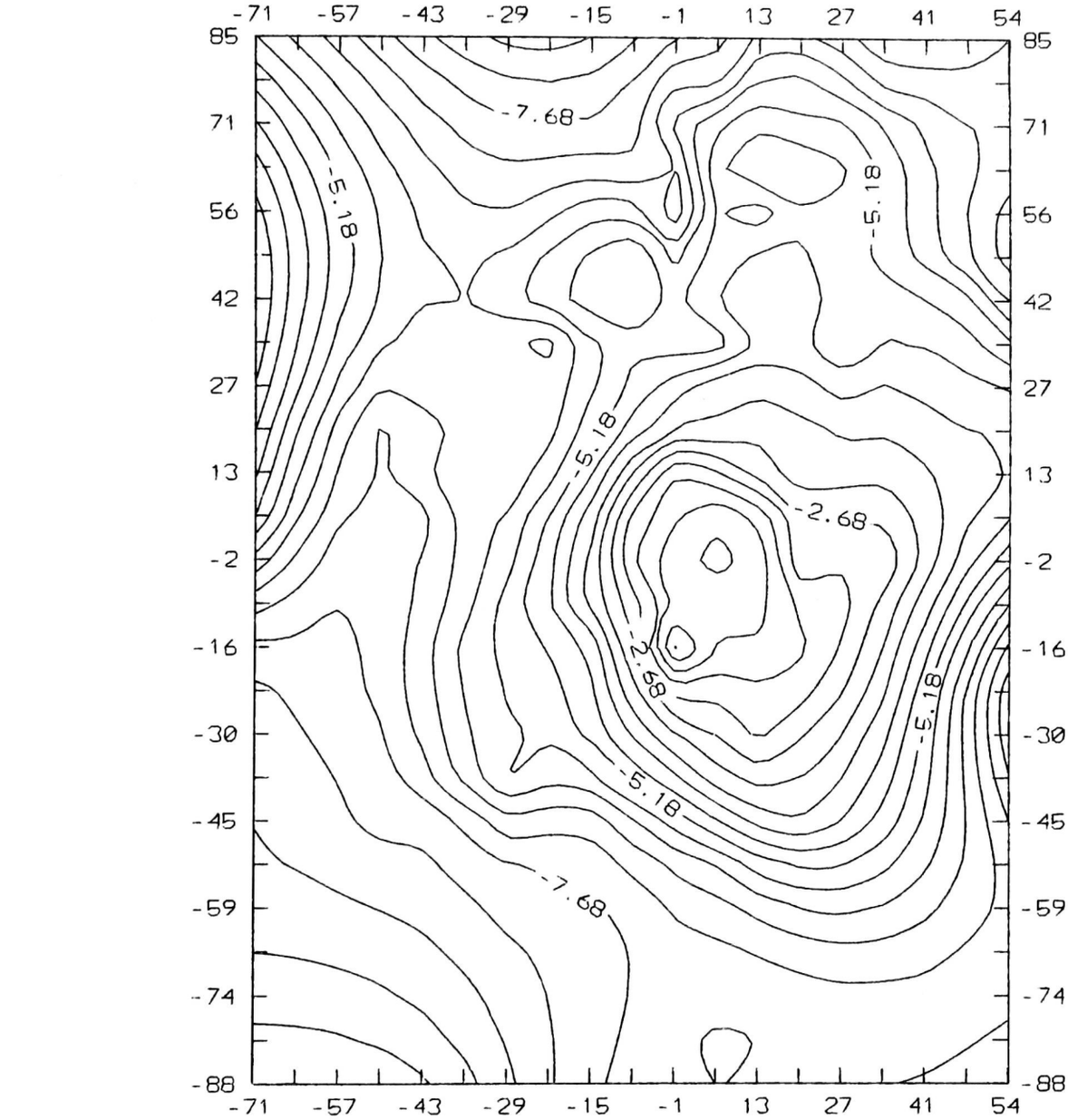
TP 258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85 71 56 42 27 13 -2 -16 -30 -45 -59 -74 -88
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