SETTLEMENT DEVELOPMENT IN THE NORTH JAZIRA, IRAQ

A STUDY OF THE ARCHAEOLOGICAL LANDSCAPE

T.J. Wilkinson and D.J. Tucker

IRAQ ARCHAEOLOGICAL REPORTS – 3

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To the people of Iraq

إلى شعب العراق

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ISBN 0 85668 658 1

Typeset by Campbell Archaeological Services, Oxton, Lauder, Berwickshire

Printed and published in England for the British School of Archaeology in Iraq and the Department of Antiquities & Heritage, Baghdad, by Aris & Phillips Ltd, Teddington House, Warminster, Wiltshire, England

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PREFACE

This monograph presents a synthesis of four seasons of survey and excavation conducted within a 475 sq km enclave of NW Iraq. Emphasis is placed upon elements of the landscape that amplify the record provided by more conventional site survey. Archaeological surveys can vary in intensity from general reconnaissance aimed at finding somewhere to dig, to very detailed fieldwalking operations in which teams of people march or crawl across the terrain often as little as 50 m apart. The North Jazira Project was intended to come closer to the latter approach but for the sake of pragmatism it became a rather hybrid operation which entailed conventional survey of sites of all sizes, combined with detailed "control" for off-site archaeological data. Such an approach combined with the eventual access to a range of air photo and related data after the summer of 1990 provided a remarkably consistent record of settlement patterns through some 8000 to 9000 years (summarized chronologically in Chapters 5 to 8). The collection of off-site data was focussed mainly, but by no means exclusively, on the northern and eastern parts of the survey area around the massive mound of Tell al-Hawa. The above record was further refined by the examination of dozens of kilometres of drains and canals dug for a new irrigation project and by the excavation of four small sites. Such excavations inevitably exposed the shortcomings of surface survey and two of the three excavated habitation sites revealed hitherto unrecognized prehistoric levels buried beneath later strata. Nevertheless, although prehistoric sites are under-represented by survey we are still able to provide a large quantity of valuable data relevant to the transformation of Chalcolithic village settlement systems into those of Bronze Age urban hierarchies. This transformation, we should emphasize, does not simply arise from changes in the structure of the settlement pattern but also entails changes in the intensity of land use and in the development of communication systems, traces of all of which can be picked up in the field.

Unfortunately, the events of August 1990 and those that followed, meant that fieldwork could not be completed, and that only summary records of much of the field data were available for most of the writing up period. The first draft of this report was therefore written using only that data that had been selected for final publication in June 1990, as well as some valuable air photo and satellite image data that became available after that date. The remaining more detailed records were then incorporated when they became available in May 1992. The result is therefore inevitably slightly uneven but we hope that most of the inconsistencies have been removed. However, given the general lack of published data from surveys in the region and the substantial amount of data that is now available, it seems logical to proceed with the publication now rather than wait until it may be possible to complete the final part of the survey.

In Iraq, we are particularly grateful to the following officials of the Baghdad and Mosul offices of the Directorate General of Antiquities for providing permits, labour and field accommodation as well as help and advice during the project: Dr Mu'ayyad Sa'id Damerji, Director General of Antiquities and Heritage, Baghdad; Manhal Jabr, Director of the Mosul office; Salem Yunis in charge of the Saddam Dam and related rescue projects; Moslem Mohammed of Tel'afar office, our representative and enthusiastic colleague during fieldwork. The project started as a wing of the Tell al-Hawa excavations and we are particularly grateful to Warwick Ball for encouraging us to undertake the project and providing us with advice, equipment and field helpers during the first field seasons. We also wish to thank the Directors of the British Archaeological Expedition to Iraq, Drs Jeremy Black and Roger Matthews, for help with numerous administrative and related matters. Core team members were as follows: Imogen Grundon (1986), Helen McDonald (1987 and 1988), John Salvatore (1989), Dave Schofield (1989-90), Bettina Stoll (1987) and Judy Wilkinson (1987-90). They formed a small team that made up for their lack of numbers by their enthusiasm and skill. Illustrations were by Dave Schofield, Andrew Fisher and T.J.Wilkinson; photographs by Judy Wilkinson and T.J.Wilkinson. We are also grateful to a number of people who provided help and advice in the field or during the process of post-excavation work: Stuart and Bronwen Campbell, St John Simpson, Wendy Matthews, Pierre Bikai, Stephen Lumsden, David Warburton, Joan and David Oates, Julian Reade, Paul Zimansky and Elizabeth Stone, Nicholas Postgate, Stephanie Dalley, John A. Brinkman, Trevor Watkins and Douglas Baird. Special thanks must go to Michael Roaf who provided a considerable amount of advice on pottery matters and on ways of improving the final version of this text. In addition we wish to thank Leri Davies and Stuart and Bronwen Campbell for help during the final stages of editing and production of the final monograph.

Funding for the four seasons of fieldwork was provided by the British School of Archaeology in Iraq, the British Academy, the Stein-Arnold Fund, the Society of Antiquaries of London, the Wainwright Fund for Near Eastern Archaeology and the National Geographic Society (grant no. 3935-88). In addition we wish to thank the following private companies for their financial support for work at Tell al-Hawa and in the North Jazira: Binnie and Partners, British Petroleum, Netherlands Engineering Consultants (NEDECO), International Computers Ltd and Société Grenobloise d'Etudes et d'Application Hydrauliques (SOGREAH). We are also grateful to HE Terence Clark (British Ambassador and Honorary Vice-President of the British School of Archaeology in Iraq), Peter Elborn and staff of the British Council in Baghdad, and engineers of the China State Construction Engineering Corporation for help during our work in Iraq. In addition we would like to thank the British School of Archaeology in Iraq for supporting us personally by giving us various grants and fellowships during the period of the project. Part of the fieldwork as well as most of the writing up of the work was undertaken when one of us (TJW) was employed full time by the British Archaeological Expedition to Iraq as Assistant Director. Without the consistent support provided by the School this publication would have been impossible. We also wish to thank the Oriental Institute of the University of Chicago for providing facilities during the final stages of this work.

Please note that since this text was written two articles have appeared that either amplify or supersede some of the material contained in Chapter 9. These are:

Wilkinson, T.J. 1993 "Linear hollows in the Jazira, Upper Mesopotamia", *Antiquity* 67: 548-62.

Wilkinson, T.J. 1994 "The structure and dynamics of dry-farming states in Upper Mesopotamia", *Current Anthropology* 35: 483-520.

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Chronological Phases used in the Text

In spite of the substantial amount of excavation that has been undertaken in the area of the Jazira and Upper Mesopotamia over the past 40 years, there remains considerable uncertainty about the chronological subdivisions of the various cultural periods. The following terms which are used in the text are based on radiocarbon assay (uncalibrated) for the earlier periods and historical dates for the period after 2500 BC. Inevitably, such a listing entails compromises and each date must be regarded as approximate. This is particularly the case for the period from 7000 to 3000 BC which, with increased application of calibrated radiocarbon dates, will change considerably from that given here.

Early Neolithic	7000-6000 BC (uncalibrated)
Hassuna	6000-5000 BC
Halaf	5000-4300 BC
Northern Ubaid	4300-3700 BC
Northern Uruk (Late Chalcolithic)	3700-3000 BC
Ninevite 5	3000-2500 BC
Later 3rd Millennium	2500-2000 BC
Khabur	2000-1500 BC
Mitannian	1500-1300 BC
Middle Assyrian	1300-1000 BC
Late Assyrian	1000-612 BC
Post-Assyrian	612-330 BC
Hellenistic	330-125 BC
Parthian	125 BC-AD 250
Sasanian	AD 250-AD 650
Sasanian/Early Islamic	AD 600-AD 700
Early Islamic	AD 700-AD 1000
Middle Islamic	AD 1000-AD 1300
Later Islamic	After AD 1300

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CHAPTER 1

Introduction and Background to the Project

The Project

The original objective of the North Jazira Survey was to unravel the complex sequence of settlement, land use and communications that evolved within a modest-sized enclave of land contained between the Syrian border to the west, the Jabal Sinjar to the south and the river Tigris to the north and east. We thus hoped to describe the events that led up to, and followed, the growth of towns in Upper Mesopotamia and to relate them to changes in land use and systems of communication. The choice of area was not made solely because of its archaeological potential but partly because the area was designated to be a major irrigation project supplied by waters channelled from the recently completed Saddam Dam. Although, in terms of settlement, the north Jazira plain is not as spectacular as, for example, the Assyrian plains to the east of Mosul or the Tel'afar/Sinjar plain to the south, the area was liberally dotted with archaeological sites which focussed on a single major centre, the massive mound of Tell al-Hawa (Plate 1.a), excavated in 1987 and 1988 by Warwick Ball for the British Archaeological Expedition to Iraq (Ball, Tucker and Wilkinson 1989; Ball 1991).

The main techniques employed during the project were:

1) Field survey, in which recognizable archaeological sites are described and dated by their surface pottery.
2) Off-site archaeology, which examines features and artifact distributions that occur between the obvious mounded sites in order to establish whether smaller settlements may have been present and to detect traces of ancient land use and communications.
3) The excavation of selected sites and the examination of numerous pits or canal sections in order to establish some "control" on the survey and off-site data.

Emphasis is placed upon viewing sites within their regional context, first by relating them to each other within a local area (basically that surveyed in detail, some 475 sq km), and then by relating various settlement systems to a larger area of interest stretching south and west from the Tigris to the Jabal Sinjar and the Syrian border (Fig.1).

The project continued for four field seasons during the autumns of 1986, 1987, 1988 and 1989, coming to an end in February 1990. It commenced during the later stages of the Iran-Iraq war and came to a premature end in 1990 because the 5th and final season, scheduled to begin in September 1990, was thwarted by the events following the invasion of Kuwait in August 1990. Of the thirteen months spent in the field, about eight were occupied in survey. During five months in 1987 and 1988, when survey permission was not granted, control excavations and limited off-site pottery sampling were conducted instead. Altogether 184 sites, distributed over approximately 475 sq kms, were recorded and collected, four sites were partially excavated, (Khanijdal, Site 66; Tell Hilwa, Site 86; Tulul al-Biyadir, Site 106; Khirbet 'Aloki, Site 113) and a total of 500 off-site sample squares were collected. In addition, the project benefited considerably from Warwick Ball's excavations at Tell al-Hawa, the dominant tell on the plain. This work, together with a programme of rescue excavations previously conducted by Mr Ball within the Saddam Dam rescue area, provided a wealth of archaeological data with which to compare the results from the north Jazira plain (Ball *et al.*, forthcoming).

Although conceived as an intensive survey, the actual results of the project can be viewed as a hierarchy of survey intensities ranked as follows (from most to least intensive):

A) Site survey and pottery collection, with a moderate density of off-site pottery sampling. (Sites 1-89, Figs. 2 and 6) c. 130 sq kms.
B) Site survey and pottery collection with little or no off-site pottery sampling. (Sites 90-184, Figs. 2 and 6) c. 345 sq kms.
C) Mapping of sites without on- or off-site pottery collection. (Un-numbered sites on Figs. 2 and 6) 275 sq kms.
D) General landscape mapping from air photographs. Within this area only a small number of key sites have been visited by a

number of archaeologists (Fig. 24) c. 2750 sq kms.*

* Note: D includes Areas A, B and C.

Although the last-named area coverage (D) can in no way be described as archaeological survey, it has provided a valuable framework within which the more modest project area can be viewed. Conversely, the area of more detailed survey (A and B, above) provides a measure of control which allows the overall area of interest to be assessed archaeologically. Thus, when viewed in concert, it is possible to extract a remarkable amount of information relating to the development of early states, man-induced environmental change, geography of communications and medieval Islamic geography (see Fig.24 and Chapter 8).

The following chapters will refer to sites according to the serial numbers allocated to sites as they were recorded in the field: Sites 1-33, 1986 season (Site 1 being Tell al-Hawa); Sites 34-89, 1987 season; Sites 90-184 (1989/90 season). Fig. 6 shows all surveyed sites, together with hollow ways, interpreted from a number of sources. Un-numbered sites are within the project area but have not yet been sampled. The pottery type series used to date site occupations is described in Appendix A and a list and summary of all sites recorded is provided in Appendix C.

The North Jazira Plain Today

Although largely uninhabited last century (see below p.13), the north Jazira plain is now populated by a sprinkling of villages, the inhabitants of which have Arabic as their mother tongue. As a result of immigration and sedentarization over the last hundred years, the surveyed area now has a population of some 6000, if the large nearby villages of Rabi'ah and Uwaynat are included.

The surrounding flat or gently undulating terrain is ploughed every year, usually to grow dry-farmed cereals (see below). Since agrarian reform took place, most of the land is worked co-operatively but a significant proportion is state-owned, with the right of usufruct being inherited. However, conversation with farmers led to the impression that they or their workers often came from outside the plain, either because they had once lived in the plain but had left and retained rights to the land, or, in the case of workers, had been hired from elsewhere by the local inhabitants . The villagers own large flocks of sheep and a total of some 50,000, together with 500 cattle, are owned and grazed on the plain. In addition, sheep-owning semi-nomadic tribes sometimes visit the area in autumn to graze their flocks on the available land. In between the villages and becoming increasingly common, especially in the west of the plain, are small farmsteads usually run by Yezidis from the Sinjar region. Their small gardens, irrigated by water pumped from deep wells, grow onions, tomatoes and other vegetables for local consumption and for sale in Mosul.

In 1986, the area started to be transformed by the implementation of a new irrigation scheme which was to distribute water pumped from the Saddam Dam to fields via a network of concrete-lined canals. It was anticipated that cash crops would be irrigated by large mechanical spray-irrigation machines. The network of canals and drains under construction at the time of the project resulted in a large number of sites being cut or damaged, and as a result, the North Jazira Project was initiated as an official project of the Department of Antiquities and Heritage.

Layout of the Report

Chapter 1 sets the stage for the archaeological data that follows by describing the physical environment as well as the climatic and ecological constraints upon crop growth. There follows an assessment of the historical geography of the region as inferred from the reports of early travellers. The resultant summary of the area during the later Ottoman Empire, together with an appraisal of the route systems used, provides a yardstick by which the archaeological data can be measured.

Chapter 2 describes techniques of archaeological field survey; site definition and morphology; off-site archaeology and extensive artifact scatters; excavation as control including a summary of the excavations at Tulul al-Biyadir.

Chapter 3 describes and analyses the linear hollows that radiate from sites and cross the landscape. Because there has been some confusion in recent years between these "hollow ways" and canals, this section has been made quite rigorous with the inclusion of a number of case studies.

Chapter 4 examines the evidence for early water supply and changes in the water table since antiquity. There follows an analysis of the distribution of sites with respect to specific water resources: wadis, relict wadis and possible water-holes.

Chapters 5 to 8 provide the core of the archaeological data by examining field evidence for the development of settlement from initial colonization during the Neolithic to the present day. Core data for these chapters are provided by the site distribution maps. Sites have been dated by reference to the ceramic type series given as Appendix A. Support data on ancient land use and communications is provided by off-site sherd scatters and hollow ways respectively.

Chapter 5, which describes the predominantly village or farmstead settlement pattern of the Neolithic and Chalcolithic, is followed by chapters detailing the rise and development of Bronze Age towns (Chapter 6) and the slight decline and re-ordering of settlements that followed during the Middle and Late Assyrian periods (Chapter 7). Finally, Chapter 8 charts the long-term settlement decline that followed the collapse of the Assyrian Empire in 612 BC and which ultimately led up to the essentially deserted landscape described by the 18th and 19th century travellers.

The volume is completed by Chapter 9 which provides an overview of settlement change through time and relates this to changing use of the land and communications. A number of models are generated to account for the growth of towns and their distribution, and to relate changing patterns of subsistence to demographic change.

Geomorphology

The most dramatic physical feature of north-west Iraq, particularly conspicuous on satellite images, is a series of elongate anticlinal ridges of middle and lower Miocene limestone or gypsum, oriented roughly east-west. The largest of these, the predominantly Cretaceous limestone Jabal Sinjar, continues into Syria. The anticlinal hills, which attain altitudes of 130-200 m above the surrounding plain (except for Jabal Sinjar which rises to some 1000 m above the plain), divide the area into various sub-divisions and broad corridors that constrain movement along certain routes. Today, the rocky limestone and gypsum slopes are deeply incised by numerous wadis and are virtually bare of vegetation, only the Jabal Sinjar having what can be described as a tree cover.

The plain and intervening hill masses are limited to the north and east by the moderately entrenched Tigris valley and its flanking river terraces. Further north still are rolling hills and high rocky ridges which progressively lead into the high ranges of the Kurdish mountains, themselves ultimately part of the Taurus/Zagros fold mountain belt.

The north Jazira plain comprises a broad tract of level or slightly rolling terrain extending between the Jabal Sinjar and the rolling hills which flank the river Tigris. The clays and silts of the plain are between 5 and 10 m in depth, being underlain by weakly or moderately consolidated sand, silt and clay deposits 200-300 m in depth. These Upper Fars formation deposits are underlain by gypsum, rock salt and marls of the Lower Fars formation (middle Miocene). Ground-water pumped from the Upper Fars is usually drinkable whereas the small amount yielded by the underlying Lower Fars sediments is usually saline.

A broad plain, similar to that of the north Jazira, stretches to the south of the Jabal Sinjar. Sediments consist of a mixture of deposits, reddish-brown and greyish silts predominating, the latter at least having been eroded from the ridges and deposited by sheet wash as alluvial fans. Several small salt pans occur some 70-90 km to the south of Tel'afar and some small, very low hills within the same area of plain may represent ancient, now stabilized, sand dunes. The Tel'afar/Sinjar plain is cut by numerous N-S flowing wadis, some of which are incised to depths of up to 5 m below plain level. Ultimately these wadis converge to form the Wadi Tharthar.

The north Jazira plain is something of an enigma. To the west it merges with the plains of northern Syria, from which there is no discernible divide. Low hills of erodable Upper Fars rocks to the north are cut by two east-west tributaries of the river Tigris: the Wadi Suwaidiyah (to the N) and the Wadi Asailah (to the S). The former is flanked by large areas of heavily eroded and deeply gullied hills that today, and perhaps throughout most of the Holocene period, restricted the agricultural potential of the lands along that wadi (Fig.24). The plain, really a very shallow basin open to the NW and SW, is drained by the intermittently-flowing Wadi al-Murr which flows to the SE through a slightly narrower valley at Uwaynat (Site 92) to ultimately drain into the Tigris at Eski Mosul.

The Wadi al-Murr receives drainage from episodic wadis draining the rolling hills to the north and from similar terrain to the south-east. Most of the southern drainage, however, comes from the Jabal Sinjar/Jabal Ishkaft hills, which clearly provide the bulk of the discharge into the Wadi al-Murr. To the west, the watershed with the Khabur/Euphrates system is very elusive, being actually within Syria near Rabi'ah/Tell Kuchek. The watershed then enters the north Jazira plain to follow an irregular course along the highest point of the rolling terrain between Rabi'ah and al-Mumi (Fig.2). To the south of al-Mumi the drainage divide is almost arbitrary, continuing virtually due south towards the Sinjar hills. This southern part of the plain is clearly outwash from the Sinjar/Ishkaft hills and the early courses of wadis are attested on topographic maps by very low ridges and on satellite images by lineations or plumes of pale image. Detailed survey in the vicinity of Khirbet 'Aloki (Site 113, Figs.2 and 36) showed one such "wadi ridge" to be comprised of fine limestone gravel. In section this occurred within and spilled over the edges of fluvial channels. Sherds of coarse, chaff- and grit-tempered pottery included within these channel fills suggest an early date for the activity of this particular channel, a date supported by the presence of archaeological mounds actually on

a number of ridges (several can be seen in the SW part of Fig.2).

Fig.2 shows that although the Wadi al-Murr receives the bulk of runoff from the Jabal Ishkaft range, a significant amount escapes into Syria to flow NW ultimately into the Wadi al-Radd and the Khabur. That this is a long-term pattern is suggested by the courses of the wadi ridges on Fig.2, which follow a similar trajectory. The only difference between the palaeo-drainage and that of today is that present-day drainage is less well-developed, and where wadis do exist they tend to be meandering and slightly incised into the plain (see Chapter 5).

Although the plain appears flat (Pl.1), detailed contouring shows that the terrain is continuously sloping in all places (Fig.2: 2m contour interval); nowhere are there the enclosed basins which are so characteristic of the more arid areas of south-west Iraq and northern Saudi Arabia. Because the land rarely slopes at gradients of less than 1:300, runoff can always be generated once the infiltration capacity of the soil has been exceeded. As a result, drainage concentration features (rills or wadis) can form everywhere, a crucial factor in the development of certain man-induced features such as hollow ways (Chapter 3).

The silt and clay upper fill of the plain is at least 3.5m deep. Although generically alluvial, it may simply be a local deposit resulting from the long-term erosion of the adjacent hills and/or the stripping of an ancient soil cover from them. Soil-forming processes operating over many tens or hundreds of thousands of years would have caused increased reddening of the deposits, as well as the redistribution of calcium carbonate. The latter process, effected by infiltrating soil water, would have produced the characteristic horizons of calcium carbonate accumulation within the aggrading soil profile. Neither the upper silt/clay fill nor the underlying beds of Upper Fars sand, silts and clays show evidence of the deep fining-upward alluvial sequence of gravel, sand and silt/clay that would be expected if the plain had ever been part of the Tigris fluvial system. A small outcrop of partly-cemented fine sands on hills between Uwaynat and Abu Kula (Sites 92 and 127) seems too high to be a relic of some former Tigris course and it is unlikely that, during the late Quaternary at least, the plain ever belonged directly to the Tigris river system.

Present-day drainage of the plain is weak and today the Wadi al-Murr is ephemeral in its flow, with only occasional pools remaining in the deeper parts of the channel. Weak springs issuing at Uwaynat (the name being derived from the Arabic for spring: *'ayn*) generate some flow below that point, and early travellers report that the water in the wadi was noticeably bitter (*murr* : Arabic bitter; Buckingham 1827 vol. p 11). In fact, Ainsworth reports that in the early 19th century the Wadi al-Murr at Uwaynat was a sluggish brook fed by springs and surrounded by reeds (Ainsworth 1840; notes in RGS archive, Simpson pers.comm.). Beyond, to the north-west of Uwaynat, Forbes (1839) reported that the plain was dry.

A conspicuous feature of the modern wadi pattern is that many wadis, for example those draining the rolling terrain to the north, disappear once they have reached the plain. This can be explained in two ways:

a) The wadi course has been changed, perhaps as a result of the development of a new wadi system encouraged by the development of hollow ways. This can be seen on Fig.6 where north-south valleys near Sites 29 and 30 (NW of Tell al-Hawa) had their issuing wadis re-directed to the SE by the development of a linear valley or hollow way (see Chapter 3).
b) Elsewhere, for example along the alignment: Site 124, 115 and 112, what may originally have been a more active wadi is now merely a trace. Other relict wadis, tentatively dated by the sites along them, are described in Chapter 5.

Whatever mechanism caused the diminished wadi activity, it is clear that once flow diminishes below a certain interval, such as one significant flow every two to three years, it will fail to evacuate much of its sediment load. If ploughing takes place every year or two on the adjacent terrain, lateral plough-wash will choke the valley floor, and the wadi channel will cease to present an impediment to ploughing. As a result, ploughing will operate freely across the former wadi bed thus re-inforcing its demise as a hydraulic feature. Such factors clearly operate today with the result that many wadi floors are barely perceptible. This does not mean that they are extinct, but merely dormant. Rain storms of sufficient magnitude may still initiate flow, a point dramatically illustrated during the wet winter of 1987/1988, when many of the recently constructed concrete-lined canals were breached by flow along apparently extinct wadis.

Typically, wadis have a meandering trace and are incised about 1-2 m into the plain. This is the natural form for a channel to take in a fine sediment of moderate cohesion (Mabbutt 1977:170). Elsewhere, for example along much of the Wadi al-Murr and in the vicinity of al-Gana, wadi traces can be straight over rather long distances. The absence of upcast sediments and freshwater molluscs alongside, as well as the lack of a water source, suggests that these features cannot be canals. But their general alignment upon archaeological sites or on hollow ways suggests that these channels too may be hollow ways (ancient routes, see Chapter 3) that have been invaded by flood water and adopted as new channels.

Although some of the above conclusions regarding the capture of natural channels by man-induced features such as hollow ways remain tentative, it is clear that the drainage system as witnessed today is incomplete, partly disrupted and has been subjected to significant infilling and erasure by continuing soil wash.

The above discussion is of more than geomorphological interest because the presence of sites along very weak wadi traces (sometimes downstream of which all traces of a channel disappear) is important in relating site development to early water resources. This important point will be taken up again in Chapters 4 and 5.

The Soils

The main soil type throughout the north Jazira is the Calcic Xerosol (FAO/UNESCO 1977); more prosaically, they have been termed Brown or Reddish-Brown soils by Buringh (1960:78). The predominant characteristics of the Jaziran soil profile are:

a) A reddish-brown colour throughout.
b) A horizon of calcium carbonate accumulation below 30 cm.
c) Some clay removal (eluviation) from the upper (A) horizon and associated deposition (illuviation) in the subsoil (B) horizon. Wind action can also deplete the A horizon of some silt and clay.

The predominantly silty clay loam soils of the north Jazira plain are alkaline throughout (pH 7-8.5). Their organic matter content is usually 0.5-2.0% in the upper horizons, declining to 0.25% or less in the subsoil. Soil structure is usually well-developed and blocky, with a tendency towards prismatic in the B horizon. Certain soils on the lower parts of the plain can be described as "self mulching". Such soils develop deep desiccation cracks due to the presence of expanding lattice clay minerals. These cracks then become filled with soil that trickles, washes or collapses in, so that the resultant expansion during the following wet season can result in the expansion of the soil mass and a general mixing of the soil. Consequently, soils are mixed, rendered more permeable and even benefit from enhanced fertility as a result of the recycling of soil constituents (Vertisols: Buringh 1960:236). This process is of more than pedological interest because Limbrey has suggested that such soils may have been the earliest soils adopted at the advent of domestication (Limbrey 1990). Obviously the existence of such vertisolic soils within the basin of the Wadi al-Murr has implications regarding the initial colonization of the plain.

Gypsum content, which usually varies between 0.05 and 0.5% in the subsoil, can reach levels of 28-46% at c. 2 m below ground level along the lowest part of the Wadi al-Murr. It is occasionally visible as numerous large crystals (see Chapter 2 and Plate 2). Both calcium carbonate and gypsum are precipitated by soil water moving through the profile and, because of its greater solubility, gypsum accumulates at a greater depth than calcium carbonate (Birkeland 1974:119).

The Calcic Xerosols are regarded as fertile and, in the presence of sufficient rainfall, only require the application of nitrogen and phosphorus to give sustained high crop yields (FAO-UNESCO 1977:68).

Like the drainage systems of the plain, the soils are also continuously developing. This is demonstrated on low archaeological mounds that show no sign of having been re-occupied since a specific recognizable phase of abandonment. In such cases, the upper layers of occupation deposits comprising mud brick (*in situ*, collapsed or disintegrated), mud floors, ash, refuse or cultural wash from upslope, have usually been transformed into a soil profile of natural appearance. The uppermost 50-100cm of such deposits have developed a blocky or weak prismatic structure, abundant fine pores (bio-pores, from fine roots and microfauna), are slightly reddened and show signs of incipient calcium carbonate accumulation. On long-abandoned sites (>2000 years old), moderately well-developed soft calcium carbonate concretions are apparent, usually betwen 50 and 70 cm depth. Charcoal flecks can remain, as can solid objects: pottery, stone, large bones etc. Furthermore, the development of soil structure, biopores and soft concretions can transform the upper parts of mud-brick walls into "ghosts" (a feature on sites with monumental architecture, such as Nimrud, see also Fig.3: Site 113). In such cases, the colour of the mud brick remains, but the characteristic dense fabric of the mud brick develops a structure more akin to that of soils and the edges of the wall become less distinct. On the Jazira plain archaeological layers are unusual in the upper 30-50 cm of low mounds because of the formation of such soil profiles. On tells with very steep slopes, or on shallower soils on uplands, for example at Qermez Dere (Tel'afar), the sequence of soil transformation will also be different. In such cases, erosion of the upper strata results in underlying layers being constantly exposed close to the ground surface so that a mature soil profile will not develop.

Fig.3 illustrates the progression of soil development that was observed on sites of increasing age of abandonment in the north Jazira:

a) Site 4, Abbasid, c. 9th century AD.
b) Site 113, last occupied c.3rd century AD.

c) and d) Sites 39B and 86, last occupied in area where sectioned c. 3500-3000 BC.

Still older sites exhibit even more well-developed soils upon them and sites more than 7000 years old and less than 1 m height, may be entirely homogenized by soil-forming processes, so that only the resistant artifacts remain. In such cases, the value of sites to the archaeologist is limited to the artifacts alone; good ashy layers and clearly defined mud brick or *pisé* may have been virtually homogenized out of existence.

Mineral Resources

The remarkable homogeneity of the sediments of the north Jazira plain underscores the paucity of mineral resources in the area compared with, for example, the nearby Tigris valley. Furthermore, there is no large river along which heavy materials can be transported, a point which makes the north Jazira appear even more impoverished (Table 1).

Table 1. Mineral resources of the project area compared with northern Iraq in general and the alluvium of southern Iraq

Resource	North Jazira Plain	Northern Iraq	S Mesopotamia
Soil/Clay	+	+	+
Limestone	-	+ (1)	o (11)
Lime concretion	+	+	o
Gypsum rock	-	+ (1)	-
Gypsum concretion	+	+	+
Flint/chert	-	+ (2)	-
Basalt	-	+ (3)	-
Salt	-	+ (4)	o (12)
Sand (for pot temper)	o (5)	+ (6)	+
Bitumen	-	+ (7)	+ (13)
Sulphur		+ (8)	-
Alkaline clays	-	+ (9)	+
Copper	-	+ (10)	-

- Absent
+ Present in significant quantities
o Present in minor amounts

Sources: 1) Various hill ranges 2) Jabal Sinjar and Tigris gravels 3) NE Syria 4) Central Jazira, S of Tel'afar /Sinjar and foothills of Taurus/Zagros mountains 5) Single small outcrop between Uwaynat and Abu Kula 6) Tigris deposits and terraces 7) 'Ain Zalah, Nimrud, Qaihara 8) Along Tigris at Hammam Ali and Nimrud 9) For washing and use in Turkish baths (Wadi at Fort Shalmaneser, Nimrud) 10) Tiyari mountains N of Amadiya (Layard 1875:165) and elsewhere in Zagros foothills 11) Near Samawa 12) In saline soils of flood basins 13) Hit

In addition to the above, more remote sources need to be tapped for obsidian, most metal ores, pigments etc.

The above emphasizes the impoverished mineral resources of the plain and indicates what minerals needed to be imported. For example, if pottery was to be sand-tempered, either the sand or the pottery must have been imported, a point examined in more detail in Chapter 9.

Climate

The climate of the north Jazira is a variant on the warm temperate semi-arid climate. The rainy season falls in winter, when solar insolation and temperatures are at a minimum. Frost can be expected from November to March and can be particularly intense in the plain because its basin-like form acts as a large frost hollow which accumulates cold dense air during stable winter nights. Snow can be expected in most winters on the plain and every winter on the Jabal Sinjar. The growing season is throughout the winter, with occasional halts when the temperature falls below that necessary for crop growth. During the hot, arid summer, when precipitation is negligible, evapotranspiration is high and there is an absolute soil moisture deficit.

Although rainfall figures exist for stations within the plain, they are for short runs of years, hence they are not representative of long-term trends. For example, Rabi'ah at the west end of the plain has recorded 320 mm per annum and Uwaynat 350 mm per annum (record length 8-9 years); a longer record, since 1940, credits Tel'afar with 325 mm per annum. In order to get an impression of the long-term mean

as well as climatic variation, the longer record from Mosul has been chosen. Fig.4 gives a chronological record for Mosul and Rutbah since 1923 and 1928 respectively, and a rank-size curve giving median, quartile and 10% rainfall figures for Mosul. Mosul, with a mean annual rainfall of 369 mm can be taken as representative of the north Jazira plain. However, mean figures for northern Iraq can vary with the data source. Fig.4 is based upon a 50-year run, whereas a 30-year record given by Thalen (1979 table IV-3) gives a higher mean of 390 mm. This latter figure is regarded by some consultants as too high, a feeling supported by running means (i.e. annual data smoothed using means for consecutive 5-year runs, see Fig.4) which show that the data for the last 30 years (until the early 1970s) omits the dry period of the 1920s and early 1930s. The same source (Thalen 1979: 296), also gives a higher figure of 403 mm for Sinjar, presumably for similar reasons. Figures for Rutba (at 33° 22' N, 40° 17' E) are included to illustrate rainfall variation beyond the limit of economic dry farming, but in a zone which can still produce viable crops in exceptionally wet years (see below).

Taking the 50-year record for Mosul as representative of the north Jazira, the long-term mean can be estimated as about 370 mm. Fig.4 enables the 10%, that is 1 year in 10, drought to be estimated as 248 mm, a figure which coincides roughly with the accepted southern limit of dry farming (Thalen 1979: 293). Applying this amount to the graph of rainfall since 1920, it appears that because rainfall is normally well above this figure, crop failures in the Mosul region would be infrequent. This will be examined in more detail below.

The smoothed chronological data on Fig.4 plotted for the mid-points of 5-year running means, show that a run of dry years in the late 1920s and early 1930s was followed by wetter years during the late 1930s, 1940s and early 1950s, after which the record, although apparently drier, is difficult to evaluate because of breaks in the data run. On Fig.4 we have substituted monthly or yearly averages, as appropriate, for breaks in the data run – a desperate and only approximate expedient.

Figures supplied by Thalen (1979:53), indicate that for the northern Jazira of Iraq, 15% of annual rainfall falls in October-November, 50% in December-February and 33% in the remainder of the spring. For Mosul this works out at roughly 50 mm (autumn), 200 mm (winter) and 150 mm (spring). Therefore in an average year, farmers should be able to determine whether there will be sufficient rain for a crop (i.e. 250 mm) by the end of February. If there is not, they could turn the germinating cereal over to grazing for the flocks, sell off more animals and buy grain on the open market.

The Ecology of Dry Farming in the Jazira

Recent studies have shown that the cropping pattern of the plain averages out at 45% wheat, 25% barley and 30% fallow. Yields vary depending upon the annual rainfall and its distribution, from negligible in a dry year to 1500 kg/ha in a good year; mean yields are 700 kg/ha for wheat and 900 kg/ha for barley. In an earlier study of lands to the north and south of the Jabal Sinjar, it was shown that yields varied depending upon the slope of the land so that nearly flat terrain, which loses less rainfall by runoff, had significantly higher yields than rolling terrain (Ali 1955:147). Hence the rolling fringes of the survey area indicated on Fig.2 would have lower yields than the basin centre along the Wadi al-Murr (in the region of 40-80% according to the study by Ali) and would be agriculturally marginal. Such areas would be affected more by drought than the basin centre and would be more liable to abandonment. Regarding crop failures, studies conducted over the past 40 years show that there can be one crop failure or very bad harvest every four or five years. Such statistics can mask the underlying complexity of dry-land farming in the Jazira, however, as will be elaborated below.

The limit of dry-land farming is approximately the 250 mm annual rainfall isohyet. At lower rainfalls harvest failures become more frequent until a point is reached when it is uneconomic to cultivate crops and at that point either irrigation or pastoralism takes over. This is however an over-simplification and, as the following discussion will show, the reality both on the ground and in the perception of the traditional agriculturalist, is rather different.

Firstly, rainfall reliability and variability rather than simply quantity can determine the success of the harvest (Davies 1959, de Brichambaut *et al.* 1963:10). Statistically, this can be expressed by the inter-annual variability of rainfall which, to give a reasonable estimate of the limit of viable rain-fed farming, must be viewed in conjunction with mean annual rainfall. Hence the moist steppe zone under consideration has an inter-annual variability of 25-35% and an annual rainfall range of 200-450 mm per annum. In areas of low inter-annual variability, successful crops can be raised with an annual rainfall of as little as 180 mm, whereas in areas of higher variability (>35%) and high rates of evapo-transpiration, annual rainfall should be commensurately higher (de Brichambaut *et al.* 1963:10).

If inter-annual variability viewed in association with mean annual rainfall were the prime factors influencing the southern limit of dry farming, the limit would approximate to the line A indicated on Fig.5 (Thalen 1979: Fig.IX-3). In reality, not only did the limit of cultivation in the early 1970s spread between 18 and 44 km beyond this limit, but also

many isolated pockets of cultivation could be traced well beyond it. According to Thalen minor enclaves of cultivation occurred even further south than Rutba where rainfall is < 120 mm per annum.

Such an extension can take place because a run of moist years can encourage farmers equipped with mechanized equipment to rapidly plough up large parts of the steppe. Crop failure would not be as catastrophic for modern agri-businesses as for the subsistence farmer or small city state, so clearly technology, perception and economics are key factors in the spread and retreat of commercialized dry-land agriculture.

Traditional dry-land farming will attempt to diminish risks and the classic way of doing this is by the use of the fallow year in which a proportion of one year's rain is held over in the soil to supplement the following year's crop. Yields are increased primarily by water held over and secondarily by the release of plant nutrients (Andrae 1981:177) and by the accumulation of nitrogen (Janssen 1970:22). Because bare soil will lose less water by evapo-transpiration than one with a plant cover, some of the rainfall falling in the fallow year can be stored in the soil to increase the yields of the following grain crop (Andrae 1981:177). Janssen, in empirical tests on the Konya plain in Turkey, estimated that the percentage of moisture carried over is 12-19% for clay loams and 20-22% for clay soils (1970:228), figures that he considers to be rather ineffective. Nevertheless, a carry-over figure of 20% would mean that a rainfall year of 200 mm, if it were preceded by a similar figure during the previous fallow year, would be equivalent to a rainfall of 240 mm, that is the difference between crop success and failure. In reality, details of soil texture, topography, vegetation cover and rainfall distribution can significantly affect moisture storage and/or crop germination or growth, (Janssen 1970:22). However, after an extensive analysis of the Konya plain data, Janssen concluded that the existence of a fallow year was crucial for maintaining crop production (Janssen 1970:79). This conclusion will also be found to be valid for antiquity as described in Chapter 9.

The significance of the fallow year for the relatively moist area around Mosul and the perhaps slightly drier area of the north Jazira plain can be illustrated by reference to Fig.4. Most of the dry years (<250 mm) are preceded by years with rainfall of at least 350 mm. In these cases, a 200 mm rainfall year would be increased by 42 (12% carry-over) to 77 mm (22% carry-over) of rainfall equivalent, that is to an equivalent rainfall of 242 to 277 mm. In the other (drier) direction, well to the south (Rutba) it is only in the very wettest years (1937/8 and 1953/4) that rainfall may be sufficient for a cereal crop. In all such cases, though, the preceding year will have been too dry (< 175 mm, often lower still) so that 12-22% of such a small figure (say 21-39 mm or less) would not suffice to raise soil moisture to the requisite level to make fallowing an effective technique. This rough analysis shows that in the northern area the fallow year is valuable by saving some of the driest years from harvest failure. If cultivation penetrates too far south, not only is rainfall barely sufficient in wet years but also the amount of moisture carried over will be too small. In the drier areas to the south, fallow intervals can be extended (that is to 2-4 years fallow) but the amount of moisture carried over will merely be a small percentage of a small percentage, so yields may only be increased very slightly (but see below p.9). However, in marginal areas in between, lengthening of the fallow interval (cropping say 1 year in 3 or 4) may decrease the incidence of crop failures, a factor crucial to the subsistence farmer. In areas well to the south of the 250 mm isohyet, a realistic crop strategy should probably entail selective planting in areas of moisture concentration as elaborated below.

The effect of the fallow year can result in yield increases averaging 59% for winter wheat in semi-arid parts of the southern USSR (Nikonov *et al.* 1988:598). Similar results have been reported by scientists working in the USA (Buckman and Brady 1960:205-6). Further yield increases can result from the judicious application of fertilizers in combination with fallow years, although this can be at the expense of yield stability or reliability (Nikonov 1988:626). In other words, this would be a maximizing strategy that could increase the chances of crop failure.

The Russian experiments, being conducted with chemical fertilizers, are not entirely relevant to the assessment of conditions in antiquity, but in Ecuador yield increases also resulted from the use of organic manures under dry-farming conditions. In this case substantial gains occurred in wet years, but rather less in dry years. Nevertheless the Ecuadorean dry year figures of 310 kg/ha (with organic manures) compared to 150 kg/ha (without) is virtually the difference betweeen an acceptable yield and crop failure, thus making the use of manure of critical importance. Although the addition of chemical fertilizers has little but a nutritive effect, the application of organic manures can, in addition, improve the moisture retention of the soil by increasing organic matter and by improving soil structure. In turn, this improves water infiltration and the germinating conditions of the seed bed. Finally, some studies have demonstrated that by encouraging additional root growth, the potential survival of the plant can be enhanced by manure applications (Isom and Worker 1979:215).

The above studies suggest that the idea that organic manures are ineffective in semi-arid environments owing to oxidation (Buringh 1960:252-3) should be modified. There is, on the

other hand, no doubt about the efficacy of the fallow year and studies in the USSR and Ecuador show that by either increasing the duration of fallow from one to two years or by increasing the extent of fallowing in the drier agricultural zones, significant gains in yield per hectare can result.

Whatever combinations of fallowing and manuring are employed, there comes a limit to the south of which (in the case of the Jazira) yields are so unreliable that cultivation ceases to be viable on normal areas of terrain. Nevertheless, pockets of cropping do extend a considerable distance further south, and in such locations the traditional farmer takes note of the local plant ecology. According to Thalen, plant growth in arid areas is most closely linked with available soil moisture; therefore those areas of most luxuriant growth of steppe vegetation occur where soil moisture is at its highest. In such areas, natural vegetation is first removed, shrubs are uprooted or cut and the area is ploughed or sown under a root crop (Thalen 1979:294). Obviously such patches cannot be used too intensively, but the long fallow exploitation of them could explain how cereal cultivation occurred at sites such as Umm Dabaghiya, so far beyond the conventional limits of dry farming (Helbaek 1972:19).

The dry-farming belt of Iraq and Syria can provide moderate crop production per unit area if suitable farming techniques are employed. When such production is multiplied by the vast area of available land within the Jazira as a whole, it becomes clear that, as Weiss has pointed out, this region is capable of out-producing southern Mesopotamia in gross cereal cultivation (Weiss 1983:40).

Using the above data, as well as some from Tunisia and North America (Andrae 1981:180), it is possible to sub-divide the dry-farming zone of northern Iraq into the following zones (roughly from north to south):

a) Rainfall >500 mm per annum. Annual cropping possible; no real need for fallow. Manure will provide real yield benefits.

b) Rainfall 300-500 mm per annum (N.Jazira and Tel'afar plain). Alternating cereal-fallow-cereal cultivation. Judicious use of organic fertilizers with a fallow year should increase yields, but perhaps at the expense of yield stability. If annual cropping is introduced with manuring, yields will still be increased but crop failures become more likely in the driest years. Such crop failures will become more probable on rolling terrain where, according to Ali (1955), moisture retention will be lower than on the flat land.

c) Marginal zone of 200-300 mm per annum. The southern parts of the Tel'afar/Sinjar plain correspond to the southern limit of significant development of tells. Longer fallow intervals may be necessary, but even then crop failures can be as much as 2 years in 5 (Oates and Oates 1976:111). With the longer fallowing intervals that are necessary, carrying capacities will be depressed and settlement densities commensurately lower.

d) Dry steppe zone: 100-200 mm per annum. Even longer fallow intervals will not entirely compensate for the low and erratic rainfall and only areas of enhanced soil moisture will produce yields, albeit over short periods. To the south it becomes increasingly important to make greater use of moisture concentration zones, areas of silt-clay soils and shallow depressions. Ultimately it becomes necessary to interfere with runoff or wadi flow conditions thereby introducing rudimentary irrigation.

Flora and Fauna

Most 19th century travellers and archaeologists visiting the area in the spring have described the delightful, albeit transitory, mass of flowers, grasses and herbs that filled the landscape. Although this is still partly the case, only relics of the former vegetation cover now remain, mainly in uncultivated patches and wasteland. Instead, the plains and cultivatable uplands are today a virtually uninterrupted agro-desert, ploughed year after year to produce wheat and barley. As a result, the natural vegetation of the region can only be understood by reference to the hypothetical reconstructions of field botanists or from the reports of early travellers.

For example, Ainsworth, en route from Constantinople to Mosul in the spring of 1840, described the country between Tell Rumailah (a little to the NW of Rabi'ah, and now in Syria) and Uwaynat as follows:

> "The country is a nearly level and uninterrupted greensward, without water, and with only here and there a tell or mound to break its uniformity..., by a proper distribution of the water descending from the Masunis and the Ba'aram hills it might however be in greater part brought under cultivation and made to maintain an industrious population instead of the worthless vagabonds to whom it is now abandoned." (Ainsworth 1841:527)

During the 19th century, the plains between Mosul, Tel'afar and Hatra provided abundant grazing for camels and sheep. Again, according to Ainsworth, various species of grasses were almost everywhere but in the drier parts of the plain, grasses

decreased and lichens became more common. Shrubland of artemisia was particularly common. A similar vegetation characterized the north Jazira plain, normally described as "desert" covered with coarse grass and thorny scrub (Forbes 1839:422). In contrast, the intervening hill land was moderately well-wooded: oak trees of modest size clothed the northern slopes of the Sinjar hills, whereas the southern slopes were primarily of bay (laurel) and hawthorn (Guest 1966: 87 and Fig.25). In addition, cultivated stands of figs, pomegranate, mulberry (Forbes 1839:411) and maybe olive were common. Today, with the exception of the Sinjar woodland, the only natural woodland is a sinuous line along the upper Wadi Ibra near the site of Maghzaliya. In addition, a cultivated area of domestic species remains immediately to the south of Tel'afar and at a few other locations in the region. The natural woodland enclaves can be assumed to have been more extensive last century.

Although dates do not ripen in the Tel'afar/Sinjar area today (only one or two trees being evident in Tel'afar), their presence in the early Islamic period was noted by Yakut (le Strange 1905:99). This suggests that the climate was more favourable for the growth, reproduction and ripening of dates at that time; certainly, dates do not seem to be an economic plant this far north.

In terms of phytogeographical zones, the area of rain-fed cereal cultivation corresponds to the moist steppe (350-500 mm annual rainfall; Guest 1966:71-2) with a Holocene climax vegetation of open savanna dominated by Pistacia and other small trees. To the south, this grades into dry steppe (200-350 mm per annum) originally characterized by grassland and perennial shrubs (Guest 1966:71-2). Today, owing to over-grazing, extensive cutting and rooting for firewood, reinforced by continued ploughing, the climax and even the 19th century steppe vegetation has been selectively reduced so that those woody plants that remain are unpalatable species such as *Artemisia scoparia* or *Peganum harmala*, the latter being poisonous when green (Thalen 1979:300). Such plants that have taken over from pre-existing, more palatable, species reduce the value of the Jazira for forage.

The above notes on progressive degradation of the natural vegetation are supported by discussions that Guest had with various bedu of the central Jazira. They recall that the vegetation was much thicker in their boyhood, the ground being covered by a thicket of *Shih* (*Artemisia herba-alba*), *Qaisum* (*Achillea*) and *Rimth* (*Haloxylon*), while *Hamdh* (salt bushes in general) was abundant. Most of the valuable shrublets had disappeared in their own lifetime (Guest 1966).

Similarly, the animal life has been reduced so that now only domestic animals, smaller mammals, as well as cats and dogs, are present. In addition, the inevitable feral dogs roam the landscape. Last century and the earlier decades of this, the following large mammals could be found (from Thalen 1979:99-103): onager (*Equus hemionus hemippus*), Arabian oryx (*Oryx leucoryx*), ibex (*Capra ibex*), gazelle (*Gazella* sp.; common on the plain south of the Jabal Sinjar until the 1940s), wolf (*Canis lupus*), Asiatic jackal (*Canis aureus*), striped hyaena (*Hyaena hyaena*), cheetah (*Acinonyx jubatus*), caracal or desert lynx (*Caracal caracal*), Asiatic lion (*Panthera leo persica*), jungle cat (*Felix chaus*), and wild boar (*Sus scrofa*). Of the above, the last recorded lion appears to have been c. 1920, cheetah c. 1948. The smaller wild animals have, on the other hand, largely survived intact and can still be commonly seen: fox (*Vulpes vulpis*), hare (*Lepus europeaus, L. capensis, L. arabicus*), jerboa (*Jaculus* sp.), gerbil (*Gerbillus* sp.), hedgehog (*Erinaceus gen.*). There are also a large number of snakes and lizards, as well as a rich bird life that includes birds of prey and large flocks of sand grouse. Virtually the entire stock of large mammals has been hunted to extinction, except for small numbers of gazelle and perhaps a few wolves and jackals, which may remain in the more remote valleys of the hills.

Water Resources

Traditional sources of water can be classified as follows (after Thalen 1979:87):

a) Springs: springs occur around the southern and northern perimeters of the Jabal Sinjar, Jabal Ishkaft, Jabal Sasan and Jabal Ibrahim ranges, particularly between Sinjar, Tel'afar and Sheikh Ibrahim. Although sometimes sulphurous, these sources were drinkable and, at the time of Forbes's visit (1838), the Tel'afar stream supported a population of fish, powered several water mills and irrigated the gardens below the town for a distance of 1 or 2 miles (1839:410). Other good springs were recorded at Tells Abu Marya, Huqna and Uwaynat and field notes made by Ainsworth (RGS archive and Simpson pers. comm.) recorded that around 1840 Uwaynat was blessed by a sluggish, reed-fringed brook and spring. Various reports indicate this stream as continuing down to the Tigris, whereas to the NW across the north Jazira plain towards Nisibis there was no surface water before Tell Rumaidhah in modern Syria.

b) In the central and southern Jazira, as well as further south, surface water collects in wadi bottoms and can be classified according to Thalen (based on local tradition) as follows:

1) *Jalta* pools formed in rock basins, rocky ground or in rocky wadi beds after floods.
2) *Barbak* : wide shallow pools in loamy hollows.
3) *Thaqub* : pools in narrow clefts, usually long, narrow and rather deep; often surrounded by bushes.

Nothing like the above is known from the north Jazira but in the past, when wadi courses were almost certainly more clearly defined, equivalent features may have existed and would have provided a focus for nomadic groups and other travellers.

c) Hand-dug shallow wells and water-holes: these are common features and often as many as 50 can be grouped together. They occur either in or near wadis and other drainage lines or in depressions. In the north Jazira, zones of shallow underground soil water concentration ("percolines", Bunting 1961) were probably once common and might have provided sites for water-holes (see Chapter 4). Water sources for water-holes are usually rainwater, infiltrated and collecting close to the surface. Depths can vary from 1 to 30 m, and in places water-holes can penetrate through the alluvium into bedrock. Wells or water-holes in low ground may be temporarily flooded but they are usually dry by the end of summer. Water quality tends to be very good, and for this reason and because of the small amount of labour required, these are preferred by bedu. In the north Jazira, a water table depth of c. <10 m can be tapped by shallow wells although today this source has disappeared owing to over-pumping so that, for example, when the pump engine at Tell al-Hawa fails, the village girls must trek the 8 km round trip to Tell Kuran (Site 9, Fig.2) to fetch water for both domestic use and animals.

d) Drilled wells: in recent years hundreds of wells have been drilled to tap the deep underground aquifers of the Jazira (Thalen 1979). Within the north Jazira, the main aquifer tapped is the Upper Fars series of Neogene date. The presence of Lower Fars marine deposits of anhydrite/gypsum, marl and rock salt stratigraphically beneath does mean that some of the pumped ground-water is brackish or bitter and consequently only of value for watering sheep/goats or irrigation of well-drained gardens. Similar problems of inferior water quality arise in the plains south of the Sinjar/Tel'afar hills and here again the Lower Fars, while comprising large amounts of chemical precipitates, results in ground-water enriched in dissolved salts (Thalen 1979:97). Further south, in the southern and western deserts, ground-water improves and provides a valuable resource for flocks.

The project area has negligible surface water sources but formerly had a shallow, perched water table above the main ground-water body available for tapping by shallow wells and water-holes. Field evidence for these is provided in Chapter 4. South of the Jabal Sinjar/Tel'afar hills, springs and perennial streams nourished by increased rainfall on the hills are more common and were probably more copious in the 19th century (see above). Satellite images show stronger and more persistent wadi traces on the plains to the south of the hills than to the north, but because they are incised to depths of as much as 4m, these south-flowing wadis are of little value for irrigation. Rainfall decreases rapidly to the south and, compared to the north Jazira, the Sinjar/'Afar plain has less potential for dry farming, but has some potential for irrigation. Although local traditions (supported by historical information) suggest that gardens were irrigated in the vicinity of Tel'afar, it is unclear whether this ever extended well out onto the plain. That irrigation may have been practised around Tell al-Rimah in or before the 2nd millennium BC comes from Old Babylonian texts from Tell Rimah (Dalley *et al.* 1976: 211-15) and from mud bricks in the Old Babylonian temple. The mud bricks contain occasional shells of small freshwater gastropods which are usually associated with irrigation canals or irrigated fields. Such molluscs must have existed in the sediments that were used as source material for the mud bricks. Alternatively, however, such shells may have come from geological beds occurring near the site and without more field work this cannot be resolved. Apart from this, evidence for former irrigation is absent from both the 'Afar and north Jazira plains. The only recorded canals are the well-known Assyrian canals in the vicinity of Mosul/Nineveh and a *qanat* that supplied Eski Mosul (Balad) from the Wadi al-Murr (Fig.47).

The plains to the north and south of the Sinjar/Ishkaft ranges thus comprise respectively: a higher rainfall, lower surface-water zone and a lower rainfall, higher run-off/surface-water zone. These contrasting conditions may have had a significant effect on the ancient agricultural economies with each producing a slightly different proportion of certain crops and animal products. Therefore during times of environmental stress there may have been some degree of mutual interdependence between the two plains, with perhaps one region supplying crops or animal products that were in short supply in the other area.

Routes

Although tucked away in an obscure corner of NW Iraq today, for many millennia the north Jazira plain was a major thoroughfare linking Nineveh with western Syria, Turkey and the Mediterranean. By taking the direct route across the plain, travellers avoided the awkward and often sinuous gorges of the Tigris. However, as Oates has emphasized, a route was only as good as the availability of water, provisions and its security (1968:5). The last-named was a relative term because both sedentary inhabitants and nomads were prone to exact tribute, but usually, if an area was insecure this fact would be known and local hearsay would guide caravans along the most secure and reliable route at that time.

One major route from Aleppo in Syria crossed the Euphrates near Carchemish to continue via Ras al 'Ayn and Nisibis (=Nusaybin, Nisibin) to Nineveh (Ninua/Ninuwa) via the north Jazira plain (for other routes see Oates 1968:5-8). This route followed the line of both the Assyrian road (Kessler 1980: maps I and III) and the Achaemenid Royal Road. It was also favoured by travellers during the 18th and 19th centuries, amongst them Niebuhr (1776-80), Buckingham (1827), Ainsworth (1840), Fletcher (1850) and Rassam (1897) who all passed through the plain.

Owing to the depredations of the Yezidi, Kurdish and Arab inhabitants this has not always been an easy route and when nomads caused problems or when water, food and grazing seemed in short supply, a more northerly route would be taken via Jazira Ibn Omar (Cizre in Turkey) and thence down the east bank of the Tigris (Fletcher 1850: 165) or via the Wadi Suwaydiyah (Admiralty Intelligence Division 1917:244).

Routes from the plain either went SSE towards Ashur or direct to Nineveh, which was effectively at the head of navigation on the Tigris. Any bulky products transported from further west could then be sent by boat to Babylonia. More detailed descriptions of ancient routes, based upon field evidence, will be described in Chapter 3 (hollow ways) and Chapters 5 to 8 (chronological development).

The North Jazira in the 19th and 20th Centuries

Although situated on one of the principal traditional caravan routes between Upper Mesopotamia and Anatolia/Syria, the sites of the north Jazira plain received little attention from early archaeologists, probably because they were either too modest in size or, when substantial, like Tell al-Hawa, did not show any obvious remains of monumental architecture, reliefs or textual archives. Consequently, when Seton Lloyd visited in the spring of 1937, the area was little-known archaeologically. However, of the 78 sites reported by him, only 5 (Lloyd 1938: sites 17, 18, 19, 20, 21 and 78) were in the area of the plain. Of these, two sites – 19 (Tell Wardan) and 20 (Tell al-Hawa) – fell within the project area. Since then a more detailed corpus has been assembled by the Directorate General of Antiquities in Baghdad (IDA 1976 and Appendix C, this volume) and Hijara (1980b, for a more limited range of sites) but even these list only a small percentage of visible sites. More recently, visits by teams working on other sites in the region (at Tell Rimah, Tell Taya and various Eski Mosul Dam sites), have indicated the archaeological potential of the area. A summary of sites visited during the Eski Mosul Project is provided by Ball *et al.* (forthcoming).

Although early European travellers must have frequently traversed the plain, it appears in their accounts mainly as a descriptive void and even the archaeologists among them did not linger sufficiently to appreciate the admittedly subtle archaeological delights of the plain. Rather than itemize all the early travellers' reports, an interpretive sketch map has been provided to indicate the various limits of settlement and cultivation from the first half of the 19th century until the 1970s (Fig.5). It is impossible to provide a comprehensive picture because, for example, the information for the Tigris valley is deficient. On the other hand the evidence for the Sinjar, Tel'afar, Eski Mosul and Nisibis areas is consistent and provides some grounds for confidence.

By the time of Layard, Buckingham, Forbes and Ainsworth, in the early to mid 19th century, the plain was a steppe or desert area peopled intermittently by Kurds, Arabs and Yezidis. To the NW, the fringes of the hills east of Nisibis were populated by villages usually located on small rises by wadis. Significantly, some were only occupied seasonally during the harvest season (Buckingham 1827:460). In spite of its meagre soil resources, the Jabal Sinjar was densely populated by Yezidis who built terraced fields sown with wheat, barley and cotton and who cultivated orchards of fig, pomegranate, vine and olive (Forbes 1839:422). Tel'afar was certainly one of the main towns of the region and was known for its extensive irrigated orchards and gardens (Forbes 1839:410-11; Layard 1849:313).

Of the north Jazira plain, little is ever said, settlement being virtually non-existent according to all informants. Nevertheless the listing of a Yezidi village at Mishrifah in the province of Mosul may refer to a village of the same name (Mushairfah) that exists today to the south of Rabi'ah and was present when Stein worked in the area in the late 1930s (Forbes unpublished list in RGS archive; Simpson

pers.comm.). Certainly this village lies within the area of Yezidi settlement but today the village shows no traces of why it should have been occupied at such an early date (c.1839). Most accounts describe the inhabitants of the plain as nomadic and, presumably in order to render the plain safe for travellers, the soldiers of the Pasha were in a tented encampment at Uwaynat around 1850. There is, however, no real evidence for sedentary occupation there until the 1930s when Stein reports that Uwaynat was a small centre for Arab cultivation (Gregory and Kennedy 1985: 107). During the same period settlement was resuming, after a gap of perhaps 400 to 600 years, at Tells Hawa and Chilparat. Lloyd reporting on his 1937 survey implies that Tell al-Hawa was not settled at that time, the nearest village being Tell Wardan, nourished by wells (Lloyd 1938:136). Although there is some contradiction in detail between the date of establishment of certain villages, it is evident that the north Jazira plain was undergoing active re-settlement in the 1930s and 1940s, a period which coincides with the construction of the Istanbul to Mosul/Baghdad railway through the area. At the same time cultivation had extended some 10-15 km south of the Jabal Sinjar by the time of Lloyd's visit (Fig.5).

Although information on agricultural colonization of the north Jazira during the 1940s is sparse, air photo evidence (1954) suggests that the plain was largely cultivated by this time. However, villages were fewer and smaller than today, farmsteads with irrigated gardens were absent and fields were large and extensively fallowed. During the 1950s and 60s, a significant area of the plain was cultivated by Turkish- and Kurdish-speaking inhabitants, some of whom now inhabit Tel'afar. Their displacement, which is recorded by the inhabitants of Tel'afar, may correspond to a period lasting until 1942, when Arab groups, pushed by the Shammar of the central Jazira, occupied areas adjacent to the areas of long-term settlement (Thalen 1979:297; data from al-Kasab).

Traditionally, the plains both to the south and north of the Jabal Sinjar have been occupied by predominantly Arabic-speaking nomads belonging to the Shammar, Anaiza, Jabur and Dulaim tribes (Oates 1968:10). Today, most of the inhabitants of the north Jazira villages (true nomads are virtually absent at the time of writing), with the exception of the Yezidis, lay claim to one of these tribal lineages. Specifically, the large villages of al-Mumi and Tell al-Samir (Fig.6) are renowned as Shammar settlements and are typically loosely-settled with a relatively small number of houses spread across a large area.

On the Sinjar/'Afar plain, a remarkable extension of cultivation occurred in the 1950s, 60s and 70s, when settlement spread from the limits suggested by Lloyd (1938) to well south of the 300 mm isohyet (Fig.5). This agricultural colonization related to the sedentarization of the Shammar bedu when 400 new villages (47,200 people) were established between Hatra and Ba'aj (to the south of Sinjar town; Thalen 1979:297). Following the good rainfall years of the early 1950s (Fig.4), cultivation pushed even further to the south so that some 250,000 ha were cultivated. This had been extended by 1963 to over 900,000 ha. In spite of a southern limit of cultivation being set by the government of Iraq in 1963, 1965 and 1971 (Fig.5), as well as a UNESCO-defined line in 1975, cultivation pushed ever southwards to eventually reach the extreme limit of the early 1970s indicated on Fig. 5 (after Thalen 1979: fig.IX-3). According to more recent satellite images, the limit has moved back to the north (closer to the UNESCO-defined limit) and now stops at a clear-cut east-west limit established by Saddam Hussein. This massive extension of cultivation resulted partly from the introduction of tractor-drawn ploughs and combine-harvesters, possibly during conditions of short-term favourable rainfall and it remains to be seen whether the area will remain cultivated. Of great significance to the archaeological future of the 'Afar plain are plans to turn the area into irrigated farmland watered from the Saddam Dam. Such a project would threaten with destruction the environs of Tell al-Rimah and possibly hundreds of surrounding sites.

The early traveller's accounts in combination with Fig.5 suggest that long-term settlement tends to extend from Mosul towards a limit roughly between Eski Mosul and Tell Abu Maryam and has formed haloes around the hills of Sinjar, Tel'afar and Nisibis. The north Jazira and Sinjar/'Afar plains, on the other hand, tend to become depopulated when administrative control slackens or during times of environmental stress.

Oates makes a similar case (1968:16-17) using 1947 population statistics and defines an area of relatively low population density (5-7 persons per sq km) within the districts of Sinjar and Tel'afar, as well as in the triangle of land between Tel'afar, Mosul and Sherqat (Assur). In contrast, the core area to the E of Mosul betwen Nineveh, Khorsabad and Nimrud had much higher population densities of c. 29 per sq km. This is interpreted by Oates as follows:

> "This pattern might be called the pattern of resilience, for it represents the relative ability of different areas to maintain a prosperous economy through 5 centuries of virtual anarchy. In this respect alone it may be of value as a standard of comparison in ancient situations, but its value is increased by its relevance to the periods of upheaval for which we have so little contemporary evidence". (Oates 1968:17).

The above settlement distribution is paralleled by the pattern of field boundaries. Along the Tigris and to the east, including the area which extends towards Abu Marya, fields are small (1954 air photographs), presumably indicating long-continued habitation and a long tradition of divided inheritance. In contrast, to the west and north in the north Jazira and 'Afar/Sinjar plains, fields tend to be large and evidently have been laid out with mechanical cultivation in mind. Furthermore they have not existed long enough for divided inheritance to result in significant subdivision. The apparent continuity within the Assyrian core area may explain why archaeological landscape features like hollow ways (Chapter 3) are less visible than in the north Jazira. In the core area, continuous cultivation may have effectively ploughed out many of the hollow ways or soil marks that further west form a conspicuous feature of the archaeological landscape.

Before describing the evolution of the settlement systems, it is necessary to introduce the archaeological landscape by examining the archaeological sites and their associated sherd scatters, ancient routes and water supply.

CHAPTER 2

The Archaeological Landscape I: Sites and Artifact Scatters

Introduction

In many parts of the Middle East the archaeological record comprises an almost continuous distribution of archaeological material: outlying buildings, animal pounds, artifact scatters, kilns, quarries, mills, hollow ways (ancient routes, see Chapter 3), wells, canals and miscellaneous activity areas. Of these features only canals and mills were not found in the north Jazira survey area. In order to record the archaeological landscape of the survey area as fully as possible, a sample of every type of archaeological evidence was taken, both on- and off-site. Archaeological traces such as the above should not be perceived as minor or less important than habitation sites because they provide crucial evidence of the ancient economic infrastructure. Furthermore, canals and hollow ways, which can traverse many tens or hundreds of kilometres of terrain provide valuable linkages between regions and can also physically connect sites, thus tangibly demonstrating links in the past. In addition to their intrinsic interest, wells and water-holes are important because in the north Jazira their introduction as early as the 6th millennium BC freed settlements from the constraint of having to be located at springs or on perennial wadis. Artifact and pottery scatters can either be viewed as traces of minor settlements or as indications of former farming practices (see below pp.19-23). Thus intensive techniques of landscape archaeology, although time-consuming, provide a wealth of information that amplifies the record from conventional excavation and can introduce a note of caution into some of the more simplistic conclusions resulting from limited area excavation (such as, for example, breaks in the occupational sequence).

Site Recognition and Definition

In the north Jazira most archaeological settlement sites remain as topographic mounds. Numerous cut sections and control excavations show that such mounds include phases of non-occupation, sometimes marked by horizons of weak soil development (see p.6). In addition, it can be assumed that many phases of nomadic transient occupation as well as burial phases are archaeologically virtually invisible, from surface evidence at least.

Topographical Classification of Sites

Archaeological mounds varied from low areas < 50cm high and no more than 0.5 ha in area to massive city mounds like Tell al-Hawa, rising to 30 m above plain level and covering 75 ha. Many sites are compound features and the following classification covers most of the sites occurring on the plain (Fig.7):

a) Large, high, multi-period tells with a number of surrounding lower mounds (e.g. Site 48). Usually, but not necessarily, the main conical mound shows evidence of 3rd or early 2nd millennium occupation.

b) Groups of small/medium-sized mounds, sometimes clustered around the depression of a water-hole (Sites 87 and 143).

c) Small, simple mounds, usually 0.5-2.0 ha in area and < 2m high. These are often, but not exclusively, prehistoric (Site 148: Ubaid).

d) Topographically very complex mounds featuring numerous depressions. These are complex primarily because the sites are fairly recent in date (Sasanian or Islamic) and insufficient time has elapsed for processes of erosion and sedimentation to mask the original building mounds. Middle-Late Islamic sites even show evidence of building plans, frequently covered by occasional fragments of gypsum plaster (eg Sites 54, 110 and 143, all Sasanian/Islamic).

e) Geometric, usually square enclosures. Most are quite small features, being as little as 30 m square but larger examples occur, such as the pentagonal Site 54 (Chapter 8). Although many were formerly regarded as Roman military features (Gregory and Kennedy 1985:29-40), the examples surveyed were either Sasanian or Islamic in date.

f) Early walled and enclosed sites such as Tell Khoshi (Lloyd 1938) and Tell Rimah (Oates 1967) were apparently absent from the survey area. This does not mean that the 3rd and 2nd millennium settlements were not walled, merely that traces of such walls are hard to detect. For example at Tell al-Hawa, where the northern range of mounds were cut by a major drain, there was no unequivocal sign of an outer wall. There were, however, a number of areas of major walling visible, including a substantial stone and brick construction in Area C (to the north) that must have blocked the drainage to form temporary pools upslope. Any of these walls could have made an effective perimeter to the site but none were proven by excavation to be enclosure walls. Although the citadel mound was almost certainly walled, this has not been demonstrated (Ball, Tucker and Wilkinson 1989: 40-41). Of the sites surveyed, that with the most conspicuous evidence of having been walled was Abu Kula (Site 127, Fig. 6). Here the lower mounding was strewn in places with broken limestone and sandstone blocks, probably from an enclosure wall, and the mound morphology suggested that it had accumulated up to, but not over, a fringing perimeter wall. On more "successful" sites, such walls may have disappeared as a result of the growth of the mound so that the walls or ramparts were engulfed and now have no surface expression. At other sites, strings of low outer mounds suggestive of the eroded remnants of outer walls, on closer examination prove to be occupational mounds either earlier or later in date than the main (Bronze Age) central mound. The best examples of possible Bronze age walled settlements are at Tell al-Bogha and Bir Halu near Tell al-Dhaim (X and Y on Fig.24). Neither site was visited, but from their smooth contours they are thought to be pre-Sasanian. The first, Tell Bogha, is a small oval enclosure with a prominent central mound, whereas the latter, Bir Halu, is a massive roughly 800 m square (i.e. 60-65 ha) enclosure, the mounding of which respects the outer, apparently walled, perimeter. Obviously both of these sites would repay a visit at the first available opportunity.

Artifact Scatters

It is incorrect to assume that all settlement sites remain as mounds and, as is illustrated by the outer town at 3rd millennium Tell Taya, the presence of flat sites can make a modest-sized mound into a town of some 100+ hectares. At the lower end of the spectrum farmsteads and individual buildings may have been dispersed across the landscape but are now distinguishable as little more than artifact scatters. Such minor sites form a significant part of the survey record around the Mediterranean and careful techniques are required for their recognition. By such means the site can be distinguished from zones of "site periphery" and various levels of background artifact densities (Bintliff 1985: 201-7). Similar small sites have been recognized in the NW part of the Jazira region, in Turkey (Wilkinson 1990, Appendix A) and any study that aims to understand the problem of past population levels will need to take account of a potentially large dispersed rural population.

In order to recognize smaller sites or traces of extensive settlement it is necessary to determine whether there are sherd concentrations indicative of ploughed-out occupation areas. The techniques of off-site artifact sampling described below assist in discriminating between such occupation scatters and the universal "background noise". In addition, the dense network of canals and drains that were dug every 500 m across the terrain provided a cross check on the off-site data. With the exception of rare, early prehistoric sites (some partially buried) no traces of small, flat sites were evident in the canal cuts.

In the north Jazira low archaeological mounds are the preferred locations for both new settlements and bedu encampments. Hence each small mound receives occasional increments of settlement and the original pattern of sites becomes reinforced. This was the case at Khirbet 'Aloki, excavated by the team in 1989, where a low Ubaid mound (undetected during survey) was settled during the Late Assyrian period and again during Hellenistic/Parthian times. As a result of this mechanism many small mounds (class c above) can include a number of archaeological phases in spite of their simple topography .

Soil Colour

After topography and artifact density, soil colour proved the most obvious feature in site recognition, occupational sites being rather grey in hue compared with the reddish-brown of the local Calcic Xerosols. This is particularly evident on later Islamic sites as well as many of earlier, prehistoric date. The latter can also exhibit white salty areas resulting from the efflorescence of salt from rising ground waters that concentrate in certain areas of sites in the lowest areas of the plain. The grey hue is produced by the quantity of ash contained within the occupation deposits and it is this distinction that enables sites to be recognized on enhanced satellite images. This contrast also enabled non-occupational mounds to be distinguished, for example see Tulul al-Biyadir (Site 104, below, pp.18-19). Although no sites were distinguished by colour alone, the oldest site

recorded, the early ceramic Neolithic site of Ginnig (Campbell and Baird 1990), was initially recognized as a result of its distinctive grey colour which also distinguished it on LANDSAT TM images.

Survey Coverage

The project area was surveyed systematically by car and on foot using the grid of newly-excavated canals and ditches, spaced some 500 m apart. Thus no site was more than 250 m from a transect, which is about sufficient to distinguish sites as small as 100 m diameter and 1 m high. Coverage in the detailed and semi-detailed areas was then completed by walking transects between sites and along other selected alignments to sample the off-site archaeology and field scatters. Finally, recently available air photographs, satellite images and other ground data provided a consistent and detailed record of archaeological sites down to those as small as Ginnig (Site 21, Chapter 5 and Appendix C). These sources showed that most sites had been recognized, but that one or two very small sites had been missed. Furthermore, even during the rapidly conducted 1989 season efforts were made to check sections exposed along canals and drains and to qualitatively appraise inter-site artifact scatters, mainly using a tally counter. This suggested that field scatters occurred over the entire 480 sq km surveyed. Circumstances during the later parts of the Iran-Iraq war, together with changing Departmental policies, meant that survey was only feasible in three of the four field seasons: 1986, 1987 and 1989. During 1988, survey was curtailed, emphasis being placed upon the excavation of three selected sites together with limited off-site work around them. This hiatus resulted in the survey falling behind schedule, so that when it resumed in 1989, the pace of survey had to be increased, with collection being primarily focussed upon occupation sites. Only limited off-site archaeology was possible, and this was conducted around the excavated site of Khirbet 'Aloki. The changing circumstances resulted in survey coverage varying from intensive around Tell al-Hawa, with numerous off-site transects being walked (Sites 2-33 surveyed in 1986, Ball *et al.* 1989) through semi-intensive, with limited off-site sampling during 1987 (Sites 34-89), to basic site survey only in the southern and western fringes (Sites 90-184) collected in 1989/90. Team size varied from two during the 1986 season, with David Tucker concentrating on Tell al-Hawa and Wilkinson recording the surrounding sites and off-site data, to usually three or four during the 1989/90 field season. On average, two or three small to average size sites were recorded per day of field-work, with larger sites such as Kharaba Tibn (Site 43) taking one day or more to complete.

Sample Techniques

The large number of sites (184 surveyed, many comprising 2-3 mounds, in some cases up to 10) required a pragmatic programme of collection. The sampling areas were either individual mounds, or, where mounds were greater than about 1 ha, mounds were sub-divided into topographic units (see for example Fig.7). Each collection unit, be it a mound or topographic sub-division, was assigned a letter which, on pottery collections was preceded by the site number, hence: 123B, 108C etc. Only diagnostic pottery was collected: rims, decorated sherds, bases, some handles, and lids. Small finds were also collected (selected examples illustrated in Appendix B), as well as chipped stone (both flint and obsidian, see Chapter 9), and distinctive stone items such as Middle-Late Assyrian tripod grinders and fragments of incised Sasanian and Islamic stonework (Appendix B). Following a brief field assessment, the results of which were recorded in the field note-books, the collected sherds were taken to the base in Tel'afar where diagnostic sherds were dated by reference to the type series (see Appendix A). The number of diagnostics of each type was recorded on printed sheets according to period, thus allowing the periodization of each site area to be made. Finally, the total number of diagnostics of each period from every site was summarized. This summary data is published here as: "minor occupation" (3-5 diagnostic sherds) and "significant occupation" (6 or more diagnostics). The threshold for significant occupation has been set low because the type series system usually required a close match of form, fabric and/or surface finish between the collected sherds and the reference example. Less exact correspondences, even if the sherd clearly belonged to a specific period, were rejected and were recorded, either on the backs of record sheets or as variants.

Even on quite low mounds, early occupation levels can be masked by later accumulations. This appears to have been particularly acute around Tell al-Hawa where 3rd and early 2nd millennium occupations may have masked underlying deposits. As a result, the higher incidence of Uruk sites recorded in the west of the survey area may be due to the absence of overburden in this less densely populated region. This process must also have affected the quantity of earlier sites recorded and the number of Neolithic, Hassuna, Halaf and Ubaid sites given in Chapter 5 should be taken as minima only.

Although a few sites were buried beneath alluvium, most such sites were limited to a zone along the valley of the Wadi al-Murr between Tulul

al-Biyadir and the Ginnig site where silt/clay deposits have accumulated to a depth of 70-120 cm. Similar sedimentary veneers may have accumulated along other major wadis, but in general, the comparison of the level of soils buried beneath sites with the adjacent ground surface has demonstrated negligible deposition. In addition three buried wadi channels, each containing ceramics, were recorded. These were to the west of Site 21 (later 3rd millennium BC), immediately W of Tell al-Hawa and at H (Fig. 36) (both Hassuna sherds in the wadi deposits). Site 33, originally found by inter-site pottery sampling, was mainly underground and was buried by local silt/clay sedimentation. These incidences of buried wadis combined with traces of apparent relict wadis on air photographs suggests that in certain areas the courses of active wadis have changed significantly (for details see Chapters 5-8).

Having described the classes of sites present and the main criteria used for site recognition, inevitably there are exceptions, the most noteworthy being Tulul al-Biyadir (for location see Fig.2).

Tulul al-Biyadir (Sites 104 and 106): An Example of a Non-habitation Site

This complex group of mounds has long been an enigma. The main group, extending c.700 m E-W by 500 m N-S comprises 23+ small mounds each rising from 2 to 6 m above plain level (Fig.8; Plate 1b). The name may mean, either "the place (mounds) where threshing took place" or perhaps, "the place that resembles a threshing area, with its high mounds of chaff".

Apart from the numerous mounds, two features distinguish this site from other archaeological sites in the area. First, the mounds, although conspicuous, exhibited a sparse sherd scatter. Those recorded are either indistinguishable from field scatters, or include a small number of Islamic sherds such as might be expected in an area occasionally visited by beduin nomads. Second, the mounds appeared to be on pedestals overlooking broad, intervening, shallow depressions. This is especially clear on the cross profiles (Figs.9 and 10) which show that the inter-mound areas are roughly 50 cm below the level of the surrounding plain. This is even more apparent at Tulul al-Biyadir West (Site 106) where the basins are more extensive and the mounds less pronounced. The location of Tulul al-Biyadir along the central, lowest point of the Wadi al-Murr basin was probably a significant determining factor in the development of the site, as is discussed below.

Enhanced LANDSAT images showed that the mounds had a greyish (false-colour enhanced) image compared with the pinkish hue of nearby occupation sites. However, without ground control in the form of excavated trenches, it would have been impossible to assess the significance of these image differences.

Three trenches and one machine cut were used to investigate the mounds and intervening hollows. Both mounds excavated were composed of soils that were devoid of cultural material and in the main section (C, Fig.10) the deposits were as follows (from bottom upwards):

a) A buried agricultural horizon of a Calcic Xerosol (explained in Chapter 1) with a horizontal upper surface and containing occasional battered sherds (Fig.11: 9).
b) Above a): Grey-brown silt/clay alternating with thin layers of reddish-brown clay. Steeply dipping tip-lines indicated that these deposits were dumped (Fig.11: 3-8).
c) Above b) and extending to the ground surface, a thick accumulation of reddish-brown silt and clay containing occasional crystals and concretions of gypsum. Probably also dumped, but with less obvious tip-lines (Fig.11: 1 and 2).

Trench D, within a basin, exposed 1.3 m of horizontally bedded silts which had accumulated as the infill of a pre-existing depression. This depression must originally have extended at least 2 m below the level of the buried ground surface (Figs.9 and 10).

Beyond the site and to the west a machine-cut section exposed 2.6 m of a natural soil profile (B, Fig.9). Key horizons were the calcium carbonate accumulation between 50-100 cm (ca, Fig.9) and a gypsum horizon below 2.0 m. A similar gypsic horizon was exposed in Trench A and a remarkably pure deposit of gypsum crystals was exposed in a mound at Tulul al-Biyadir West (Site 106; Plate 2a).

Interpretation

Deposits b and c, being mainly soils of natural type without any signs of cultural debris, probably represent materials dug from the adjacent depressions (such as around D) and dumped on the pre-existing ground surface. The grey-brown hue of some of the soils in b suggests that weak chemical reduction may have taken place under conditions of sustained soil moisture. The basin silts accumulated in trench D were quite different from the natural soil profile exposed at B. The latter presumably represents the original soils that were subsequently dug away and dumped to form the mounds. The mounds are therefore interpreted as heaps of waste derived from the intervening basins. The resource that generated this activity remains problematic. Mud brick can be excluded because soil pits for mud brick in the north Jazira usually result in negligible waste. Apart from gypsum, and the ubiquitous calcium carbonate, no

minerals of economic value are known in the area. Soil mapping has shown that, in contrast to calcium carbonate which occurs as a soil horizon over the entire plain, gypsic horizons were mainly restricted to a narrow zone along the Wadi al-Murr around Tulul al-Biyadir. It could therefore be suggested that the mounds are upcast resulting from the excavation of a gypsic horizon at a depth of c. 2 m below plain level.

This conclusion is, however, perplexing given the presence of veins of gypsum rock in the Tel'afar ridge some 35 km to the SE. This may be explained in one of three ways: 1) the effort to transport gypsum from Tel'afar was greater than the effort required to dig the pits 2) the Tel'afar source was not available for political reasons 3) a surplus of labour (e.g. captives from a military campaign) existed in the north Jazira and this was absorbed by the excavation of gypsum.

Apart from undiagnostic sherds of field scatter type (which are probably true field scatter sherds cast up with the excavated soils), the site yielded no datable artifacts in context. The rounded relief of the mounds suggests that they are of some antiquity and are unlikely to result from activity in the last 200 years. Because the demand for gypsum probably increased significantly during the Islamic period, when buildings using gypsum plaster were common, an Islamic (probably Early or Middle Islamic) date could be suggested for the quarrying; in fact similar mounds of waste resulting from gypsum or lime quarrying during the Islamic period have been observed in the area of Samarra. However, there would have been no obvious labour surplus at this time and the most likely date, in terms of labour availability, would have been the Late Assyrian period when numerous deportees may have been available as a result of imperial policy (see Chapters 1 and 8). However, a high demand for gypsum is not attested during the Late Assyrian period.

Although the date and source material must remain open, it seems clear that the Tulul al-Biyadir mounds represent ancient pits with associated soil waste. Alternatively, the gypsum may be all that remains of a former saline or saline-alkali horizon that existed when valley bottom water-tables were higher. Evidence for higher prehistoric water-tables will be presented in Chapter 5, and given the considerable pumping that has occurred during the past 50 years, water-tables are now much lower than even last century. The southern Jazira, south of Jabal Sinjar has a long history of supplying the neighbouring towns with salt and, although some was of high quality, other sources were used for curing hides or were only suitable for animals (Potts 1984: 232,242). Such salt extraction either entailed evaporation of brine from pits or, as in west Africa or medieval Britain, may have involved washing salts from saline soils. Either process would result in considerable upcast or waste. The lack of evidence of a saline-alkali soil horizon may result from the leaching or chemical exchange of soluble salts (perhaps Na_2SO_4) following the lowering of the local water-table. Because saline-alkali soils may contain a calcium-enriched soil exchange complex, during leaching, dissolved calcium would replace the exchangeable sodium resulting in the further accumulation of gypsum ($CaSO_4$) within the the soil (USDA 1969: 5, 48 and 49) and the gradual loss of the salts.

Given the substantial demand for salt in antiquity, the historical record in the Jazira and the field evidence of both waste soil and pits, salt extraction (perhaps of a low-quality saline alkali horizon) provides a compelling explanation. Therefore, in terms of the regional economy as well as local needs, salt extraction rather than the quarrying of soil gypsum seems a more plausible explanation for the Tulul al-Biyadir mounds.

Off-site Archaeology and "Field Scatters"

It is now widely acknowledged that the archaeological landscape does not simply comprise archaeological sites surrounded by open space but, in many areas, can form a continuum of archaeological material (Cherry 1983: 395). Such scatters have now been recognized from Western Europe, the Eastern Mediterranean, the Middle East and Central Asia (Wilkinson 1982 and 1989). The recording of such off-site material, which can cover many hundreds of square kilometres, is economically effected by means of the sample survey techniques described below.

In the north Jazira the inter-site scatters are dominated by small sherds of pottery (Table 2), usually very battered, with minor quantities (in order of descending importance) of: vitrified kiln waste, chert or flint, basalt chunks from quern stones, fired clay or brick, obsidian and fragments of baked clay figurines (Table 2).

Table 2. Total counts of artifacts within the 479 sample squares

Sherds	Kiln slag	Chert and flint	Basalt	F. Clay and Brick	Obsidian	Figurine Frags.
18,675 [21,391]	147	82 [106]	20	9	8	4
Per Sample Square						
39 [44.7]	0.31	0.17	0.04	0.019	0.016	0.08

Note: all figures are for sample squares laid out off-site except for those figures in [ ] which fell on occupation sites.

Measured sherd densities of 20-39 sherds per 100 sq m sample square were most common, although figures in excess of 100 were occasionally achieved (Fig.12). In contrast, under equivalent collecting conditions, on-site artifact densities were in excess of 200 sherds per 100 sq m.

Sampling Techniques

Sampling was by means of 10 x 10 m squares positioned, by pacing, at 50 to 300 m intervals along pre-determined transects. All visible artifacts were collected, counted and recorded on printed sheets. Diagnostic sherds (rims etc) and small finds were retained for later study, other material being discarded. Examination in the field showed that the pottery contained a wide range of chronological types, but later 3rd millennium diagnostics were dominant (see Chapters 6 and 9). Non-ceramic material, although very sparse, was evenly distributed across the entire plain and only when a square fell on or near a flat prehistoric site did flint/obsidian rise to more than one item per square.