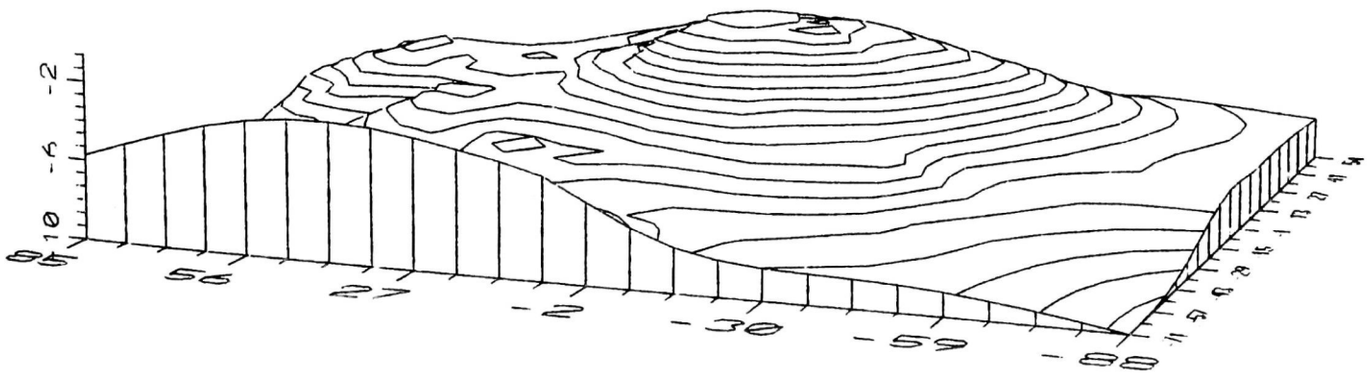
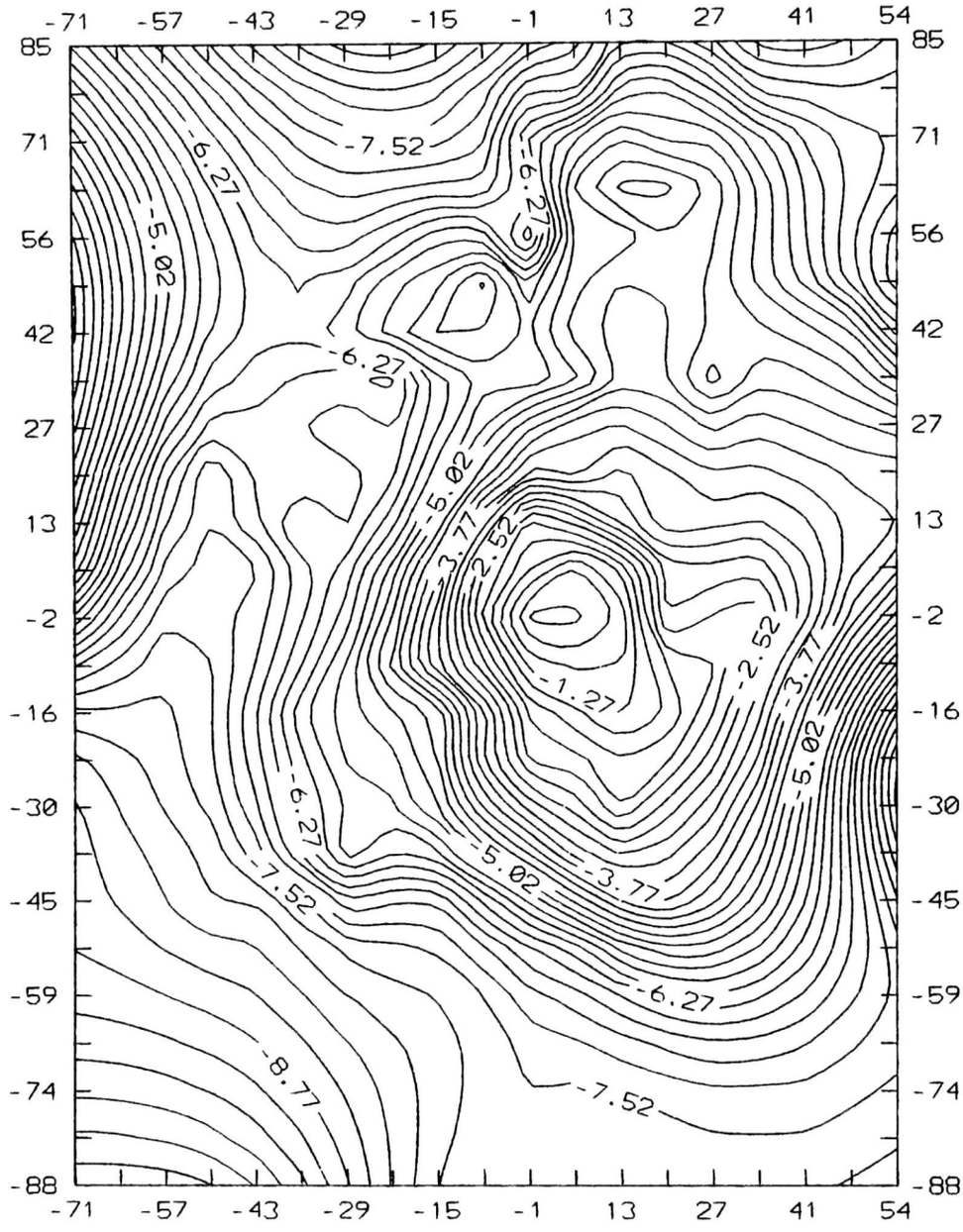

85 56 27 -2 -30 -59 -88

TP 258C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85 71 56 42 27 13 -2 -16 -30 -45 -59 -74 -88