The presence of canals and drains enabled the context of the scatters to be examined and in nearly all cases sherds were distributed within the cultivated horizon of Calcic Xerosol soils (see Chapter 1). Conventional settlement sites should have yielded evidence of pits, post-holes, ash lenses and wall foundations, as well as larger, unabraded sherds. Such traces were virtually absent. Sample survey showed that although there tended to be a gradual decline of sherd scatter density away from sites, scatters were usually consistent across the terrain (Figs.13-16). This impression was reinforced when sample squares were set at 50 m intervals across the terrain and when a tally counter was used to count the number of sherds that occurred during pacing between sampling points. Sedentary occupation would be expected to produce a patchy record as a result of the disposition of numerous small living sites.

The field practice was to set sample squares along transects that radiated from sites, or ran between them (Fig.14). This is not an ideal procedure because an even coverage of the terrain is not achieved and the eventual statistical manipulation of data can become problematic. Nevertheless the method is pragmatic, fast and effective, a prismatic compass being all that is required to set out the survey lines. Distances between sample squares were 200-300 m in 1986 and 1987 but were reduced to as little as 50 m during 1988 and 1989. During the 1989 season a 100 m grid sampling technique was employed around the excavated site of Khirbet 'Aloki and these results enabled the scatters to be viewed with greater precision.

Both the collector and the condition of the ground surface sampled affected the sample counts. All but 17 of the squares were collected by T.J.Wilkinson but even where a different collector was used (D.J.Tucker), sample counts were very similar to those of Wilkinson taken a few tens of metres away (Fig.13, top). The annual agricultural and climatic cycle is crucial to field scatter sampling in that it renders the field surface invisible during spring and early summer when most fields are under cereals. By June/July, although cereals have been harvested, the ground surface is usually obscured by stubble and loose straw. Gradually, grazing sheep and goats disperse and deplete the crop waste and by September the ground surface in many fields is sufficiently visible to be sampled. Ploughing, which usually takes place in late summer and autumn, although providing a uniform sampling surface, tends to bury a proportion of sherds and renders others virtually invisible by coating them with dust. After the late October/November rains, sherds again become more visible as a result of rainsplash and associated wash which expose and clean the sherds. Heavier rain, on the other hand, can result in burial of sherds beneath localized sediment accumulations. Finally, by mid-late February new cereal growth starts to obscure the ground surface; at this time shepherds also withdraw their flocks from the fields and it is politic not to go trampling over the developing cereals.

The difference between sherd counts from freshly ploughed and moderately washed surfaces is indicated on Fig.13 which indicates a ratio of around 3:1 between washed and freshly ploughed fields. Because ground conditions played a crucial role in determining the number of visible sherds, it was

necessary to be consistent in the selection of surface conditions for sampling. The standard field condition was that of ploughed and moderately washed, but inevitably a number of less washed or heavily washed soils were collected. The effect on the results would vary: if all samples were taken, for example, from freshly ploughed fields, absolute counts would be too low but the trend in the results would remain valid. However, if samples were taken from freshly ploughed and well-washed soils along the same transect major differences between sample counts may be ascribed simply to collection conditions. The results plotted on Figs 14-16, although mainly resulting from sampling on standard washed ground include one or two anomalies that may result from extreme collecting conditions: those high-density scatters near Kharaba Tibn (Site 43) were collected after heavy autumn/winter rains in 1987; conversely, the low-density scatters between Sites 127 and 60 were from lightly washed soils. To make them comparable to soils from the transect to the SW, they might be increased x2 or even x3.

The presence of such a continuous scatter of sherds and other artifacts across the land cannot be interpreted as the result of sedentary occupation. Deposition of waste from nomadic encampments seems equally unlikely, especially because the most frequent non-ceramic artifact is vitrified kiln waste. In general, such scatters can be explained as resulting from the application of settlement-derived organic waste, ash (including that from kilns), manure from byres and streets, and perhaps night-soils on fields as compost or fertilizer. The inorganic inclusions then become incorporated in the ploughsoil, and the density of artifacts can be taken as roughly proportional to the quantity of manure applied (Wilkinson 1982 and 1989). Such processes also result in field soils becoming enriched with phosphates (Wilkinson 1988 and 1990b), although no attempt was made to undertake a phosphate sample programme during the four field seasons. Inevitably field scatters incorporate the full range of off-site activities, so samples should include occasional sickle blades, lithics fallen from threshing sledges, or those discarded by transient nomads. The lithic counts showed no marked pattern, densities being much less than one per sample square, and therefore could not be interpreted.

Results of the Field Scatter Sample Survey

The results of the field scatter survey are presented in map form (Fig.14), as linear point plots along individual transects (Figs.15 and 16) and as scatter diagrams (Fig.17). The distribution of kiln slag and pottery of specific periods is indicated on Figs 40 and 51.

Fig.14 indicates that the denser scatters of surface sherds occur around Tell al-Hawa and Kharaba Tibn (Site 43). Inadequate sampling around Abu Kula (Site 127) may explain the more restrained distribution around this secondary centre. In addition, high density scatters were recorded around the satellites, most of which were occupied during the 3rd and early 2nd millennium BC. In such cases, though, the high density scatters were of limited diameter (e.g. Sites 10, 12, 15/22 and 29). In more distant locations, particularly in the west and SW but also in the intermediate zone near Site 38, sherd scatters were significantly sparser, frequently less than 10 sherds per 100 sq.m. Only 2 of the 479 squares sampled yielded no sherds at all (Fig.12).

Around the main centres, following a moderately low density near the site, sherd densities rose to a maximum between 0.5 and 1.0 km away from it and thereafter declined (Fig.15). All graphs indicate that there is no point at which sherd scatters become absent, rather they gradually decline to a level of "backgound noise". To the north of Tell al-Hawa this noise level remains at 20-30 sherds per 100 sq.m., whereas to the south, along the Wadi al-Murr, scatter densities drop off to as low as 10.

Although the trend of sherd density declining with distance from the site is clear, there is considerable variation in detail. Two transects, B and K, show an abrupt decline followed by a gradual rise to a secondary peak at c.2 km from Tell al-Hawa. Others to the west of the tell (A,L and M) exhibit a reverse gradient, with low densities near the tell and values rising away from it. Both the twin-peaked and reverse-gradient forms may result from the accumulation of sediments over pre-existing sherd scatters as a result of changes in the pattern of wadi flow. This is almost certainly the case west of the tell where other evidence indicates that the natural drainage system has suffered disruption as a result of the accumulation of the tell and the development of hollow ways. As a result, wadi flow must have spilled over the ground surface to deposit a sheet of sediment (for a comparable situation from Syria, see Wilkinson 1982:328-30). An earlier land surface was also buried along the Wadi al-Murr between Sites 86 and 87 and perhaps around 104 (Tulul al-Biyadir) where canal sections and topographic levelling of buried soils show that up to 50-80 cm of fine sediment have accumulated during the Holocene. Between Sites 86 and 87, occasional sherds occurred at 20-30 cm below the ground surface in an area where surface sherd counts, at between 1 and 10 per 100 sq m, were unusually low.

Scatter plots (Fig.17) show that the decline in sherd density with distance from the main centres is variable. Around Tell al-Hawa the data is plotted from the major transects that radiate from the tell only (that is, omitting the small transects around the

minor satellites). Although fuzzy, there is a general decline in sherd scatter density away from Hawa in the same manner as has been recorded around the 3rd millennium centre of Tell Sweyhat in Syria.

In summary, large centres were surrounded by substantial belts of high sherd scatter density. Scatter densities declined to the level of the ambient "background noise" for the plain at 2-3 km from those centres. Minor satellites, as indicated by individual point plots on Fig.16 and scatter diagrams for selected sites (Fig.17), showed a more rapid decline in sherd density which reached a low level at roughly 1 km from the site. The presence of satellites, especially around Tell al-Hawa, disrupts the gradual decline in sherd densities away from this site and leads to higher values than would be expected in such distant areas.

The decline in sherd scatter density with distance from sites can be interpreted as reflecting greater inputs of settlement-derived manure around the settlements. This in turn reflects a decline in labour inputs in transporting manure as distance from the settlement increases (Chisholm 1979: 47 and Blaikie 1971). Similar patterns in manure distribution have been recorded by von-Thunen and Muller-Wille in Germany (summarized in Chisholm 1979: 33-62).

Dating the Field Scatters

Sherds from the sample squares were typed according to the type series (Appendix A). Although belonging to many periods, the majority were later 3rd millennium wares, while a secondary peak occurred in Late Assyrian times. There were few Chalcolithic sherds and there was no obvious decline in sherd density away from the Chalcolithic sites. For example, detailed sampling around small Chalcolithic sites, such as Khanijdal East (Site 66, Fig. 13), showed that the only field scatter appeared to be the ambient "background noise" on the plain. Particularly common, especially near major centres, were later 3rd millennium flat bases of bowls and beakers (Types 29 and 30, Appendix A) and sherds of sub-stonewares or Taya types. The latter stonewares were categorized as probable diagnostics when they lacked a rim or base. Late Assyrian and Sasanian/Islamic wares, then provided a significant body of later sherds.

Fig.18 shows the distribution of later 3rd millennium diagnostics measured in 0.5 km wide rings away from the main centres of Hawa, Kharaba Tibn and Abu Kula. To act as a control, the number of Late Assyrian and Sasanian/Islamic diagnostics have been plotted in the same manner. The latter types represented the only other group of diagnostic types recorded that could act as a yardstick against which the later 3rd millennium distribution could be measured. Fig.18 suggests that later 3rd millennium diagnostics were most common within 4.5 km of the relevant centres, with a maximum concentration between 1 and 2.5 km. The later sherds, on the other hand, were evenly dispersed across the landscape with a slight maximum between 4 and 5 km radial distance. Because sample collection was not uniform across the plain, the lower counts in the more distant zone (5.5 - 8.0 km), are simply because there were fewer samples collected in these areas. The above suggests that there was a more centralized distribution of later 3rd millennium sherds than other diagnostics, a point that will be taken up in Chapter 6.

The peak in later 3rd millennium diagnostics may partly result from differential sherd preservation so that the more resistant sub-stonewares and related types end up being over-represented. Less resistant jars, such as Type 32, appeared to be less common in scatters, presumably because they were less likely to survive the millennia of ploughing, trampling and other wear processes that took place in the plough-soil. The softer and less resistant Hassuna, Halaf and Ubaid types, if they ever formed field scatters, may have been entirely depleted as a result of processes of abrasion. Post-3rd millennium pottery, on the other hand, having a shorter residence time in the soil would have been more likely to survive. Also each of these periods has its own distinctive resistant types (e.g. Khabur cordoned and grooved jars [Types 36 and 35]; Middle Assyrian nipple bases [Type 50]; Sasanian/Islamic handles etc.) which would therefore become over-represented and could be used as a dating indicator.

Sherds can also arrive in fields as a result of the excavation of tells in the present day. Such nutrient- and phosphate-rich deposits are frequently prized as manure, and their distribution on fields can result in the contamination of field soils with ancient pottery. Such scatters should, however, include larger, less abraded sherds than the field scatters under consideration. Also they should comprise a representative assemblage of artifacts from the sites from which they were dug rather than being skewed towards a certain period (in this case the 3rd millennium BC). For example, if Tell al-Hawa were dug, the most accessible deposits would not be those of the 3rd millennium but would be Sasanian/Islamic on the lower southern town and Late or Middle Assyrian on the high mound. When the distribution of significant sherd scatters is compared with both modern villages and later Islamic settlement, i.e. settlements that might have been expected to indulge in such practices, it is evident that there is little correspondence (Wilkinson 1989,Fig.7). In contrast, not only is there good correspondence between the location of 3rd and early 2nd millennium sites and field scatter densities, but also the magnitude of field

Table 3. No. of sample squares that were necessary to include one kiln slag fragment and no. of sherds per slag fragment for selected areas in the north Jazira

Area	No.of Squares Recording 1 Slag Fragment	No. of Sherds per Slag Fragment
Hawa Area	2.36	102
Karaba Tibn Area	1.19	103
Outlying Areas Around Sites 66, 69, 86 and 104	15.4	235

scatters seems to be roughly proportional to the hierarchy of Bronze Age sites and bears no relationship to the Islamic or modern settlement pattern. A final pointer to the relative antiquity of such scatters is that at Tulul al-Biyadir field scatter sherds contained within an agricultural soil horizon are buried beneath upcast deposits that must be at least several hundred years old (see above).

In conclusion, the use of diagnostic types as prima facie evidence of the date of field scatters is favoured here. Although taphonomic processes will have depleted and biased the assemblages, these factors also enable the field scatters to be distinguished from more recently dug contaminations.

The Distribution of Kiln Slag

Here "kiln slag" refers to the dark olive green to black vitrified, globular clay product which usually develops on the inner lining of high temperature kilns or furnaces; it does not include unvitrified oven linings. The term is also used here to include ceramic wasters vitrified beyond recognition but not those that still retain their form, which were classified separately. Kiln slag is a common constituent of field scatters. For example, at Kurban Höyük (Turkey) scatters containing kiln slag were restricted to the main Euphrates terrace that included the main sites of the Late Roman period. Scatters around smaller sites on the upper terrace were devoid of kiln slag and tile wasters, probably because kilns were restricted to the larger sites of the period (Wilkinson 1990a: 123).

In the north Jazira, by comparing the number of slag fragments per sample square and to collected sherds (Table 3), it was shown that areas near major centres contained significantly more fragments of slag than did distant areas, namely those around Sites 66, 69, 86 and 104.

Similarly Fig.18 (which shows the radial distance of slag fragments from major centres) demonstrates that kiln slag, like later 3rd millennium pottery, tends to be clustered around those centres.

The above suggests that ash from kilns was probably used as an ingredient of composts or as a soil-conditioning agent. Because animal dung was used as a kiln fuel (personal observation at Site 66 in 1989) it seems that the use of kiln ash was a way of further recycling animal manure. Although incineration would have led to a loss in the nutrient qualities of the manure it would have retained some value as a soil-conditioning agent and ancient sources variously cite ashes as a useful ingredient of composts (e.g. Columella ii, 14.5 in White 1970, 132 and Ibn Wahshiyya in el-Samarraie 1972: 74-75). The distribution of slag around the Bronze Age centres, like the distribution of later 3rd millennium pottery, suggests that the source was the centres. Nevertheless, because even quite small settlements can contain evidence of high temperature kilns (Adams 1981: 78; Wilkinson 1990a: 96), some fragments must have come from kilns within smaller settlements. Again, like the sherd scatters, the kiln slags probably belong to many periods although their distribution suggests that a significant proportion are Bronze Age.(For further analysis of systems of kiln slag distribution, see Chapter 6).

To conclude, field evidence showed that north Jazira off-site artifact scatters are ancient rather than recent additions to the land surface and resulted from manuring activity during the later 3rd millennium BC. The decline in sherd scatter density away from centres probably relates to a decline in the application of manure with distance from the settlement. In turn this probably reflects the greater supply of manure and related ingredients near settlements and that larger quantities of manure could be more economically applied to the immediate vicinity of the site.

CHAPTER 3

The Archaeological Landscape II: Hollow Ways

Introduction

Hollow ways form one of the most important elements of the Jaziran landscape but they are difficult to see on the ground. They are best viewed on air photographs and, to a lesser extent, on detailed topographic maps. neither of which are always available to the archaeologist. The recently improved resolution of satellite images, specifically the French SPOT images, is however making hollow ways visible in at least part of the Jazira and should lead to significant improvements in mapping capabilities.

Typically, hollow ways appear as straight, shallow valleys that either radiate from sites or cross the landscape as long linear depressions (Plate 2b). The conventional interpretation is that they result from the continued passage of people and animals along routes. As a result the ground surface is compressed, runoff is increased and concentrated, and, if topographic conditions are suitable, valleys are eroded. O.G.S. Crawford cited examples from both the Near East and Britain (1953:58) and his interpretation that hollow ways are ancient routes is also accepted by most archaeologists who have examined similar features (e.g. van Liere and Lauffray 1954, Hoskins 1955, Buringh 1960, Oates 1968a, Taylor 1979 and Muir 1981). The most noteworthy contribution on this subject is that of van Liere and Lauffray (1954) who, working from some 10,000 air photographs, mapped the predominantly radial hollow ways of the Khabur basin. In addition they produced a morphological classification of archaeological sites and were able to distinguish between both ancient routes (which predominated) and irrigation canals.

A recent re-interpretation has, however, challenged conventional views by suggesting that the Syrian hollow ways mapped by van Liere and Lauffray are irrigation canals (McClellan n.d.). If this proved correct the current understanding of the entire economic base of the Jazira would require revision, transforming the region from a low-yield (albeit extensive) zone of dry farming to high-yield irrigation agriculture capable of supporting at least double the population. In order to address this problem, the hollow ways of the Iraqi north Jazira have been examined from scratch. First the size and distribution of the features will be described, then their relationship to the topography and drainage will be examined and finally the pros and cons of the ancient route versus canal theories will be reviewed.

Hollow Ways in the North Jazira

Two basic types of hollow ways can be identified on air photographs: a) broad, apparently shallow features that radiate from major tells and b) narrower features that either cross the terrain over long distances or link the more recent archaeological sites. This distinction, which was also recognized by van Liere and Lauffrey, is subject to some exceptions and in a few cases the broad type (a) can form longer features and the narrower type (b) can radiate from tells. In the project area the type (a) features are normally up to 0.50 or 1.0 m deep, rarely 2-4 m (Fig.19) and are 30-60 m in width, the largest examples being as much as 130-200 m wide. No examples of type (b) were measured but from their traces on air photographs they would seem to be narrower than 30 m, with a lower ratio of width to depth and apparently a slightly sharper cross-profile. They seem to be more recent, some examples being virtually modern, but their date-range remains to be demonstrated.

Not all hollow ways are truly hollow and some appear to be soil or vegetation/crop marks, which may result from pre-existing hollows having become infilled with soil wash. This soil, by being deeper and more moisture-retentive than soils on the adjacent slopes, encourages differential vegetation growth or crop ripening, which can be conspicuous on the ground at certain seasons of the year.

Radial Systems

According to van Liere and Lauffray (1954), most broad radial hollow ways radiate from Bronze Age tells. Within the north Jazira, the best examples are found around the Bronze Age centres of Tell al-Hawa, Kharaba Tibn (Site 43, Fig.20), Abu Kula (Site 127), Abu Winni (Fig.21) and Abu Wajnam. Where they are sufficiently distinctive to be

measured to a termination point, the radial features have a modal length of 2-2.9 km and a mean length of 3.0 km (Fig.22). This compares with a mean length for similar features in the Syrian Jazira of 3.9 km, with an average of 5.4 lines per site (T.McClellan pers. comm.). Twelve examples bifurcated into two hollow ways and these bifurcation points were predominantly 1-2 km from the tell centres (Fig.22). The mean distance to such bifurcation points, at 1.5 km, is roughly half-way to the mean termination point noted above. The radiating network of hollow ways can be dense (for example, 14 have been recorded near Tell al-Hawa) but this should be taken as a minimum because conditions of differential formation and preservation have probably rendered some hollow ways unrecognizable. There is nothing to show that these features were all in use at the same time.

Two of the three examples of radial hollow way systems illustrated here (Fig.20) are based on air photographs and contour surveys, with appropriate field checks, and the third (Fig.21) is based on air photographs alone, without the benefit of field checking. Around Tell al-Hawa and Kharaba Tibn, the radial hollow ways on the air photographs conform to topographic hollows, some of which (see examples profiled at A-E) are remarkably oblique to the general slope of the land surface. This, together with their straightness, clearly distinguishes them from the slightly sinuous, occasionally meandering wadi traces. The Tell al-Hawa hollow ways are best developed on the northern, upslope side of the tell whereas at Kharaba Tibn examples radiate from every side. At Abu Winni the pattern is of an almost complete radial system, slightly less well-developed to the north.

Some hollow ways are occupied by wadis or gullies for long distances whereas others merely accommodate wadis for a short interval thus causing kinks in the channel pattern (e.g. Fig. 6 at Sites 29 and 30, as well as to the W and SW of Abu Winni). They therefore operate as flow paths for flood waters and can influence the development of drainage patterns. They are not, however, simply natural valleys but just appear to have become adopted by wadis where they provide a natural low point.

Although the main elements of radial hollow ways extend 2-3 km from the central settlement, additional elements often provide links with satellites or nearby tells. Topographic profiles along selected hollow ways demonstrate that although many trend consistently up or down slope, in some cases at an oblique angle, several cross the terrain virtually independent of topography. For example, within a radial distance of 2 km from Kharaba Tibn, profile II shows the hollow way to rise and fall as a continuous feature over a watershed some 1.5 km from the tell. The hollow way disappears in the wadi (noted as dormant on Fig.23), but re-appears to the NW. A second feature (I) follows a similar up-hill and down-dale path and, some 3 km from Kharaba Tibn, re-appears as a weak trace to cross another watershed (Fig.20). Although not contoured, a similar configuration can be concluded from Fig.21 where three hollow ways to the W and SW of Abu Winni rise and fall over several minor watersheds. This inference is possible because the hollow ways cross from one wadi catchment to the next and must therefore incorporate elements that conduct flow in opposite directions.

On a regional scale, this pattern becomes even more convincing (Fig.24). For example, the long hollow way that radiates from Tell al-Hawa towards Hamad Agha Kabir clearly crosses a major watershed some 8 km NE of Hawa.

The foregoing indicates that hollow ways do not just slope in one direction downhill but can cross watersheds in such a manner that if they were canals, complex engineering works would be required for their negotiation. Although technically feasible, the traces of such engineering works would leave conspicuous archaeological evidence, of which there is none within the area of study. On the other hand, in relationship to the topography it can be seen that elements of each hollow way could have conducted water down a simple slope. Where hollow ways crossed a watershed, runoff parted at the watershed thus eroding paths in opposite directions. Detailed three-dimensional study of air photographs shows frequent repetitions of this situation with hollows being particularly well-represented on slopes where runoff conditions would be expected to favour the concentration of overland flow. For example, the great depth of hollow ways near Kharaba Tibn may result from the steeper slopes in this area that promoted greater runoff concentration which in turn increased the erosion and transport of sediment along the hollow ways.

Many hollow ways appear to have formed over a considerable span of time. The radial pattern of broad features around the main Bronze Age centres implies that these features were being formed at this time, and that they were in use as long as the tells were occupied. The alignment of 3rd and early 2nd millennium sites along the major inter-regional systems through Tell al-Hawa and Tell al-Samir suggests that these hollow ways also functioned during the Bronze Age. It is relevant that transport-dependent functions such as pottery manufacture seem to have been located (at Tell al-Hawa at least) on the edge of one of the major hollow ways (see Chapter 6). Furthermore the presence of Late Uruk sites along two hollow ways possibly extends their origins back to the 4th millennium BC (Chapters 5 and 9). The narrower features, of which there are many, would, according to the work of van Liere and

Table 4. Some inter-regional hollow ways on Fig.24

A-A	Abu Wajnam to Hamad Agha Kabir
B-B	Zummar to Kharaba Tibn
C-C	Tell al-Hawa to Abu Dhahir, via Bardiya
D-D	Nineveh/Mosul to Tell Huqnah, Uwaynat, Tell al-Hawa and Bir 'Uqla (Plate 2.b)
E-E	Uwaynat to Tell Talab and Tell al-Samir and thereafter to the NW to either E1 or E2
A-F	Abu Wajnam to Abu Winni and thence to the large site at X
G-G	From near Tell Huqna, branching to NE of X with N branch going via Site 123 (al-Kibar) to al-Gana and to NW (G3). S branch towards al-Mumi whence it branches to to G1 and G2. Route G-G3 may conform to the Emar itinerary of Goetze (1953) and Hallo (1964)
H-H	NNW-SSE alignment to W of al-Mumi
J-J	Short length of NNW-SSE alignment in SW corner of project area
K-K	SW-NE alignment via Tell al-Dhaim to Abu Kula and possibly continuing on to Kharaba Tibn thence along B-B to Zummar
C-A	Tell al-Hawa to Hamad Agha Kabir

Lauffray, be later in date, probably Byzantine (=Sasanian in Iraqi Jazira) or Islamic (1954: 145). More detailed discussion of dates of selected hollow ways will be provided in the appropriate chronological chapters (5-8), below.

Long-distance Systems

Among the dense network of non-radial hollow ways are at least eleven longer features that either link distant sites or form parts of longer inter-regional systems. Although no evidence can be cited to demonstrate that each alignment was in use throughout its length at any one time their geographical continuity across extensive tracts of land suggests that they were. As with the radial features, evidence of excavated canals is entirely absent. In addition to the feature between Hawa and Hamad Agha which clearly crossed a watershed, it was evident that many alignments listed on Table 4 rose up and down over the topography at some points along their routes. With the exception of a short feature on the right bank of the Tigris near Sheikh Humsi, there is nothing to suggest that any alignments of hollow ways were canals and the interpretation that these features are ancient routes seems more acceptable. In future chapters hollow ways will be interpreted as such. Until dating evidence (such as the alignment of dated sites along them) can be given, the inter-regional systems must be regarded as multi-period in date.

Fig. 24 shows that the inter-regional hollow ways pass through the lowlands that run between the hill masses and nowhere is there any evidence of them heading towards passes in the hills. This is obviously the case for systems D-D, A-E, B-B and G-G and can also be inferred for H-H, J-J and K-K which, when extrapolated, would follow a southward alignment towards a gap at Tell al-Shaw situated between the eastern nose of Jabal Sinjar and Jabal Ishkhaft (route C, Wilkinson 1990c: fig.1). This route probably then continued across the 'Afar-Sinjar plain towards Tell Rimah and points south.

Discussion

The hollow ways, which usually function as valleys, frequently contain traces of channels or gullies. In the absence of traces of ancient engineering works those examples that run up one side of a watershed and down the other cannot be accepted as ancient canals. Neither do any show evidence of banks or levees of upcast in the manner of true Mesopotamian canals. Although it can be shown in favourable circumstances that upcast can be deflated by wind action, usually some trace of upcast material would remain in sheltered localities. Freshwater molluscs, which are another diagnostic feature of ancient canals, are common along canals and in irrigated areas throughout the Middle East but, except along the Wadi al-Murr near Uwaynat, were absent from the north Jazira. This rules out the possibility that hollow ways conducted perennial flow, but does not exclude the presence of episodic flow. Neither do the hollow ways show any consistent attempt to tap any particular type of water
source, be it slope runoff or perennial flow in wadis. If perennial wadi flow had formed a source of supply, a significant climatic change would need to be assumed because none of the wadis contain year-round water today. Finally, where it was possible to view hollow ways in section, no canal or canal deposits were evident, the centre of the hollow being developed on soils of natural Calcic Xerosol type.

Although the hydraulic element of the hollow ways is undeniable, it is almost certainly a secondary effect. That is, the long-continued passage of people and animals along routes has resulted in the

acceleration of runoff and channel flow along favoured alignments. As a result, along each individual slope element along a general alignment, localized channel flow results in the erosion of a length of valley. This does not mean that other processes are not operating. Anyone who has witnessed a flock of sheep crossing the steppe in dry weather will have noticed the large cloud of dust produced and eventually blown out of the system. Therefore the continued movement of flocks and shepherds to and from the settlement every day will have had a significant effect on wearing down the land surface. During wet weather tracks would have become boggy and perhaps, like medieval roads in Britain, rendered virtually impassable. Such disturbance would make the soils vulnerable to erosion, especially because, in spite of its apparent flatness (Pl.1) the north Jazira is never flat. Mostly the land slopes at 1:300 or more, which is quite sufficient to generate run-off and encourage overland flow. Additional deepening of sunken lanes or hollow ways has been noted from manorial records in Britain to be a result of the digging of mud and rubbish from the roads to be spread on adjacent fields as manure (T.Williamson pers. comm.; Taylor 1979: 145-6). This process, unproven for the Middle East, is particularly attractive because it provides a direct link between hollow ways and manuring.

The spatial pattern of the hollow ways conforms to what would be expected of a system of radial routes around a central settlement. This, together with the similarity of the features to hollow ways or sunken lanes elsewhere in the Old World, makes the route system interpretation much more likely. Theoretically, the size of hollow ways should be proportional to the amount of traffic passing along them and to the slope of the terrain, combined with conditions favourable to the concentration of runoff. Although modern geographical theory postulates that interaction (i.e. traffic) between settlements should be proportional to the size of the settlements in question (the gravity model: Hagget 1977 *et al.*, 38), this cannot be assumed for the Bronze Age. From the evidence in the Jazira it can be argued that radial hollow ways are larger and that systems linking sites or inter-regional features are rather smaller. Although some examples of long-distance features such as the NW-SE systems through Tell al-Hawa and Tell al-Samir are substantial (see cross profile E, Fig.19), most seem rather small. This suggests, other things being equal, that they carried relatively less traffic in antiquity. Although it has been suggested that hollow ways link the central tell with satellite settlements (van Liere and Lauffray 1954: 145), in the north Jazira many appear to have acted as routes for gaining access to fields or for the passage of flocks and herds to pastures beyond. Although it is difficult to estimate such traffic, nominal figures enable potential local traffic flows to be compared to estimated inter-city movements.

Table 5 Nominal traffic movement along a single local transport route radiating out from a large centre of 10- 20+ ha

Cultivated zone:	200 field workers working for 25 days per month for 6 months, harvesting, gathering in the crop, ploughing, manuring etc. Including 30 draft animals: 34,500 man/animal movements.
Pasture zone:	3 flocks of 50 sheep with 3 shepherds, every day: 55,845 man/animal movements.
Total man/animal movements:	90,345 man/animal movements per annum.

In other words inter-regional traffic would need to attain this figure (equivalent to 247 man/animal movements per day) to erode an equivalent hollow way. However, along certain routes, in the vicinity of the tell any inter-regional or inter-city traffic would need to be added to the local figure thus generating even more erosional traffic on the selected local route. Tentatively therefore, from the dominantly radial configuration around the centres, it can be suggested that in the Jazira local traffic from centres to their fields was more important than inter-city or inter-regional traffic. It is also possible that the type of traffic was different. Local traffic was probably predominantly sheep, goats, draft animals and workers on foot. Sheep are not noted for their single file discipline and they often travel as a broad swathe along any given route, only constrained by field boundaries. This daily semi-constrained passage of flocks of sheep along radial local routes may account for the broad width of radial hollow ways. Inter-regional traffic may have been dominated by smaller groups of people, either dispersed very widely, if the terrain was pasture and unbounded, or in a fairly narrow alignment if constrained by field boundaries. The former case may explain the absence of hollow ways in certain areas, the latter may result in narrower features, perhaps indicative of later routes. Also, wheeled transport, by producing ruts, would probably induce more erosion than pedestrian or animal traffic.

Ancient tracks, by concentrating overland flow, must have played an important role in the initiation of gully erosion in the region. This can be paralleled during the 19th century in the SW United States where tracks, animal droveways and roads probably played a significant role in the initiation of gully erosion (Cooke and Reeves 1976: 178, 189).

Near the Wadi al-Murr, where hollow ways follow the lowest part of the valley floor, they provide additional routes for flood water. Meandering wadi traces have been replaced by straight flood channels as a result of the adoption of a hollow way by flood waters. Hence along the lowest point of the Wadi al-Murr basin there are a number of straight reaches, some conveying the modern flow, others being without evidence of flow, in the manner of conventional hollow ways. Similarly, in the vicinity of Tell al-Hawa, radial hollow ways replaced an earlier system of roughly parallel wadis that drained from north to south. The later radial drainage appears to have effectively captured part of the original drainage system which is no longer visible, possibly because it has been masked by a veneer of later soil wash.

The above hypothesis is supported by the evidence of a buried Hassuna settlement (Site 33) and an infilled wadi to the west of Tell al-Hawa, as well as a possible buried Halaf site to the east of it (Chapter 1 above). The effect of a radial system of hollow ways on local drainage is illustrated schematically on Fig.25 for a generally southward-dipping land surface. The radial hollow ways upslope tap larger hydraulic catchments than those further south. Progressing from north to south, catchments become more assymetrical and also diminish in size as more run-off is intercepted by the hollow ways upslope. Run-off and flow concentration therefore diminish towards the south except for along hollow ways that receive flow directly from channels upslope. In the example illustrated, this hollow way is north-south but in the case of Tell al-Hawa, channel flow from the north of Hawa appears to have been funnelled into the large oblique hollow way trending SE towards Site 23.

In areas such as that around Tell al-Samir, where hollow ways are tenuous features, topographic and drainage conditions were probably less favourable to flow concentration and the development of hollow ways. Elsewhere, such as around Kharaba Tibn where slopes are steep and topography is less conducive to the radial interception model described above, hollow ways are more pronounced and fully developed.

In the context of the rural economy hollow ways represent routes that evolved to optimize access to the land. Along any system of radial routes, with increased distance from the centre, the distance between rays increases and accessibility to the land decreases. This can be addressed by adding radial routes, but with the consequence of overcrowding the valuable lands near the tells with tracks, animals and ancillary nuisances. Alternatively, a smaller number of radial trunk routes that branch at a convenient point from the settlement can be used. It has already been shown (above p.25) that the bifurcation points of those hollow ways that did branch were about half-way to the mean termination point of the radial hollow ways. The mean length of radial hollow ways around larger Bronze Age centres corresponds roughly to the limit of intensive cultivation as inferred by the field scatters. Thus the bifurcation point occurs about half-way to the edge of the most heavily cultivated land. Fig.26 indicates an idealized geometric model of a system of six radial routes each bifurcating into two branches. This shows that no point is greater than R/4 from a track, which, in the case of a R=3 km radius catchment would be 750 m. If, however, the agricultural belt became extended beyond 3 km radius, the land between the branch tracks would remain within R/4 from a track whereas any lands on an extended radial route would become increasingly remote from a track. Hence, the transport system would either cease to be effective or additional branches would need to be added.

The above model is not intended to replicate the ancient Bronze Age route systems: for one thing, the field evidence does not supply sufficient bifurcations. Nevertheless, it shows that by adopting a branched route system roughly half-way from the tell to the mean limit of intensive or permanent cultivation, access to fields could be optimized. Congestion at the centre would be lessened and the effort of getting to fields and hauling crops away from or manure to them would be significantly diminished.

CHAPTER 4

Water Exploitation in Relation to Site Distribution and Morphology

Introduction

It is frequently assumed that water supply is the prime determinant of site location in the Jazira. In other words, sites develop next to springs or on wadis and, where perennial flow is unreliable or absent, there are no settlement sites and occupation is limited to occasional visits by bedu. This in turn leads to a patchy settlement distribution, such as that recorded in the area of Leilan where settlement tends to cluster along water courses (Stein and Wattenmaker 1990:11). Certainly, in the north Jazira plain most or all of the major sites developed on wadi courses (Tell al-Hawa, Tell al-Samir, Abu Kula, Kharaba Tibn etc) or on wadis that have become attenuated features for some reason (Sites 138, 137, 139; perhaps also Sites 140, 108, 115, all on relict wadis). Although it is unlikely that these wadis and relict wadis ever had perennial flow (none do today), water could have been obtained simply by digging into the wadi bed or by the construction of an earthen bund across the channel.

A significant number of sites were, however, away from wadis or relict wadis and the remarkably even distribution of sites, with one site per 2.5 sq km, is not what would be expected from a pattern dictated by water sources alone.

This chapter will analyse the site distribution by examining archaeological, topographic, hydrological and sedimentary features that may relate to the development of sites and associated water exploitation features. These features comprise: a) excavated pits with evidence of waterlogging in antiquity, b) wells and c) enclosed depressions within sites. By examining the distribution of sites with specific groundwater sources in relation to topography and drainage, the relative contributions of groundwater exploitation and wadi flow to the water supply of settlements can be estimated. Before describing water exploitation features, it is necessary to summarize the geomorphological evidence for stages of wadi flow.

Stages of Wadi Flow

The three stages to be described should not be viewed as successive, discreet phases but as chronologically overlapping phases that occurred in different areas at different times.

Stage I: An early phase during which linear deposits from episodic but moderately high energy flows draining from hill masses to the south resulted in the formation of distinctive "wadi ridges" (Fig.2). One example, to judge from coarse chaff-tempered pottery contained within a fine gravel channel fill near Site 113, probably accumulated during Hassuna times (Figs.31 and 36). Other ridges to the SW, which have several probably post-Chalcolithic sites upon them, are also pre-Bronze Age. Wadi ridges are not active today, drainage being by means of stage II or III channels. The fine gravel fill of the feature near Site 113 suggests that flow energy was greater than in the nearby modern wadis, which lacked gravel bed load. Although the dating evidence is sparse, stage I channels probably date from the later Pleistocene and early Holocene. They were active during the Hassuna period but, had probably ceased to form by the Bronze Age.

Stage II: There followed a long and ill-defined phase during which slightly incised wadis carried much or all of the drainage across the plain. To a certain extent this pattern continues today as exemplified by the well-defined sinuous channels indicated on Fig.2. Relict channels of this stage appear as shallow depressions or swales, partly infilled by soil washed from the surrounding terrain. Because the soil inwash obscures the channel morphology, they cannot be described accurately but, like recent wadis, they were probably sinuous. The presence of sites along relict wadis suggests that wadis were active from the Hassuna period (for details see Chapter 5). The absence of freshwater molluscs from the associated deposits of stage I and II channels suggests that neither feature contained permanent water and presumably, in antiquity as in the 19th century, perennial flow in the Wadi al-Murr started at Uwaynat (Ainsworth 1840, RGS archive).

Table 6. Sites with evidence of water-holes in form of waterlogged depressions

Date	Sites
Hassuna	19, 39
Halaf	140, 172
Ubaid	148
Uruk	86, 143*
Later	143*

*Note: Site 143, a Sasanian/Islamic site, exhibited a complex area of features with oxidation/reduction staining. The location of these, adjacent to both Sasanian/Islamic and Uruk mounds, may belong to either occupation, so must remain equivocal.

Stage III: Overlapping with the incised wadis of stage II and then following on from it, was a period when the well-defined channel system started to become disrupted and partially infilled as a result of localized human activity. This took place after the Chalcolithic and entailed wadis being diverted by hollow ways, as was the case near Sites 2 and 30 (Fig.2), or even being diverted along them as between Sites 19/20 and Uwaynat.

Water-Holes and Related Features

Sections exposed by drains and canals through the fringes of a number of archaeological sites revealed occasional patches of distinctive sediments. Typically, these were grey, olive green and mottled orange deposits contained within pits or hollows, the sides of which also bore similar distinctive colourations. Such colours, which contrast conspicuously with the uniform reddish-brown of the natural Calcic Xerosols or the greyish-brown archaeological sediments, appear to result from ancient waterlogging, as will be described below. The following sites, all cut by canals or drainage ditches, revealed evidence of such formerly waterlogged depressions (Table 6):

In addition, a limited area of waterlogged sediments was observed in the north drain cut at Tell al-Hawa (for location, see Ball 1990a, fig.2). These appear to have resulted from a sustained accumulation of flood waters against a structure along the edge of the site or within a depression adjacent to the site. Because of the absence of excavated depressions and the lower intensity of reduction features, this occurrence is not classified with those on Table 6.

Tell Hilwa: Site 86

Of the six sites that supplied evidence of waterlogged depressions, only Tell Hilwa (Site 86) was excavated by the survey team. This small (c. 1 ha) tell produced evidence of Halaf, Uruk, Ninevite 5 settlement, as well as very sparse traces of Hellenistic or later occupation.

The main excavated levels were along the southern fringes of the mound and within 300 m of the present course of the Wadi al-Murr (Fig.27). Below upper levels of soil washed from the mound upslope were exposed undisturbed deposits of Late Uruk date. These included southern Uruk and chaff-tempered Amuq F forms (Types 12, 152 and 153). Ceramics of this date were contained within the fills of a large, deep pit, context 14, that was exposed in plan and section (Fig. 27; Pl.3). The fills were predominantly olive-grey clay loams, and to a lesser extent black charcoal lenses, overlaid by browner deposits of soil wash disturbed by animal burrows.

The pit walls, dug into the natural Calcic Xerosol subsoils (discussed in Chapter 1), exhibited a variegated scheme of olive grey, olive green, orange and reddish-brown mottles from the lowest exposed levels up to some 50-60 cm below the lip of the pit. Such mottling is unusual within the normally reddish-brown natural soils of the region, even when they are waterlogged. They must therefore have undergone some process of change in antiquity when conditions permitted. Such mottling would normally be expected under conditions of waterlogging in the presence of organic matter and associated bacteria. By using up the available oxygen, these promote chemical reduction and the associated migration of iron and other soil minerals, which only become re-precipitated in locations or at times when conditions are favourable. Such variable reducing/oxidation conditions result in the mottling of both the pit walls and any deposits that were cleaned from the pit and subsequently collapsed back as pit fill.

Fig.27 (middle) shows the pit with a vertical exaggeration of x15 in relation to the mound (to the north), adjacent plain level and the level of the buried soil beneath the tell. This indicates that the level of the adjacent plain has risen by some 70 cm. At least some of the sedimentation that caused this aggradation relates to the wadi gravels to the west on Fig.27

which accumulated when a former course of the Wadi al-Murr flowed near to the site. From the stratigraphic relationship between the gravels and the lowest occupation levels on site, this must have been after the late 4th millennium BC. The zone of former waterlogging, as indicated by the mottled sediment, has its upper level some 115 cm above the present water table. In other words, there has been a decline of roughly this magnitude since the pit was in use.

Its irregular form in both plan and section, as well as its large surface area, suggests that this pit was not simply a well. Such extensive pit complexes are typically dug for the extraction of soil for mud brick, a factor that is significant to the overall interpretation of water-holes (see discussion, below). When dug, the ground-water must have risen to the level indicated by the mottling, and waterlogging presumably operated in the presence of abundant organic matter or organic waste deposits. The feature can be tentatively interpreted as a water-hole which was physically entered by the inhabitants in order to withdraw water. Quarrying of soil for mud brick was probably an ancillary function. In the absence of specific water-lifting or containing devices or artifacts it is impossible to prove that this feature was a deliberately constructed water-hole but, even if it was not, it must have provided a convenient source of water and, for our purposes, it provides a useful indicator of former ground-water levels. Significantly an adjacent grain or legume storage pit, of the same Late Uruk date (pit 22, Fig.27), was dug down to just the depth of waterlogging and no further, presumably in order to avoid the deleterious effect of excessive moisture.

Gar Sur: Site 39

Here a deep pit showing copious evidence of past waterlogging was cleaned and excavated by Stuart Campbell of Edinburgh University. The pit fill contained a large quantity of Hassuna, with some Samarran, pottery as well as domestic refuse, animal bone and charred plant material. The base of excavation, which reached some 4.5m below ground level (Campbell n.d.:4), did not reach the base of the feature because flooding from the adjacent drain prevented further excavation. Nevertheless, the deep, roughly conical form of the feature, combined with the well-mottled sedimentary infill and adjacent deposits suggests that the pit was a well or water-hole. This is one of the earliest wells or water-holes recorded from the Middle East, other early examples being from Halaf sites (Miller 1980:333-4) and Neolithic sites in the eastern Sahara (8100 BP; Wendorf and Schild 1980:135-37).

Discussion

Little can be said about features at the other sites listed on Table 6, but most formed scoops 2-3 m deep, both infilled with and cut into mottled olive and orange deposits. Within the Hassuna site at al-Botha (Site 19), several oval, mottled features measured c.1 m long axis, but it is unclear whether these were well shafts, water-holes or just pits excavated for soil and subsequently waterlogged.

At Tell Hilwa, the part of the mound occupied by the water-hole was damp, in contrast to the dry soils elsewhere on the mound. The capillary movement of moisture through the pit-fill up to the mound surface would cause both this damp patch as well as occasional salt efflorescences. Similar efflorescences at other (usually prehistoric) sites may relate to similar infilled water-holes. Thus, if the association is proven, such efflorescences could provide a simple way of recognizing sites with infilled water-holes.

It can be concluded that a number of Neolithic and Chalcolithic sites, and perhaps some of later date, received their water supply from open water-holes that tapped shallow water tables in the valley floor and within areas of undulating terrain. The record from Tell Hilwa suggests that Late Uruk water tables were a little over 1 m higher than those of today. Similar water-holes supply traditional communities in East Africa (White *et al.* 1972:28), the funnel-shaped profile allowing direct access to the water-level. Presumably the large amount of activity that would have taken place within and around the water sources would have resulted in frequent pit-wall collapses. The resultant re-cutting would progressively extend the area of the feature until a larger feature was formed, perhaps more reminiscent of that at Tell Hilwa.

Wells

The traditional method of water extraction within the north Jazira is the well. Formerly these were usually shallow and hand- or animal- operated, but more recently reliance has been placed on deep diesel or electric pumped wells. A beautiful Ottoman stone-built well at Gar Sur (Site 42), equipped with a tripartite configuration of rectangular stone animal troughs, illustrates the quality of construction reached within the last century (Pl.4).

Two examples of wells were recorded, both at Tell al-Hawa. The first was a 1 m diameter shaft exposed in the north drain. Although not firmly dated, from its context, a 3rd or early 2nd millennium date seems most likely. It can be compared with a similar example excavated from mid-late 3rd millennium levels at Kurban Höyük in SE Turkey

(Algaze 1990: 48 and Fig. 43). A second possible well was noted on the northern slopes of the high mound. It was a circular brick structure built of curved, segmented, oven-fired bricks bonded in clay mortar. At c. 5.5 m below the summit it was probably Akkadian in date, and was probably used to supply buildings on the high mound (c. 25 m above the plain) with water.

Sites with Enclosed Depressions

A characteristic feature of many sites in northern Iraq is the enclosed depression, the surface of which is at least 50 cm below plain level. Usually such features are situated within the mounded area of a multi-mounded and multi-period site (Figs. 7 and 29). Enclosed depressions are usually 1-2 ha in area, but can be as large as the 350 m x 100 m feature at Mowasha (see below and Fig.29). Most sites that exhibit a depression have only one, but as many as eleven can occur. Partly enclosed re-entrant depressions, which are more difficult to define because of potential confusion with ordinary valleys, are not included on Fig.28. This figure indicates that the modal size of sites with enclosed depressions corresponds to the modal size of sites within the project area in general (1-2.5 ha), but that sites with more than one depression are rather larger (see below).

Mowasha: Site 15

Mowasha is a small multi-period site complex comprising a c. 1 ha Ninevite 5 and Khabur period conical tell (D) and various lower mounds of Hellenistic (A,B,C) and Sasanian/Islamic date (A,B,C and F) arranged around a 3.5 ha elongated enclosed depression (Fig.29). This depression, which is slightly larger than most, was cut by a deep, inclined, engine-housing pit and well that provided a convenient section through the base of the depression. Fig.29 gives a N-S profile (vertical exaggeration x50) through the depression with projected profiles of the plain to the west (broken line), the archaeological mounds to the east (D and C) and the well section (E). The basin floor is partly cut through the natural soils of the plain (see section in Ball *et al.* 1989, fig.3). The cut extends for a maximum depth of 3 m below the floor of the depression, which places it approximately 5 m below the adjacent plain level. The basin fill, consisting of greyish-brown archaeological deposits, wash and ash layers, extended down to the well mouth, which at the time of recording was flooded by standing water. The presence of a large fragment of a Partho-Sasanian jar from c. 2 m depth within the fill suggests that most of the fill accumulated since the Parthian period.

The section provided no evidence of the original function of the depression. It is too large to have been a well-head/water-hole with ancillary access and working areas. Undoubtedly, the feature would have successfully acted as a reservoir for accommodating winter/spring runoff; therefore, if any well had been present, it would have been inaccessible for much of the year. The absence of waterlogged deposits comparable to those associated with the water-holes described above, suggests that either the locus of water extraction was elsewhere within the depression or that the water-table was lower than the base of the depression. Before attempting an interpretation of this feature, the date and distribution of enclosed depressions will be analysed.

Distribution and Chronology of Enclosed Depressions

Table 7 shows the qualitative breakdown of sites with and without enclosed depressions in relation to topography and drainage. In such an undramatic landscape, topographic terminology is limited to: plain, undulating "upland" and edge of undulating "upland"; drainage depends upon whether a site is on a sinuous wadi, a wadi with a moderately distinct trace, or a weak trace. Additional locational criteria are: valley re-entrant or on wadi ridge (see Chapter 1).

The following conclusions can be drawn from Table 7: on the plain there are roughly equal numbers of sites with or without enclosed depressions (70 versus 68 sites); of the total of 23 sites located along the upland edge 74% (i.e. 17) have enclosed depressions and 26% are without; of the 110 sites along wadis only 29% have enclosed depressions, whereas 71% are without.

Table 7. Site locations in relation to wadis and topography

a) Enclosed depression on plain	70 sites	(22%)
b) Enclosed depression on upland edge	17 sites	(5%)
c) Enclosed depression on upland	1 site	(<1%)
d) Upland sites without enclosed depressions, wadis or re-entrants	6 sites	(2%)
e) Upland edge sites without enclosed depressions, wadis or re-entrants	6 sites	(2%)
f) Sites on wadis but without enclosed depressions[1]	78 sites	(24%)
g) Sites on wadis but with enclosed depressions[2]	32 sites	(10%)
h) Sites on wadi ridges (all without enclosed depressions)	4 sites	(1%)
i) Sites near or related to wadi ridges	8 sites	(3%)
j) Sites on plain without enclosed depressions	68 sites	(21%)
k) Sites with valley re-entrant on upland (7 with enclosed depressions)	18 sites	(6%)
l) Sites located at valley re-entrants and other locations (7 with enclosed depressions)	9 sites	(3%)

Total no. of sites: 317*

*Counted from entire area of North Jazira Project, see Fig.2

Notes: 1: of class f sites, 33 (10%) were on wadis with a sinuous or distinct trace, 22 (7%) were on wadis with a moderate trace and 23(7%) were on wadis with a weak trace.

2: of class g sites, 10 (3%) were on wadis with a sinuous or distinct trace, 8 (3%) with a moderate trace 14 (4%) with a weak trace.

Sites on wadis (35%) form a significant but not overwhelming proportion of the total. It can be assumed that some former wadis have been lost as a result of major channel movements (see Chapter 1) and subsequently obscured by later sedimentation. Such sites will be included within classes (j) and (a) above, but it seems unlikely that wadi shift can account for 65% of sites not located on wadis. Consequently, sites with enclosed depressions on the plain, but not on wadis (category (a), on Table 7) may be interpreted as being located away from wadis because they were able to utilize other water resources, either by tapping ground-water or by ponding overland flow within the enclosed depressions. The significant number of sites located on the plain, but without enclosed depressions, can be accounted for in a number of ways as follows:

1) they were formerly on wadis that, owing to channel shift and later sedimentation, now have no trace (e.g. Site 108);
2) they are short-range prehistoric sites that typically show no traces of enclosed depressions (see below)(e.g. Sites 16, 21 (Neolithic), 26, 27, 33 (buried), 81, 82, 84, 85, 113;
3) and were supplied with water by means of wells alone.

The negligible quantity of sites with enclosed depressions on the upland may be due to the fact that, in the undulating upland areas, the water-table was too deep to be tapped by large water-holes. In such locations conventional shaft wells would have been more appropriate. Sites around the upland edge, whether on re-entrants or not and with or without enclosed depressions, would have been suitably located to take advantage of seepages that might occur in such ground-water concentration locations.

If the number of sites with enclosed depressions is broken down according to their periods of occupation, a blurred pattern emerges (Fig.30). This is partly because many sites are multi-period, therefore site areas that were not necessarily contemporaneous with the use of enclosed depressions might be included. Bearing this limitation in mind, in terms of absolute numbers, sites with one or two enclosed depressions were most common during the Late Assyrian and Hellenistic periods. However, this is partly because there are more sites of these periods. Expressed as a percentage of the number of sites of each period, the pattern is less abrupt with the increase starting in the Middle or even Old Assyrian period and culminating around the Sasanian. The apparent decline that follows the Sasanian period is partly a result of the data points used. Thus Fig.30 shows that those sites with major extensive occupation in the Sasanian or Islamic periods are more likely to include multiple depressions.

It would be both arduous and uneconomic for the inhabitants to dig up to 11 deep and large pits simply as water-holes. In such cases it is more likely that many of the depressions were dug for the extraction of soil for use as mud brick. On such recent sites, insufficient time would have elapsed for such quarry pits to have been filled in by soil wash from the adjacent land, hence they remain as conspicuous features. On earlier sites, on the other hand, the time lapse is greater and there would be more chance for depressions to have become filled in and ultimately lost from view. Hence, on Fig.30, the apparent increase of sites with enclosed depressions after the Middle Assyrian period may be due to the fact that earlier sites have had a greater chance to be filled in.

Discussion

Although the sample is small, it can be suggested that, during the prehistoric period, away from wadis, water-holes or pits up to c.4.5 m in depth were used. Water-tables must have been moderately high to account for the copious mottling evident within 3-4 m of the ground surface. Such sites, when they are of short chronological range, show little evidence of enclosed depressions, either because the early features were rather small or because they had more than 5000 years to become filled with sediment, either washed in from the adjacent site or with overland flow. Enclosed depressions become more common on sites later than the mid-2nd millennium BC, but in the only example that was visible in section, ancient waterlogging was absent. The above evidence, together with that from Tell Hilwa, suggests that water levels may have dropped some 115 cm since the late Uruk. This might be due to climatic change or because removal of vegetation has increased runoff with a consequent decline in ground-water recharge. Alternatively, demographic growth (or concentration) since the Chalcolithic may have led to increased abstraction of ground-water, with consequent lowering of the water-table. By the Sasanian-Islamic period, multiple enclosed depressions become common and at least some can be inferred to result from the quarrying of soil for the manufacture of mud brick. These remain visible, simply because insufficient time has elapsed for them to fill.

The above discussion has deftly avoided the issue of why the enclosed depressions, if dug solely for water extraction, should be so large. It would obviously be prohibitively laborious to excavate depressions of 1 or more hectares in area and to a depth of 3-5 m simply for water. Mud brick extraction has already been mentioned as another explanation for enclosed depressions because every village from the Neolithic onwards comprised buildings of mud, all of which was excavated from the adjacent soils. In terms of economy of effort during mud brick manufacture, it would be most efficient to locate both water and soil sources at the same place. In other words, soil would be excavated in the vicinity of a traditional water-hole, thus cutting back the edges and transforming it from a simple inverted cone into an irregular depression with a scalloped perimeter resulting from progressive re-cutting. Conversely, the operation of digging soil for mud brick could be engineered to reach the water-table or to create a depression suitable for the collection of winter runoff. By conducting both activities at the same place, a large depression combined with a water source would result. Table 8 illustrates approximate volumetric rates of potential soil extraction for a small settlement. In this, it is assumed that for a medium-size community of 250 people, 30 small houses are occupied within their own compound. Wall thicknesses and heights are assumed to be 0.5 m and 2.5 m respectively; 4 rooms measure 6x3 m and compound walls of 9 m and 12 m length are assumed.

Table 8. Nominal volumes of mud brick required for single 4-room courtyard house

No. of walls	Dimensions of each wall	Total Volume [m^3]
8 walls	X [6.0x2.5x0.5m]	= 60
5 walls	X [3.0x2.5x0.5m]	=18.75
1 wall	X [9.0x2.5x0.5m]	=11.25
1 wall	X [12.0x2.5x0.5m]	=15.00
4 roofs	X [6.0x3.0x0.3m]	=22.00
		=127.00

Total volume per courtyard house: 127 m^3
Total volume for 30 houses in one generation: 3810 m^3

The total volume excavated for one generation (assuming minimal rebuilding) would therefore be an area c.40 m x 30 m excavated to a depth of some 3.2 m. Assuming total reconstruction every generation (say every 25 years), a depression of approximately 1 ha and 3 m depth would have been excavated in c. 200 years.

This suggests that the large size of the enclosed depressions can be accounted for by the excavation of soil for mud brick at a water-hole. Given the scale of soil extraction required for house construction, why are not enclosed depressions more common? For early sites sufficient time has elapsed to allow the features to fill completely. Many other sites show evidence of not fully enclosed re-entrant depressions which gradually merge into normal, shallow valleys. Such depressions could have been excavated in a similar manner to the fully enclosed examples. At sites on wadis, soil extraction for mud brick would have occurred close to the wadi where the depressions would have blended in with the form of the wadi. Furthermore, higher rates of sedimentation

along the wadi would infill such features more rapidly than on the plain.

Although enclosed depressions should theoretically be proportional to the size of the associated site, this is clearly not the case because massive sites like Tell al-Hawa and Tell Brak show virtually no signs of such depressions. This is partly because large-scale slope and gully erosion off the tell slopes, as well as the encroachment of peripheral occupation areas, have probably infilled such depressions. Smaller sites and lower sites of more recent date will have generated less slope-wash and sedimentation, therefore their depressions will have filled up much more slowly.

The shallower Chalcolithic water-holes were replaced either by standard shaft wells, such as the Bronze Age example from Hawa, or by deeper water-holes associated with enclosed depressions. A similar pattern was recorded at the excavated Chalcolithic and Bronze Age site of Kurban Höyük, where a mid-3rd millennium well replaced a spring or seepage that had been in use during the Chalcolithic (Wilkinson 1990a: 31). In turn, the well eventually dried up and, when excavated in the early 1980s, the well base was found to be 0.5 m above the local water-table. At Kurban Höyük, the fall in the water-table was ascribed to woodland removal after or during the 3rd millennium BC, which resulted in increased runoff and diminished ground-water storage. Although the above provides some evidence for moister conditions during the Chalcolithic, as at Kurban, it is possible that the decline in groundwater may have been man-induced, a point that will be returned to in Chapter 9.

To conclude, at least 25 % of all sites grew up on wadis but a similar number probably relied solely upon water-holes for their water supply. The relative contributions of runoff and ground-water to these water-holes is difficult to estimate. According to Thalen (1979:87), traditional water-holes usually receive their water from rainfall, infiltrated and collected close to the surface; in other words the source is a very temporary shallow, perched water-table. On the other hand, Felix Jones, in his notes relating to the topographic mapping of Assyria, noted that most of the villages in the district of Mosul possessed reservoirs for accumulating rainwater. Whatever the relative contribution of ground-water to runoff, the observation that the enclosed depressions are water-holes (enlarged by mud-brick extraction) seems to be supported by local information. The term *al-gana* or *al-qana* is often applied to these depressions and they are also regarded as water-holes. Hence the village of al-Gana, when viewed on air photographs, can be seen to contain an enclosed depression which, at the time it was photographed (November 1954), was partly filled with flood water.

CHAPTER 5

The Prehistoric Village Period: Neolithic to Uruk

Introduction

There is negligible evidence for Palaeolithic occupation on the north Jazira plain and in this report the term prehistoric extends from the onset of the first traces of settlement during the Aceramic or Proto-Neolithic until the Late Chalcolithic. For the sake of convenience it extends to the close of the Uruk period and terminates immediately before the adoption of Ninevite 5 ceramics. Where used, Chalcolithic refers to the Ubaid and northern Uruk periods, that is approximately to the 5th and 4th millennia BC.

Natural Environment and Land Use

Owing to the lack of systematic environmental sampling, information on early Holocene environments is sparse but by combining data from a number of sites it is possible to sketch the regional subsistence economy.

The earliest record of plant and animal remains comes from early Aceramic Neolithic Qermez Dere (Tel'afar), where the small amount of charred plant material suggests an abundance of wild grasses, with some wild and perhaps a little cultivated barley (Watkins *et al.* 1989:21). The possible presence of wild einkorn is of interest because it is commonly associated with pistachio woodland; therefore the carbonized pistachio shells may have come from local stands of pistachio woodland. Vetch and vetchling seeds, including bitter vetch as well as lentils, suggest that these plants may have been gathered in the vicinity.

Aceramic Neolithic Nemrik, situated on the left (east) bank of the Tigris, like Qermez Dere, was on the boundary between two distinct environmental zones. According to Kozlowski and Kempisty (1990:348), vetch, lentils, peas and wild cereals were gathered. A few bones of domestic sheep, goat, pigs and cows suggest that domestic animals were being grazed on the outlying steppe. The presence of numerous bones of antelope and gazelle suggest that the site was near to grassy steppe (Kozlowski 1989:30). A mixed forest environment occupied by red deer, wild ox (*bos primigenius*), wild boar, roe deer, beaver and badger, existed on slightly higher land to the east. Only during the later 7th millennium phases of the site was there evidence of domestic fauna, traces of cultivation being scarce.

Both land snails (*Helix Salomonica*) and river clams (*Unio Tigridis*) were exploited, and perhaps crayfish. Such riverine resources were not generally available, however, for the inhabitants of the Jazira.

At both Qermez Dere and Nemrik the community was poised on the threshold of domestication, with a partly domestic economy but with much reliance being placed upon hunting and gathering.

At later Aceramic Neolithic Maghzaliya, numerous charred cereal grains (>300) indicate that both wild and domestic barley, as well as emmer, were grown but these were significantly smaller than those from the fully agricultural Hassuna site of Yarim Tepe I situated on the plain a few kilometres to the south (Bader *et al.* 1981: 62).

The gradual adoption of agriculture can even be seen at Umm Dabaghiyah, in spite of its location in what today is a climatically marginal area. Here, Helbaek demonstrated the existence of domestic emmer, einkorn and naked barley which may have been cultivated in shallow basins or swales where soil moisture was slightly higher than elsewhere. In addition, impressions of wild barley, brome (a grass strongly resembling oats), goosefoot and a number of plants characteristic of saline marshes were found (Helbaek 1972:17).

By the Hassuna period a largely domestic subsistence economy was being practised at this time when population and sedentary settlements were increasing (see below). This shift of emphasis towards the cultivable plains may have been because soil represented the critical resource for subsistence compared with the Aceramic Neolithic when a broader spectrum of resources was sought from a wider range of ecological niches.

The analysis of carbonized plant remains from Yarim Tepe I and II suggests that cereal agriculture developed during the Hassuna period from naturally occurring non-domestic species (Bakhteyev and Yaneshevich 1980). At Arpachiyah cereals cultivated during the Halaf period included emmer, hulled and naked 6-row barley, 2-row hulled barley, hexaploid wheat and einkorn; legumes were represented by lentils (in one sample only; Hubbard 1980:153). The

absence of charcoal of all types of tree, except for tamarisk, suggests that the Halaf countryside was about as open and treeless as it is today, a contention that is supported by the recovered seeds of plants which are those commonly found among the spring vegetation today: *Aegilops crassa* (a grass which invades fields) and *Adoxis annua.* Similar conclusions have been reached regarding the early degradation of the steppe of eastern Syria (McCorriston 1992).

Faunal evidence from Ubaid Khanijdal East in the project area suggests a mixed animal husbandry dominated by domestic pig and cattle with less emphasis on sheep/goat husbandry. By the Late Uruk sheep/goat dominated with cattle and pig being much less important (Pipe, below p.42). Although there is no evidence for plant husbandry from the area, dung was already being used as fuel in kilns at Khanijdal, which implies that by the Late Ubaid the woodland had been reduced and charcoal was not available as fuel.

The presence of prehistoric settlements across the entire area surveyed suggests that there would have been little space left for large areas of wild vegetation or countryside to survive. This is supported by the dearth of wild animals in the faunal sample from Ubaid Khanijdal East (Pipe, below p.42). Nevertheless, during phases of localized settlement abandonment, there may have been phases of wood or scrub regeneration. By the late Chalcolithic, as at Arpachiyah, it can be suggested that the landscape was already moderately denuded and degraded. At this time, to judge by the faunal remains from Tell al-Hilwa, sheep/goat husbandry had replaced the previous mixed animal husbandry (Pipe, below p.42) and refuges for wild animals were probably both rare and distant.

Early Neolithic Settlement

The survey suggests that during the early Holocene, the fertile clay plain was virtually devoid of sedentary settlement and, instead, the very early sites can be found around the edges of the limestone/gypsum hills (Qermez Dere, Maghzaliya) or on rolling steppe near to rivers (Nemrik, M'lefaat). Such a distribution, although based on a tiny sample, appears to support the suggestion that the earliest sedentary settlements developed in areas of highly differentiated terrain, usually hilly, with relatively easy access to as many different ecological units as possible (Nissen 1988:19).

There were no traces of early Aceramic Neolithic occupation on the north Jazira plain and the first trace of settlement was later, coming from the site of Ginnig, excavated by Stuart Campbell of Edinburgh University in 1987. This small site, c.0.4 ha in area and some 50 cm in height, had occupation of early ceramic and perhaps aceramic date, the sequence of which can be summarized as follows: at the base a buried soil with a developed calcium carbonate horizon, roughly equivalent to those on the present plain, was overlain by three major deposits. Some 60-110 cm of archaeological deposits, apparently largely undisturbed, were overlaid by 60-70 cm of brown to reddish-brown loam with a soil profile resembling those that develop in the uppermost levels of abandoned sites over extended periods of time. Although no clear duration can be indicated for this level, it probably required at least one thousand years, probably more, for its formation. Finally, occupying the uppermost 30 cm were the excavated layers which yielded a mixed assemblage of lithics and hand-made Neolithic pottery from within a large structure of firm clay loam interpreted as a rectangular building of *tauf* by the excavator (Campbell and Baird 1990).

The lower excavated levels were confined to a small sounding and, although only lithics were excavated from these levels, a larger sample would be required to determine whether these are genuinely aceramic or belong to the same culture as the uppermost level.

Although the lithic assemblage overlaps with that of Qermez Dere and Nemrik (Campbell and Baird 1990:75-6), none of the occupational phases are securely dated and at present the occupation can only be described as Early Ceramic and possibly Aceramic Neolithic. The duration of the period of abandonment corresponding to the middle stratigraphic levels, although considerable, could be taken as representing either the abandonment of the site, followed by re-occupation during the Early Ceramic Neolithic, or the abandonment of the site altogether, without any re-occupation taking place at all. Without further excavation, the chronological problems of this site are difficult to resolve.

Some time after abandonment, approximately 125 cm of silt/clay alluvium accumulated in the valley bottom around the site. This alluviation, which forms part of an aggradation that occurred along much of the length of the Wadi al-Murr, appears to have covered outlying Ceramic Neolithic sites of uncertain attribution, but probably post-Ginnig/prehistoric in date. These sites, which were just visible on the surface as grey ashy patches a little to the north of Ginnig, were exposed in section by an east-west canal. One appears to have been associated with lime or gypsum burning.

Although not well dated, the Ginnig site was probably occupied during the 7th millennium BC. It therefore pre-dates any other occupation on the plain, but this may be purely a chance factor because its recognition was made easier because later occupation phases were absent. It is very likely that other early

sites are either buried or have gone unrecognized. The site, although probably not unique, seems to represent the stage when the locus of settlement was moving away from the upland fringes and village-farming communities were being established on the cultivable plains. It thus occupies that crucial stage between Qermez Dere/Maghzaliya/Nemrik on the one hand and Umm Dabaghiyah/Tell Sotto/Tulul al-Thalathat on the other.

Hassuna

During the Hassuna period the north Jazira plain became extensively settled. This is indicated on Fig.31 which shows 27 significant and 11 minor occupations (totalling 38) within the survey area. As a result of further sampling and re-examination of the original collections, Stuart Campbell has provided information on 4 additional Hassuna occupations. Finally, if trace occupations represented by <3 sherds of probably Hassuna type are also taken into account, this total is increased by 4. Such weak attributions have not, however, been included on Fig.31. The above statistics should be regarded as minima because on multi-period sites, many Hassuna occupation levels are probably buried beneath later levels.

The burial of early levels presents considerable problems for the assessment of past settlement patterns. Frequently, during survey of multi-period mounds, the only evidence of Hassuna or early prehistoric occupation came from the upcast of fox holes or from the careful examination of the lower parts of the site where early strata were expected to crop out. Because the only evidence of Hassuna occupation may be a trace, namely one or two sherds, often not strictly dated to the Hassuna, Hassuna occupation may be severely under-represented. Hence the presence of a single festoon-painted Hassuna sherd found at Tell al-Hawa (Ball 1990:11) suggests that the prime centre of the plain was already occupied by this time.

At Tell al-Hawa the problem of burial of prehistoric levels is particularly acute because the chance of sherds of this date reaching the surface is very low. For example, if occupation levels are below the level of slope wash that fringes the perimeter of the high mound, they are unlikely to be eroded out. Therefore the only way they can get to the surface is by being incorporated into mud brick that was dug from the mound at a later date, or as a result of incidental excavation. By the Ubaid, however, it was possible for sherds to appear on the mid slopes, either because Ubaid occupation actually cropped out at this level or because they were eroded from Ubaid deposits contained at a sufficiently high and accessible level within the mound core.

Other forms of burial also serve to obscure the record of early sites. For example Site 33 showed as a sparse surface scatter (in sample square 288: 6 flint and/or obsidian pieces) with no topographic expression. Stratigraphy recorded in a nearby machine trench revealed Hassuna pottery within a buried soil horizon, below a soil horizon containing Halaf and some Chalcolithic sherds. This in turn was buried below some 80 cm of sedimentary build-up that was subsequently transformed into a developed soil profile resembling a natural Calcic Xerosol (Ball, Tucker and Wilkinson 1989: 8 and Fig.3). Although the cause of burial is unclear, the area of Site 33 has been subjected to complex changes in drainage during the Holocene and has also been open to the aggradation of sediments washed from the uplands to the north. Although similar aggradation has been recorded along a swathe of land alongside the Wadi al-Murr, no buried Hassuna sites were noted along canal or drain cuts within this zone.

The distribution of early Neolithic and Hassuna sites given on Fig.31 presents a misleadingly static picture. The approximately thousand-year duration of the Hassuna may have included, on any given site, one or more phases of cyclical re-occupation. Thus, although a site might be occupied intermittently over a span of several thousand years, any single village on it might have existed for only a few generations (Adams and Nissen 1972:30). In the north Jazira a variant of this principle probably operated as follows: within the Halaf period, for example, a single community may have moved from place to place at intervals of every few generations, so that although all the sites yielded Halaf pottery, they were occupied sequentially. As a result, although appearing ceramically contemporaneous, the sites illustrated were not necessarily all occupied at the same time. To demonstrate convincingly that cyclical re-occupation has taken place, it is necessary to produce a much finer ceramic phasing and then to see how these are distributed.

No attempt was made during initial processing to subdivide the Hassuna but refined processing by Stuart Campbell has enabled the collections to be subdivided into: Proto-Hassuna (contemporary with Umm Dabaghiyah), Archaic (Hassuna I, Campbell 1992), and Standard Hassuna (Hassuna II, *ibid.*). An additional final short-lived phase in the north, Samarran/Hassuna, dominated by painted pottery, has also been distinguished (Hassuna III, *ibid.*). Thus, using a strict definition of Samarran sherds as being densely tempered with sand, much of it dark, and with dark brown or purple painted designs according to a defined range of motifs and body types, Campbell has recognized Samarran occupation at four sites (26 [2], 39 [7 from survey], 45 [1] and 72 [3]. Note: number of sherds indicated in []). Although these are basically stylistic divisions they do have some

chronological validity and by combining this information with the similarly sub-divided Halaf, Ubaid and Uruk sites, it is possible to get an impression of the dynamics of Chalcolithic settlement (below p.46). The total number of occupied sites discussed here relates to the complete area surveyed (namely 184 sites) rather than the restricted number that were available at the time that Stuart Campbell's thesis was compiled (140 sites). Minor discrepancies between the present data base and that presented by Campbell (1992) appear to result from the up-dating of the north Jazira record using data that became available after spring 1992. However, any discrepancies appear to relate to minor or trace occupations only.

The 38 Hassuna occupations present a remarkably even distribution on Fig.31, with all parts of the survey area being occupied. Campbell's chronological sub-division of 26 of these sites recognized nine Proto-Hassuna sites (19, 27, 33, 68, 117, 119, 133, 134 and 138; Campbell 1992 table 7.1). Given that these ceramics may be elusive, both because of burial and because of their subtle characteristics, it is clear that by Proto-Hassuna times there had been a significant occupation of the plain. It appears that, following initial occupation of the plain during the Early Neolithic, significant settlement by village farmers occurred in the proto-Hassuna period and that by the time standard Hassuna pottery was in use, occupation was widespread.

Several site clusters along the southern fringes of the survey area were aligned along relict wadi courses. These show up as weak traces of infilled valleys on the ground, quite different from the distinct traces of present-day channels. The following alignments can be recognized: a) Sites 162, 164 and 165; b) Sites 138, 139 and 140; c) Sites 133, 134 with perhaps 117 either on the same or an adjacent channel; d) Site 68. The relationship between Hassuna sites and relict wadis is less clear along the northern fringes of the map.

Near the Wadi al-Murr, sites do not occur on the wadi but along the northern edge of its flood plain: Sites 147, 94, 89, 19, 103 and the Early Neolithic site of Ginnig. Although this may imply that some sites in this zone have been buried by alluviation (e.g. the ceramic Neolithic sites near Ginnig) or isolated by channel shifts, it may also imply that settlements avoided the very lowest point of the valley that was more prone to flooding.

An addition, a number of sites developed away from obvious water sources. Of the 27 significant occupations, 6 (22%) were within areas of higher ground some distance away from wadis or obvious water sources. Particularly conspicuous on Fig.31 is a group of sites located within rolling terrain where there are no traces of former wadis (centred on Site 170, towards the west of the survey area). Sites in such areas or not actually on wadis must therefore have obtained water in one of the following ways: from seepages from nearby valley re-entrants; from water-holes such as that at Site 39 (see Chapter 4) or, as a last resort, by the haulage of water from sites where water was accessible. Of these three potential sources only water-holes have been demonstrated to have existed.

The presence of a significant number of sites away from both wadis and relict wadis suggests that part of the remarkably even spread of settlement that developed during the Hassuna resulted from the development of water-holes or wells. This freed the inhabitants from the constraint of having to settle on wadis or at other obvious water sources.

No Hassuna sites were excavated by the North Jazira Project team but Site 19 at al-Botha, which revealed Proto-, Archaic and Standard Hassuna levels, was excavated by the Department of Antiquities and Heritage (Mosul) office. Khirbet Gar Sur (Site 39), excavated by Stuart Campbell of Edinburgh University (Campbell 1992), exposed a water-hole and associated upcast (in areas D, F and G) containing Standard Hassuna and Samarran pottery. Further discussion of the settlement pattern of the Hassuna, with particular reference to cyclical re-occupation, will follow at the end of this chapter.

Halaf

Although some would emphasize the cultural discontinuity between the Hassuna and Halaf cultures (Mellaart 1975: 169), within the plain there is no abrupt change in the distribution of Hassuna and Halaf sites (Fig.31). Continuity is also emphasized by recent work on the ceramics (Campbell 1992) and by excavations at Sabi Abyad where the transition from Ceramic Neolithic (Balikh IIC) to Halaf (Balikh IIIA) was very gradual (Akkermans 1990:122).

No attempt was made in the field to subdivide the Halaf ceramics but this was achieved by the re-collection of selected sites and the re-examination of all pottery by Campbell. The number of occupied sites, as well as their distribution, remains similar to that of the Hassuna but is not identical. Even if both significant and minor occupations are taken into account, only some 34% of sites show both Hassuna and Halaf occupation. Because of the problem of cyclical re-occupation, this statistic should not be used to demonstrate continuity of occupation; it is only of value as a standardized measure for comparing apparent site continuity over period boundaries, that is Hassuna:Halaf, Halaf:Ubaid, etc (Fig.51). A finer analysis is necessary to demonstrate real continuity. Thus if later Hassuna (Standard and Samarran) and Early Halaf wares are present there is a greater likelihood that continuous occupation has

occurred. Such an analysis for a limited range of sites by Stuart Campbell suggests that there was more discontinuity of settlement within a ceramic phase than between the main ceramic phases (i.e. Hassuna and Halaf, Campbell 1992:122). This again reinforces the impression of frequent shifts in settlement through time.

Compared with the Hassuna, when the most frequent site size range was around 1.0 ha or less (Fig.32), sites were within the range 1-2.5 ha. This statistic should be treated with caution because of the difficulty, on multi-period sites, of estimating the area of prehistoric occupations. Nevertheless, because a significant proportion of prehistoric sites were occupied for a short time and therefore have a measurable site size, such statistics are of some value. On the other hand, without substantial excavation at key centres such as Tell al-Hawa, it is impossible to determine accurately the aggregate area of Hassuna and Halaf occupation.

Within Campbell's chronologically divided subsample, there were 8 early and 12 later Halaf sites, at four of which (Sites 45, 66, 72 and 98) early and late phases were present. This suggests frequent abandonment of sites even at this relatively coarse level of analysis.

The dispersed settlement pattern suggests that, as during the Hassuna, wadis were not the sole determining factor in site location. In the southern area, at least, there were fewer Halaf sites on relict wadis than during the Hassuna. Thus the alignments of sites along wadis at 162, 164, 165 and at 138, 139, 140 had dwindled to Site 162 in the former and 139, 140 in the latter case. Moreover, Sites 133, 134, 117 were all abandoned. Whether this decline within the southern enclave was because there was less water in those wadis, thus impelling the development of more water-holes, or whether socio-economic factors came into play is not clear. Sites increased in number away from wadis so that, for example, there were more in the rolling terrain of the western enclave. The continued use of water-holes during the Halaf is supported by field evidence which showed that at Sites 140 and 172 there were traces of infilled water-holes exposed in sections cut adjacent to the sites.

Finally, on both Hassuna and Halaf distribution maps, major gaps in the distributions focus on Tell al-Samir and Tell al-Hawa. This supports the contention made above that these sites and their satellites have obscured a significant number of Hassuna and Halaf occupations. Because such settlements may have been quite large, it should be appreciated that site distribution maps are probably much more accurate for the rural hinterland than for the areas of growing proto-urban centres.

Ubaid

There is no obvious change in settlement pattern between the Halaf and Ubaid, with small villages and/or farmsteads continuing to be dispersed across the landscape (Fig.31). No attempt has been made to sub-divide the pottery into early or late styles except that a final Ubaid assemblage, transitional to the earliest Uruk, was recognized at the site of Khanijdal East (Site 66, see below p.41-43) as well as from surface collections from Sites 118 and 147.

The proportion of sites showing continuity is approximately 34%, a statistic that, if anything, exaggerates the extent of continuity because although individual sites may show both Halaf and Ubaid occupation, occupation may have shifted from one mound to another within the same site. Hence at Site 66, the south mound was Halaf and the north mound was Ubaid, and both surface collection and excavation showed very little overlap. Even on single mound sites such as Site 72, where the locus of occupation moved progressively from Hassuna in the east through early Halaf in the centre, late Halaf west of centre and ultimately Ubaid to the west, it is possible that there were breaks in occupation undetected in the ceramic record (Campbell pers. comm.1991).

The total number of occupied settlements increased from 40 (Halaf) to 43 (Ubaid= 34 significant and 9 minor). Settlement size differed little from the Halaf (modal size: 1-2.5 ha, Fig.32), except that Tell al-Hawa attained an estimated area of about 15 ha (Ball, Tucker and Wilkinson 1989: 31). Additional information gained from excavation of Trench D in 1988 suggests that this area may even be increased to 18 ha (Ball 1990b:12). Of course such an area may encompass a progressively moving Ubaid settlement that ultimately covered 18 ha, but at any one time was rather smaller. Nevertheless, bearing such possible complications in mind, Ubaid Tell al-Hawa would appear to rank among the largest known sites, comparing with Tepe Gawra at 2.5-3.0 ha (Tobler 1950:261); Eridu at c. 12 ha (Wright 1981:338); sites in the region of Uruk: 10 ha (Adams and Nissen 1972:9); Susa and Choga Mish, both at 15 ha (Hole 1987:63) and Tell Uqair at some 11 ha (Oates and Oates 1976b:125). In general, though, Ubaid settlements in northern Mesopotamia were rather small, usually not greater than 2-3 ha (Akkermans 1989:341), often being mere hamlets like the 0.6 ha settlement at Arpachiyah (Mallowan and Rose 1935:11). Rather than raising Tell al-Hawa to a superlative status in the Ubaid world, the above statistics demonstrate that when careful, systematic collection techniques are employed, it is possible to define the true scale of early proto-urban centres. It would therefore come as no surprise if tells such as Erbil, Brak and Leilan also incorporated settlements in the 10-20 ha range.

Although the true size of Tell al-Hawa remains uncertain, it is clear that by the late 5th or early 4th millennium BC, there was at least one proto-urban settlement within the north Jazira plain. Unfortunately, nothing can be said about the settlement hierarchy because at key sites such as Tell al-Samir (93), Kharaba Tibn (43) and Abu Kula (127), virtually no Ubaid settlement could be recognized, either because the site itself was insufficiently investigated (Tell al-Samir and Abu Kula) or because the Bronze Age occupation blanketed pre-existing levels. Similarly, there is no evidence for the ring of satellite villages that later appeared around Tell al-Hawa (see below p.50).

In the southern part of the area the locational bias towards sites on wadis becomes more tenuous (Fig.31). Although the single recognized site (141) on the 138-140 relict wadi may represent the northernmost settlement of a prehistoric community whose catchment effectively included most of this wadi, it remains possible that Ubaid levels are buried beneath the large mounds at Sites 138 and 140. Within the northern part of the area, many sites were located on wadi courses or valleys but others, such as Sites 41, 52 and 72, as well as those to the west, were some distance from wadis. As before, large blank areas remain around Tell al-Hawa and Tell al-Samir, presumably owing to the burial of Ubaid levels beneath later occupation.

Having sketched the settlement geography, it is appropriate to summarize the results of excavations at one of the many small late Ubaid settlements.

Excavations at Khanijdal East: Site 66

Khanijdal East is a small, low mound covering approximately 1 ha and rising to c. 1.5 m above plain level. It is located 2 km east of the tell and village of Khanijdal and is some 7 km south of Tell al-Hawa. Excavations continued for 5 weeks between October 29th and December 4th 1988.

Originally recognized in the autumn of 1987 during a preliminary survey of the area, it was selected for further excavation because first, it was a good example of a small Chalcolithic settlement, in this case dating to the late phases of the Ubaid period comparable to Tepe Gawra stratum XIII and second, being cut by a canal, it qualified as a rescue site according to the stipulations of the Department of Antiquities and Heritage. Finally it provided control for the survey, testing whether the limits of mounding actually corresponded to the settled area, and whether the surface sherd collection was representative of the stratified sequence. Altogether, an area measuring 100 m x 20 m had been cut away by earth-moving machines to provide a way for two gravel roads and a cement-lined canal between. Of this, some 30 m x 10 m could be reasonably tackled by the available workforce of 8 workmen. The most efficient technique of investigation was to excavate within the cut area where sections were available to show stratigraphy and a sufficiently large area existed to uncover extensive ground plans of buildings (Figs.33 and 34). A total area of the main cut measuring 23 m E-W x 8 m N-S was excavated and, in order to obtain a record of the mound centre, a 16 m x 1 m slit trench was driven into the highest point of the mound (Trench D, Fig.34). As a result, the site stratigraphy can be summarized together with the main structures and features present within the northern part of the mound. It is hoped to provide a complete report in a future publication.

Archaeological Features and Structures (Fig.34; Plate 3)

All features and structures are late Ubaid and a preliminary phasing places their stratigraphic order as follows (from earliest to latest): early phase: 67; middle phase: 33, 34, 35 and 44; later phase: 39, 41, 42 and 65.

Pit complex 67: an extensive area of pits measuring 9 m E-W by at least 5 m N-S, and dug to a depth of c. 1.30 m below the original ground surface. This was excavated during an early stratigraphic phase of the site, probably for the extraction of clay for the construction of mud brick or *tauf* structures.

Circular building, context 33: part of a group of *tauf* and mud-brick structures arranged along an E-W alignment in areas E and F. These had been cut by the canal and its associated machine disturbance and the walls, floors and associated deposits had become compressed by the passage of heavy machinery. The round house (33) comprised roughly half of a circular building, approximately 4.5 m in diameter and constructed of a wall 20-40 cm wide of orange *tauf*. The hard, compressed clay floor was cut by a small pit (61) and in turn sealed another pit (66). The floor, and its associated wall/roof tumble contained numerous rectangular chert sickle blade segments with adhering bitumen. These appeared to have come from sickles stored within the building.

Context 34: small rectangular structure of *tauf* abutted to the eastern part of the round house.

Context 35: adjacent to and immediately to the west of the roundhouse, a small rectangular structure, 1.8 x 1.2 m, constructed of hard, brittle mud bricks. These had become partly baked during the initial use of the structure as an oven or kiln. The presence of some vitrified clay suggests that high temperatures may have been attained. Later this structure may have been used as a storage bin. The abrupt tilt of the mud-brick floor towards the WSW appears to have resulted from the compression of the underlying fill of pit 67, over which the bin had been constructed.

Wall, context 44: within the mound interior (trench D) evidence of an early occupation was revealed in the form of an E-W revetment wall (44) of mud brick and *tauf*, behind and to the south of which was constructed a horizontal platform or mass of collapsed mud brick.