-6.27
-7.52
-5.02
-6.27
0
-6.27
-5.02
-3.77
-2.52
-1.27
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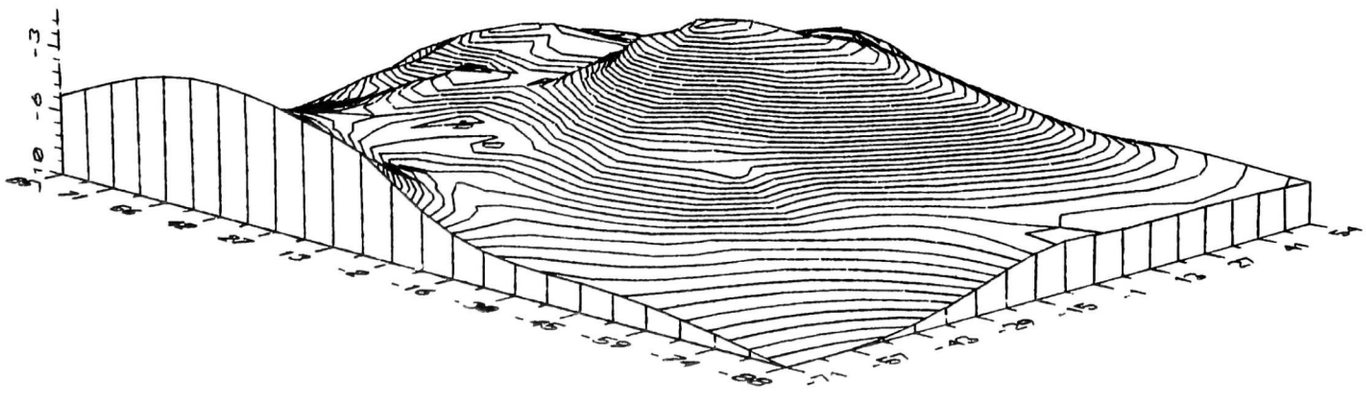
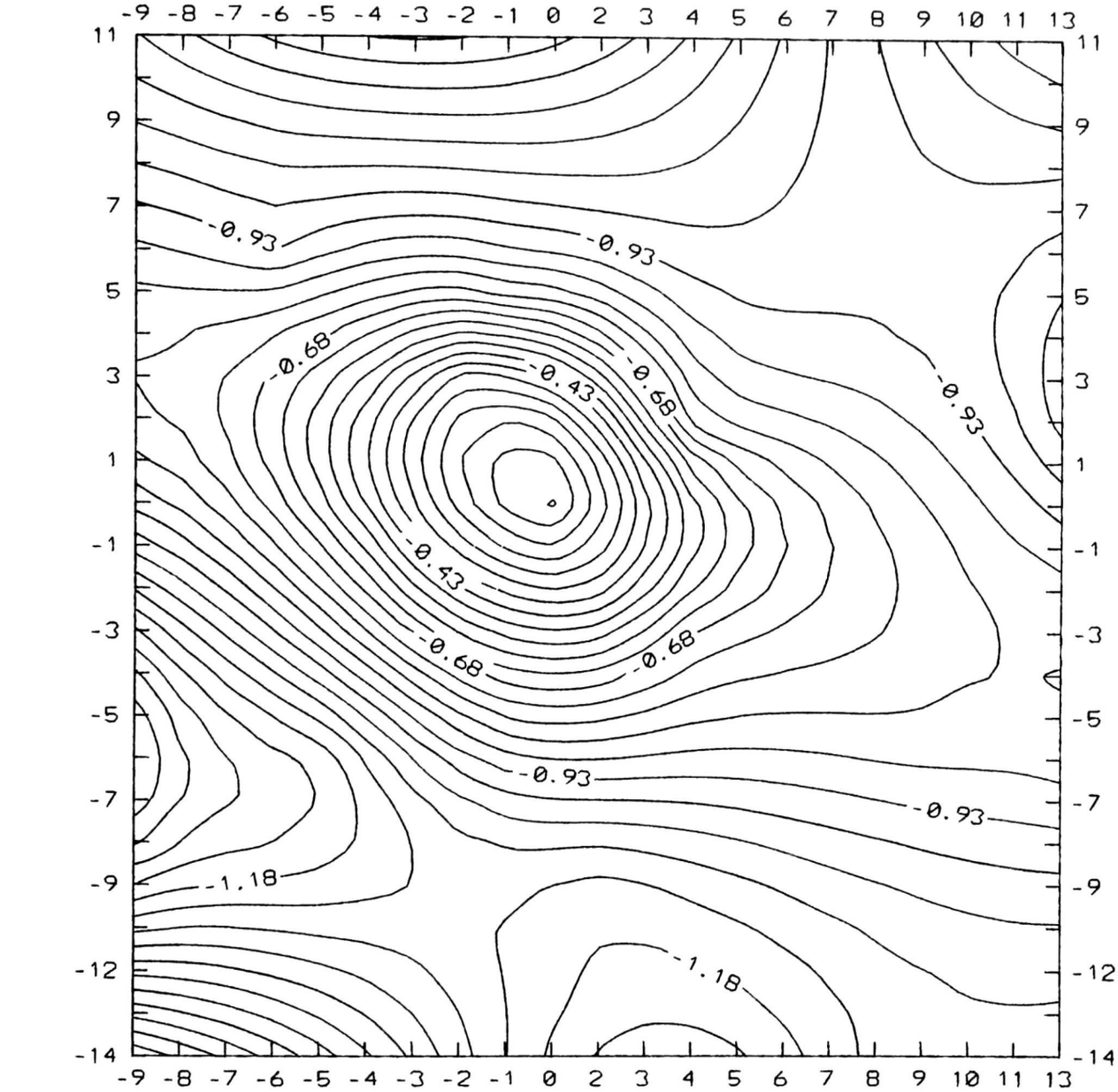


TP 275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11 9 7 5 3 1 -1 -3 -5 -7 -9 -12 -14
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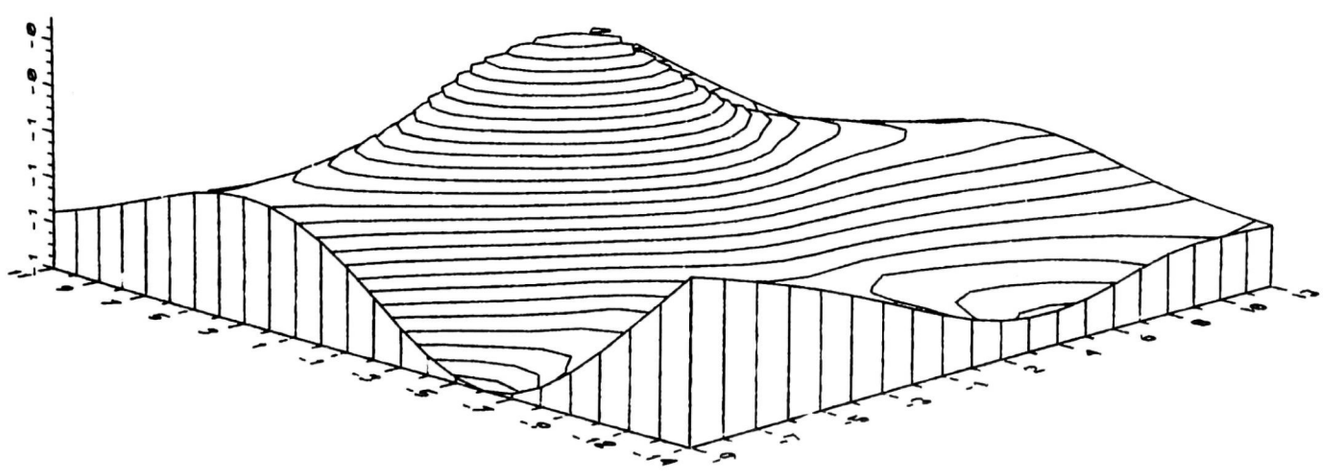