A number of indeterminate structures of *tauf* and mud brick were exposed to the east and west of the round house and bin. Although fairly substantial, the function of the

Table 9. Identified bone fragments from late Ubaid Khanijdal East (66) and later Uruk Tell Hilwa (86). Counts of identified bone fragments provided by Alan Pipe

Site		Dom. Cattle	Sheep/ Goat	Dom. Pig	Dom. Dog	Gazelle	Mole Rat*	Horse	Hare	Total
66:	No	66	46	62	4	3	1	1	-	183
	%	35%	25%	34%	2%	2%	<1%	<1%	-	100%
86:	No	9	89	15	1	-	-	1	1	121**
	%	7%	74%	12%	1%	-	-	1%	1%	96%**

* Spalax

** in additional 5 fragments of frog/toad bone were found in a burial (context 5 at Tell Hilwa), to bring the total to 121 (100%).

large *tauf* structure in trench H and the roughly N-S pit cut through it remain uncertain.

Context 39: late phase *tauf* wall in trench D; stratigraphically later than 44.

Burials, contexts 41, 42 and 65: all of infants set in unfired clay containers: none had grave goods.

Kiln: a small kiln, oval in section (long axis vertical). Exposed in section along a second E-W canal some 50-70 m west of the excavated area, cut by canal in 1989 in the year after excavation. Fill included recognizable fragments of burnt dung. This appeared to be a pottery kiln, but no wasters were observed in the restricted exposure.

The Finds

In addition to a large assemblage of late Ubaid (or initial Uruk) pottery recovered from spoil cast up during the initial machining, excavated small finds included a number of baked clay spindle whorls, a fragment of perforated stone axe, 6 small animal figurines, one gaming piece, one fragment of a baked clay muller and at least 22 bi-conical sling pellets.

The faunal remains from Khanijdal East and Tell Hilwa (summary)

The following note on the analysed faunal remains is based on data kindly provided by Alan Pipe (Museum of London). The small sample of identified bone fragments (sheep/goat-size and cattle-size counts have been omitted) was hand-collected during the 1988 excavations. Both sites were small rural settlements of ca. 1 ha area, and the excavated contexts from both (amalgamated on Table 9) were of late Ubaid (Khanijdal East) and later Uruk (Tell Hilwa) date. This note is mainly intended to provide the basic data on the domestic animal economy; it is hoped that a more complete report with tables will be presented at a later date.

At both sites the quantity of wild species is minimal, although the presence of gazelle at Khanijdal does suggest some hunting. Because of the rather dense scatter of settlements on the plain, it is unlikely that much wild landscape will have been available and the animals were probably hunted beyond the limits of the project area or within the surrounding uplands. The presence of horse is remarkably early for a species usually regarded as a second millennium BC introduction in the region.

Although both assemblages are predominantly domestic, there is a marked shift from a reliance upon domestic cattle and pig, also with significant sheep and goat (35%, 34% and 25% respectively) at Khanijdal, to more specialized production of sheep/goat at Tell Hilwa (74% of identified fragments). In terms of meat production, however, because cattle provide more meat per animal than sheep and goats, this statistic should not be taken to indicate that sheep/goats were the dominant source of meat. The difference in faunal usage may reflect a shift from a more resilient, household-based subsistence economy in the Ubaid to a more specialized economy in the later Uruk which supplied wool for textiles, in addition to meat and milk. This process presumably continued during the growth of urban centres in the Early Bronze Age when both textile production and specialised sheep/goat husbandry are well-attested (Gelb 1986:158; Wattenmaker 1987).

Discussion

The excavation confirmed the results of surface collection, that the northern mound was late Ubaid in date. Halaf, and perhaps Hassuna sherds, although seen, were present in such small amounts that they could be interpreted as being peripheral scatter from the Halaf mound (A) immediately to the south. The central area of the mound, roughly that defined by the 101.5 m contour on Fig.33, appears to have comprised two building levels. This area could have contained roughly ten of the Tell Madhhur tripartite houses (14 x 14 m), if packed tightly together, or rather less if more loosely arranged. Judging from the large open spaces revealed by excavation, the settlement layout was rather spacious (Fig.34), a frequent characteristic of Ubaid settlements (Akkermans 1989:341). In that case, one might expect as few as 4-6 residential buildings. Careful examination of the E-W canal and cleaning of the adjacent machined bench showed no obvious built structures to the north-east, north or north-west of those excavated. The built structures illustrated on

Fig.34 may therefore have been located towards the periphery of the occupied area, where they may have been specialized structures associated with the storage of agricultural tools and produce. This may explain the idiosyncratic presence of a circular structure on a later Ubaid site. Although it might be argued that the building was a Halaf tholos swept clean and later inundated by Ubaid debris, this is not supported by its stratigraphic context. The complex 33, 34 and 35, being built over pit 67, which was demonstrably Ubaid from its contained ceramics, can therefore confidently be ascribed to the later Ubaid.

Northern Uruk

The settlement pattern of this period is based upon the distribution of all four ceramic groups a-d, described in Appendix A. According to current opinion, the development of pottery types in northern Mesopotamia during this period can be interpreted in two divergent ways:

I: a chronological scheme that can be broken down into two broad phases:

a) earlier types represented by pottery from Tepe Gawra XI-VIII. These are groups (a) and (b) in Appendix A, both of which are specific to upper Mesopotamia and the fringing uplands, and also extend as far west as the Amuq plain on the Mediterranean coast of Syria.

b) a later, Uruk-related group found at Nineveh (Ninevite IV), a late version of which is found at Mohammed Arab and which includes southern Mesopotamian types or their derivatives (group (d) in Appendix A). Chronologically this may belong to the middle-late Uruk period of the south, therefore allowance should be made for later types (group (c), Appendix A).

II: the above scheme has been amended by a number of researchers who consider that during the period of southern influence, there was also a spatial distribution of pottery types depending upon the degree of linkage with the south. According to this view sites like Habuba Kabira had strong links and may have been some type of colony, whereas sites like Gawra are viewed as local centres commercially linked more with the Azerbaijan/Anatolian highlands than with the south (Rothman 1989; Voigt 1989). As a result, later Uruk sites are subdivided according to the proportion of southern Uruk types present into (i) "colonies" and (ii) sites which were primarily tied into the local exchange and production systems (Algaze 1989). According to this scheme pottery groups (b) and (d) (and perhaps some of (a)) would have been in use at the same time, but in different proportions at different sites. For example, at Kurban Höyük, although chaff-tempered Amuq F types were progressively replaced by grit-tempered types of southern form, the former (?local) types continued to co-exist with the southern types (Algaze 1990:261). A similar pattern occurred at Leilan where Leilan IV, which is later, includes bevelled rim bowls (BRBs) and V, which is earlier, does not; other chronological relationships are tabulated in Schwartz 1988:73).

In neither case should the Uruk-related wares be seen as direct imports from the south and recent work in the Kurban Höyük area showed that the production of these types can be very localized. For example, neutron activation analysis on pottery and local clay sources has shown that sites occupying different levels in the local hierarchy - hamlet, village and town- each probably produced their own southern Uruk-type pottery (Evins 1989). In other words there was strong local economic autonomy and little ceramic trade between sites at different hierarchical levels. Another complicating factor is that the Amuq F type assemblage is not the only diagnostic assemblage for the local earlier Uruk. This problem is raised at Hammam et-Turkmen level V, viewed by the excavator as being contemporary with Leilan V (Akkermans 1988:123). The resemblances are, however, meagre and the Balikh site includes types that, although recognized in the north Jazira and at Grai Resh, are not common at Leilan. This raises the possibility that Hammam V may either run earlier than Leilan V (and perhaps Kurban VIB also) or that some sites have an Amuq F assemblage running virtually throughout, whereas others do not. Finally, the period of southern influence, rather than being late Uruk, may be somewhat earlier, probably contemporary with Eanna VI and VII at Uruk (Surenhagen 1986:32).[1]

Because further research is required to subdivide the Uruk of the north Jazira into chronological phases, for purposes of settlement distribution the following division has been made:

1) Fig.35 (top): Distribution of sites with Late Chalcolithic or northern Uruk types. These sites contain the general run of earlier Uruk wares (a) and Amuq F chaff-tempered wares (b). These may represent more than one phase of Uruk settlement from the earlier part of the 4th millennium until the final quarter. This map also

1 Since the above was written, excavation in area TW at Tell Brak has shown that the horizon dominated by true southern ceramic types is restricted to the late Uruk period, which in turn immediately precedes a 'Jemdet Nasr' horizon. BRBs, however, extend much earlier (as well as somewhat later) into the Middle Uruk (Oates and Oates 1993). That local Amuq F types were in use at the same time as southern late Uruk forms and within the same settlement (albeit by different communities) is illustrated by recent excavations at Haji Nebi Tepe on the Euphrates in Turkey (Stein 1994).

Table 10. Uruk sites with pottery of southern type

Site	CERAMIC TYPE					
	6	18a	19a	120	151	Total
1	Many	-	1	-	-	Many
16	1	-	-	-	-	1
19	2	-	-	-	-	2
26	-	1	-	-	-	1
30	1	-	-	-	-	1
39	12	-	-	2	-	14
49	1	-	-	-	-	1
60	1	-	-	-	-	1
75	19	-	-	-	2	21
83	1	-	-	-	-	1
84	6	-	-	-	-	6
86	47*	1	**	2	3	53
89	64	1	-	-	-	65
99	32	-	1	-	1	34
115	3	-	-	-	1	4
118	3	-	-	1	1	5
119	1	-	-	-	-	1
137	-	-	-	-	1	1
138	1	-	1	-	-	2
139	20	1	2	-	-	23
143	5	-	-	-	-	5
145	1	-	1	-	1	3
146	-	-	-	-	1	1
160	1	-	-	-	2	3
170	4	-	1	-	1	6
174	-	-	1	-	-	1

* Includes detailed collection from upcast at Tell Hilwa.

** Examples of drooping spouted vessels were later excavated from this site, together with a much larger assemblage of northern and southern Uruk types.

includes group (c) types, which however, only form a small proportion of sherds collected.

2) Fig.35 (below): Distribution of Later Uruk ceramics of southern Mesopotamian type (d), specifically BRBs (Type 6), nose-lugged vessels or lugs therefrom (Type 18A) and drooping spouts (Type 19A). In addition, broad strap handles (Type 120) and undercut jar rims (Type 151) provide supplementary evidence concerning the presence of southern Uruk types. The counts per site are given on Table 10.

Three quantitative levels of occurrence of southern Uruk types were identified. The first (minor occupations) indicate <5 sherds per site as given on Table 10; the second (significant occupations) has 6-10 diagnostics per site; the third (major occupations) has > 11 sherds per site. In every case BRBs are the dominant type.

The distribution of local or northern Uruk sites (class 1) is dispersed, as during the Ubaid, with the entire plain being occupied primarily by village-size sites. There was a significant increase in the number of sites occupied from 43 to 66 (significant and minor occupations). In addition, the number of larger settlements, in the range 2.5-5.0 ha and 5.0-7.5 ha, increased but this may be an understatement due to the burial of Uruk levels by later occupation. A major centre occupying an area of 33-50 ha is now evident at Tell al-Hawa (Ball, Tucker and Wilkinson 1989:32). This is based upon the distribution of earlier Uruk types which, rather than forming a continuous distribution, occurred in clusters where conditions favoured the exposure of earlier levels.

As in previous Chalcolithic phases, voids in the distribution occur in the vicinity of Tells Hawa and Samir. This is probably partly because cultivation around the emerging centres had discouraged settlement in these places but also because Uruk layers lie buried beneath later levels. Another, less explicable void occupies the south central area between Site 89 to the north and 118 to the south and Site 140 to the west and 67 to the east. This probably results from the burial of Uruk levels by later

occupation at large sites such as Sites 96, 110 and 111, perhaps reinforced by sherd collection conditions on some sites. For example, 110 was only briefly sherded because it had been freshly ploughed and sherds of all periods (except on the unploughed eastern area) were difficult to recognize. It was consequently left for sherding at a later date. Site 111, within the village of al-Morrah, provided only a meagre ceramic collection owing to the heavily trodden surfaces and resultant small sherd size. Therefore, although Halaf painted wares were recognizable, the less distinctive plain, chaffy Assyrian and Uruk wares were less obvious.

Continuity of occupation between periods was again low with 31% of Ubaid sites continuing to be occupied in the Uruk period. This is despite the fact that there appears to be a demonstrable transitional horizon between the Ubaid and earliest Uruk at sites such as Tepe Gawra (level XII).

The large number of sites with northern Uruk types (class 1 above) contrasts with a significant fall in those of Late Uruk type (class 2). This contrast can be interpreted as follows: if the southern Uruk assemblage is viewed as a chronologically distinct horizon, there was a major contraction in the number of sites occupied from 66 to 15 (stated here as > 3 diagnostic sherds per site to ensure consistency with earlier periods). Even allowing for the chronological complexity and length of the earlier Uruk this represents a precipitous drop. This cannot be accounted for by an increase in the size of individual settlements during the Late Uruk because the size of these sites is rather modest. Alternatively, if the assemblage reflects functional, political or economic factors, this statistic may simply reflect the limited dispersal or adoption of these ceramic types. Such specialized sites would, according to the reasoning of Algaze, represent stations or outposts of southern Uruk colonization that would be contained within a larger hinterland occupied by indigenous communities. A survey by Stein and Wattenmaker in the Leilan area which focussed upon just this question showed that the local Uruk assemblages were characteristic of village-size sites centred in the upper Khabur valley but southern Mesopotamian types were relatively more common at small sites along the Wadi Jarrah (Stein and Wattenmaker 1989:283).

Whichever interpretation is adopted, there is a tendency for sites with southern Uruk-related pottery to be clustered, mainly in the vicinity of hollow way routes (Fig.35). Of 7 sites on Table 10 with >10 diagnostic sherds, 3 sites (1, 75 and 139) were located on or immediately adjacent to such routes. Of these Tell al-Hawa (Site 1) had attained an area of roughly 37 ha by this time (Ball 1990b:12). Three other sites (86, 89 and 99) with an aggregate area roughly 9 ha were sufficiently close to those hollow ways (<2 km) to have them running through their territory. The remaining sites, mainly those with minor or significant occupations, were more widely dispersed. Of these, Sites 19, 26, 30, 145, 146, 160 and 174 were on or close to the major through routes although the degree to which a site is on or near a hollow way is rather subjective. The association of these sites with ancient through routes supports the notion that there is a relationship between the development of such settlements and major communication lines.

During 1988, Tell al-Hilwa (Site 86), a 1 ha low mound dated as primarily Ninevite 5 during survey, was sample excavated. Excavation of a narrow trench along its southern side (Fig.27) showed that Late Uruk pottery, that went virtually undetected during surface collection, was present in significant amounts. Within the excavated levels, Uruk pottery, southern types and Amuq F forms coexisted within the same contexts. A similar coexistence of Late Uruk ceramics (mainly BRBs) and Amuq F chaff-tempered wares (groups (d) and (b), Appendix A) existed at Tell al-Hawa, albeit out of context in landfill related to Middle-Late Assyrian construction (Ball 1990b:14).

If southern Late Uruk pottery was in use at the same time as indigenous northern wares and greater amounts of southern ware occurred on sites close to major hollow ways it implies that such sites were well-integrated into the Uruk distribution network. If the sites with local Uruk wares were occupied at the same time as those with the southern Uruk-related wares it follows that the former sites were less well-integrated into the Uruk distribution network. Significantly, although few in number, the spread of later Uruk sites (Fig.35) was across the entire plain and there is no sign of the concentration of settlement that was to take place in the Ninevite 5 period that followed.

Discussion: Settlement Density and Land Use

In order to assess land use during the early phases of settlement it necessary to estimate how the density of settlement changed through time. Nominal settlement densities for the north Jazira plain can be calculated by dividing the area surveyed by the number of sites occupied for any one period. Owing to the problem of cyclical or sequential occupation noted above, this figure does not give a realistic estimate of occupation at any particular instance, but it does enable settlement densities to be compared from region to region within greater Mesopotamia. The north Jazira figures, which vary from 1 site per 17.6 sq km (significant occupation in Hassuna) to 1 site per 7.4 sq km (significant and minor occupation for Uruk), compares with site densities of 1 site per 14.9 sq km

in the Deh Luran plain (Khazineh phase of early village period). Site densities are similarly low in southern Mesopotamia where Hole has computed the following densities for Ubaid period sites: 1 site per 157 sq km (Ur/Eridu area); 1 per 79 sq km (Warka area); 1 per 59 sq km (Kish/Uqair area) (Hole 1987: 90). Both sets of figures, from western Iran and southern Mesopotamia, indicate considerably lower site densities than those from the north Jazira or indeed from the 'Afar plain where densities were in the region 1 per 10-15 sq km (J. Oates 1980: 307). This difference might result from a) settlement densities (in terms of number per unit area) being genuinely less dense, b) the use of less intensive survey techniques, c) less favourable conditions for site recognition, d) different conditions (e.g. water supply,irrigation) governing settlement.

Critical to site recognition is the fact that in southern Mesopotamia, sites may be differentially buried beneath alluvium. In other words the presence of some early sites gives the illusion that such sites are being recognized and therefore are not buried. In fact detailed examination of land cut by drains shows that whereas some early sites may be visible on the surface, others will remain buried: a factor resulting from the extremely complicated micro-topographic and geomorphological conditions that can prevail in the alluvial south. Although the density of prehistoric sites in the north Jazira seems high compared with other parts of greater Mesopotamia, such a figure should be treated with caution owing to variations in survey technique and geomorphological conditions. At present it is not therefore possible to make meaningful comparisons in settlement pattern for these early periods.

Cyclical or sequential occupation appears to be a key factor in understanding the development of settlement because any one community may shift from site to site through time within an extended catchment, or even beyond it. One example of this has already been published for the area of Khanijdal East (Site 66, Wilkinson 1990b: fig. 5) and other examples can be suggested by reference to Fig.36. Hassuna and Halaf site phases were sub-divided by Stuart Campbell, except where indicated by *; Ubaid sites and those marked by * were dated by means of the standard type series diagnostics. Relict wadis are indicated and have been extrapolated based on contour re-entrants and/or site locations where they apparently continue the lines of former wadis. The only dated wadi ridge is that NE of Site 113 where H marks the approximate find spot of early prehistoric pottery within the channel fill. It is evident that many prehistoric sites developed upon wadis that were formerly active (although probably not perennial in flow).

The site distribution appears to be both sequential and patchy. Sequentially occupied sites can be suggested (in chronological succession from earliest to latest, continued occupation at a site being represented by a repeat of the site number) as follows: 138 (perhaps proto-Hassuna)-139-140-140-139-141; 134-133-133-98-98; 117-97-97-96-96; 114-114-114-114-118; 112-111-112-113. Such groupings, although arbitrary and not allowing for phases of abandonment, demonstrate that occupational densities were rather lower than raw site density per period suggests. In this particular sub-area for the Hassuna, community densities within compound catchments might have been 1 per 12-14 sq kms (i.e. 5 or 6 communities within the 70 sq km area) compared with for example a site density of 1 per 7-8 sq km (all occupations within Fig.36). Later sites are indicated on the map by outline only, and their position indicates points where early sites could lie buried and undetected by survey. This is exemplified by Site 113 where a small Ubaid site, unrecognized during survey, was buried beneath excavated Parthian, Hellenistic and Late Assyrian levels (Chapter 8). Similarly, burial could account for the extensive voids in the north-central and south-east parts of the map.

Sequential occupation would affect our perception of land-use changes through time because sites may have shifted according to changing social, economic or environmental conditions. This does not necessarily imply shifting cultivation but settlements may have been abandoned at intervals and the total community of some 100-200 would have been supported on an extended catchment that represented the sum of several smaller site territories. As a result, land use could have been of low intensity and the land required to sustain such a population, some 200 ha (2 sq kms), would have represented only a small fraction of the extended catchment. Cropping intervals could thus have risen to as much as 1 year in 6 or 7 amounting to 5 or 6 years of fallow. Alternatively there may have been more persistent land-use near the settlement, followed by a longer rest when the settlement shifted. Owing to the non-recognition of a number of sites due to burial, such a cropping interval may have been lower, perhaps 1 year in 3 or 4 (i.e. extended catchments of 6-8 sq kms) but in either case, land use would have remained extensive and there would have been ample time for soil moisture and nutrients to recover.

By the Uruk period, even though a similar settlement distribution prevailed and perhaps sequential occupation was still practised, the site density was such (1 site per 7.4 sq km with the addition of growing urban centres) that cropping intervals may have dropped to 1 year in 3 in the rural hinterlands but may have approached 1 year in 2 or even annual cultivation around the growing urban area of Tell al-Hawa. Although urban centres were possibly also developing during the 4th millennium BC at Tell al-

Samir, Kharaba Tibn and Abu Kula, these were not recognized during survey.

There is no evidence for the development of hollow way routes until the late Uruk (late 4th millennium) when a number of sites and site clusters appeared on major inter-regional hollow ways (see above). In contrast, the existence of dispersed settlements during earlier periods would have resulted in a dispersed system of routes also. The growth of centres such as Tell al-Hawa in the Ubaid and Uruk periods implies that the predecessors of the radial routes were probably Chalcolithic but there is no field evidence to support this.

CHAPTER 6

The Development of Bronze Age Urban Centres

Introduction.

During the Early Dynastic period, following the period of Later Uruk expansion, connections with the south were sparse. Textual references to the area of the north Jazira as well as artifactual connections are either absent or equivocal. By the second half of the third millennium the Jazira must have come under some Akkadian political control. In addition to Sargon's claim to have conquered much of the known world, various archaeological and textual sources attest to an administrative presence at this time. Even relatively modest and far-flung sites can demonstrate some Akkadian administrative connection. For example, a weight said to come from Titrish Höyük, near Urfa, is inscribed with the name of an official under Shu-turul, the last king of the Akkadian dynasty (Algaze *et al.* 1986:102). On a more substantial scale, the presence of a monumental administrative building (the Agade "palace") of Naram Sin at Brak (Mallowan 1947), a temple of Ishtar built at Nineveh, by Manishtushu, Naram Sin's predecessor (Campbell-Thompson and Hamilton 1932:59), as well as a number of administrative texts from Brak, Ashur and Nuzi all suggest some political control of the north by the dynasty of Agade. Such control would have been exerted via regional centres such as Tell Brak, which has recently been suggested as the possible administrative capital of the entire northern province under Naram Sin (Oates and Oates 1989:210).

Artifacts, on the other hand, show a different picture. For example, metalwork (much of it from funerary contexts) shows much similarity between northern and southern types with northern products not simply being copies of southern examples but also showing evidence of innovation and some level of originality (Watkins 1983:18). Pottery, on the other hand, both Ninevite 5 and later 3rd millennium, is quite distinct from southern forms. Unlike during the Later Uruk period, when distinctive southern types can be traced well into south-eastern Turkey, the 3rd millennium shows distinctive regional ceramic styles with significant differences occurring between southern and northern Mesopotamia. Therefore northern Iraq, although under political control, probably had some economic and cultural autonomy, perhaps under a number of different regional entities.

By the early 2nd millennium BC (the Old Assyrian period), the relative independence of the north became even more evident with the rise of Assyrian merchant trade between Assur and present day Turkey. Nevertheless, southern influences were still present as is illustrated by the style of the Rimah temple in the 'Afar plain (Oates, D. 1967: 90, 94-5). By this time ancient names can be suggested for some of the sites in Upper Mesopotamia. For example, the large mound of Abu Marya (Fig.1) appears to be Old Assyrian Apqum (later Apqu; Goetze 1953:57) and Tell Leilan, now in Syria, was probably Shubat Enlil (later Sehna). Both of these lay on Old Babylonian routes and it is now possible to start to link the archaeological and textual records as will be discussed below.

In the following three sections, the chronological sequence of settlement development will be summarized. These will be followed by the field evidence for route systems and land use. In these cases, although it is possible to allocate certain routes and land-use zones to specific periods, it proved more convenient to treat the evidence for the three periods Ninevite 5, Later 3rd millennium and Khabur together.

All hollow ways indicated on the period maps have been dated by means of site association alone. That is, if a hollow way radiates from a site of a given date, the hollow way is assumed to be of the same date as the site. In the case of large multi-period tells such as the major urban centres, the hollow ways that radiate from them appear to have formed over a long period of time. It is tentatively suggested that their use started in the Ninevite 5 period, or earlier. There is no way of determining whether all the hollow ways of a radial set were in use simultaneously but unless there is evidence for proving otherwise, all hollow ways of a radial set are indicated on the maps. Regarding inter-regional routes, these have been put on if they pass through several sites showing significant occupation of the period in question. When only one site is on a hollow way and therefore the hollow way was not clearly in use at the time, the route is indicated by a dotted line. When no sites of the relevant period lie on a hollow

way, it has been omitted, although it is always possible that it remained in use taking people through the unoccupied zone.

Similarly, data on land use must be used with caution (see Chapter 2). In addition to diagnostics of known type contained within the artifact scatters, for this preliminary assessment it is assumed that the sherd scatters accumulated at the time of the site that they surround. If a sherd scatter zone has been mapped but no site of the period in question lies within that zone, the zone is not indicated. However, field scatters could only be mapped around a limited number of sites, therefore many sites are indicated without a field-scatter zone, even though such scatters are almost certainly present.

Ninevite 5

The ceramic types upon which the Ninevite 5 settlement pattern is based fall into two groups: an earlier group dominated by painted wares and a later group in which incised and excised grey wares form the main diagnostic types. A more detailed breakdown is given in Appendix A; these should eventually allow a finer sub-division of the settlement sequence to be produced. No sub-division into sites with painted wares and those with only grey wares is attempted on Fig.37, but all sites indicated yielded grey incised or excised wares. Normally, such wares form the overwhelming majority. Although no separate pottery assemblage for the transition between the Late Uruk and Ninevite 5 has been isolated for the survey, it is clear from work at Tells Mohammed Arab and Karrana, in the area of the Saddam Dam, that there was a strong ceramic continuity with a gradual change from Late Uruk ceramics into those of the Ninevite 5 period (Roaf and Killick 1987 and Rova forthcoming).

Owing to problems concerning the chronological or spatial attributes of the later Uruk period (Chapter 5), it is not possible to state from survey evidence whether there was continuity of occupation between the Uruk and Ninevite 5 periods. The ceramic data needs to be much more refined, preferably in relation to excavations, if true continuity or discontinuity is to be recognized. Nevertheless when the general Uruk data (i.e. Uruk + Late Uruk) is compared with Ninevite 5 occupations, settlement continuity is low at 14%. The percentage of sites abandoned, at 62%, is higher than the number established (22%) because many Uruk sites in the west and south were abandoned while new, often satellite sites, were established in the east. The statistics, although coarse, suggest that a substantial re-ordering of settlement took place at this time. Both abandonment and continuity can be cited from excavated evidence: at Tell Karrana there was continuity of settlement (Rova forthcoming), whereas at Tell Mohammed Arab the site was abandoned at the end of the Late Uruk (MA period 1) and was reoccupied during early Ninevite 5 times (MA period 2; Roaf and Killick 1987:207).

Although certain levels may have gone unrecognized owing to burial, field observations indicate that early (i.e. painted) Ninevite 5 pottery was much less common than the later grey wares. This is especially clear at Tell al-Hawa where only five painted Ninevite 5 sherds were recognized (Ball, Tucker and Wilkinson 1989:32). This dearth might arise from a number of factors: a) a general under-representation in surface collections of painted Ninevite 5 wares because of its softer fabric and often fugitive paint, b) a decline in the use of this pottery westward from the core area around the Tigris, c) a real decrease in settlement at this time, d) painted Ninevite 5 ware was a specialized ware that did not necessarily represent a distinct chronological phase. Points a), b) and c) may all contribute to the under-representation of this type. Point d) contradicts the evidence presented by Roaf and Killick that painted Ninevite 5 is a chronological phase during which incised grey wares were little used (Roaf and Killick 1987, Fig. 6a). If the decrease in the amount of painted Ninevite 5 pottery is a result of a decrease in settlement (c) it seems that only when incised and excised wares were in use did the full Ninevite 5 pattern, as illustrated, become established.

Whether there was a post-Uruk phase of settlement collapse or not, settlement did continue at Hawa and three smaller sites: 26, 39 and 86. None of these three minor sites showed any trace of later 3rd or early 2nd millennium occupation and it might be argued that Late Uruk-Ninevite 5 continuity was a prelude to ultimate collapse.

By the time Ninevite 5 incised grey wares were in use, the settlement pattern had become highly differentiated. In the first place, a substantial area of land to the west and south-west that had been occupied by small Uruk farming communities, was abandoned so that by the early 3rd millennium the 30 identified Ninevite 5 settlements were concentrated into roughly half the area (Fig.37). Second, there are signs that a settlement hierarchy was starting to appear.

Tell al-Hawa, at the apex of this hierarchy, attained an area of at least 24 ha. Occupation on the high mound is more difficult to interpret. Ninevite 5 pottery was certainly sparse on the slopes of the high mound. This implies either that habitation was both sparse and episodic, or that the high mound had a specialized function. For example, it might have been a religious quarter/cemetery or had a function that precluded the use of the fine wares most evident during survey. Alternatively, earth-moving operations may have taken place in antiquity and removed

or redistributed some of the Ninevite 5 levels (cf similar activity on Tell Brak entailing Late Uruk levels); such activity may explain the appearance of large quantities of Late Uruk pottery in Assyrian contexts in area AB on the southern summit (Ball 1990a:81). In view of the above complications the most conservative interpretation is that the main mound of 18 ha was sparsely occupied, at best.

Thus the main occupation had shifted from the high tell to the outlying mounds to the north and south. Although the southern area appears to have been of greater importance, excavations by Warwick Ball in 1988 demonstrated that over 1 m of stratified Ninevite 5 overlay Uruk levels in area D to the north of the main tell (Ball 1990b:14).

The status of Ninevite 5 settlement at those sites that became secondary centres during the mid-3rd millennium is difficult to assess. Although Ninevite 5 occupation was demonstrated at both Tell al-Samir and Abu Kula (Sites 93 and 127), it was impossible to demonstrate their extent; at Tell al-Samir, only a brief sampling of the main tell was permitted whereas Abu Kula, being outside the permit area, could only be briefly examined. Based on the area of mounding and the brief sampling that was possible, Ninevite 5 and later 3rd millennium occupations at Abu Kula were estimated as 5 and 10 ha respectively. At Kharaba Tibn, on the other hand, the presence of sparse scatters of Ninevite 5 sherds occurred around the northern slopes of the mound (Fig.38), particularly at the base of the northern slopes in area H. Again the ceramics were overwhelmingly Ninevite 5 incised grey wares. Clearly, from the distribution illustrated on Fig.38, there must be a substantial stratum of Ninevite 5 occupation running beneath the later levels. Therefore although the area of Ninevite 5 scatter at 5.5 ha is quite modest, when extrapolated as an ellipse based upon the configuration of the northern crescent, an occupied area of some 13.75 ha is implied. This is virtually the size of a small town.

Forming a third level in the settlement hierarchy is a very distinctive ring of satellite settlements which occur on average some 4 km away from the main centre of Tell al-Hawa and, to a much lesser degree, around Sites 43, 93 and 127. The remarkable ring around Tell al-Hawa consists of Sites 9, 10, 5, 12, 11, 15, 14, 13, 20, 18 and 28. On the other hand Site 43 had probably only two satellites (39 and 48), Site 127 two (58 and 60) and Site 93 one or two (90 and 91). In addition, other lower-order settlements occurred at Sites 23, 26, 92, 49, 50, 19, 86, 87, 29 and 30. Such settlements may also have been satellites, tributary to the nearest major centre, although the presence of sites such as 92, 26, 23, 19, 29 and 30 on major routes suggests that their growth may have been partly accounted for by trade and related factors.

Although the term satellite is rather arbitrary, it is clear that by the Ninevite 5 period a true settlement hierarchy of three ranks had developed with a main town Hawa, a small town at Kharaba Tibn (probably also Tell al-Samir and Abu Kula) and numerous villages or farmstead-sized communities. This now clearly differentiated landscape is a prelude to the more substantial urbanization that followed during the later 3rd millennium. Owing to the loss of many village-sized settlements to the west and south-west, the smallest size of settlement (< 1 ha, Fig.39) virtually disappeared and settlement size became more evenly spread with a modal area of 1-2.5 ha.

Discussion

Some immediate comparisons can be made here with the nearest comparable survey, that of Stein and Wattanmaker around Leilan in 1987 (Stein and Wattenmaker forthcoming). Although the percentage continuity of occupation around Leilan is much greater for the periods Uruk to later 3rd millennium, the trend is the same. They report a major discontinuity between the Uruk and Ninevite 5 periods, followed by an increase in total site numbers during the Ninevite 5. As in the north Jazira there was a dearth of early (painted) Ninevite 5 wares. Significantly, their evidence for Ninevite 5 occupation consists entirely of incised wares (plus associated coarse wares); painted Ninevite 5 ceramics were absent from all but one of the recorded sites. According to the writers, the later phase of the Ninevite 5, although not fully urban, did provide clear antecedents for the large-scale urban system that followed.

A collapse or re-ordering of settlement is thought to have occurred at the end of the Uruk period in the area of Leilan (Weiss and Calderone forthcoming), as well as in the Turkish lower Euphrates (Algaze 1990: 426); a similar phenomenon has also been inferred for southern Iraq by Postgate using the data of Adams (Postgate 1986).

For the north Jazira, although the decline in settlement continuity may be ascribed to the very dynamic conditions of settlement abandonment, shift and re-establishment that prevailed during the early phases of urbanization, there is apparently also a genuine decline in settlement as well. This decline corresponds to the early phases of the Ninevite 5, and perhaps the final stages of the Uruk period that postdated the southern Uruk expansion.

The Later 3rd Millennium BC

Whereas the term Ninevite 5 can be applied to roughly the first half of the third millennium, the second half, which represents a crucial phase in early Bronze Age urbanization, is less well-defined by

accepted nomenclature. Politically it encompasses both the Akkadian and Ur III empires, as well as the intervening Amorite or Gutian interludes, and in the local chronology it corresponds approximately to Taya levels IX to VI (Reade 1968:260). The possibility that this phase of urbanization started late in the Ninevite 5 period (roughly ED III) has been raised by excavations at Leilan and Taya. On the other hand it may have continued through into the earliest part of the 2nd millennium. Because the local sequence is difficult to subdivide ceramically we have referred to this entire phase between the Ninevite 5 and Khabur as later 3rd millennium. The pottery types used to date this occupation phase, as well as the field-scatter diagnostics, are described in Appendix A.

In terms of the coarse-grained chronology of the north Jazira, settlement continuity rose from 14% (Uruk/Ninevite 5) to 25% (Ninevite 5/Later 3rd millennium) and approached levels attained between the Hassuna and Uruk. At the same time there was a large degree of abandonment (53%) and only minor establishment of settlement (23%), the abandonments being largely a result of the extinction of the ring of satellites that surrounded Ninevite 5 Hawa.

The prime feature of this period is that the main multi-period tells attained or approached their maximum settled area. Judging by the estimated depth of occupation, visible architecture and the quantity of finds, this was a period when the density of occupation on Tell al-Hawa was very high. The site grew to some 66 ha and, according to preliminary evidence from soundings and a major E-W drain cut through the northern mounds, it was unwalled (Ball *et al.* 1989 fig.2; Ball 1990:15; see Chapter 2). The main tell, lightly occupied during Ninevite 5 times, again became an important area of settlement. Kharaba Tibn, at around 17 ha, almost reached its maximum area (Fig.38), with all parts of the main mound yielding at least some sherds of the period, the exception being the summit where 3rd millennium levels were overlaid by those of the Khabur period. The presence of monumental architecture, and perhaps a city wall, is hinted at by the large number of limestone blocks or fragments thereof that litter the surface of the main mound. Such scatters of blocks can be compared to the multi-period Tell Ibra, near Tel'afar, where erosional gullies have exposed the limestone curtain wall *in situ*. In addition, judging from stones fallen by a hollow way to the SE, there may have been a gate in this quarter (immediately south of P, Fig.38).

The other main centres, Abu Kula to the SE and Tell al-Samir to the west, provided more sketchy evidence for the extent of 3rd millennium occupation. The main tell at Samir, although littered with later 3rd millennium and Khabur pottery, was located within a village that had been subject to a recent tribal dispute; this frustrated our attempts at more detailed survey. Consequently it was only possible to estimate the extent and amount of occupation based upon collection from the main tell and the topographic extent of the lower mounds. However, the estimate of total mounded area (28 ha) is accurate.

Abu Kula, being outside the limits of the irrigation project, was beyond the area of our permit. However, we were allowed to visit the site and make a general assessment of its sherd scatter and morphology. Later 3rd millennium and Khabur wares were abundant on the high tell, the bench-like mound that extended to the north and to a lesser extent, on the lower mounds to the east. Field visits and examination of air photographs enabled the later 3rd millennium and Khabur ware occupied areas to be estimated at around 10 ha. Like Kharaba Tibn, limestone blocks littered the surface and the form of the northern bench suggests that it was contained by a defensive wall.

Of the above four settlements, Tell al-Hawa, being the largest, must have been the prime urban centre whereas Tell al-Samir, Kharaba Tibn and Abu Kula at c. 19, 17 and 10 ha respectively, must have formed the secondary towns that grew up between 9 and 12 km from the centre. Owing to their massive overburdens of Khabur and late 3rd millennium occupation, earlier levels are obscured but from the sheer bulk of these mounds it is likely that they incorporate a long sequence of Chalcolithic occupation. Although they may have attained some importance before the Ninevite 5 period, it is not possible to demonstrate when they attained urban proportions without extensive excavation or much more detailed survey .

Surface pottery is problematic when used for dating the smaller sites of the later 3rd millennium BC that comprise the third level of the settlement hierarchy. First, as with the prehistoric, Early Bronze Age occupation may have been buried by later occupation so that diagnostic pottery may only occur in favourable "windows". Other factors may explain the occurrence of small amounts of later 3rd millennium pottery. The field scatters that veneered the land between sites (see Chapter 2) included common later 3rd millennium diagnostics, especially fine green hard wares (Types 29, 30 and 33). As a result, the presence of small quantities (1-5 sherds) of such pottery on sites within the areas of densest field scatter may not signify occupation but rather sites that somehow include field scatters upon them. With post-3rd millennium sites it is likely that mud brick dug from formerly manured fields would include such sherds. Alternatively earlier low mounds might have been ploughed and manured during the 3rd millennium. On several mounds the scatters are little different from those on the surrounding fields and are much less than the large quantity of diagnostics that

litter the major tells. It is also possible that such trace occurrences might indicate some form of transient or nomadic occupation that left insubstantial remains (see Chapter 8 for a discussion of this problem for the Sasanian-Islamic period).

Because such trace occupations are scarce the overall site count is little affected, but in order to check the scale of satellite abandonment during the later part of the 3rd millennium three satellite sites with Ninevite 5 occupation but no later 3rd millennium pottery were re-examined in 1987 and 1988 (Sites 14, 18 and 20). Of these, Sites 14 and 18, after re-survey, showed that following the Ninevite 5 occupations there was a gap corresponding to the latter half of the millennium and that settlement resumed during the early 2nd millennium. This extinction and resumption of settlement at the satellite sites partly accounts for the relatively low percentage of settlement continuity during the 3rd and 2nd millennium.

As Fig.37 makes clear, the former well-developed ring of satellites around Hawa was reduced to only one very minor occupation (at Site 20). On the other hand the sparser groupings around the secondary centres show little change. The satellites of Kharaba Tibn declined from 3 or 4 during the Ninevite 5 period to 1 or 2 during the later 3rd millennium (note that the area to the east was beyond the permitted survey area). One of these satellites (Site 54) was distinguished by only 3 diagnostics from a very large collection of Hassuna and Late Sasanian/Islamic sherds. Adjacent field scatters were dense and included significant quantities of later 3rd millennium diagnostics, thus these few sherds might be strays as explained above. Abu Kula had one satellite (58) within the surveyed area, compared to the two Ninevite 5 satellites. Tell al-Samir increased its satellites from 2 in the Ninevite 5 period to 4 in the later 3rd millennium. Of the other sites, Site 29 occupied an ambiguous position both upon a route or as a more remote satellite. Nowhere were rings of satellites as well-developed as during the Ninevite 5 or Khabur periods.

At the same time there was a slight shift back to lands deserted during the Ninevite 5 period. Of these, Site 175 was a significant occupation on a 1.5 ha mound, Sites 152 and 177 were meagre occupations and Site 140 represented the occupation of a site that grew to a prominent position during the succeeding Khabur period. Significantly Site 177 appears to have developed on one strand of the southern major hollow way (Fig.37), a position that suggests that this communication route was promoting settlement again. Site 152 is also interesting by virtue of its surface pottery, the later 3rd millennium component of which was limited to fine, mainly sub-stone wares (see Appendix A); coarse wares and storage jars were absent. Although the site had a later Parthian occupation, it did not appear to be overlaid by major later levels. This site may therefore have had a specialized function or had been occupied by a mobile or transient community, namely one that lacked the large storage jars that are characteristic of sedentary communities (Wright 1987:142).

The above, relatively simple, three-tier hierarchy is blurred by Site 91, Tell Talab, a site which in total occupied some 20 ha, compared with a maximum size for all periods at Tell al-Samir of some 28 ha. Because Site 91 lay within a village, it could only be partly collected but an earlier visit suggested a maximum occupation within the Khabur period and a rather smaller occupation in the later 3rd millennium (E.Stone and P. Zimanski pers. comm.). Our estimate for later 3rd millennium occupation is based upon this visit and a visit to the main and eastern mounds in 1989. The existence of such a large site during perhaps the later 3rd and certainly the Khabur period may be ascribed to growth stimulated by its position upon a main artery of communication.

Discussion

If Tell al-Hawa is compared with the nearest well-investigated Early Bronze Age centre, Tell Leilan, we see that whereas Leilan underwent a six-fold increase in size between the Ninevite 5 period and later 3rd millennium, Hawa achieved a modest expansion of between 1.5 to 3-fold. Such a straightforward picture is confounded by Tell Taya, located adjacent to the Jabal Sheikh Ibrahim near Tel'afar. Taya, which expanded massively to between 70 ha and 160 ha during the mid-3rd millennium conforms to the generally accepted model of mid-3rd millennium urbanization as expounded by Weiss for the Jazira (Weiss 1986). However the gross extent of this site may only have been recognized because, being located on limestone bedrock, wall footings were visible and the site could be mapped in total. Relying upon obvious mounding alone, the site would have been assigned to the netherworld of the third rank of our settlement hierarchy on the basis of a high mound of (< 1 ha) or about 8 ha based upon the walled town or outer enclosure. The flat settlement, if found on the adjacent plain away from rock sources, might form a pattern of small mounds with a dense field-scatter halo of 400-500 m radius merging into a less dense scatter extending to a maximum of 700-800 m. This resembles the 1-5 ha satellites with associated sherd scatters around Hawa which conceivably therefore might have been sites of Taya-like size. Similarly, Hawa and the secondary centres might have to be increased proportionately. Obviously such an alternative interpretation of the north Jazira data needed to be taken seriously,

therefore during fieldwork considerable attention was paid to drain and canal cuts made through field scatters and through the edges of sites. With the exception of the buried prehistoric occupations mentioned in Chapter 5, there were no outlying structures in sections. This is supported by excavations and long sections through site peripheries at Tell al-Hilwa and Khanijdal which, although not later 3rd millennium in date, indicate that in the north Jazira, surface topography does provide an approximate guide to the former extent of occupation. Minor additions to the occupied area may however come from the inclusion of areas of grey soil, such as area Y to the NW of Tell al-Hawa (Ball *et al.* 1989:28). This may represent an outlying suburb or specialized activity area on the fringe of the site. Rather than proposing that tens or hundreds of expanded Taya-like sites developed on the Iraqi and Syrian Jazira plains, it is suggested that Taya was a large but short-lived centre, comparable in area or larger than Tell al-Hawa which, because of its position on bedrock, was preserved differently from the average mounded site. Suburbs, although they may have existed, probably extend the area of sites like Hawa by only a small amount.

The exceptional preservation of Tell Taya may therefore result from its position upon bedrock slopes that have a long-term history of soil loss. The single-phase, mud-brick, collapsed superstructures were probably eroded as part of a long-term erosional trend. Sites on the alluvial plains, in contrast, which are either in erosional/depositional equilibrium or even aggrading, would not lose their mantle of collapsed mud brick so readily (this point was made by Reade 1982:77). Although the presence of small or modest-sized suburbs around 3rd millennium centres is not dismissed, the presence of massive Taya-size agglomerations as annexes to modest tells is considered unlikely.

The growth of Tell al-Hawa from between 24 and 42 ha during Ninevite 5 times to some 66 ha in the later 3rd millennium could have been supplied by the population of the Ninevite 5 satellites as follows: 12 roughly 2.5 ha satellites = 30 ha, which, added to the Ninevite 5 settlement area, would produce a later 3rd millennium settlement of 54-72 ha. Although such a calculation should not be used to demonstrate that such a movement took place, it does demonstrate that Hawa and its satellites could virtually have operated as a closed demographic system, with growth at the centre being met by abandonment of satellites.

Khabur (Old Assyrian)

The Old Assyrian period is defined by the distinctive range of Khabur wares and related types (Appendix A). According to Mallowan, and contradicted little by later work, this assemblage occupies the approximate time range from 1900 BC until 1600 BC. Although chronologically the use of Khabur ware commenced approximately with the reign of Shamshi Adad of Assyria, it would be dangerous to view this ware as being confined to any particular political entity or national group (Kramer 1977). Nevertheless, its occurrence within the early Assyrian state and at the Karum of Kultepe in Anatolia suggests that its movement and production may have been related to the Old Assyrian trade network. Khabur ware was not necessarily current throughout the first half of the 2nd millennium and so-called later 3rd millennium wares probably continued in use into the first century of the 2nd millennium (Buccellati and Buccellati 1988). Here, for convenience, Khabur painted ware is considered to belong to the earlier 2nd millennium BC, gradually tailing off in use around 1500-1400 BC.

The Khabur period is particularly recognizable owing to the profusion of conspicuously painted wares, usually striped (Appendix A). Caution was necessary during processing so that miscellaneous painted wares, such as various painted prehistoric types, were not included. Diagnosis of the assemblage was aided by the existence of a number of distinctive rim, shoulder and base forms.

Settlement continuity increased from 25% (Ninevite 5-later 3rd millennium) to 31% (later 3rd millennium-Khabur) and few settlements were abandoned. Many were established, however, partly because of the re-emergence of satellite communities around Tell al-Hawa (60% establishments between the Later 3rd and Khabur periods, see Chapter 9). Although perhaps subjected to short phases of abandonment, of which we have no evidence, the major centres of Hawa, Kharaba Tibn, Abu Kula and Tell al-Samir continued to be occupied. With estimated occupied areas of c.66 ha, 18 ha, 10 ha, and 19 ha respectively, the size of centres showed little change since the later 3rd millennium. (Note, however, that figures for the two last-named sites are estimates from quick visits combined with measured mound area). The 1986 survey of Tell al-Hawa suggests that there was more occupation on the main mound than during the later 3rd millennium, and a more uneven extent of occupation on the lower mounds. Occupation at Kharaba Tibn, on the other hand, extended to the lower north and east mounds (A, B and P Fig.38) where the smaller quantity of diagnostics suggests sparse occupation. A shift to more peripheral mounds at this site may have been a prelude to greater concentration on these areas during Middle Assyrian times.

Tell al-Hawa regained a ring of satellite sites, with 9 sites (9,10,23,22,15,14,20,18 and 29) compared with 13 during the Ninevite 5 period. At

the same time Kharaba Tibn had 3, Abu Kula none (but note that the land to the east was not surveyed) and Tell al-Samir 5. The last-named site is unusual because an inner ring of satellites can be distinguished at Sites 131, 160 and 126. Of these, however, the last-named may be later because the wares, although of Khabur form, were plain and very chaffy. These may represent a transition to the Middle Assyrian period when settlement was moving away from the main centres (see Chapter 7).

With an expanded Tell al-Hawa and satellites during the Khabur period, there was an apparent increase in the population of the area. On the other hand Tucker's survey suggests that there was a thinning of the amount of occupation deposit (therefore population) at Hawa during the Khabur period (Ball *et al.* 1989:35). This may have offset the increase in aggregate site area with the result that the overall population may have remained stable or only increased slightly.

About a millennium after Ninevite 5 settlements became clustered in the north and east of the project area, settlement was again starting to develop in more outlying areas. The development of sites upon routes may result from the stimulus of trade, whereas others, such as Sites 159, 169 and 175, show no reason for their existence. Because our survey coverage did not extend far enough in this area, substantial tells like Ab Takh or Rajim Hassan remain uncollected. These may have been secondary centres of which small settlements like Sites 169 and 175 could have been satellites. Alternatively, it is possible that away from the main centres the marked settlement hierarchy broke down so that settlements became more evenly spaced and less clearly ranked.

Route Systems.

Ninevite 5

Some of the radial hollow ways around Tell al-Hawa and Kharaba Tibn must have been in use. The systems are not complete because topographical and geomorphological conditions were not conducive to their development in certain areas (Chapter 3). Additional radial systems were probably in use around the developing centres at Abu Kula (127) and Tell al-Samir (93).

The northern pair of long hollow ways that branched at Uwaynat (92) were probably in use during the Ninevite 5 period but, because of the lack of settlement to the south, it cannot be determined whether or not those hollow ways through al-Kibar (123), Site 140 and al-Gana were in operation. It could of course be argued that such routes through unoccupied land may have come into their own at this time so that travellers and caravans could have avoided tariffs. Because settlement showed only moderate orientation towards major routes it is possible that localized socio-economic or subsistence factors may have been as or more important in influencing the settlement pattern than inter-regional movement and trade. Nevertheless, that the two northern routes were in use can be suggested by the alignment of sites along them, as follows:

Northern route (N branch): 92, 26, 23, 1, 29, 30.
Northern route (S branch): 92, 58, 20, 19, 91, 93.

Additional long routes are those through Abu Kula (127), 58, 26 and 39, and another from Hawa through Site 9. Both can be seen on the overall route map to lead via the modern village of Bardiyah towards Abu Dhahir in the Tigris valley (Fig.24). A further linking route can be suggested from Abu Kula (127) through Sites 60 and 28 to Site 29.

Later 3rd Millennium

By the later 3rd millennium the radial route systems around Hawa and the secondary centres were almost certainly in use, this being the period when these sites reached their maximum size. The fact that the satellite sites were abandoned or lightly occupied at this time implies that the radial routes were probably used more for daily visits to the fields rather than for travelling to and from satellite communities. In the case of Tell al-Hawa, however, survey was not possible beyond 2.5 km north of the tell; therefore, some radial hollow ways can be seen to lead to sites of unknown date beyond the limits of the survey (Fig.24). Almost certainly, the daily movement of flocks of sheep and goats to outlying pastures contributed to the development of radial hollow ways.

The thinning of the settlement pattern resulted in fewer sites on the main hollow ways but a clearer orientation of sites along them, as follows:

Northern route (N Branch):	92, 1, 29, 155
Northern route (S Branch):	92, 20, 71, (?76), 91 and 93.

There was also a hint of settlement development on the southern hollow ways but because Tell al-Kibar (123) was visited only fleetingly, the amount of settlement on this route remains unclear. Tell Mana'a (140) was beginning to grow during the later 3rd millennium and this, together with the minor occurrence of ocupation at 177, suggests that there was sufficient traffic along the southern routes to stimulate some settlement growth.

The Khabur Period

The radial routes must have continued in use and there is a hint of radial systems around Tell Mana'a (140), which attained its maximum size of 8 ha during the Khabur period. Bearing in mind the dearth of site data to the north of Hawa there is little sign of linkage of hollow ways to satellites. Sites continued to be common on inter-regional hollow ways, as follows:

Northern route (N branch):	92, 23, 22, 1, 29, 30, 155.
Northern route (S branch):	92, 20, 19, 71, 91, 93, 154.
Southern route:	123, 96, (?108), 140.

Of the above, Sites 71 and 91 are noteworthy because both appeared to attain their maximum size during the Khabur period. The former site continued in use and perhaps attained its maximum size during the late Khabur and Mitannian period (Zimanski forthcoming), whereas the latter became a very large site during the Khabur period.

There was also a suggestion of settlement growth along a southern branch of the southern route through Sites 99 and 138, a route that increased in importance during the Middle and Late Assyrian periods.

The increased number of sites, including some enlarged examples, along the northern routes implies that human movement, presumably trade, was stimulating the growth of settlement along route-ways. This compares with what was probably a more localized economy during the early 3rd millennium (Ninevite 5) and a more centralized system during the later 3rd millennium. Textual evidence suggests that the southern route through al-Kibar (123) and Mana'a (140), may have formed a segment of the Emar itinerary, as described by Hallo (1964, fig.3) and originally published by Goetze (1953). The route in question led from Assur and the south via Tell Abu Marya (Apqum) towards Leilan (Shubat Enlil). Between the two known stations of Apqum and Shubat Enlil, intermediate stopping points were listed. These were obscure places, probably situated some 25-30 km apart along the route travelled. Being probably little more than caravanserais these receive sparse mention in other texts (Hallo 1964: 63, 73). Hence the travellers only stopped one day or night at each way station. It has already been suggested that the route through 123 and 140 may correspond to this itinerary (Wilkinson 1990c:61). Since the interim report was written, further evidence of hollow ways has shown that this route does not pass directly SE to Tell Abu Marya but leads towards it, veering a little to the north to run between Jabal al-Qusair and Jabal Ishkhaft between Tell Huqna and Tell Abu Marya (Fig.24). The hollow way as indicated on air photographs may of course not be the Old Assyrian route, but may be later. If it is the route, it was relatively simple to reach Tell Abu Marya from it by means of a short branch route across the flat terrain. The potential stopping points can can be viewed on Fig.24 as a) in the vicinity of Tell al-Dheim and al-Kibar (Kiskis) and b) near Ab Takh or its vicinity (Iapterum; near Site 177, Fig.6). The mounds of Tell al-Dhaim and Ab Takh, on the basis of size, probably include Khabur occupation levels but because neither was visited this must remain speculative. Alternatively, Tell Mana'a (140, Fig.37) which grew considerably during the Khabur period, being of the right period, would make a good candidate for either Kiskis or Iapterum.

Although Kiskis is not otherwise known, Iapterum is mentioned in a Mari letter (B81) in the context of a representative of Zimri-lim at Zalluhan, who reported a crop failure in four districts and the resultant fleeing of some inhabitants to Iapterum (Jean 1947:70).

The situation during the Khabur period contrasts with the absence of settlement and hollow way combinations in the south of the area during the Ninevite 5 period. It is possible therefore that during the early 3rd millennium, inter-regional movements were less aligned towards Assur and the south and instead were more localized. If they were aligned to any centre in the region, it was towards Kissik, Eski Mosul and Nineveh, upon which the northern hollow ways were aligned. In the later part of the millennium, more settlements grew up on all routes and there was incipient growth along the southern route. During at least part of the Old Assyrian empire, inter-regional routes reached their peak activity and the southern route and its settlements increased in importance, probably as result of the stimulus of both official movements and trade along it. Nevertheless, to judge by the concentration of large sites, the northern routes maintained their primacy even at this time.

Land Use During the 3rd and Early 2nd Millennium.

As described in Chapter 2, the remarkably continuous scatter of sherds that littered the modern plough soils may be ascribed to the application of settlement-derived organic refuse as composts or manures to the fields. Although sherds of all periods occurred within the scatters, those of the later 3rd millennium are most common, followed by those of Late Assyrian and Khabur ware date (Fig.51). Further evidence for dating the scatters and the associated phase of land use are supplied in Chapter 2.

Interestingly, the distribution of kiln slag mirrors the clustering of later 3rd millennium sherds

around the 3rd millennium centres, as described in Chapter 2. This implies that a significant amount of kiln slag also arrived on fields during this period, again from the major central places, presumably as a result of manuring.

The distribution of kiln slag collected from field scatter squares is indicated on Fig.40 which also shows the location of probable kilns of the later 3rd millennium at Tell al-Hawa (L and K) and the major relevant hollow way route (stippled). The kiln, [field collection area K1 (Ball *et al.* 1989:27,28)] yielded: 91 later 3rd millennium diagnostics, 8 of which were Type 29 bases; 1 3rd millennium pottery waster, 50 lumps of kiln slag and 6 fragments of fired brick (none over-fired). In the vicinity was a 30 m diameter depression, c. 1.2 m deep, within an area of grey soil. Nearby, area K2 produced a scatter of Islamic sherds, some slag lumps and a few baked brick fragments, in an ill-defined depression.

On nearby area L, pottery manufacture is also implied by the presence of dense scatters of late 3rd millennium pottery (perhaps pottery dumps) and wasters.

The location of both sets of pottery waste on the edge of or immediately outside the urban limits suggests that such a position was deliberately sought so that smoke and smell would be as far as possible from living quarters without the kiln being either inaccessible or within the fields. Similar locations can be cited from Uruk, Shahdad, Altyn, Tepe Hissar, Tell Jigan and Lidar Höyük. The location of the kilns on the main hollow way suggests that they were also positioned to facilitate the import of fuel (wood and dung) and clay, as well as for the transport away of pots, for sale and probably ash, for fertilizer (see Chapter 2 for a discussion of kiln waste as a fertilizer ingredient). As is evident from Fig.40, it is within the SE sector that off-site kiln scatters were most common. The presence of significant quantities of late 3rd millennium rather than Islamic, diagnostic pottery within the field scatters suggests that the kiln slag is probably mainly from 3rd millennium kilns.

From the above, it appears that ash from kilns was used as a fertilizer ingredient and was probably dispersed along the main hollow way road. Thus within this sector of town it is possible to see evidence of a complex recycling of materials: first, dung or wood fuel was hauled from the countryside or from animal stabling areas nearby; pottery manufacture then used the fuel, with the distribution of products taking place along the main road; finally ash was hauled towards the fields to act as a fertilizer. A similar system may have prevailed to the NW of Kharaba Tibn where, again, off-site slag densities were remarkably high (Fig.40).

Combining the evidence of diagnostic pottery, the distribution away from centres and the overall correspondence between field scatters and Bronze Age settlement patterns, it seems that a significant amount of the pottery and slag scatters were formed during this period. It must, however, be emphasized that the scatters are multi-period and from at least the Ubaid to the Islamic there was probably some contribution of settlement-derived waste to the fields.

Unrealistically large samples of diagnostic pottery would be required to produce statistically valid period-by-period distributions. Therefore, as a preliminary approach, field scatters for the Ninevite 5, later 3rd millennium and Khabur periods are plotted as a gross scatter as described at the beginning of this chapter (p.49). Although approximate, this approach provides a preliminary breakdown of land-use phases.

During Ninevite 5 times Tell al-Hawa must have been surrounded by a belt of cultivation of some 1.5 km radius. The small number of Ninevite 5 diagnostics in the field scatter collections suggest that settlement-derived manure was only sparsely applied. Therefore the limits of intensive cultivation may occur as shown on Fig.37, (i.e. the 40 sherds per 100 sq m contour for the total scatter). There was a decline in sherd scatter density away from the centre and land use intensity probably paralleled this (Figs.15 and 17). At between 3 and 5 km radial distance, a ring of satellite communities occurred, each with its own halo of land use of probably low intensity. Because sherd scatters belong to more than one period, it is not certain that these zones were as heavily manured as is implied by the frequently dense field scatters but it is likely that such satellites developed beyond the economic distance of farming from the main centre. As a result, both time and effort could be saved by journeying to the fields for work. For these outlying areas haulage of crops and manure was therefore from the satellites rather than from the main centre.

By the later 3rd millennium, the lack of satellites implies that the satellite zone had ceased to be a semi-independent cultivation zone and had been absorbed into the main cultivation zone of Hawa. The dearth of sherds of this period on the satellite mounds suggests that sedentary settlement was minimal but that, instead, small temporary settlements might have developed to operate seasonally when workers were required on the more distant fields. However, the distribution of later 3rd millennium BC diagnostics per 0.5 km ring (Fig.18) does imply that settlement-derived manure was used beyond the satellite settlements, probably up to 5km radial distance from Hawa. The centres at Hawa, Kharaba Tibn and Abu Kula were all surrounded by substantial zones of intensive land use. In fact during field scatter sampling it was observed that 3rd millennium diagnostics extended from Kharaba Tibn to the W of Site 48 and from Abu Kula to the vicinity

of Site 69. In other words, the zones of dense sherd scatter as indicated on Fig.14 probably corresponded approximately to the areas of most intensive cultivation during the later 3rd millennium.

The later 3rd millennium landscape probably comprised a zone of very intensive cultivation extending to 2-2.5 km from the central settlement and secondary centres, surrounded by less extensively farmed zones extending to 5 km in the case of Hawa and perhaps 3-4 km in the case of the secondary centres.

Because of the limitations of the data sources, the zones of Khabur period land use resemble those of the Ninevite 5, with centres being surrounded by larger scatter areas and the smaller number of satellites having smaller haloes. The presence of more Khabur ware than Ninevite 5 diagnostics in scatters (Fig.51) implies that manuring and therefore land use intensity were greater than in the early 3rd millennium. As with the later 3rd millennium, production was probably centralized around the primary and secondary centres but the satellites must again have serviced the outer land use rings. A clustering of satellites in the NE (9 and 10), the SE (14, 15, 22 and 23), SW (18, 19 and 20) and NW (29) suggests that there was a tendency towards settlement along main routeways. This might indicate strengthened communications during the Old Assyrian period. Unfortunately, because no off-site sampling was conducted to the S and SW , it is not known whether growing centres such as Tell Mana'a (140) were surrounded by their own substantial land-use haloes or not. The only record of field scatters from this zone was from a limited area of detailed sherd scatter sampling that took place around Khirbet 'Aloki (113). There sherd scatter densities were low, being 1-3 sherds per 100 sq m to the S of the site and 1-10 sherds to the N, attaining slightly higher values in places. Diagnostics were rare but the presence of a few later 3rd millennium fine wares to the north suggests that there was still some settlement-derived manuring at this time some 8-10 km from the nearest 3rd millennium centre.

With the rise of urban centres, field scatters started to accumulate around the main centres. Although this phenomenon might be expected to start in the Uruk, diagnostics of this period were rare, possibly because differential abrasion of the less resistant Uruk pottery resulted in their virtual disappearance from the record. Although more durable, Ninevite 5 grey wares are scarce. Cultivation intensity was probably only moderate, and perhaps productivity at this time was raised by cultivating around satellite settlements at 4-5 km distance. There followed a period corresponding to the peak of urbanization during the later 3rd millennium when cultivation intensity increased substantially around the centres. There was a progressive decline away from the centres but, judging by the lack of significant satellites, agricultural activity and control must have emanated mainly from the centres. It is even possible that the use of manure allowed fields to be cultivated annually, with the consequent loss of the fallow year. This situation continued into the early 2nd millennium with intensity perhaps decreasing slightly and with a corresponding shift of production to the zone of satellite and more distant settlements.

The concentration of production around major centres or within 5 km of them must have left large areas of low intensity agricultural land in the S and SW of the project area. Such voids would have provided an ideal pastoral resource for the large herds of sheep and goats that, from textual sources, one can conclude must have been a key part of the economy.

CHAPTER 7

Assyrian Decline and Revival (Mid-2nd To Mid-1st Millennium BC)

The Historical Background

As early as 2200 BC, and probably earlier, the population of northern Mesopotamia included a Hurrian element and, at least following the collapse of the Old Assyrian trading system, a number of small Hurrian states were established in present-day Syria and northern Iraq. By c. 1500 BC these were combined into the kingdom of Mitanni (Wilhelm 1989:19-29). This substantial northern kingdom, which stretched from the Zagros to the Mediterranean, was administered from its capital of Washshukanni, to date unidentified on the ground but located within N Syria, N Iraq or S Turkey.

During the growth stages of the Middle Assyrian empire the Mitannians probably still controlled the area west of the Tigris in Iraq but the Assyrians were gaining ascendancy to the east. From about 1300 BC, however, textual evidence increases and the following notes summarize the situation that prevailed during the gradual colonization of the northern Jazira by the Assyrians. We are extremely grateful to Dr Jeremy Black for providing notes on this period, upon which the following text is based.

Although the east bank of the Tigris was absorbed into the growing Assyrian Empire by about 1300 BC, areas further west took longer to control effectively. From about 1360 BC onwards, and after the decline of the Mitannian empire, Assyria underwent a period of growth and increasing power under three strong kings from Ashur. During this period, Assyrian armies conquered cities to the west in an area which was probably still Hurrian in population. Colonists, administrators, landowners and merchants pushed westwards to occupy Nemed-Ishtar (perhaps modern Tel'afar), Qatara/Karana (Late Assyrian Zamahu; modern Tell al-Rimah) and two sites now in modern Syria, Tell Fakhariyah and Dur-Katlimmu (Tell Sheikh Hamad). At the time of the murder of Tukulti-Ninurta I in 1207, a period of confusion prevailed with migrations of people taking place especially southwards out of Anatolia and into the area west of the Tigris. By 1200, the Assyrians had abandoned Tell al-Rimah and the other sites west of it and, shortly before 1100, the area had suffered periodic raids of the Ahlamu (a people akin to the later Aramaeans). In the 12th century, the Assyrians were able to make some attempts to recover their losses west of the Tigris and Assur-resha-ishi I (1132-1115) either built a palace at or improved the defences of Apqu (Tell Abu Marya). During the time of Tiglath-pileser I (1114-1076 BC) the area west of the Tigris included the land of Katmuhu, the location of which, although not certain, must have overlapped with the former Mitannian kingdom. Tiglath-pileser I clearly regarded Katmuhu as at least an Assyrian area of influence, that is, it was liable to pay tribute and thus it may be inferred that the area to the south and east (i.e. the area around Tell al-Hawa) was also liable to pay tribute.

From a different quarter, Tiglath-pileser I had to contend with considerable trouble from the Ahlamu, an anarchic and destabilizing force. Shortly after 1075 they had crossed to the left bank of the Euphrates and to the east of the Khabur from their homeland, perhaps the Jabal Bishri. They also reached up as far north as Nisibis. It was from about this time that a sub-tribe of the Ahlamu, the Armai or Armayu (Aramaeans akin to the Ahlamu) were gradually advancing into the lands west of the Tigris to eventually occupy the entire area.

The land of Katmuhu, which was an Assyrian province in the reign of Tiglath-pileser I, was no doubt again brought within the boundaries of the Assyrian empire by Adad-nirari II (911-891) under whom, at the beginning of the ninth century, Assyrian power began to revive. Hence the north Jazira plain, being SE of Katmuhu, probably also fell within the empire during the same period. By this time Aramaeans were present (perhaps still more or less nomadically) all over the Jazira. Ashurnasirpal II (883-859) was able to build a palace at Tilule or Tille. He received tribute from Katmuhu and from this time Katmuhu at least can be regarded as a true province of the Assyrian empire. By Ashurnasirpal's time a regular route, or group of routes, was coming into use from a river crossing (perhaps at Balata: Eski Mosul) leading up through Katmuhu to the NW. From this crossing, the route described by Ashurnasirpal went through Apqu up to Tille. He crossed

Katmuhu and went up into the mountains by the pass called Ishtarate, probably near Nisibis, up to present-day Midyat. It is thought that the routes from Tille and Nemed-Ishtar (normally identified with Tel'afar) met at Apqu. It was at approximately this time that the population of Tille revolted and attacked Kahat (Tell Barri), downstream from Nisibis. It is not possible to specify the name of the north Jazira plain during the Late Assyrian period but it would appear that the lands to the west of the Tigris comprised Katmuhu to the north (immediately south of the mountains of Tur Abdin and west of Cizre in modern Turkey) and Tille to the south, occupying the area to the north of Jabal Sinjar and to the east of Nasibina (modern Nisibis). To the west of the province of Nasibina lay Guzana (Tell Halaf) and to the south of Jabal Sinjar extended the large province of Rasappa. From the above, it can be suggested that the Neo-Assyrian provincial capital of Tille or Tilule must be located either in the area of the North Jazira Project or slightly to the west. The latter position is considered more likely by Kessler (1980) who suggests that Tille was modern Tell Rumeilan in Syria, although it remains an attractive proposition (originally suggested by Julian Reade) that Tell al-Hawa was in fact Tille.

The Nuzi Period and Cultural Continuity

Mallowan has emphasized the ceramic and cultural continuity that characterized the Jazira during the period between c. 1800 BC, when Khabur ware became important, and the 14th century when white-painted Nuzi ware died out (Mallowan 1947:19-21). Such continuity posed a problem during survey because, although the distinctive painted Khabur ware sherds were instantly recognizable, their gradual merging into later, fine, painted late Khabur and transitional Nuzi wares often went unrecognized. For example, in Appendix A, Type 44 is classified as Nuzi, but can be as late as Middle Assyrian. Other fine, band-painted wares would however be classified as Khabur Type 34. At a coarse level of analysis, some Type 44s may therefore have been misclassified as Khabur. Thus when our classification was applied to excavated material from Tell Hamide, it suggested a higher proportion of Khabur ware than the excavators had estimated (thanks to the excavators, Paul Zimansky and Elizabeth Stone, for their advice with this). Chronologically this means, for survey purposes, that our periodization may continue until about 1500 or even 1400 BC (Joan Oates pers. comm. 1991). Following Khabur ware, Mitannian types take over and ultimately merge into Middle Assyrian traditions as described in Appendix A.

As a survey indicator, white-painted Nuzi pottery and its fine banded relative, Type 44, proved of little value as chronological markers. Mallowan assumed that the white-painted ware was basically a palace style (Mallowan 1947:20) and its very limited distribution on the north Jazira plain would support a specialized function. Only three sites – Tell al-Hawa (Ball *et al.* 1989:35), Tell Hamide (Site 71) and Gar Sur (Site 42) – produced examples of this ware, with one or two examples also being noted at Sites 14 and 37. The first three sites all registered Khabur and Middle Assyrian occupation, and the two last-named had Khabur and Khabur/Middle Assyrian respectively. Tell al-Samir and Abu Kula probably also were occupied during the Mitannian period but survey of these sites was not intensive enough to make possible the recognition of Nuzi ware. Because of its specialized function and perhaps its restricted distribution among the élite, the small number of Nuzi sherds recognized should not be used to infer a decline in settlement.

At this coarse level of analysis, Khabur ware and its associated types will be taken as representative of most of the first half of the second millennium, with Middle Assyrian types representing most of the second half. The middle of the millennium is therefore under-represented, but further work on pottery sequences in the area should enable the pottery types listed in Appendix A (Khabur, Nuzi and Middle Assyrian) to be re-classified.

Middle Assyrian Settlement

Settlement continuity (the number of sites that showed occupation for both Khabur and Middle Assyrian periods), at 47%, was significantly higher than for the preceding later 3rd millennium/Khabur boundary (31%). This supports the suggestion of Mallowan that cultural continuity was the hallmark of much of this millennium in contrast to the political changes that were under way (Mallowan 1947:19-20). In the Middle Assyrian period the overall pattern of settlement, while resembling that of the Khabur, had undergone a significant thinning (Fig.41). This sparse but generally rather stable pattern is indicated by a decline in the total number of sites from 43 to 28 (Khabur and Middle Assyrian respectively) and a decline in the number of centres. Substantial voids of unoccupied land had appeared, a factor that was significant for Late Assyrian settlement policy (see below).

The decrease in the number of settlements should be assessed in the context of the visibility and durability of Middle Assyrian ceramics. The dull, greenish or buff, chaff-tempered coarse ware forms are readily abraded, and also rather subtle indicators, but a number of other indicators (nipple-based beakers, as well as various plates and dishes) are sufficiently distinctive to compensate for such

deficiencies. Nevertheless, because of their lack of distinction compared with the Khabur and later 3rd millennium ceramics, the Middle Assyrian wares might be under-represented, a factor that may account for part of the decline in site numbers.

Estimates of the approximate settled areas at two centres, Tell al-Hawa (Ball *et al.* 1989:35-36) and Kharaba Tibn, indicated a substantial decline in the settled area since the Khabur. At Tell al-Hawa, Middle Assyrian occupation was limited to the high mound (c. 12 ha) and a secondary area on mound F to the SW. The small number of Nuzi ware sherds also fell within this distribution. The total settled area of Tell al-Hawa, at approximately 15 ha, was therefore little different to that of the Ubaid period. Nevertheless the considerable depth of Middle Assyrian deposits indicates that it was still an important centre in the Middle Assyrian period, probably equipped with an administrative complex comprising a mud-brick platform or ziggurrat as well as a temple of Adad (Ball 1990a:86).

Based on a more rapid survey and coarse sample areas, Kharaba Tibn (Site 43) showed an even steeper decline from ca. 18 ha during the Khabur to 4 ha in the Middle Assyrian (Fig.38). Only very small amounts of Middle Assyrian pottery were recovered from the main mound, the main locus of occupation being on the smaller mounds to the east, particularly mound P. For reasons given above, insufficient time could be devoted to post-Khabur collection at the other centres of Tell al-Samir and Abu Kula, so their importance in the Middle Assyrian period is unknown. Regarding Tell al-Samir, however, there is evidence for dispersal off the main mound in the form of the appearance of occupation at Site 126, about 1 km to the east, either at the end of the Khabur or in the Middle Assyrian period.

Tell al-Hawa probably remained the prime settlement of a system which, as during the Khabur period, comprised a northern and a southern zone separated by a zone without settlement (Fig.41).

The northern pair of hollow ways probably continued in use but with fewer sites along them. The relationship of the southern sites to routeways is more tenuous because the distinctive alignment of Sites 121, 115, 110, 108 and 140 corresponds to no obvious hollow way. On the other hand a hollow way through Sites 99 and 138 seems to be the precursor of a more important feature in the Late Assyrian period.

Little can be said regarding the radial hollow way systems and their inclusion on Fig.41 as dotted lines is speculative. Presumably, however, at Tell al-Hawa they continued in use. The same might be said for Kharaba Tibn but the impressive array of features illustrated on Fig.41 dwarfs the modest size of the settlement at this time. Owing to our lack of knowledge of Middle Assyrian occupation at these centres, hollow ways have been omitted from around Tell al-Samir and Abu Kula.

Evidence for Middle Assyrian land-use intensity is meagre and, although field scatters included significant amounts of Khabur and Late Assyrian wares, Middle Assyrian diagnostics were rare. This is despite the existence of robust diagnostics such as the nipple base (Type 50) and the large squared jar rim (Type 56) which would have been recognized if present. The absence of Middle Assyrian diagnostics from field scatters suggests a decline in the use of settlement-derived manure and land-use intensity. This corresponds to a decline in total settlement area, which implies that as population dispersed and fragmented there was a concomitant decline in land-use intensity.

The Late Assyrian Period

The pottery assemblage for this period, being predominantly chaff-tempered, was readily abraded but in spite of this more sites yielded pottery of this type than of any other period. Particularly valuable as diagnostics were the range of ribbed rim bowls (Type 57) and suggestive of occupation of some affluence or status were palace wares (Type 60).

The most obvious and impressive change since Middle Assyrian times was that settlements became dispersed over the entire area surveyed. Settlement numbers increased from 28 during the Middle Assyrian to 78 (60 significant and 18 minor) during the Late Assyrian period. As a result, the percentage of sites established was 63%, compared with only 3% abandoned. Although these 78 sites should not all be considered to be contemporaneous, the relatively brief interval involved, some 400 years, implies that most sites were probably occupied at the same time. Sites were distributed evenly over the plain at 2-4 km apart with the result that the former gaps in the Middle Assyrian settlement pattern were filled in (Fig.41).

In order to assess the degree of infilling, nominal site territories have been generated for the Late Assyrian settlements by drawing Thiessen polygons. In this method, catchment boundaries are drawn halfway between any two adjacent sites and at right angles to the straight-line distance between them. By applying this to all nearest neighbours, a territorial limit (not weighted to site size) is defined. Reconstructed territories form a cellular pattern, each cell being 2-4 km across. When overlaid upon the previous Middle Assyrian distribution it is possible to determine which Late Assyrian territories did not include any Middle Assyrian sites. Such settlements are presumably Late Assyrian foundations. If our identification of Middle and Late Assyrian pottery and sites has been accurate, the area of Middle

Assyrian empty land can be inferred. Because the territorial limits stray rather close to certain Middle Assyrian sites (specifically Sites 71, 108 and 110), this boundary should not be regarded as entirely reliable but it is apparent that a large part of the Middle Assyrian landscape was devoid of settlement, thus was either deserted land or land of low agricultural productivity. Three main areas of fertile "desert" or waste are recognizable from Fig.41:

a) To the SE of Tell al-Hawa a large irregular enclave between the Bronze Age centres of Tell al-Hawa, Kharaba Tibn and Abu Kula.
b) A corridor of land, roughly 2-5 km broad, roughly midway between the two main inter-regional hollow way routes. Late Assyrian settlements that infilled this void developed approximately on the mutual territorial boundary between the two sets of Middle Assyrian settlements. Hence if a median line (as for Thiessen polygons) is drawn between Sites 20 and 69, 19 and 121 etc, a hypothetical Middle Assyrian territorial limit results. Sites 60, 63, 111, 113 and 109 all appeared to develop on or close to this line, which implies that new settlements were established on former territorial boundaries, that is on land that was least used.
c) A large area of rolling terrain on the west of the project area. This land had been very lightly occupied during the Khabur period and had been virtually unoccupied by sedentary settlement since the Late Uruk extinctions of the 4th millennium BC. This area is without wadis and its elevation would make ground-water less accessible than elsewhere on the plain. In this case, Late Assyrian settlement appears to have colonized marginal land or steppe/pasture.

The average size of Late Assyrian sites was quite consistent at 1-2.5 ha, less commonly being up to 5 ha, which suggests that they were mainly farmsteads, villages and occasional settlements of higher status such as "villas" or "manors" (Fig.42).

One of these settlements, Khirbet 'Aloki, situated within the corridor of Middle Assyrian open land, was excavated in 1989 to determine the sequence of occupation and abandonment associated with this phase of apparent resettlement. A summary description of the stratigraphic sequence is given in Chapter 8. From the excavations it was clear that Late Assyrian occupation did not follow on from a Middle Assyrian settlement, but was on a low Ubaid mound.

Whereas there was clearly an expansion of rural settlement, the central settlement at Tell al-Hawa was even smaller than during the Middle Assyrian period. The main mound remained the focus of occupation but a gap, or at least a thinning of cultural debris, occurred between the two loci located on the northern and southern summits. A secondary area of settlement on mound F to the SW continued to be occupied. Whether one accepts the estimate of 15 ha (Ball *et al.* 1989: 37), or the revised figure of Ball (1990b:20) of not greater than 7 ha for the size of the settlement, it is clear that Tell al-Hawa was no longer a major centre. It did, however, preserve an administrative/religious function which probably overshadowed its rôle as a domestic settlement. Hence the temple of Adad was refurbished in the reign of Shalmaneser III (George 1990:42). Its presence probably continued the thread of the site's religious dominance of the plain and, given the limited area that remained for occupation, that may have been one of its major functions. One can only assume that, as the population of the centre declined, the inhabitants moved either to other sites within the rural hinterland or to the major cities of Assyria: Nimrud, Khorsabad and Nineveh.

This theme of dwindling population centres was echoed at Kharaba Tibn, where settlement was restricted to areas G and P to the SE (Fig.38). Whether it was as small as 0.2 ha, as the estimate suggests, or covered much of the 4 ha of the Middle Assyrian settlement, is of little significance for by this time Kharaba Tibn had lost all pretence of being a centre and was no bigger than its surrounding rural settlements.

By the early 1st millennium BC the settlement hierarchy had disintegrated to, at most, a two-tier system with a 7-15 ha Tell al-Hawa at the top and numerous rural settlements forming the next rank. This should not be taken to indicate that the area was impoverished, simply that the urban centre of gravity had moved to one of the aforementioned Assyrian capitals or to some provincial capital such as Tille or Apqu.

Sherds of palace ware beakers came from a number of sites, including a virtually complete vessel from Site 99; even 1 ha Khirbet 'Aloki included palace ware within its domestic pottery. More impressive, excavations conducted by the Department of Antiquities and Heritage Mosul office and supervised by Moslem Mohammed, showed that the modest 2 ha mound of Mithlai (Site 101, Fig.41, near Tell al-Samir) had some trappings of wealth. The three excavated Late Assyrian levels included well-built mud-brick buildings and a potter's yard with kilns, drain and a well. A number of graves were excavated, one of which included amongst the grave goods a cuneiform tablet (not yet studied). Although we lack evidence regarding the overall layout of such settlements it is clear that sites such as Mithlai included both manufacturing and administrative functions and would have accommodated a population of some 200-300 people.

Assuming site territories of 4-8 sq km (based upon the cell size on Fig.41), the total population that

could be sustained on each site would vary between 130 (4 sq km territory, extensive land use) to c. 800 (8 sq km territory, intensive land use). Such population densities could be readily accommodated on sites of 1-6 ha, approximately the size range of the sites in the north Jazira.

Unlike during the third millennium, there was probably little need to increase land-use intensity at the centre but the significant number of Late Assyrian sherds within field scatters (Fig.51) suggests that part of the field scatters accumulated at this time. Presumably population levels were locally high enough to justify intensive cultivation around certain sites.

The dispersed rural settlement pattern shows no evidence of site alignments along routes. Both branches of the northern hollow way were probably in use and, to the south, an alignment of Late Assyrian sites (135-99-138-163) suggests that a new E-W route was in operation. Although a route through Tell Mana'a (145, 142, 140, 108, 96) is represented by an alignment of sites, there is only an intermittent hollow way along it. In addition, a number of NE-SW routes or segments thereof are suggested on Fig.41. Although such re-alignments show a slight re-orientation of communications towards the west and south-west (towards Brak and the Sinjar plain), this might indicate little more than a change of emphasis. Again, owing to the continued occupation of Tell al-Hawa, that radial hollow way system is indicated but owing to the site's dwindling population it seems unlikely that they were all fully utilized during the Late Assyrian period.

Discussion

In what must have been a dominantly Hurrian area, 2nd millennium settlement patterns are characterized by two inter-related themes: declining urbanization and continuity of settlement. At the coarse level of resolution possible with the available data, there is no sign of a collapse of settlement and indeed the plain contained at least one small town, Tell al-Hawa, which retained some administrative and religious functions.

Political entities are notoriously difficult to relate to the archaeological record and the north Jazira represents no exception. Thus there is at present no archaeological evidence to confirm that the north Jazira was incorporated into the Assyrian Empire by Adad-nirari II at the beginning of the 9th century BC.

Because the Middle or Late Assyrian ceramic records cannot be sub-divided, short-term fluctuations in settlement remain invisible. However, the massive increase in the number of Late Assyrian settlements can best be explained as a result of a programme of resettlement by Late Assyrian kings (Postgate 1974: 237-8). Such programmes became policy, especially during the 8th and 7th centuries BC (Oded 1979:19) and their impact has already been observed in the archaeological record for the Tel'afar plain (Oates 1968:130). By increasing rural settlement and by the cultivation of the wasteland or "desert", the productivity of the Assyrian economy was increased and towns were provisioned (Oded 1979). Resettlement primarily involved the movement of populations captured during various campaigns to places – either cities, barren deserts or strategic regions – that required them. According to Oded, the Jazira was one such area and the kings of Assyria, from the days of Ashur-dan II (934-912), were very active in establishing settlements in this underpopulated region which, however, remained a major corridor of communication (Oded 1979:71). Deportees, usually families, were settled in this region and given land, livestock and ploughs. In favourable areas they were supplied with vineyards and orchards (Oded 1979:71), whereas others laboured on royal building projects. Clearly the extensive area of open land between the Middle Assyrian settlements could have been transformed from "waste" to cultivation by such a policy. There is no sign of whether such colonization was piecemeal or occurred at one time; nor is it possible to say whether there was ever a total collapse of Middle Assyrian settlement that enabled the entire plain to be resettled. In the north Jazira the Late Assyrian settlement programme appears to have been one of infilling with settlements being established on former territorial boundaries or on marginal land. Nevertheless, a large area of land was available to be settled, so that a total of 32 Late Assyrian settlements eventually developed within the Middle Assyrian empty or under-utilized lands. These settlements, which included the excavated site of Khirbet 'Aloki (Site 113, Chapter 8), probably contained 3000-8000 people. This figure falls well within the statistics of numbers of deportees, there being 13 instances of >30,000 people being deported (Oded 1979:21). Such voids would have been readily filled either by settlement programmes on this scale, or by the sedentarization of tribesmen who may have abandoned transhumance at around this time (cf. Reade 1972:105).

CHAPTER 8

After The Assyrians: Stability And Decline

Historical Background

Following the sack of Nineveh by the Medes and Babylonians in 612 BC, the former province of Katmuhu entered a period of obscurity. It is still unclear whether it passed under the jurisdiction of the Medes under Cyaxeres or of the Babylonians under Nabopolassar, but Curtis has suggested that for at least a while after the fall of Nineveh, the Babylonians held sway in the north Jazira plain (Curtis 1989: 53). This inference is based on the Babylonian chronicle (BM 2190), written in the 22nd year of Darius I, and probably from Babylon, which states:

> L.47 "On the 20th day of the month Elul Cyaxares and his army went home. After he had gone the king of Akkad (i.e. Nabopolassar) [despatched his army and]
>
> L.48 they marched to Nasibin. Plunder and exiles, ...[.....]
>
> L.49 and they brought [the people of] Rusapu to the King of Akkad at Nineveh.."
>
> (Grayson, 1975:94)

Although not stated explicitly in the above text, the most straightforward route for Nabopolassar and his army would have been through the north Jazira plain and this could have resulted in the fall of many settlements as well as the general plundering of the land. Owing to disagreements on the location of Rusapu, the reference is mainly of value on the basis of an assumed route and it cannot be used to refer to any places within the north Jazira of Iraq. Curtis suggests, admittedly from negative evidence, that the absence of Late Babylonian tablets from sites in Assyria indicates that there was no Babylonian administrative presence in Assyria at this time. He then suggests that Assyria became merely a route of passage for the Medes on their way into Anatolia (Curtis 1989:53-54), in which case the areas through which they passed would have suffered considerably from episodes of terror or plundering. Such anarchic conditions may have typified the entire period between the fall of Nineveh and the installation of Achaemenid rule in the period 550-539 BC.

The Achaemenid period in the north Jazira is a dark age both historically and archaeologically and it is not until the arrival of the Seleucids that the position starts to clarify. Even then, there was a phase between the arrival of Alexander in 331 BC and 310 BC, when Seleucus I assumed control, when the area must have experienced some instability. Archaeology provides the main data source for the area at this time and it seems that both Kalhu (Nimrud) and Nineveh were occupied by the start of the Seleucid or Hellenistic era. According to a recent review of a wide range of textual, historical and archaeological evidence, a case can be made for at least some episodic administrative and/or religious functions at Nineveh after its sack in 612 BC (Dalley 1992). In the Hellenistic and Parthian periods the sketchy field evidence implies that settlement at Nineveh may have been quite extensive (Scott and McGinnis 1990: 69-71; also below p.65). Although no textual evidence relates to the north Jazira, Xenophon's account of the east bank of the Tigris valley notes a number of villages, sufficiently prosperous to provide the passing army with provisions (Oates 1968a:61).

During the Roman/Parthian period, the plains of the north Jazira formed part of the frontier region between Rome and Parthia. Accounts indicating the strategic position of the area are given in Oates (1968a: 67 ff), and French and Lightfoot (1989). In summary, the plain was not incorporated into the Roman empire until 114 AD when Trajan captured Nisibis and Singara to establish the province of Mesopotamia with its southern boundary represented by the E-W road running through Sinjar-Tel'afar. For two centuries before that, the boundary had been moderately stable along the course of the River Euphrates in Syria and SE Turkey but, by extending the limits so far east, the new province became vulnerable to Parthian attack (Oates 1968a: 70). Conflicts therefore developed between the Parthians and Romans in AD 161-66, 196 and c.216 and subsequently between the Sasanians and Romans in 237. Although the north Jazira did not necessarily change hands as a result of every conflict, they must have created a climate of instability. Finally, around AD 250, the area was overrun by Shapur I and the Roman dominance was broken (Oates 1968a:75 and

93). Nevertheless, both Singara and Nisibis remained under nominal Roman control into the 4th century until, in 363 AD, both Singara and Nisibis were ceded to the Persians, along with 15 other unspecified posts (Gregory and Kennedy 1985:22). After this date the frontier between the Byzantine empires passed through the area of Nisibis (Segal 1970) and at this time the plain, according to contemporary sources, appears to have become largely deserted (Oates 1968a:96).

The land to the SE of Nisibis, recently captured from the Byzantines by Shapur in 363 AD, became part of the Sasanian province of Arbayestan (or Beth 'Arbaye), its southern and western borders being respectively the southern limit of Jabal Sinjar and Nisibis (Morony 1982:6). Historical sources hint that large areas of the province were deserted and inhabited by nomadic Arabs and the church of St Sergius at Qasr Serij near Tell Huqna (Fig.46) was established as a centre for bedu (Oates 1968a:95). Contemporary sources paint a picture of abandoned villages and a deserted and waterless terrain. Although relating only to certain episodes, this provides a reasonable model to be tested against the results of the survey. The area contained Christians and the western part was within the Metropolitan of Nisibis in 410 AD (Morony 1982:6).

During the Muslim conquest, the area was subjected to invasion from two directions and Mosul, Balad and Nisibis were taken from the SE in 638 and again from the west in 639-640 AD (Morony 1982:7). The Sasanian province of Arbayestan, with Nisibis as its capital, then became the Muslim district of Diyar Rabi'a. It served as an administrative division of the Jazira but eventually Beth Arbaye seems to have been gradually restricted in use to refer to the district in the centre of the province between Nisibis and Balad where there was a rural Arab population (Morony 1982:8). Evidence for early Islamic, including Abbasid, administration is sparse but during the early phases of the Muslim conquest the eastern fortress at Nineveh (Kuyunjik) was taken and replaced by a new foundation on the right bank of the river at Mosul (Morony 1982:13).

The Sasanian and Early Islamic periods were mainly negative periods in the settlement and occupation of the north Jazira plain but the situation probably changed during the 12th-13th centuries when northern Iraq came under the control of the Atabeg dynasty of Mosul (Oates 1968a:76). This period of revival, well documented historically (Ashtor 1976:240), is also one in which there is a brief florescence in the archaeological record, after which evidence for settlement on the plain becomes more elusive.

The period that intervened between the textual references to the Atabegs in the 12th/13th centuries and the accounts of European travellers in the 18th/19th centuries is little documented. An enigmatic reference to periods of anarchy and civil wars in the 15th century (al-Feel 1965) and a decline in a "great number" of Mesopotamian towns in the three generations after Yaqut's visit in 1220 (Reitlinger 1938:144) suggest, however, that there was a real decline in the region since the Atabegs. It was between this point and the re-settlement of the plain in the early 20th century that the north Jazira plain appears to have been essentially deserted (see Chapter 1).

Post-Assyrian and Hellenistic Settlement

Archaeologically the period between the fall of Nineveh and the rise of the Seleucid empire in the period 330-310 BC is almost invisible on the north Jazira plain. This is primarily because insufficient is known about the pottery types and, as a result, no meaningful site distribution maps can be constructed. Coupled with the historical evidence describing the collapse of the Assyrian empire, as well as recent excavation results that indicate the abandonment of Tell al-Hawa and the small rural settlement of Khirbet 'Aloki (see below), a compelling case can be made for a virtual cessation of settlement over the plain for some 200-300 years. When examined in more depth, however, the field evidence is contradictory and at present the post-Assyrian period represents more of an archaeological dark age than a definite period of abandonment.

Crucial to the interpretation is the recognition of post-Assyrian pottery (see Appendix A). Excavated assemblages have been described by Curtis (1989) and Goodwin (forthcoming). The small number of possible post-Assyrian diagnostics were recognized too late in the project (1990) and were too few in number to be of value in producing distribution maps. By the 3rd century BC, however, a local Hellenistic pottery assemblage came into use (Oates and Oates 1958). Like the coins from Nimrud, the north Mesopotamian Hellenistic pottery suggests a significant influence from western Syria, Greece and Turkey, although the imported fine wares are much less common. However, as described in Appendix A, and confirmed by excavations at Khirbet 'Aloki, there is a distinctive local pottery assemblage that differs significantly from that of southern Iraq. This enabled the Hellenistic settlement pattern to be readily pin-pointed and contrasted with that of the Late Assyrian period.

The Settlement Pattern

The Hellenistic settlement pattern virtually replicated that of the Late Assyrian period (Fig.43) and only a

small number of sites were either abandoned or established. Settlement continuity, at 50%, is remarkably high for the area, suggesting that either a large number of Late Assyrian settlements were re-occupied in the Hellenistic period or that occupation continued right through the intervening post-Assyrian period. Such continuity is counterbalanced by the fact that on some sites the locus of settlement shifted within a site, often from one mound to another. Nevertheless such continuity, which exceeded that of all other periods, suggests that occupation continued between the two periods; certainly it would be rash to argue for a large-scale abandonment of the plain from such data.

The number of Hellenistic sites (76) is hardly less than for the Late Assyrian period (77) and from this, and the record of settlement continuity, it can be concluded that the pattern of Hellenistic settlement differed little from that of the Late Assyrian period. In other words, the Late Assyrian policy of re-settlement of the desert appears to have determined the pattern of rural settlement for at least the rest of the 1st millennium, perhaps until the mid-1st millennium AD (see below).

Although some post-Assyrian or Achaemenid sherds may have been present on the main mound, Tell al-Hawa was not occupied during the Hellenistic period. This was demonstrated by detailed survey in 1986, followed by excavation by Warwick Ball in 1987 and 1988. The latter programme demonstrated that following the abandonment of the high mound in or immediately after the Late Assyrian period, there was no resumption of activity there until the Parthian period. In view of the absence of occupation deposits and structures of this period, it seems that the recovered pottery may come from a small Parthian cemetery (Ball 1990a:82). With the abandonment of what had been the prime settlement of the region, probably at the same time as the sack of Nineveh, settlement developed at three small rural Hellenistic sites located between 1 and 2 km from Tell al-Hawa. As indicated on Fig.41, these were positioned only half as far from Hawa as its Bronze Age satellites, thus placing them well within the zone that had been intensively cultivated during the 3rd and early 2nd millennia BC. Particularly close was Hellenistic Site 8 which, although perhaps little more than a farmstead, was located within the hypothetical territory of the much-diminished Late Assyrian Tell al-Hawa.

The demise of Tell al-Hawa meant the loss of the former administrative centre of the plain and, for the Hellenistic period, there is no obvious successor. Kharaba Tibn (43) remained small, with a Hellenistic settlement located upon a low mound immediately to the east. Little is known about the status of Hellenistic settlement at the other former centres of Abu Kula or Tell al-Samir but in the brief visits that were made to these sites no significant scatters of Hellenistic pottery were observed. In fact no Hellenistic sites greater than 7.5 ha were found within the project area and even the largest sites, 9 and 69, with Hellenistic pottery scatters falling in the range 5-7.5 ha (Fig.44), showed no signs of being of special significance at this time. None showed evidence of monumental masonry (frequently revealed by limestone blocks from major walls or their foundations) or noteworthy concentrations of high-quality imported pottery.

It can only be concluded that the 475 sq km of land surveyed included no obvious centre; there was little in the way of a settlement hierarchy and the pattern of settlement was primarily a dispersed scatter of small farmsteads, villas and/or "manors" The range of pottery, although well-made, was not unusually fine and, with the exception of 10 pieces of black gloss ware imported probably from Greece (1 perhaps being from Turkey, Mckenzie nd), there was little evidence for the import of fine quality pottery (Appendix A). In general, within north-western Iraq no major Hellenistic centres have been recorded, the largest known to date being that at Nineveh. Although it is difficult to estimate the size of this settlement, finds of Parthian/Hellenistic date from Kuyunjik (Thompson and Mallowan 1933, pls. 75 and 76), Parthian/Hellenistic religious architecture from between Kuyunjik and Nebi Yunus (Scott and MacGinnis 1990, 69-71) and Hellenistic pottery to the north of Kuyunjik (Lumsden pers. comm.) together suggest that following the collapse of the Assyrian city, Nineveh must have been revived to attain at least some importance as a religious and/or administrative centre (Oates 1968a:61).

Routes

Although there is evidence of settlement along all three major SE-NW hollow ways (Fig.43), the dispersed settlement pattern does not allow for any convincing orientation of settlement to be inferred along routeways. Almost as important were a pair of SW-NE routes: 167-138-108 and beyond, as well as 146-142-143-94. A third SW-NE route through Hawa via Site 8, towards Site 9 and towards the Tigris at Abu Dhahir might also have been in operation. Suggested trends in route systems are both SE-NW and SW-NE. Unlike during the 3rd and early 2nd millennium BC, there was no strong relationship between route systems and settlement and there is no evidence for a strong SE-NW bias in routeways at this time.

Land Use

No attempt has been made to re-construct site territories but, judging by site continuity and distribution, these would have been similar to those of the Late Assyrian period. In spite of the presence of robust and distinctive Hellenistic rim forms (such as Type 65 jars), Hellenistic pottery is poorly represented in field scatters (Fig.51). Detailed field scatter sampling around Khirbet 'Aloki showed that the density of field scatters fell off rapidly away from that site to produce only a small halo of higher counts. Land use may therefore have been moderately extensive with each settlement being surrounded by an agricultural territory of radius c. 1-2 km. To judge by the meagre field scatters, the use of settlement-derived manure was less important than during the Late Assyrian period and the main agency of soil fertility restoration was probably the use of fallowing in alternative years.

Excavations at Khirbet 'Aloki (Site 113)

Khirbet 'Aloki (Site 113) was selected for partial excavation in order to determine if there was continuity of occupation between the Late Assyrian and Hellenistic periods. It was convenient because of its small size and its surface pottery scatter, which included both Hellenistic and Late Assyrian types. Thus if there was continuity of occupation it should have been possible to demonstrate this within a stratigraphic sequence. An additional advantage was its location within a corridor of Middle Assyrian non-settlement. It was therefore necessary to demonstrate whether the site was a new foundation during the Late Assyrian period.

Excavation entailed cleaning some 30 m of E-W section (Trench G) and opening a further 10 m of N-S sections through the main 1 ha mound (Trenches H and J). An additional small sounding (Trench K) was dug to the west of H/J to expose the Late Assyrian levels. The main archaeological sequence can be summarized as follows (from earliest to latest):

a) *Ubaid.* The base of the sequence comprised 30-40 cm of pale olive-grey silts locally partly altered by the development of a calcium carbonate-enriched soil profile, probably as a result of abandonment in antiquity. The deposit was thickest in the main E-W section (trench G) and diminished in thickness to the S. Both painted and plain Ubaid pottery was recorded.

b) *Late Assyrian.* A brown silt loam with few distinguishing features overlay a. The main contexts G8 and K8 were characterized at the top by a thin, roughly horizontal horizon of brown weakly-structured soil with a distinct upper boundary. Although lacking well-developed pedogenic features such as calcium carbonate concretions, the horizon appears to occupy a phase when the site was abandoned. Tentatively this weakly-developed soil horizon combined with the lack of potential post-Assyrian ceramics or any archaeological continuity in these levels suggests that the horizon represents a brief phase of some 200-300 years of abandonment.

c) *Hellenistic.* Above b occurred a wide range of occupational contexts including, towards the base, a mud-brick wall flanked by a pavement constructed of baked bricks and one or two re-used bowl sherds. The wall and pavement were cut by a complex of pits some of which were contemporary with them, others being later Hellenistic or Parthian. The pit sequence proved complex and dates could only be suggested from the levels from which they were dug. The distinction between Parthian and Hellenistic pits proved difficult because of the continuity between Parthian and Hellenistic pottery types as well as the presence of much residual material that was incorporated into the pits from the levels that had been cut or from elsewhere.

d) *Parthian.* The uppermost levels of the site, were only 20-40 cm thick. During the c. 1700 years since abandonment they had been transformed into a weakly-developed soil horizon. In addition to some storage pits at least one "ghost" of a mud-brick wall was evident within this developed soil profile.

Conclusions.

The 40 m length of trench excavated combined with intensive surface sherd collection, both on- and off-site, provided a representative selection of contexts from this small site. The absence of Middle Assyrian pottery from both surface and excavated levels demonstrated that the site was re-founded in the Late Assyrian period, although when in this period is uncertain. It was apparently abandoned again at the close of this period, perhaps as a result of the collapse of the Assyrian empire. During the Hellenistic and Parthian periods the small settlement may well have been continuously occupied. Storage of grain clearly took place in a large number of well-constructed storage pits. The main mound to the south was abandoned during the Parthian period and, although there was a suggestion of late Parthian or early Sasanian occupation on the smaller north mound, by the time the main range of diagnostic Sasanian ceramics came into use, the site had been abandoned.

Discussion

The record of settlement suggests either that rural settlement did continue from the Late Assyrian period or that if there was a collapse coinciding with the fall of Nineveh, there followed a few hundred years later a period of rapid re-colonization of the same sites. The abandonment of Hawa can be plausibly ascribed to the Babylonian or Median invasion in 612 BC at which time there was a general decline, although not necessarily a total collapse, of the main administrative and religious centres. However the apparent abandonment of Late Assyrian Khirbet 'Aloki suggests that rural settlements were not exempt from the general sack. Abandonment of such sites may mean that the inhabitants were either killed or fled to the desert to become nomads. Alternatively, being a transplanted population, many may have taken this opportunity to return to their native or ancestral lands. This argument is particularly apposite for Khirbet 'Aloki which, being in the corridor of Middle Assyrian non-settlement, was very likely to have been founded as a result of Late Assyrian settlement or deportation policy. Other Late Assyrian settlements with a longer history of occupation, such as those along the northern and southern hollow way routes (e.g. Sites 115 and 140), may have been inhabited throughout the post-Assyrian period. Also of significance is the apparent continuity of site territories that is implied by the continuity of many of the settlements. Therefore, even if the actual houses were abandoned, it is possible that the now nomadic inhabitants returned periodically to plough, sow and harvest their fields, rather in the manner that was practised in the area east of Nisibis in the 19th century (Buckingham 1827:460).

The adaptation of the Late Assyrian rural population to the crisis resulting from the collapse of the Assyrian empire may have entailed the abandonment of centres and certain rural settlements as well as some permanent migration or transhumance. In addition there was probably some continuation of settlement, probably at subsistence level, on a significant but unquantifiable number of sites.

The pattern of Hellenistic settlement described above is quite different from that described for the Seleucid period in Syria. There, new urban foundations acted as major centres and stimulated the growth of rural settlements and the expansion of settlement along the desert frontier (Grainger 1990:118). In the west, new foundations predominated whereas in the north Jazira the Hellenistic pattern of settlement closely resembled that of the Late Assyrian period but was slightly diminished in scale. The proliferation of storage pits on Hellenistic sites such as Khirbet 'Aloki, Mohammed Arab (Roaf 1984) and Grai Darki (Curtis *et al.* 1987/88:52) suggests that grain was stored locally, presumably for local subsistence use. Certainly, by the Hellenistic period, all vestiges of the Early Bronze Age settlement hierarchy had been lost.

Parthian (100BC-250AD)

In spite of some cultural continuity between the Seleucid and Parthian periods, a distinctive assemblage of Parthian pottery was recognizable. Because the reference collection for the Parthian period was largely drawn from parallels from 3rd century occupation levels at 'Ain Sinu (Oates 1959), sites indicated as Parthian on Fig.43 are likely to belong to the later phases of the Parthian Empire. The local Parthian assemblage for the north Jazira plain was not isolated until the 1987 field season, therefore sites collected first (that is those visited around Tell al-Hawa in 1986) may be under-represented in Parthian diagnostics. Such sites typically only yielded one or two Parthian diagnostics and were thus registered as "trace" occupations (+ on Fig.43). Trace occupations for the Parthian period, at 23 occurrences, were much higher than for most periods but because the majority of these came from sites around Hawa, this may simply be an artifact of the original procedure of collection and diagnosis. Re-collection may have redressed this imbalance.

A feature of the 'Ain Sinu pottery is the presence of Roman brittle ware, a hard, brittle cooking-pot ware, often corrugated, that is particularly common on Roman sites of the 1st-4th centuries AD in Syria and southern Turkey (Appendix A). This ware (Type 100), which should not be confused with a slightly later brittle cooking-pot ware (Type 75 of the 4th-7th centuries AD), does not occur on Parthian sites of the plain but is particularly evident, for example, at sites such as Tell 'Ibra (Vicat) on the Roman military road between Sinjar and Tel'afar (Ad Pontem?). Such wares may therefore suggest a Roman presence, either as a result of trade or because of a direct military presence at the sites at which they occur.

The decrease in the number of sites from 76 in the Hellenistic to 66 in the Parthian period can be partly accounted for by the under-representation of Parthian sites around Tell al-Hawa. Ceramic continuity at 41%, although lower than the 50% for the Late Assyrian/Hellenistic, rises to 54% if the "trace" occupations around Tell al-Hawa are included. This pattern is supported by the small proportion of sites abandoned and established between the Hellenistic and Parthian periods (20% in each case).

The ceramic and settlement continuity is supported by the excavations at Khirbet 'Aloki, which showed stratigraphic continuity between Hellenistic

and Parthian occupations, so that it proved extremely difficult to determine which levels or pits were Parthian and which were Hellenistic.

The number and distribution of Parthian sites resembled that of the Hellenistic except that Tell al-Hawa was re-occupied during the Parthian period. This settlement was only on the lower mounds: F,V and W to the SW overlooking the main hollow way. Such a re-occupation, both small and off the high mound, suggests that Hawa either did not resume its administrative/religious function or that the location of this functional area moved; in fact, by this time it may have been little different from many other settlements on the plain.

Both Hellenistic and Parthian settlements probably occupied a virtually full landscape, a point emphasized by the presence of Parthian sites on the marginal rolling terrain that fringed the Wadi al-Murr basin. Sites such as 77 (Parthian only) and 125 (Hellenistic and Parthian) were very small and possibly developed at the margin of cultivation during this period of high rural settlement density. Many Parthian sites may have been little more than farmsteads, a point demonstrated by the site-size histograms (Fig.44) which show that for the first time since the Uruk period there is a predominance of sites less than 1 ha.

As for the Hellenistic, a settlement hierarchy is lacking, the exception being Site 43, the size of which was perhaps over-estimated owing to the inclusion of a particular large site sub-division (K) in the calculated area of the Parthian site. Nevertheless, even if the calculated area is smaller and falls in the 7.5-10 ha range, which is closer to a realistic field estimate, the site was still large and it probably formed the prime Parthian settlement on the plain.

From the initial invasion of upper Mesopotamia by Trajan in AD 114-115, a Roman military presence can be assumed for at least part of the area. This has been inferred from written sources, such as the Peutinger Table (Gregory and Kennedy 1985) and confirmation is suggested by the field evidence of certain structures. No attempt will be made to describe the detailed history of the Roman presence but, instead, the field evidence will be examined for traces either of possible Roman structures or of Roman artifacts that may have arrived either as a result of direct occupation or by trade.

The most obvious evidence employed by Stein to demonstrate a Roman presence was the recognition of certain rectilinear or geometric structures from the air. These were assumed by their form to be Roman but without field checking for diagnostic pottery this must remain no more than an assumption. Although most of Stein's structures fall outside the survey area, sufficient structures of similar form were examined within the project area to lead us to question the basic assumption that square, rectangular or geometric walled structures were Roman. Careful surface sherding at Sites 4, 47, 54 and 110, all geometric structures but not recognized by Stein, proved to be of Sasanian or Islamic date (see below). Another structure near the village of Mushairfah, suggested by Stein as a post on a Roman road, may correspond to Site 158, an Islamic site with some rectilinear elements. Certainly no geometrical structures within the survey area produced Parthian or Partho-Roman pottery. Conversely, none of the numerous Parthian sites exhibited anything resembling fortified or walled enclosures. In fact, judging by Stein's descriptions, many of the masonry structures with mortared stones [e.g. Tell Huqna (Gregory and Kennedy 1985:103-5)] more closely resemble the Islamic structures of the region in their construction technique.

After some 475 sq kms of land had been surveyed and 184 sites visited, the only significant trace of a Roman presence were fragments of fine brittle ware pottery (Type 100, Appendix A) from the following sites: 32 (3 sherds), 93 (1), 143 (1), 152 (2), 161 (1), 174 (2) and 184 (1). This ware, common on the Severan frontier at 'Ain Sinu (Zagurae) and Tell 'Ibra (Vicat?), was absent from Khirbet 'Aloki as well as most other sites of similar date on the plain. The occurrences of this pottery are indicated on Fig.43, where they occupy the western part of the survey area. Whether this results from our increased awareness of fine brittle ware in the field, or is because there was a genuinely greater Roman presence in the west (as one might expect) is not clear. The greatest number of sherds of fine brittle ware came from Site 32, a low mound complex of no particular distinction located adjacent to the major NW-SE hollow way NW of Tell al-Hawa. The incidence of this pottery on a demonstrable ancient route may be significant, for this may have been one of the major Roman lines of communication (Gregory and Kennedy 1985:103). Site 32 may either have been a small settlement on a major Roman route or a Roman station, although evidence of any distinctively Roman structures is lacking. There is also a partial association of fine brittle ware pottery with other hollow ways. Such small amounts of this pottery cannot be used to demonstrate a Roman presence but, instead, may show that trade with the Roman sphere took place, either within the western part of the area or along these routes. Of these routes, two might have been Roman: a) Uwaynat (92) through Tell al-Samir (93) and Site 161; b) Uwaynat through Tell al-Hawa and past Site 32. In addition, the alignment of Sites 143, 93 and 32, along an intermittent hollow way, may be part of a route linking Singara or Zagorra ('Ain Sinu) with Bezabde near Jazirat Ibn Omar (modern Cizre) on the Tigris, although this is not one of the routes originally noted by Stein (Gregory and Kennedy 1985, map 1).

Without milestones, or Roman structures with a more complete Roman pottery assemblage, such routes can only be seen as possibilities. Another possible route is implied by a hollow way between the suggested Roman fort at Seh Qubba (Ball 1989) and Tell al-Hawa, although in this case the route is marked neither by Parthian sites nor fine brittle ware pottery.

The dispersed pattern of Parthian settlement makes it difficult to determine which other hollow ways were in use, although the presence of Sites 75, 126, 161, 134 and 129 along the various major hollow ways suggest that they probably all continued in use.

The pattern of land use was probably similar to that of the Hellenistic with agriculture being limited to small enclaves, fallowed in alternate years, around settlements. To judge by the continuation and perhaps spread of settlements on to higher rolling terrain, any expansion of agricultural production may have been by the extension of the total farmed area rather than by increased land use intensity.

Discussion

Parthian settlement continued that of the Hellenistic with little change and it appears that the Roman presence exerted little tangible impact. Not only was there no trace of Roman castella or forts but also Roman influence, as measured by the introduction of Roman pottery, was minor.

The Romans' impact on the area must have been localized and in most places the Parthian way of life and the countryside probably remained unchanged. Key sites for the archaeology of the Roman frontier which remain un-surveyed include: Tell Haval, a prominent square enclosure to the north of the main hollow way and north of Site 155; Tell Uwaynat, a suggested castellum, probably now obscured by the modern village (Gregory and Kennedy 1985:107); Gohbal, perhaps the Roman site of Baba, according to Stein (Gregory and Kennedy 1985 :109); a major site surrounded by a square enclosure wall (X on Fig.24) which, although possibly of Bronze Age date, could prove to be Parthian/Roman. Fig.46, which illustrates sites relevant to the Roman, Sasanian and Islamic frontiers indicates that fortified and/or controlling structures were more numerous for the post-Roman period than for the period up to 363 AD when Nisibis and Sinjar fell to Shapur II.

Sasanian and Islamic Settlement

Introduction

Typically Sasanian and Islamic sites appear as low, often irregular, sprawling mounds with conspicuous grey soil colouration and many enclosed hollows. Such morphology and soil colour are particularly evident on the Middle-Late Islamic sites. Sasanian-Islamic sites retain some of the form of the original buildings or building groups as well as any enclosed depressions resulting from the excavation of soil for mud brick or for water-holes (see Chapter 4). Because natural agencies of erosion and sedimentation have had less time to operate, the pottery collected can be more easily related to the constituent buildings. As a result, in the following text there has been a slight deviation from the practice of listing and plotting sites followed previously. Significant sedentary occupations of the given period are now recognizable from the combination of site morphology and pottery assemblage.Therefore on Fig.45 significant occupations are >6 sherds on site areas that are morphologically recognizable as late. Minor occupations, still defined as <5 sherds per site, are only associated with rounded, regular mounds that morphologically appear to be earlier (details of sherd counts per site are given on Table 11). Such occupations are probably not sedentary but result from visits by nomads or other transient occupants.

Trace occurrences of less than six Sasanian or Islamic diagnostics per site are shown on Table 12. This cannot be explained away as a result of burial by later occupations, neither is there a problem of non-recognition of diagnostics, as for example was the case for the Parthian sites surrounding Tell al-Hawa. Rather, it is suggested that during the Sasanian and Islamic periods, when sedentary settlements accommodated less of the population, nomadism or transient settlement increased with the consequence that occupations were brief and there was less discarded pottery. It can be commonly observed today that bedu tend to pitch camp on low, pre-existing mounds but when they leave, only a very sparse scatter of waste, including perhaps a stray pot or two, will remain. Such transient occupation, often on multi-period sites, is quite different from the true sedentary settlements described above.

Sasanian (c. 250 AD- early 7th century)

Although Sasanian pottery types were recognizable (such as the distinctive animal-stamped ware:Type 78), in order to build up a type assemblage, a number of types were added. Although these were probably in use during late Sasanian times, they also continued after the Islamic conquests. Consequently, the ceramic types are not tidily contained within the Sasanian period and the sites indicated on Fig.45 were also occupied during the early stages of the Islamic empire. Although the chronological period may commence in 224 AD with the defeat of Artabanus V by Ardashir, in terms of the Roman

presence the capture of Valerian by Shapur I was a key event. More relevant to the local area, the capture of the towns of Singara and Nisibis by Shapur II in 363 AD remains a turning point, after which the Romans were not to return.

The coarse, gritty pottery described in Appendix A was conspicuous in the field, with specific types such as jug and amphora handles, stamped wares, coarse brittle wares and smeared or honeycomb wares providing a good range of diagnostic types. However, these ceramic types showed a tendency to merge with some Abbasid and Middle Islamic wares, as will be shown below.

For the first time since the Late Assyrian period there is clear evidence for settlement decline. The total number of sites declined from 66 in the Parthian period to 51 with Sasanian and Early Islamic occupation. This is matched by a decline in the percentage site continuity which was down to 33% from 41-54% in the previous period. As a corollary, more sites were abandoned than were established. Fig.45 shows significant voids in the settlement pattern, which apparently result from the abandonment of sites during late Parthian or early Sasanian times. This process is illustrated by Khirbet 'Aloki (Site 113), where occupation had ceased by the time the full Sasanian/Islamic assemblage had come into use.

Site size histograms reveal a shift from smaller farmsteads or hamlets of < 1ha during Parthian times to more extensive, sprawling villages (Fig.44). Although the largest site within the survey area was at Tell al-Hawa, three other large sites were present to the north and west at Chilparat, Bir 'Uqla and Jazruniya (see below and Fig.46).

A conspicuous feature is the appearance of square, rectangular or geometric walled enclosures. Usually these comprise an earthen bank that can vary in size from 20 m square upwards. The best example, Site 54, is illustrated on Fig.7. Initial growth during the Hassuna period must have left a small mound which became the focus for the development of a settlement in the Late Sasanian or Early Islamic period. Growth occurred around the enclosed depression of a water source (see Chapter 4) and continued into the Middle Islamic period. It is not clear whether settlement was continuous but surface pottery suggests that the settlement was established in the Late Sasanian and came to an end at the close of the Middle Islamic period (i.e. 6th-13th/14th centuries). The date of the pentagonal enclosure wall is unclear but a Late Sasanian/Early Islamic date is tentatively suggested here. The site was regarded by Fiey as a Roman fort (Fiey 1964: 111, after Palgen) but such a date cannot be sustained owing to the total absence of Parthian-Roman pottery. Gaps in the enclosure wall probably indicated the position of gates, the western gap being oriented on a hollow way as shown on Fig.7. (The overall route of this hollow way is inferred from other lengths of hollow way on Fig.24).

A square enclosure on the edge of Site 110 is of Sasanian/Early Islamic date according to the abundant surface ceramics. The square bank may either be a dumped earth embankment or consist of collapsed mud bricks. Other square enclosures, but probably of Early Islamic date, are those at Sites 4 and 47 (Fig.46).

For the first time carved stones appear as surface finds; for example, Site 129 yielded a single fragment of a possible limestone door lintel, with a cross carved in low relief (Fig.81.7). Such relief carvings can occur on early churches or monastic buildings and this stone may indicate an early Christian site established on this southern hollow way route.

Discussion

Two themes, possibly related, emerge from the above evidence. First, there is now clear evidence of settlement decline with the abandonment of certain areas. The development of open space and "waste" may have been associated with the appearance of nomads and pastoralists. Second, fortified enclosures start to appear. The appearance of open space agrees with the textual evidence cited by Oates, which suggests that large parts of the Jazira were deserted and waterless by the 4th to 6th centuries AD and became logical sites for the establishment of monastic complexes such as Qasr Serij (Oates 1968a:95).

The appearance of walled or embanked enclosures represents a new element in the landscape of the north Jazira. The small square enclosures are Sasanian/Early Islamic (Site 110) or Early Islamic (Sites 4 and 47); none show any evidence of being occupied during Partho-Roman times. Such small forts may have been simply guard posts along routeways (see Fig.46). The alignments of square enclosures shown on Fig.46 may be of similar date and may have served a similar function. On the other hand, the more extensive Site 54 was probably a large defended settlement, analogous to three other apparently walled settlements located to the north of the project area on Fig.46 (Chilparat, Bir Uqla and Jazruniya). Although not well dated, all three have, on air photographs, the distinctive building morphology of Sasanian/Islamic settlements. Furthermore, Jazruniya has been dated, in part, to this period (i.e. Sasanian, Middle and Late Islamic: Ball, Simpson and Tucker forthcoming). The presence of fortlets, guard posts, fortified enclosures and walled settlements apparently from the Sasanian period may result from the decrease in security that accompanied the decline of settled life. Settlements like Site 54

may have been constructed to police the area of desert and its mobile population of Tayyaye bedu, whereas other smaller enclosures may have controlled the major routes.

Alternatively, the increase in the number of fortifications after the 4th century may relate to the defence of the Sasanian frontier against the late Roman and Byzantine empires. Certainly Dara, located some 6 miles NW of Nisibis, was constructed to provide the Roman army with a secure base for attacking Nisibis, the frontier being west of Nisibis and some 5 km from Dara (Whitby 1986:726-7). A number of fortifications in the Tur Abdin strengthened this part of the frontier and it can be suggested that the Sasanians built a similar system of fortifications. According to Procopius, there was in the 5th century an agreement between the local Roman administrators and the Persian king that neither side would henceforth construct fortifications close to their mutual frontier (Rabin 1986:682), the implication being that at other times fortifications were built. Furthermore, Theophones described systems of fortifications along the Lesser Zab and elsewhere to the SE of Nimrud, which may have constituted part of a frontier "in depth" to rival that on the Roman/Byzantine side. (We are grateful to St John Simpson and J.Howard Carter for the suggestion that there may have been some form of Sasanian *limes* in this region). Whether the north Jazira enclosures represent some form of *limes* or were simply to control or police the desert is impossible to say without further fieldwork.

The Islamic Period

Despite recent advances in our knowledge of Sasanian and Islamic pottery from work carried out at 'Ana, Samarra and in a number of recent rescue projects, it is still difficult to sub-divide satisfactorily the archaeological sequence of the north Jazira. The conservatism of pottery tradition that enabled the earliest Islamic (7th and early 8th century) to be combined with that of the later Sasanian leaves the remaining Islamic period to be broken down into Early Islamic (Abbasid: 9th/10th centuries, including the distinctive Samarran glazed wares), Middle Islamic (11th-13th centuries) and Later Islamic (14th century and later).

Although an apparent Abbasid assemblage was isolated at the small, short-lived Site 4, a distinctive corpus of glazed Samarran pottery was absent from most sites. Glazed wares (Type 74A) are ambiguous and of Sasano-Islamic type, therefore eggshell wares ("thinware" of Northedge and Falkner 1987:163) and cream-wares (Types 80 and 84) were used to refine the chronology. The recognition of a corpus of Middle Islamic and Later Islamic ceramics enabled the later phases to be recognized, although unfortunately not in sufficient detail to relate the settlements to individual historical periods.

For the purposes of settlement distribution (Fig.45), preliminary processing sub-divided the sites into two phases: the Sasanian-Early Islamic and the Middle-Late Islamic, according to the types given in Appendix A. In order to refine this dating scheme, a finer sub-division has been attempted using those types listed at the head of Table 11. The resultant six phases: Sasanian (3rd-6th centuries); Sasanian/Early Islamic (4th-7th centuries); Early Islamic (8th-10th centuries); Middle Islamic (11th-13th centuries); Middle-Late (11th-15th centuries) and Late Islamic (14th and 15th centuries or later), being based upon more specific diagnostics, result in fewer diagnostic sherds per site and some sites being under-represented. This is particularly evident for the Sasanian, Middle Islamic and Late Islamic which either have few diagnostic types or types that are quite scarce. Therefore such chronological refinements, by discarding the longer range or more ambiguous types, can hamper the dating of sites by restricting sample size. Nevertheless, Table 11 provides support for the coarser data by showing the following: first, there was a decline in the number of occupied sites from 28 (Sasanian/Early Islamic), through 22 (Early Islamic) to 18 (Middle-Late Islamic), figures that rise to 41, 37 and 25 respectively if sites with 3-5 diagnostics are included; second, the number of trace occupations (1-2 diagnostics per site) is consistently high, in many cases out-numbering significant (sedentary) occupations. These sparse occurrences may indicate transient occupation by nomads.

The preliminary sub-division into Sasanian-Early Islamic and Middle-Late Islamic (not shown on Table 11) indicates a dramatic decline in occupied sites from 76 (Hellenistic), 66 (Parthian), 51 (Sasanian-Early Islamic) to 28 (Middle-Late Islamic). It is clear from Fig.45, however, that the plain was not entirely depopulated by the Middle-Late Islamic period. These sites were conspicuous on the ground and varied from small sites such as Huwaysh (Site 102: c. 2 ha) excavated by Moslem Mohammed for the Department of Antiquities, to the 8 ha site at the foot of Tell al-Hawa. Because the Middle Islamic pottery assemblage comprised distinctive glazed (Type 94) and Sgraffiato wares (Type 82), the distribution of these sites is quite reliable. Our meagre knowledge of the post-14th century pottery of the plain (high quality imported wares were rare) makes it difficult to quantify the post-Ilkhanid settlement decline. Nevertheless, using the limited range of Late Islamic wares, it seems there was a continued decline after the 13th century, so that when the area was first visited by European travellers, it was largely unsettled (in both senses of

the word). The impression gained from survey is that, although elusive, there was some settlement between the 14th and 19th centuries, but this was probably just a sparse scattering of transiently occupied villages.

Land Use and Communications

There is little evidence for post-Parthian land use or communications. With the gradual decline in settlement numbers (and presumably population) land-use intensity must have declined. There are no signs from field scatters that settlement-derived manure was much used, a situation that contrasts radically with areas to the NW (Kurban Höyük in SE Turkey, Wilkinson 1990a) and in southern Mesopotamia where, during a similar phase (4th-6th and 4th-9th centuries respectively), field scatters were very well-developed. Probably large areas of the north Jazira were steppe, "desert" and pasture, with only limited enclaves being cultivated around sites. Such cultivation probably incorporated generous fallow intervals.

Although the main inter-regional hollow ways probably continued in use, the grouping of settlements along them is not sufficiently distinctive to indicate which routes were preferred. The only hollow ways that can be assigned to the Islamic period are the radial (but still multi-period) system around Site 67 and the route associated with the above-mentioned enclosure, Site 54.

Discussion

The above description of the Islamic archaeology provides at best a skeletal view of what the area must have looked like. In contrast, in his description of the Abbasid road from Mosul to Nisibis, Fiey equated modern Uwaynat with the district of Ba'aynatha, described by Mukaddasi as lying "in the midst of 25 fertile districts, the richest and pleasantest of all Mesopotamia". Although this may rather overstate the delights of late 20th century Uwaynat, there are some underlying similarites: for example, both names refer to the presence of springs (*'ayn*) which, although now usually dry, were present in some quantity when 19th century travellers visited, that is, before the water table was lowered by numerous pumped wells. Such accounts which describe the valley downstream with its springs and reed-fringed pools conjur up a more verdant and pleasant landscape than that of today. The reference to some 25 fertile districts may simply be to the various nearby settlements and their surrounding fields, which undoubtedly were fertile. Fiey's equation of Ba'aynatha with the valley of Hawali, one of the valleys of Rabi'a, also seems reasonable because Hawali (possibly a Turkish derivative of al-Hawa) might refer to the district of Tell al-Hawa. Support for the location of the river Alhauli is provided by a map of Mesopotamia in the Bodleian Library which shows this river flowing towards the east and south of Barcaid (Barqa'id) and north of the Sinjar hills (Bourgignon d'Anville 1779, in Bodleian Library; Jeremy Black, pers.comm. 1989). Unfortunately the locations of Sinjar and Tel'afar are wrong relative to the Jabal Sinjar and this map remains geographically ambiguous.

Barqa'id, the next point on the road to the NW, was notorious for the thieving ways of its inhabitants (Le Strange 1905:99). Its location, some 11-13 parasangs from Balad (Eski Mosul) represents a distance of some 63-75 km, which places Barqa'id at either Chilparat or at the c. 1 sq km walled site at Bir 'Uqla (Fig.47, Fiey 1964:114). The sizeable town of Barqa'id reportedly contained some 200 shops and was supplied with many springs of excellent water. According to Istakhri it was set among extensive fields of wheat and barley (Paul Wheatley pers.comm. 1993). Its position along the road between Nisibis and Mosul enabled it to function as a caravan-provisioning town located at a junction where the road to Jazira Ibn Omar branched off the main Nisibis road. Although there is no very convincing branching of the hollow ways at either of the above-mentioned sites, there is a junction some 10 km E of both sites and at c. 7 km W of Tell al-Hawa. According to modern 1:500,000 maps, the track to Cizre (i.e. Jazira Ibn Omar) branches off in the vicinity of Bir 'Uqla. The Bir 'Uqla site lies within the main north bank tributary of the main Wadi al-Murr. This clearly had the most perennial channel in antiquity and is the valley which had the greatest number of wells in the recent past (note: there are several place names, Bir (well) 'Uqla, on modern maps), some of which are likely to have had springs as precursors. Therefore, although the historical descriptions barely resemble the modern reality, both the presence of the large sites and the general geography make Fiey's attribution reasonable. Only the so-called "Roman fort", located some 3.5 km north of Uwaynat (Fiey,1964:111 = Site 54), which is clearly Sasanian and Islamic can be found to be erroneous, but this does not affect the general thrust of Fiey's argument. Barqa'id, the birthplace of the Hamdanid rulers, although at its height in the 9th century, declined in the 10th century once the route that passed through it ceased to be used and by the 13th century it had declined to little more than a village (Yaqut; see Fiey 1964:111, and Le Strange 1905:100).

Because the above candidates for Barqa'id lay outside the project area they remained unvisited during the survey but clearly deserve detailed

examination in the future. The decline of Barqa'id seems to follow the trajectory of settlement decline in the area, one that can be followed by the records of both archaeological survey and various texts.

The historical record provides a dismal picture of deteriorating economic and social conditions. As early as the 6th and 7th centuries AD, written sources, especially those in Syriac, present a succession of imperial wars, famines, plagues and locusts; building projects were mainly either defensive structures or religious buildings such as churches and monasteries (C. Robinson pers.comm. 1991). This accords well with the archaeological record of a significant post-Parthian decline in settlement as well as the appearance of defended enclosures and square fortlets (see above, Sasanian period).

Nevertheless, even as late as the 8th-9th centuries AD, Upper Mesopotamia was recognized as a large cereal-growing area supplying parts of the south with wheat that was shipped down the Tigris and Euphrates (Ashtor 1976:42). Although some of this production may have taken place in the north Jazira, there is no evidence that there was any peak in rural population that might have been associated with such production and it seems that the emphasis on grain production may have been in those parts of Upper Mesopotamia within easy reach of river transport.

Long-term decline in agricultural production is attested by the records of Islamic land tax (*kharaj*). When the records for Mosul, Tarik, Furat, Diyar Mudar and Diyar Rabia are combined as a general statistic for Upper Mesopotamia they indicate a progressive decline in *kharaj* returns from almost 3 million dinars (dirham equivalent) at around the time of Harun al-Rashid (c.800 AD) to 80,000 dinars in c. 960 AD (Ashtor 1976:63,173). Similar data has been assembled by al-Feel to demonstrate that the Jazira region showed a progressive decline from 58 million dirhams c. 810 AD to 11.55 million in 1335 AD (al-Feel 1965: Table 4). Such declines, although only approximations, give an impression of the amount of productive land in use, which in turn must have been related to the amount of productive rural population and settlement. Such decline was probably unevenly distributed across the landscape and would have been less adjacent to major transport arteries such as rivers. Also Mosul, with an area of some 292 ha, appears to have been a thriving centre at this time (Ashtor 1976:89). In general, the Abbasid period was one of unprecedented urban growth (Adams 1965:98), therefore some of the population decline indicated by the archaeological record and implied in the declining *kharaj* returns may result from migrations to growing centres such as Baghdad, Basra and Samarra, as well as changes in the overall geography of agricultural production.

According to Ashtor the Islamic period witnessed a steady decline in the population of Upper Mesopotamia which can be summarized by the following notes (Ashtor 1976; page numbers in brackets): expansion in the number of beduin in north Mesopotamia in the first half of the 10th century (158); evidence of pillaging of settlements, but some sedentarization of beduin as well (158); evidence of plagues in late 10th and early 11th centuries (170); decline of population in upper Mesopotamia in late 10th century; a decline of Mosul, Dara and Balad (Eski Mosul) (169); late 10th and early 11th centuries, revolts at several towns in upper Mesopotamia including Nisibin (183,187); further urban depopulation in 11th and early 12th centuries (218); earthquakes and famines throughout 11th and early 12th century (218); according to Yaqut, Barqa'id declined to a village by mid-late 13th century (221); immigration of Turcoman tribes brought about a shift from arable to pasture in the 12th century (223).

This catalogue of disasters, periodic unrest and increasing nomadism was only interrupted by a spell corresponding to the reign of Nur ad-Din and the Ayyubids in the late 12th and early 13th centuries when there was some evidence of urban expansion, some growth of new town quarters and the construction of caravanserais (Ashtor 1976:230). Such growth may correspond to the occurrence of distinctive Middle Islamic settlements recorded on the north Jazira plain but is only evident if one interpretation of the archaeological record is used (above p.71). Otherwise the overall trend is one of fairly consistent decline. Not only does such decline pre-date the Mongol invasions and the rule of the Ilkhanids but it becomes particularly evident after their collapse particularly during the reign of the Jalairids and the Turcoman tribal leaders of the Kara Koyun and Ak Koyun (the Black and White Sheep) during the 14th and 15th centuries. The proportion of sedentary to transient settlement for the period from the 14th to the 19th centuries is difficult to assess but some villages may have been intermittently occupied. This accords with the records of Ottoman *defterler* which indicate that the plains around Sinjar and Nisibis, although largely unoccupied during the post-Ilkhanid periods, did develop occasional villages, specifically during the 16th century when there was more administrative control of the area (Hutteroth 1990: 179). Uncertainties in the ceramic record do not allow the written record to be related to the archaeology but, clearly, after the Parthian period there was a progressive decline in settlement and presumably cultivation, only punctuated by occasional episodes of prosperity and growth such as that of the Ayyubids. However, in contrast with the Late Assyrian to Parthian periods, Sasanian and Islamic times apparently witnessed the growth of

occasional substantial towns, some of which, such as Barqa'id and Eski Mosul, attained areas approaching 100 ha. Rural-urban migration within Upper Mesopotamia may therefore account for some of the post-Parthian decline in rural settlement. The sparse archaeological record that is apparent for the Late Islamic period cannot simply be blamed on the lack of a distinctive assemblage of diagnostic pottery. It seems that, like the Syrian Jazira (Lewis 1955:49), the north Jazira of Iraq was largely deserted by the 19th century and was mainly inhabited by pastoral nomadic tribes, despite its obvious potential fertility.

Table 11. Counts of diagnostic pottery for Sasanian and Islamic sites (note: because more specific diagnostics have been used, there are some discrepancies between Table 11 and Fig.61, so that some sites or periods are under-represented in this table)

Types used:	
Sasanian:	Types 69, 70, 77, 78
Sasanian and Early Islamic:	Types 71, 72, 73, 74B, 75, 79, 139.
Early Islamic:	Types 74A, 80, 83, 84, 123 [+81*].
Middle Islamic:	Types 82, 122.
Middle-Late Islamic:	Types 91, 94, 97, 98.
Late Islamic:	Types 92, 93, 95, 96.
Undifferentiated Islamic:	Types 85, 86, 87, 89, 90 (not counted in Table 11)

* Type 81 continues into Middle/Islamic

Site No.	Sas.	Sas./E. Islamic	E. Islamic	Middle Islamic	Mid/L. Islamic	Late Islamic
1	-	+	+	+	+	+
2		1	1	-	-	-
3	-	1	-	-	-	
4	-	10	44	1	1	-
5	-	-	3	-	-	-
6	-	4	4	1	28	4
7	2	-	-	-	-	-
8	-	12	7	2	25	2
9	-		3	-	21	4
10	-	-	1	-	-	-
11		7	18	8	16	5
12	-	-	-	-	3	2
14		1	-	-	-	-
15	-	8	3	4	19	2
17	1	-	-		-	-
18	-	-		-	-	1
19	-	3	12	7	25	13
23	-	-	-	-	-	1
24	-	1	-	-	-	-
25	-	5	-	-	-	-
26	-	-	1	1	-	-
27	-	1	-	-	-	-
28	4	9	8	3	23	5
29	-	1	1	1	1	-
30	-	1	-	-	-	1
31	-	-	1	-	-	-
34	-	1	2	11	37	15
35	-	2	3	-	1	-
37	3	41	11		-	-
38	-		7		26	4
39	-		-	-	2	1

Site No.	Sas.	Sas./E. Islamic	E. Islamic	Middle Islamic	Mid/L. Islamic	Late Islamic
40	-	-		-	1	-
42	-	32	7	2	9	7
43	14	59	12	5	21	15
44	-	-	3	-	-	
45	-	-	-	-	-	1
46/48	-	1	1	-	-	-
47	-	3	12	4	3	1
48	-	-	1	-	1	-
50	-		-	-	2	-
51	-	2	1		-	-
52	-	1	3	-	1	-
53	1	-		-	1	
54	1	69	57	1	28	47
55	-	1	-		1	
56	1	1	1		-	-
57	-	-	1	-	1	
58	7	15	1	-	3	1
59	-	-	-	-	2	1
60	1	3	5	-	2	-
61	23	18	2	1		4
62	-		1	-	-	1
63	-		-	1	3	1
65	2	7		-	-	-
67	4	58	27	17	28	20
70	-	-	1	-	-	
72	-	-	-	-	1	-
74	-	3	-	-	-	1
75	6	67	41	-	2	-
78	-		1		-	-
83	8	46	35	-	4	-
86	-	-	-	-	-	1
89	-	-	-	-	1	-
90	-	1	-	-	-	-
91	-	-	1	-	4	-
93		1	-	4	2	1
94	1	1	-	-	-	-
95	-	-	-	-	4	2
96	1	1	-		11	-
99	1	1		-	1	2
105	1	-	2	-	-	-
107	3	1	-	-	-	2
108	1	2	1	-		-
109	1	1			-	1
110	2	17	12	-	-	-
112	1	-		-	-	-
113	1	1	-	-	-	-
115	1	4	-	-	-	-
117	-	-	-		-	1
118	-	1	-	1	5	-
121		1	1	-	-	-
123		-	1		-	-
124	-	-	1		-	-
126	2	1	-	-	-	-
128	-		1			-

Site No.	Sas.	Sas./E. Islamic	E. Islamic	Middle Islamic	Mid/L. Islamic	Late Islamic
129	13	19	-	-	-	-
130	1	-	3	-	-	-
134	2	1	2	-	-	-
135	-	4	5	-	23	-
138	-		1	-	1	-
139		3		-	-	-
140	1	3	1	-	-	-
142		8	-	-	-	-
143	3	52	37	-	1	1
144	-	-	1		-	-
145	1	11	2	-	-	-
146	-	-	2	-	-	-
147	-	1	-	-	1	-
152	-	3	5	-	-	-
153		2	5	1	1	-
154	-	3			-	
156		1	8		-	-
157		2	4		-	-
158		1	10	1	18	2
159	-	11	1		1	-
160	-	-		-	1	-
163	-	1		-	-	-
165	-	-	-	-		2
166	-	3	3	-	-	-
169	-	1	-	-	-	-
173	-		1		-	-
174	2	40	13		-	-
175		-	2	-	1	-
176		1	13	-	-	-
177		15	6			-
178	1	11	1	-	6	3
179	-			-	1	
182	-	15	-	-	-	-
183	-	7	2	-	-	-
184	-	10	3	-	-	-

Note: The low counts of Sasanian and Middle Islamic diagnostics are simply the result of the typology; many wares of Sasanian date are included within the category Sasanian/Early Islamic; equally, many Middle Islamic wares are present in the class Middle -Late Islamic.

Table 12. Number of Sasanian and Early Islamic diagnostics per site (i.e. Sasanian, Sasanian-Early Islamic and Early Islamic in Table 11)

No.of Diagnostics per Site	**No.of Occurrences**	
1	17	}
2	11	}
3	6	}
4	2	} Transient
5	4	} Occupation
6	1	}
7	0	}
8	0	}
9	1	
10-20	1	]
21-30	3	]
31-40	2	]
41-50	2	]
51-60	6	] Sedentary
61-70	1	] Occupation
71-80	0	]
81-90	0	]
91-100	1	]
>101	4	]

CHAPTER 9

Overview: Settlement, Land Use and Communications Through Time

Introduction

The previous chapters have been either thematic or devoted to the details of chronological phases. This final chapter will now review the dynamics of settlement during some 9000 years, in particular: aggregate settlement area (as a substitute for regional population), the number of settlements, population density, settlement continuity and rank size curves. The growth and distribution of Early Bronze Age settlements will then be viewed in relation to pre-existing systems of Chalcolithic villages and the mechanism of growth from village to urban centre will be examined with specific reference to land-use intensity. There follows a discussion of the relationship of settlement patterns, specifically those of urban centres, to inter-regional route systems. Finally, an attempt will be made to see how external factors such as trade in specific items and climatic change may relate to the settlement patterns that have been described.

It must be reiterated that the interpretations offered are only as good as the quality of the field evidence. Undoubtedly many prehistoric occupations lie buried buried beneath later levels. On the other hand, burial beneath alluvium appears to have been localized and of small scale. Although figures for occupation area are no better than estimates, owing to the data sources used and the cross check provided by numerous canal sections, statistics of site area are more reliable.

Settlement Change Through Time (Figs.48-51)

Aggregate settlement area is the total area of sites within the project area for the given period. If it is assumed that settlements had a population density of c. 100-150 persons/ha (for a discussion, see Kramer 1980), it follows that aggregate settlement area acts as a proxy for total population. However, because of the uncertainties involved, it is possible that during the Hassuna to Ubaid periods for example, on-site population densities may have been closer to 30-50 persons/ha (Akkermans 1990:167), thus giving lower total populations for the earlier periods. Aggregate settlement area has also been calculated for each period for every 2.5 x 2.5 km square within the project area. This provides settlement density in ha/6.25 sq km, which in turn gives the distribution of population density (Figs.48 and 49). The average of the settlement densities in ha/6.25 sq km, when arranged as a time series, provides an important parameter: local settlement density (or population density) through time (Fig.51d). Settlement continuity (Fig.51a) is calculated as the percentage of the number of sites of the two given periods that were occupied in both periods. Percentage abandonments (Fig.51b) are, in a similar way, the proportion of settlements that were occupied in the first of the two periods in question but were not occupied during the later period. Settlement establishments (Fig.51c) are the proportion of settlements of the two periods that were not occupied in the first but were occupied in the second period. Although it is acknowledged by the writers that statistics of continuity, abandonments and establishments might be of dubious validity, as pointed out earlier in the text, they have been included because they appear to provided informative and interpretable data on settlement dynamics. Whether they reflect the true picture or not depends upon much more detailed investigations in future. The next few pages will attempt to make sense of this morass of data, beginning with a summary of the main trends in settlement and population as deduced from the survey (a-e):

a) Between the Hassuna and the Uruk periods there was a gradual increase in the number of settlements and aggregate settlement area, the latter reaching a peak in the Uruk. Unfortunately, because of problems in subdividing the Uruk period it has not been possible to provide reliable statistics for all phases of the Uruk (see Chapter 5). An urban centre started to appear during the Ubaid (at Tell al-Hawa) but it is possible that earlier centres, now buried, existed at Tell al-Samir, Kharaba Tibn or Abu Kula. Settlement density, in ha/6.25 sq km, was sparse and evenly dispersed, with a slight concentration around Hawa during the Ubaid and Uruk

periods (Fig.48). Settlement continuity was quite high (Fig.51a), bearing in mind that settlements were mobile, perhaps making several shifts within a period (Chapter 5).

b) During the Ninevite 5 period settlement density increased in the north and east while the entire west and south was deserted. This accounts for the high percentage of abandonments and the decline in settlement continuity at this time (Fig.51). Both aggregate settlement area and the number of settlements declined and there was a slight shift to sites of medium size. The smallest village-size communities (or smaller), so characteristic of the Uruk period, declined significantly. In the later 3rd millennium there was a concentration of population within larger settlements. This accounts for the increase in aggregate site area during the later 3rd millennium. Not only were settlements concentrated within a small area but also local settlement density attained its all-time high at this time (Fig.51d). During the Khabur period that followed, the higher aggregate settlement area was spread over many more outlying settlements, which resulted in a lower local settlement density. Settlement continuity reached a minimum during the 3rd millennium, probably because this was a phase of considerable change when many outlying villages were being abandoned (Uruk/Ninevite 5) and satellites were being occupied and abandoned (Ninevite 5/Late 3rd millennium).

c) The marked decline in settlement following the Khabur period is conspicuous in both settlement density and aggregate settlement area. The degree of decline may, however, have been exaggerated by the lower visibility of Middle Assyrian pottery and its susceptibility to abrasion as noted in Chapter 7. Settlement continuity and abandonments were moderately high, while newly established settlements were at a minimum. This suggests that the Mitannian/Hurrian settlements merely decayed from their predecessors in the early 2nd millennium. The voids in the settlement pattern were in approximately the same position as during the Khabur and the impression is one of a thinning of settlement density.

d) Late Assyrian colonization of the "desert", as described in Chapter 7, appears as a jump in the number of sites and aggregate settlement area. This increase is primarily in the small rural settlements which infill pre-existing voids and raise the settlement density across the area (Fig.49). With Tell al-Hawa being probably at it smallest size since the Ubaid period, there is little evidence of any central town. Settlement density returned approximately to Chalcolithic levels. As would be expected, the number of newly established settlements is high.

e) Following this Late Assyrian peak, there was a slow decline in aggregate settlement area, settlement numbers and density. Only during the Sasanian/Islamic period was there a slight rise in local settlement density as settlements tended to concentrate in certain areas of the plain, perhaps to seek increased security. As with the previous period of settlement decay during the Khabur-Middle Assyrian phase, settlement continuity and abandonments were both quite high. Although the number of settlements established was low, new sites were being established throughout, from the Hellenistic to Islamic periods (Chapter 8). The final stages of settlement during the Late Islamic period are obscure but it appears there was continued decline until the area appeared to be virtually, but not entirely, deserted by the time of the 18th/19th century European travellers.

During the phase of Early Bronze Age town development that commenced around 3000 BC, the area comprised a densely populated zone with towns towards the north and east and a sparsely-settled periphery in the south and west. By assessing settlement trends in both areas a refined view can be obtained of the mechanism of settlement growth at the centre. Statistics which show the number of settlements in a range of size classes (not published) indicate that during the prehistoric and Chalcolithic the trend in settlement was comparable in both inner and outer areas. After the Uruk period there was collapse in the outlying areas which was compensated for by settlement growth during Ninevite 5 times in the core area. The 3rd and most of the 2nd millennia were periods of non-settlement in the outer zone, the only exception being a slight revival of settlement in the outer area during the Khabur period. Thereafter, the Late Assyrian revival was clear in both zones, with post-Assyrian decline following a similar trajectory in both areas, except for the slight revival that took place in the Hawa area during Sasanian/Islamic times.

A convenient way of analysing settlement patterns is by means of rank-size curves, although the interpretation of these essentially empirical plots continues to be debated (Johnson 1981). In rank-size graphs settlements within a region are arranged in descending order of population or site size. This frequently results in the nth largest settlement being very roughly 1/nth the size of the largest but variations in the idealized straight line plot can result in convex up or concave up curves. The former curve results when the other settlements in the system (i.e. those below the largest in rank) are larger than the rank-size rule would predict; conversely, the latter

so-called primate distributions indicate the existence of a prime city that overshadows all others in size. This approach enables a number of deductions to be made about settlement development and whether smaller settlements are integrated into the overall settlement system or not. Here, instead of attempting a detailed interpretation of the rank-size graphs, they will be used simply to described the evolution of the settlement system through time, for which they seem admirably suited. In Fig.52 the rank-size graph for each period is illustrated on double-log paper as a solid line with that of the preceding phase dotted. This enables changes in observed settlement size distribution to be compared with that of the preceding period.

1) *Hassuna-Halaf:* the similarity of the curves suggests that there were no major changes in the settlement hierarchy. Settlements were small and the absence of a centre may simply be because a large site is buried beneath later occupation, for example at Tell al-Hawa. The sharp drop-off in settlement numbers below 1 ha is characteristic of all the curves. This "lower limb effect" means that there are fewer small settlements than would be predicted by the rank-size rule. A similar phenomenon has been noted in a number of other parts of the world, including modern villages in SE Turkey (Gülöksüz 1975) and it may imply that there was a small number of settlements with just a few families. In the case of the north Jazira, it is not known whether this is because the small settlement areas were not correctly estimated on multi-period sites or whether there was a genuine dearth of very small settlements. Off-site survey did, however, indicate that very small sites were virtually absent away from the mounds.
2) *Ubaid*: there was a slight growth in settlement size with one centre emerging at Tell al-Hawa.
3) *Uruk*: growth continued both at the centre and at the village level throughout this system.
4) *Ninevite 5*: an increase in medium-size settlements (i.e. those in the north and east) was matched by a larger decline in small settlements (those to the south and west).
5) *Later 3rd millennium*: dramatic urban growth is evident in the form of the increased size of Tell al-Hawa and the secondary centres at 43, 93 and 127 (Chapter 6). This was counterbalanced by a sharp decline in smaller settlements, some of which had been satellites during the Ninevite 5 period. This curve approaches a classic straight rank-size curve and it is interesting that the second rank in the settlement hierarchy, represented by Sites 43, 93 and 127, shows up as little more than a ripple in the curve.
6) *Khabur:* the replication of the upper limb of the two curves is partly because the two occupation periods were found within the same collection areas on the larger sites. The increase in the rural settlement base is clear and, as we know from the distribution maps, is a result of the regrowth of satellites as well as the development of settlements in the south and west of the area.
7) *Middle Assyrian*: all levels of settlement appear to have declined with the resultant appearance of a slightly convex up curve.
8) *Late Assyrian*: the upper limb of the system appears to be moderately stable but there has been a massive increase in smaller settlements, interpreted here as the result of Late Assyrian colonization.
9) *Hellenistic* (note: no meaningful statement can be made about the post-Assyrian interlude): apart from the obvious collapse of the centre at Tell al-Hawa the only other feature is a slight decline in the middle range of settlements. In spite of the fall of Nineveh and the ensuing troubles, the rank-size distribution of the Hellenistic is remarkably similar to that of the Late Assyrian period (see Chapters 7 and 8).
10) *Parthian*: there are signs of a further contraction of settlement but the form of the curve remains similar, implying little change in the settlement hierarchy. The largest settlement (Site 43), estimated at 12.76 ha, may be an over-estimate based on the large size of collection areas on this site (see Chapter 8 and Fig.38).
11) *Sasanian/Early Islamic*: slight growth in the medium to large settlements is counterbalanced by a slight decline in the smaller sites that were the hallmark of the Late-Assyrian, Hellenistic and Parthian periods.
12) *Middle-Late Islamic*: further growth of medium-large settlements may result from settlement concentration due to regional insecurity. Although the form of the curve resembles the preceding one, there is a significant decrease in the number of small settlements.

The above summary of the rank-size curves demonstrates that they can be interpreted in terms of settlement dynamics as indicated from other sources and that they offer additional supporting data. Conventionally interpreted, they show that a village-sized settlement pattern, without an obvious centre, evolved into a more linear rank-size pattern corresponding to the main phase of urbanization during the Early Bronze Age. This situation might be described as well-integrated, perhaps because there was more interaction between the outlying sites and the primary and secondary centres (see below p.84). Following the collapse of this system in the 2nd millennium BC, a less well-integrated system

prevailed. To many people the concept of integrated and non-integrated systems is rather vague but recent work by Johnson suggests that convex up curves that typify the prehistoric and Chalcolithic may result simply because several settlement systems, each with linear log-normal distributions, have been combined during survey (Johnson 1981:167-77). The sum of such distributions can result in a convex up curve (pooling). The possible presence of a number of sub-systems that pre-date the large Early Bronze Age system will be considered below.

The Early Bronze Age Settlement Hierarchy

The settlements of the 3rd and early 2nd millennia can be arranged in a hierarchy with Tell al-Hawa (1), the regional centre, at the apex, followed by secondary centres at Kharaba Tibn (43), Tell al-Samir (93) and Abu Kula (127) located at some 9-12 km distance. An additional centre, at Tell Mana'a (140), developed during the Khabur period. These centres, in turn, were surrounded by a number of small satellite settlements at 3-5 km radial distance; presumably these were directly linked to the nearest centre, both administratively and in terms of food production. In addition, a number of outlying sites cannot be classified strictly as satellites but fall into this third rank of settlement (Fig.53). Although this hierarchy is blurred on the rank-size plots, it does form a remarkably regular pattern, which enables the area to be perceived as a number of territorial modules of 5 km radius centred upon the primary and secondary towns (Fig.54). It will be argued below that these modules, which include the satellite communities, are the primary food-producing areas of the centres they contain.

The Early Bronze Age settlement pattern was therefore based upon a series of roughly equal-sized parcels. Fig.54 shows Tell al-Hawa and its adjacent secondary centres to the W, E and S, each with its own territorial module (solid circles). In addition, the Khabur period outgrowth at Tell Mana'a (140) is indicated by a dotted circular catchment. Because of the lack of detailed survey beyond the project area, the recognition of other centres is difficult but from the size of certain sites and as a result of visits by various people to them, the following sites can be suggested to have been Early Bronze Age centres: Hamad Agha Kabir (H; with Hamad Agha Saghir as a satellite or vice versa); Tell Abu Winni (WN); Tell Abu Wajnam (AW); and Tell Huqna (TH). Tell Abu Dhahir on the Tigris (DH) was also probably a local centre of the later third millennium (Ball *et al.* forthcoming). Survey within the project area has demonstrated that certainly during the Ninevite 5 period, and to a lesser extent during the later 3rd millennium, this modular pattern must have died out to the west where the settlement pattern became very attenuated. With the development of Site 140 during the Khabur period, part of this area again was within range of a secondary centre but the structure of the settlement pattern beyond is not clear. To the north and east contiguous modules may have supplied the other centres as indicated. To the south the modular pattern of territories may have broken down into smaller centres, closer together, such as Tell al-Daim and other medium-sized tells indicated on Fig.24.

Field evidence suggests that Tell al-Hawa was surrounded by its own immediate territory of 5 km radius. In turn this was surrounded by secondary centres and surrounding modular territories. This greater module is shown by the tangential solid line on Fig.54, with the outlying Tell Mana'a (140) indicated by the broken line. Although these secondary centres might have provisioned Tell al-Hawa directly, distribution of hollow ways around each centre (Fig.24) suggests that the supply of agricultural produce would be as follows: each module would supply its own centre which, if it then had surplus produce, would be able to contribute additional produce to the main centre (see below). Obviously such a mechanism would vary depending upon the level of control (or dependence) between the primary and secondary centres. Beyond the outer module the greater effort required for the transportation of bulky food products would make it less likely that it would have been economic to supply Hawa from these more distant centres. Equally, their administrative relationship with the capital may have been more tenuous.

It has been suggested that early states (or the Early State Module) were probably bounded by a territorial limit at a distance of some 50-70 km distance, or 1-2 days' march from the capital (Renfrew 1975). In the north Jazira such a limit is best defined with reference to other major centres, namely Leilan and Nineveh located at distances of 75 and 85 km respectively. This places the mutual boundary at some 40 km from Tell al-Hawa, which would take it through the east tip of the Jabal Sinjar, Tel'afar, Eski Mosul and through the tripartite border junction between Turkey, Syria and Iraq near Cizre. If Tell Abu Marya is taken as being of equivalent rank to Tell al-Hawa, the administrative area of Hawa is decreased southwards to some 20 km radius. The above boundary is probably closer to one day's walk from Tell al-Hawa and would include all the circular modules indicated on Fig.54 as well as the area of attenuated centres to the south. The marked gap in the distribution of 3rd millennium sites in the western part of the project area suggests an effective western limit only some 16 km to the west of Hawa. The hypothetical limit sketched above probably applies to the military requirement of having the

border within a day's march of the centre. Moreover, as is evident on Fig.53, economic activity can be viewed as operating within a hierarchy of increasingly large modules, the fundamental unit being that of 5km radius.

Most agricultural activities for each centre would have been conducted within these modules, with the module having Tell al-Hawa as its centre being the focus of the maximum level of activity. This may explain the presence of the greater number of satellites, during the Ninevite 5 and Khabur periods, around Tell al-Hawa compared with around its secondary centres (Chapter 6). At a still greater distance from Hawa, that is beyond the solid line boundary on Fig.54, interaction with Tell al-Hawa would have been less, except for those centres located on the main NW-SE hollow way. These would have been more directly linked by means of trade with Hawa and may therefore have maintained a slightly higher level of communication.

This particular early state may therefore be viewed as a number of modules of 5 km radius, which become less strongly linked to the centre with increasing distance from it, especially outside the zone of the greater module indicated on Fig.54. It is now appropriate to examine how such centres developed and were provisioned as they expanded and needed to intensify agricultural production.

Land-Use Intensity and Settlement Growth

In the following text, an attempt will be made to link the growth of urban centres with the evidence for land-use intensity exemplified by the presence of field scatters of pottery, kiln slag and other materials (Chapters 2 and 6).

Field scatters, as suggested in Chapters 2 and 6, are probably the result of manuring in antiquity. The contained diagnostic sherds include a significant peak of later 3rd millennium types with a secondary peak comprising Late Assyrian types. Although the relationship between the number of late 3rd millennium BC diagnostics and aggregate settlement area (as shown on Fig.50) is only slight, there is an immediate visual correspondence with the peak in settlement density (Fig.51d and e). The implication is that the late 3rd millennium peak in manuring corresponds with the phase of maximum population concentration and density. This provides some support for the notion that land-use intensity relates to phases of maximum population density, although it is not possible to demonstrate here which came first (Boserup 1965, Turner *et al.* 1977). The secondary peak of the Late Assyrian period shows no clear correlation with anything except that at this stage there was a rapid increase in aggregate settlement area (i.e. total population) and number of sites as the area was colonized (Chapter 7).

The decline in sherd-scatter density away from sites, with bigger sites being surrounded by larger and denser scatter zones, implies that manuring intensity also declined with distance (Chapter 2). This in turn suggests that both land-use intensity and crop yield also declined away from the site. When combined with assumed crop yields, such declines can be used to compute total production under different cropping regimes. Because wheat and barley probably formed the bulk of sustenance and must therefore have occupied a large proportion of cultivable land, land use has been expressed in terms of wheat yield per hectare. The presence of sherd scatters across most of the terrain also implies that cereals were manured. Consequently, in the following calculations crop yields are expressed in terms of wheat yield per ha. It is fully realised that in other cultures, vegetables and some arboreal crops can receive the bulk of manure. These would, however, probably only form a small proportion of the total cultivated area and at present it is not possible to incorporate them into the crop production figures.

Fig.55 (top) shows a range of wheat yields, each of which declines at a steady rate of 100 kg/ha per km away from the central settlement. These yields represent the range experienced on the plain today, namely 450-700 kg/ha for wheat, 655-900 kg/ha for barley. Yields would have been higher with increased applications of manure, or in years of higher rainfall, therefore the yield figures used in Table 13 represent both in combination. It seems unlikely that the higher yields could be sustained under an annual regime and they may even have been difficult to maintain under biennial fallow when a small percentage of annual rainfall (c. 20%) would have been held over in the soil as a supplement (Chapter 1). Nevertheless, these figures have been included for the sake of comprehensiveness.The rate of decline, although subjectively modelled on the sherd-scatter declines, has been chosen at what seems to be a realistic rate. It primarily represents diminished yields that result from lessened manuring with distance but also incorporates factors allowing for increased fallowing intervals and increased area of permanent pasture with distance. The yield graphs on Fig. 55 (top) are not therefore intended to show how much wheat would be produced on any given land if it was cropped but how much was actually produced allowing for cropping patterns and alternative land use.

The adoption of a linear decline to zero crop yield at a given distance seems applicable to the model in question because beyond 5 or 6 km, crops produced go to another centre; therefore, as far as the centre in question is concerned, they drop out of the

equation. The factor for fallowing interval would be additional to the standardized annual/biennial cropping regimes that are included in the following calculations. No attempt has been made to derive a decline directly from the sherd-scatter plots themselves, primarily because the scatters are of multi-period date and do not entirely relate to the Early Bronze Age. The following graphical analysis is simply used to illustrate likely mechanisms of growth and land-use change; there is no intention to "explain" the details of land-use and settlement relationships. It is also possible to generate more realistic equations of exponential decline that could be employed in a more rigorous analysis. These could be refined by incorporating factors for net as well as gross production, but this is beyond the aims of the present study.

In order to generate graphs of crop productivity on Fig.55, the computed crop yield at any one point is multiplied by the area of a given land-use ring of 0.5km width; that is 0.5-1.0, 1.0-1.5 km ..... For a yield expressed by:

$$Y=C - mR$$

and a land use ring of area

$$\pi (R^2 - r^2)$$

where R=outer radius of ring*, r=inner radius*
m = slope of crop yield decline
(100 kg/ha per km**)
C = cereal yield adjacent to the centre.

Note: * in 100m units to be compatible with hectares.
** equivalent to 10 kg/ha per 100m.

Therefore total yield per ring is approximately:

$$Y = \pi (R^2 - r^2)(c - mR)$$

This crude equation has the appeal of being simple but it is also approximate. A more rigorous approach would employ differential calculus.

The graphs of total production per ring on Fig.55 illustrate that:

a) As initial crop yield rises from 400 to 1000 kg/ha, aggregate production for the entire territory must rise considerably.
b) The point of peak gross production and the onset of declining yield per ring moves away from the settlement as initial crop yield rises. This maximum point is expressed by the point:

$$R=c/2m$$

In other words, as a centre increases in size, by manuring, it can increase total production to feed its population, with the result that the effective belt of cultivation will extend further away from the site. This is partly a function of the original linear decline selected and also needs to take into account the effect of distance that will result in more effort being expended at greater distances from the site. Hence a small settlement with a modest non-manured near-site yield of 400 kg/ha will produce a low total production which would drop off at 2 km. As the settlement increases in size, the aggregate product will rise and the potential cultivable zone will extend to 3, 4 and ultimately perhaps even 5 km.

In order to compare this theoretical model with the field evidence, Table 13 has been compiled using mean annual yields of 400 to 1000 kg/ha to calculate, for a catchment of 5 km radius, the following: total catchment production; net production (i.e. less seed corn); estimated population that could be supported by such production and the range of site area that such a population would inhabit. Estimated population is based upon an annual consumption of wheat, or its equivalent, per person, of 350 kg per year (see Hillman 1973:229). The range of site size is based on assumed population densities of 100-150 persons per ha (Kramer 1980). Cropping regime is given as A: annual and B: biennial cropping, an over-simplification that can be resolved to a certain extent by assuming that increased fallowing intervals (beyond the biennial) may also account for some of the decline in yields.

Fig.56, derived from Table 13, shows the area of settlement that could approximately be sustained by crop yields of given amounts for a catchment of 5 km radius; the areas of Tell al-Hawa and its secondary centres are indicated in order to compare relative production from each catchment. For the biennial cropping regime, hatched vertical bars indicate that the site(s) in question generated a surplus under the indicated crop yield; ooooos indicate a shortfall. The discussion that follows will mainly focus upon biennial fallow which is that traditionally employed and also seems to be most appropriate for the environment.

In a productive year, with rainfall and manuring in optimum combination, Tell al-Hawa would be just self-sufficient but the secondary centres (Kharaba Tibn [43], Abu Kula [127] and Tell al-Samir [93]) would produce a substantial surplus which could either be stored or traded with more distant communities, bearing in mind the prohibitive cost of overland transport of bulk produce (Weiss 1986:94). In a less productive economy, or year, with a near-site yield of 800 kg/ha, Hawa would experience a deficit which could be satisfied by the significant

Table 13. Carrying capacities estimated for territory of 5 km radius (all yields in kg or kg/ha)

Yield per ha.	Regime: Annual/Biennial	Total Yield	Net Yield in kg*.	Estimated Pop. (hectare)	Range of site size
1000 kg	A	4,972,000	4,894,200	13,983	93-140
1000 kg	B	2,486,100	2,448,100	6,995	47-70
800 kg	A	3,417,000	3,339,000	9,540	64-95
800 kg	B	1,708,500	1,669,500	4,770	32-48
600 kg	A	1,861,800	1,783,800	5,097	34-51
600 kg	B	930,900	891,900	2,548	17-25
400 kg	A	522,550	444,550	1,270	9-13
400 kg	B	261,275	222,275	635	4-6

* i.e. the required amount for seed has been subtracted.

surplus generated by each satellite (if sufficient labour was available to gather and process the crop). In a still less productive system, with a near-site yield of 600kg/ha, Hawa would suffer a massive shortfall while the secondary centres would break even. Still lower yields would result in widespread famine.

The above shows that a complex system of relationships must ensue depending upon rainfall fluctuations, fallowing intervals and manuring intensity. There would be the temptation, especially at Tell al-Hawa but also during dry spells at the secondary centres, to resort to annual cropping. Hawa could probably not expect to be entirely self-sufficient and would in certain years have to depend upon surplus production from its secondary centres. After a run of poor years in which the secondary centres had been producing less, there would be even more of a temptation to undertake annual cropping, with potentially dire consequences as will be described below.

Table 13 indicates that extensive non-manured agricultural systems with low yields and long intervals of fallow would only be capable of supporting small central settlements of perhaps 4-6 ha in area. The point of decreasing yields, using the adopted model, would be about 2 km from the site. Settlements of this size or less were probably quite common during the prehistoric and Chalcolithic periods and it is noticeable in the plain today that medium-sized multi-period tells often occur at intervals of 4-5 km apart. Such mounds, a number of which were satellites of Tell al-Hawa (e.g. Sites 9, 14 and 20), frequently show traces of Halaf and Chalcolithic occupation, although in other cases such levels are frequently buried beneath later levels.

On the assumption that such a network of small Chalcolithic centres once existed, Fig.57 has been constructed to illustrate how such a network might be transformed by the growth of a single large centre. The above land-use model shows that as crop production increases in response to the growth of the centre, the point of maximum yield will extend as an advancing wave towards the surrounding settlements, which were originally of similar size. The point of diminishing yield would reach the adjacent settlements (at 4 km) when the near-site yield had been increased to 800 kg/ha. As a result, such settlements presumably became part of the settlement/subsistence system of the growing centre and would eventually have become satellites. Using the above model of small 2 km radius catchments (or 5 km radius compound catchments surrounding Bronze Age centres), it can be shown that the next centre to develop would be at 10.5 km distance (Fig.57).

The foregoing analysis provides a rough mechanism (although not a cause) for the transformation of a series of minor Chalcolithic sites of similar small size into a smaller number of Bronze Age centres each surrounded by its own ring of satellites. Such satellites might be extinguished entirely under particular production regimes or when it was deemed more efficient or expedient (i.e. in times of unrest) to conduct all agricultural activities from the central settlement. Because Table 13 gives the range of aggregate site size that can be supported within any 5 km catchment, the size of the satellites should also be included within this figure. The estimated catchment population, because it applies to all settlements within the catchment, can therefore be used to compute a theoretical population density for each catchment. These are as follows:

Chalcolithic case with small centre <39 ha:	50 persons per sq km
Bronze Age case with large centre of 47-95 ha:	60-121 persons per sq km

These rough calculations imply an approximate doubling of potential population from the Chalcolithic to the Bronze Age. Such figures, which are for maximum potential population, compare with mid-20th century densities of 5-8 persons per sq km for areas west of the Tigris and 20-30 per sq km to the east (Oates 1968a:17). Although Bronze Age and

indeed prehistoric population densities were apparently higher than those of the mid-20th century, when averaged-out over large areas they would not have been as high as indicated above owing to the presence of large areas of pasture and steppe in the west of the surveyed area as well as around the fringes of cultivation.

Settlement, Central Places and Travel Time

The similarity between the settlement hierarchy as described and the administrative solar central place model of Christaller, amended by Smith (1976), suggests that Tell al-Hawa served as the administrative centre for the surrounding secondary centres and the minor settlements. This seems reasonable, but classic central place theory also implies the presence of a body of consumers for which the centre operated as a market. As has been demonstrated above, the hierarchical settlement pattern may emerge simply by the expansion of agricultural production and may therefore be independent of the development of markets. Nevertheless, some degree of administration and trade are implied, first by the necessity to administer commodity flows between centres and second by the development of centres upon major route systems (see below).

The settlement system described was probably mainly dependent upon the production system that could support it and therefore is not necessarily a true central place system as described by Christaller. The critical constraint in the system's development, apart from annual rainfall, was distance or travel time. The limit of the 5 km module outlined above would be about one hour from the centre (2 hours return trip); secondary centres at c 10 km would be 2 hours (4 hours return) and the outer limit of the main compound module (hard line Fig.54) would be some 3 hours (6 hours return). For daily work in fields a 2 hour return trip represents 20-25% of the days work and it would be uneconomic to exploit beyond this point. The outer extinction zone of the Uruk period was therefore some 3 hours (at least 6 hours, almost a day's walk) from the emerging urban centre at Tell al-Hawa and it is significant that these economically marginal settlements were abandoned during the early stages of urbanization. Finally, the limit for the state borders may have been 1 day's march from the capital, as discussed above (p.81). Travel time is an important constraint but is also a variable one because, as the above graphical analysis has shown, the point of diminishing returns in terms of crop production increases from 2 to 5 km depending upon the system in operation. Therefore, rather than adopting a rigid 3 km/1 hour catchment model as proposed by traditional site catchment analysis, a more flexible range of economic territories seems warranted. Probably the 5 km radius catchment is the production-maximizing one but with changing requirements and the adoption of subsistence systems then a different economic limit would have been applicable. Clearly the settlement pattern described fluctuated through time between resilient risk-reduction subsistence systems (e.g. the Chalcolithic) and brittle product-maximization systems (the Early Bronze Age).

The Settlement/Land-Use System and Environmental Change

The transformation from Chalcolithic villages to Early Bronze Age towns was not simply a trend towards denser population; it also represents a change in the resilience of the local economies. During the Chalcolithic period, when cultivation was probably characterized by lengthy fallowing intervals, a proportion of rainfall would be carried over from the fallow year(s) into the next cropping season (as described in Chapter 1), thus providing a higher soil moisture content for crop growth. In the Bronze Age, with the ever-present need to maximize yields, annual cropping would have been a constant temptation, with the result that there would be no soil moisture reserve to act as an insurance against drought. This tendency would be reinforced by the higher soil moisture demands of the higher crop yields but counterbalanced by the raised organic matter from the applied manure, which would raise the water-retention capacity of the soil. Such brittle economic systems, although more productive in terms of gross output would be liable to occasional catastrophically low yield, even after one dry year. Although the complex web of supplies sketched above might replenish some of this deficit in the short term, the general vulnerability to drought would make such a settlement and land-use system susceptible to collapse.

There remains the possibility that slightly moister conditions during the Chalcolithic may have benefited agriculture. As noted in Chapters 4 and 5, evidence from water-holes and shallow pits implies that water-tables were slightly higher during the prehistoric period until approximately the later 4th millennium BC. This impression is supported by the presence of wadi ridges (for the early Holocene; Chapter 5), alignments of Hassuna and Halaf sites along wadis which are today relict features (Chapter 5) and pollen analysis from the fringing highlands (Bottema 1989:6). The presence of a relatively cool and moist period during the early Holocene has also been suggested for the Tigris/Euphrates basin by Kay and Johnson (1981, Fig.4). A drier, warmer period may then have followed during the 3rd and early 2nd

millennia, but by about 900 BC when the colonization of the plain took place at the instigation of Late Assyrian rulers, the climate may again have been cooler, moister and more favourable to dry-land farming (Kay and Johnson 1981, Fig. 4; Neumann and Parpola 1987). A drier, warmer spell during the early 2nd millennium is supported by harvest dates from southern Mesopotamia which indicate that late Old Babylonian harvests were earlier and Neo-Babylonian harvests were later in the year as a result of the cooler and moister climate of the 1st millennium BC (Neumann and Sigrist 1978). The move from a more stable, resilient but less productive economy during the Chalcolithic to a more productive but brittle economy in the 3rd millennium thus took place when the climate was possibly getting drier (or was subject to greater inter-annual fluctuation). The use of more resilient cropping practices during a period of slightly moister environment, may explain the long-term stability of the Chalcolithic settlement pattern which contrasts markedly with that of the Bronze Age, which was economically dynamic but vulnerable to climatic fluctuations. The onset of urbanization, which may have been preceded by a decline of settlement during the close of the Uruk period (Chapters 5 and 6), therefore occurred during a possible swing to greater aridity. Such a decline may have been climate-induced.