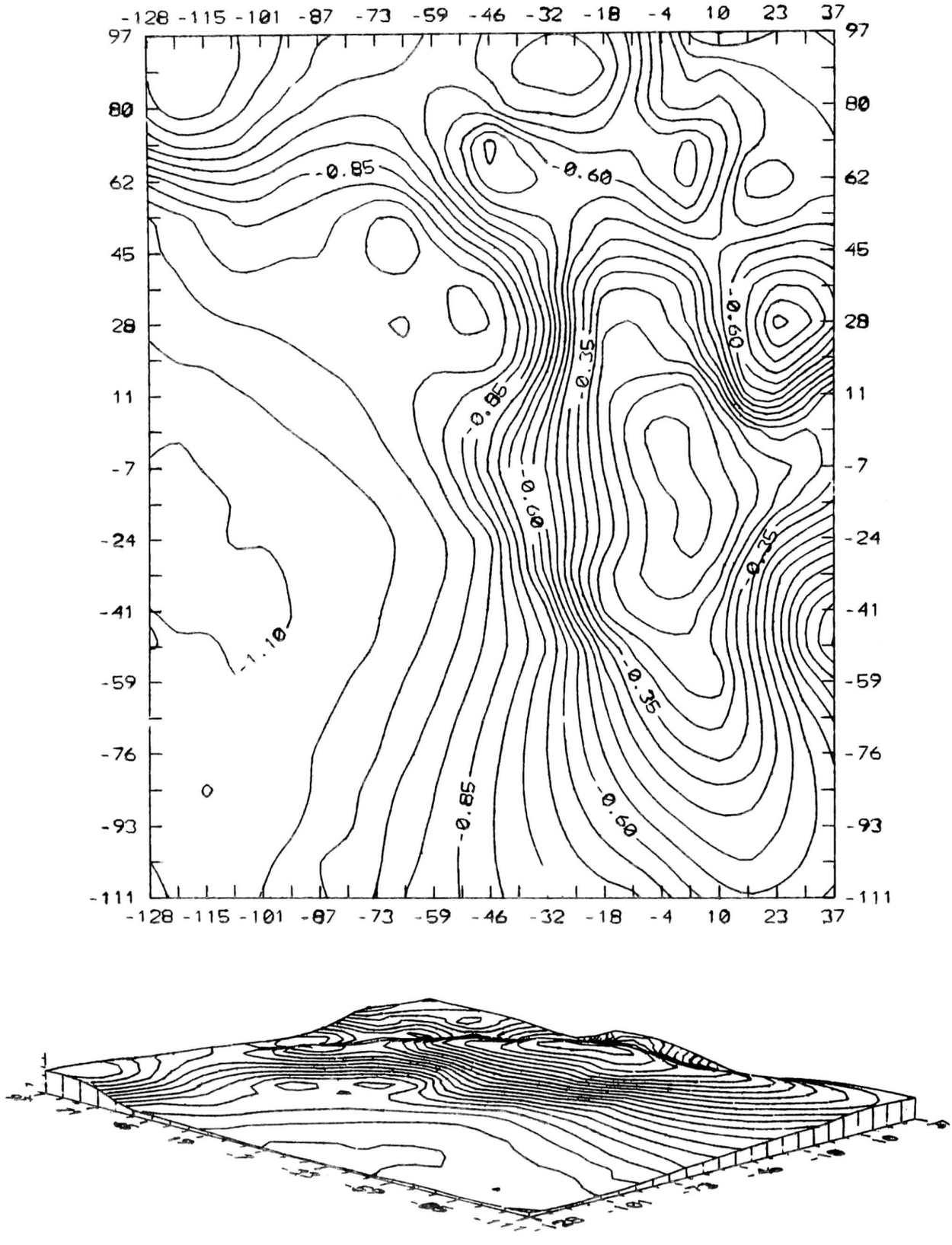
-1.18



TP 340


-128 -115 -101 -87 -73 -59 -46 -32 -18 -4 10 23 37
97
80
62
45
28
11
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-24