The above discussion on environmental change must be treated with caution because, for example, local and regional sedimentation, as well as the pollen and vegetation record, are significantly influenced by human factors such as increased fuel-gathering around growing settlements and intensification of land use. Hence some of the physical evidence for environmental change described in Chapter 5, as well as by Kay and Johnson, may result from man-induced environmental change. To use it as evidence for climatic change which in turn triggers changes in settlement is clearly an example of circular reasoning. Furthermore, recent re-dating of cores from Lake Van, upon which part of Kay and Johnson's as well as Neumann and Parpola's data depend, weakens their case for significant climatic change during the periods in question (van Zeist and Bottema 1991:59-65). However, the short-term effect of year-to-year climatic fluctuations on crop yields and on the economic system must have been significant when acting on the brittle Early Bronze Age production systems. The probability that such a fragile economy prevailed during a slightly drier episode made such economies even more vulnerable to collapse. Similarly it remains a possibility that Late Assyrian colonization did not occur until a relatively cool, moist phase made such settlement economically viable. An additional problem is the influence of topography on crop yields. As noted in Chapter 1, slightly rolling or rolling terrain, such as occurs around the margins of the project area, has lower crop yields than the nearly flat zones (Ali 1955: 147). Consequently the basin margins and other areas of rolling terrain would be more susceptible to drought and crop failure than the basin centre. This factor may be particularly significant for the prehistoric period, as well as the later (post-Parthian) phases of settlement, when there is evidence for a decline of settlement on marginal land. Although such areas are more likely to suffer decline during periods of drier climate than the basin centres, there is still insufficient evidence to suggest that any of the changing patterns of settlement can be blamed on climatic change.

Transport, Trade and External Contacts

The long hollow ways that pass through the north Jazira exhibit, in certain periods, a beaded settlement pattern, which implies that site development or growth was perhaps stimulated by communications and trade. This settlement pattern was investigated by estimating the percentage of sites of any given period that lie on or adjacent to major hollow ways. Although easily calculated, the interpretation of such ratios is ambiguous because dispersed settlement patterns will automatically have large numbers of sites off the main routes and will thus give low readings. This is probably irrespective of whether some sites were significantly stimulated by trade or communications. Nevertheless this simple test deserves exploration. Bearing the above caveat in mind, there was evidently a significant increase in the percentage of sites on major routes during the Ninevite 5 period (Fig.58). The percentage reached a peak during the later 3rd millennium, corresponding to the climax of urbanization; it remained high during the Khabur period and declined thereafter, there being only a minor rise during the Sasanian/Islamic period. As noted in Chapter 5, Late Uruk sites were apparently significantly related to routeways. The correspondence between the development of urban centres and routes suggests that communications were stronger and settlement growth may have been stimulated by these links and perhaps by trade along them. Although appealing, this should not necessarily be taken as evidence of causality and there is probably an element of the chicken and the egg here. That is, did hollow ways simply connect pre-existing sites or did the sites develop on hollow ways?

The incidence of certain artifact classes in relation to evidence of hollow way usage also deserves examination. For example, flint, chert and obsidian must all be imported on to the plain. The Jabal Sinjar and foothills are the nearest flint source while

obsidian probably came from a variety of Anatolian sources, most being "green" obsidian from a Bingol/Nemrut Dagh source. The single Neolithic site (Ginnig, Site 21) was dominated by flint and chert artifacts, although obsidian was present in small amounts (Campbell and Baird 1990). Elsewhere in the region, however, at aceramic Maghzaliya, obsidian is present in abundance, which suggests that either the dearth at Ginnig is temporal, or that Maghzaliya was located on a major obsidian trade route. In contrast, Hassuna sites had meagre lithic assemblages. There followed a steady increase in the quantity of lithics on single-period Halaf, Ubaid and Uruk sites, after which the situation became uninterpretable because most sites of the 3rd and 2nd millennia were multi-period, thus rendering the analysis of surface lithics impossible. Although Halaf lithic assemblages had various proportions of flint to obsidian, during the Ubaid flint was dominant. This pattern was reversed during the earlier Uruk period when the large lithic assemblages had significantly more obsidian than flint. This pattern had ceased by the Late Uruk and Ninevite 5 periods when flint and chert again dominated assemblages. Little can be inferred from the above except that the obsidian trade appears to have been most pronounced during the earlier Uruk period with perhaps a minor peak during the Halaf. The dearth of lithics during the Hassuna period, which seems to be consistent on all Hassuna sites examined, remains a mystery.

Basalts (probably deriving from the NE panhandle of Syria) are present as grinding stones from the Ubaid, if not earlier, and continued throughout the subsequent periods. Bitumen, for use in hafting chert sickle blades, was in use from at least the Ubaid, the closest obvious source being 'Ain Zalah to the north of Abu Wajnam (Fig.24).

Although a vigorous pottery trade has been attested by neutron activation analysis as early as the Halaf (Davison and McKerrel 1976,1980), for most periods it is difficult to isolate quantitatively the proportion of imported wares . The most obvious candidate is the Late Uruk assemblage, which was significantly related to route systems. These vessels probably belonged to communities that either introduced these from the south or, more likely, manufactured them in imitation of southern types (Appendix A). During the Parthian/Roman period so-called brittle wares of the 3rd century AD (Type 100, Appendix A) also have an association with route ways but are absent from other sites with Parthian pottery (Chapter 8). Although about 10 Hellenistic black gloss wares were recorded from sites on the plain, these obvious imports were not clustered on major routes and, in contrast to the brittle wares, these were probably being disseminated throughout the sites on the plain.

More readily quantified are pottery fabrics. All drawn sherds from the type series were described in detail using a hand lens so that the fabrics could be used to infer general sedimentary sources. The ceramics could be classified into three broad fabric groups (Fig.59):

Chaff-tempered wares, which employed local materials, were commonly used during the prehistoric, as well as during the Middle Assyrian period.

White sand (calcium carbonate) was sometimes used in various combinations with chaff.

These locally available tempers were presumably used in pottery of local manufacture. Except for very small percentages during the Halaf and Nuzi periods, when diagnostic types were mainly finewares, it is clear that these local fabrics were dominant.

Sand-tempered wares. Tempers were either mainly quartz sands of indeterminate origin or sands with numerous dark minerals characteristic of the sediments of the Tigris channel or its terraces. The two categories merged into one another; neither had its source within the north Jazira plain, although a minor source of indurated sand was noted near Site 44. With the exception of this minor source, which showed no signs of having been worked in antiquity, it appears that sand for pottery or the pottery itself was introduced onto the plain. With the exception of a slight rise in the early Uruk period corresponding to the distinctive Sprig ware and related types (Type 9, see Appendix A) and minor occurrences during the 3rd and 2nd millennia, pure sand-tempered pottery was scarce until the significant rise in the Hellenistic period. Sand-tempered fabrics continued to dominate in the Parthian and Sasanian but fell during the Islamic period when local fabrics (i.e. white sand and chaff-tempered wares) increased slightly in importance.

The available data does not allow for more detailed analysis but it is clear that some events, such as the earlier Uruk peak in obsidian and the Hellenistic-Sasanian peak in sand-tempered wares, show no relationship with the pattern of increased communication-related settlement of the Early Bronze Age. The obsidian peak, together with the general use of flint during the prehistoric and Chalcolithic periods, was presumably overtaken during the 3rd millennium by the use of metals, which go virtually unrecognized during survey. Consequently, the first period of widespread and common use of metals is represented by a negative record in survey. The rise in sand-tempered wares that characterized the Hellenistic to Sasanian periods might be accounted for by the development of more industrial methods of production that predominated when Upper Mesopotamia was incorporated into the Seleucid Empire. This does not mean that ceramics were necessarily imported from major production centres, rather that

they were made to a standardized format, using prescribed styles and ingredients. The resumption of local fabrics during the Islamic period may correspond to the decline of the area into a backwater.

From the above sketch, it can only be concluded that there must have been a constant background of inter-regional communications and trade from at least the aceramic Neolithic. At certain times specific sources were tapped or specific economies were keyed into and at such times distinctive materials or artifact groups can be recognized. During the phase of urbanization of the 3rd millennium, when clustering and growth of settlements clearly took place on route ways, growth was presumably stimulated by a range of factors. These included: increased wealth resulting from trade and communications; the centralization of administration and religion; the need to cluster in centres for reasons of defence; migration from the countryside either as a result of coercion or because it was more economically beneficial to be situated in the central settlement at that time.

Conclusions

Among the many strands of evidence concerning environment, population, settlement pattern, communications, land use and agriculture that have been discussed, the following inter-relationships warrant further attention.

The urbanization that took place in the 3rd millennium apparantly evolved out of the Chalcolithic phase of villages and minor centres that preceded it. Settlements during the 3rd and early 2nd millennium were clustered on major transport routes which suggests that settlement nucleation may have been stimulated in part by increases in trade and communications. Alternatively, settlement nucleation may have resulted from a need for defence within a fortified settlement. Although even small settlements such as Hamad Agha Saghir were walled (Fig.24; Spanos 1990) and presumably the high mounds of Hawa and the secondary centres (Sites 43, 93 and 126) were also walled, evidence for walled lower towns remains ambiguous (Chapters 2 and 6). Thus, although a number of sites may have been fortified, it is not clear that a need for defence was the reason behind nucleation. Whatever the reason behind settlement nucleation around the middle of the 3rd millennium, it is clear that settlement growth stimulated an increase in land-use intensity that could be inferred from the distribution and density of field scatters. This intensification was probably a result of the considerable increase in population density that took place in the north and east of the project area (Fig.51). Such a regrouping of population away from the preceding dispersed scatter of villages left large voids in the landscape that could have been used for grazing (Fig.60). These open spaces would have made ideal pasture for the large flocks of sheep and goats that probably succeeded the mixed animal husbandry of the Chalcolithic period (Chapter 5; see also Reade 1973 :185, specifically Taya level IX). In turn, these animals would have supplied the centres with wool for use in textile manufacture, a key resource of the 3rd millennium (Gelb 1986). Additional episodic grazing would have been found on the cereal stubble as well as on the fallow lands beyond the zone of intensive cultivation.

The settlement/land use model described above (p.82-85) suggests that as total settlement within a catchment expanded beyond some 50-70 ha (i.e. to include a settlement of roughly the size of Hawa), the capacity of the immediate (5 km) territory to sustain that settlement from local production alone diminished. During dry years the surplus from adjacent territorial modules would have been required, thus leading to a potentially complex web of transactions between adjacent centres. During exceptionally dry spells, owing to the brittleness of these intensive economies and their susceptibility to famine, the entire system of inter-linked centres may have been prone to collapse.

These settlement and land-use changes took place within a rather marginal area, some distance removed from the moister and more consistently productive Assyrian core area of the Nimrud-Nineveh-Khorsabad triangle (Chapter 1). We are thus dealing with four different levels of marginality in this study: first, the region itself is marginal to the productive core area; second, the settlement/land use-systems fluctuated from resilient to brittle, the latter being more susceptible to climatic fluctuations; third, areas of rolling terrain would be more vulnerable to droughts than flatter lands; fourth, the climate and fluctuations thereof could induce collapse or conversely favour agricultural colonization. As a result of these subtle and complex variations, it is very difficult to produce clear-cut statements about the effect of environmental stresses or variations upon settlement and land-use changes. Although the application of techniques of landscape archaeology to site survey allow us to sketch rather successfully the record of past human geography, interpreting this record in the light of environmental fluctuations remains extremely difficult.

APPENDIX A PART 1:

Pottery Type Series

Introduction

The following pottery type series was created from a simple reference system of ceramic types to date surface collections from sites and field scatters. Initially it was developed by David Tucker for dating the surface collections from Tell al-Hawa (Ball, Tucker and Wilkinson 1989:47-66). It was then refined to include more types and the numbering was changed (see Table 16). The initial Hawa type series developed from vessel types found during excavations on the Saddam Dam sites and it was then expanded by means of surface associations and external parallels. In the text that follows, external parallels are given where appropriate, but there has been no attempt to make the references comprehensive.

Surface associations could only be assembled from sites that were apparently of single-period occupation. This was mainly feasible for pre-Ninevite 5 and post-Middle Assyrian assemblages. Third and second millennium BC sites, being mainly high multi-period accumulations, were less useful in providing unmixed assemblages. Since it is possible that sites assumed to be single-period occupations may have included several, unobserved occupations, assemblages were selected from sites cut by canals and demonstrably of only one period. Further evidence was gained for the late Ubaid, late Uruk and Hellenistic periods by the partial excavation of the small sites of Tell Hilwa, Khanijdal East, and Khirbet 'Aloki (see Chapters 3, 5 and 8). The type series includes a number of excavated sherds from these sites but the complete excavated assemblages will be published at a later date with the relevant excavation reports.

Pottery types were selected according to their distinctive form, surface decoration or finish, or less frequently ware type. The ideal type sherd was of distinctive form, robust and of fairly brief chronological duration. Weak, indistinct forms, such as the prehistoric jar rim (Type 124) were less useful but had to be used when we were desperate to expand meagre collections, especially where it was obvious that large numbers of rim sherds would otherwise go un-recorded. In the following text, such less specific types are indicated by an asterisk. Such types should not be used in isolation to date occupation phases.

Sherd taphonomy and other factors had to be taken into account during survey, especially when interpreting field scatter pottery (see Chapter 2). For example, soft, chaffy vessels are much more likely to be broken down into tiny sherds than durable, thick vessels or handles and bases. Also certain fine wares may require extra vigilance during surface collection. Note is therefore made, where appropriate, of pottery types that may be under-represented in surface collections.

Although it is often implied that all sites are in fact settlement sites, many mounds include cemetery phases in which pottery and other artifacts would be interred with the dead. Unfortunately, such cemetery phases proved unrecognizable in the field even though the the interred pottery may be expected to remain in larger fragments than those from common refuse.

The total of 164 types are allocated to the periods Hassuna to Middle-Late Islamic as follows. It is evident that there is a considerable difference between the number of types in different periods. This is simply because periods such as the Halaf with very distinctive and visible ceramics required fewer diagnostics to pinpoint occupation. The chronological and functional/political complexity of the Late Chalcolithic/Uruk, on the other hand, required a more extended range of diagnostics.

Hassuna
Types: 1, 2, 119, 124, 125, 126.

Halaf
Types: 3, 137.

Ubaid
Types: 4, 5, 135, 147, 148.

Uruk
Types: 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19[A], 20, 21, 55, 106, 120, 121, 134, 138, 140, 149, 150, 151, 152, 153.

Ninevite 5
Types: 18[C], 22, 23, 24, 25, 26, 27, 28, 133.

Later Third Millennium
Types: 29, 30, 31, 32, 33, 103, 154, 155.

Khabur (Old Assyrian)
Types: 34, 35, 36, 37, 38, 39, 40, 41, 42, 109.

Nuzi
Types: 43, 44, 45.

Middle Assyrian
Types: 47, 48, 49, 50, 51, 52, 53, 54, 56.

Late Assyrian
Types: 57, 58, 59, 60, 61, 62, 63, 105, 111, 112, 113, 114, 118, 132, 156.

Post-Assyrian
Types: 102, 104, 142, 143, 144, 145, 146, 157.
Hellenistic
Types: 64, 65, 66, 67, 68, 108, 116, 117, 158, 159.
Parthian
Types: 76, 100, 107, 115, 127, 128, 129, 130, 131, 163, 164.
Sasanian
Types: 69, 70, 77, 78.
Sasanian-Early Islamic
Types: 71, 72, 73, 74, 75, 79, 139.
Early Islamic
Types: 80, 81, 83, 84, 123, 160, 161.
Middle And Later Islamic
Types: 82, 91, 92, 93, 94, 95, 96, 97, 98, 101, 122.
Undifferentiated Islamic
Types: 85, 86, 87, 89, 90, 162.
Others
Types: 46, 88, 99, 104, 110.

Hassuna (Fig.62)

The following types are the most common Hassuna forms represented on the north Jazira plain. Although spanning the chronological range from Archaic Hassuna (the earliest) to Samarran (the latest), the very earliest settlement phases contemporary with Umm Dabaghiyah are not included as separate types. Some, however, are included within Type 124 but specific indicators, such as the Umm Dabaghiyah wares with applied relief decoration, are sufficiently rare on the plain to make them of little value for dating most sites (Kirkbride 1972: 10). When earliest Hassuna/Umm Dabaghiyah phase occupation is suspected, this is indicated in the site catalogue.

Type 1: Hassuna Painted Wares

Sherds are usually lightly fired, ranging from grey-brown to pink. Temper can be of chaff or sand and, in the latter case, the inclusion of white grits of calcium carbonate can cause surface spalling. Surfaces are smooth or lightly burnished although sherds collected from the surface may appear matt due to prolonged weathering. Slips, when present, are mainly cream. Decoration normally comprises dull red or red-brown obliquely painted lines or cross-hatching. Forms are either open bowls or slack-profiled jars. Of the illustrated examples, 1-5 are all Archaic Hassuna (Lloyd and Safar 1945:278; Hassuna I in Campbell 1992). Because surface collections are normally both small and weathered, it is not always possible to be certain what proportion of Type 1 sherds are Archaic.

Type 2: Husking Tray

When complete, these form flat-bottomed oval dishes some 60 cm long and 40 cm wide with low, slightly outsplayed walls (Lloyd and Safar 1945: 277). Vessels are usually poorly fired with moderately soft, dark grey reduced cores tempered with common chaff and some grit. Surfaces vary from reddish to pale brown. In the earliest examples from Umm Dabaghiyah and Yarim Tepe I levels 12 to 10, interior surfaces are roughened by pitting but the most common form, through the Hassuna into perhaps the earliest Halaf, has deep grooves which may run up the vessel sides. The long time span of the grooved form is attested by its presence at Umm Dabaghiyah (Kirkbride 1973:5) as well as in earlier Halaf contexts. The latter types tend to be better fired than those of the Hassuna period (S.Campbell pers. comm). In the north Jazira, grooved examples were overwhelmingly the most frequent type, the pitted form being rare. Lloyd's tentative interpretation that these curious vessels were used for separating grain from its husks, although still held, may require further modification in the light of further research. Interestingly, according to Adams, a related type re-emerged during the Achaemenid and Parthian periods and these have been variously interpreted as mortars (cf. the Roman mortarium) or charcoal burners (Adams 1965 fig.13.10.j; and references p.130).

Type 119: Red Burnished Ware

A: Rim B: Body sherd
In the north Jazira these have a moderately fine body, a grey reduced core with orange margins and a burnished red exterior. At Tell Hassuna, burnished wares, including red-burnished wares, were confined to the earliest Archaic levels (Lloyd and Safar 1945: fig.5), that is levels Ia-II within the main area. Pottery from Umm Dabaghiyah also included a range of burnished wares, some exhibiting a "plum-coloured" paint (Kirkbride 1972:10). Here Type 119A denotes rims, 119B body sherds.

*Type 124: Coarse Chaff- or Grit-tempered Ware**

A: Rim B: Base
A general class of pottery, usually but not necessarily, limited to the Hassuna. The soft, poorly-fired wares with reduced, dark grey cores and pale brown surfaces are mainly chaff-tempered but also include white grits. Similar vessels occurred in the lowest levels (Ia-Ic) at Tell Hassuna (Lloyd and Safar 1945: fig.6 nos.24-36) as well as at Umm Dabaghiyah phases 12-6 (Kirkbride 1972: pl.XII). Sites of limited duration dominated by these types and lacking Hassuna painted and other Hassuna diagnostics may thus be very early Hassuna or contemporary with Umm Dabaghiyah (the very fugitive paint at that site being unlikely to survive prolonged exposure) but such evidence should always be viewed very critically.

*Type 125: Hassuna Incised Ware**

A: Incised B: Stabbed
The two sub-types, 125A and B, should be treated separately because they may enable the archaic and standard Hassuna phases (A) to be distinguished from the later Samarran phase (B).

125A: The incised decoration is linear with no sign of slashing or jabbing (Lloyd and Safar, 1945: 279). The bodies of north Jazira examples are usually pale orange with a cream exterior slip. Tempering is of sand and white calcium carbonate grits. Painted decoration can occur on incised ware of both sub-types A and B. Of the illustrated examples 12 and 13 (Fig.62) are the best examples of 125A with the incisions often forming a herring-bone pattern or variants thereof.

125B: Incisions are shorter and were apparently effected by stabbing. Painted motifs are common and fabrics are as for 125A. Of the illustrated examples, 14 and 15 belong to Type 125B although the presence of a herring-bone linear pattern on 15 suggests the existence of types transitional between A and B. Care must be taken that such sherds have the appropriate prehistoric fabric because there is potential confusion with other prehistoric incised sherds such as incised and painted Ubaid wares from Tell Madhhur (Roaf 1984b: fig.20).

Type 126: Samarra Ware

At Hassuna, but also on the north Jazira, bodies varied from buff-pink to red, occasionally fired to light green (Lloyd and Safar 1945:281). Vessel surfaces are generally covered by ornamentation. Painted decoration is monochrome, dark or red-brown, red, brown or black, and the most characteristic motif is the row of "dancing ladies" just inside the rim interior (no.140; cf. al-A°dami 1968: pl. XV). At Tell Hassuna, the clay body of Samarra wares was better tempered than Hassuna wares and slips were thicker. Chronologically, at Tell Hassuna, Samarra wares overlapped with Hassuna standard and incised wares (in levels III to IV) but continued somewhat later into levels VII and VIII. Although present at a number of north Jazira sites, Samarra wares were not common.

Halaf (Fig.63)

No chronological subdivision is attempted here but Stuart Campbell has provided a breakdown of chronological phases for selected sites (Campbell 1992 chapter 7; see Appendix C).

Type 3: Halaf Painted Ware (Plate 4a)

Because of the distinctive appearance of painted Halaf pottery, this type dominates the ceramic assemblage from Halaf sites. Painted fine wares form a significant part of all Halaf ceramic assemblages in northern Iraq, amounting to c. 40-60% of vessels (Watkins and Campbell 1986:42). In most cases vessels were manufactured with a very fine clay body. Temper was absent or limited to very rare inclusions. Sherds were painted with the usual range of Halaf motifs (Fig.63) in lustrous red-brown or dark brown paint. During manufacture, vessels had probably been wet-smoothed or lightly burnished to give a smooth, soapy feel. Because of their distinctiveness both body and rim sherds are included as Type 3, although sometimes, due to prolonged surface exposure, the lustrous characteristics of the vessel surface have been lost, and sherds appear to be matt-painted. If there were any doubts about a Halaf attribution, sherds were simply classified as "painted prehistoric", a catch-all term for undistinctive Hassuna, Halaf and Ubaid wares. This group also would include matt-painted Halaf sherds which can dominate local Halaf assemblages such as Kharabeh Shattani in the Saddam Dam area (S.Campbell, pers. comm). Although no attempt was made to subdivide chronologically the Halaf, two early Halaf (or transitional Hassuna-Halaf sherds are illustrated on Fig. 63 (6 and 7).

Type 137. Finger-nail rusticated

Manufactured from a pink or reddish sparsely tempered ware and decorated with horizontal rows of finger-nail impressions. This unusual type has been recorded from Tell Chagar Bazar (Mallowan 1936, fig.27, no.19) and within the area of the Eski Mosul Dam. Almost certainly confined to the latest stages of the Halaf, this type might be linked to the occasional appearance of a similar pottery on Hamrin Ubaid sites such as Tell Abada (Jasim 1985: 130-132 and fig. 212), or perhaps to Dalma impressed ware (Roaf pers.comm.).

Ubaid (Fig.64)

For the purposes of survey five ceramic types have been selected as representative of the Ubaid period. Although the full chronological range of the northern Ubaid appears to be covered, no type is specifically typical of the earlier phases. Here, Type 4 is used as a general class for Ubaid painted wares, and is subdivided according to fabric colour, whereas the remaining types are representative of the middle and later phases (Table 14).

In addition to the survey types, a much more comprehensive assemblage of later Ubaid sherds has been excavated from Khanijdal East and will be published separately.

For the purposes of chronology, reference is made to three northern sites: Hammam et-Turkman in the Balikh valley, Syria (Akkermans 1988:109-45), Tepe Gawra (Tobler 1950, vol.II) and Tell Leilan (Schwartz 1988). A chronological sketch of the duration of the five Ubaid types is given on Table 14 from which it is evident that no complete chronological subdivision of north Jazira Ubaid sites is yet practicable. Given the small often battered samples available, it is currently impossible to produce sub-types for say Hammam IVA, B, C and D. Only when sites had been cut by irrigation canals was it possible to produce a more refined assessment. In the case of those sites that were cut (Sites 66, 118 and 148) all appear to lie within the later Ubaid, transitional to early Uruk phase.

Type 4: Ubaid Painted Wares (Plate 4b)

Body or rim sherds painted with dark brown, brown, greenish black or rarely, red-brown paint. Fabrics have been subdivided into three colour classes:

Type 4A: Greenish fabric, often purple-brown paint
4B: Pink fabric, often with reddish paint
4C: Other coloured fabrics

Of these, 4B is closest in fabric to Halaf wares. Tempering is variable being of varying degrees of sand and chaff temper with occasional white inclusions. The last-named, which appear to be locally available calcium carbonate, can be up to 1 mm or more across and produce spalling. In general, the smaller bowls were finer and the larger, coarser vessels were more densely chaff-tempered. As is clear from Fig.64, surface decoration was simple, being limited to broad curvilinear designs.

Type 5: Ubaid Corrugated Ware

A: Corrugations on interior and exterior
B: Corrugations on exterior only

These distinctive but relatively uncommon vessels are usually unpainted and manufactured in a buff fabric. When internal and external corrugations are present, the sherds can be assigned to the Ubaid; when only external corrugations are present they might be confused with later Uruk types. One corrugated sherd (no.154) had fine stabbings along the troughs of the corrugations. Rare painted examples are also known to exist. Examples of Type 5 sherds from Tepe Gawra were either from necked jars (pl.CXXXI nos.218,220) or from short everted rim vessels (pl.CXXXVIII, nos. 300 and 302). The Gawra examples were late Ubaid: that is, from strata XII, XIIA and XIII, equivalent to Hammam et-Turkman IV, C and D.

Type 135: Open bowl with grooved top

Plain vessels made from a chaff-tempered clay with occasional white inclusions, fired brown or pale orange. Vessels with shallow grooves in the tops of rims were common at Khanijdal East (Site 66), dated to the late Ubaid. A similar vessel came from the Arpachiyah Ubaid cemetery (Mallowan and Rose 1935: fig.41 no.17).

Type 147: Ubaid Everted Rim Jar

A quite common form with a distinctive sharply everted rim and flattish top that projects at right angles to the centre line of the body. A noteworthy diagnostic feature is a shallow indentation on the rim exterior. Both illustrated examples are plain, but painted forms were recorded from late Ubaid Khanijdal East. The vessel

Table 14. Preliminary chronology of Ubaid types

Hammam Period	Type 4	Type 5	Type 135	Type 147	Type 148
IVA	X		?		
IVB	X		?	X	X
IVC	X	X	?		X
IVD	X	X	?	X	X

bodies show signs of a reduced core and are heavily chaff-tempered. Their occurrence at Khanijdal East and in Stratum XIIA and XII at Gawra (Tobler 1950 pl.CXXXVI, nos.274 and 277) suggests a late Ubaid date, equivalent to Hammam IVD. Examples from Leilan VI are Ubaid.

Type 148: Ubaid Incurved Rim

A: Painted B: Plain

This distinctive type, not to be confused with a similar Hellenistic form (Type 64), is handmade. Tempering is mainly with chaff, although white inclusions can occur. The form appears to have been in use for much of the Ubaid (equivalent to Hammam periods IVB-IVD). Type 148 was particularly common in period VIa at Leilan (Schwartz 1988: fig.52,nos.4,6 and 8), but also occurred in strata XIIA,XII,XIII, XV and XVI at Tepe Gawra (Tobler 1950 pls.CXXXIII no 236, CXXVII, nos. 167, 169 and CXXIV,126,129). Both illustrated examples are from Khanijdal East (preliminary dating: late Ubaid).

Uruk (Figs. 65, 66 and 67)

The total number (29) of Uruk ceramic types reflects the increased complexity of the ceramic record for the 4th millennium BC. It is necessary to treat the assemblage in rather greater detail than for previous periods because it subdivides into a number of groups that may reflect chronological, functional and geographical factors. In turn it is necessary to isolate specific ceramics that relate to exogenous influences, such as the growth of later Uruk colonies and trade.

In the following text, although types will be described in numerical order, they appear to fall into four major groups that help to pinpoint both the date and cultural affinities of the sites in question:

a) *Earlier Uruk local wares:* Types 7, 8, 9, 10, 13, 16, 17, 21, 55, 134, 138 and 150. These types were in use before any recognizable intrusion of southern Uruk ceramics into the area. The types in question have been recognized at Tepe Gawra, Hammam et-Turkman, Grai Resh (near Sinjar) and Qalinj Agha (Arbil). Chronologically, the types in this group are thought to be representative of both the middle Uruk (Types 10, 16, 21 and 138) and the earlier Uruk (Types 7, 8, 9, 17 and 55), although at this stage it is premature to make hard and fast chronological sub-divisions.

b) *"Amuq F" chaff-tempered wares:* Types 12, 152 and 153. This group of coarse, heavy vessels that was initially named by Braidwood for sites in NW Syria (Braidwood and Braidwood 1960), has now been found at a wide spread of sites in Upper Mesopotamia such as Tell Brak, Kurban Höyük, Tell Leilan and Tell al-Hawa. The chronological limits as defined by Braidwood and also by Akkermans (1988) are used here, although it is possible that these types were in use for longer.

c) *Local late Uruk types:* Types 14, 15, 18c, 20, 121, and 140. This small group of types has been recognized at a number of northern sites: Leilan, Tell Brak, Kurban Höyük as well as at several Eski Mosul Dam sites. This phase, which overlaps with or is later than the intrusive southern Mesopotamian sites, is absent from Hammam et-Turkman.

d) *Later Uruk introductions from southern Mesopotamia and related forms:* Types 6, 18 (a and b), 19 (a and b), 20(?), 120 and 151. These form part of a now well-recognized ceramic horizon that appears on a number of sites in upper Mesopotamia, such as: Habuba Kabira (south), Nineveh, Tell Brak, Jabal Aruda and Hassek Höyük. At its purest, the horizon is represented by vessels virtually identical to those in use in the Uruk heartland of southern Mesopotamia. Although often referred to as late Uruk, this is perhaps inappropriate because the assemblage in question appears to be roughly contemporary with level VI and VII in the Uruk Eanna sequence (Surenhagen in Weiss 1986:32). We therefore employ the term later Uruk for this phase, thus allowing for the presence of a slightly later phase, perhaps to include some of the local late Uruk types [(group c), see Oates, J. 1986, for Tell Brak CH9-12]. In the case of Eski Mosul Dam sites such as Tell Mohammed Arab, as well as in the North Jazira Project, the southern Uruk related types are sufficiently distinctive to suggest that there is some local influence at work (Killick 1986:230).

Type 6: Bevelled-rim Bowl (henceforth:BRB)

As elsewhere, BRBs are heavily chaff-tempered, probably mould-made and sometimes feature a finger squirl impression on the base interior. Usually, rim fragments alone were counted but, when indisputable, base fragments were included in counts. In northern Iraq the BRB was in use for a shorter duration than in southern Mesopotamia and it appeared in greatest numbers during the period of maximum contact with the south, equivalent to levels VI and VII of the Uruk Eanna sequence (Surenhagen 1986: 32). Full citations, including parallels, for this type are given in Schwartz 1988: 74 and Finkbeiner and Röllig 1986).

Type 7: Uruk Coarse Shallow Bowl

Usually recorded as rim fragments; these are rounded, with a slight external swelling. Mainly coarse chaff-tempered, but with occasional grits. The surface is smoother than BRBs. Type 7 which occurred in excavated contexts in trench LP at Hawa, appears to be earlier Uruk in date, and may be the local precursor of the BRB. They resemble the Coba bowls of Hammam VA (Akkermans 1988: fig.8, 118-121) but are not flint-scraped and are similar to the wide flower pot at Brak (Oates,J., 1986:fig.3, 44 and 45).

Type 8: Uruk Hole-mouth Jar

A common earlier Uruk form, usually grey or black, sand-tempered with some chaff, commonly with a lightly burnished exterior. Parallels occur at Grai Resh (Lloyd 1940: fig.7), from Gawra levels XA-XI (pl.CXLII,402-4) and from Tell al-Hawa trench LP (Ball, Tucker and Wilkinson: fig.28,38-40).

Type 9: Sprig Ware

A common form in Gawra XII, dated to final Ubaid or earliest Uruk. This is an unusual example of an Uruk painted ware. The painted designs are executed in brown, red-brown or reddish paint on a hard, usually sandy fabric.

Two variant designs are recognized:

a) Painted sprig decoration
b) Other linear motifs in the same paint and on a comparable fabric

Although it has been suggested that examples of sprig ware from Shelgiya (within the area of the Saddam Dam) are later Uruk in date, examples from Gawra were consistently earliest Uruk or even late Ubaid (Gawra XII). This conclusion is supported by field evidence from the north Jazira where they were most common on sites that yielded either earlier Uruk or even late Ubaid sherds.

Type 10: Double-rimmed Jar

Examples from the north Jazira are moderately hard-fired, sand-tempered and in various colours. Types 10,11 and 138 frequently share characteristics; thus Type 10 can be in grey ware (Type 138) or brown-washed ware (Type 11). A common earlier Uruk form at Gawra, particularly in stratum XI, earlier examples can occur, for example the Ubaid form from Tell Madhhur (Roaf 1984b:fig.19 no.9). The complete vessel has a pointed or parabolic base, rarely flat. The presence of perforations along the inner rim suggests that liquid was sometimes present between the two rims and that this space was intended to be drained occasionally. It has been proposed that these vessels were used for distillation, with a cover or lid being placed over the vessel top so that the vapour would strike the cooler lid, condense and run down into the trough between the rims (Levey 1959: 31-4; Pfeiffer 1986: 108-11). This distinctive vessel form was valuable during survey because the double rim junction, being resistant to abrasion, was more likely to survive than other parts of the vessel.

Type 11: Brown-washed Ware

Moderately hard, sand-tempered sherds in a range of forms, with brown or red-brown washed or slipped surface. Found associated with earlier Uruk sherds on sites in the north Jazira. Although forms are illustrated here, it is the ware that is diagnostic.

Type 12: Internally Hollowed-rim Jar

This heavily chaff-tempered jar rim is usually plain, but occasionally features a simple notched decoration below the short neck. A common Amuq F type, this has been recorded from Tell Leilan (Period V, Schwartz 1988: fig.44,3-4), Kurban Höyük (Period VI, Algaze 1990: Pls 39 and 40, Jars 31 and 32) and Tell Brak (Trench CH, Fielden 1981: fig.2, 5-9). Type 12 also includes a variant with a more abrupt internal hollow and sand-tempered. This is not a true Amuq F type and, when present on sites, such sandy variants are usually specified.

*Type 13: Flaring Rim Jar**

A common type in the earlier Uruk assemblages of the north Jazira, also excavated from Hawa trench LP with other earlier Uruk types. Fabric colours and temper varies, and commonly the vessel exterior is painted. Parallels outside the region are meagre, but include Hammam et-Turkman VB (Akkermans 1988: fig.10, 154). Because of doubts about its exact chronological position, it remains a general "Uruk" indicator. In fact there is potential confusion between this form and late Ubaid flaring rims and, in general, this form may occur virtually up to Ninevite V times.

Type 14: Internally Grooved Rim Jar

Jar rims distinguished by various numbers of grooves on rim interior; with sand or chaff temper. Although apparently a local late Chalcolithic ware in much of Upper Mesopotamia, this may in places post-date the phase of southern Uruk influence. For example, at Brak the form was associated with the latest Uruk phase exposed in CH:9-12 and it may be as late as Jemdet Nasr in date (Oates,J. 1986: 251; fig.2:16-18). Type 14 is widespread and has also been reported at Leilan (Period 5: Schwartz 1988: fig.45.1) and Kurban Höyük where it occurs as part of the indigenous late Chalcolithic Amuq F type sequence (Algaze 1990:256, Jar 19c).

Type 15: Carinated-ridged Bowl

Of variable temper, but with a distinctive form. At Brak, this came from the late Uruk sequence in CH 9-12 (Oates J., 1986: fig.2,nos.19,31).

*Type 16: Fine Beaker**

Usually tempered with fine chaff, and with a slight carination near the base. Unless found in large fragments or featuring incised lines (as in no.176), this vessel is not sufficiently distinctive to be always recognizable in the field. At Gawra the form occurs in levels X, XA and XI and at Brak in the early Uruk levels exposed in CH 13-14. Note: more distinctive but less common are a range of beakers with stamped decoration. Again these seem to be earlier or middle Uruk in date, but conceivably might be later. Because of their scarcity within the plain, the stamped wares have not been included as a separate type.

*Type 17: Deep bowl**

A range of dominantly chaff-tempered bowls, sometimes with slightly beaded rims. A rather ambiguous range of forms that might be confused with other Chalcolithic types. At Hammam et-Turkman and Brak area CH these are early Uruk (Hammam VA, Akkermans 1988: fig.8,113-15; Oates,J. 1986 no. 38). Also present in earlier Uruk levels in trench LP, Tell al-Hawa (Ball, Tucker and Wilkinson 1989: fig.28, 23-4).

Type 18: Nose and Crescent Lug Handles

A: Pierced Nose Lug
C: Crescent Lug

A. A "southern Uruk" type. Typically these occur on the shoulder or just below the neck of Uruk 4-lugged jars. Wares tend to be sand-tempered and moderately hard. They have been found at, amongst other sites, Tell Brak areas CH and TW (Oates,J.1986: fig.3,46-48); Kurban Höyük (Algaze 1990: Pl.25 B and C; Jars 6a and 6b) and Tell Mohammed Arab (Killick 1986: fig.2,1-3). They are good indicators of the period of southern Uruk contact, or slightly later, although some appear to be local imitations of southern types.

C. Crescent lug. Vessels appear to be hand-made and in a cooking pot ware. The handles can be either crescent- or horseshoe-shaped at Leilan (Schwartz 1985,fig.3) and Tell Brak (Oates,J. 1986,fig.4:nos.61-3). At Tell Hilwa (Site 86) crescent-lugged vessels were present in later Uruk levels, but elsewhere they can be a Ninevite 5 type.

Type 19A: Drooping Spout

Sand-tempered; a characteristic southern type and found on either tall water bottles or more squat and rounded jugs (e.g. Surenhagen 1986: figs. 6 and 8). The squat vessels are more characteristic of the north Jazira (e.g. Tell al-Hilwa no.58, unpubl.). Although usually only a spout or fragment thereof remains, they are sufficiently distinctive to be diagnostic.

Type 20: Small Carinated Bowl

Moderately fine plain bowls manufactured from mixed fine sand and chaff-tempered clay. Similar bowls were common in late Uruk levels at Tell Mohammed Arab (Roaf 1984a: fig.8; Killick 1986: fig.2, 6-9) where they appear to represent a local or northern type. Because both rim and carination needed to be on one sherd for diagnosis, it was necessary for sherds to be large for this type to be recognized. Rims or carinations alone were not taken as diagnostic. Initially these were subdivided into 20A (plain bowls) and 20C (painted bowls), but only the former were found in the north Jazira.

Type 20 bowls appear from their contexts to be late Uruk transitional to Ninevite V.

Type 21: Bowl with Internally-thickened Rim

A local northern Uruk type, usually chaff-tempered. Common at Grai Resh and Hammam et-Turkman (Hammam VB, Akkermans fig.9:140-42). This form and variants of it are very common on Uruk sites in the north Jazira. A Hammam VB dating suggests a roughly middle Uruk date, that is pre-dating the phase of southern imports and, at Brak, pre-dating CH 9-12. The presence of Type 21 in sounding LP at Tell al-Hawa implies that its use started during earlier Uruk times (Ball, Tucker and Wilkinson 1989:fig.28,2-4).

Type 55: Double-Mouth Jar

An early Uruk form featuring twin mouths. Characteristic of Gawra IX-XI, it was commonest in stratum XI and decreased in frequency in later levels (Tobler 1950:159). However, Ubaid examples have come from Tells Abade and Madhhur. This diagnostic is of limited value in survey because it is only recognizable if sufficient of the body from between the two mouths remains. A single rim is undiagnostic. This form is indicative of occupation between late Ubaid/earliest Uruk times until perhaps the middle Uruk.

*Type 106: Ceramic Ring**

Ceramic rings have been variously interpreted as a) potstands (Algaze 1990, 247: Stand 2, Period VI, Late Chalcolithic; and Pl.129 E-H; Period II late 3rd millennium), b) devices for securing a cloth pot cover (in late Uruk levels at Mohammed Arab) or c) ceramic ring scrapers (Alden 1988: 143).

The last-named are: "open rings with maximum outside diameters of 8-12 cm and minimum inside diameters of 4-9 cm....They range from well-fired to overfired, and some examples have been overfired to near the point of vitrification." (Alden 1988:143). The pointed (or sharper) edge shows traces of wear and sometimes chipping and Alden's interpretation is that the scrapers were used to remove excess clay from the outside of pottery vessels to lighten them, thus making them easier to transport. Although found on a wide range of Ubaid, Uruk and Early Bronze Age sites in the Near East, ceramic rings are included among Uruk types because they appear to be most frequent in such contexts on the north Jazira. They are however poor chronological indicators.

Type 120: Broad Strap Handle

A fairly uncommon type, this is one of the earliest examples of a strap handle. They are distinguished from later examples (i.e. post-Hellenistic) by their breadth. At Kurban Höyük, where they fall within the period of later Uruk contact with the south, they are sand-tempered (Algaze 1990: Pl 25, G and H; Handle 1) but in the north Jazira fine chaff was also used as temper. They do not appear to belong to any indigenous northern tradition and are most likely a southern later Uruk type (cf. Tell Rubeidheh: Killick *et al.* 1988: fig.33, 83-91; Nippur: Wilson 1986: fig.7 no.6).

Type 121: Sharply out-turned rim

This later Uruk type is usually fired brown to orange and is tempered with vegetable matter and white calcite grits. Similar examples are common in Plain Simple Ware at Kurban Höyük Period VI levels (Algaze 1990: Pl.25,K,L: Jar 8a) and again are later Uruk in date.

Type 134: Internally Moulded Bowl

This chaff- and grit-tempered vessel is usually unevenly fired. Although common in the earlier and middle Uruk periods, it can occur later and thus cannot be used as a sensitive chronological indicator. The form is very common in the north Jazira and is also found as far west as Hammam et-Turkman on the Balikh (Akkermans 1988:no.135) as well as at Grai Resh (Lloyd 1940: fig.7).

Type 138: Uruk Grey Ware

A common Uruk ware that can occur in a range of forms. Vessel forms are illustrated here but it is the ware that is diagnostic. At Grai Resh and Hammam et-Turkman it was chaff-tempered, grey-slipped and roughly burnished on one or both sides of the vessel (Lloyd 1940; Abu al-Soof n.d.:92; Akkermans 1988:fig.9). Forms were commonly deep bowls, either with a moulded or a slightly carinated rim. In the north Jazira, this chaffy and grit-tempered ware, although grey, is not necessarily burnished. This might, in part, result from abrasion on the surface of sites, and excavated examples may retain traces of burnishing. Common forms are bowls, either with internal or external beading. This type is characteristic of the middle Uruk (Hammam VB) and at Brak it appears to occur before the arrival of southern Uruk wares in area CH:9-12.

Type 140: Oblique-rimmed Bowl

A sand- or chaff-tempered type also noted from later Uruk assemblages at Hassek Höyük (Surenhagen 1986:fig.26), Kurban Höyük (Algaze 1990: Pl.21, Bowl 11) and Tell Brak (Fielden 1981: fig.1,no.8).

Type 149: Flared-rim Cooking Pot

A distinctive usually burnished grit-tempered ware, sometimes including white grits. This appears to be a local northern ware, cf. Qalinj Agha (Abu al-Soof: p.196, level VI, nos.2-5).

Type 150: Grooved-rim Beaker

Small fine-ware beaker with shallow groove in top of rim; sometimes weakly carinated. From associated ceramics in the north Jazira, these appear to be earlier or middle Uruk in date but equivalents from Kurban Höyük Period VI (Algaze 1990:

Pl.23.D, Jar 1a) and Tell Brak (Oates, J. 1986: no. 76) are late Uruk.

Type 151: Undercut-rim Jar

A southern form; in the north Jazira this is chaff-tempered and although not common, it is sufficiently distinctive to act as a useful dating indicator. Appears in late Uruk levels at Kurban Höyük (Algaze 1990: Pl.26.C, Jar 11).

Type 152: Inturned-rim Bowl

A common coarse, chaff-tempered Amuq F form. In the north Jazira Type 152 represents a wide range of these bowl forms, but all quite clearly belong to this group. This later Uruk form has a wide distribution in northern Syria, SE Turkey and Iraq: for example Leilan Period V (Schwartz 1988:fig.45,nos.3 and 5) and Kurban Höyük (Algaze 1990: Pl.32, Bowl 26).

Type 153: Carinated Bowl

Another coarse, chaff-tempered Amuq F type. At Tell Brak, known as a casserole (Oates,J. 1986:fig.1, nos.3 and 4; Fielden 1981: fig.2,nos.1-2). Also at Kurban Höyük Period VI (Algaze 1990: Pl.20,D-J:Jar 20).

Ninevite 5 (Fig.68)

The duration of the Ninevite 5 period for northern Iraq was from about 3000 to 2500 BC (Roaf and Killick 1987:226-7). Thanks to a recent upsurge in excavation within the Ninevite 5 culture zone, the ceramic sequence can now be subdivided into an early phase in which painted pottery dominated, a middle phase when painted pottery decreased and early incised ware took over, and a later phase when late incised and excised fine wares co-existed (Roaf and Killick 1987: fig.10). Although initially disputed by work at Tell Leilan, more recent work has identified levels with painted Ninevite 5 and without incised or excised grey wares. In the north Jazira project area, painted Ninevite V was scarce and was less common than either the incised or the excised varieties. The period was one of essentially local production, with fewer influences being received from the south than during say the late Uruk (Schwartz 1985:60).

The nine Ninevite 5 types defined (i.e. including Type 18C) can be sub-divided into the following chronological sequence:

a)	Early Ninevite 5:	Types 22 and 27
b)	Middle Ninevite 5:	Type 25
c)	Late Ninevite 5:	Type 23

General indicators of Ninevite 5: Types 18C, 24, 26, 28 and 133

The fine wares, Types 22, 23, 25, 26, 28 and 133, are hard, wheel-made, and the fabric is either devoid of visible temper or includes only rare fine sand or fine chaff inclusions. Colours, although usually grey, can be olive or yellowish brown.

Type 18C: Crescent-lugged Cooking Pot (See Uruk, above)

Type 22: Incised Grey Fine Ware

The simple wavy or linear dotted patterns illustrated are characteristic of the earlier phases of the Ninevite 5 (Mohammed Arab period 2; Roaf and Killick 1987: fig.4). Later incised wares have more complex incisions, with much of the vessel surfaces being covered by both incised and excised patterns.

Type 23: Excised Grey Fine Ware

A term coined by Seton Lloyd, this type was first recognized by Mallowan who described it as: " a ware, the surface of which has been grooved, leaving the main elements standing out against a low background" (1964,146). Often the raised parts themselves are incised. This decorative technique has been used in conjunction with earlier simple motifs (cf.10 and 11 on Fig.68) and can sometimes produce a complex textured effect. Excised ware is relatively late in the Ninevite 5 sequence.

Type 24: Pedestal Base

A: Grey pedestal base
B: Scar of pedestal base*
C: Pedestal base, but not grey
The pedestal base occurs with both painted (see type 27) and fine grey ware vessels. The former are often distinguished by a painted band around the perimeter but those with fine wares are chaff-tempered and were added to the fine ware upper body at a late stage of manufacture before firing. Frequently the vessels have broken at the point of contact between the pedestal base and upper body to produce a distinctive attachment scar, classed here as Type 24B. Good examples of pedestalled plain and incised vessels are illustrated from Telul al-Thalathat (Fukai *et al.* 1974: pl.XLIX: 2-4; pl.XLIX:1) and pedestalled painted vessels from Leilan IIIc (Schwartz 1985: fig.2). Note that one of the last-named (no.3) is a high pedestalled form that, although recognized in the north Jazira (potential diagnostic HD), was not common enough to be made a type.

Type 25: Vertical Grooved Fine Ware

Normally a grey fine ware, it has been suggested that this is an early form of excised ware (Roaf and Killick 1987:219). This class is missing from Mohammed Arab, probably because of a gap in the sequence between periods 2 and 3, but is present in the later phases of Leilan III (see Schwartz 1985, fig.5 no.23).

Type 26: Ribbed Fine Ware

The distinctive upper body can be associated with either a pointed/parabolic or with a pedestalled base. For good examples of contrasting pairs see Bielinski 1987 (figs. 18 and 19). This could not be allocated to a specific chronological phase of the Ninevite 5.

Type 27: Painted Ware

In the north Jazira these are pale wares, sand- or chaff-tempered with reddish-brown or purplish-brown paint occasionally representing animals or birds.

Formerly known as "Billa Ware", this, to many, is the classic indicator of Ninevite 5 occupation. In the north Jazira it is less common than the incised ware (Type 22). At Nineveh, Type 28 was usually of a cream or buff ware decorated with dark purple, violet, brown, red or even green paint (Mallowan 1964:144) although "plum" is the most frequently described colour. Designs can be both geometric and naturalistic (27-30, Fig.68). According to the Roaf and Killick scheme, painted ware is restricted to the earlier part of the period (1987, fig.10) and derived from local late Uruk painted ware (see this volume Fig.66 no.17). Painted vessel forms can be pedestalled bowls,

pedestalled necked jars or chalices (Schwartz 1985, fig.2; Fukai 1974 pl.L and pl.XLVIII).

Type 28: Pointed or Parabolic Fine Ware Base

Fine ware bases of Types 22,23,25 and 26. Being thicker than the upper parts of vessels they survive better on the surface. Alone, they should not be used as indicators of Ninevite 5 occupation but they do supply useful supplementary evidence. A range of complete vessel forms is illustrated in Thompson and Mallowan (1933: pl.LIII, nos.1-9).

Type 133: Fine Ware Beaded-rim Bowl

A form distinguished by its straight sides or slightly inturned lip with distinct external beading. Similar forms have been recognized at Thalathat (Fukai *et al.* 1974: pl.XLVII, nos.25-32) where they have parabolic bases (Type 28). They have also been recorded from slightly later mid-late 3rd millennium BC levels (Va and Vb) at Tell Fisna (Numoto 1988, fig.21,no. 127; fig.22, no.151) and Tell al-Raqa'i, Syria, level 2 of approximately mid 3rd millennium date (Schwartz and Curvers 1990: fig.5, no.6). None of the above parallels is exact, however, and at present this form can best be regarded as an early-late 3rd millennium indicator.

Later Third Millennium ("Akkadian/ Ur III") (Fig. 69)

A small but distinctive assemblage exists to date occupation of the second half of the 3rd millennium BC. This phase starts at the end of Ninevite 5 times, around the middle of the millennium, and continues until roughly the end of the millennium or a century later. The ceramic types decribed here encompass both the Akkadian and Ur III periods as well as any sub-phases that might have existed. Although there is some evidence for chronological sub-division within the data, at this stage of research the differences are not sufficientiy well-understood to enable the assemblage to be confidently subdivided.

Like the Ninevite 5 assemblage, the pottery of the later 3rd millennium is characteristically northern, with no sign of wares imported from the south. Pottery production, especially with regard to coarse wares, appears to have been highly regionalized hence pottery parallels must be sought mainly from the region of the site itself. Only selected foreign introductions, such as the metallic or stonewares, exist to link this area with more distant production centres.

Type 29: Flat-based Bowl

Most frequently found as a flat base with side walls curving up at a relatively low angle to the horizontal. Mainly manufactured in a hard, pale green, sub-stoneware, usually smooth-finished, with fine sand temper and often conspicuous fine throwing rings. They can also occur in a slightly lower-fired buff earthenware. Examples of Type 29, in various fabrics, have come from Tell Brak (Fielden 1977: pl.XI,nos.15,16; Oates,J. 1982: nos.22,29,30) with closer parallels coming from the Eski Mosul Dam at Tell Fisna (Numoto 1988: fig.22) and Tell Abu Dhahir.

Type 30: Flat-based Beaker

A form that is related to Type 29, but with steeper side walls, which in the complete vessel formed a tall beaker. Usually, these were manufactured from a hard pale green sub-stoneware, although some examples were of a slightly softer earthenware. Again fine throwing rings were conspicuous. A particularly good diagnostic, with parallels coming from Tell Brak (Mallowan 1947:pl.LXVIII, nos.17,18; Fielden 1977:pl.XI,no.7), Tell Taya level IX (Reade 1968: pl.LXXXIV,no.8) and Tell Leilan Operation 2, Periods II (Weiss 1983: fig.10,nos.1-2). At Brak, Mallowan considered these vessels to be a good Sargonid marker (Mallowan 1947: 232). Their distinctiveness and robustness make them a conspicuous diagnostic for survey work and they are particularly noticeable in field scatters.

Type 31: String-cut Flat Base

A form with distinctive eccentric whorls on the underside of the base resulting from the use of a string to sever the vessel from the potter's wheel. Manufactured from a pale greyish or greenish, dominantly chaff-tempered, ware. The type has been recorded from later 3rd millennium Tell Brak, where it has been referred to as a conical cup (Oates,J. 1982: fig.6, nos.95,96). At that site they occurred on post-Agade floors and they post-dated the Naram Sin building. At Brak, string-cut bases, in general, were much less common in the ED destruction level than in the succeeding Agade and Ur III levels and although they may prove to be a useful indicator for the final quarter of the 3rd millennium, this has not been possible in the north Jazira. Type 31 should not be confused with a similar but grit-tempered Hellenistic form from east of the Tigris at Balawat or an Uruk form from Kurban Höyük Period VI (Algaze 1990: bowl 1a, Pl. 19:B and C).

Type 32: Comb-incised Jars

A distinctive range of thick, heavy jar rims decorated with combed incisions (32A) or body sherds of the same (32B). In a greenish, chaff-tempered ware, with some, usually white, grits. A particularly common type in the north Jazira and Eski Mosul Dam area (Tell al-Hawa: Ball, Tucker and Wilkinson 1989: fig.22;Tell Fisna: Numoto 1988: fig.24), but also occurs in buff or red ware at Tell Rimah (Oates 1970:pl.IX) as well as at Brak, Leilan and Tell Taya. At the last-named site the curvilinear comb incisions are commonly replaced by various infilled triangles or zig-zags (Reade 1968:pl.LXXXIV, nos.1 and 2). At Tell Mozan, Syria, comb-incised jars are described as Ur III (Buccellati and Buccellati 1988: fig.21:M1,22 and 23) but in the north Jazira they are used as a general indicator for the 2nd half of the 3rd millennium. Note that a pink variant of Type 32 has also been defined as Type 155 (below).If attention is not paid to fabric, body sherds (Type 32B) can be confused with comb-incised Sasanian/Islamic wares.

Type 33: Taya-type fine wares and related sub-stonewares

A: Flat base
B: Incised ware
C: Rim or other base in Type 33 fabric

Type 33 is reserved for the finest of the later 3rd millennium ceramics. They are always hard and thin-walled and some even approximate to stoneware in their hardness (Schneider 1989). True metallic wares characteristic of Syria and south-east Turkey are scarce; if found, however, they would be included in this type. Fabric colours are usually green or grey-green although pinks can occur. Stonewares and sub-stonewares can also appear as red- and black-banded sherds or in dark grey. Bases can be flat (Type 33A) or low rings and upper vessel forms include gently incurving rims. Incised Taya ware (Type 33B) seems relatively scarce north of the Tell'afar ridge. A range of Taya wares can be seen on Pl.5 of Reade (in Curtis 1982), but the large proportion of dark grey, pink and black sherds is not typical in the north Jazira.

Type 103: Indented-rim Jar

A: With surface chaff B: With surface grit.
Although occurring in significant quantities at Tell al-Hawa, this is generally not common in the north Jazira. Also recorded from Tell Leilan (Weiss 1983: fig.10,nos. 13,14,16), this seems to have been particularly common at Tell al-Raqa'i, where it occurred in levels 3 and 2 dating to slightly after the mid-3rd millennium BC (Schwartz and Curvers 1990: fig.6,1,4,7,8, and fig.18,2,4,6). Schwartz's attribution to around the mid-3rd millennium makes Type 103 a potentially useful indicator for the period when urban centres were probably attaining their maximum size.

Type 154: Lugged Bowl

Not particularly common, but distinctive. Unlike Ninevite 5 cooking pots, the lugs tend to be horizontal and the fabric is dominantly chaff-tempered. Parallels can be cited from Tell Brak, Agade temple (Fielden 1977:pl.XII no.9) and Leilan (Weiss 1983: fig.10,no.20).

Type 155: Comb-incised Jar (Pink variant)

As Type 32, but in an oxidized pink or reddish-brown fabric.

Khabur (Old Assyrian) (Fig. 70)

The ubiquitous painted Khabur ware that occurs on sites of this period has been given an approximate range of 1900-1600 BC by Mallowan (1937:102) and also by Hamlin (1971:302-3). The ware is most common in northern Mesopotamia, particularly in the Khabur region, stretching to east of the Tigris in Iraq. Beyond this, outlying sites such as Nuzi, Dinkha Tepe (near Hasanlu,Iran) and Kultepe (Karum Ib) have all produced Khabur ware. Old Assyrian texts associated with Khabur ware from Chagar Bazar show that Khabur ware was in use at the time of Shamshi Adad I of Assyria (1813-1781 BC). A similar case can be made for Kultepe Karum Ib and, at Tell al-Rimah, Khabur ware was found in the palace with Old Babylonian texts and in the upper floor of room XXI of the temple (Oates 1967: 83; 1968b: 136). The ware can therefore be regarded as Old Assyrian in date, although here no pretence is made to relate this pottery to any particular cultural or linguistic group (Kramer 1977). In addition to the distinctive painted wares, a number of plain wares have been added to extend the range of diagnostics. This "Khabur ware assemblage" can be used to indicate occupation during much of the first half of the 2nd millennium BC. Unfortunately, the described types do not enable the Khabur painted ware (i.e. Type 34) to be subdivided further. In general, it appears that the proportion of fine painted wares increase towards the end of the period (i.e. towards Nuzi times). Kantor has argued for a typologically transitional phase between Khabur and Mitannian ware but this phase is not supported by the stratigraphy of the site in question: Tell al-Fakhariya (Kantor 1958: 21-9; Hamlin 1971: 174).

Type 34: Khabur Painted Ware

A: Painted jar and bowl rims
B: Body sherd
Vessel bodies are of a reddish or pale brown ware, chaff- and grit-tempered. Type 34 sherds, because of their distinctive band-painted design, are easily recognizable during survey. At the type site of Chagar Bazar, Khabur painted ware was described as very coarse, buff, pink or creamy ware with monochrome painted designs painted in matt red, red-brown or black on the exterior (Mallowan 1937: 102). Both necked jars (or vases) and carinated bowl forms were included. Unimaginative band-painted designs predominate, but there are occasional areas of cross-hatching, circular motifs or simple geometric designs. These artistic limitations are re-inforced by the slap-dash use of paint that often resulted in the dribbling of paint on the otherwise unpainted interiors.

Although stripy painted wares of loosely Khabur type can continue as late as 1400 BC or even later, these occur in diminishing quantities. Only during the first half of the second millennium BC do the illustrated types form a significant proportion of pottery collections.

Type 35: Jars with Horizontally Grooved Shoulders

A: Rim with shoulder
B: Body sherd with grooved shoulder
Made from a ware similar to Type 34; horizontal painted bands can again be present. Although less common than Type 34, this type appears to have a wide geographical spread, and is common within the area of the north Jazira and the Eski Mosul Dam. It occurs at Dinkha Tepe (Hamlin 1974: fig.III, nos.15a,b and c) and at Mozan (Buccellati and Buccellati 1988: fig. 26, M1, 83 and 84) where it was regarded as a transitional type between Ur III and Khabur ware. Within the area of the Eski Mosul Dam it occurred at Tell Fisna level IV (Numoto 1988: fig. 28, 274-80). On the basis of the Mozan evidence, Type 35 can be used, tentatively, to indicate occupation at the early stage of the Khabur period, that is 2000 BC or a little later.

Type 36: Indented-cordoned Jars

No complete form of these thick and heavy vessels is known from the north Jazira, therefore cordoned body sherds are taken as the type. The form also occurs in the Eski Mosul Dam area, and ribbed jars from Nuzi period levels at Nuzi can occur with or without grooved cordons (cf Starr 1939: v.II,pls.64-67). If a Nuzi attribution is correct, these would appear to be a useful indicator for the late Khabur or mid-2nd millennium BC.

Type 37: Jar with Impressed Circles

Although occurring in the Eski Mosul Dam area, this type, to the writers' knowledge, has not been reported elsewhere. Nevertheless, the occurrence of impressed circles on Type 35 jars (classed as 37A) suggests that it is an early 2nd millennium type. In the field, body sherds of Khabur ware fabric decorated with impressed circles, or rarely squares, were taken as diagnostic Type 37B.

*Type 38: Concave Fine Bowl Base**

A rather ambiguous type which could sometimes be confused with channel bases (Type 40) of the same period. Type 38 bases are, however, usually small (< 10cm diameter) and of fine fabric. In the area of the Eski Mosul Dam they have been reported from Khirbet Karhasan. They have a tenuous resemblance to some Nuzi bowls.

Type 39: High Ring or Pedestal Base

Small high base, usually less than 5 cm diameter, and manufactured from a painted buff fine ware with sandy inclusions. Within the Eski Mosul Dam published examples came from Tell Fisna, level IV (Numoto 1988: fig.25,nos.226,227,238). Further afield, examples on painted, bowls (both globular and open), have come from Chagar Bazar (Mallowan 1936: fig. 17,nos.1,2,14) and were also quite common at Nuzi. Their presence in Nuzi levels, as well as their association with finer painted wares, suggests that these

might be indicators of the final stages of the Khabur period to overlap with Mitannian wares.

Type 40: Channel Base

A: With rounded "channel"
B: With angled "channel"
A distinctive form and in the north Jazira plain a good indicator for the Khabur period, but at Ana examples as late as Neo-Assyrian have been recorded (Northedge *et al.* 1988: fig.30, nos.38-41). It should be noted that the two sub-types defined here do tend to merge. The occasional presence of painted drips on the vessel interior demonstrate that they were part of Khabur painted vessels (Type 34). Parallels come from Tell al-Rimah (Oates D., 1970: pl.IX,no.1; early Khabur), Chagar Bazar (Mallowan 1936: fig.14 nos.9-11 and fig.16 no.15) and Tell Fisna, level IV (Numoto 1988: fig.26). Although mainly restricted to the Khabur period, this base form does continue into Nuzi levels at Nuzi.

Type 41: Burnished Grey Ware Bowls

Typically, a hard, sand-tempered grey ware (contrast the chaffy Uruk grey ware: Type 138), usually slightly burnished and occurring in a number of bowl forms. Similar grey ware bowls have been recorded at Dinkha Tepe (Hamlin 1974:128 and fig. V,41,46,48,51 and 52) and Chagar Bazar (Mallowan 1937:fig.20 no.4 [a Type 42 bowl in grey ware, c. 1900 BC]). When combined with distinct Khabur-type forms, Type 41 makes a distinctive diagnostic. On less distinctive forms and without other associated Khabur wares, grey wares might be confused with Uruk grey wares and caution should be excercised in using Type 41 alone.

Type 42: Externally Grooved Bowl

Bowl with slightly incurved rim, in medium fine ware, in various shades of pale yellowish-green, pink and buff; rarely in grey ware. These are distinctive because of the 2, 3 or 4 horizontal grooves inscribed into the bowl exterior just below the rim. This distinguishes them from the Hellenistic incurved rim bowl (Type 64). Although few have been published from other sites, they appear to be widely distributed and are paralleled at Dinkha Tepe (Hamlin 1974: fig.V, 39, 40,53) and Chagar Bazar (Mallowan 1937: fig.20,no.4: Type 41)

*Type 109: Pie-crust Potstand**

This form can occur in Khabur, Nuzi and Middle Assyrian contexts. The Khabur and Middle Assyrian varieties are distinguishable on the basis of fabric (see Type 54). A complete example from Nuzi is illustrated in Starr 1939 (v.II,pl.94,k) among a range of plain potstands. Hamlin reported that Khabur-type potstands occurred at Tell Brak (Hamlin 1971:170). Rims of plain potstands are difficult to distinguish from normal vessel rims and therefore are of little value for purposes of survey. The long time range of this form is indicated by close parallels for the illustrated example (Fig.70, no.25) which have come from both the early and middle phases of Middle Assyrian occupation at Tell Mohammed Arab (Roaf pers.comm).

Nuzi (Mitannian) (Fig. 71)

In terms of diagnostics for use on survey, the Mitannian period with its characteristic Nuzi wares is rather unsatisfactory. There is a limited range of known types and, although distinctive, they seem remarkably rare. This scarcity might be explained by large-scale desertion of the plain (except around Tell al-Hawa) but perhaps, more likely, it is because the diagnostics employed are fine wares found on a limited class of site, probably centres using prestige pottery. At present, therefore, no significance should be inferred from the absence of Nuzi wares. The three types described are mainly from Tell al-Hawa, although the two goblet bases (Type 45) came from peripheral Sites 37 and 71.

When viewed in conjunction with the preceding Old Assyrian period, Kantor argues for a gradual shift from earlier Khabur coarse types towards thin-walled and more sparsely-painted later Khabur wares (Kantor 1958:22). Furthermore, based on stylistic grounds, she identifies a transitional Khabur/Mitannian class of pottery. To counter these conclusions, Mallowan sees no evolution within the Chagar Bazar ceramic sequence and Hamlin dismisses the transitional horizon because of the lack of stratigraphic support.

Because of the problems of recognition of a Nuzi assemblage the following three types are used to demonstrate when Mitannian occupation is present, and no more.

Type 43: Nuzi White-painted Ware

This type is rare, being restricted to Tell al-Hawa and Tell Hamide (Site 71). The vessel body usually has white paint on a red or brown painted background; motifs include animals and birds and straight lines. Fabrics are chaff-tempered, usually pale yellow or buff, and are usually well-finished and smooth. The classic Nuzi ware assemblage from Yorgan Tepe most commonly occurred as "high cups" with neat, small pedestal bases (Starr 1939:pl.78,P-X and pl.79). They have also been reported from Tell Aqrah (Markhmor plain: al-Amin and Mallowan 1950:pl.IX), Tell Jidle (in the Balikh) and Tell Brak (Mallowan 1946: fig.11,no.10; Mallowan: 1947 pls.LXXVI,LXXVII and LXXVIII). A particularly good parallel for Fig.A.10b came from the Mitannian temple at Brak (Oates,J. 1987: pl.XLVb). Note: although animal and bird motifs can occur in colours other than white paint (originally recognized during survey as Type 46) such vessels were virtually absent from the Project area and Type 46 has therefore been omitted.

Type 44: Fine Painted Goblet

Typically these are fine rim sherds painted with horizontal red or brown bands or lines, one of which is normally along the rim edge. Although they can have nipple bases, more frequently bases are pedestals (cf.Mallowan 1947: pl.LXVII no.15, from Brak). These rims also come from Nuzi "shouldered cups" (cf.Starr 1939:393 and pl.77,Q), although such vessels are usually plain. Type 44 is not exclusively Mitannian: it can merge with the later Khabur band-painted fine wares and is also found in Middle Assyrian layers at Mohammed Arab (Roaf pers. comm.).

Type 45: Pedestal (Stump) Base

Solid base normally of fine-medium fabric with traces of vertical burnishing remaining on the pedestal stump. Good examples have come from Brak (Mallowan 1947:pl.LXVII nos, 15,16); at Nuzi, simple or complex variants of this base are associated with shouldered cups (Starr 1939:pl.77). Because they normally break to include at least part of the vessel body, they form a good diagnostic, although care needs to be taken when they are found on Hellenisitc sites that can yield occasional unguentarium bases of similar form. Like Type 44, they continue into the Middle Assyrian period.

Middle Assyrian (Fig. 72)

The state of publication of Middle Assyrian ceramics is, at present, meagre and consequently the range of types described

	TYPE SERIES NUMBERS							
Early Middle Assyrian	52A,B	53=56	54	109	50	141	48	47=51
Middle Middle Assyrian					50	141	48	47=51
Later Middle Assyrian							48	47=51
Not phased	49							

here is based upon unpublished parallels from other sites. Notably, these have come from Tell Mohammed Arab and we are very grateful to Michael Roaf for providing drawings and preliminary phasing from that site in advance of publication. In such cases, reference will only be made to the site of excavation. Middle Assyrian pottery from NW Iraq is notable for its usually greenish, heavily chaff-tempered fabric; this fabric might have been used for functional reasons, to make porous vessels for cooling liquids. Only a minority of wares such as the beaker rim (Type 49) and associated nipple base (Type 50) are of finer fabric.

The date range suggested here (1400-1000 BC) is slightly late because, for example, glyptic evidence from Tell Mohammed Arab might extend the earlier date of the ceramics back as far as the 15th century BC. However, these seals may have been heirlooms, which were old when deposited (Collon 1988). Nevertheless Middle Assyrian coarse wares, or varieties thereof, were probably also in use in the Mitannian period.

Unless stated otherwise, all ceramic types are made from a greenish or buff chaff-tempered ware with occasional white (calcium carbonate) grits.

The following phasing for the types can be tentatively suggested:

(Based on results from Tell Mohammed Arab)

Type 47: Collared Rim Jar

A common form in the north Jazira, numerous examples also came from Nemrik within the area of the Eski Mosul Dam. The rim appears to belong to tall, narrow jars with ring bases of Type 51 (Roaf pers.comm). The type also extends as far west as Tell Sabi Abyad, in the Balikh valley (Rossmeisl 1989: fig.XII.4 nos.46,48; fig. XII.5,nos. 49,51,53). The Balikh examples, although in a cream-coloured or orange ware, are of the same form as those from the north Jazira and are dated to the late Bronze Age. At Mohammed Arab, these seem to be confined to the middle and later phases of Middle Assyrian occupation (Roaf pers comm).

Type 48: Small Bowl

Distinctive in complete profile, this form can be distinguished from other Middle Assyrian bowl forms (Types 52 and 141) because it lacks the thickening or beading at the rim interior. A common, widely distributed form reported from Tell al-Fakhir, near Nuzi (Mahmoud 1970:pl.19,no.349) and Tell Sabi Abyad (Rossmail,1989: fig.XII.I). Usually Type 48 has a flat base, but ring-based examples come from Tell Aqrah, Makhmor plain (al-Amin and Mallowan 1950: pl.VIII nos.22-26). Only the flat-based type is taken as diagnostic here. At Mohammed Arab Type 48 bowls appear in all three Middle Assyrian levels, but they seem to be most common in the middle phase.

*Type 49: Fine Beaker**

In greenish-buff fine ware. Small sherds of this form are difficult to recognize with confidence, hence the type is probably under-represented in the pottery counts. Although no complete profiles were collected from the north Jazira, it appears from other sites to be a form associated with a nipple base. For example, Tell Fakhariyah (Kantor 1958:pl.38 no.62: conical beaker), Tell Aqrah (al-Amin and Mallowan 1950: pl.IX, no.10), Assur (Haller 1954: Tafel 3,a, f and Tafel 23,b,c and d) and Tell Mohammed Arab (Roaf pers.comm.). There is a danger of confusion with Nuzi shouldered cups (Starr 1939:pls.78,79) and, like the nipple base (Type 50) it should not be assumed to belong to the Middle Assyrian period alone.

Type 50: Nipple Base

A common and distinctive type, this can be as early as Mitannian but related forms can occur in Late or even Post-Assyrian contexts (Curtis 1989,fig.40,no.268 and fig.43,no.323). Middle Assyrian parallels come from Mohammed Arab (Roaf 1983: fig.5 nos. 1 and 2) where they seem to be confined to the early and middle phase (Roaf pers.comm.), Tell Fakhariyah (Kantor 1958:pl.38 no. 62), Tell Aqrah (al-Amin and Mallowan 1950:pl.IX, nos.6,8,9,10) and Assur (see Type 49). As noted for Type 49, the nipple base is commonly associated with fine beaker wares.

*Type 51: Coarse Ring Base**

A: Inner angle of base (see Fig.72, nos. 12-13) >45°
B: Inner angle of base <45°

These heavy ring bases have a number of minor variants but can be identified by the coarse, usually greenish, chaff-tempered fabric as well as the underside of the base that slopes gradually from the ring trough to the centre of the base. It is not always possible to distinguish between sub-types A and B but in complete profiles these may relate to different vessel types. On the basis of parallels from Mohammed Arab, both examples illustrated appear to belong to tall, narrow jars surmounted by Type 47 rims (Roaf pers.comm.). They may therefore also be restricted to the mid to later phases of the period. General parallels can be cited from Tell Sabi Abyad (Rossmeisl 1989: fig.XII.10,no.108, fig.XII.11, nos.121,122).

Type 52: Plate or Dish (Note: Type 141 combined with Type 52)

A: Plain Bowl
B: Bowl with Painted Stripe

A distinctive very shallow bowl, dish or plate, frequently with a painted red band on the rim interior or exterior, or both. Usually in a pinkish or orange fabric with occasional chaff and grit temper. Complete profiles from Tell Brak have ring bases (H.McDonald pers.comm.). The fabric is significantly different from that of most other Middle Assyrian pots. The presence of large quantities of these vessels in Mitannian levels at Brak (pre-13th century BC) suggests that these are also Mitannian, after which they continue into at least the earlier phases of the Middle Assyrian period, if not later (H.McDonald pers. comm.). A related type (141) has been defined which overlaps in some of its characteristics with Type 52. At Mohammed Arab, Type 52 dishes were restricted to the early phase of occupation (Roaf pers.comm and Roaf 1983: fig.5, nos.3,4,5).

Type 53: Sherds with Wavy Grooved Lines

Although wavy line combing or incision is a common decoration for several periods, the broad impressed groove on a coarse greenish chaffy white-gritted fabric is distinctly Middle Assyrian. At Mohammed Arab, the vessels appeared to be storage jars equipped with rims of Type 56 (Roaf pers.comm).

Type 54: Pie-crust Pot-stand

Pot stands of similar type also occur on Khabur sites and the form presumably continues through much of the 2nd millennium. Middle Assyrian stands are in the distinctive greenish-buff chaffy fabric, a good Middle Assyrian example being illustrated from Mohammed Arab (Roaf 1983: fig.5 no.6). For a complete profile of a Khabur equivalent see Khabur Type 109 (above). The example illustrated from the north Jazira is a rather poor example (Fig.72 no.21).

Type 56: Square Rim Jar

This strong squared profile, although primarily Middle Assyrian, may also occur in Khabur contexts. Its distinctiveness and frequent occurrence makes it an excellent indicator for survey. The presence in some examples of a slight indentation in the rim exterior suggests that unless care is taken to note the fabric there is some possibility of confusing Type 56 rims with similar late Ubaid rims of Type 147; usually, however, the Middle Assyrian type has a greater vertical depth. A common type from Middle Assyrian levels at Nemrik and also reported from Tell Aqrah (al-Amin and Mallowan 1950:pl.VIII,nos.9-12). In the area of the Eski Mosul Dam these vessels were decorated with horizontal cordons or ribs. At Mohammed Arab, Type 56 rims were confined to the early phase of Middle Assyrian occupation (Roaf pers.comm.).

Late Assyrian (Fig. 73)

Although the Late Assyrian period, from approximately 1000 BC to the fall of Nineveh in 612 BC, encompasses some ceramic evolution, the pottery types will be treated as one assemblage. In one or two cases, however, where there are clearly either early or late forms, these will be indicated. Lloyd viewed Late Assyrian pottery as "homely in character and technically undistinguished" (Lloyd and Gokce: 1953,46), which is probably fair for the coarse wares but is inappropriate for the superb fine palace wares (Type 60). Nevertheless, most of the pottery is chaff-tempered and moderately coarse (e.g. types: 57, 58, 59, 61, 105, 111, 112, 113 and 114). Sand temper, in the north Jazira and Tigris regions, becomes more significant in the later phases and during the "post-Assyrian" period, but it is not clear when this change took place. Because of the persistence of Late Assyrian forms through into post-Assyrian times, the presence of Late Assyrian occupation should be judged on both vessel form and fabric, the sandier examples being separated out as potentially post-Assyrian.

It should be appreciated that even the above generalizations are based on a sparse record of stratigraphic excavations and even one of the best records, that from Qasrij Cliff and Khirbet Qasrij (probably c.8th century and early 6th century BC, Curtis 1989: 17 and 52), for example, is from two adjacent sites not stratigraphically superimposed. Even with the use of microscopic examination of sherd thin sections it proved difficult to distinguish between the earlier Qasrij Cliff and the later Khirbet Qasrij assemblages (Freestone and Hughes 1989:71).

In the following catalogue, vessel forms will be described according to the nomenclature of Curtis (1989), Joan Oates (1959) and a preliminary catalogue of the pottery from Nineveh compiled by Pierre and Patricia Bikai.

Table 15. Preliminary periodization of Late Assyrian pottery

Phase	Type Number
Late Assyrian (Full Range)	61,63,105,111,112,113,114,118.
Earlier: 10th-8/9th century	62.
Later: c.7th century	57,58,59,132.
Uncertain	60

Type 57: Bowl with Ribbed Rim

The rim is distinguished by a perimeter groove or depression, below which is a slight bulge, rib or bead (Curtis 1989:fig.27, nos.67,71-4). Curtis also distinguishes a second type: bowls with inverted and thickened rims (ibid.fig.28), but for survey purposes only one type is employed. Type 57 was found in Late Assyrian 7th century contexts at Nineveh (P and P Bikai, type P2) and at Nimrud (Oates,J. 1959: pl.XXXV,14,25). It was present in significant amounts at Khirbet Qasrij but was absent from the earlier Qasrij Cliff assemblage (Curtis ibid.). The form occurs as far west as Sultantepe in SE Turkey (Lloyd and Gokce 1953: fig.7, 22-9) as well as at sites near Samsat, near Urfa (Wilkinson 1990a: fig. B.11, nos.6 and 19), that is towards the north-western limits of the Assyrian Empire.

Type 58: Bowl with Thickened Rim

Another common form, again like Type 57, probably later (i.e. 7th century). A common type in the lower town at Nineveh (P and P Bikai, type P1) and also occured at Sultantepe (Lloyd and Gokce 1953: fig.7). The range of forms merge with the carinated bowl (Type 113) but it appears to occur at a slightly later date.

Type 59: Swollen Convex Base

A range of distinctive bases. To judge from complete vessels from Late Assyrian graves at Assur, these are associated with necked jars (Haller 1954:Tafel 3). They have also been recorded from Nineveh lower town (P and P Bikai, type B1) and at Khirbet Qasrij (Curtis 1989: fig.43) Their absence from Qasrij Cliff suggests that they are a later form.

Type 60: Palace Ware Beaker

A beaker or goblet with a long neck, in some cases taking up to 50% of the body length. The fine clay body is usually buff or greyish-green, more rarely pink. Apart from the distinctive fabric, the most diagnostic trait is the presence of finger-impressed dimples at or below shoulder level; although surely an intentional decorative device, these were in part produced as a result of the removal of the vessel from the wheel (Rawson 1954: 168). This is the finest quality ceramic produced during the Late Assyrian period and its eggshell delicacy, often thrown to a thickness of less than 1 mm, well demonstrates the skills of the Late Assyrian potter. Although not common (at least on the minor sites of the north Jazira plain), the ware is sufficiently distinctive to make a good diagnostic and its presence on a site does suggest some degree of fine living. A range of typical profiles from Fort Shalmaneser, Nimrud is illustrated in J. Oates 1959: pl. XXXVII.

*Type 61: Angled Ring Base**

Because of the possibility of confusion with Type 51, the Middle Assyrian equivalent, this type should only be used with other Late Assyrian diagnostics to demonstrate the presence of Late Assyrian occupation. It can form the base of carinated bowls (Oates,J. 1959: pl.XXXV,nos.8,10,23). Other examples, but bases only, were recorded from both Qasrij Cliff (Curtis 1989: fig.14, 87-93)

and Khirbet Qasrij (Fig. 44,335, 346-8) thus suggesting that the form continued throughout the Late Assyrian period.

Type 62: Powder Box Base

A distinctive but rather rare form (cf. Oates.J. 1959: pl.XXXVII no.68). Manufactured in a moderately fine ware, the form occurred at Qasrij Cliff (Curtis 1989: fig.10, 34-7), but not at Khirbet Qasrij, suggesting that it may be an earlier (10th-8th century BC) type. On the basis of a complete profile from Nimrud (Oates,J. 1959,pl.XXXVI,37-49) Curtis suggests that the larger and coarser examples from Qasrij Cliff may be a type of "istikan".

Type 63: Button Base

A medium to fine ware form which occurs in 7th century levels at Nineveh (P and P Bikai, type B2) but also at Qasrij Cliff, which suggests that it is a fairly long-lived type (Curtis 1989: fig.10,no.42; fig.14,nos.96-7).

Type 105: Assyrian Shouldered Bowl

Although a distinctive form with Late Assyrian parallels, mainly in the class of carinated bowls (Type 113), this type is not well dated and may continue through much of the 2nd and earlier 1st millennium BC.

Type 111: Internally Hollowed Jar Rim

One of a range of minor variants on a Late Assyrian jar form (cf. Curtis 1989: fig.11, nos.58,59 and fig.12, 66). The latter examples are from Qasrij Cliff and thus are probably earlier in the period but occasional examples from Khirbet Qasrij (Curtis 1989: fig.33, nos.171,172) suggest that the form continued throughout the period.

Type 112: Oblique T-shaped Bowl Rim

Although superficially similar to both Types 57 and 113, these have a distinctive bead on the rim interior that gives them a vaguely T-shaped profile. Similar examples can be cited from Qasrij Cliff and Khirbet Qasrij (Curtis 1989: fig.7,nos.6 and 7; fig 25,nos.53 and 54) and Sultantepe (Lloyd and Gokce 1953: fig.7 no.20). The form is less common in the 7th century levels at Nineveh but its presence at Khirbet Qasrij suggests that it was in use throughout most of the Late Assyrian period.

Type 113: Carinated Bowl

A common Late Assyrian bowl. Although they occur in smaller numbers at Qasrij Cliff than at Khirbet Qasrij (Curtis 1989: fig.10, 29-31; figs. 24 and 25), the form appears to have a fairly long duration. This point is emphasized by the presence of similar vessels from Khabur contexts, e.g. no.699 from stratified levels exposed in a drain cut at Site 140. The Late Assyrian variety has a ring base and an everted rim (see also ring-based bowls from Nimrud: Oates, J. 1959: pl.XXXV, pl.XXXVI, nos. 32,33; 1954,pl.XXXVII, no.10; all 7th century BC).

Type 114: Necked Jar

A very common Late Assyrian form, subdivided for field collection purposes into Type 114A: jar with cordoned neck; 114B: necked jar (plain); 114C: shoulder with cordon. The abundance of this type on any given site immediately provided a strong hint of a Late Assyrian presence.

Type 118: Button Ring Base

A minor but distinctive type, also recorded from Khirbet Qasrij (Curtis 1989: fig.44,no.339) and Nimrud (Oates,J. 1959: pl.XXXVI,79).

Type 132: Jar with Folded Rim

A common Late Assyrian form which ocurs in the later assemblage of Khirbet Qasrij but not at Qasrij Cliff (Curtis 1989: fig.37). A possible predecessor from Qasrij Cliff exhibits a small cordon at the base of the neck. At Nineveh, Type 132 is very common in 7th century levels (P and P Bikai, type SJ2) and this form seems to be a useful indicator of later (7th century) occupation. It may continue through the first millennium BC to become a prototype for the distinctively sand-tempered Hellenistic jar Type 65.

Type 156: Ribbed Carinated Bowl

A chaff-tempered bowl, related in form to Type 113, but with the addition of another perimeter rib between the rim and shoulder. Although apparently rare or absent from Khirbet Qasrij and Nineveh lower town 7th century levels, this type was recorded from Qasrij Cliff (Curtis 1989: fig.7, nos.4,7, and fig.8, 15,17). It thus appears to be a useful indicator of earlier, 8th-10th century BC, occupation.

Post-Assyrian (Preliminary assessment) (Fig.74)

Here the term post-Assyrian is used to describe the period that starts with the fall of Nineveh in 612 BC and finishes approximately with the advent of the Hellenistic Empire in 330 BC. It includes the Median and Achaemenid periods. The calendar dates given above are approximate because the ceramic and archaeological sequences for this period in northern Iraq are still very poorly understood. It has therefore been impossible to assemble a range of indicator types comparable with those of preceding periods. Instead, we can only offer some potential "post-Assyrian" types and give some notes on the likely sequence of ceramic changes through the period.

Two sites have provided reference assemblages. Both are small, one-period sites within the Eski Mosul Dam area and both have meagre dating evidence. The sites are Khirbet Qasrij for the earlier phase, perhaps first half of the 6th century BC and Kharabeh Shattani for the later phase, possibly 4th century BC. Unfortunately the two assemblages are quite different and few consistent types can be recognized.

The basic pattern of development appears to be that Late Assyrian forms persist after the fall of Nineveh into the 6th century for an unknown duration but that the fabric changes from predominantly chaff- to predominantly sand-tempered (Curtis 1989: 52). Inevitably one would expect some evolution of vessel form and a number of possible variations on Late Assyrian forms (in sand temper) have been recognized (Types 144-146,below); these resemble, in general, forms from Khirbet Qasrij. For the later part of the period, tempering continues to be of sand and organic temper is scarce (Goodwin forthcoming). The range of ceramic forms from Kharabeh Shattani includes few with Late Assyrian parallels but there is now some suggestion of Hellenistic-like forms appearing. For example, the jar with fold-over rim (Type 65) appears to have a post-Assyrian precursor.

In addition, a number of oval-stamped and embossed wares (Type 143) appear to have been current during post-Assyrian times but because of their continuation into the Hellenistic period, it is at present impossible to say which are Hellenistic and which post-Assyrian.

Type 102: Flat-rimmed Bowl

A simple but distinctive form known from late or post-Assyrian levels at Pasargadae (Stronach 1978: fig.111 nos. 9,10,11) and Kharabeh Shattani (Goodwin, forthcoming: fig.f, nos. 1,3 and 4) as well as Hellenistic levels at Nimrud (Oates, D. and J. 1958: Pl.28, 16). Nevertheless, the form is ambiguous because in grey ware it can be of Khabur date. It may therefore be a long-lived form extending from the 2nd millennium BC until Parthian times (cf Northedge *et al.* 1988: fig.32 no.62).

Type 104: Jar with Grooved Top

Except for a passing resemblance to Type 144 (below), this has no obvious parallels. It may be Late Assyrian or post-Assyrian.

Type 142: Hole Mouth Jar with Grooved Rim

A: Two grooves in top of rim
B: Three grooves in top of rim
Usually sand-tempered, rarely chaff-tempered. Not securely dated within the north Jazira, this type apparently occurs in Hellenistic/Parthian as well as post-Assyrian contexts. Although the form also occurs at Samaria-Sebaste in approximately 8th century levels, it can extend into the "Persian period" (6th century levels in the Amman citadel (Dornemann 1983: fig.44, LXXVII and p 181 and 237). Although such long-distance parallels are tenuous, they should not be dismissed.

Type 143: Oval Stamps

A: Flat and formed of a serrated oval
B: with bulging centre or embossed and with serrated oval
C: plain with bulging or embossed centre
D: others
All stamps illustrated are on dominantly sand-tempered wares but during survey one or two were noted as chaff-tempered and were almost certainly Late Assyrian. Although evidence for similar stamps in southern Iraq during the Achaemenid period is meagre, there is,for example, a range of rosette, tear-drop embossed, radial and palmette-embossed stamps from the "Achaemenid residence" at Abu Qubur near Sippar, built and briefly used during the late 6th and early 5th centuries BC (Warburton in Gasche *et al.* 1989: 24 and Pls. 7, 8 and 11). In the north, however, at Nimrud, similar stamps are regarded as Hellenistic because of the associated ceramics and coins (Oates, D. and J. 1958: 129). North Jazira examples, being on a very sandy fabric, are presumably Hellenistic also, but those slightly less sandy or of mixed temper may be post-Assyrian. Oates also considers that the southern stamps are on rather more prominent bosses than those of the north. At present the stamps, although chronologically ambiguous, are more likely to represent Hellenistic not post-Assyrian occupation but it may be possible at a later date to isolate the earlier examples.

Type 144: Bowl with Grooved-top Rim

A: With oblique notches below the rim
B: Plain below rim
The form, although distinctive, has not been shown to have come from a post-Assyrian context, but in view of its evolved Late Assyrian form (in sand or sand with chaff temper) it seems a good candidate. Approximate parallels came from Khirbet Qasrij (Curtis 1989: fig.38, no.244; fig.27,76). Neither however is exactly the same, therefore this distinctive form requires further parallels before it can be used as a post-Assyrian diagnostic.

Type 145: Bowl with Notched Exterior

This sand- or occasionally mixed-tempered variant on Late Assyrian bowl form Type 58 is distinguished from the Late Assyrian form by its temper and notched shoulder. No parallels are known but its evolved Late Assyrian form suggests a post-Assyrian date.

Type 146: Carinated Bowl Variant

Apparently an evolved form of carinated bowl Type 113. The form has, however, evolved so that only a shallow groove now remains between the rim and shoulder. One good parallel exists from Khirbet Qasrij (Curtis 1989: fig.26, no.60) but again, at this stage, the type should only be viewed as a potential diagnostic.

Type 157: Crescent Stamped Ware

Various forms, usually in a sandy fabric, with shallow impressed crescentic stamps. In Achaemenid levels at Abu Qubur these appeared on a raised band on a jar neck (Warburton in Gasche *et al.* 1989 Pl.11,5) whereas at Nimrud they are no earlier than late Achaemenid, probably Hellenistic (cf. Oates, D. and J. 1958: 144 and pl.XXIV, no.4).

Hellenistic (Fig.75)

The following types, which were used during site survey, include some further examples provided by the excavation of the small Hellenistic site of Khirbet 'Aloki (Site 113). The accompanying notes incorporate information contained in a report on Hellenistic pottery of the north Jazira plain (1986 and 1987 seasons) by Leah McKenzie (McKenzie n.d.). No chronological sub-division is attempted, although this may be possible at a later stage.

In contrast with Late Assyrian pottery, Hellenistic wares are dominantly sand-tempered. In the following descriptions, all types should be taken as heavily sand-tempered, unless specified otherwise.

Type 64: Incurved Rim Bowl

A very common form, sometimes painted. It has a wide distribution throughout the Hellenized lands and was in use in the Near East from the early 3rd to the late 1st century BC. Both ring and flat bases can occur. Good examples have come from Tell Mohammed Arab (Roaf 1984a: fig.3b), Pasargadae (Stronach 1978: fig.109) and Failaka (Hannestad 1983: pls. 1 and 47). A common variant, usually specified as such during processing, has a grooved exterior wall; although not widespread, parallels for this sub-type have come from sites within the Eski Mosul project.

Type 65: Jar with Rolled-over Rim

A very common jar form in the north Jazira and Eski Mosul project (Roaf 1983: fig.6, nos.26, 33, 38,40). Apparently less common at Nineveh and to the east of the Tigris but it is reported from Nimrud (Oates, D. and J. 1958: pl.XXV, nos.5-6). Related forms occurred as far east as Pasargadae (Stronach 1978: fig.120 nos. 10,11,13) and as far west as Tell Sweyhat, Syria (Holland 1976: fig.6, 32,33). The folded-over rim with its distinctive collar, is of long duration. It may derive from a Late Assyrian form (Type 132), to evolve into the related Parthian form Type 130.

Type 66: Hellenistic Plates

Here, Hellenistic plates include the characteristic fishplate (Fig.75 no.10),with its sharply down-turned rim and very shallow plate-like profile. Related plates included as Type 66 had rolled rims (8 and 9) as well as a number of other profiles. Most were in a moderately fine ware, frequently grey. Rarely, the up-facing plate interior bore a stamped motif.

Fishplates were in use from the early 4th to the mid-1st centuries BC and were spread throughout the Hellenized eastern Mediterranean to Mesopotamia and as far east as Ai Khanoum and Kandahar in Afghanistan.

Type 67: Hellenistic Fine Ware

Hellenistic fine wares imported from the eastern Mediterranean are rare in Mesopotamia: for example, only 10 examples of black gloss ware from the north Jazira, 5 from Failaka (all Attic black ware) and only one at Pasargadae (Stronach 1978: 185). Black gloss ware was also rare at Nimrud and Hellenistic Pergamon ware was absent (Oates, D. and J. 1958: 125). This very low incidence of high-quality fine wares from the west would support Hannestadt's statement that trade in (fine?) pottery played an insignificant role in the Seleucid economy (Hannestadt 1983: 117). Because of the rarity of imported fine wares, Type 67 is not restricted to rim forms alone but was used for body sherds and bases as well. Here, the use of the term Hellenistic fine ware does not therefore mean that the pottery itself was imported.

Type 68: Hellenistic Fine Ring Base

A: With interior groove above ring base
B: Without interior groove

These are well-made, moderately high, ring bases of fine-medium, usually sand-tempered ware. A concentric groove around the interior of the ring base (Type 68A) is unusual in the Levant and only one example came from, for example, Antioch (Waage 1948: pl.I form H1). This base type occurs with the slipped or painted bowls from Nimrud (Oates, D. and J. 1958: pl.XXIII, nos.2-5 and 33) and also occurred at Mohammed Arab (Roaf 1983: fig. 6, nos. 7,13).

Type 108: Impressed Dog-tooth

A: With hard, sandy, Hellenistic-type fabrics
B: With other fabrics

A distinctive type of relief decoration not restricted to the Hellenistic period, although Type 108A is most likely of this date. The pattern was apparently created by repeatedly stamping and partially overlapping a single triangular stamp (St John Simpson pers. comm.). The pattern was moderately common at Nimrud, where it was described as notched decoration (Oates, D. and J. 1958: pl.XXI, 17,18,20; pl.XXIV,8). The incidence of dog-tooth decoration at Roman/Parthian Tell Barri (Parmegiani 1987: fig.D,22A) as well as at Khirbet Qasrij (Curtis 1989: fig. 42, no.295, in vegetable and grit temper) demonstrates that the type is not restricted solely to the Hellenistic period. This type of dog-tooth decoration probably began in Mesopotamia during the Achaemenid period but is better attested at Hellenistic sites (St John Simpson pers. comm.).

Type 116: Out-turned Rim Bowl

A distinctive, moderately fine bowl, usually with a slipped interior. The form appears to have originated in Greece and is common on sites in Greece, Turkey and the Levant. In Mesopotamia, examples have come from Failaka (Hannestad 1983: pls. 2 and 3, nos.24-34; i.e. bowls with angular profiles and out-turned rim), Nimrud (Oates, D. and J. 1958: painted bowls, pl.XXIII, 8-11), a number of Eski Mosul sites and from Seleucia. The suggested date range for examples from the North Jazira Project is from the 3rd to the end of the 2nd century BC.

Type 117: "Hemispherical Bowl" *

From partial illustrations alone, the term "hemispherical bowl" does not appear appropriate but in complete profile these bowls have a more rounded lower part, giving them a roughly hemispherical appearance. Black-glossed examples are found in Greece and the Levant. It is dated from the mid-2nd to the mid-1st centuries BC, perhaps with Achaemenid origins. Complete profiles are illustrated from Failaka (Hannestad 1983: pl.4, nos. 43-48) and other examples came from Mohammed Arab (Roaf 1984a), Nimrud (Oates, D. and J. 1958: pl.XXIV, nos.4,9) and Seleucia (Valz 1984: fig.1 nos.1-4). Although the small sherds recovered during survey do not convey a hemispherical impression, the presence of incised grooves on the interior, and their Hellenistic fabric, make them sufficiently distinctive to be used as a diagnostic.

Type 158: Amphora Base

A distinctive base form which, because of its resistance to erosion, survives well. In a sandy "Hellenistic" fabric. The form is not restricted to amphorae and similar bases occur on elongate Hellenistic storage jars (Oates D. and J. 1958: pl.27,11). One illustrated example (Fig. 75, no.21) may be from Rhodes, perhaps implying participation in the Rhodian wine trade (Mckenzie n.d.).

Type 159: Bag-shaped Jar (or Phiale)

Although the rim form of this vessel lacks distinction, complete profiles are more recognizable and make useful diagnostics. The form appeared in Athens from the 6th century BC and is believed to have descended from an Achaemenid prototype, some of which were in metal (Mckenzie n.d.). A number of examples were found in the fill of the Ezida site at Nimrud (Oates, D. and J. 1958: pl.XXIV, no.21), although many of the north Jazira examples were more bag-shaped in profile.

Parthian (Fig.76)

The Parthian period, defined here as extending from c.100 BC until c.250 AD, encompasses both types that are unique to this period (such as the diamond stamp ware: Type 76) and types that were transitional between Seleucid/Hellenistic and Sasanian forms. A number of types such as the strap handle (Type 127) and the rocker pattern sherds (Type 107) are long-lived and may rather be assigned to a Hellenistic/Parthian or even Hellenistic-Sasanian period. The assemblage of early 3rd century forms published from 'Ain Sinu represents a valuable corpus of comparative material from close to the survey area. These are, however, late Parthian rather than being representative of the whole period. The presence of fine red brittle ware (Type 100) of Late Roman type at a limited range of sites, but particularly those on major route systems, suggests that such types are not uniformly distributed.

The common factor to many of the following vessel types is that they are of a typical "Parthian" fabric which can be summarized as follows: buff to pink bodies, with some sand temper but less sandy than the preceding Hellenistic or the Sasanian that followed. Surfaces are smooth and usually covered with a cream, pale pink or pale orange slip. Further details are contained in the catalogue.

Type 76: Diamond Stamped Sherds (Plate 5a)

Sherds decorated with impressed diamonds form one of the most distinctive Parthian types. Type 76A, the commonest, has diagonal raised compartmented divisions separating raised circular knobs. On vessels from 'Ain Sinu, groups of these stamps form pendant diamonds or are aligned along diagonal paths (Oates 1968a: 148). Also common at Hatra (Ibrahim 1986: pl.189), a single example is illustrated from Nuzi (Starr 1939: pl.136 G). Type 76B with compartment divisions running from apex to apex of the diamond is less common. Type 76C: other variants include those with two circular knobs (no. 299) up to as many as 9 (no.298), or where the knobs are abnormally large and virtually run into one another. At 'Ain Sinu diamond stamped wares are dated to the early 3rd century but they continue into the 4th century at, for example, Tell Mahuz (Ricciardi 1970/71: fig.91, 41). Because of their common occurrence, distinctiveness and limited chronological range, diamond stamped wares form an excellent indicator for later Parthian and early Sasanian occupation.

Type 100: Fine Brittle Ware

A distinctive, hard, thin gritty ware that is frequently ribbed or corrugated. Because of its brittleness it is usually found as small red or dark red sherds; large pieces are rare, but from excavations the commonest forms are twin-handled cauldrons, single-handled jugs and twin-handled dishes (Oates 1968a: 150).

Sub-types: Type 100A: Rims and handles
Type 100B: Corrugated bodysherds.
Type 100C: Plain body sherds

Although described as Parthian by David Oates, recent work has shown that these types are more common on Roman sites to the west in Syria. Diagnostic types have been described by Harper from 1st century to early Islamic levels at Dibsi Faraj on the Syrian Euphrates (Harper 1980: 334) and S. Dyson has described a range of brittle ware from Dura Europos (Dyson 1968). Type 100, although rare in the north Jazira, is important because it may be an indicator of a Roman military presence or of trade of Roman goods along specific (?)military routes, rather than of rural Parthian occupation. It is interesting to note that a number of examples have been excavated by Ricciardi from Hatra, a site that although dominantly Parthian, had a limited Roman occupation in the 3rd century AD (Ricciardi pers.comm.).

A thicker, coarser variant of fine brittle ware, Type 75, occurs on Sasanian and Islamic sites and should not be confused with the finer, harder Type 100. Ideally, the range of rim forms illustrated from 'Ain Sinu could be used as diagnostics (Oates 1968a: fig.23 nos. 75-85) but because few rim forms of this ware occur on survey, all parts of the vessel are counted.

*Type 107: Impressed Rocker Pattern**

A: On Parthian Fabric
B: On Other Fabrics
A distinctive incised zig-zag pattern, presumably made when the vessel was being thrown. This is not restricted to the Parthian period and good parallels have come from Hellenistic (Oates, D. and J. 1958: pl.XXI, nos 15 and 16) to early Islamic contexts (Harper 1980: fig.D. no.65; Northedge and Falkner 1987: fig.11, no.44). The latter examples were, however, on a distinctive brittle ware or cooking pot and here would be classed as Type 107B. Examples from Parthian contexts in southern Iraq are given by Debevoise (1934: fig.14, nos 1,2 [116-120AD]; fig.143 [116-43AD]). The type was used by Adams as a diagnostic of Seleucid/Parthian occupation, and in the north it should not be used in isolation to demonstrate Parthian occupation. However, when fabric type is taken into account it can be distinguished from Hellenistic and even Late Uruk and Ninevite 5 types.

Type 115: Straight or Grooved Jar

A: Straight Jar with external indentation
B: Jar Rim with Groove
Sub-type A proved ambiguous during field collection and was amalgamated with the more numerous potential diagnostic DB. Both sub-types were in Parthian ware. B with its deep rim-top groove proved more distinctive. Similar forms came from early 3rd century 'Ain Sinu (Oates 1968a: fig.24 nos.98-101); from Seleucia on the Tigris (Debevoise 1934: fig. 134 [116-43 AD]) and from the Susiana Plain (Wenke 1975-76: Type 502, "Middle Parthian"). The rather weak form 115A resembles a Parthian jar from 'Ain Sinu (Oates 1968: fig.23 no.66).

Type 127: Strap Handle with Central Hollow

A long curvilinear handle usually in Parthian or buff plain ware. By surface association this can be assigned to the Parthian, but a Partho-Sasanian date would be more realistic. Common at Tell Mahuz (near Kirkuk; Partho-Sasanian; Ricciardi 1970/71: various on pls. 88-93) as well as from Choche near Seleucia (3rd-5th century; Ricciardi 1967: fig. 137-143).

Type 128: Rod Handle

A distinctive circular-section handle usually in a cream-slipped Parthian fabric. The illustrated example was affixed to a distinctive Parthian rim (Fig. 76, no. 19), but this handle can also occur with rim Type 130 (cf. Oates 1968a: fig.24 no.103). Surface association suggests a Parthian date. The form also came from Partho-Sasanian Tell Mahuz (Ricciardi 1970/71).

Type 129: Hole Mouth Jar

A: With Small Crest Ridge
B: With Upper concavity
In Parthian ware; both illustrated examples come from a good Parthian site (Site 51B) but other data on surface association is lacking.

Type 130: Flat Collared Rim

In Parthian fabric, this may be an evolved form of the Hellenistic rolled-over rim (Type 65). Transitional examples can be recognized, for example from Hellenistic levels at Nimrud (Oates, D. and J. 1958: pl.XXV, no.8). The form also occurs in early 3rd century levels at 'Ain Sinu (Oates 1968: fig.24, no.103). This should be viewed as a Hellenistic-Parthian diagnostic.

Type 131: Flared Rim dish

A: With external groove
B: Others
A distinctive form occasionally embellished with pie-crust decoration. Variants are quite common in Turkey and Northern Iraq: for example, small basins from Anemurium (1st century BC-2nd century AD; Williams 1989: fig.43, 59, 60); a deep bowl from 'Ain Sinu (early 3rd cent; Oates 1968: fig.24 no.88) and SE Turkey (late Roman-early Byzantine; Wilkinson 1990: fig.B.16 no.12). A related type was also used by Wenke as diagnostic of Seleucid-Parthian and Middle Parthian occupation (325-25BC and 25BC-125AD; Wenke 1975-76). The form probably belongs to an evolving series of early 1st millennium bowls and in the north Jazira, Type 131 is probably transitional to Type 139.

Type 163: Fine Strap Handle with Central Hollow

A variant of Type 127 (parallels are as for that form) made from a pale yellow moderately fine ware.

Type 164: Flanged Hole Mouth

A distinctive form in a slightly sandy Parthian fabric. Dated by its surface association with Parthian ceramic assemblages.

Sasanian/Islamic

Although a number of key diagnostics are recognized for the Sasanian/Islamic period many of the types described below have been dated only by their occurrence on briefly occupied Sasanian and Islamic sites of recent appearance (see Chapter 2). In the text that follows a number of index sites have been chosen on the basis of known diagnostic sherds and surface morphology. The most representative index sites for the appropriate periods were as follows:

Sites 58, 37:	Sasanian
Sites 83 and 75: .	Sasanian/Islamic
Site 4:	Early Islamic
Sites 11, 19 and 34:	Middle and Later Islamic

Although these assemblages are not entirely pure (for example, Site 11 may include a small Early Islamic occupation), they are sufficiently different from one another to justify separation into the above four subdivisions. The characteristic very sandy temper of Sasanian ceramics from the North Jazira plain, which is noticeably sandier than either Parthian or Islamic wares, is also characteristic of Sasanian wares from further south e.g. 'Ana. (Northedge, Bamber and Roaf 1988 Ch.4).

Sasanian (Fig.77)

Type 69: Corrugated Jar Rim

A distinctive Sasanian type sandy fabric found in small quantities on Sasanian-Early Islamic short-range sites. This form is not however uniquely Sasanian because Parthian examples have been excavated from Hatra (Ibrahim 1986: pl.182 no.5).

*Type 70: Simple Gritty Jar Rim**

In sandy fabric and occurring on Sasanian short-range sites. The simple rim form, which is not very distinctive, also occurs on Sasanian sites outside the north Jazira, for example at 'Ana (Northedge *et al.* 1988: fig.26, no.9).

Type 77: Smeared Ware

A buff, heavily sand-tempered ware with a distinctive surface effect that is produced by the manipulation of a slurry of clay over the vessel surface. It is related to but in some cases earlier than Honeycomb Ware (Type 79, below). In the area of the Saddam Dam, Type 77 is regarded as Sasanian, a date supported by surface associations in the north Jazira. A single example from Nuzi also appears to be Sasanian (Starr 1939: pl.137A). Although distinctive, this ware can be easily overlooked in the field because its roughened surface acts as an effective camouflage.

Type 78: Sasanian Stamped Ware

These distinctive stamps usually occur on a greenish-buff sandy ware. Typically they are of animals in low relief, but they can also be geometric within a circular or oval field (Adams 1965: fig. 14.B and 131; Northedge and Falkner 1987: fig. 10 no.34 from Samarra; Finster and Schmidt 1976: fig.16p from Tulul al-Ukhaidir). They are regarded as Sasanian, late Sasanian or in one or two cases very early Islamic (St John Simpson pers. comm.).

*Type 136: Parthian/Sasanian Green Glaze**

Usually a pale or apple green glaze, sometimes crazed or yellowish in appearance, over hard yellowish or pinkish sand-tempered fabric. This fabric differs significantly from the soft-bodied early Islamic type. Glazed wares have a long history in Mesopotamia and it is not always possible to distinguish between them chronologically for the Hellenistic, Parthian and Sasanian periods. From surface contexts, Type 136 is probably Parthian or Sasanian.

Sasanian-Early Islamic (Fig.77)

Type 71: Jar Rim with Bulge

Of characteristic sandy fabric, this was found on a number of Sasanian-Early Islamic sites in the north Jazira. Dated to the late Sasanian period at Qara Dere in the Saddam Dam area (excavated by Michael Roaf; St John Simpson pers comm), the form has few parallels outside the area. It may be related to Parthian rims from 'Ain Sinu (Oates 1968a: fig.24, 99-102) or Late Roman-Byzantine grooved rim amphorae from SE Turkey (Wilkinson 1990: fig.B.15 no.2).

Type 72: Coarse Brittle Strap Handle

These have a distinctive ridged or centre grooved cross-section and are manufactured in a variety of coarse brittle or gritty cooking pot ware (see Type 75, below). Their surface association is Sasanian-Early Islamic and the form is characteristic of 4th-8th century date ceramics through much of the Jazira region, see for example the Qoueiq survey (Northedge 1981: Fig.245 no.4) and SE Turkey (Wilkinson 1990a: Fig.B.15 no.33).

Type 73: Buff Grooved/Ridged Strap Handle

A: With Central Ridge
B: With Central Groove
In buff sandy and gritty ware. From surface associations these are Sasanian-Early Islamic. They are common throughout the Jazira at this time but at Kurban Höyük (SE Turkey) they are somewhat fatter.

Type 74: Early Islamic Blue-Green Glaze

A: On Pale Yellow Body
B: On Bodies of Other Colours
Sub-type A, with its typically soft, smooth pale yellow fabric, is probably early Islamic whereas sub-type B is a less specific indicator and should be regarded as Sasanian-Early Islamic. Northedge (1985: note 37) considers that sherds of sub-type A are almost always the same wherever found and were probably the product of a single "factory" perhaps in southern Iraq (see also Whitehouse 1979: 49). These products are widely distributed from Raqqa, in the west, to the Gulf, Oman, Pakistan, Malaysia and E Africa. They were introduced at Siraf in the early 9th century (Whitehouse 1968:14) but it is not clear when they went out of use. However, equivalent Abbasid wares in at least part of SE Turkey are on reddish-brown bodies and are quite different (Algaze 1990: 391-2).

Type 75: Coarse Brittle Ware

A: Corrugated
B: Plain
In Syria, Brittle Wares continued in use from the 1st-8th centuries AD (Harper 1980: 334-5). In the north Jazira, Type 75 is a moderately hard orange-fired ware with a reduced brown or grey core and white grits; it is both softer and thicker than the Late Roman/Parthian fine, hard Brittle Ware (Type 100) and is transitional to what is conventionally described as cooking pot ware. This contrast is also true for the Kurban Höyük area of SE Turkey where the thicker, softer brittle ware was found with Early Islamic assemblages (Wilkinson 1990a: 248). In Early Islamic contexts at Kurban Höyük, Brittle Wares are not distinguished but the equivalent vessels are described as cooking pot wares (Algaze 1990: Ware 19). Surface associations in the north Jazira show that Type 75 is associated with Type 72 and with assemblages of Sasanian-Islamic date.

Type 79: Honeycomb Ware

A greenish-buff heavily sand-tempered ware with a distinctive surface pattern produced by pressing honeycomb or channel patterns in a heavy wet slip with the thumb (Northedge 1985: 121; fig.4, no.1). Although not common on the north Jazira, good examples came from Sasanian-Early Islamic Sites 43 and 143. At 'Ana Honeycomb ware was introduced in the late phases of the Sasanian and continued in use into the Umayyad period (Northedge *et al.* 1988: 82, fig.26 no.18). Examples of similar date also came from Tulul al-Ukhaidir (Finster and Schmidt 1976: Abb. 48, a, c and d), Nuzi (Starr 1937) and Samarra (Northedge and Falkner 1987: pl.XXX).

Type 139: Comb and Slash Decoration

A: Rims with Comb and Slash Decoration
B: Body Sherds
Shallow dishes made from a moderately hard pale brown or cream sand-tempered ware. From surface associations these are Sasanian or Early Islamic. This decorated type commenced in the late Sasanian: 5th-7th centuries AD. It perhaps became more popular during earliest Islamic times and was present in 8th/9th century collections from Babneet within the area of the Saddam Dam (St John Simpson pers. comm.). Similar dishes were common on Late Roman-early Byzantine sites around Kurban Höyük in SE Turkey (Wilkinson 1990a: fig.B.16 no.1 and B.25 nos.30,31). These, in turn, may be related to pie-crust rim ware dated to the 7th century at Anemurium (Williams 1989: 53).

Early Islamic (Fig.78)

Type 80: Fine Eggshell Handle

Thin handles in a fine pale yellow or yellowish-green ware. Cross-sections can be circular, sometimes with a longitudinal groove removed; in some cases the handle is equipped with a small knob or applied pellet on the crest to facilitate pouring (Fig. 78, 1). These are typically the handles of Abbasid thinware cylindrical jars and at 'Ana they were regarded as 9th century, perhaps continuing into the 10th (Northedge *et al.* 1988: 82, fig.40, 6 and 8). The vessels and handles are widespread, from at least SE Turkey to the Indian Ocean (Whitehouse 1971: 13 and 15 and Costa and Wilkinson 1987: fig. 98, c, d and e).

*Type 81: Band-rimmed Jar**

Manufactured from a moderately fine buff, reddish or greenish plain ware. Surface associations suggest an Early, Middle or even Late Islamic date. These resemble examples from Abbasid areas of Samarra (Northedge and Falkner 1987: fig.11 no.39), but those from the north Jazira are without the wavy line combing. The late continuation of this form in the north is suggested by Fig.79, 8 which is decorated with the characteristic Middle-Late Islamic rouletting.

Type 83: Relief-moulded Ware

Made from a pale greenish- or yellowish-pink ware tempered with occasional, usually fine, sand. The elaborate floral or geometric relief patterns are mould-made rather than being from applied (barbotine) clay. All examples illustrated came from Site 4 which yielded a consistently Early Islamic assemblage but for a similar, slightly later variant see Type 122. At al-Mina in Syria this decoration occurred on unglazed water vessels from 9th-10th century levels (Lane 1937: 38 and pl.XX).

Type 84: Creamware String-cut Base

Cream-coloured plain ware jars with sparse sand temper and flat bases usually showing distinctive eccentric string marks are common throughout the Gulf and adjacent areas in the 9th and 10th centuries (e.g. Algaze 1990: 393). In the north Jazira the cream thin-walled vessels with string-cut bases and rod handles (Type 80) are probably 9th-10th century in date. Later, the vessels appear slightly coarser and these are classed as Type 87 (below). At al-Hasa in Saudi Arabia similar cream and red bases are regarded as Early Islamic (Whitcomb 1978: pl.77 nos.7 and 8). In the north Jazira the occurrence of Type 84 on Sites 11 and 19 may be because a slightly later variant (Type 84/87) has been counted or because these sites do have a minor Early Islamic component.

*Type 123: Tall Slender Handle**

Tall, slender handles of swan's-neck form made from pale brown or greenish sand-tempered plain ware. Some have a subdued recess running longitudinally along the centre. From surface associations these are Late Sasanian or Early Islamic in date and a similar example from 'Ana is Early Islamic (Northedge *et al.* 1988: fig.26, no.22). Because similar handles can occur on, for example, Parthian vessels, Type 123 is best regarded as only a general pointer to Early Islamic occupation.

Type 160: Coarse Red Cooking Ware

Note: Types 160 and 161 were not used in the Sasanian/Islamic ceramic periodization listed in Table 11 in Chapter 8.

Unevenly fired reddish and dark brown ware with large inclusions. External sooting suggests use as cooking vessel. This is related to the brittle wares (Type 75) but is coarser and softer. The example illustrated compares with a plainware vessel from Kurban Höyük dated to the 9th/10th century (Algaze 1990: pl.142.D). The type example from the north Jazira (illustrated Fig.78, 12) was from an Early Islamic assemblage at Site 4.

Type 161: Twin Rod Handle

A fine, usually straight rod handle in pale greenish or cream fine ware similar to that of Type 80, to which it is presumably related. Although both illustrated examples are from Site 4 and are almost certainly early Islamic, thicker and heavier twin rod handles (sometimes with a twisted rope design, cf Adams 1965: fig.13 11.C) can be Seleucid or Parthian.

Middle Islamic (Fig.79)

Type 82: Sgraffito Ware

A: Green Glaze
B: Yellowish-brown Glaze
C: Other Colour Glaze

Unlike earlier Islamic blue-green glazed wares (Type 74), these are on a buff or reddish sand-tempered body. At Samarra, Sgraffito wares, although found on post-Samarran parts of the city, were absent from the areas of purely Abbasid occupation and can be regarded as post-9th century in date (Northedge 1985: 124). They are used by Falkner as a Middle Islamic indicator at Samarra. In Syria, according to Lane, although they are thought to have been made by the 9th/10th centuries they are not common until the 11th and 12th centuries (Lane 1937). In Turkey they form a good indicator of 11th-13th century occupation, occurring at both Asvan Kale and Gritille (Mitchell 1980; Redford 1986) and in Syria they can continue through into the 14th century, (see an example from the Ashmolean Museum, Porter 1981: pl.XXXVI). Although the styles of Sgraffito ware can be subdivided in other areas, examples from the north Jazira were homogenous and can be regarded as of mainly 11th-13th century date.

Type 122: Late Relief Decorated Ware

Relief-moulded decoration on a yellowish-brown, sand-tempered ware. The floral pattern differs from Type 83 by being in low relief with the intervening spaces filled by low raised dots. The illustrated sherd (Fig.79, 24) compares closely with an example from al-Mina, Syria dated to the 13th century (Lane 1937: pl.XX1.D). Although not common in the north Jazira, its surface association suggests a Middle-late Islamic date.

Middle-Late Islamic (Fig.79)

Type 91: Coarse Lid

Flat, thick, moderately soft and tempered with chaff, sand and white grits. The underside is frequently patterned with matting or textile impressions. Related lids from SE Turkey have handles, are painted, and are dated to the 11th-13th centuries AD (Redford 1986: fig.11). Although 9th century examples are reported from 'Ana (Northedge *et al.* 1988: fig.30, 9 and 10), from their surface associations the north Jazira examples appear to be Middle or Late Islamic. Similar "lids" from earlier periods in the Levant exhibit small holes in the underside and have been interpreted as baking trays. By simply elevating the tray on stones above the fire, dough placed on the upper side could be baked (St John Simpson pers. comm.).

Type 94: Glazes on Reddish-Brown Ware

A: Dark Green Glaze
B: Yellowish-brown Splashed Glaze
C: Other Coloured Glaze

Glazed wares of Type 94 are usually open bowls and are frequently associated with the Sgraffito technique of decoration. Middle Islamic wares from Samarra are of brownish, pink-brown or yellowish-brown fabrics (Northedge 1985: 126; Northedge and Falkner 1987: 167). Similarly, at 'Ana, the soft yellow-bodied glazed wares of the "Samarra horizon" (9th century) are replaced by the 11th century by buff or pink sand-tempered wares (Northedge *et al.* 1988: 13). Although similar bowls and wares from SE Turkey are dated to the 9th/10th centuries, by surface association, the north Jazira wares are clearly Middle-Late Islamic.

Type 97: Coarse Finger-impressed Handle

Like most of the Middle-Late Islamic handles, these are crudely made; wares are pale greenish with white grits. From surface associations these are Middle-Late Islamic. The fluted example illustrated (Fig.79) resembles a crude handle from the Kurban Höyük area dated to the 11th-13th century (Wilkinson 1990a: fig.B.18, 13 and B.25, 53) but those from the north Jazira may be later.

Type 98: Handle with Applied Knob

Simple oval-sectioned handles made from unevenly fired reddish and grey ware, moderately soft and tempered with chaff and sand. Only a few were recorded and surface associations could only suggest an Islamic (undifferentiated) date. Similar forms from Asvan, Turkey are of 11th-13th century date (Medieval II; Mitchell 1980: fig.92, no.1017). Although applied knobs or pellets are common on earlier Islamic handles, Type 98 is characterized by the tight curvature of the handle, the uneven firing and oval section, compared with the usually more elegant buff, greenish or cream wares of Early Islamic date.

Later Islamic (Fig.79)

Type 92: Rouletted Ware

The characteristic feature is a broad band of deep rouletting around bowl rims or jar necks; the ware is usually buff and tempered with fine sand. Surface associations demonstrate this to be a later Islamic ware, probably post-13th century. It is thus a useful potential indicator for post-Mongol occupation.

Type 93: Finger-tip Impressed Ware

Buff to reddish-brown ware, with occasional sand temper; decorated with finger impressions. The presence of rouletting (cf Type 92) on some sherds (e.g. Fig.79, 11) suggests a Middle-Late Islamic date, but the surface association only suggests an Islamic date.

Type 95: Coarse Finger-formed Rim

These very coarse, crudely made vessels of clay tempered with chaff and sand are not common or perhaps went unrecognized because of their crude undistinctive appearance. Surface association suggests that they are Middle, or more likely Late Islamic. In SE Turkey similar very coarse chaff- and grit-tempered sherds have been interpreted as belonging to small Middle Islamic ovens (Scott Redford pers.comm. and Wilkinson 1990a: 253-4).

Type 96: Coarse Impressed and Rouletted Ware

Sherds of buff, reddish or greenish wares tempered with some chaff and sand. These are coarser than the normal rouletted wares (Type 92) and are decorated with, often crudely, stabbed triangles or impressed lines. Surface association suggests a Middle or probably Late Islamic date.

Type 101: Ottoman Green-glazed Ware

A: Pre-20th century
B: 20th century wares

The distinction between pre-20th and 20th century wares is based upon examples that were available for sale during the 1980s in the Mosul suq (B) and those from archaeological sites and presumably earlier (A). The green glaze is applied to a grey or

greyish-green body; no information on temper is available. There is no clear pattern to the distribution and many incidences may be a result of discards by bedu on temporary camp-sites.

Undifferentiated Islamic (Fig.78)

The following, although clearly Islamic, could not be assigned a chronological phase either by surface association or by external parallels:

Types 85, 86, 87, 89, 90 and 162. Most, however, are probably Middle-Late Islamic in date.

Type 85: Grooved and Slashed Bowl

Bowls made from medium plain wares with some sand and white grit temper; grooved and/or slashed decoration on exterior. Surface associations in the north Jazira suggest a wide chronological range within the Islamic period. There are few obvious parallels except for a bowl from Qalat Bahrain dated to the Middle Islamic (1055-1500, according to Larsen, 1983: fig.66C). Note: see the similar bowl Type 90 (below).

Type 86: Beaked Jar Rim

Made from greenish or orange-cream ware of variable temper. This distinctive form may come from narrow-necked creamware pitchers. Decoration is by means of oblique slashes or incised wavy lines. They are dated to the Islamic period from their surface association and distinctive fabric.

Type 87: Islamic Flat Base

A medium ware with a cream or greenish body, tempered with white grits and/or sparse chaff. Neither as fine nor as well-made as the related earlier Type 84, Type 87 also frequently exhibits string cuts on the underside of the base. Surface association indicates, probably, a Middle or Late Islamic date.

Type 89: Islamic Coarse Gritty Handle

Moderately soft, coarse, gritty and unevenly fired handle with an oval cross-section (contrast with Types 73, 80 and 123). These were probably handles for cooking pots.

Type 90: Grooved Rim Bowl

In red-brown or brown ware with, usually, a cream slip. Similar to Type 85 but with a linear grooved design. Similar vessels from both Babneet village, in the area of the Saddam Dam, as well as from Kurban Höyük, appear to be Early Islamic but from their meagre surface association, the north Jazira examples are more likely to be Middle-Late Islamic.

Other types not specific to period.

Type 18B

Miscellaneous pierced lugs on rims; mainly Chalcolithic.

Type 19B

Conical spouts. Although commonly Uruk, also belong to other periods, especially Islamic.

Type 46

Animal motifs painted, but not in white, on fine Nuzi vessels.

Type 88

Indeterminate strap handles: Parthian to Islamic in date.

Type 99

Modern thick, porous storage jars (*hubb*), sometimes rouletted.

Type 141

Mitannian or Middle Assyrian bowl which overlapped in its characteristic features with Type 52 to such an extent that the two types were combined.

APPENDIX A PART 2:

Type Series Pottery Catalogue

Conventions and Abbreviations

When temper is not visible in the hand specimen, it is not described; int. = interior; ext. = exterior; surfs. = surfaces; vert. = vertical; horiz. = horizontal. Relative abundance of temper inclusions as follows: abundant; common; occasional; rare. Diameters, which are given when available, are approximate. Locations of numbered sites are indicated on Fig.6. HW refers to Tell al-Hawa (Site 1); KA to Khirbet 'Aloki, Site 113; LM to Leah Mckenzie catalogue numbers (for Hellenistic ceramics only, see McKenzie n.d.). For details of collection areas at Hawa see Ball, Tucker and Wilkinson 1989: Fig.8.

Hassuna (Fig.62)

Type 1: Hassuna Painted Ware

1) Bowl rim. Pale grey-brown; smooth, pink surfs.; fine sand, occasional large white grits. Red matt paint on ext. and int. Site 19D. No.116.
2) Bowl rim. Pale red with pale brown core and int. surf.; fine-medium sand, common chaff voids; dull red painted design on int. Site 14A. No.25.
3) Bowl rim. Pale red-brown; cream ext. and very pale brown int. slips; fine-medium sand, rare chaff. Dull red paint on both surfs. Site 19D. No. 111.
4) Bowl rim. Soft, dark grey-brown, pink surfs.; blackened ext. apparently from fire. Common fine-med. chaff. Site 33. No. 115.
5) Jar rim. Dull red, pale pink int. and cream slipped ext. Fine sand, occasional voids. Red paint int. and ext. Site 19D. No. 112.

Type 2: Husking Tray

6) Rim. Dark grey core, light orange int. and rim top, very pale brown ext.; abundant coarse chaff, occasional grits. 1 horiz. and 3 vert. grooved lines on int. Site 19D. No.132.
7) Rim. Dark grey core, pale grey surfs.; abundant coarse chaff, occasional grits. 2 large grooves on int. Site 19D. No. 113.
8) Profile. Dark grey core, pale brown surfs.; abundant coarse chaff. Line of groove on base int. Dia. 32 cm. Site 39D. No.133.
9) Base. Black core, pale brown surfs.; slightly friable; abundant chaff. Site 33. No. 114.

Type 119: Red Burnished Ware

10) Jar rim. Grey core, pale orange margins; burnished red ext., up and over rim int. Site 19D. No. 134.

Type 124: Coarse Chaff- or Grit-tempered Ware

11) Bowl rim. Grey core, pale yellow-brown surfs. with grey patches; chaff with abundant calcite and grit. Dia. 34 cm. Site 39D. No.135.

Type 125: Hassuna Incised or Painted and Incised Ware

12) Linear-incised shoulder (125A), thickened at neck. Very pale orange core, cream ext. blackened int.; sand with rare calcite. Brownish-orange painted band on neck ext. Site 39F. No. 139.
13) Linear-incised body sherd. Pale orange core, cream, surfs.; sand. Incisions form closely-spaced infilled triangles. Site 39F. No. 138.
14) Stabbed-incised body sherd (125B). Pale orange core and int. surf., very pale green ext. ?slip.; sand, rare calcite inclusions. Fugitive painted lattice below. Site 39G. No. 136.
15) Stabbed-incised body sherd. Light orange core, cream surfs; sand. Orange painted lines below. Site 39G. No. 137.

Type 126: Samarra Ware

16) Bowl rim. Orange core, cream slip. Thick brownish-red paint on both surfs. Dia. 12 cm. Site 39G. No. 141.
17) Bowl rim. Pale green throughout; sand, with calcite grits. Greenish-brown paint on both surfs. Dia. 12 cm. Site 39D No. 140.

Halaf (Fig.63)

Type 3: Halaf Painted Ware

1) Dish rim. Light orange core, pale cream surfs.; dark brown paint on both surfs. Site 72A. No.143.
2) Bowl rim. Light pinkish-orange core, cream surfs.; dark brown paint on both surfs. Site 72A. No.144.
3) Everted dish rim. Pale orange-brown core, cream surfs.; red-brown paint on both surfs., fugitive on ext. Site 48D. No.145.
4) Carinated "cream bowl" sherd. Pale orange-brown core, cream surfs.; red-brown paint, somewhat fugitive on both surfs. Site 72A. No. 149.
5) Bowl rim. Very pale brown core, cream surfs. Two post-firing, internally drilled perforations; both surfs. painted dark brown, now fugitive. Site 72C. No.148.
6) Fine jar (Early Halaf). Pale brown, pale red core. Occasional fine sand; matt brown paint on ext., motif in negative; int. paint blackish-brown. Site 162D. No.710.
7) Jar rim, (transitional Hassuna/Early Halaf). Pale red, cream margins and surfs.; common medium sand, mainly white, rare chaff voids. Dark red-brown matt paint. Site 162D. No. 711.

8) Bowl rim. Grey-brown; slightly lustrous brown paint on ext. applied with oblique strokes on paler brown paint (not illustrated). Site 162C. No. 712.
9) Bowl rim. Brown core, pale orange margins, lightly burnished cream surfs.; dark brown paint, fugitive on int. Site 48D. No. 142.
10) Everted rim. Pale pinkish orange core; cream int. surf.; red-brown paint covers ext., also on int. Dia. 38 cm. Site 72A. No.146.
11) Body sherd. Pale pinkish-orange core, very pale orange surfs.; both surfs. have thick brown paint; oblique lines on ext. in thin red-brown paint. Site 33A. No.150.
12) Cream bowl sherd. Pinkish-orange core, pale orange int. surf., cream ext. surf.; dark brown painted ext. Site 72A. No.151.
13) Everted rim. Very pale brown core, cream surfs.; dark brown paint on both surfs.; fugitive band on ext. Dia. 22cm. Site 72A. No.147.

Type 137: Finger-Nail Rusticated Ware

14) Body sherd. Pinkish-orange core; light orange surfs. Horiz. rows of deep finger-nail impressions on ext. Site 72A. No.152.

Ubaid (Fig. 64)

Type 4: Ubaid Painted Ware

1) Bowl rim. Pink (Type 4B), very pale brown int., off-white slip,; fine sand, rare fine chaff; dull dark brown paint on ext. Site 16A. No. 64.
2) Dish rim. Pale red body (Type 4B), very pale yellow slipped surfs.; occ. fine chaff. Site 16A. No.63.
3) Bowl rim. Pale green (Type 4A), pale yellow surfs; common fine chaff, occasional sand; dark brown matt paint on ext. Site 16A. No.74.
4) Dish rim. Very pale brown throughout (Type 4C); slipped surfs.; rare sand and chaff; dull dark brown paint mainly on int. Site 16A. No.62.
5) Everted jar rim. Very pale greenish body and int.; occasional chaff; dull greenish black paint on ext. Site 16A. No.71.
6) Dish rim. Very pale red-brown (Type 4B); cream slipped int.; occasional fine sand; dark brown matt paint on both surfs. Site 16A. No.67.
7) Bowl rim. Very pale orange-brown core, pale orange margins and smoothed surfs.; chaff temper, occasional calcite flecks; dark brown painted surfs. Site 1 HW.B.131. No.161.
8) Bowl rim. Pale red-brown, oxidized to pale red margins (Type 4B); common sand includes white inclusions; matt red painted surfs. Site 1 HW.B.60. No.707.
9) Bowl rim. Pale yellow-green core (Type 4A), very pale green int., pale brown ext.; occasional chaff and calcite; brown painted ext., up and over rim. Site 1 HW.M.1. No.153.
10) Bowl rim. Dull green throughout (Type 4A); occasional fine sand and chaff, rare large white inclusions; matt brown painted surfs. Site 1 HW.B.125. No.708.
11) Body sherd. Pale yellow core and surfs. (Type 4C); chaff; brown paint on ext. Site 1 HW.B.11. No.164.
12) Body sherd. Very pale brown core and int. surfs.(Type 4C), pale yellow-green ext.; chaff; brown paint on ext. Site 1 HW.B.134. No.165.

Type 5: Ubaid Corrugated Ware

13) Body sherd. Very pale brown core and int. surf., very pale green smoothed ext.; rare chaff; deep ext. corrugations with rows of fine incised lines on lower edge of corrugations. Site 66C. No.154.
14) Jar rim. Buff core, smoothed pale cream surfs; fine chaff; both surfs. corrugated below rim. Site 89A. No.160.
15) Vessel neck. Very pale red-brown core, smoothed very pale green surfs.; chaff temper; corrugated int. and ext. Smoothing of join to shoulder visible on ext. Site 1 HW.B.219. No.155.

Type 135: Open Bowl with Grooved Top

16) Bowl profile. Brownish-orange core, light orange surfs.; chaff with grey sand and white flecks. Dia. 26 cm. Site 57A. No.158.
17) Bowl rim. Pale orange core, smoothed yellow-cream surfs.; occasional white grits and rare chaff. Dia. 26 cm. Site 57A. No.159.

Type 147: Ubaid Everted Jar Rim

18) Jar rim. Grey core, pale orange margins and surfs; abundant chaff, rare black flecks, occasional fine white grits. Dia. 43 cm. Site 66C. No.156.
19) Jar rim. Light yellow-brown core, pale brown surfs; abundant chaff, rare large grey and fine white grits. Brown paint covers ext. Some internal blackening. Site 66C. No.157.

Type 148: Ubaid Incurved Rim Bowl

20) Bowl rim. Light brown core, pale yellow-green surfs.; abundant chaff, occasional white grits. Dark brown painted ext. Dia. 22 cm. Site 66C. No.163.
21) Bowl rim. Orange core, pale orange int. surf., cream ext.; chaff. Dark brown painted ext. up and over rim. Dia. 14 cm. Site 66C. No.162.

Uruk

Local Earlier Uruk (Fig. 65)

Type 7: Uruk Coarse Shallow Bowl

1) Bowl profile. Black becoming pale brown on ext. and int.; abundant chaff, occasional coarse white grits (calcite). Very roughly made. HW.B.80. No.567.
2) Bowl profile. Brown, slightly reddened towards surfaces; abundant chaff, rare grits. Underside of base pockmarked. HW.LP. No.566.

Type 8: Uruk Hole-mouthed Jar

3) Rim. Grey becoming black towards int. and red towards ext. Ext. red and grey, very lightly burnished. Common medium-coarse grits. Dia. 24 cm. HW.LP(1). No.570.
4) Rim. Black, becoming brown towards ext.; ext. brown and black lightly burnished; granular; rare chaff and coarse grits. Dia. 22 cm. HW.B.87. No.569.

Type 9: Sprig Ware

5) Jar neck. Pale red-brown, pale brown int., pale green slipped ext.; hard; abundant medium rounded sand, some dark minerals; matt dark brown paint on ext. HW.B.76.No.573.
6) Body sherd. Pale red, pale brown int., pink ext.; hard; common sand, includes white minerals; dark red-brown matt paint on ext. HW. B.124. No.574.
7) Body sherd. Pale red, slightly polished red ext.; hard; common fine sand with mica; red-brown paint on ext. HW.B.161. No.575.
8) Body sherd. Pink with pale brown core, bright red, slightly burnished ext.; hard; common fine-medium white sand; dark brown painted motif on ext. (Type 9B). HW.B.164.

Type 10: Double Rimmed Jar

9) Jar rim. Grey throughout; common medium sand; perforated below inner rim for a mend or cover. Dia. 50 cm. HW.B.90. No.578.
10) Jar rim. Red-brown, pale brown core; very dark brown wash or paint on ext.and int.; common medium rounded sand. HW.B.163.

Type 13: Flaring Rim Jar

11) Jar rim. Pale greenish grey throughout; common fine chaff, occasional medium white grits. HW.B.1. No.590.
12) Jar rim. Dark grey, pale grey int.; common fine sand; grey painted bands on ext. Dia. 38 cm. HW.B.1. No.589.

Type 16: Fine Beaker

13) Beaker profile. Pale pinkish-orange core, very pale green surfs.; fine chaff, occasional calcite. HW.B.108. No.175.
14) Beaker rim. Very pale pinkish-brown core, pale buff surfs.; fine chaff, rare calcite flecks. Two pairs of parallel incised grooves on ext. HW.B.104. No. 176.

Type 17: Deep Bowl

15) Bowl rim. Grey, oxidized to pale red-brown at margins; common chaff, occasional grit. Wheel finished. HW. 1.No.602.
16) Bowl rim. Dark grey with pale red oxidized margins and surfs.; occasional chaff, rare white grits. Wheel finished. HW.B.90. No.605.

Type 21: Bowl with Internally-thickened Rim

17) Bowl rim. Light green core, pale yellow-green margins and surfs.; chaff, rare calcite flecks. Pointed rim apex externally wiped. Dia. 28 cm. HW.B.90. No.191.
18) Bowl rim. Pale red-brown, grey core; common chaff, rare fine sand. Wheel finished. HW.B.1.No. 608.

Type 55. Double Mouth Jar

19) Double mouthed miniature jar. Yellowish-brown surfs., grey core; chaff temper. Site 66 C, context 229.

Type 138. Uruk Grey Ware

20) Bowl rim. Dark grey core, grey surfs.; chaff, occasional calcite and grey grits. Dia. 20 cm. Site 72A. No.183.
21) Bowl rim. Dark grey core, grey surfs; chaff, calcite grits occasionally large; grooved line below beaded rim on ext. Dia. 32 cm. Site 72A.

Type 150: Grooved-rim Beaker

22) Rim. Grey throughout; fine fabric, rare fine voids. Dia. 14 cm. Site 60D. No.617.
23) Rim. Very pale orange core and int.surf., smoothed cream ext.; fine chaff. Site 60D.

Amuq F Chaff-tempered Wares (Fig. 66)

Type 12. Internally Hollowed-rim Jar

1) Jar rim. Red core, pale brown ext., red-brown int.; occasional white sand and fine chaff. HW.LP. No.585.
2) Jar rim. Red-brown, pale red-brown surfs.; occasional sand, common fine chaff. HW.B.143. No.586.
3) Jar rim. Pale brown, very pale brown surfs.; abundant chaff, rare grits. HW.B.122. No.587.
4) Jar rim. Pale green throughout; abundant fine chaff. Site 86.6. No.86.12.
5) Jar rim. Pale red-brown surfs., grey core; abundant chaff. Site 86.6. No.86.11.

Type 153: Carinated Bowl

6) Bowl rim and carination. Grey core oxidized to red-brown surfs.; common chaff, occasional medium-coarse white grits (calcite). Horizontal string-like impressions on carination. Dia. 34 cm. HW.B.83. No.626.
7) Bowl rim and carination. Grey-brown, pale brown surfs.; abundant chaff, common white and grey grits (calcite?). Very roughly made. HW.B.114. No.627.

Type 152 : Inturned Rim Bowl

8) Bowl rim. Pale red-brown surfs., pale brown core; common chaff, rare large grits. Dia. 44 cm. Site 86.6. No.86.3.
9) Bowl rim. Pale brown surfs., dark grey core; occasional chaff, common coarse white grits. Dia. 34 cm. Site 86.6. No.86.18

Northern Later Uruk Types.

Type 14: Internally Grooved Rim Jar

10) Jar rim. Grey, red-brown oxidized surfaces; occasional chaff. c. nine 1 mm grooves on int. of rim. HW.M.119. No.593.
11) Jar rim. Pale brown, pale red-brown surfs.; occasional fine chaff. 4 deep grooves incised into rim int. Dia. 52 cm. HW.C.133. No. 594.

Type 15: Carinated Ridged Bowl

12) Bowl profile. Grey-brown, pale red oxidized surfs.; abundant chaff, rare white grits. HW.B.204. No.596.
13) Bowl rim and carination. Pale brown core, reddened oxidised margins; cream slipped surfs.; rare medium sand, occasional chaff. HW.B.83. No.597.

Type 18C: Crescent Lug Handle

14) Rim with handle. Pale red-brown throughout; common sand, rare fine voids. Dia. 34 cm. Site 58C. No.628 (Late Uruk/Nin.5).
15) Rim with handle. Grey, red-brown oxidized surfs.; occ. sand and fine chaff. Dia. 16 cm. Site 19A.

Type 20: Small Carinated Bowl

16) Rim and carination (Type 20A). Pale red, grading to pale brown surfs.; fine fabric, occasional fine voids, rare fine sand. HW.B.123. No.621.
17) Rim and carination (Type 20C). Pale greenish grey throughout; occasional chaff and medium sand; dark greyish-red paint on ext. and int. Site 86.B.1.10. No.86.23.

Type 121: Sharply Out-turned Rim

18) Jar rim. Bright orange core and int. surf., pale orange-cream ext. and over rim; chaff, small calcite grits. Both surfs. wiped. Site 39E. No.192.
19) Jar rim. Bright orange core, pale orange-cream ext. and over rim, light orange rim; chaff, calcite grits. Both surfs. wiped. Dia. 14 cm. Site 39E. No.193.

Type 140: Oblique-rimmed Bowl

20) Bowl rim. Grey core, buff to orange margins, orange surfs.; hard; chaff, small calcite grits. Linear groove under ext. rim edge; ext. wiped. Dia. 26 cm. Site 75C. No.199.
21) Bowl rim. Pale red-brown, pale brown surfs.; common sand, some fine white sand. Site 75C. No.624.

Southern Late Uruk Types (Fig.67)

Type 6: Bevelled-rim Bowl

1) Bowl profile. Pale brown and pale red-brown throughout; abundant chaff, occasional medium-coarse white grits. HW.B.123. No.619.
2) Bowl profile. Grey core, oxidized pale red-brown surfs.; common chaff, rare fine white grits. HW.B.96.

Type 18A: Pierced Nose Lug

3) Nose lugs on 4-lugged jar. Cream ext., pink and cream int. orange core; fine fabric, fine sand, occasional fine ores. Rouletted design on ext. formed by oblique incisions; applied circular blobs on ext. Site 86.B.1.11. No.86.40.
4) Single nose lug. Pale grey-brown core, pale orange margins, red-burnished ext.; fine fabric, common fine planar voids. Traces of rouletted design adjacent to lug. Site 86.B.1.109. No.86.41.

Type 19: Spouts.

5) Jar with drooping spout (Type 19A). Buff to buff-orange; abundant white grits; cream slip. Wipe marks on lower body. Site 86.B.01.
6) Drooping spout (Type 19A). Pale brown, pale red ext.; common fine sand, some mica. HW.U. No.620.
7) Conical spout (Type 19B). Cream throughout; fine sand. Site 86.B. No.86.42.

Type 120: Broad Strap Handle

8) Part of handle. Pale brown throughout; common fine chaff. Site 39E. No.623.

Type 151: Undercut-rim Jar

9) Jar rim. Pinkish-brown core, very pale brown surfs.; fine sand in moderately smooth fabric. Site 28.B. No.89.

Other Uruk Types

Type 11: Brown-washed Ware

10) Bowl rim. Grey-brown, dark grey-brown washed or painted surfs; common fine-medium sand; rare fine chaff. Dia. 30 cm. HW.B.165. No.581.
11) Bowl rim. Pale red-brown, dark brown washed surfs.; abundant medium rounded sand, some dark minerals. HW.B.108. No.582.

Type 18B: Pierced Lug at Neck of Jar

12) Jar neck with pierced lug. Pale grey core, pale brown margins, cream/buff surfaces; chaff, occasional calcite grits. Dia. 14 cm. Site 45.E. No.195.

Type 106: Ceramic Ring Scraper

13) Incomplete example. Pale red-brown; moderately fine fabric, occasional fine voids, rare fine-medium sand. Site 48C. No.559.
14) Incomplete example. Light grey core, light brownish-grey ext., light brown int.; fine chaff. Externally wiped and internally smoothed. Dia. 10 cm. Site 46A. No.200.

Type 134: Internally Moulded (Beaded?) Jar

15) Bowl rim. pale red, pale brown surfs.; common chaff, rare grits. Site 49B. No.610.
16) Bowl rim. Very pale brown core, thick light orange margins, pale orange surfs.; chaff temper, small calcite flecks. Groove on int. below rim. Dia. 28 cm. Site 49B. No.186.
17) Bowl rim. Pale red-brown throughout; common fine chaff, occasional medium sand. Site 49B. No.611.
18) Bowl rim. Grey, reddened oxidized margins and surfs.; occasional chaff, rare fine sand. Dia. 30 cm. Site 49B. No.609.

Type 149: Flared-rim Cooking Pot

19) Jar rim. Blackish-brown core, brown margins, red-brown surfs.; coarse chaff, occasional calcite grits. Burnished on rim int. Dia. 22 cm. Site 45.E. No.185.
20) Jar rim. Light brown core, dark orange surfs.; chaff, some calcite and grey grits. Both surfs. highly burnished. Dia. 22 cm. Site 45.E. No.171.
21) Jar rim. Dark grey brown, black core, brown and grey surfs.; slightly crumbly, occasional chaff and sand. Lightly burnished ext. Dia. 20 cm. Site 60.B. No.614.
22) Jar rim. Dark grey-brown oxidized to brown towards ext. Pale brown slipped int., pale red-brown ext.; slightly crumbly, abundant medium grits. Site 60.B. No.613.

Ninevite 5 (Fig.68)

Type 22: Incised Grey Fineware

1) Jar rim. Very pale greenish grey throughout; very hard; very fine fabric, some fine voids. Simple incised wavy line and broad vertical gouges. HW.B.37. No.632.
2) Jar rim. Pale greenish grey throughout; very hard; fine fabric; rare fine sand and fine planar voids.Incised lines form triangular pattern. HW.L.76. No.633.
3) Jar rim. Pale grey throughout; very hard; fine fabric, rare fine voids. Broad vertical grooves and incised point wavy line (combination Types 22 and 23). HW.P.89. No.631.
4) Jar rim. Very pale brownish grey core, very pale brown int., very pale green ext.; fine sand. Incised point wavy line between incised grooves. Dia. 10 cm. HW.B.135. No.204.
5) Jar rim. Pale grey throughout; very hard; very fine fabric; incised points form wavy line motif. HW.B.40. No.630.
6) Jar rim. Smooth fine grey fabric; very rare fine voids. Site 86.B. No.86.35.(Note: this example shares some characteristics with excised Nin.5, namely the raised bar with oblique slashes).
7) Jar rim. Pale greenish grey fine ware; rare fine voids. Site 86.B. No.86.34. (Transitional to excised, see note for f).

Type 23: Excised Grey Fine Ware

8) Bowl rim. Very pale brownish-green, with pale yellowish-green int. and ext.; very rare sand, occasional chaff. Smoothed surfs., diagonal excisions over vertical parallel grooves below ext. rim edge groove. Dia. 10 cm. HW.0.78. No.205.
9) Body sherd. Very pale greenish-grey throughout; smooth paste, occasional fine sand. 1 mm deep triangular incisions, broad horiz. gouges with short obliques incisions on raised bands. Site 14A. No.29.
10) Body sherd. Very pale grey-brown surfs., grey core; fine sand, common small voids, occasional chaff impressions on surfs. Broad horiz. gouges with short oblique incisions as infill. Site 14.A. No.28.
11) Bowl rim. Pale greenish-grey throughout; very hard fine fabric. Oblique incisions on residual surface and point-incised wavy line. HW.Q.100. No.637.
12) ?Bowl rim. Pale brown, pale greenish surfs.; very hard, fine with very fine sand and rare fine voids. Oblique incisions on raised areas. Site not known but probably HW; No.639.
13) Body sherd. Light grey core and int., light greenish grey ext.; sparse chaff with small calcite grits. Smoothed surfs. Decoration includes: in upper panel, row of incised zig-zags; in lower panel, incised zig-zag line, acute apices and oblique incisions on raised bands. HW.I. No.206.

Type 24: Pedestal Base

14) Type 24C. Pale olive green throughout; occasional chaff, virtually absent from body above. Site HW.D. No.641.
15) Type 24C. Pale green throughout; common fine chaff, rare in body above. HW.L. No.642.
16) Type 24A. Dark grey, pale grey surfs.; common fine chaff. HW.R.103. No.643.
17) Type 24C. Pale brown throughout; rare fine chaff voids. HW.M.119. No.644.
18) Type 24A. Hard greenish grey, pale olive surfs.; occasional fine chaff voids, rare medium grits. HW.B.38. No.645.

Type 24B. Attachment scar between base and body

19) Pale red throughout becoming greyer beneath; fine, very fine sand and occasional fine planar voids. HW.B.116. No.648.
20) Grey throughout with pale grey surfs.; rare chaff. HW.M.120. No.646.
21) Grey, pale greenish grey surfs.; hard fine fabric, rare fine sand, rare irregular voids. HW.H.62. No.647.

Type 25: Vertical Gouged Fine Ware

22) Body sherd. Pale greenish-grey throughout; moderately hard and fine, occasional fine sand. Vert. broad gouges on ext. HW.L.73. No.649.
23) Bowl rim. Very pale yellowish-green core and ext.; sparse chaff, sand and calcite. Smoothed surfs., vert., parallel grooved lines below plain cordon; gouged line below ext. rim edge. Dia. 8 cm. HW.B.11. No.203.

Type 26: Ribbed Fine Ware

24) Bowl rim. Pale grey throughout; very hard. Site 12.D. No.1.
25) Bowl rim. Very hard greyish-green; very fine slightly granular fabric. Site 20A. No.100.
26) Bowl rim. Dark greenish grey; hard moderately fine, occasional fine voids. HW.B.45. No. 650.

Type 27: Painted Ware

27) Bowl. Very pale greenish-cream surfs. and body; common fine, occasional medium sand; purplish brown matt paint on ext. and rim int. Site 20.A. No.61.
28) Carination sherd. Pale red-brown, pale brown surfs; occasional medium sand. Animal design in red-brown paint on ext. Site 20.F. No.653.
29) Body sherd. Pale brown throughout; occasional fine chaff. Two necked birds in red-brown paint on ext. Site 49.B. No.654.
30) Body sherd. Very pale green, pale brown surfs. Moderately fine, rare voids. Purplish-red paint on ext. HW.B.112. No.652.

Type 28: Pointed or Parabolic Fine Ware Base

31) Grey throughout; common fine-medium sand. HW.Q.100. No.655.
32) Pale brown, very pale brown surfs.; fine fabric, rare fine sand and fine voids. HW.M.119. No.656.
33) Pale red-brown throughout; common fine-medium sand, mainly white. HW.I.65. No.657.
34) Pale greenish throughout; moderately fine fabric. Underside of base heavily scraped. HW.L.74. No.658.

Type 133: Fine Ware Beaded Rim Bowl

35) Bowl rim. Pale greenish grey throughout; moderately hard and fine, slightly granular fabric and occasional fine voids. Site 43.A. No.659.
36) Bowl rim. Pale grey throughout; occasional small calcite grits. Smoothed surfs., grooved line beneath ext. rim edge. Site 43.H. No.202.

Later Third Millennium (Fig.69)

Type 29: Flat-based Bowl

1) Base. Very pale green core and int., very pale brownish-green ext.; chaff, rare small calcite grits. Smoothed surfs., fine throwing rings over ext. HW.A.7. No.210.
2) Base. Pale green throughout; hard; fine sand, some fine voids. 1 large planar void (flaw) filled with red-brown unfired clay. Throwing rings on ext. and int. HW.B.40. No.376.
3) Base. Pale green throughout; hard; fine sand. Smooth surfs. with throwing rings; slight dimple in bowl int. above centre of base may result from throwing on wheel. HW.B.130. No.378.
4) Base. Pale creamish-brown surfs., pale brown core; hard; fine sand and occasional medium sand, rare fine chaff voids. Throwing rings on ext. HW.B.44. No.379.

Type 30: Flat-based Beaker

5) Base. Green fine ware; hard, little visible temper. Throwing rings on ext. and int., slight perimeter groove above base. HW.H.60. No.380.
6) Base. Very pale green throughout; hard; fine sand. Throwing rings on ext. HW.L.73. No.381.
7) Base. Pink surfs., red-brown core; hard; fine sand, occasional long, fine planar voids. Throwing rings on ext and int. HW.B.125. No.382.

Type 31: String-cut Flat Base

8) Base. Pale yellowish-green throughout; chaff, rare calcite grits. HW.L.72. No.213.
9) Base. Grey-brown core, very pale greenish grey surfs.; chaff, occasional calcite grits. HW.M.122. No.214.

Type 33: Taya-type Fine Wares and Related Sub-stonewares

10) Flat base. Grey fineware; very hard, slightly granular with rare planar voids. Smooth surfs., ext. pared with wooden implement. HW.M.120. No.391.
11) Flat base. Dark grey throughout; very fine, smooth, sub-stoneware, rare fine voids; throwing rings on int. HW.B.150. No.392.
12) Flat base. Grey throughout; very hard, very dense, fine smooth fabric. HW.F. No.393.
13) Bowl rim. Very pale brown throughout; moderately hard, common fine planar voids; smooth surfs. with throwing rings. HW.M.1. No.394.
14) Low ring base. Dark grey, olive ext.; very hard sub-stoneware, fine smooth fabric, occasional fine white inclusions. HW.F.30. No.395.
15) Flat base. Grey core, light greenish-grey surfs; fine sand, very smooth surfs. HW.M.119. No.211.
16) Flat base. Very pale greenish-cream throughout; fine sand, very smooth surfs. HW.B.62. No.212.
17) Base. Olive green throughout; very hard, very smooth sub-stoneware; very fine fabric, very fine vesicles with white linings on ext. HW.A.6. No.396.

Type 32: Comb-incised Jars

18) Jar rim. Very pale brown, cream surfs.; common fine chaff, rare white sand. Comb incised ext. with impressed circle. Dia. 48 cm. HW.Q.93. No.385.
19) Jar rim. Dull olive green; common fine chaff, rare grits. Comb incised ext. with oblique stabs. HW.O.78. No.387.
20) Jar rim. Pale greenish-brown throughout; common chaff. Comb-incised ext. with oblique cord impressed "maggots". HW.B. No.389.
21) Jar rim. Pale greenish-brown throughout; common fine chaff, moderately porous, rare white grits. Comb-incised ext. Dia. 38 cm. HW.B.119. No.286.
22) Jar rim. Very pale brown, cream surfs.; occasional chaff, rare sand. Comb-incised ext. HW.L.72. No.384.

Type 103: Indented-rim Jar

23) Jar rim. Grey core, light orange margins, pale orange surfs.; chaff, with sparse white grits. Indent on rim ext. produced with finger.Dia. 32 cm. HW.B.47. No.341.
24) Jar rim. Grey core, reddish-orange margins and int., pale orange ext.; chaff with occasional white grits. Finger impressed groove on rim ext. Dia. 28 cm. HW.O.79. No.342.

Type 154: Lugged Bowl

25) Bowl rim. Pale yellowish-green core, pale green surfs.; chaff. Narrow crescent lug on ext. Dia. 38 cm. HW.L.72. No.357.
26) Bowl rim. Pinkish-brown surfs., pale red core; occasional fine chaff and fine white grits. HW.B.53. No.400.

Type 155: Comb-incised Jar: Pink Variant

27) Jar rim. Cream surfs., pale brown-pink core; common fine chaff, rare sand. Comb-incised ext. No.399.
28) Jar rim. Light orange-pink core, very pale orange surfs; chaff with small black and occasional calcite grits. Incised ?comb-stabs form herringbone pattern on neck. Site 58.B. No.208.

Khabur (Old Assyrian) (Fig.70)

Type 34: Khabur Painted Ware

1) Jar rim. Pale red, cream slipped surfs.; common fine-medium white ?calcite and chaff; red paint on ext. dribbled down int. HW.M.122. No.402.
2) Jar rim. Pale red core, pink surfs; common fine white sand, some surf. cracks and spalling, occasional chaff; matt red and red-brown paint on ext., random spots on int. HW.B.209. No.403.
3) Jar rim. Very pale red-brown surfs., pale red-brown core; common fine chaff, common medium-coarse calcite; matt red paint on ext. and rim. HW.B.202. No.404.
4) Jar rim. Dull red core, cream slip; fine sand, occasional white grits; brownish red matt paint on ext. and rim int. Site 20.A. No.92.
5) Body sherd (Type 34.B). Pale red, cream slipped surf.; occasional fine sand and irregular voids. Dark red-brown paint on ext. HW.B.93. No.408.
6) Body sherd (Type 34.B). Pale red, pale red int. and cream slipped ext.; common fine-medium white grits, occasional quartz; matt red paint on ext. HW.B.93. No.407.

Type 35: Jar with Horizontally Grooved Shoulder

7) Jar rim. Pink core and int., cream slip on ext.; common sand, occasional chaff; red-brown and dark red-brown paint

on ext.and rim top; deeply incised grooves on ext. Dia. 32 cm. HW.B.202. No.410.

8) Jar rim. Pale red-brown, very pale brown surfs.; abundant medium white sand; grooves on applied rib stand proud of surface. HW.B.41. No.411.

Type 36: Indented-cordoned Jars

9) Body sherd. Orange core, creamy yellow ext., very pale orange int.; chaff, rare calcite; on ext. wide band ridge cordon with deep finger-impressed groove. HW.E.7. No.220.

10) Body sherd. Pale brown core and int., pale brown ext.; occasional medium sand and chaff. HW.C.137. No.413.

Type 37: Jar with Impressed Circles

11) Jar rim. Very pale greenish-brown throughout; occasional medium-coarse calcite grits, occasional voids from chaff; grooves incised into vessel body, impressed circles below rim. HW.A. No.417.

12) Jar rim. Pale brown surfs., brown core; common sand, some white and common fine chaff. Ext. grooves impressed into body. Impressed circles and rectangles below rim. Dia. 32 cm. HW.A. No.414.

Type 38: Concave Fine Bowl Base

13) Very pale green throughout; moderately hard, fine granular fabric, occasional fine sand; smooth surfs. HW.B.203. No.418.

14) Very pale pinkish-brown, slightly pink core; fine fabric, little visible temper; smooth surfs. HW.B.38. No.419.

Type 39: High Ring or Pedestal Base

15) Carinated bowl. Pale pinkish-brown surfs., pale red core; common medium sand, occasional irregular voids, rare chaff. HW.B.75. No.426.

16) Base. Very pale greenish-brown throughout; common fine sand. HW.B.164. No.421.

Type 40: Channel Base

17) Base. Pale pink surfs., pale red core; occasional medium sand, occasional irregular voids, rare chaff. HW.J.125. No.425.

18) Base. Pale pinkish-brown surfs., pale red core; common medium sand, rare chaff. HW.B.75. No.426.

Type 41: Burnished Grey-ware Bowl

19) Bowl rim. Pale greenish-grey core, light grey surfs.; hard, sand; burnished ext. up to rim int., very smooth int. HW.B.170. No.219.

20) Bowl rim. Grey core, grey burnished surfs.; fine fabric, very fine sand, rare chaff voids. HW.D.1. No.429.

21) Bowl rim. Grey core, grey burnished int. and rim top; very fine sand, slightly micaceous, very fine voids from chaff. HW.B.170. No.430.

22) Bowl rim. Greenish-grey core, grey surfs.; granular core, hard, sand with abundant very fine calcite; burnished int. and over rim, very smooth ext. Dia. 30 cm. HW.B.1. No.216.

Type 42: Externally Grooved Bowl

23) Bowl rim. Very pale brown throughout; fine fabric, rare very fine sand. HW.P.91. No.433.

24) Bowl rim. Brownish-orange core, light brownish-orange surfs.; hard; sand; burnished ext., two horiz. deep grooves below rim on ext. HW.P.89. No.218.

Type 109: Pie-crust Potstand

25) Potstand profile. Light brownish-orange core, very pale orange surfs.; sand with occasional calcite grits. Site 92(?). No.215.

Nuzi (Mitannian) (Fig.71)

Type 43: Nuzi Painted Ware

1) Jar rim. Cream throughout; occasional medium sand; brown painted stripes on rim top and gazelle with eye of white paint below rim. HW.B.137. No.435.

2) Body sherd. Very pale yellowish-brown throughout; evenly fired with occasional medium sand and chaff. Matt red-brown slip or paint on ext., overpainted gazelle/goat and bushes in white. HW.A/B. No.436.

3) Bowl rim. Pale brown throughout; fine sand; red-brown matt paint on ext. with off-white over-painted vert. lines. HW.B.135. No.372.

4) Body sherd. Very pale red-brown, cream slip on ext. and int.; fine fabric, occasional white sand. On ext. slip covered by very dark red-brown to black paint with over-painted white dots. HW.B.135. No.437.

5) Body sherd. Pale orange core and int.; fine sand; dark brown slip/paint overpainted with white wavy lines. HW.B.120. No.224.

Type 44: Fine Painted Goblet

6) Rim. Pale red-brown, very pale brown surfs.; fine fabric, rare planar voids. Pale red-brown bands painted on ext. HW.B.119. No.439.

7) Rim. Pink body, cream slipped surfs.; common fine sand. Ext. painted with dark brown bands. HW.A.1. No.438.

8) Rim. Grey brown, pale brown surfs.; fine and some medium sand. Dull red bands painted on ext. and rim top. HW.B.162. No.441.

9) Rim. Very pale brown throughout; common medium calcite sand. Brown and dull red painted bands on ext. HW.B.140. No.440.

Type 45: Pedestal (Stump) Base

10) Light orange core, thick orange outer margin, orange and cream ext., pale orange int.; fine sand, some calcite. Incised cross on underside of base, off-centre. 71.A. No.222.

11) Pale orange core, creamy orange surfs.; fine sand, some calcite. Site 37.A. No.223.

Middle Assyrian (Fig.72)

Type 47: Collared Rim Jar

1) Jar rim. Pale greenish brown throughout; common chaff. Site 43. No.444.

2) Jar rim. Pale brown, pale greenish-brown surfs.; common chaff, occasional fine sand. HW.B.101. No.447.

3) Jar rim. Pale greenish brown throughout; abundant chaff. HW.B.110. No.445.

Type 48: Small Bowl

4) Bowl profile. Very pale brown throughout; abundant chaff. HW.B.103. No.453.
5) Bowl profile. Pale greenish brown throughout; common chaff, occasional medium-coarse calcite. HW.B. No.449.
6) Bowl rim. Pale greenish brown throughout; abundant fine chaff. HW.B.64. No.454
7) Bowl rim. Dull green and pale red-brown, pale red-brown patches on ext.; abundant chaff, occasional small white (calcite) grits. HW.B.135. No.451.

Type 49: Fine Beaker

8) Rim. Pale green throughout; rare irregular voids and calcite grit; smooth surfs. Dia. 8 cm. HW.B.103. No.228.

Type 50: Nipple Base

9) Pale green throughout; occasional fine sand including rusty red inclusions. HW.B.103. No.456.
10) Pale green throughout; occasional fine chaff, small voids and medium sand. HW.B.33. No.455.
11) Greenish grey throughout; rare fine chaff and fine sand. HW.F.20. No.457.

Type 51: Coarse Ring Base

12) Grey, pale greenish grey surfs.; occasional chaff and fine sand. HW.A.1. No.461.
13) Very pale green throughout; abundant chaff. HW.B.103. No.460.

Type 52: Plate or Dish

14) Plain dish rim. Pale red-brown throughout; occasional chaff and medium quartz sand, rare coarse rounded grits. HW.B.115. No.462.
15) Plain dish rim. Pale red-brown throughout; occasional chaff, rare medium-coarse grits, some quartz. Dia. 32 cm. HW.F.100/200. No.463.
16) Painted dish rim. Very pale orange-brown core and int., pale orange ext.; common chaff and calcite; smoothed int., burnished red-brown paint over rim and into int. Dia. 44 cm. Site 71.A. No.229.
17) Painted dish rim. Pinkish brown, brown core; occasional chaff, rare medium-coarse grits; dark red paint on int. and on rim. Dia. 26 cm. Site 71.A. No.464.
18) Painted dish rim. Pale orange core, cream slipped surfs.; common chaff and calcite grits, vesicular; Brown paint, burnished, all over rim. Dia. 34 cm. Site 71.A. No.230.
19) Plain dish rim. Very pale orange core, pale orange-cream surfs.; chaff, occasional calcite, abundant vesicles. Pointed rim edges define ext. ridge. Dia. 26 cm. Site 71.B. No.226.

Type 53: Sherds with Wavy Grooved Lines

20) Body sherd. Pale green core, very pale orange green surfs.; common coarse chaff. Impressed wavy groove on ext. Dia. 10 cm. HW.B.8. No.166.

Type 54: Pie-crust Pot-stand

21) Very pale brown core, buff surfs.; common chaff, occasional coarse calcite grits, abundant vesicles. Weak finger impressions on lower edge of rim. HW.B.135. No.231.

Type 56: Square Rim Jar

22) Jar rim. Very pale green throughout; common chaff, occasional calcite grits, abundant vesicles. Beginning of cordon at lower edge of sherd. Site 45.C. No.225.
23) Jar rim. Pale brown throughout; common chaff, occasional medium white calcite grits. Site 7.A. No.562.
24) Jar rim. Very pale yellowish green core, very pale orange surfs.; common chaff. Site 30.D.

Late Assyrian (Fig.73)

Type 57: Bowl with Ribbed Rim

1) Bowl rim. Grey with pale brown surfs.; common chaff, rare fine sand. HW.A.11. No.467.
2) Bowl rim. Light brownish-orange core, light pinkish orange surfs.; chaff, sparse calcite grits, some vesicles; smooth, slurried surfs. HW.A.8. No.233.
3) Bowl rim. Light brownish-orange core, pale pinkish-orange surfs.; chaff, some calcite grits and vesicles. HW.A.7.

Type 58: Bowl with Thickened Rim

4) Bowl rim. Pinkish-brown, pale brown surfs.; occasional chaff and large irregular voids. HW.B.34. No.469.
5) Bowl rim. Light brownish-orange core, pinkish-orange surfs.; chaff, occasional calcite grits, some vesicles. Smoothed surfs.,slurried int. HW.B.16. No.240.
6) Bowl rim. Pale orange core, orange to pink margins and surfs.; chaff, calcite grits and some vesicles. Smoothed surfs., slurried int. HW.A.8. No.241.

Type 59: Swollen Convex Base

7) Light yellowish-green core, pale brown surfs.; chaff, rare calcite grits. Site HW.M.1 No.245.
8) Pale pinkish-orange core, pale pink to cream surfs.; chaff, occasional white grits. HW.A.8. No.246.

Type 60: Palace Ware Beaker

9) Beaker profile. Very pale brown, very smooth pale green ext. and very pale brown int.; very hard, fine smooth fabric, rare fine voids. Site 99.C. No.706.
10) Body sherd. Pale greenish-brown throughout; very fine fabric, common very fine sand; smoothed surfs. HW.B.135. No.472.
11) Beaker base. Pale brown, very pale greenish slipped surfs.; very smooth fabric. Site 113.G.20. No.KA.178.

Type 61: Angled Ring Base

12) Very pale pinkish-buff core, buff/cream surfs.; chaff, some calcite and vesicles. Site 42.I. No.242.

Type 62: Powder Box Base

13) Very pale brown core and int. surf., brownish-cream ext.; chaff, occasional calcite and vesicles; very smooth ext. Two horiz. grooves above sharp angle of base. Site 3.A. No.243.

Type 63: Button Base

14) Light brown core, pale pinkish brown surfs.; chaff. Site 48.B. No.247.
15) Grey throughout; fine sand, slightly micaceous, rare planar voids. HW.A.7. No.475.

Type 105: Assyrian Shouldered Bowl

16) Bowl rim. Brown, pale brown surfs.; occasional chaff, common small voids, rare medium rounded sand. HW.A.5. No.476

Type 111: Internally Hollowed Jar

17) Jar rim. Pale red-brown, pale brown surfs.; common chaff, occasional fine-medium sand, some mica. HW.B.109. No.478.

Type 112: Oblique T-shaped Bowl Rim

18) Bowl rim. Pale red, brown core; rare chaff and fine voids. HW.B.135. No.479.
19) Bowl rim. Light brownish-orange core, pale orange surfs.; chaff, calcite grits and rare vesicles; smoothed surfs. HW.A.6. No.239.

Type 113: Carinated Bowl

20) Bowl rim. Very pale brown core, thick pale pink int. margin and surf., buff ext.; sparse chaff visible on surf. HW.B.42. No.236.

Type 114: Necked Jar

21) Jar rim with cordon. Brown throughout; occasional chaff, rare sand. HW.B.136. No.483.
22) Jar rim with cordon. Pale brown, very pale brown surfs.; common chaff; occasional medium sand, some calcite. HW.A.13. No.482.

Type 118: Button Ring Base

23) Light pinkish-brown core, cream-orange ext., pale pinkish-orange int.; chaff with rare calcite grits. Site 24.B. No.248.

Type 132: Jar with Folded-over Rim

24) Jar rim. Pale greenish-brown throughout; occasional chaff, rare coarse calcite grits. HW.A.8. No.485.
25) Jar rim. Pale brown, very pale brown surfs.; slightly granular fabric, occasional small voids, rare large irregular voids, rare medium sand. HW.A.7. No.484.

Type 156: Ribbed Carinated Bowl

26) Bowl rim. Pale red-brown throughout; common chaff. Site 58.D. No.486.
27) Bowl rim. Pale pinkish-brown surfs., pale brown core; moderately fine fabric, sparse chaff. Dia. 34 cm. Site 58.C. No.375.

?Post-Assyrian (Fig.74)

Type 102: Flat-rimmed Bowl

1) Bowl rim. Light brown core, red-orange margins and ext., orange int.; hard; common sand and chaff, occasional white grits. Dia. 22 cm. HW.A.4. No.345.
2) Bowl rim. Pale pinkish-brown core and ext., buff int.; common sand and chaff, occasional white grits. Dia. 24 cm. HW.F.19. No.346.

Type 104: Jar with Grooved Top

3) Jar rim. Light brown core, thick reddish-orange margins, light reddish orange int., cream ext. slip to rim int.; common chaff, occasional small white grits. 3 grooves in top. Dia. 40 cm. HW.A.11. No.350.
4) Jar rim. Pale brown core, very pale brown int., very pale brown-pale green slipped ext.; chaff, rare white grits. 3 grooves in irregular top. HW.A.8. No.352.
5) Jar rim. Light green core, pale green surfs.; chaff, occasional white grits. 2 grooves in flat top. Dia. 16 cm. HW.A.5. No.349.