-41
-59
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-93
-111
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-0.60
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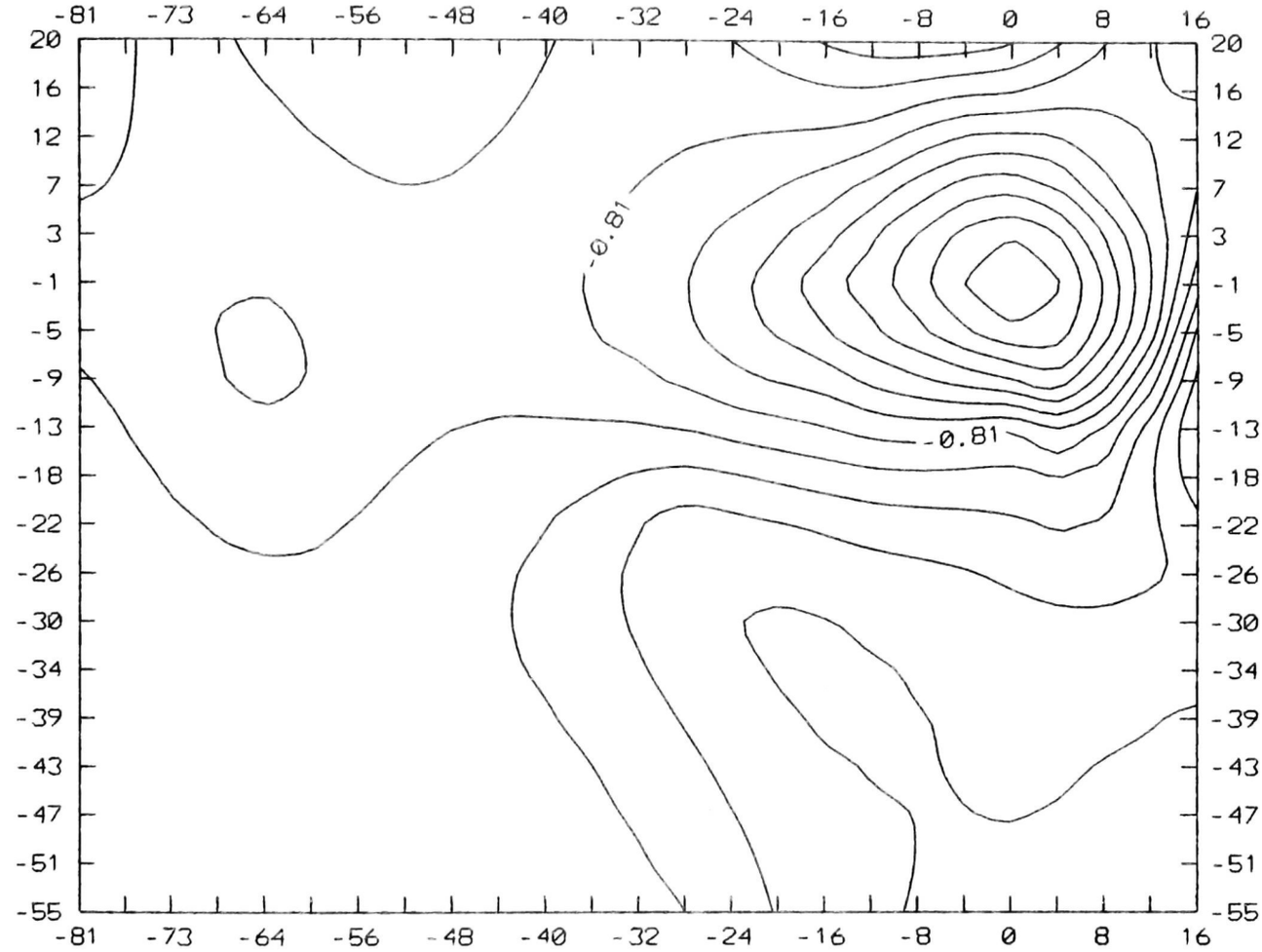
-1.10

TP 356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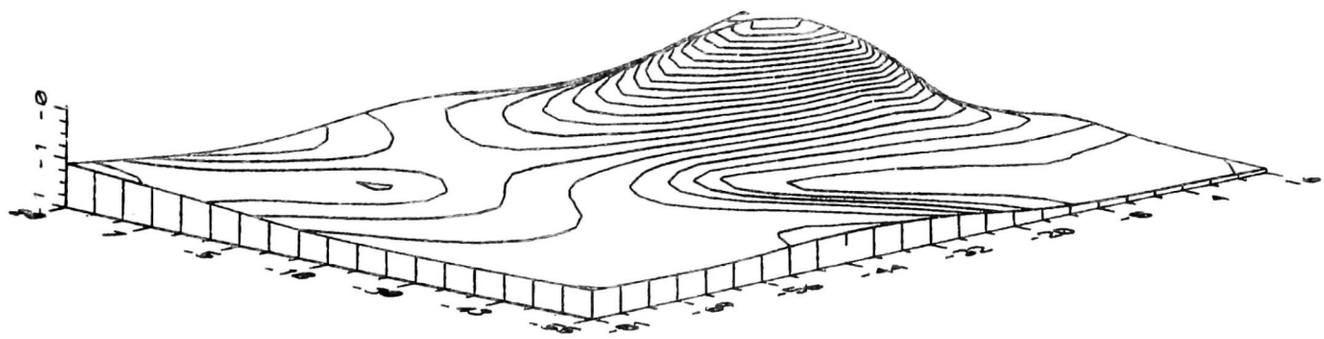

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