Type 142: Hole Mouth Jar with Grooved Rim

6) Jar rim (Type 142A). Orange core, light orange int., pale orange ext.; sand with abundant large calcite grits; smooth ext., row of impressed stabbings in lower rim ridge with partial serrated oval stamp impression below (143A or B). Site 80.C. No.261.
7) Jar rim (Type 142A). Light red-orange core, very pale orange surfs.; common sand, some white grits; slurried int. Site 37.G. No.264
8) Jar rim (Type 142B). Reddish-orange core, light reddish orange int., light buff-orange ext.; sand, rare white grits; smoothed ext., row of impressed dog-tooth incisions below rim ridge. Site 48.B. No.259.

Type 143: Oval Stamps

Sub-type 143A

9) Jar rim (variant on Type 104). Light pinkish-orange core, light buff-orange int., pale buff orange ext.; common sand, occasional white grits. Stamp impressions below neck groove line. Site 29.D. No.265.
10) Body sherd. Orange core, pale yellow surfs.; sand, abundant small white grits. Stamp impressed on pot shoulder below row of dog-tooth impressions. Site 60.C. No.249.
11) Body sherd. Light brown core, pinkish-orange margins, light orange surfs.; sand, abundant small calcite grits; smoothed ext., slight pitted int. Flat, serrated stamp impression. Site 60.C. No.250.

Sub-type 143B

12) Body sherd. Pinkish-orange core, light orange int., buff orange ext.; sand, rare calcite grits; horiz. grooved line above bulbous impression of stamp. Site 29.C. No.253.
13) Body sherd. Brownish orange core, pinkish orange int., buff-orange ext; sand, sparse calcite grits. Serrated stamp. Site 87.B. No.252.

14) Body sherd. Pale yellow-orange core, buff-orange int., pale yellow-green ext.; common sand. 2 horiz., ridged grooves with 1 post-firing perforation above bulbous stamp impression. Site 5.B. No.255.
15) Body sherd. Pale brownish-orange core, buff orange int., greenish cream ext.; common sand. Lightly impressed partial stamping next to bossed oval impression. Site 29.D.

Sub-type 143 C.
16) Body sherd. Pinkish-orange core, pale pinkish orange int.; common sand. Smoothed ext. Teardrop stamp. Site 37.G. No.254.

Sub-type 143 D.
17) Body sherd. Orange core, brownish-orange int., pale orange ext.; common sand. Slightly bulging teardrop stamp. Site 54.K. No.257.

Type 144: Bowl with Grooved-top Rim

18) Bowl rim. Brown throughout; common fine-medium sand, occasional fine voids. Triangular stabbed impressions on ext. Dia. 34 cm. Site 180.A. No.687.
19) Bowl rim. Grey brown, pale brown surfs.; common fine-medium sand, some dark minerals (particularly visible on surfs.). Double row of deep stabbed impressions on ext. Dia. 24 cm. Site 180.A. No.689.
20) Bowl rim. Brown, pale red surfs.; common medium sand, some dark minerals. Large oblique notches on weak shoulder. Dia. 32 cm. Site 182.A. No.681.

Type 145: Bowl with Notched Exterior

21) Bowl rim. Pale brown oxidized to pale red surfs.; occasional medium-coarse white grits and planar voids from chaff. Vert. stabbed notches on weak shoulder. Site 182.A. No.682.
22) Bowl rim. Brown core oxidized to red ext. margin and pale red int. margin, pale brown ext. surf.; common medium, occasional coarse sand, occasional voids. Triangular notches on weak shoulder. Dia. 38 cm. Site 180.A. No.683.

Type 146: Carinated Bowl Variant

23) Bowl rim. Pale brown, very pale brown surfs.; hard occasional fine-medium sand. Site 182.A. No.696.
24) Bowl rim. Brown, reduced to grey towards surfs.; common fine sand. Site 182.A. No.698.
25) Bowl rim. Brown, pale brown surfs.; moderately hard, moderately fine fabric, occasional fine-medium sand. Site 182.A. No.697.

Type 157: Crescent Stamps

26) Body sherd. Light brownish-orange core, pinkish-orange ext. margin, buff-orange ext. surf.; common sand, smoothed surfs., single row of impressed plain crescents with top of serrated oval stamp impression (Type 143A or B). Site 60.F. No.251.
27) Hole-mouth jar rim. Brownish-orange core, pale orange int., buff-orange ext.; sand. Single row of plain crescents impressed below rim edge, with impression of serrated stamp below (type 143A or B). Site 53.A. No.258.

Hellenistic (Fig.75)

Type 64: Incurved Rim Bowl

1) Bowl rim. Pale orange core, pale brown surfs.; sand with abundant white grits, abundant surface voids. Thin orange paint or slip over rim and ext. Site 71.A. No.275.
2) Bowl rim. Pale red body, pink ext., dark brown washed slipped int.; moderately smooth, fine sand temper, (1 or 2 red inclusions). Site 3.A. No.24.
3) Bowl rim. Brown body, pale red surfs.; common medium sand, some mica. Site 3.A. No.22.
4) Bowl rim. Dull red core, pink surfs.; common medium sand, white inclusions. 2 lightly incised lines below rim ext. Site 3.A. No.23.

Type 65: Jar with Rolled-over Rim

5) Jar rim. Pale red body, pale brown surfs.; common medium sand (1 or 2 white grains), rare voids. Rim folded over. Site 3.A. No.17.
6) Jar rim. Orange throughout; sand. Site 63.A. No.LM142.
7) Jar rim. Pale red body, very pale brown surfs.; common medium sand. Site 3.A. No.16.

Type 66: Hellenistic Plate

8) Plate rim. Pale brown, oxidized to red margins; common medium sand; matt red and very dark brown paint on int. surf. Site 131.B. No.700.
9) Plate rim (fine ware body:type 67). Pale brown, glossy brownish-black slipped surfs.; very fine, evenly fired. Site 138.C. No.665.
10) Fishplate rim. Dark grey-brown core, buff surfs.; sand, occasional white grits and surface voids; smooth int. Site 69.B. No.280.

Type 67: Hellenistic Fine Ware

11) Body sherd with stub of strap handle. Pale orange throughout; fine sand; dark orange slipped surfs. Site 6.A. No.272.

Type 68: Fine Ring Base

12) Pale to bright orange core, pale orange int., and creamy orange ext.; fine sand; plain smooth int. Site 3.A. No.270.
13) Pale red-brown, red-slipped surfs.; occasional sand, some white. 2 grooves incised on int. Site 56.A. No.488.
14) Light brownish-orange core, slipped surfs: red-brown int., reddish-orange ext.; sand with white grits; smooth ext. Site 43.Q. No.271.

Type 108: Impressed Dog-tooth

15) Hole-mouth jar rim. Pale red throughout; abundant medium sand, some calcite; impressed dog-tooth below rim. Site 29.D. No.489.
16) Jar rim. Pale orange core, buff-grey slip coated int., pale orange ext.; sand with rare white grits. Row of deep dog-tooth impressions below neck groove line. Site 29.AB. No.262.
17) Hole-mouth jar rim. Orange core, pale orange int., pale buff-orange ext.; hard, sand with white grits. Wiped ext., deep dog-tooth impressions at lower rim edge with corresponding finger press indentations on int. Site 71.A. No.260.

Type 116: Out-turned Rim Bowl

18) Bowl rim. Pale orange core and int., pale creamy-orange ext.; sand, abundant small and rare large white grits. Bright orange-red paint/slip all over rim. Site 6.A. No.274.

Type 117: "Hemispherical Bowl"

19) Bowl rim. Brownish-orange core, grey-brown ext. margin, very pale brown surfs.; sand with abundant very small white grits; Ext. slipped with dark brown, int. with red-brown thin paint or slip. Grooves on ext. and int. Site 43.Q. No.278.

20) Bowl rim. Bright orange core; slipped with pale yellow upper ext., dark brown lower ext. and int. surfs. Sand with occasional very fine white grits. Grooved int. Site 6.A. No.279.

Type 158: Amphora Base

21) Orange to bright pinkish-orange core, pale brownish orange int., pale creamy pink slipped ext.; hard, common sand. Blackened int. with patches of white residue. Site 87.C. No.277.

22) Pale orange core, cream to pale orange surfs.; common sand with black and white grits. Site 60.A. No.266.

23) Yellowish-brown core, pale orange-brown int., pale grey-brown ext.; hard, common sand, some black grits. Site 60.A. No.267.

Type 159: Bag-shaped Jar

24) Jar profile. Red-brown, pale brown surfs.; common fine-medium sand, some dark and white inclusions. Site 113.H/J.81. No.KA.177.

25) Jar profile. Creamy orange core and int., cream ext.; sand with rare white grits. Site 63.A. No.276.

Parthian (Fig.76)

Type 76: Diamond Stamped Sherds

Sub-type 76A:

1) Body sherd. Very pale yellow-green core and surfs., thick pale orange margins; common sand. Site 83.B. No.301.

2) Body sherd. Pale red, pale brown surfs.; occasional sand with white inclusions. Ext. decorated with diamond stamp and impressed rocker pattern. HW.F. No.491.

3) Strap handle. Pink, pale yellowish-brown slipped surfs.; very fine fabric, rare fine sand. Site 154.B. No.670.

Sub-type 76B:

4) Body sherd. Orange-pink core, cream to pale orange surfs.; sand with rare white grits. Diamonds arranged in oblique rows. Site 83.C. No.300.

Sub-type 76C:

5) Body sherd. Pale orange inner half of core, pale brown outer half, very pale greenish cream surfs.; hard, sand with occasional white grits. Stamp impression of 9 unframed raised circular dots set in oblique rows. Site 100. No.298.

6) Body sherd. Brownish-orange core and int. surf., brown ext. margin, brownish-grey ext. (?burnt); hard, fine sand, small white and black grits, abundant mica. Stamp impression of framed diamond with central horiz. bar separating 2 raised circles; arrangement of diamonds, irregular. Site 51.B. No.299.

7) Body sherd. Very pale greenish-brown throughout; rare fine sand, occasional fine planar voids. Type 76A, but with enlarged circular blobs. Site 151.A. No.669.

8) Body sherd. Pale red throughout; common medium sand, some white inclusions. Stamp impression as for f) but central bar runs along long-axis of diamond. Site 142.B. No.666.

Type 100: Fine Brittle Ware

9) Rim and handle. Dull red vessel int. merging to black ext. Moderately hard and brittle, occasional fine sand. Site 93.B. No.702.

Type 107: Impressed Rocker Pattern

10) Body sherd (type 107A). Pale brown, cream surfs.; rare fine sand and planar voids. HW.M.119. No.553.

11) Body sherd (Type 107A). Pale pinkish-orange core and int. cream ?slipped ext.; sand with small dark grits on int. surf. Broad wavy impression between horiz. grooves. Site 51.B. No.353.

12) Body sherd (Type 107A). Pinkish-orange core and int., pale green ?slipped ext.; sand, smooth surfs. Patterns set in multiple horiz. and oblique rows. HW.N. No.355.

13) Body sherd (Type 107A). Pale orange core, pale green ?slipped surfs.; sand, occasional white grits; smoothed surfs. 3 evenly spaced horiz. rows of impressions. HW.B.43.

Type 115: Parthian Jar

Sub-type 115A:

14) Jar rim. Pinkish-brown, pink surfs.; abundant well-rounded sand, mainly quartz or white sand. Site 3.A. No.556.

15) Jar rim. Pale creamish-green throughout; moderately fine fabric, fine sand and common fine pores. (Originally type DB). Site 44.A. No.371.

Sub-type 115B:

16) Jar rim. Reddish-orange core, pale orange int., pinkish-cream slipped ext.; sand, occasional white grits. Flat top with narrow groove, indented on ext. Dia. 12 cm. Site 3.A. No.347.

17) Jar rim. Orange core, pale orange int., cream slipped ext.; sand, abundant black grits on surfs. Wide groove in rim top and slight ext. groove. Dia. 12 cm. Site 51.B. No.348.

Type 127: Strap Handle with Central Hollow

18) Pale pinkish-orange core, cream slip; hard, sand with rare white grits and dark grits on surfs. Site 51.C. No.296.

Type 128: Rod Handle

19) Handled jar neck with rim of hybrid type (115 and potential diagnostic CE). Pale orange-brown to brownish-pink core, slipped surfs.; very pale orange int., very pale buff ext.; hard, sand, rare white grits and small dark grits on surf. Site 8.B. No.294.

Type 129: Hole-mouth Jar

20) Jar rim. Pale brownish-pink core, pale orange-brown int., cream ext.; hard, sand with rare white grits. Narrow ridge on rim top. Site 51.B. No.285.

21) Jar rim. Light brownish-pink core, cream slipped surfs.; hard, fine sand, occasional white and dark grits. Narrow ridge on rim top. Site 51.B. No.281.

Type 130: Flat Collared Rim

22) Jar rim. Light greyish-brown int. half, light orange ext. half, pale pink int., yellow-orange smooth ext.; hard, sand, rare white grits. Site 51.B. No.284.
23) Jar rim. Pale pink core, thick, buff ext. margin, pale buff surfs.; hard, sand. Site 51.B. No.286.

Type 131: Flared Rim Dish with Exterior Groove

24) Dish rim. Pale pinkish-orange core, yellowish-orange slipped surfs.; hard, sand. Decorated on ext. with 2 rows of deep triangular impressions. Dia. 14 cm. Site 69.D. No.290.
25) Dish rim. Light brownish-orange core, pink-orange int. margin, cream slipped surfs.; hard, sand, with rare white and dark grits. Applied finger impressed pie-crust strip at neck. Dia. 25 cm. Site 51.B. No.289.
26) Dish rim. Orange core, bright orange margins, yellow-orange slipped surfs.; hard, sand with small white grits. Plain. Site 40.B. No.292.

Type 163: Small Handle with Central Hollow

27) Jug rim. Pale yellow, pink core; fine, rare inclusions and fine voids, rare coarse calcite inclusions. Site 93.B. No.705.
28) Pinkish brown, pale yellow slip; fine fabric, occasional fine sand. Site 9.A. No.564.

Type 164: Flanged Hole-mouth Jar

29) Jar rim. Orange core, bright pinkish-orange margins and int., pinkish-cream slipped ext.; hard, sand with sparse white grits. Narrow ridge on rim top, trace of incised wavy line on shoulder. Dia. 14 cm. Site 43.H. No.291.
30) Jar rim. Light brown core, bright orange ext. margin, pale orange brown int., light orange ext.; hard, sand, sparse white and black grits. Distinct narrow ridge on top of wide rim. Site 43.H. No.293.

Sasanian (Fig.77)

Type 69: Grooved Rim Jar

1) Jar rim. Pale greenish-brown throughout; common medium, well-rounded sand, black, grey and white grits. Dia. 17 cm. HW.G.47. No.492.
2) Jar rim. Pale brown with pale yellowish-brown slipped surfs.; abundant medium sand, as 1). HW.I.65. No.493.
3) Jar rim. Pale orange core, creamy orange int., pale yellow ext. surface; hard, gritty sand temper, white and abundant dark grits. 2 grooves on rim ext. HW.G.48. No.313.

Type 70: Plain Jar Rim

4) Jar rim. Pale red-brown, pale yellow-brown surfs.; common medium sand, as 1). HW.G.56. No.494.

Type 77: Smeared Ware

5) Body sherd. Pale greenish-brown throughout; abundant medium quartz sand and dark minerals. Irregular finger-smeared ext. surf. HW.I.71. No.502.

Type 78: Sasanian Stamped Sherds (Note: sherd angles arbitrary)

6) Body sherd. Very pale green core and ext. surf., greenish cream int.; hard; sand with abundant dark grits. Smooth ext. surface, gazelle or perhaps goat in low relief. Site 28.E. No.303.
7) Body sherd. Light grey-green core and int. surf., pale green ext.; hard; gritty, sand with sparse white and abundant dark grits, some surf. voids. Stamp of goat with tufted neck and breast, and wide cloven hooves; cross placed above rump. Site 83.C. No.304.
8) Body sherd. Light greenish-grey core and int. surf., pale brown ext. margin, very pale green ext.; hard; sand with dark and white grits. Smooth ext. surf. Circular stamp of stag with flowing ribbon attached to neck. Site 43.K. No.305.
9) Body sherd. Light orange core, creamy-orange surfs.; hard; sand with dark and occasional white grits. Smooth ext. surf., partial circle stamp framed by grooved circle and two curved rows of small circles within. Suggestion of a second stamp below left. Site 61.C. No.306.

Sasanian-Early Islamic (Fig.77)

Type 71: Beaded Jar Rim

10) Jar rim. Pale brown, pale red-brown surfs.; abundant coarse angular grits (grey and white, some calcite). HW.F.31. No.495.
11) Jar rim. Pale brown, very pale brown surfs.; abundant medium sand, as 1). HW.G.59. No.497.

Type 72: Brittle Ware Strap Handle

12) Light grey core, light orange-brown ext. margin, light brown int., orange to red-orange ext.; coarse sand, abundant white grits. HW.F.31. No.307.
13) Dark brown core, red-brown margins, grey-brown int. surf., dark red-brown ext.; coarse temper, abundant white grits. HW.V.113. No.308.

Type 73: Strap Handle with Central Ridge

14) Dark grey core, yellowish-green surfs.; hard; common dark grits often visible on surf. HW.V.113. No.309.
15) Pale red-brown with pale brown ext.; common fine-medium sand. HW.G.180/110. No.499.

Type 75: Coarse Brittle Ware

16) Corrugated jar rim. Pale brown int. half core, bright orange ext. half core and int. surf., brownish-orange ext.; coarse sand, occasional white grits. Pointed corrugations. HW.G.55.
17) Corrugated jar rim. Black core and int. surf., light orange-brown ext.; coarse sand, occasional white grits. Finger-impressed cordon below rim with rounded corrugations below. Dia. 12 cm. HW.I.68. No.316.

Type 79: Honeycomb Ware

18) Body sherd. Pale red-brown, pale greenish-brown surfs.; abundant medium sand, (quartz and dark minerals). Channels formed by finger-smearing; finger-applied strip on ext. Site 43.H. No.501.

19) Sherd of vessel shoulder. Pale greenish-brown throughout; abundant coarse rounded sand with many dark minerals. Wet-smeared finger impressions and channels on ext. Site 143.I. No.667.

Type 136: Green-glazed Ware

20) Low ring base. Pale yellowish green core, pale pinkish-yellow margins; sand; thick crazed green all over, where thin appears yellowish, iridescent surface. Interior groove; rough-edged int. stacker marks, ext. stacker marks unglazed. Site 56.A. No.295.

Type 139: Comb and Slash Decorated Ware

Sub-type 139A:

21) Bowl rim. Cream core, cream to pinkish-orange surfs.; hard; sand with occasional dark and rare white grits. 2 sets of incised lines on rim top, narrow lines follow perimeter, broad slashes radial. Dia. 19 cm. Site 83.B. No.302.

22) Jar rim with handle. Pale brown throughout; common medium sand, includes dark minerals. In addition to comb and slash decoration, triangular notch impressions occur on low raised band on neck. Site 143.B. No.668.

23) Bowl rim. Pale greenish-brown throughout; common medium sand, various minerals. Decoration as for 21. Site 75.B. No.505.

Sub-type 139B:

24) Body sherd. Red-brown, pale greenish-brown surfs.; abundant medium sand, various minerals. Comb-incised band with oblique slashes. Site 67.B or F. No.508.

Early Islamic (Fig.78)

Type 80: Fine Eggshell Handle

1) Very pale brown core, pale green surfs.; sand. Applied pellet on handle upper side. Site 4. No.122.

Type 81: Band-rimmed Jar

2) Jar rim. Pale greenish-grey throughout; rare orange inclusions, common fine planar voids. HW.R.107. No.509.

3) Jar rim. Very pale green throughout; fine sand. Rim apparently folded over. HW.N.81. No.321.

4) Jar rim. Pale red-brown, pale yellow surfs.; moderately fine fabric, occasional large, irregular voids. HW.R.107. No.510.

Type 83: Relief Moulded Ware

5) Jar neck with handle stub. Pale yellowish-green throughout; occasional sand. Band of relief moulding on neck and shoulder. Site 4. No.120.

6) Body sherd. Pale green throughout; sand. Relief moulding on ext. Site 4. No.121.

7) Body sherd. Very pale green core, pale greenish-cream slipped surfs.; fine sand. Relief moulding on ext. Site 4. No.317.

8) Body sherd. Light pinkish-orange core, cream slipped surfs.; fine sand. Relief moulding on ext. Site 4. No.318.

Type 84: String-cut Creamware Base

9) Pale cream throughout; smooth, rare medium sand. Site 4.C. No.10.

Type 123: Tall Slender Handle.

10) Jar rim with strap handle. Pale brown core, pale green surfs.; sand. Site 4. No.127.

11) Pale green throughout; sand. Site 4. No.123.

Type 160: Coarse Red Cooking Ware

12) Jar rim. Reddish-orange core and int. surf., dark red-brown ext.; coarse sand, occasional large inclusions; ext. sooting. Site 4. No.126. [NB a variant on coarse brittle ware].

Type 161: Twin Rod Handle

13) Mid-part of handle. Pale orange core, pale greenish-cream thick margins and surfs., fine sand. Formed of 2 joining rods. Site 4.A. No.319.

14) Handle stub. Pale greenish-cream throughout; fine fabric, rare medium sand. Site 4.A. No.513.

Undifferentiated Islamic (Fig.78)

Type 85: Impressed Relief Ware

15) Jar rim. Buff core, pale orange int., pale orange-green ext.; sparse white grits. 4 horiz. grooved lines with single rows of diagonal slashed impressions in upper and lower sections; roughly triangular impressions on worn central band. Dia. 7 cm. HW.N.81. No.327.

16) Jar rim. Very pale orange-green core, very pale green surfs.; sand with sparse white grits. 3 horiz. grooved lines with 2 rows of short diagonal slashed impressions. Dia. 8 cm. Site 38. No.328.

Type 86: Beaked Jar Rim

17) Jar rim. Pale greenish cream throughout; common medium sand and occasional fine red-brown inclusions. Oblique stabs on ext. HW.M.120. No.520.

18) Jar rim. Pale greenish-cream throughout; rare chaff, rare irregular voids and rare orange or white inclusions. HW.M.121. No.519.

19) Jar rim. Pale orange-cream core, pale yellow-cream surfs.; fine sand. Distinct undercut ridge below top of rim. HW.N.81. No.320.

Type 87: Islamic Flat Base

20) Pale brown, cream surfs.; occasional irregular voids and white calcite medium sand. Rings from string cut or throwing, on underside. HW.F.20. No.521.

Type 89: Islamic Coarse, Gritty Handle

21) Pale red-brown, pale grey-brown core; common large white inclusions. HW.M.121. No.525.

22) Pale red-brown, dark grey core; moderately soft; occasional medium-coarse grits, "cooking pot ware" HW.R.104. No.524.

Type 90: Grooved Rim Bowl

23) Bowl rim (Sub-type 90A). Pale red-brown, cream surfs. Moderately fine with occasional voids and sand. HW.R.107. No.527.

Type 162: Creamware Spout

24) Very pale greenish cream throughout; fine fabric. Site 43.B. No.511.
25) Cream throughout; occasional medium sand and voids. Site 43.B. No.512.

Middle-Late Islamic (Fig.79)

Type 82: Glazed Sgraffito Ware

1) Body sherd. Pale red throughout; common fine sand. Shiny bright green glazed ext. with white slip on lower body beneath transparent glaze; int. bright green glaze with broad, incisions. Site 6.A. No.33.
2) Body sherd. Light brownish-orange throughout; sand, sparse white grits. Yellowish-brown spatter of glaze all over int.; blackened slip below glaze over ext. HW.P. No.332.
3) Ring base. Pale red throughout; rare sand. Very pale yellow slip, covered with clear glaze. One mending perforation. HW.M.123. No.515.
4) Flat base. Brown to greyish-brown; fine fabric, rare fine voids; pale yellow slip covered by clear glaze on int. Slip incised by broad (1 mm) lines. HW.N.82. No.516.

Type 91: Coarse Lid

5) Dark grey core, pale brown ext., orange int.; common coarse chaff. HW.R.107. No.128.
6) Very pale green throughout; coarse, grit and sand, chaff, occasional white grits and voids. Matting impression on base. Dia. 30 cm. Site 34.F. No.334.

Type 92: Rouletted Ware and Related Types

7) Bowl rim. Pale greenish brown; moderately hard, abundant sand. Irregular rouletting on ext. Site 19.F. No.119.
8) Band-rimmed Jar. Very pale brown throughout; fine sand. Rouletting on ext. Site 19.F. No.118.
9) Jar rim. Very pale brown, cream surfs.; moderately fine with fine sand. Regular notch rouletting on ext. Dia. 8 cm. HW.T.109. No.532.

Type 93: Finger-tip Impressed Ware

10) Body sherd. Pale red-brown int. half, pale yellow-brown ext. half; occasional fine-medium sand and planar voids. Deep finger impressions on ext. HW.K. No.536.
11) Body sherd. Pale red-brown, pale brown surfs.; occasional fine-medium sand. Square rouletting (Type 92) and finger impressions on ext. HW.V.112. No.534.

Type 94: Glazed Reddish Ware

12) Bowl base (Type 94C). Red throughout; occasional fine white sand. Pale yellow glazed surf. HW.N.82. No.542.
13) Bowl rim (Type 94A). Red-orange throughout; sand with sparse white grits. Dark green glaze, partially decayed all over int. and rim, white underglaze on ext. Dia. 28 cm. HW.M.122. No.337.
14) Bowl rim (Type 94A). Red throughout; fine-medium sand, occasional planar voids. Bright green lustrous glaze on int., paler green on ext. HW.T. No.537.
15) Bowl base (Type 94C). Pale red-brown throughout; fine sand, rare fine voids. Green and brown splashed glaze over white glaze or slip; all sealed by clear lustrous glaze. Dia. 8 cm. HW.M.122. No.541.
16) Bowl rim (Type 94C) Reddish-orange throughout; sand. Both surfs. glazed, int. to rim top: cream with purple-brown over top; ext.: cream band with light brown at rim edge and over all below, purple-brown splash at rim edge, green patch below. Dia. 22 cm. HW.M.121. No.340.

Type 95: Coarse (Finger-impressed) Jar Rim

17) Jar rim. Orange core and int.surf., reddish-orange ext.; coarse gritty sand and chaff (chaff voids abundant on surf.) with some white grits. Finger impressions at lower rim edge on ext. Dia. 32 cm. HW.T.109. No.339.
18) Jar rim. Pale red throughout; common chaff, occasional coarse grits; very roughly formed. HW.N.B1. No.663.

Type 96: Coarse Impressed Ware

19) Body sherd. Pale red-brown, brown core; occasional chaff, rare sand. Impressed lines and stabbed triangles on ext. HW.R.107. No.546.
20) Body sherd. Pale green, pale brown surfs.; common chaff, occasional coarse white calcite inclusions. Incised lines and stabbed triangles on ext. HW.U.111. No.545.

Type 97: Coarseware Rough Handles.

21) Pale green with pale greenish-brown surfs.; common chaff, occasional coarse white inclusions. HW.R.107. Applied knob on top (similar to Type 98). HW.R.107. No.548.
22) Very pale green throughout; coarse sand and chaff, rare white grits. Pale brown slipped surfs; circular finger impressions on top. HW.R.106. No.335.

Type 98: Handle with Applied Knob

23) Jar with knobbed handle. Dark grey, reddish-grey core, pale red-brown surfs., blackened towards base on ext. Moderately soft, rare chaff, occasional medium grits.("cooking pot ware") HW.T. No.549.

Type 122: Moulded Ware

24) Carinated body sherd. Variagated pale yellow brown, cream surfs.; common medium rounded sand, rare dark minerals. Relief-moulded design on ext. HW.R.107. No.550.

APPENDIX A PART 3:

Table 16.

Concordance of North Jazira Pottery Types (Appendix A, part 1, this volume) and types used during the surface survey of Tell al-Hawa (Ball, Tucker and Wilkinson 1989, Appendix 2).

NJP Type	Hawa Type	NJP Type	Hawa Type	NJP Type	Hawa Type
3	19	34A	58	75	16
4	50	34B	59	77	15
5	51	35	61	81	97
6	20	36	62	83	128
7	21	37	63	85	98
8	22	38	66	86	99
9	23	39	67	87	94
10	25	40	57	88	121-126
11	26	41	68	89	131
12	29	43	60	90	120
13	70	44	64	91	80
14	106	47	30/31	92	81
15	107	48	32	93	82
16	108	49	34	94	83
17	111	51	35	95	84
21	103	52	37	96	85
22	40	53	39	97	86
23	41	56	30/31	98	88
24	42	57	71	102	18
25	44	58	72	103	92
26	45	59	75	104	93
27	47	60	76	105	134
28	48	69	10	107	127
29	52	70	11	111	74
30	53	71	12	112	73
31	56	72	1	113	73
32	55	73	2	114	77
34	58/59	74	4		

APPENDIX B:

Selected Surface Finds from Survey

Figs. 80-81 show small finds from the North Jazira Project which have been assembled to give an impression of representative, but rarely exceptional, finds from the survey. All were collected from surface contexts except those from Sites 66 and 113, which were from the excavated contexts indicated. Although the date indicated comes from their surface context, i.e. from the associated ceramics on a short-range site, this attribution has been checked with published parallels. Additional finds will be illustrated in future publications.

Note: Numbers in [ ] refer to North Jazira Project registration numbers.

Fig. 80

1. Figurine fragment of baked clay. Reddish-orange clay with pale greenish-brown surfaces, occasional white grits and chaff. Head and arms broken. The purple-brown painted stripe forms an open V penetrating between the breasts and a wide band on rear of neck and back. Site 142 A [776]. Probably Halaf.
2. Buttocks of steatopygous female figurine. Of pinkish-orange baked clay with light orange surfaces and tempered with fine chaff and small white grits. Broken at front where presumably the legs extended forward. Site 157 A [818]. Probably Halaf; cf. Merpert and Munchaev 1987, fig. 12.9, (from earlier Halaf levels at Yarim Tepe II).
3. Polished stone celt, heavily worn at cutting edge. Dark greyish-blue with some light blue veining; probably dolerite. Site 162 A [819]. Hassuna or Early Halaf.
4 Drinking horn (or ceremonial rhyton?). Fine fabric, orange, with sparse white grits and occasional mica. Exterior: brown to dark brown paint on white slip. Site 162 B [826]. Hassuna or Early Halaf. (Plate 5.b).
5 Roughly bi-conical sling ball or counter of light orange to brownish-grey fired clay. Site 119 B [725]. Probably Halaf.
6 Perforated mace-head of polished bluish-black basalt with abundant white inclusions. Perforation drilled from both sides. Site 174 D [829]. Probably Uruk.
7 Clay sealing of stamp seal. Pale brown to light grey baked clay with sparse dark grits and chaff voids. Central design: positive raised X with apices extended to form L. One dot in relief between arms. Site 148 A [807]. Late Ubaid/Early Uruk.

Fig.81

1 Tripod grinder of dark bluish-grey vesicular basalt. Site 163 A [822]. Probably Late Assyrian.
2 Hair-ring of thin gold plate, probably over a core of bitumen. Forms part of spiral with slightly flattened terminal points (cf. Maxwell-Hyslop 1971: 67 and pls. 26 and 46d). Site 162 A [820]. Late 3rd millennium BC. (Plate 6.a).
3 Potter's stamp of fired clay; pale brown with yellowish-orange surfaces; grit temper. Pinched at upper end where held. Circular end of stamp (partly broken) is cut by oblique notches to form a "sun motif" (Warburton and Warburton forthcoming). Site 63 B [539]. Probably Hellenistic; less likely Late or post-Assyrian. Plate 6b).
4 Perforated stone pendant from dark grey pebble. Site 113 H, context 67 [741]. Probably Hellenistic or Parthian.
5. Figurine of ?equid, of orange, sandy, baked clay with cream surfaces. Two right legs complete; two left legs, head and tail broken. Site 113 J, context 3, [762]. Probably Parthian.
6. Two-piece moulded clay figurine of baked clay; pale brown fabric with mottled orange surface; occasional brown and white grits and mica. Broken at neck. Body below this point hollow. Details of face obscure but head crowned with pointed helmet. Site 113 K, context 3 [781]. Hellenistic or Parthian.
7. Fragment of stone cross in low relief. In off-white limestone. Central roundel contains Maltese cross, one arm of which is complete. Some chisel marks on upper surface. Probably part of a voussoir or door lintel, perhaps from religious building. Site 129 C [774]. Sasanian/Early Islamic date.
8. Terracotta pipe lamp, complete. Manufactured in two pieces with moulded upper body. Variable orange fabric with light orange to dark greyish-brown surfaces. Traces of burnishing or glaze in places. Site 113 G, context 26 [729]. Hellenistic.
9. Base of blue-grey stone bowl with very smooth interior surfaces. Ground on wheel. Site 113 J, context 98, [808]. Probably Hellenistic.

APPENDIX C

Site Catalogue: Survey Area Sites 1-184

Introduction and Conventions

IDA: Iraq Dept. Antiquities. Where appropriate, reference has been made to the Archaeological Atlas of Iraq (published by IDA): map number and site reference number. It has not been possible to relate every site listed on the IDA atlas to those sampled on the ground because locations on the atlas maps are not sufficiently accurate to make the association certain. In the case of smaller mounds, even where the positions did seem to correspond, the names were not always the same as recorded in the field. Additional subdivision of Hassuna and Halaf wares have been provided by Stuart Campbell where indicated. Although total site areas are quite accurate, estimates of occupation areas for each period are approximate. For locations of sites see Figs.2 and 6.

Abbreviations: N, S, E, W: north, south, east, west; M.: Middle; L.: Late; L.3rd: late 3rd millennium BC.

Sites collected in 1986

1) Tell al-Hawa (Summary only). IDA: map 125, site 46. The largest site in region comprising a main mound c. 31 m high covering 17 ha and outlying lower mounds covering additional 58 ha. Total area 75 ha. All periods represented from Hassuna to Mid/Late Islamic except for Hellenistic. Modern village on lower mound. Reached maximum size in later 3rd and early 2nd mill. BC. Excavated by Warwick Ball for British Archaeological Expedition to Iraq. For detailed description see Ball et al. 1989 and Ball 1990 (a and b).

2) 2.9 km NW of Hawa. Three small mounds to N of enclosed depression. Total area 2.7 ha, max. height 1.5 m (A). Area A: 1 ha of L. Assyrian; Hellenistic and Parthian (trace). B: Parthian (trace). L. Islamic building traces on C.

3) 2.4 km SE of Hawa. Main mound (A) 3.5 m high and c. 3.0 ha. Smaller mound (B) to S cut by canal; Even smaller mounds C and D to S and E. L. Assyrian levels excavated by IDA, 1988. Total area 3.8 ha. A: L. Assyrian and Hellenistic (3 ha); kiln slag common. Mounds B,C and D: L. Assyrian, Hellenistic and Parthian (trace).

4) 1.6 km SW of Hawa. Low mound of total area 2.5 ha rising to max height of 1 m. Low earthen enclosure c. 80 m square to S of main mound (included in total area). Cut by canal; Early Islamic levels excavated by IDA, 1988. Entire area Sasanian/Early Islamic probably to early Abbasid (c. 9th century).

5) 3.6 km E of Hawa. Small mound (Areas A, B and C) of c. 1.8 ha and 2 m high and very low mound (D) to NW. Immediately W of wadi. Ninevite 5 (0.4 ha); L. Assyrian (0.4 ha); Hellenistic (2.5 ha); Parthian (1.0 ha); Sasanian/Early Islamic (0.4 ha).

6) 1.8 km S of Hawa. Two small mounds, A to S and B to N of enclosed depression. Additional low mounds, one with scatter of limestone fragments, to E. Max. height of A, 1.5 m.; total area 2.8 ha. Both mounds Hellenistic and Early- M./L. Islamic. Hellenistic (1.9 ha); Early Islamic (1.4 ha); M./L.Islamic (2.2 ha).

7) 1 km SW of Hawa. Three small mounds: A, B and C, of total area 1.4 ha and max. height 1.0 m. Pottery types problematic but between 6th century BC and 4th century AD. Some Hellenistic and Parthian parallels. Cut by road.

8) 1.2 km NE of Hawa. Complex of low mounds overlooking NE-SW swale or hollow way; outlying very low site to N of swale. Main occupation on Area A (3.9 ha). Sasanian/ E.Islamic (3.9 ha); M/L.Islamic (4.5 ha); Hellenistic and trace of Parthian on B (0.3 ha). B cut by canal and excavated by IDA.

9) Tell Kuran. 4 km NE of Hawa. IDA map 125, site 30. Main mound A: 6.5 ha, 8 m high. Lower mound B extends to NE below village. To E of wadi and supplied with pure water from pumped well. A: Hassuna (0.5 ha); Halaf (0.5 ha); Nin.5 (4.2 ha); Khabur (6.5 ha); M.and L. Assyrian trace; Hellenistic [(6.5 ha), probably over-estimate]; Sasanian/Early Islamic (trace); B: M/L.Islamic (1.9 ha).

10) 5.2 km ENE of Hawa. Twin mounds overlooking swale to W. Main mound A (4.5 ha); subsidiary mound B, and two outlying areas C and D. Area A heavily disturbed by earthmoving vehicles. A: Nin.5 (2.2 ha); Khabur (4.5 ha); L. Assyrian (2.2 ha); B: Hellenistic (1.1 ha); C: M. Assyrian (0.5 ha). Common presence of thick chaff-tempered ware and obsidian on B suggests prehistoric component.

11) 3.6 km SE of Hawa. Complex of mounds covering 7.5 ha with max. height of 3.3 m. Mound A occupied by farmstead. Located immediately W of wadi; two enclosed depressions at W end. Occasional baked bricks. Most of site occupied by Sasanian/Early Islamic (2.3 ha) and M/L.Islamic (3.3 ha). In addition: A: Nin 5 (0.7 ha); L. Assyrian (trace). B: Hellenistic trace. E: Hellenistic (0.4 ha).

12) 5 km ESE of Hawa. Three mounds, A and B to NE and C/D to SW. Total area: 3.6 ha, max. height (A) 2.5 m. Nin.5 on A and C/D; Uruk on A. B is L. Assyrian and Hellenistic. Estimated areas: Uruk (0.8 ha); Nin 5 (1.5 ha); M. Assyrian (trace); L. Assyrian (1.4 ha); Hellenistic (0.6 ha).

13) 3.5 km S of Hawa and immediately S of Mosul road and railway. Elongate mound (A,B,C) overlooking enclosed depression to S. D: lower mound at W end of depression. Total area 4.0 ha; max. height (A at east end: 2.5 m). A,B,C: Nin 5 (2.0 ha); Khabur (trace); L. Assyrian (0.4 ha); Hellenistic (1.0 ha); D: Hellenistic (0.4 ha).

14) 3.5 km SSE of Hawa immediately N of Mosul road. Medium size tell 4.9 ha and 5.5 m high (A and B). Very low mound (C) 300 m to E. A: Uruk (1.9 ha); Nin 5

(3.8 ha); Khabur (3.8 ha); Nuzi trace. B on N toe of main mound, M. Assyrian (trace); C: L. Assyrian (0.3 ha).

15) Mowasha, 4 km SE of Hawa. IDA Map 125 site no.51. Group of 4 mounds: A/B; C,D and F grouped around long N-S enclosed depression (Fig.29) itself cut by trench (E). Village occupies and obscures mounds A/B and F to W. Main mound (D) 1.3 ha and 3.5 m high. A cut by modern excavation (B); Trench E in depression exposed 3 m of archaeological wash containing pottery; overlay relict natural Calcic Xerosol (section in: Ball *et al.* 1989 fig.3). Mound D mainly Nin 5 and Khabur with trace of Uruk. Overall occupations: Nin 5 (1.3 ha); Khabur (1.3 ha); Hellenistic/Parthian (0.6 ha); Sasanian/Early Islamic (2.4 ha); M/L.Islamic (2.5 ha).

16) 700 m SSW of Mowasha (15), 400 m N of Mosul road. Small simple mound 1.4 ha, 2.0 m high. Soil grey and ashy on lower slopes; salt efflorescences common. Flints common. Ubaid (1.4 ha); Uruk (0.7 ha).

17) al-Khubaza, 3.4 km W of Hawa. Mound of 3.0 ha, 4.0 m high, partly obscured by houses of village which resulted in sparse pottery collection. Only L. Assyrian (1.5 ha), and Hellenistic (3.0 ha) represented plus Parthian (trace). Hellenistic prominent on N spur. Other periods probably present but buried.

18) 3.5 km SW of Hawa, 200 m S of Mosul road near al-Botha. IDA Map 125, site 52: Biyada Foqani. Twin mounds of total area 2.5 ha, max. height 3.5 m (A and B). A (to NE): Nin 5 (1.3 ha); Khabur (1.3 ha). B/C (to SW): L. Assyrian (0.9 ha); Hellenistic (1.0 ha). Site partly machined away in 1990.

19) Mounds within and around village of al-Botha 4.5 km SW of Hawa. IDA map 125, site 53: Tell Qarayah al-Botha. Total area of site 19.9 ha; includes 10 enclosed depressions some several metres deep. At least half of the site is Early and M/L. Islamic beneath village. East end of site (C) includes L. Assyrian (0.4 ha) and Hassuna (C+D = 1.0 ha); D cut by N-S drain and partly excavated by IDA, revealing 4 Hassuna and 2 L. Assyrian levels. Main Bronze Age occupation on two mounds A and B at W end of site, each 2.5 and 3.5 ha and 5 m high: Uruk (trace); Nin 5 (6 ha); Khabur (6.0 ha); M. Assyrian on A (1.2 ha).
Overall occupations: Hassuna (1.0 ha) [proto, archaic and standard, Campbell]; Halaf (trace); Uruk (5.4 ha); Nin 5 (6.0 ha); Khabur (6.0 ha); M. Assyrian (1.2 ha); L. Assyrian (1.0 ha); Hellenistic (0.5 ha, c. 300 m to S of main mound); Sasanian/Early Islamic (3.8 ha); M/L. Islamic 11.4 ha.

20) 4 km S of Hawa. IDA map 125 site 54: Qabi al-Biyadir. Prominent mound (A) 2.8 ha, 10 m high on bank of Wadi al-Murr; lower mounds B, C, D to N and E to SE. Lower slopes of A designated as F. S. side of A trimmed by wadi. Total site area 7.9 ha. A: Halaf (1 ha); Ubaid (trace); Nin 5 (2.8 ha); L. 3rd (trace); Khabur (2.8 ha). B and C: M. Assyrian (0.4 ha); L. Assyrian (0.8 ha). F: L. Assyrian (2.7 ha).

21) Ginnig, 3.8 km S of Hawa approx. mid-way between Mosul railway and Wadi al-Murr. 0.4 ha mound, or slightly larger, c. 0.5 m high; occasional outliers of pale greyish soil occur to N and NW. Described in text Chapter 5; excavated by S. Campbell (Campbell and Baird 1990). Early ceramic Neolithic and ?aceramic Neolithic.

22) 4 km SE of Hawa. Elongate mound NW-SE covering 1.6 ha and rising to 2.0 m. Khabur (1.6 ha); M.Assyrian (0.40 ha).

23) Tell Wardan, 5.5 km SE of Hawa. Lloyd (1938) site 19. Prominent mound covering 5 ha and rising to 14 m. Village ranged around N and NE may overlie low outer mounding. From late 1986 summit occupied by small building. When visited in spring 1986 by Tucker, summit showed traces of mudbrick structure 1.2 m x 6 m. Either platform or major wall. Base of slopes to S covered by modern graves. Sited on N-S wadi now partly captured by NW-SE hollow way. A and B (main mound and lower slopes): Uruk (trace); Nin 5 (4.2 ha); Khabur (4.6 ha); Hellenistic (0.4 ha).

24) 400 m SW of Tell Wardan (23). Twin mounds, total area 1.7 ha, max. height 3 m. Each mound c. 100 m diameter. A (to W): L. Assyrian (trace); Hellenistic (0.8 ha). B (to E): L. Assyrian (0.4 ha); Hellenistic (0.9 ha); Parthian (trace).

25) 1.3 km NE of Tell Wardan (23). Small low mound of 1.1 ha and 2 m high. Occasional surface fragments of limestone. Parthian (1.1 ha); Sasanian (0.5 ha).

26) 1.6 km SE of Tell Wardan (23) and 500 m N of Mosul road. Single mound 5 m high trimmed on N by old track along hollow way. Terrace to W and subsidiary area to N (originally Site 36) made total area of 5 ha. Hassuna (1.0 ha),[archaic, standard and Samarran, Campbell]; Ubaid (1.0 ha); Uruk (1.8 ha); Nin 5 (2.6 ha); Hellenistic (0.2 ha); M/L.Islamic trace.

27) 1.1 km SW of Tell Wardan (23), 300 m N of Mosul road. Low mounding max. 1 m high spreading over 1.3 ha. Soils grey, silty. Common fragments of coarse chaff-tempered pottery, rare flints, very rare obsidian. Hassuna [proto and archaic, Campbell].

28) 3.5 km WNW of Hawa. Large complex mound spreading over 7 ha, c. 6.5 m high. 3 enclosed depressions. A: main mound. B: spur to SW has occasional fragments of limestone, kiln slag and gypsum plaster (from Islamic buildings). C: spur and subsidiary mounds to SE. Islamic occupation probably masks extensive earlier levels. Uruk (trace); Nin 5 trace (0.5 ha); Sasanian/Early Islamic (2.0 ha); M/L.Islamic (5.9 ha).

29) 4.6 km NW of Hawa on major hollow way. Initially collected from two small cuts at foot of main mound (in 1986 allocated A and B). C: main mound collected in 1987; D subsidiary S mound collected in 1987 disturbed by machine spoil, some of which pushed to east. Farmstead on S tip of D. Main canal cuts between C and D. Kilns exposed in pit on SW slope of C. Total area 8.9 ha, height of C 6 m. Nin 5 (7.2 ha); Later 3rd (7.2 ha); Khabur (8.3 ha); M.Assyrian [2.2 ha (on D)]; L.Assyrian [2.7 ha (on D)]; M/L.Islamic (trace).

30) 6 km NW of Hawa on main hollow way. Complex of mounds covering total of 5.7 ha and max. height of 3.5 m. Enclosed depression to NW, Main mound A trimmed to N by track along hollow way. Subsidiary mounds B, C, D and E. Another mound to SW occupied by farmstead. Nin 5 and Khabur on A. Uruk and Ubaid on D and E to SE. Halaf (0.7 ha); Ubaid (1.1 ha); Uruk (trace); Nin 5 (1.9 ha); Khabur (3.4 ha); M. Assyrian (0.6 ha); L.Assyrian (1.1 ha); Parthian (0.6 ha); M/L. Assyrian (trace).

31) 500 m N of Bir 'Uqla village. Low mound estimated at 1 m high and 1.8 ha area. Immediately N of project area. Briefly visited in 1986. Pottery included 2 fragments of Sasanian/Early Islamic green glaze, a Parthian stamped sherd and occasional handles of Parthian-Islamic type.

32) 2.5 km N of Abu Hijara (90). Triple mound on major hollow way. Briefly visited in 1986 when Hellenistic sherds noted. Collected in 1989. Total area 2.8 ha, max. height 2.5 m. Mound C to SW yielded Parthian wares and sherds of L. Roman fine brittle ware (Type 100). Standard Hassuna [(Campbell) 0.5 ha]; Halaf (0.5 ha); Uruk (0.5 ha); Hellenistic (trace); Parthian (1.0 ha).

33) 3 km NW of Hawa. Originally recognized in field scatter sample square 288 as a significant amount of Chalcolithic painted pottery and obsidian. This flat site was also exposed in a machine trench 200 m long x 9 m wide 50 m S of 288. Profile described in Ball *et al.* 1989: 8, gives details of occupation levels. Proto and standard Hassuna [(Campbell) 0.5 ha]; Halaf (0.5 ha); Ubaid/Uruk (trace).

Note: areas are nominal figures; they are not based on any surface configuration.

Sites Collected in 1987

34) 1.3 km ESE of Tell Wardan (23). Small prominent mound of 1.1 ha, 4 m high. Weak trace of outer rectlinear enclosure wall to E, obscure to S, N and W. terrace to N. Occasional baked bricks. If this is a multi-period site earlier levels are completely blanketed by Islamic debris. Early Islamic (trace); M/L.Islamic (1.1 ha). Probably the mound of a fortified Islamic building.

35) 3 km NNW of Tell Uwaynat (92). Twin mounds. A/B: 1.8 ha to W; C/D: 1.3 ha to E. Total area 3 ha, 1.5 m high. Hassuna pottery and obsidian (trace) evident from fox holes at east on mound A/B. Kiln slag on C/D. Hassuna (0.5 ha); L. Assyrian (1.8 ha); Hellenistic (1.3 ha); Parthian (0.5 ha). A/B mainly L. Assyrian. C/D Hellenistic.

36) 330 m N of Site 26. 50 cm high mound c. 0.5 ha originally recognized as independent site, later incorporated with 26. Abundant obsidian, common flint; Uruk.

37) 2 km NNE of Gar Sur village (42). Large crescent-shaped mound of 8.6 ha and 4.5 m high. Main mound: areas A/B on summit, C,F and G on lower slopes. D: SW spur; E: SE spur. Wadi to W; enclosed depression to N. Sasanian and Early Islamic notably on area E. Ubaid 1.5 ha; Nin 5 (trace); Khabur (0.2 ha); M. Assyrian (2.0 ha); L. Assyrian (0.4 ha); Hellenistic (0.5 ha); Parthian (trace); Sasanian (2.3 ha); Sasanian/E.Islamic (4.5 ha).

38) 1.5 km NNW of Gar Sur village (42). Elongate mound 2.1 ha, 1.5 m high comprising 5 component mounds. Occasional fragments of undressed limestone on largest mound; rare baked bricks. Shallow wadi to E. L. Assyrian (1 ha); Early and M/L.Islamic (2.1 ha).

39) Khirbet Gar Sur. 1 km ENE of Gar Sur village (42). Group of 3 low mounds to N of road: A, B (cut by drain) and C; also one mound D to S of road, again cut by drain. E refers to cut area through B, F to olive green mass exposed in side of drain in D, G is the upcast from F dumped on the east side of the drain. A: Hassuna (0.9 ha); B: Uruk (1.1 ha); Nin 5 (1.5 ha); C: pottery indeterminate; D: (with F and G) Standard Hassuna and Samarran. Area D, located to the NW of main drain, was excavated by S. Campbell in early 1987. It yielded abundant Hassuna pottery from pedologically altered deposits. The olive green zone exposed in adjacent drain was excavated to depth of 4.5 m. It appears to have been a water-hole infilled with clean-out deposits and Hassuna refuse. Bone from G included 2 pig jaw bones, 2 bovid teeth, various bovid long bones, a small number of human phalanges; 1 bone awl.

40) 2.5 km NE of Gar Sur (42) immediately S of tarmac road. Single elongate mound 2.4 ha in area and 3 m high. Wadi to W. A: summit of mound; B, C, D lower slopes to NE, S,E,W and N spur. Later 3rd millennium pottery most common on D. Ubaid (1.9 ha); Uruk (trace); Later 3rd (trace); L. Assyrian (0.5 ha); Parthian 0.5 (ha).

41) 1 km E of Gar Sur village (42). 1.3 ha simple mound 1 m high. Finds included small stone "eye idol". Ubaid 1.3 ha.

42) Complex of mounds within and to S of village of Gar Sur. IDA Map 125, site nos. 43 and 45. A/B and C mounds 500 m to S of village (2.5 ha and 6 m high). Areas D, E and F to S of these, partly cut by pipe trench. Mounds within village: G to W (prehistoric); G,H,I and J further east and mainly Islamic. Ottoman stone-built well with radial water tanks on edge of enclosed depression W of A; 3 other enclosed depressions within village area. Sited on two wadis that join to S of A/B and C. A/B Khabur, M and L. Assyrian; D, E and F Parthian/Sasanian. Periods overall: Hassuna (0.5 ha); Halaf, (1.0 ha); Nin 5 (trace); L.3rd (trace); Khabur (5.9 ha); Nuzi (0.8 ha); M. Assyrian (0.8 ha); L. Assyrian (2.9 ha); Hellenistic (3.6 ha); Parthian (4.2 ha); Sasanian/Early Islamic (1.5 ha); M/L.Islamic (1.8 ha).

43) Kharaba Tibn 5 km E of Gar Sur village (42). IDA Map 125, site 50; also known as Tell Abu Hajar. Situated in broad valley, therefore inconspicuous from many angles. Large mound extending over total of 21 ha; 16 m high; main mass of mound immediately W of wadi; subsidiary mounds to E. Large limestone fragments common on surface and particular concentration in SE adjacent to mound P on hollow way: possible gateway. IDA excavations on mound summit and to N exposed Khabur levels. Main mound (areas C-I and K) is Bronze Age; B, to east Bronze Age and Islamic; Eastern mounds (J, Q, P and M) mainly M. and L. Assyrian, Hellenistic and Parthian. Overall periods, (areas estimated from maps): Nin 5 (5.5 ha); L.3rd (17.2 ha); Khabur (18.3 ha); M. Assyrian (4 ha). L. Assyrian (0.2 ha); Hellenistic (1.6 ha); Parthian [12.8 ha! (owing to small no. of sherds within a few large collection areas, probably an over-estimate)]; Sasanian/Early Islamic (1.3 ha); M/L Islamic (1.6 ha).

44) 2 km WNW of Uwaynat (92) and 500 m S of Mosul road. 3 low mounds overlooking shallow central depression; total area 2 ha; height 1 m. On mound B to SW limestone fragment with claw chisel marks. L. Assyrian (1 ha); Parthian (1.1 ha); Sasanian/Early Islamic (0.5 ha).

45) 2 km NW of Uwaynat (92) c. 1 km N of railway station. Cut to N by E-W canal. Main mound A, B, C and D rises to 5.5 m. Outlying mounds; E to S, F to W. Excavated by IDA in 1988 through L. Assyrian levels into those of Halaf date. Total area 5.9 ha. Main mound dominantly Halaf and Ubaid with Khabur immediately N of summit and L. Assyrian further N; F to W Partho-Sasanian. Periods: Standard Hassuna and Samarran (Campbell) (trace); Early and Late Halaf (1.4 ha); Ubaid (3.5 ha); Uruk (2.1 ha); Khabur (2.0 ha); M. Assyrian (0.5 ha); L. Assyrian (0.5 ha); Parthian (0.4 ha).

46) 3 km W of Uwaynat (92). Small simple mound 1.3 ha, 2 m high. Collected by quadrats 2 of which subsequently became mixed with Site 48 collection; problematic batches subsequently isolated. Occasional obsidian, common flint; significant presence of Sprig Ware (Type 9). Ubaid (0.7 ha); Uruk (1.3 ha).

47) 3-3.5 km W of Uwaynat (92). A: Low embanked enclosure 50 m E-W, 40 m N-S, 0.7 m high with a ?range of rooms along S side where mounding broader. Early/M. Islamic; cut and disturbed by E-W canal. B: Large complex of mounds mainly of M/L. Islamic date to W of enclosure. Total area 2.3 ha, 2 m high. Parthian (trace on B); Early Islamic (2.3 ha); M/L. Islamic (2.3 ha).

48) 2.5 km SE of Gar Sur village (42): Tell Gar Sur. Prominent tell, 3.2 ha and 11 m high (areas A, B and C) and outlying low mounds D, E, F and G. One enclosed depression. Main mound bulldozed away in 1989. Areas A, B and C dominantly Bronze Age. Halaf to NE at D. E, F, G mainly M. Assyrian, L. Assyrian, Hellenistic and Parthian. Total area 8.0 ha. Trenches on summit of main mound excavated by IDA in 1986 exposed L 3rd and Khabur levels. Halaf (0.3 ha); Uruk (1.0 ha, very approx); Nin 5 (2.1 ha); L. 3rd (3 ha); Khabur (6.1 ha); M. Assyrian (1.7 ha); L. Assyrian (2.7 ha); Hellenistic (2.8 ha); Parthian (0.9 ha); M/L. Islamic (trace).

49) 3.5 km NNE of Uwaynat (92). Twin mounds, A to N predominantly Uruk; crescent-shaped 3.5 ha yielded BRB on E part. and B to S mainly Nin 5; 1.9 ha smaller and more prominent. Total area 5.4 ha, 2 m high. Ubaid (trace); Uruk (5.4 ha); Nin 5 (1.9 ha); Parthian (0.5 ha).

50) 2 km SSE of Gar Sur village (42). Crescent-shaped mound covering 1.6 ha, 3 m high. One enclosed depression. Area A to S; C centre and B to NW. Possible prehistoric chaff-tempered wares at base of slope of B. Nin 5 (1.4 ha); L. Assyrian (0.8 ha); Hellenistic (1.3 ha); Parthian (trace); M/L Islamic (trace).

51) 2.5 km NE of Uwaynat (92). Twin mounds, A to NE; M. Assyrian and L. Assyrian (trace). B to SW; L. Assyrian and Parthian; cut by N-S canal. Total area 5 ha, 2.5 m max. height. M. Assyrian (2.9 ha); L. Assyrian (1.0 ha); Parthian (2.1 ha).

52) 3.5 km NE of Uwaynat (92). Elongate group of mounds on N-S alignment overlooking enclosed depression to E. A, main mound 2 m high. B to N, E, C and D to S. Total area 3.4 ha. Limestone fragments common. B has common flint and chaff-tempered pottery but prehistoric and Chalcolithic diagnostics were rare. Ubaid (0.3 ha); Uruk trace; L.3rd (trace); L. Assyrian (0.6 ha); Hellenistic (1.1 ha); Parthian (0.5 ha); Şasanian/Early Islamic (trace).

53) 3.5 km ENE of Uwaynat (92). Slight mound covering 1.7 ha but only 0.5 m high. Chaff-tempered sherds common, rare obsidian. Upcast from fox-holes also included prehistoric wares. Minor late component. Hassuna (0.9 ha); Partho-Sasanian (trace).

54) 3 km ESE of Gar Sur (92). Extensive pentagonal enclosure formed of low earthen bank. Gap in W bank (?gate) aligned on hollow way. 2 minor gaps in N bank and one in S bank may also have been gates. Mounded area in SE covers 5.9 ha is 2.5 m high; includes 3 enclosed depressions. Hassuna pottery (and some bitumen lumps) found around central depression (K) and on areas D to N and C to S. Remainder of mounding Sasanian/Early Islamic (dominant to W) and M/L.Islamic (dominant to E). Periods: Standard Hassuna (2.5 ha); L.3rd (trace); Sasanian/Early Islamic (3.1 ha); M/L. Islamic (4.2 ha). The enclosure was not dated directly but probably dates from first major phase of occupation; i.e. Sasanian/E.Islamic.

55) 3.5 km ESE of Gar Sur village (42). Elongate mound covering 2.2 ha; 2.5 m high. Enclosed depression to E. Occasional limestone fragments. Nin 5 (trace); Hellenistic (0.5 ha); Parthian (2.2 ha; dominant to S).

56) 6 km NE of Uwaynat (92). Small mound of 3 ha, 3 m high. A: main mound is Hellenistic. B: minor spur to SE is dominantly Parthian. Occasional limestone fragments. L.Assyrian (trace); Hellenistic (2.7 ha); Parthian (0.5 ha); Sasanian/Early Islamic and M/L.Islamic (trace).

57) 5 km ESE of Gar Sur village (42). Small mound (A) overlooking wadi with minor spur (B) to S. Area 1.3 ha; 2.5 m high. Ubaid (0.4 ha); L.3rd mill (trace); M. Assyrian (trace); L. Assyrian (0.2 ha); Parthian (0.4 ha, on B).

58) Tell Warada (IDA map 125, site 68) but Tell Hilawat from local information. 3 km S of Tell Wardan (23), S of Wadi al-Murr. Assymetric mound with steep N-facing slope. A: Crescent-shaped mound with spur to SE (B, C, D). Lower mound (E) to east is Partho-Sasanian. Concentration of later 3rd mill. sherds at base of A within area C. 10-12 Islamic graves on summit of A. Periods: Halaf (trace); Uruk (4.8 ha); Nin 5 (5.0 ha); L.3rd (0.4 ha); Khabur (trace); L. Assyrian (2.5 ha); Parthian (2.7 ha); Sasanian/Early Islamic (2.7 ha).

59) 3.5 km SSW of Tell Wardan (23). Small mound of 1 ha, 2.5 m high. Footslopes to S cut by canal. L.Assyrian more common to N; Sasanian/Islamic to N. Occasional fired bricks. L. Assyrian (0.5 ha); Sasanian/Islamic (trace).

60) 3.5 km NNE of Abu Kula (127). Complex of 7 mounds and 3 enclosed depressions. Largest mound B: 3.5 ha and 4.5 m high is Uruk. Total area 10.6 ha. A to NE is Hellenistic. Periods: Ubaid (1.4 ha); Uruk (4.9 ha); Nin 5 (1.6 ha); L. Assyrian (0.7 ha); Hellenistic (2.0 ha); Parthian (2.2 ha); Sasanian/Early Islamic (0.7 ha). M/L. Islamic (trace).

61) 4 km NNW of Abu Kula (127). Twin mounds A/B to E of, and C to W of enclosed depression. Total area 5 ha, max. height 3 m. Chaff-tempered prehistoric pottery traced at N edge of A/B lower slopes in 1987. In 1989 these recognized as buried levels within drain cut through A/B. Overlaid by Parthian. Mound C dominantly Sasanian. Early Islamic. Hassuna (1.0 ha); L. Assyrian (trace); Hellenistic [0.5 ha (1990 visit)]; Parthian (2.1 ha); Sasanian/Early Islamic (2.0 ha) M/L. Islamic (trace).

62) 3.5 km NW of Abu Kula (127). Small simple mound A/D of 0.7 ha, 2.5 m high, mainly prehistoric. Group of Uruk sherds collected from machine cut to N at B. Parthian recorded from small flat site (C) to E of A/D. Standard Hassuna (Campbell) (0.8 ha); Early Halaf (trace); Ubaid (0.8 ha); Uruk (0.8 ha); Parthian (0.5 ha).

63) 4 km S of al-Botha village (19). Prominent simple mound 2 ha and 5 m high, with small enclosed depression to W. Lower slopes to SW show salt efflorescences. Subdued traces of walls of L. Islamic building of mudbrick probably accounts for small amount of L. Islamic pottery. Surface collection yielded Hellenistic or Parthian stamped sherds as well as a small potter's stamp (Fig.81.3). L. Assyrian more common to N. L. Assyrian (1.2 ha); Hellenistic (2.0 ha); M/L. Islamic (trace).

64) 3.5 km S.of al-Botha (19). Small low mound 1.4 ha, 2 m high. Soil grey on lower slopes. Located near re-entrants of ?recent gullies and wadi headcuts. Ubaid (1.4 ha); Uruk (0.7 ha).

65) 2.5 km SSE of al-Botha (19). Crescent-shaped mound partly surrounding an enclosed depression. A: higher mound to SW. B: spur to NE. Total area 2 ha; 2.5 m high. Stones on S-facing slope of B may be part of well lining. Meagre pottery sample owing to recent ploughing. Hellenistic (1.3 ha); Sasanian/Early Islamic (1.0 ha).

66) Khanijdal East. 3.5 km WNW of Abu Kula (127). Twin mound with shallow enclosed depression and V.low mounding to E. A: to S, 1.4 ha is Halaf. B: N mound of L. Ubaid date. C represents spoil from canal cut that ran E-W through mound B. Cut site B excavated in 1988 (see chapter 5). Total area of site 2.8 ha, max. height 1.5 m. Periods: Hassuna (trace on A). Early and Late Halaf (1.4 ha); Ubaid (1.9 ha). The Ubaid is L. Ubaid and occupation may have continued into the early Uruk.

67) Khanijdal village. Large complex mound within small village of Khanijdal some 6 km W of Abu Kula. Total site area 10.6 ha, 10 m high; 4 enclosed depressions. Main mound A has extensive area of L. Islamic buildings with gypsum mortar; area 80 m x 80 m. This may be the khan. Also common baked bricks. Central depression to W of A. Uruk pottery on E to SW. Partho-Sasanian on F and G to W and NW. Mound I, to S, appears Islamic. Obviously the Islamic, although considerable, may blanket a significant amount of earlier occupation. Halaf (trace); Ubaid (1.1 ha); Uruk (2.6 ha); Parthian (1.0 ha); Sasanian/Early Islamic (4.8 ha); M/L. Islamic (6.0 ha).

68) 1.3 km SE of Khanijdal village (67). 3 low mounds extending over 2.5 ha and rising to a mere 0.5 m. Evident as area of pale greyish mounding a little to W of relict wadi. Common chaff-tempered wares. Proto and standard Hassuna (Campbell) (2.3 ha).

69) On rising ground 3.5 km W of Abu Kula (127). Triple mound forming crescent around S and W of re-entrant depression. Enclosed depression to S. Total area 10.8 ha, 3.5 m high. A: highest mound. B: lower mound to E. C/D lower mounds to NW. E: gentle NW-facing slopes. In 1989 small, low Uruk site recognised at F to SW. Large fragments of limestone occur on summit of A and slopes of B. In 1988/89 N-S drain cut between A and B. Field notes suggest mound A dominantly L. Assyrian but pottery counts suggest that Hellenistic is dominant: Uruk (0.5 ha);

M. Assyrian (0.8 ha); L. Assyrian (0.8 ha); Hellenistic (7.5 ha); Parthian (1.0 ha).

70) 1.7 km NNW of Khanijdal village (67). Small simple mound adjacent to wadi. 1.5 ha; 1.5 m high. Meagre collection from A and B on mound, supplemented by collection from C made along adjacent wadi cut. Hellenistic (1.5 ha); Parthian (0.7 ha); Islamic (trace).

71) Tell Hamide, 3 km W of al-Botha village (19). Extensive triple mound covering at least 11.2 ha, 7 m high. Enclosed depression to E. Main mound to SW excavated on summit and east slopes by Paul Zimansky and Elizabeth Stone. Smaller mound (A) to E. cut by N-S canal. Northern mound (B) also cut and extensively disturbed. Disturbed areas along east and NE examined in 1987 yielded Hellenistic and Middle Assyrian occupation; tripod grinder from B. Preliminary estimated occupations: Halaf [0.5 ha (trace)]; Nin 5 (0.5 ha); L.3rd (1.0 ha); Khabur (5.6 ha); Nuzi (5.6 ha); M. Assyrian (5.6 ha); Hellenistic (0.5 ha). These figures being partly based upon the area of the main mound (C) are arbitrary and should be amended in the light of more detailed surface collections of Zimansky (forthcoming).

72) 6 km NW of Hawa. Single mound covering 3.1 ha, 2 m high; cut by one canal and one drain, both N-S. Collection areas: A: along W canal (mainly Halaf); B: along E drain (mainly Hassuna); C: W slopes; D: central area between canal and drain. E: small area of cut and upcast within D. Site re-examined by Campbell in 1989 who demonstrated that occupation had progressed from late Hassuna in the E, through dominantly early Halaf around the summit to late Halaf and later in the W. Note: collection also yielded a significant Ubaid and Uruk presence, mainly in the W. Standard Hassuna and Samarran (2.0 ha); Early and L. Halaf (2.0 ha); Ubaid (1.0 ha); Uruk (0.8 ha); Nin 5 (trace).

73) 7 km NW of Hawa, 3.5 km NE of Abu Hijara (90) and near Bir Uqla village. Twin low mounds covering total area of 3.2 ha, rising to 2 m; enclosed depression to NW. S mound (A) almost entirely destroyed by main canal; common baked brick, also long bones (human?) suggest presence of burials; traces of metalwork in disturbed soils. B undisturbed. Fragment of M/L. Assyrian tripod grinder. Periods: Khabur (1.6 ha); M. Assyrian (1.6 ha); L. Assyrian (2.4 ha); Hellenistic (1.7 ha).

74) 4.5 km W of al-Botha (19) on W bank of wadi. Small prominent mound of 2.3 ha, 3 m high. Main mound A/B is predominantly Khabur and L. Assyrian. Pottery in wadi designated C. D: small low area to E of wadi mainly Hellenistic and Parthian. Uruk (0.5 ha); Khabur (2.0 ha); L. Assyrian (1.0 ha); Hellenistic (1.2 ha); Parthian (0.3 ha). Excavations by IDA in 1988 exposed Khabur levels.

75) 4 km WNW of al-Botha village (19). Low mound comprising A: to E, 1.3 ha, 1 m high, Parthian and Sasanian/E.Islamic. B: extensive low area mainly Sasanian/E.Islamic. C: Low area of 0.7 ha to NW; disturbed by machines. L.Uruk, abundant BRBs. Periods: Halaf (trace); L. Uruk (0.7 ha); Parthian (0.7 ha); Sasanian/Early Islamic (3.4 ha); M/L. Islamic (trace).

76) 1 km S of Tell Talab (91). Small 1.9 ha mound, 2 m high. Main mound subdivided into A to N and B to S. Outlying grey ashy area C to W and D to S. Poor visibility due to recent ploughing; rather sparse collection. Uruk (0.4 ha); L 3rd (0.5 ha); L. Assyrian (1.0 ha).

77) 5 km NW of Hawa on undulating upland overlooking wadi. Very low poorly defined Parthian occupation covering 0.6 ha. One or two surface stones and sparse pottery.

78) 3 km to E of Abu Hajira (90). Small low mound of 1.2 ha and 0.5 m height. Some grey ashy patches, occasional surface limestone; a few flints and painted prehistoric/Chalcolithic sherds. Poor visibility. Halaf (1.2 ha); Hellenistic/Parthian (0.6 ha).

79) 2.5 km SE of Abu Hajira (90), immediately N of main Mosul road. Small crescent-shaped mound of 2.3 ha and 1 m high; sub-divided into 3 sub-mounds. Enclosed garden to E; modern building on SW. Nin 5 (trace :1 pedestal base); L. Assyrian (2.3 ha); Parthian (trace: diamond stamp).

80) 1.2 km SE of Abu Hajira village (90). Immediately N of main Mosul road; framed to W by vegetable garden. 3 m high. Nin 5 apparently present on all 3 sub-mounds. Hellenistic/Parthian dominant on C to W. Occasional limestone fragments. Periods: Nin 5 (2.8 ha); L. Assyrian (0.6 ha); Hellenistic (0.7 ha).

81) 1.5 km NW of al-Botha village (19). 1.7 ha simple mound, 1 m high. Occasional flint, more common on N part of site. Standard Hassuna [Campbell] (1.7 ha); Early Halaf (1.7 ha); Ubaid (1.7 ha).

82) 2 km NW of al-Botha village (19). 0.7 ha simple mound 0.5 m high. Obsidian common; 1 stone pounder noted. Uruk (0.7 ha).

83) 2.5 km NW of al-Botha (19). Group of 3 moderate-sized mounds around central enclosed depression. A to N, 3 m high multi-period with traces of Halaf, Ubaid, Khabur and L.Assyrian only poorly visible because of burial beneath Sasanian/Early Islamic deposits. B to SW, C to E, mainly Sasanian/E.Islamic. 2 enclosed depressions. Total site area 5.7 ha. Halaf (1.0 ha); Ubaid (0.5 ha); Uruk (trace: 1 BRB from A); Khabur (trace); L. Assyrian (trace); Hellenistic (1.1 ha); Parthian (0.5 ha); Sasanian/Early Islamic (2.2 ha).

84) 2 km WSW of al-Botha (19) Small simple mound 0.8 ha, 1 m in height. Common flint, obsidian rare. Late Uruk, which included 6 BRB sherds, concentrated in NE corner. Ubaid (0.8 ha); Uruk (0.8 ha).

85) 1 km W of al-Botha village (19); 0.8 ha, 1 m high. Obsidian and flint common. Uruk (0.8 ha).

86) Tell al-Hilwa, 1.5 km SW of al-Botha (19). Simple mound of 1.4 ha and 2 m high. Cut in 1988 by E-W canal and road. Originally recognized as mainly Halaf and Nin 5, with only a trace of Ubaid and Uruk. Site partially excavated in 1988 (see Chapter 4) with result that significant Uruk including L. Uruk occupation was exposed. Periods: Halaf (1.0 ha); Ubaid (trace); Uruk (1.4 ha); Nin 5 (1.0 ha); Hellenistic (trace).

87) 3 km WSW of al-Botha (19). Crescent-shaped mound fringing S part of enclosed depression. Total area 2.8 ha, 3 m high. Nin 5 apparently present on all 3 sub-mounds. Hellenistic/Parthian dominant on C to W. Occasional limestone fragments. Periods: Nin 5 (2.8 ha); L. Assyrian (0.6 ha); Hellenistic (0.7 ha).

88) 1 km NNE of Tell al-Samir. 0.8 ha mound only 0.5 m high. [Originally Site 88 was allocated to a mound N of Khirbet 'Aloki (113) but this proved to be part of a natural wadi ridge].Hassuna (0.8 ha).

89) 4 km W of al-Botha on N-S wadi. Prominent tell (areas A and C) of >4 ha, 13 m in height; comprised of Halaf and Ubaid levels capped by Uruk (including BRBs). B: low 1.8 ha mound to the N which appears to be mainly Uruk with some Ubaid. E-W canal disturbed S part of B and at least 20 BRBs counted in disturbance. Area A/C bulldozed in early 1990. Hassuna (0.5 ha); Halaf (0.5 ha); Ubaid (2.7 ha); Uruk (5.8 ha; includes L.Uruk).

Sites Collected in 1989-90

90) Tell Abu Hajira. Prominent mound of 6.1 ha and 15 m high immediately N of village and c. 1 km NE of the camp of the Chinese engineers. Enclosed depression to W. Only

main mound (A) collected: This comprised 2 sub-mounds, the higher (A) to the W and a lower ridge-like mound (B) to NE. Low mound partly within village, not collected. Total site area 7.2 ha. Ubaid (1 ha); Nin.5 (6.1 ha); L. 3rd (6.1 ha); Khabur (6.1 ha); Parthian (1.0 ha).

91) Tell Talab 3 km ESE of Tell al-Samir (93). Prominent mound (A) rising to some 16 m with extensive spread of lower mounds to W, and lower mounds of complex topography to E. Total area 19.9 ha; 5 enclosed depressions. Much of the site is under modern village and this includes the M/L Islamic site to the E. Mound B, to SE, is a square structure with Early Islamic pottery. Bronze Age occupation dominates on high mound; Khabur and Akkadian pottery also present on lower W mound. Rough area estimates: Uruk (5 ha); Nin 5 (5 ha); L. 3rd (7.5 ha); Khabur (10 ha); Early Islamic (0.25 ha); M/L Islamic (4.8 ha).

92) Tell Uwaynat. IDA Map 125, site no.67. Small c. 3 ha mound, c. 8 m high at W end of village by railway and outside project area. Although extensive low mounding occurs it is beneath modern village. Nin 5 (1.5 ha); L. 3rd (1.5 ha); Khabur (3.0 ha).

93) Tell al-Samir. IDA Map 125, site 47. Very extensive site covering 28 ha with a large central mound (A) c. 150 m diameter and 24 m high. Morphologically the 450 m diameter mound that immediately surrounds the high mound appears to belong to the main Bronze Age occupation and the limited area of it examined also had a scatter of 3rd and early 2nd millennium sherds. Not all outlying mounds could be collected but mounds C and B to the SW, both cut by N-S drain, were respectively L.Assyrian and Parthian. Most of mounding lay below village which, due to recent tribal conflict, could not be collected for long. Estimated areas: Nin 5 (10.0 ha); L. 3rd (19.0 ha); Khabur (19.0 ha); L. Assyrian (2.5 ha); Parthian (2.2 ha); M/L Islamic (1.0 ha). Other periods not known.

94) 3.5 km S of Tell al-Samir (93). Two mounds (A and C; A prominent and 7 m high) occur 300-400 m to N of 2 lower mounds (B and D). Total area 8.9 ha. A: L. Assyrian and Hellenistic; C: low Parthian mound; B: Hassuna, Halaf and Ubaid; D: (beneath farmstead) Uruk. Areas: Standard Hassuna (2.8 ha); Halaf (2.8 ha); Ubaid (1.4 ha); Uruk (1.5 ha); L. Assyrian (2.9 ha); Hellenistic (2.9 ha); Parthian (1.7 ha).

95) 7.5 km S of Tell al-Samir (93). Complex mound covering 4.7 ha and max. height 3 m; 2 enclosed depressions. C: to NW cut by canal, Hellenistic; A and B: to SE, complex of 3 contiguous mounds, L. Assyrian and Parthian; Very small SW mound indeterminate L. Assyrian-Parthian. Drain cut through central depression in 1989. L. Assyrian (1.4 ha); Hellenistic (1.8 ha); Parthian (1.4 ha).

96) Tell Ghubain 5 km ESE of al-Gana village. IDA Map 125, site no.107: Kharaba Tarafa. Sited immediately W of meandering wadi. Prominent mound rising to 13 m; total area of 5.4 ha. Enclosed depression to S. Main mound (A) Halaf, Ubaid and Khabur, with Hellenistic on SE slope; bench-like mound (B) to E is L. Assyrian and possibly post-Assyrian. Bench-like mound (C) to S has Halaf beneath and M/L. Islamic over top. Standard Hassuna (trace); Halaf (late) (2.3 ha); Ubaid (2.3 ha); Khabur (1.0 ha); L. Assyrian (1.5 ha); Hellenistic (0.6 ha); Parthian (0.6 ha); Sasanian-Early Islamic (0.25 ha); M/L. Islamic (1.2 ha).

97) 4 km ESE of al-Gana. 1 ha simple mound, 1.5 m high. Standard Hassuna [(Campbell) 0.5 ha]; Early Halaf (1.0 ha).

98) 3.5 km SE of al-Gana. 1.5 ha simple mound, 1.5 m high. Early and Late Halaf [(Campbell) 1.5 ha].

99) 5.5 km SE of al-Gana. IDA Map 125, site 121. Tell Bahri al-Shamal or Tell Zana'a. Extensive ridge-like mound complex covering 9.5 ha and with max. height of 10 m. Prominent conical mound (A) mainly Khabur, flanked by lower Uruk and L. Uruk mounds to east and NE (E and F). Large tabular mound (B and C) to W of conical mound is mainly M. and L. Assyrian (includes Palace Ware); trace of L. Islamic building on top. Isolated W mound (D) Hellenistic. Uruk (1.6 ha), Khabur (1.0 ha); M. Assyrian (3.8 ha); L. Assyrian (3.8 ha); Hellenistic (0.7 ha).

100) 3 km NE of Hawa on line of main canal and road which have cut and disturbed site. Common large pieces of stone litter surface, some dressed. At least 12 were of 50-70 cm long axis; they included bedded sandstone, basalt but were predominantly limestone. They appear to have come from a major Parthian building. Enclosed depression to W. Site 1.3 ha and 1.5 m high; all Parthian.

101) Mithlai, 2.3 km WNW of Tell al-Samir (93). Main area A: 2.2 ha, 4 m in height, cut by E-W drain to N. Excavations by IDA in 1987 revealed several phases of major mud brick L. Assyrian buildings with walls standing to 1.5 m. L.Assyrian kilns and part of potter's yard exposed in NE trenches. These included fired clay pipes forming a pipeline to a ?well. Some Hellenistic sherds on S part of A. B: Hellenistic, also excavated by IDA. Enclosed depression to SW of A. Subsidiary mounds to N not visited. L. Assyrian (2.2 ha); Hellenistic (1.0 ha).

102) Khirbet Hawas. 2 km ESE of Tell al-Samir (93). Irregular complex of low mounds covering 2.2 ha; 2 m high. 3 enclosed depressions. Excavated in 1987 by IDA. M/L. Islamic.

103) 2 km SW of Tell Wardan (23) and immediately S of railway. 0.8 ha, 0.8 m high. One or two fragments of limestone on surface. Standard Hassuna [(Campbell) 0.8 ha]; Later Halaf (0.8 ha).

104) Tulul al-Biyadir, 5.5 km SE of Tell al-Samir (93). IDA Map 125, sites 80-90. Complex of mounds extending over 800 m E-W and 550 m N-S, with intervening shallow depressions. Excavation by BAEI in 1988 demonstrated the mounds to be upcast, apparently from quarrying (see Chapter 2). Not dated but probably in range 1000 BC to 1000 AD.

105) 4.5 km SE of Tell al-Samir (93). 3 mounds with shallow enclosed depression to E. Total area 3.3 ha; max. height 3 m. M. Assyrian (0.8 ha); L. Assyrian (1.5 ha); Hellenistic (1.5 ha); Sasanian-Early Islamic (0.25 ha).

106) 4.5 km S of Tell al-Samir. IDA Map 125, site nos. 80-90. Irregular poorly defined scatter of low mounds extending over 1 km E-W and 600-700 m N-S. Extensive enclosed depressions spread between mounds. Although almost certainly a quarrying area comparable to Site 104 to the E, at Site 106 the mounds are smaller but the excavated areas are more extensive. This implies that less overburden was removed and that the quarried material (?gypsum) was at a shallower depth to the W. Not dated.

107) 5.5 km ENE of al-Gana. Small twin mounds with enclosed depression to SE; 1.6 ha, 1.5 m high. Trimmed by canal to W. Hellenistic (0.9 ha); Parthian (0.7 ha on SE mound:B); Sasanian (0.5 ha).

108) 3.5 km E.of al-Gana. Complex of 4 mounds of total area 5.4 ha and 2.5 m high. E: northern mound; A,B,C: central complex includes foundations and baked bricks of L. Assyrian building where cut by E-W canal. D: Prominent mound in SW, mainly Hellensitic. Periods: Khabur (0.5 ha); M. Assyrian (3.3 ha); L. Assyrian (3.3 ha); Hellenistic (1.1 ha); Parthian (1.6 ha); Sasanian-Early Islamic (0.25 ha).

109) 5.5 km SW of al-Botha (19). 3 mounds around an enclosed depression. Total area 1.8 ha; height 2 m. L. Assyrian (0.6 ha); Parthian (0.5 ha); Sasanian (0.5 ha).

110) 6.5 km E of al-Gana. IDA Map 125, site nos. 99 and 100: Kharaba al-Qasimiyah or Tell Madari. Extensive complex

of mounds on opposite sides of meandering wadi. A, B and C to W occupy c. 4.6 ha and are 4 m (max.) in height. Due to poor artifact visibility these never yielded sufficient diagnostics, but M. and L. Assyrian types were most common. The highest mound (A) has remains of L. Islamic mud-brick walls on top. D, E and F on east side of wadi, form extensive area (3.9 ha) of low mounding with 2 enclosed depressions. 100 m square embanked enclosure (E) occurs at east edge of site. D, E and F all well-defined Sasanian/Early Islamic. Total site area 8.6 ha. Periods: M. Assyrian (3.5 ha); L. Assyrian (trace); Parthian (trace); Sasanian/Early Islamic (3.9 ha); remainder of occupation not known.

111) Al-Morrah. within village of same name, 2 km W of Khanijdal village. A: main mound, mainly beneath houses of village; covers 4.5 ha and is 6 m high. Pottery although abundant, is fragmented. Main diagnostics Halaf and L. Assyrian. B: Smaller Hellenistic mound to S cut by E-W canal. Two smaller mounds to NW not collected. 2 enclosed depressions. Periods: Halaf (1.0 ha); L. Assyrian (2.0 ha); Hellenistic (0.9 ha). Other periods may be present, but went unrecognized.

112) 2.2 km W of Khanijdal (67). Simple mound of 1.6 ha and 1.5 m high. Located on relict wadi. Standard Hassuna [(Campbell) 0.8 ha]; Ubaid (1.6 ha).

113) Khirbet 'Aloki. 3.5 km NW of Khanijdal village (67), 1.5 km NW of al-Morrah. 1.3 ha and 3 m high. Small pair of mounds, with a yet smaller mound to W. Cut by E-W canal and excavated by John Salvatore for the British Archaeological Expedition to Iraq in 1989. The main S mound (A) included Ubaid (unrecognized during survey), L. Assyrian, Hellenistic and Parthian. N mound (B) L. Parthian or Early Sasanian. For summary of sequence see Chapter 8. Ubaid (0.7 ha); L. Assyrian (1.0 ha); Hellenistic (1.4 ha); Parthian (1.4 ha); Sasanian (0.25 ha).

114) 4 km WNW of Khanijdal (67). Low elongate mound covering total of 2.1 ha; 2 m high. Shallow enclosed depression to E of A. Early Hassuna and Halaf on N sub-mound, Ubaid (together with more flints) on S sub-mound. Proto, Archaic and Standard Hassuna [(Campbell) 2.1 ha]; Halaf (1.5 ha); Ubaid (1.0 ha).

115) 3.5 km SW of Khanijdal (67). Moderately large site comprising double mound (A) surrounded by small mounds B and C (to SE), D (to S), and E (to east). Total area 4.5 ha; max. height 5 m. 3 enclosed depressions. S mound (D) cut by E-W canal. Mound A: Uruk, M. and L.Assyrian, B and C (to SE): Hellenistic, Parthian and Khabur. E: Sasanian. Periods: Uruk (2.0 ha); Khabur (1.0 ha); M. Assyrian (2.0 ha); L. Assyrian (2.0 ha); Hellenistic (2.0 ha); Parthian (2.0 ha); Sasanian (0.6 ha).

116) 4.5 km WNW of Khanijdal (67). Very small mound on E bank of meandering wadi. 0.5 ha and 0.8 m high. M/L. Islamic.

117) 5.5 km WSW of Khanijdal (67) on bank of meandering wadi. Small, simple mound of 1.1 ha, 0.5 m high. Proto, Archaic and Standard Hassuna [(Campbell) 1.1 ha].

118) 5 km SW of Khanijdal (67). Khirbet al-Akhwain. Comprises large prehistoric mound (A,B,C,E,F) to the N and covering 5.7 ha and 4 m in height plus small 0.8 ha S mound (D) surmounted by remains of L. Islamic building. B/C cut by N-S canal/road (to W) and E/F by drain (to E). Western part of main mound (B/C) mainly L. Ubaid; the upcast included a single fired clay spectacle idol (found by IDA staff). The eastern part (E/F), which was mainly Uruk, yielded a single BRB. Hellenistic on top of A. Periods: Ubaid (late) (3.0 ha); Uruk (3.0 ha); Hellenistic (1.0 ha); Sasanian (trace); M/L. Islamic (0.8 ha).

119) 2.5 km NNW of Abu Kula (127). Simple mound of 0.8 ha and 1 m high, with very low site to E. Total area 1.7 ha. Cut by N-S canal which showed developed soil over Halaf cultural deposits. Proto Hassuna [(Campbell) 0.5 ha]; Later Halaf (0.8 ha); Ubaid (0.5 ha); Uruk [0.5 ha (from S part of mound in area of pits)]; traces of Parthian to E.

120) 4.5 km W of Khanijdal (67). Small pair of mounds on opposite banks of meandering wadi. Main occupation on E mound (B). Total area 0.8 ha; 3 m in height. Hellenistic (0.8 ha); Sasanian (trace).

121) 3 km WNW of Khanijdal (67). String of 3 small mounds aligned N-S and straddling wadi. Northernmost mound (A and B), of uncertain but perhaps post-Assyrian date, is cut by N-S drain. Main central mound (C and D): Khabur, M. and L. Assyrian and Hellenistic. In addition slag from a kiln exposed in pit on W side. E to S, Parthian-Sasanian. Total area 2.8 ha, max. height 4 m. Khabur (1.0 ha); M. Assyrian (1.6 ha); L. Assyrian (1.6 ha); post-Assyrian (0.6 ha); Hellenistic (1.6 ha); Parthian-Sasanian (0.6 ha).

122) 3 km S of Khanijdal (67). Small simple mound of 0.8 ha and 0.8 m high. Ubaid (0.5 ha); Uruk (0.8 ha).

123) al-Kibar. IDA Map 124, site no.83: Kharaba al-Kabir. Small prominent mound within this extensive village. Area c.1.8 ha; c. 7 m high. Only briefly visited because outside project area. The incomplete record included: Ubaid (1.8 ha); Uruk (0.8 ha); Khabur (1.8 ha).

124) 4 km SW of Khanijdal (67). Small simple mound, 1.4 ha and 1 m high. Uruk (1.4 ha).

125) 2.8 km SSE of Khanijdal (67). Group of three mounds on fringing rolling hills (A to N, B to W and C to SE). Cut by E-W canal. Hellenistic (1.5 ha); Parthian (1.5 ha).

126) 1.3 km SE of Tell al-Samir (93). Complex group of low mounds occupying total of 3 ha; max. height 2 m; 2 enclosed depressions. The higher N mound (A) trimmed by E-W canal. A,B,C and D: crescent-shaped mound to W. E and F: elongate mound to east. Periods: Khabur [(but unusual unpainted forms) 1.0 ha]; M. Assyrian (0.5 ha); L. Assyrian (0.5 ha); Hellenistic (1.5 ha); Parthian (1.5 ha); Sasanian (trace).

127) Abu Kula. To S.of village and overlooking wadi. IDA Map 125, site 95. 15 m high main mound (A) with tabular lower mound (B) extending to N. This is truncated to N by steep slopes and form and outcropping large stones suggests a defensive wall. Similar stone blocks on NW side of high tell suggest an outer wall or gate. Low mound (C) extending to E increases site area to c. 12.5 ha; virtually all of this Bronze Age. Some smaller later mounds to W near wadi not collected. Rough estimates: Nin 5 (5.0 ha); Later 3rd (10.0 ha); Khabur (10.0 ha); Mid/Late Islamic (1.0 ha).

128) 1.8 km N of Abu Hajira (90) on W bank of wadi. 1.8 ha simple mound, 1.5 m high. Late Assyrian (1.8 ha).

129) 5 km SE of al-Gana. 3 mounds around central re-entrant depression. On major NW-SE hollow way. A,B and D: larger W mound Parthian and Sasanian. E: smaller east mound Sasanian and Early Islamic; C: small mound to S. Total area 2.2 ha, max. height 1.5 m. Parthian (1.3 ha); Sasanian (1.6 ha); Sasanian/Early Islamic (1.6 ha). Yielded limestone fragment with cross in low relief (Fig.81.7).

130) 3 km NE of Tell al-Samir (93) and immediately N of Mosul road. Single large mound (A,B) c. 3 ha and 3 m high overlooking enclosed depression to E. Minor Hellenistic mound (C) to N. Modern farmstead immediately to NW. On A and B painted prehistoric pottery was eroding out of middle of N slopes. Parthian scatter on ridge apex to W. Periods: Standard Hassuna [Campbell (0.5 ha)]; Halaf (1.0 ha); Uruk (0.5 ha); L. Assyrian (2.0 ha); Hellenistic (0.5 ha); Parthian (1.0 ha); Sasanian-Early Islamic (0.25 ha).

131) 2.2 km NE of Tell al-Samir (93). Small mound (A), elongate to E (area B); 1.1 ha and 2 m high. Although apparently a simple mound, the subtler features and surface pottery suggests it comprises 2 mounds. Halaf (0.9 ha); Ubaid (0.9 ha); Uruk (0.5 ha); Later 3rd (0.9 ha); Khabur

(0.9 ha); M. Assyrian (0.5 ha); L. Assyrian (0.9 ha); Hellenistic (0.9 ha).

132) 4 km NNE of Tell al-Samir (93). Total area 4.8 ha, 2 m high. Complex of mounds comprising an elongate low mound (A,B) and 4 smaller mounds. The northernmost, near a modern farmstead, was not collected. East end of D cut by N-S canal and road. C: mound of greyish soil yielded Ubaid and Uruk sherds. Periods: Ubaid (0.6 ha); Uruk (0.6 ha); Khabur (1.1 ha); L. Assyrian (1.1 ha); Hellenistic (trace); Parthian-Sasanian (trace).

133) 6 km SE of al-Gana. Small simple mound of 1.7 ha and 1 m high. Located on relict wadi. Proto, Archaic and Standard Hassuna [(Campbell) 1.7 ha].

134) 6.5 km SE of al-Gana, 1 km NE of Site 133 on same relict wadi. Small mound (A) with steep N facing slope and "tail" (B) extending to S. Hassuna crops out towards base of N slope and on "tail". 1.7 ha, 2.5 m high. Proto Hassuna [(Campbell) 1.5 ha]; Hellenistic (1.0 ha); Parthian-Sasanian (0.5 ha); Sasanian-Early Islamic (0.25 ha).

135) 8 km SE of al-Gana on S edge of project area. Medium-size mound (A) with crescent-shaped mound to NW (B and C: Islamic) curling around an enclosed depression. Total area 3.5 ha; 4.5 m high. Bulk of main mound has L. Assyrian pottery scatter, with some Parthian-Sasanian. L. Assyrian (2.3 ha); Parthian (trace); Sasanian (1.0 ha); M/L. Islamic (0.6 ha).

136) 8 km SE of al-Gana and SW of Site 135 along S side of project area. Elongate mound, only briefly visited; 2.1 ha, 4m high. Partial record only: Uruk (2.1 ha); Khabur (2.1 ha).

137) 2.5 km SSE of al-Gana. Small simple mound of 1.1 ha; 1.5 m high. Uruk (1.1 ha).

138) 3.5 km S of al-Gana. IDA Map 125 site 107: Kharaba al-Kabeba. A,B: large elongate mound, dominantly M. and L. Assyrian with traces of Khabur and Uruk, probably buried. Outlying smaller mounds to N (from S to N): E: Hassuna; C: Hellenistic; D: Parthian. One small enclosed depression to east of D. Total area 6.3 ha; 4 m high. Periods: Proto-Hassuna [Campbell (0.3 ha)]; Uruk (0.5 ha); Khabur (0.5 ha); M. Assyrian (4.2 ha); L. Assyrian (4.2 ha); Hellenistic (0.9 ha); Parthian (0.5 ha); Sasanian-Early Islamic (0.25 ha).

139) 1.5 km SSE of al-Gana. Two mounds: A: simple mound to E. B/C: a double mound coalesced into one. Situated by a major NW-SE hollow way. Periods: Archaic Hassuna [(Campbell) 0.8 ha]; Early Halaf (trace); Uruk [2.7 ha (including significant quantity of L. Uruk)]; Hellenistic (2.7 ha); Parthian (2.7 ha); Sasanian (2.7 ha).

140) Tell Mana'a; 1.5 km ENE of al-Gana. IDA Map 124, site 57. Large prominent mound (A), 13 m high, with ridge extending to north (B,C). High mound (A) with contiguous mound (E) to east forms the nucleus of the Bronze Age centre of some 7-8 ha. Dominant occupation on this was Khabur but there were traces of L. 3rd millennium fine wares on the high mound (A). E yielded some L. 3rd millennium forms including a Syrian grooved rim jar (Kurban Hoyuk Jar 18; Algaze 1990). East edge of E cut by N-S drain (G), produced abundant Khabur pottery. Outer mounds: H: Halaf; cut by drain which exposed olive green fill in deep depression (water hole). K: Uruk; J and M: M. Assyrian. Total area 11.2 ha. Overall periods: Standard Hassuna [(Campbell) trace]; Early Halaf (1.2 ha); Uruk (0.7 ha); L. 3rd (1.0 ha); Khabur (8.0 ha); M. Assyrian (3.5 ha); L. Assyrian (3.0 ha); Parthian (trace); Sasanian (1.0 ha).

141) 2.5 km ENE of al-Gana. Small simple mound of 0.7 ha, 1 m high. Small trench on top revealed greyish soil weakly transformed into developed soil. Ubaid (0.7 ha).

142) 1.7 km NNE of al-Gana. Small but prominent mound (A) of 1.3 ha and 3 m high; shallow enclosed depression to W. Main prehistoric and Chalcolithic occupation; also yielded fine part of baked clay female figurine (Fig.80.1). B: to the NW, c. 0.7 ha and low, mainly Parthian with sparse Halaf. Periods: Halaf (1.5 ha); Ubaid (1.0 ha); L. Assyrian (1.3 ha); Hellenistic (1.3 ha); Parthian (0.7 ha); Sasanian-Early Islamic (0.5 ha).

143) 3.5 km NNE of al-Gana. Complex mound (see Fig.7) covering 4 ha; max. height 3 m. 3 enclosed depressions. G and I: double mound to S, L. Assyrian, Hellenistic and Parthian, with Sasanian/Islamic to E. C and D: Uruk; B, C and E: Sasanian/Early Islamic. E cut by drain to reveal deposits of olive green silts in pits (water-holes). Site heavily cut by N-S and E-W drains. Periods: Uruk (0.7 ha); L. Assyrian (1.5 ha); Hellenistic (1.5 ha); Parthian (1.5 ha); Sasanian/Early Islamic (2.3 ha); M/L. Islamic (0.4 ha).

144) 3.5 km NNW of al-Gana. Small simple mound on rolling terrain. 0.7 ha and 0.8 m high. L. Assyrian (0.7 ha).

145) 4 km NW of al-Gana. Two mounds cut by N-S road (A,B and C to N; D and E to S). Both comprise coalesced double mounds. Total area: 3.9 ha; 2 m high. Hassuna (2.0 ha); Halaf (2.0 Ha); Ubaid (2.0 ha); Uruk (2.0 ha); L. Assyrian (2.0 ha); Hellenistic (1.0 ha); Parthian (1.0 ha); Sasanian (1.0 ha).

146) 2 km W of al-Gana. Group of 4 mounds covering 3.5 ha. A: highest mound, 4.5 m high. B: to SE of A. C: small mound cut by crossing N-S and E-W canals; Uruk. D: low mounded area to NW; Parthian. Ubaid (1.0 ha); Uruk (0.4 ha); L. Assyrian (1.3 ha); Hellenistic (1.3 ha); Parthian (0.5 ha).

147) 4.5 km N of al-Gana. Total area 2 ha, 3.5 m high. Elongate mound (A and B) with enclosed depression to NW and small prehistoric mound (C and D) to E. C and D cut by N-S canal. Hassuna (0.4 ha); L. Assyrian (1.6 ha); Hellenistic (1.6 ha); Parthian (1.6 ha).

148) 2.5 km SSW of Tell al-Samir (93). Small simple mound of 0.8 ha, 0.5 m high. Cut by N-S canal which exposed extensive deposits of olive green silts contained within pits (water-holes). Part of oven also exposed. Approximately contemporary with Khanijdal East (Site 66). Ubaid (0.8 ha); Uruk [0.8 ha (i.e. L.Ubaid/earliest Uruk)].

149) 5 km W of Tell al-Samir (93) on rolling upland. Small simple mound of 0.8 ha and 0.5 m high. Hassuna (0.8 ha); Halaf (0.8 ha).

150) 4 km W of Tell al-Samir (93). Elongate mound sub-divided into 2 sub-mounds: A, the higher, to the E, and B, the lower, to the W. Hassuna (0.5 ha); Halaf (0.6 ha); Uruk (1.2 ha).

151) 4 km W of Tell al-Samir (93). Pair of mounds of total area 0.8 ha, the E mound (A) being slightly the higher at 1 m. W mound (B) cut by N-S mound. Hellenistic (0.5 ha); Parthian (0.5 ha). Indeterminate traces of prehistoric occupation, but no definite diagnostics.

152) 5 km NW of Tell al-Samir (93). Pair of mounds c. 300 m apart, covering a total area of 1.4 ha. A: to NE, c. 1.5 m high produced mainly Parthian sherds, but also a significant number of fine L 3rd mill sub-stonewares. Also one very worn Old Babylonian cylinder seal. B: Smaller disturbed mound to SW. Periods: Hassuna (0.7 ha); L. 3rd (0.5 ha); Hellenistic (0.7 ha); Parthian (0.7 ha); Sasanian-Early Islamic (0.25 ha).

153) 5 km NW of Tell al-Samir (93). A and B: Small double mound to N. C: single very small mound to S. 2 small enclosed depressions. Located immediately N of farmstead. Total area 0.7 ha, 1.5 m high. Halaf (0.5 ha); Ubaid (0.5 ha); Uruk (0.5 ha); Parthian (0.5 ha); Sasanian-Early Islamic (0.5 ha).

154) 4.5 km NW of Tell al-Samir (93). Pair of low mounds to N of re-entrant depression. Very small mound to S of depression. Farmstead adjacent. Total area 2.2 ha. Max. height (of W mound, A) 2 m. B: (to E) dominantly

Parthian. A: includes Khabur. Periods: Uruk (0.9 ha); Khabur (0.9 ha); Hellenistic (0.9 ha); Parthian (1.2 ha); Sasanian-Early Islamic (0.25 ha).

155) Tell Hayal. 5.5 km N of Tell al-Samir (93). Immediately N of main canal and just outside project area. Prominent tell with numerous graves on summit. 300 m E-W; 2.4 ha+; c. 7 m high. Situated to N of village which may overlie other occupation. Only briefly visited, therefore not all periods present were necessarily recorded: L. 3rd (2.0 ha); Khabur (2.4 ha); M. Assyrian (2.0 ha); L. Assyrian (1.0 ha).

156) Rajim Hassan. IDA Map 125, site nos. 59 and 60. 9 km SW of Tell al-Samir. Large mound 10 m high within village (not visited). Outer mounds to NE heavily cut by canals collected in 1989; these cover 2.2 ha; total site area 8.7 ha. Early Islamic (2.2 ha); M/L Islamic (trace).

157) 6 km W of Tell al-Samir (93). Complex of 4 mounds with 1 enclosed depression. Total area 3.2 ha; max. height 2 m. Areas A/F, to S Halaf and Ubaid; Areas B/C, M and L Assyrian; Area E to SE is M/L Islamic. Periods: Halaf (0.5 ha); Ubaid (1.0 ha); M. Assyrian (1.2 ha); L. Assyrian (2.4 ha); Hellenistic and Parthian (trace); M/L Islamic (0.5 ha).

158) 6 km WNW of Tell al-Samir (93). Large complex of mounds immediately to S of modern farmstead. Total area 6.3 ha; height 4 m. 3 enclosed depressions. A, the most prominent, to N includes prehistoric sherds. B and C, an area of complex mounding with enclosed depressions to N and S, Islamic. D, to east, indeterminate. Area B and C, which has some rectilinear alignments on air photographs, may be the "Roman" square structure reported by Stein near Mushairfah (Gregory and Kennedy 1985: 108-9). Halaf (1.0 ha); Uruk (2.2 ha); Hellenistic (trace); Early Islamic (2.0 ha); M/L Islamic (3.0 ha).

159) 7.5 km WNW of Tell al-Samir (93). Triple mound (A, B and C), with outlier (D) to W, 1.4 ha; 2.5 m high. Khabur (0.7 ha); L. Assyrian (1.4 ha); Hellenistic (1.4 ha); Parthian (1.4 ha); Sasanian (1.0 ha).

160) 3 km NW of Tell al-Samir (93). Pair of mounds, A, more prominent to W, B, rather subdued, to E. Total area 1.6 ha; 1.5 m high. Uruk (0.9 ha); Khabur (1.6 ha); M. Assyrian (1.6 ha); L. Assyrian (0.4 ha).

161) 2.5 km NW of Tell al-Samir (93). IDA map 125, site 33: Tell Shara. 3 mounds surrounding elongate enclosed depression. Total area 1.6 ha, 2.5 m high. A: Most prominent mound to S. L. Assyrian (0.5 ha); Hellenistic (0.9 ha); Parthian (1.1 ha).

162) 2 km SW of al-Gana. Elongate mound (A) with Hassuna tail to N (C) and Hassuna and Early Halaf bulge to SE (B). 4.1 ha, 2.5 m high. Cut to E by N-S canal. Olive green deposits in pits to NE (D: water-hole?). Hellenistic sherds on top of mound. Akkadian gold hair-ring (Fig.81.2) on surface to N of summit but no obvious 3rd millennium context. Hassuna (up to 4.0 ha); Early Halaf (2.0 ha); Ubaid (1.0 ha); Hellenistic (0.8 ha).

163) 3 km SW of al-Gana. Prominent mound with summit covered by graves (A). 2.5 ha, 5 m high. Lower mound to W (B). Total site area 3.4 ha. Complete M/L Assyrian basalt grinder from summit of mound. L. Assyrian (2.6 ha); post Assyrian (0.8 ha); Hellenistic (0.5 ha).

164) 3 km SSW of al-Gana. Small simple mound of 0.8 ha and 1 m high. Hassuna (0.8 ha).

165) 3.8 km SSW of al-Gana. Small, moderately prominent mound within bend of meandering wadi. Prehistoric pottery eroding out of SW corner. 1.3 ha and 2 m high. Hassuna (0.7 ha); L. Assyrian (1.3 ha).

166) 4.6 km SSW of al-Gana. Group of 3 small mounds almost completely destroyed by major canal. Included large basalt trough fragment c. 90 cm long axis; perhaps robbed out of pre-Islamic site. Original site area 0.7 ha; 1 m high. Sasanian/Early Islamic (0.7 ha).

167) 4 km S of al-Gana. Small simple mound largely destroyed by major E-W canal. Produced foot of M/L Assyrian tripod grinder. 0.4 ha and 0.5 m high. L. Assyrian (0.4 ha); Hellenistic (0.4 ha).

168) 6.8 km WNW of Tell al-Samir (93). Very small site with virtually no topography. 0.5 ha, 0.3 m high. Ambiguous chaff-tempered pottery, possibly Hassuna; Uruk (0.5 ha).

169) 7 km W of Tell al-Samir. Village of Salhia. IDA Map 125, site 48. A: Elongate tell to SE of village. 3 small mounds (not collected) within village and to S. 1 enclosed depression. Total area 3 ha; 5 m high. Halaf (0.5 ha); Ubaid (1.0 ha); Uruk (2.2 ha); Khabur (2.2 ha); Sasanian (trace).

170) 7 km WSW of Tell al-Samir (93) 0.8 ha, 0.8 m high. Small simple mound cut to SW by canal where L. Uruk exposed. Hassuna (0.8 ha); Halaf (0.5 ha); Uruk ([including L. Uruk] 0.8 ha).

171) 6 km SW of Tell al-Samir (93). A: small simple mound 0.9 ha c. 1 m high S of small village of Khirbet Ayash; Uruk (0.9 ha). B: Small prominent mound within village, not collected.

172) 5 km WSW of Tell al-Samir (93). Twin mounds, the larger (A) to S cut by E-W drain which exposed olive green silts in depressions (?water-holes). Area 2.2 ha; max. height 2 m. Halaf (1.9 ha); Uruk (1.9 ha).

173) 9.5 km W of Tell al-Samir (93). Small simple mound 0.9 ha 0.5 m high. Cut by E-W canal to yield abundant Uruk pottery. Uruk (0.9 ha).

174) 10.5 km W of Tell al-Samir (93; Wilkinson 1990c, fig.3). Complex mound cut by NW-SE road and NE-SW drain. Total area 5.1 ha; max. height 5.5 m; 2 enclosed depressions. A: Most prominent mound to SW of large depression. Uruk exposed on SE tail (G) of this mound. Parthian and Sasanian on small mounds, B, C, E and F to N. Halaf on simple mound (H) to SE. Periods: Hassuna (0.4 ha); Halaf (0.8 ha); Uruk (2.7 ha); L. Assyrian (2.7 ha); Hellenistic (0.9 ha); Parthian (0.7 ha); Sasanian (1.0 ha).

175) 8.3 km W of Tell al-Samir (93), immediately S of Mushairfah village. 3 mounds around central enclosed depression, the main mound being A. Total area 1.5 ha, 2.5 m high. L. 3rd (1.0 ha); Khabur (1.0 ha); L. Assyrian (1.0 ha).

176) 9km NW of al-Gana. Pair of very small mounds with small enclosed depression and almost flat spread of Islamic ocupation to S. 0.6 ha, 1 m high. M/L Islamic (0.6 ha); Sasanian-Early Islamic (0.6 ha).

177) 11 km NW of al-Gana and c. 2 km N of Ab Takh village. 2.8 ha, 2 m high. Conjoined double mound with Uruk dominant on W mound (A) and Parthian-Sasanian on the E mound (B). Uruk (2.0 ha); L. 3rd (1.0 ha); Parthian-Sasanian (0.5 ha).

178) 7.5 km NW of al-Gana. Complex of mounds around enclosed depression. 3.6 ha, 4 m high. L. Assyrian, Hellenistic and Parthian on main mound (A), Hellenistic on small mound (B) to SW. M/L Islamic on area C to S. Periods: L. Assyrian (2.5 ha); Hellenistic (1.5 ha); Parthian (trace); Sasanian- Early Islamic (0.5 ha); M/L Islamic (0.9 ha).

179) 6 km NW of al-Gana. Small double mound of 2.2 ha and 2 m high. Farmstead on S mound (B) with irrigation canal (local) leading across mound from pump. Hassuna, Halaf and Ubaid on N mound (A), Uruk on B. Hassuna (1.3 ha); Halaf (0.7 ha); Ubaid (1.3 ha); Uruk (0.9 ha).

180) 9 km WNW of al-Gana, 2 km S of Ab Takh. Main mound with tiny N mound adjacent to enclosed depression. 1.6 ha, 3 m high. L. Assyrian (1.5 ha); post Assyrian? (1.5 ha); Hellenistic (trace).

181) 8.5 km WNW of al-Gana. Between Sites 180 and 182. Very small almost flat site cut and disturbed by N-S canal. c 0.5m high. Few finds but areas of occupation estimated as: Hassuna (0.5 ha); Uruk (0.3 ha).

182) 8.5 km W of al-Gana, 3.5 km S of Ab-Takh. Elongate mound (A,B) with small mound (C) to S of enclosed depression. NW end cut by drain, SE end by canal. Parthian exposed over SE tail (B). Total area 1.7 ha; 2.5 m high. L. Assyrian (1.3 ha); ?post-Assyrian (1.3 ha); ?Hellenistic (1.0 ha); Parthian (1.0 ha); Sasanian (1.0 ha).

183) 7 km W of al-Gana. Pair of mounds to S of enclosed depression. Smaller mound to W of depression. Area 2.0 ha, 2.5 m high. A, to SE, early Uruk and Ubaid; B, to NW, Post-Assyrian, Hellenistic and Parthian. Ubaid (1.4 ha); Uruk (1.4 ha); Hellenistic (0.5 ha); Parthian (1.0 ha); Sasanian (1.0 ha); M. Islamic (trace).

184) 5.5 km WNW of al-Gana. Moderate-sized mound to S of enclosed depression (A), Hellenistic and Parthian. Elongate mound (B) with Early Islamic to N of depression. Total area 2.1 ha; 2 m high. Hellenistic (trace); Parthian (0.8 ha); Sasanian (trace); Early Islamic (1.3 ha).

(End of survey mid-February 1990)

Table 17. Cross-references to additional sites in the outer area (see Fig. 24)

IDA No.	Site Name	NJP No.
IDA Map 124.		
52	Tell Uwaynat	Site 92
57	Tell Mana'a	Site 140
83	Al-Kibar	Site 123
90	Tell al-Dhaim	
96	Tell Abu Winni	
108	Tell Huqna	
117	Qasr Serij	
IDA Map 126		
14	Tell Jazruniyah	
19	Tell Abu Dhahir	
26	Tell Hamad Aghir Saghir	
27	Tell Hamad Aghir Kabir	
55	Kharaba Abu Wajna	

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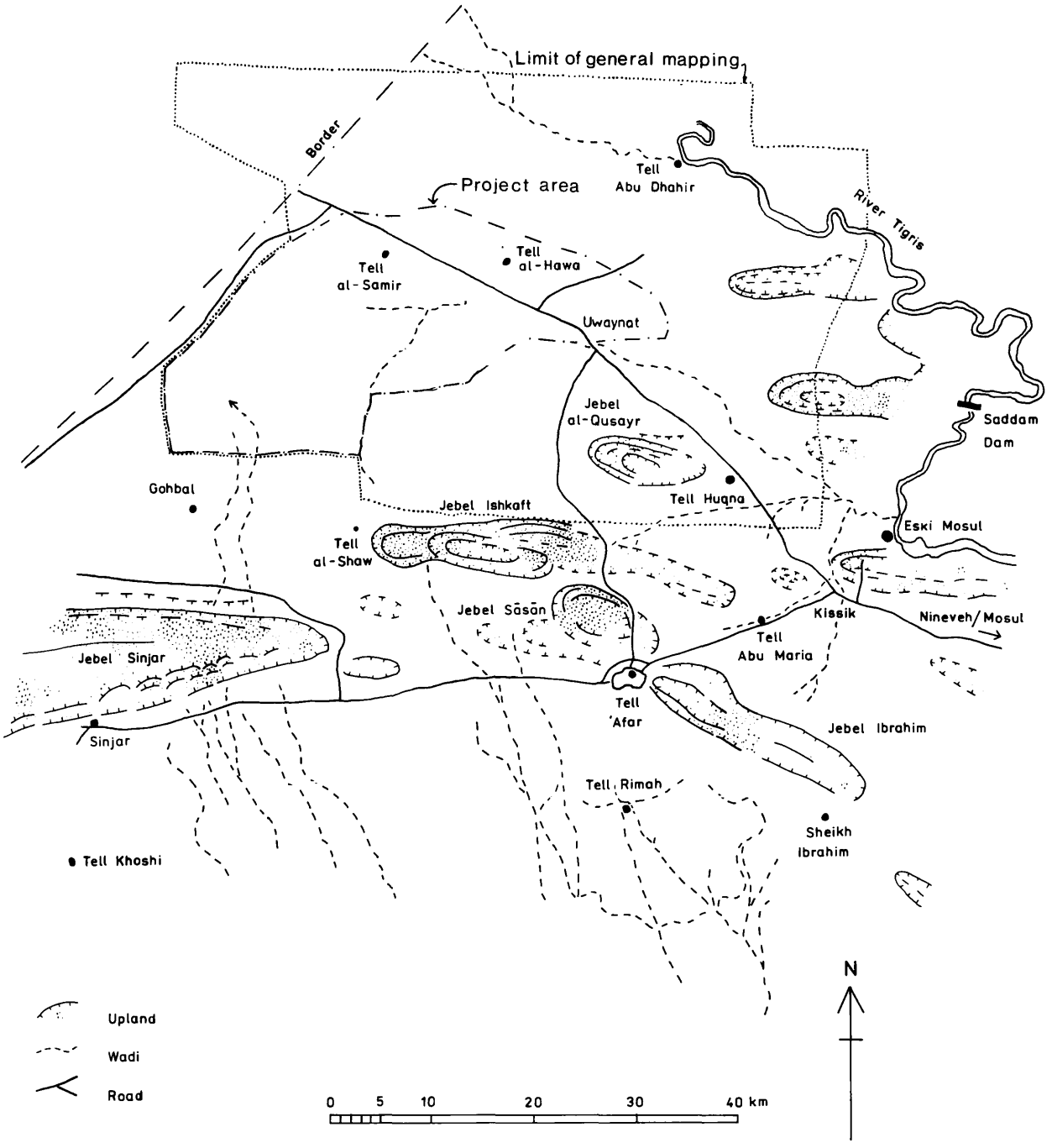

Fig.1 Location of the North Jazira Project (Figs.2 and 6), the limit of general mapping (Fig.24) and some significant sites in NW Iraq (large dots).

Rabi'ah

Tell al-Samir

Tell al-Hawa

Kharaba Ti

al-Gana

al-Mumi

Abu Kular

N

0 2 4 km

Sites

2m contours

Wadi ridges

weak trace
moderate trace
strong trace
} Wadis

Fig.2 Contour map of north Jazira plain showing sites, wadis and wadi ridges.

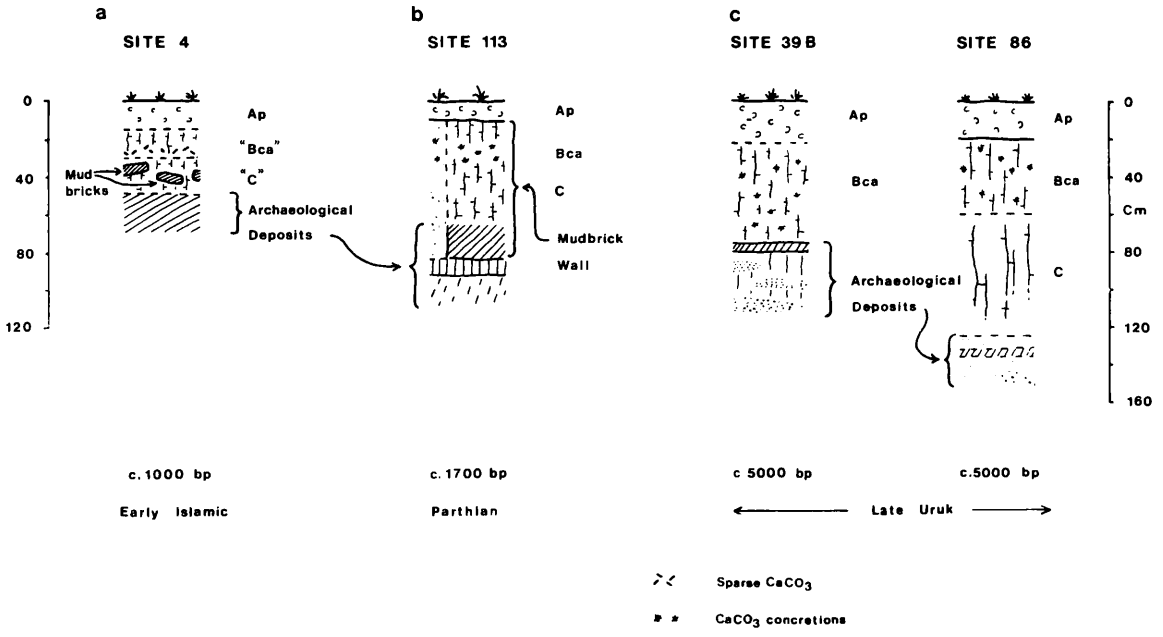

Fig.3 Soil development on low sites through time.

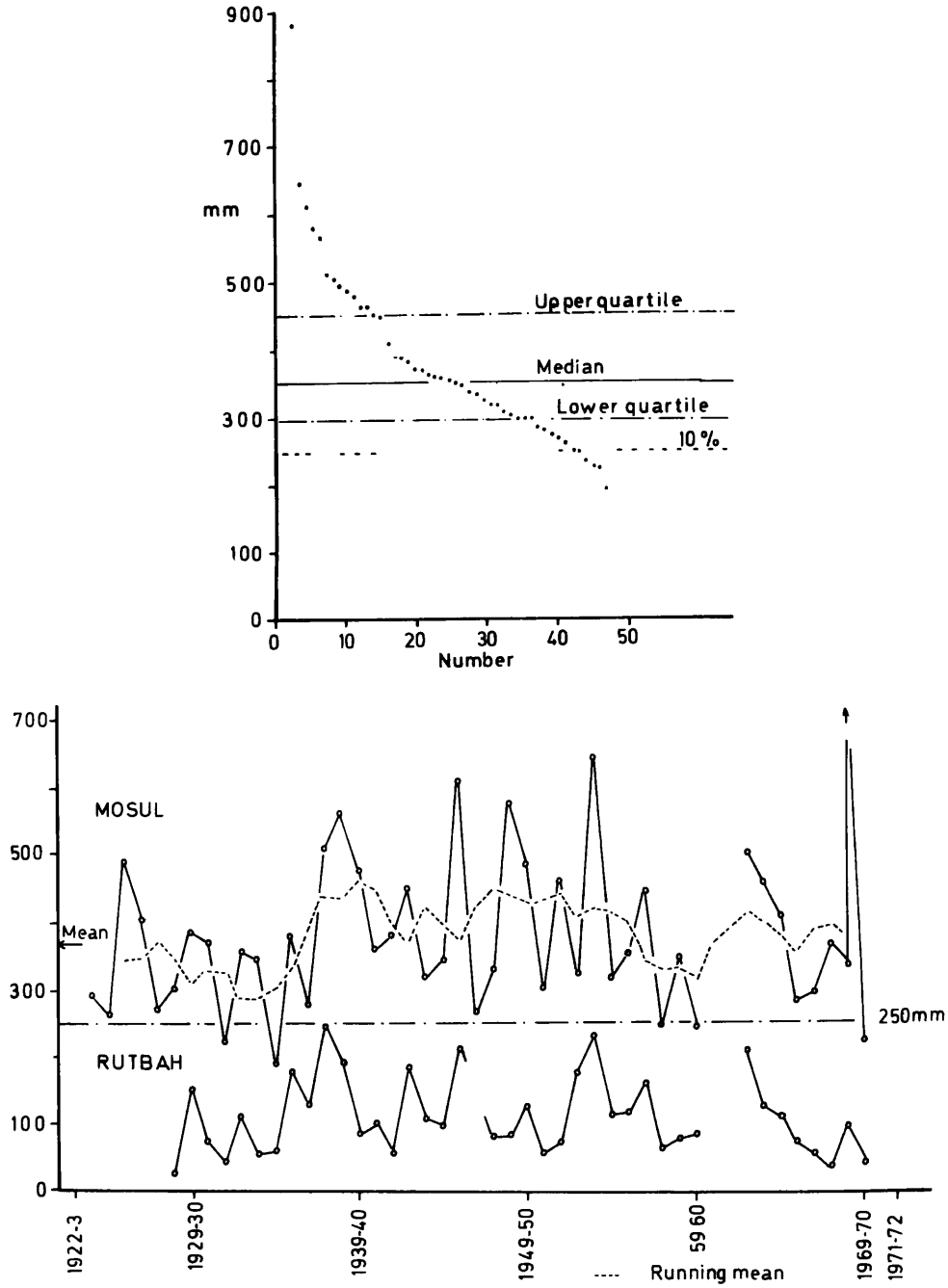

Fig.4 (above) Rank-size curve for rainfall for Mosul for the period mid-1920s to mid-1970s. (below) Rainfall graphs for Mosul and Rutbah for the same period.

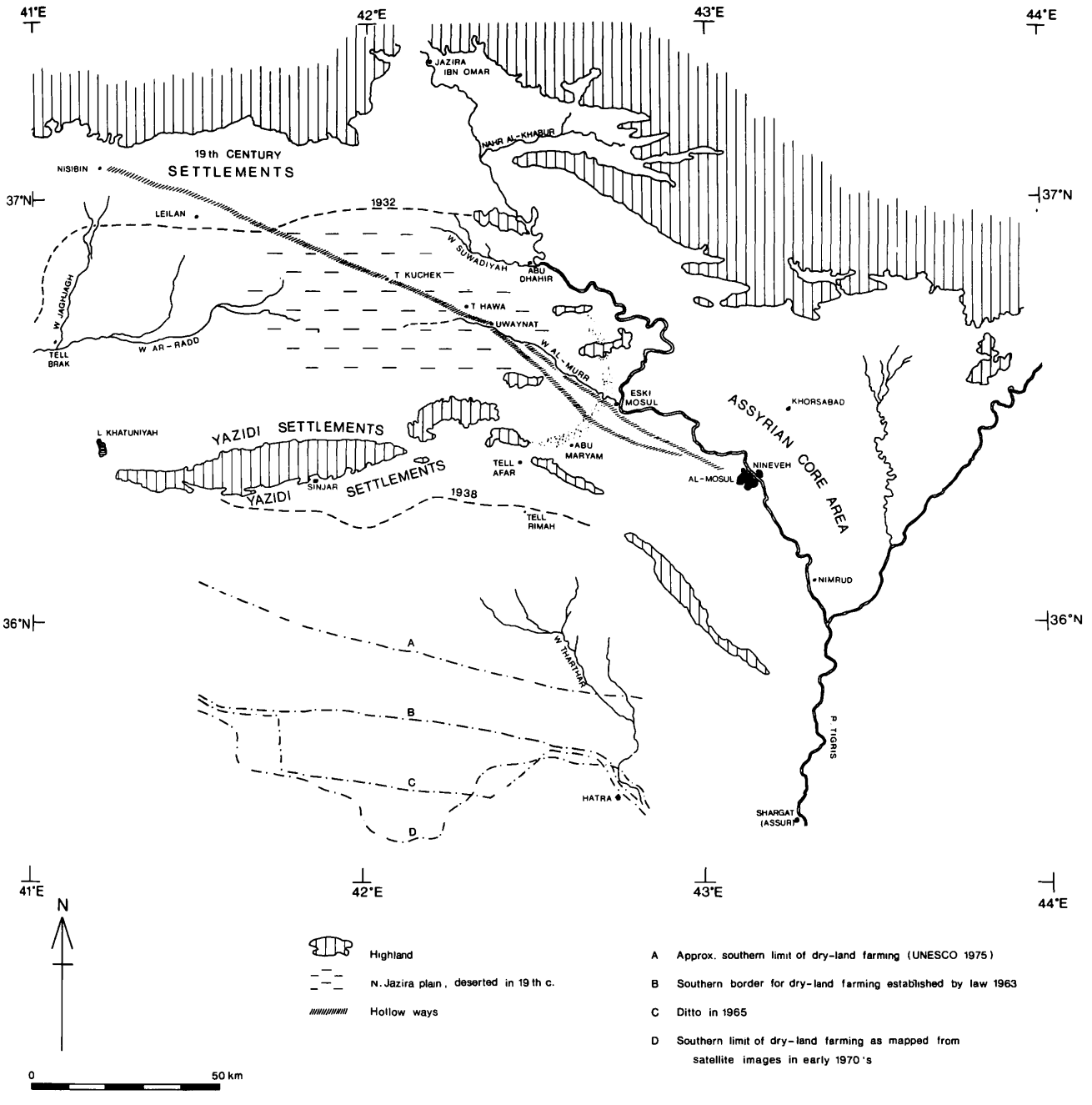

Fig.5 Historical reconstruction of NW Iraq showing estimated limits of cultivation as follows (from N-S):
1932: southern limit, after Dilleman 1962.
1938: southern limit around Jabal Sinjar, sketched from Lloyd 1938.
A-D: southern limits showing the progressive southward movement as a result of colonization of steppe after World War II.
"Yazidi settlements" and "19th century settlements" (near Nisibis) recorded by various 19th century travellers.
Stippled arc near Eski Mosul indicates roughly the NW limit of cultivation as recorded by 19th century travellers.

Rabi'ah

Tell al-Samir

Tell al-Hawa

Kharabat Tibn

al-Gana

Abu Kular

al-Kibar

al-Mumi

0 2 4 km

N

Surveyed sites

Sites not collected

Villages

Hollow ways

Wadis

Roads

Railway

Fig.6 The project area showing sites and major hollow ways. Sites numbered 1-184 were investigated between 1986 and 1990.

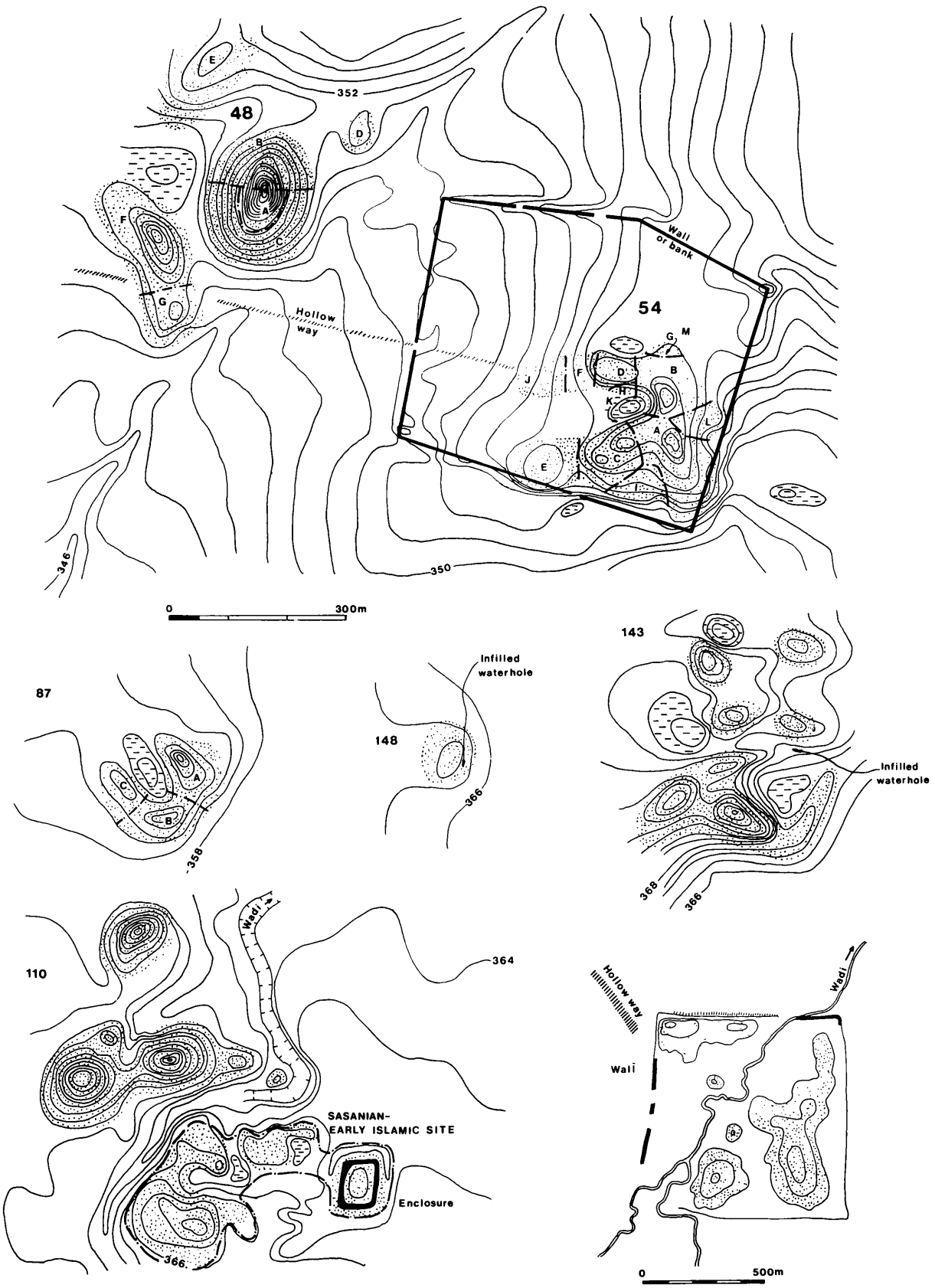

Fig.7 Classification of types of site: high tell with adjacent Sasanian/Islamic enclosed settlement (Sites 48 and 54); smaller groups of mounds with central depression (87); simple prehistoric mound (148); late complex mounds (143 and 110: note the rectangular Sasanian/Islamic enclosure); large walled site near Bir Halu, to S of Tell ad-Dhaim (note different scale).

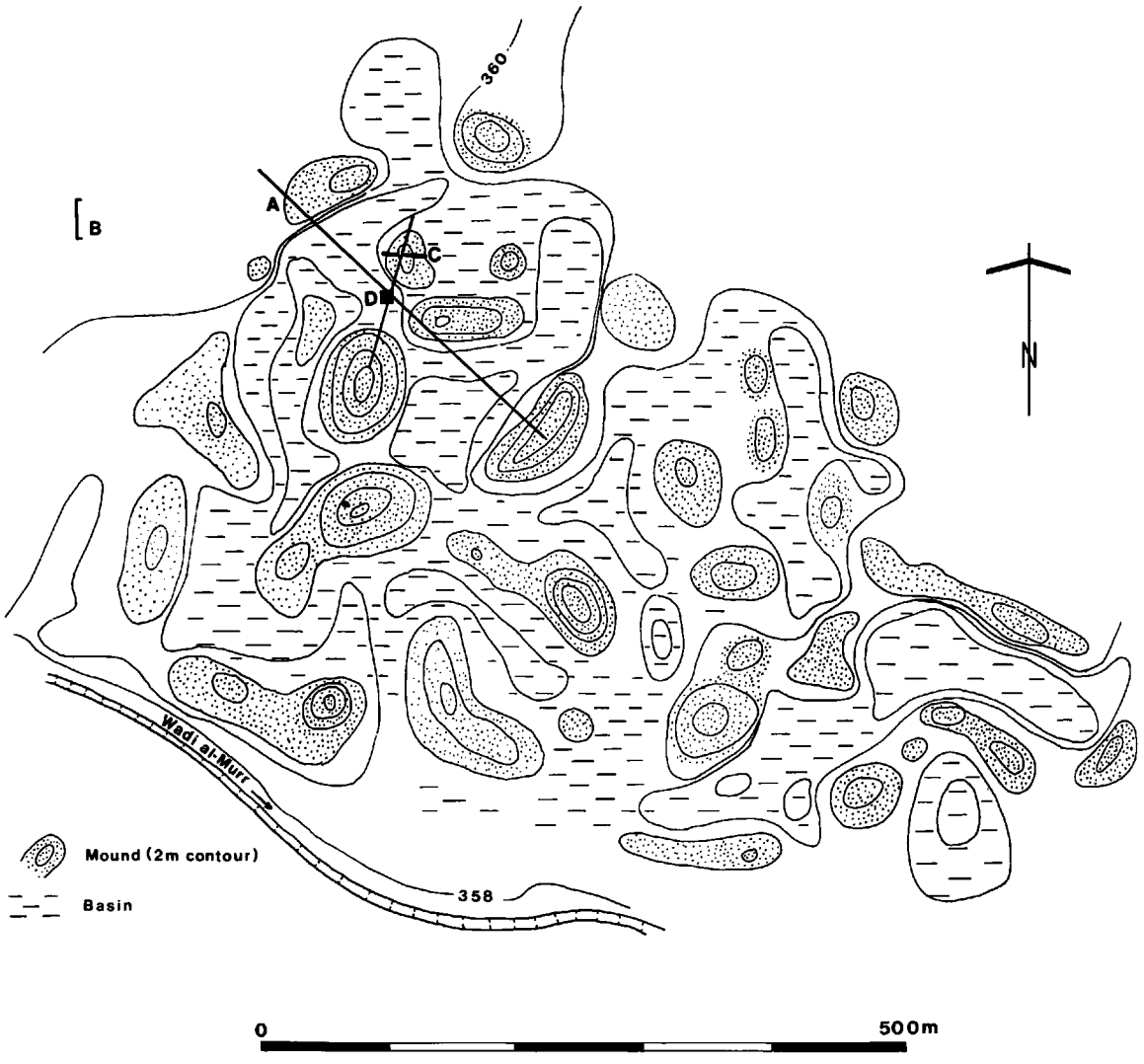

Fig.8 Tulul al-Biyadir, showing location of the investigated areas.

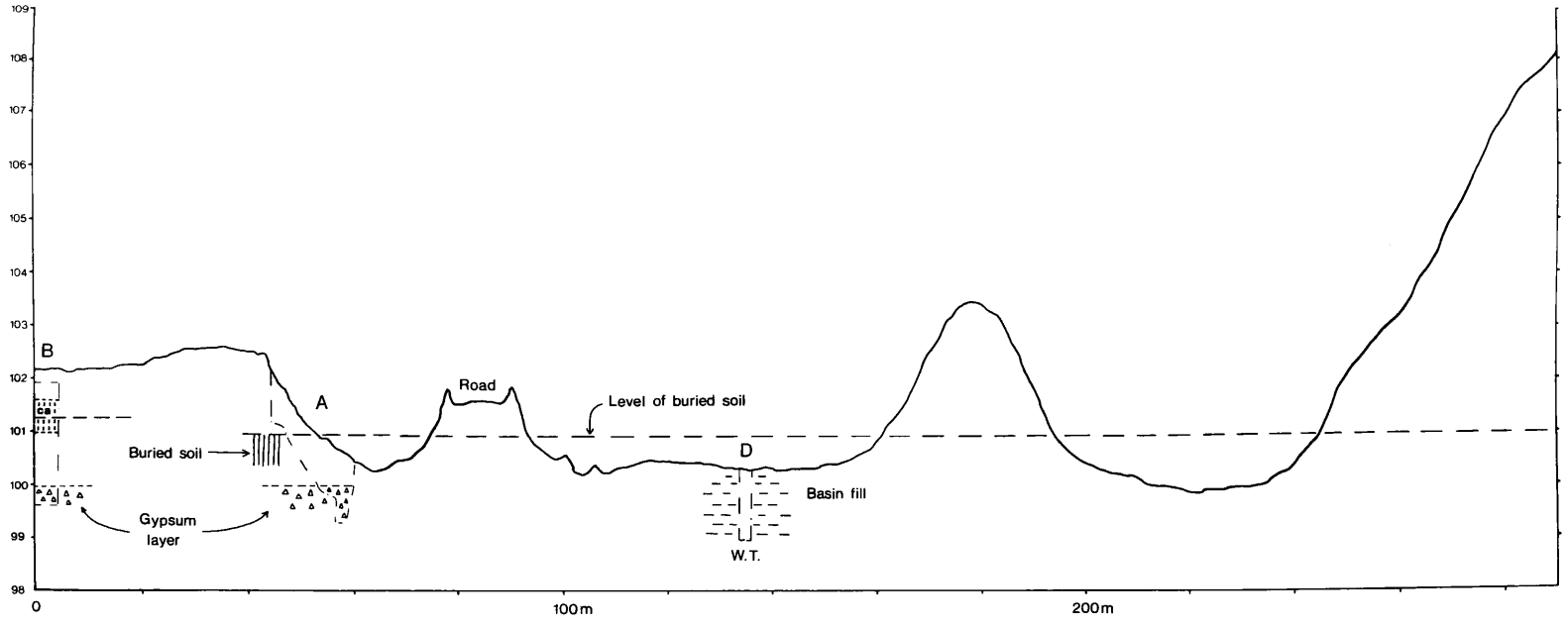

Fig.9 Section and levelled profile through Tulul al-Biyadir areas B, A and D.

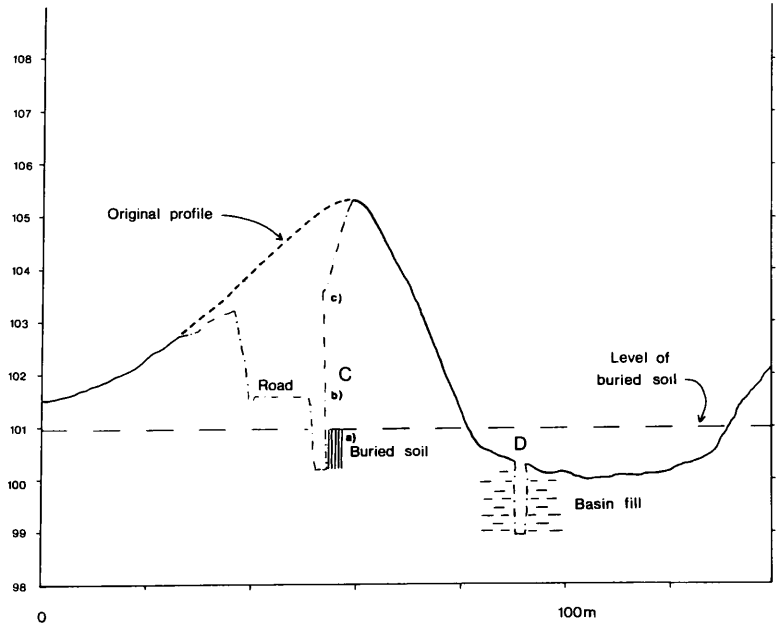

Fig.10 Section and levelled profile through Tulul al-Biyadir areas C and D.

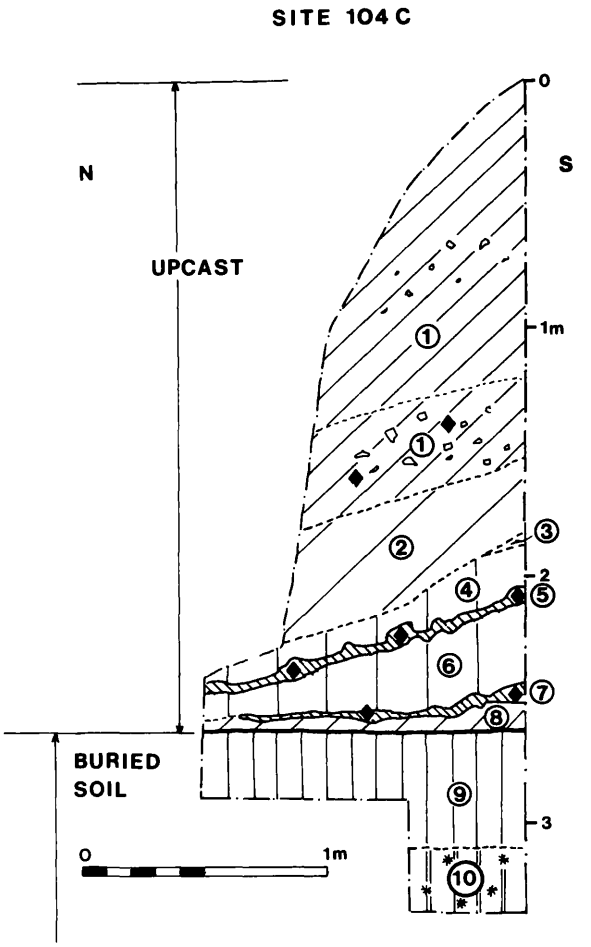

Fig.11 Section C, showing upcast dumps (1-8) with gypsic layers (5 and 7) over buried soil (9 and 10).

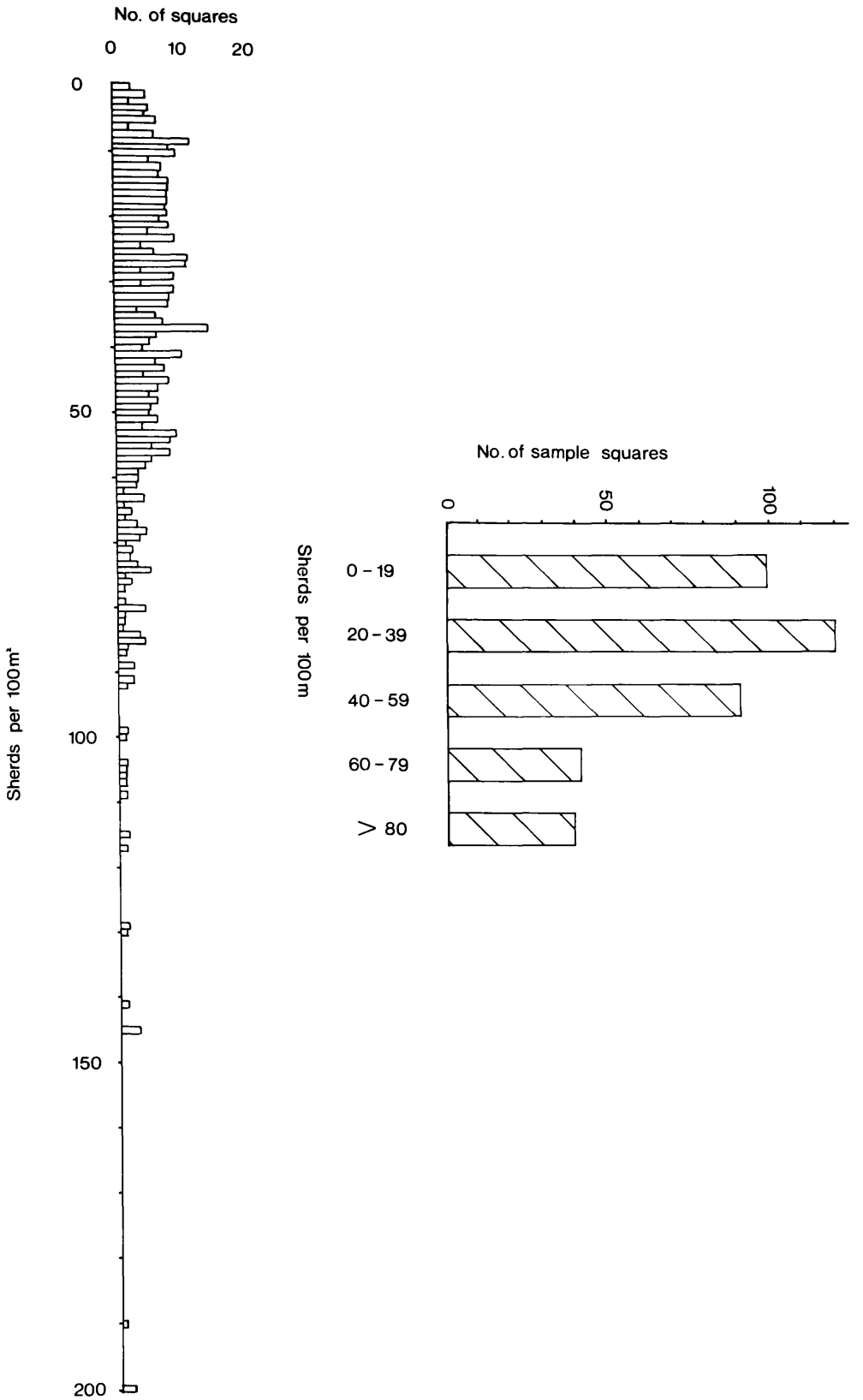

Fig.12 Histograms showing number of sherds per sample square (off-site). To left: vertical interval 1 sherd per 100 sq m.

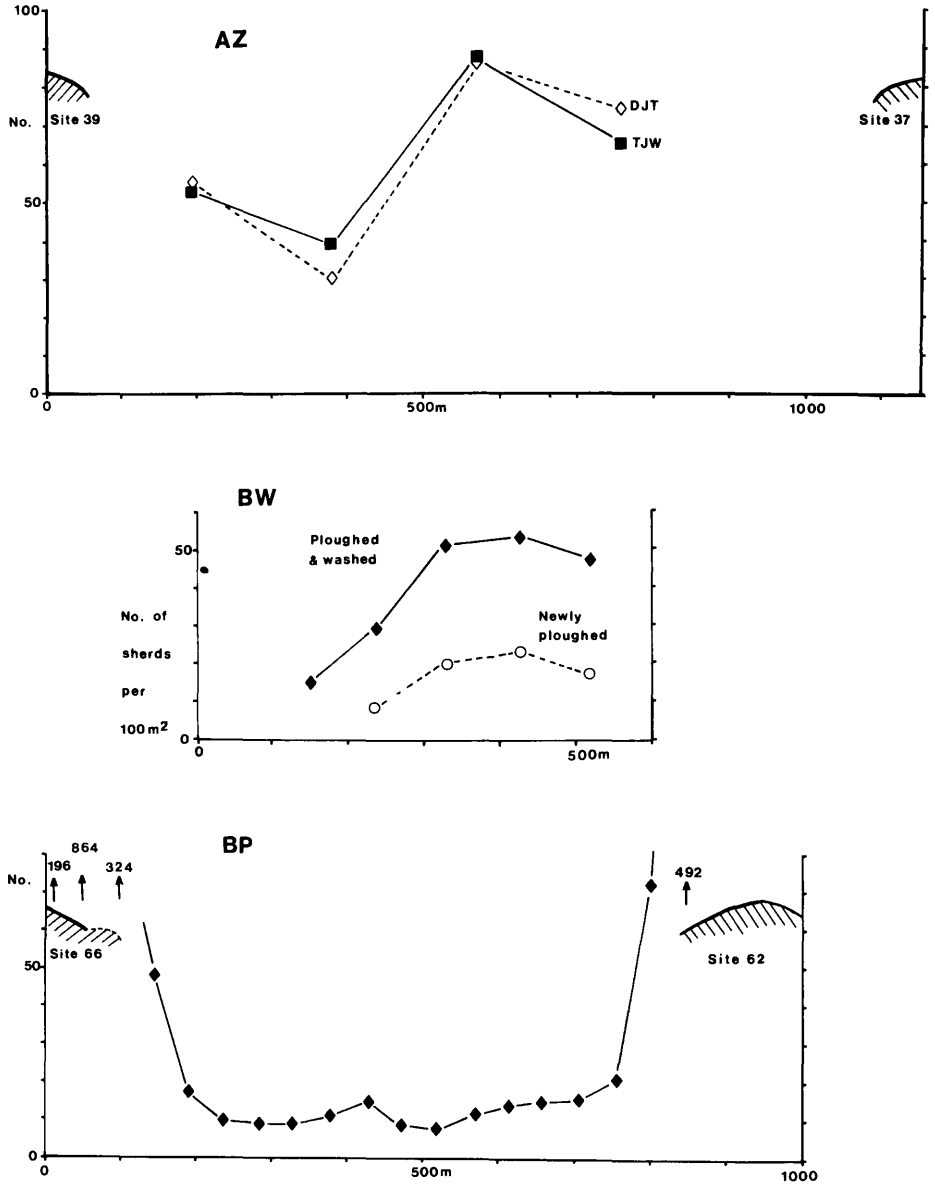

Fig.13 *(above) Operator differences in field scatter sherd collection (DJT=D.J. Tucker; TJW= T.J. Wilkinson).*
(centre) Effect of land use on sherd counts.
(below) Sherd counts in area of sparse field scatters between prehistoric Sites 62 and 66. AZ, BW and BP transect numbers as indicated on Fig.14.

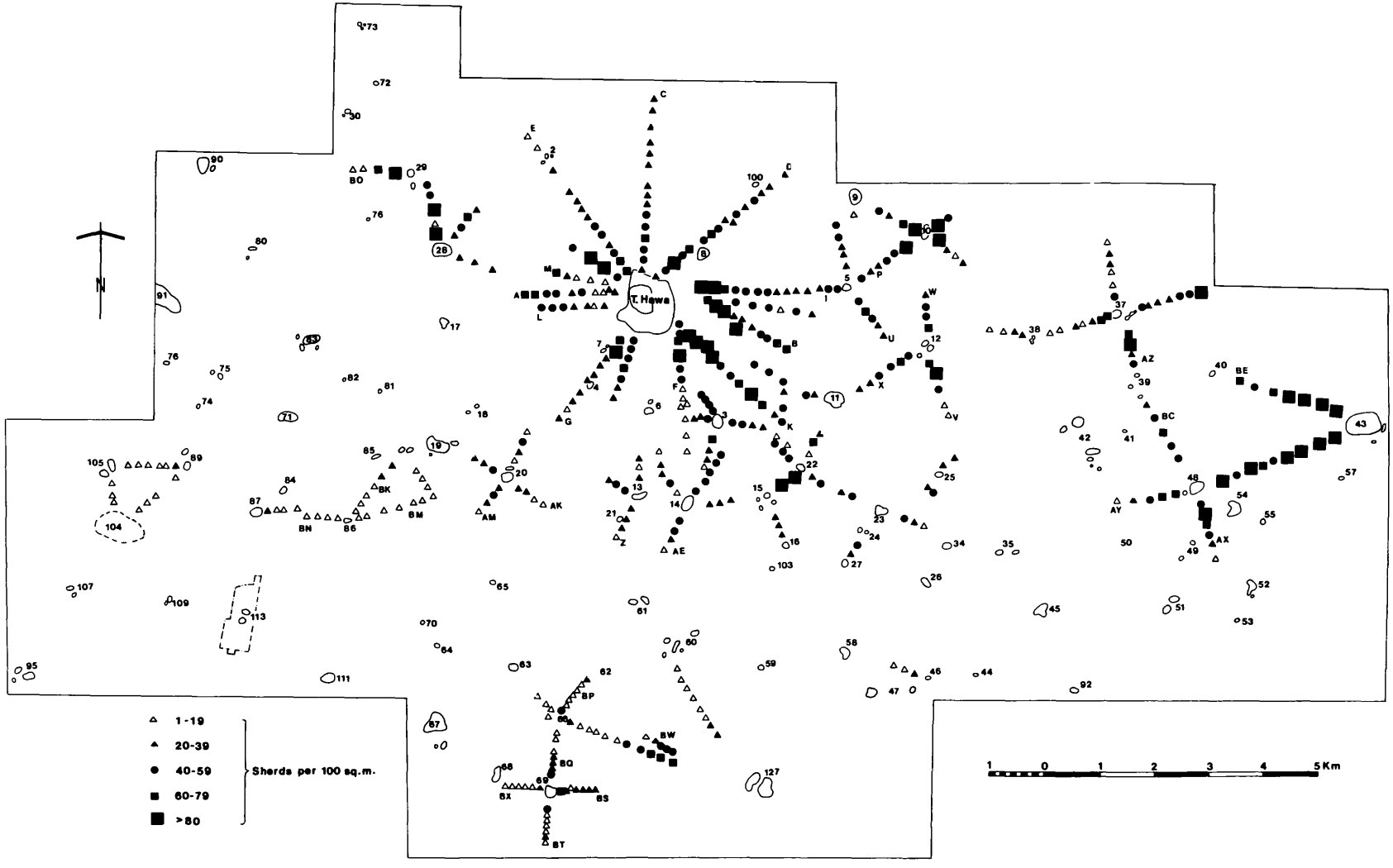

Fig.14 Sherd scatter densities as mapped in 1986-1988. Sites are indicated by numbered open figures.

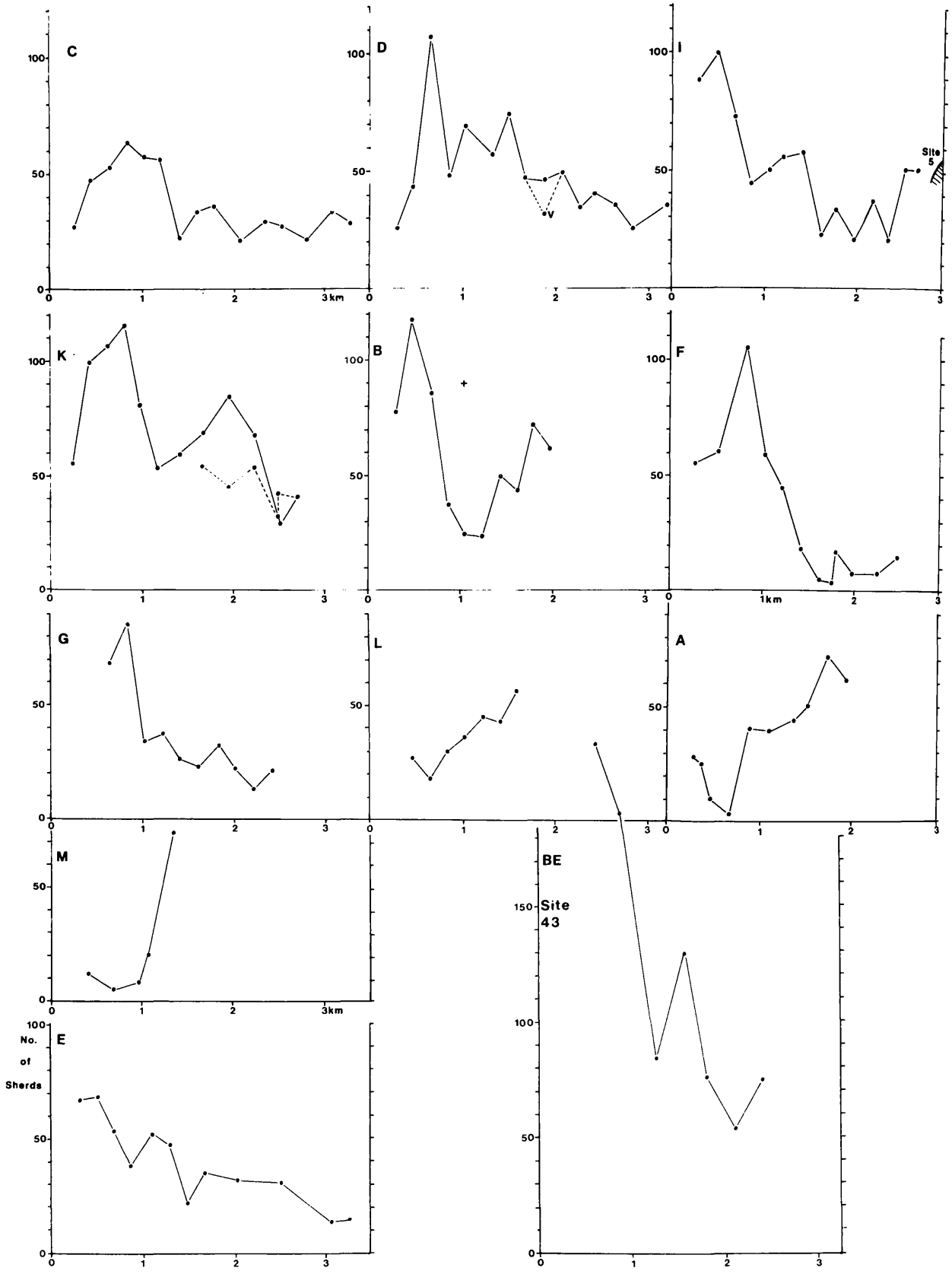

Fig.15 Field scatter densities from 10x10 m sample squares. All from around Tell al-Hawa (to left at 0) except BE which is from Site 43 (Kharaba Tibn).

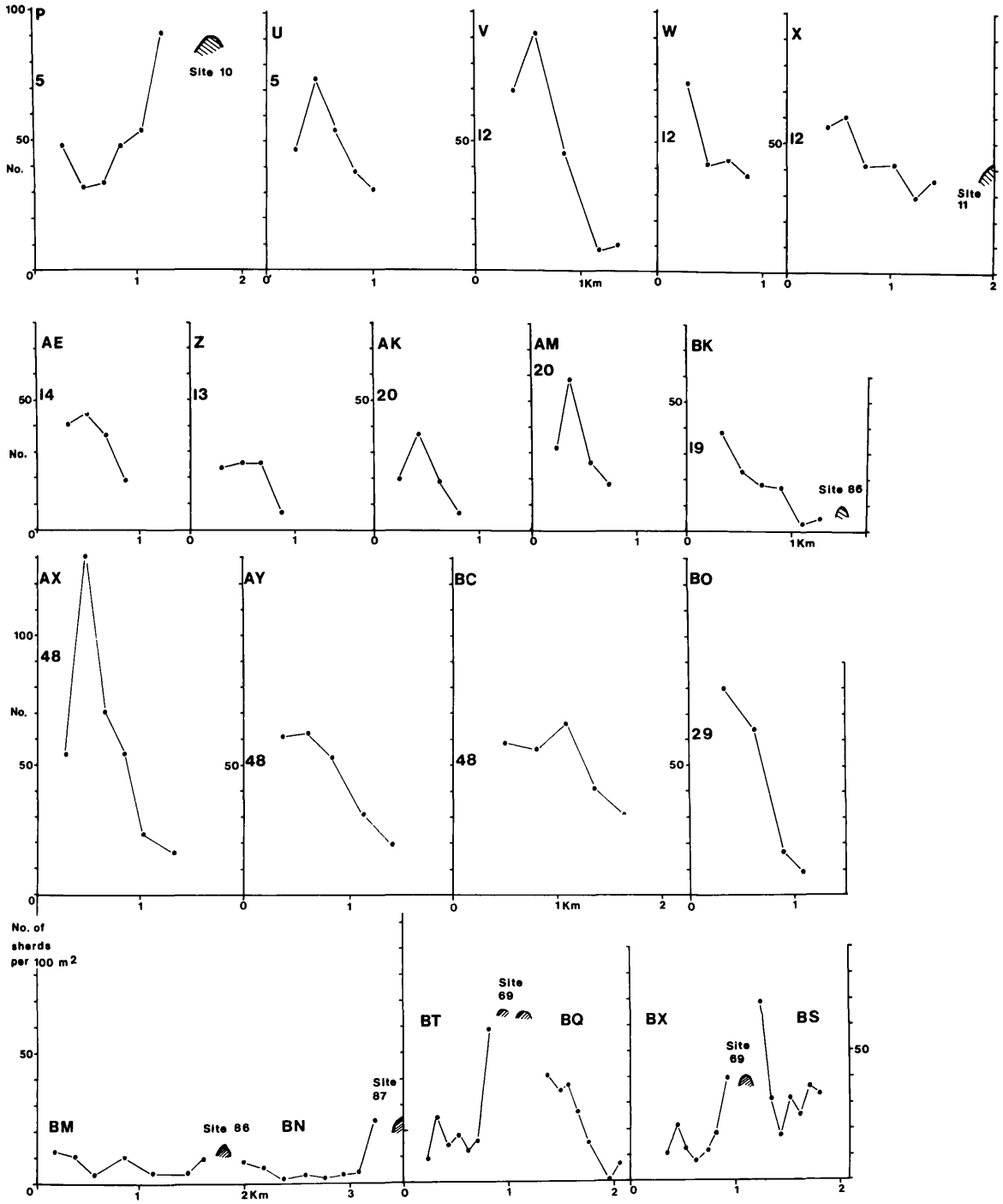

Fig.16 Field scatter densities from transects around smaller sites (numbered 5, 12, 14, etc). P, U etc transect numbers as indicated on Fig. 14.

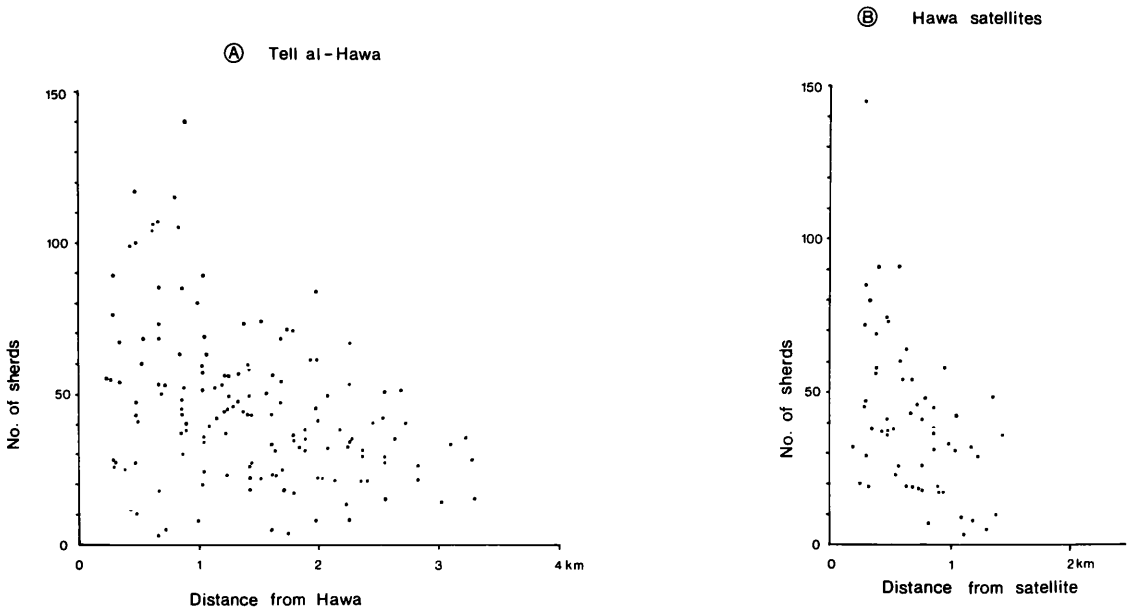

Fig.17 Scatter diagrams showing sherd densities with distance from sites: A) From Tell al-Hawa. B) From satellites around Tell al-Hawa: Sites 5, 10, 12, 20, 19, and 29.

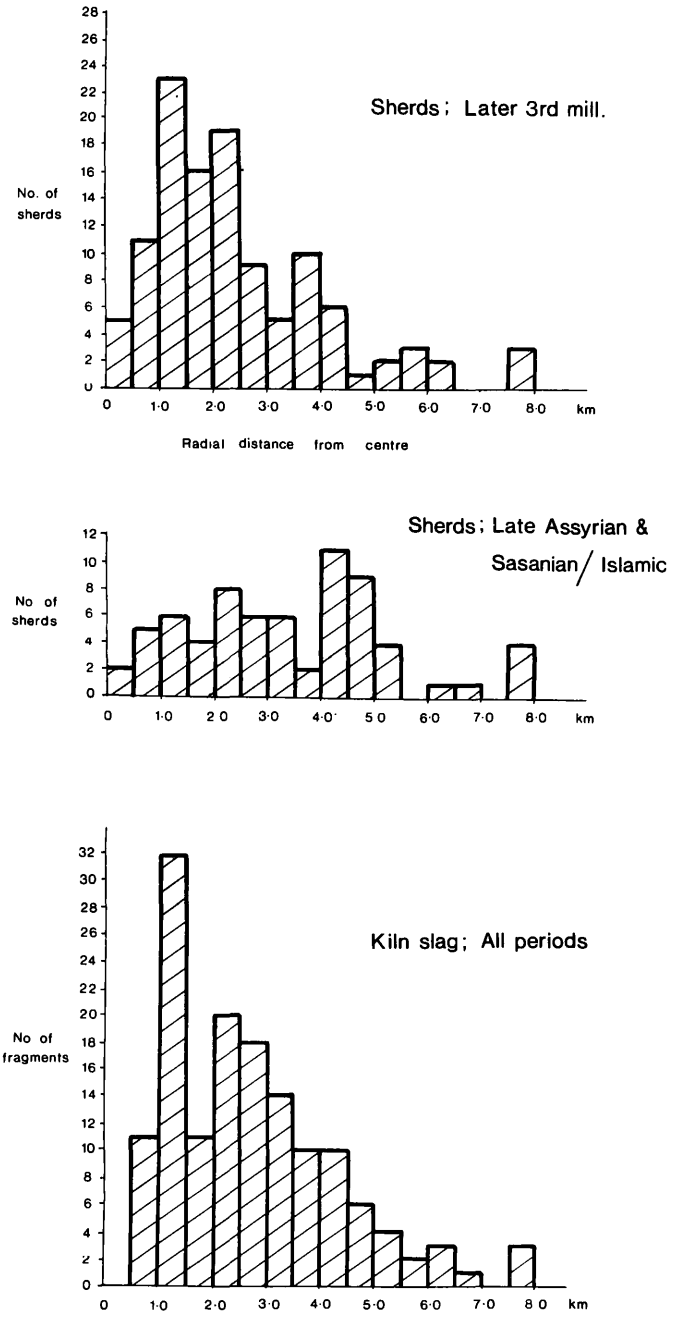

Fig.18 Distribution of dated sherds (above and centre) and kiln slag (below) away from central sites.

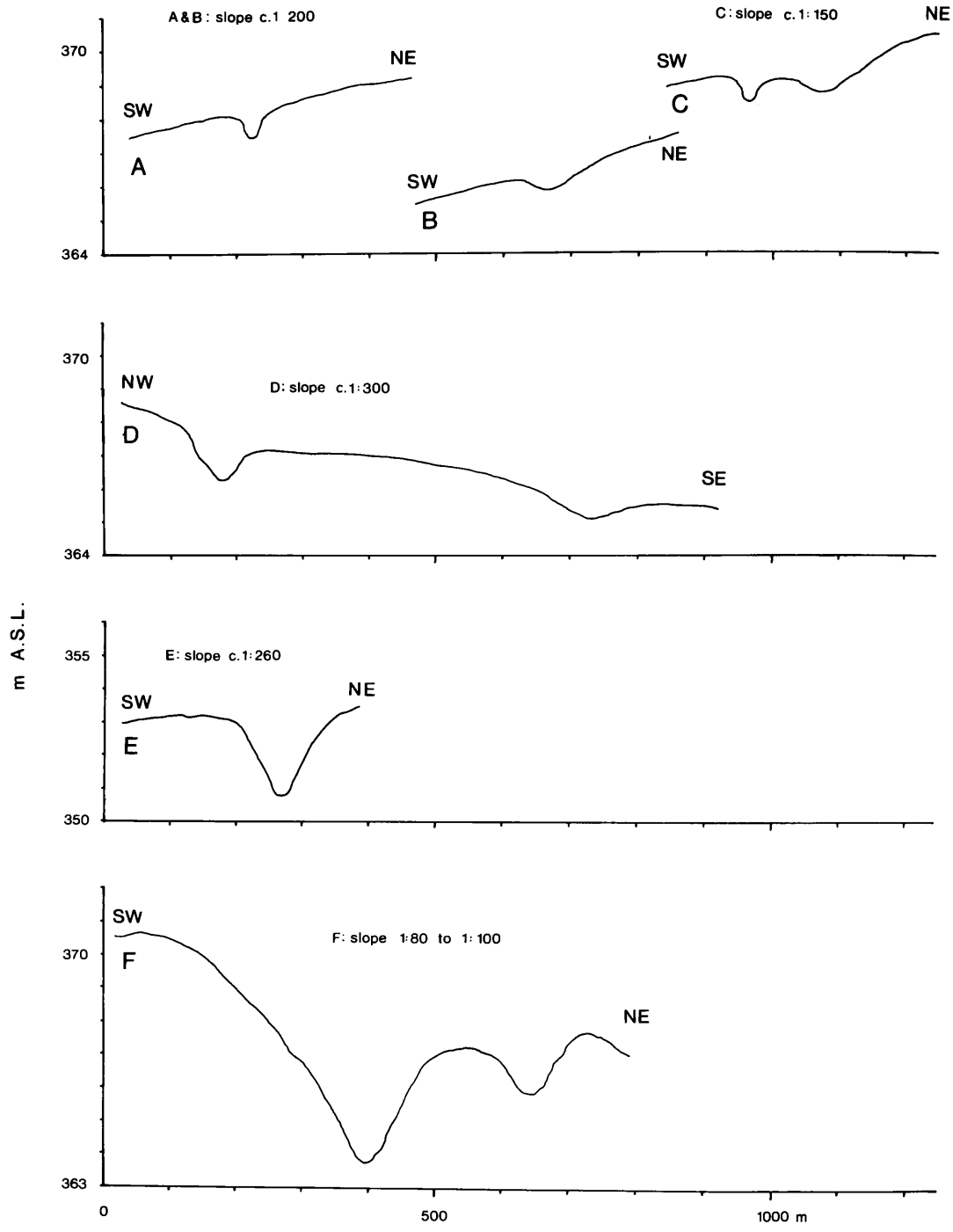

Fig.19 Profiles across selected hollow ways near Tell al-Hawa and Kharaba Tibn. For locations see Fig.20. ASL = Height above mean sea level. Note: vertical exaggeration x 50.

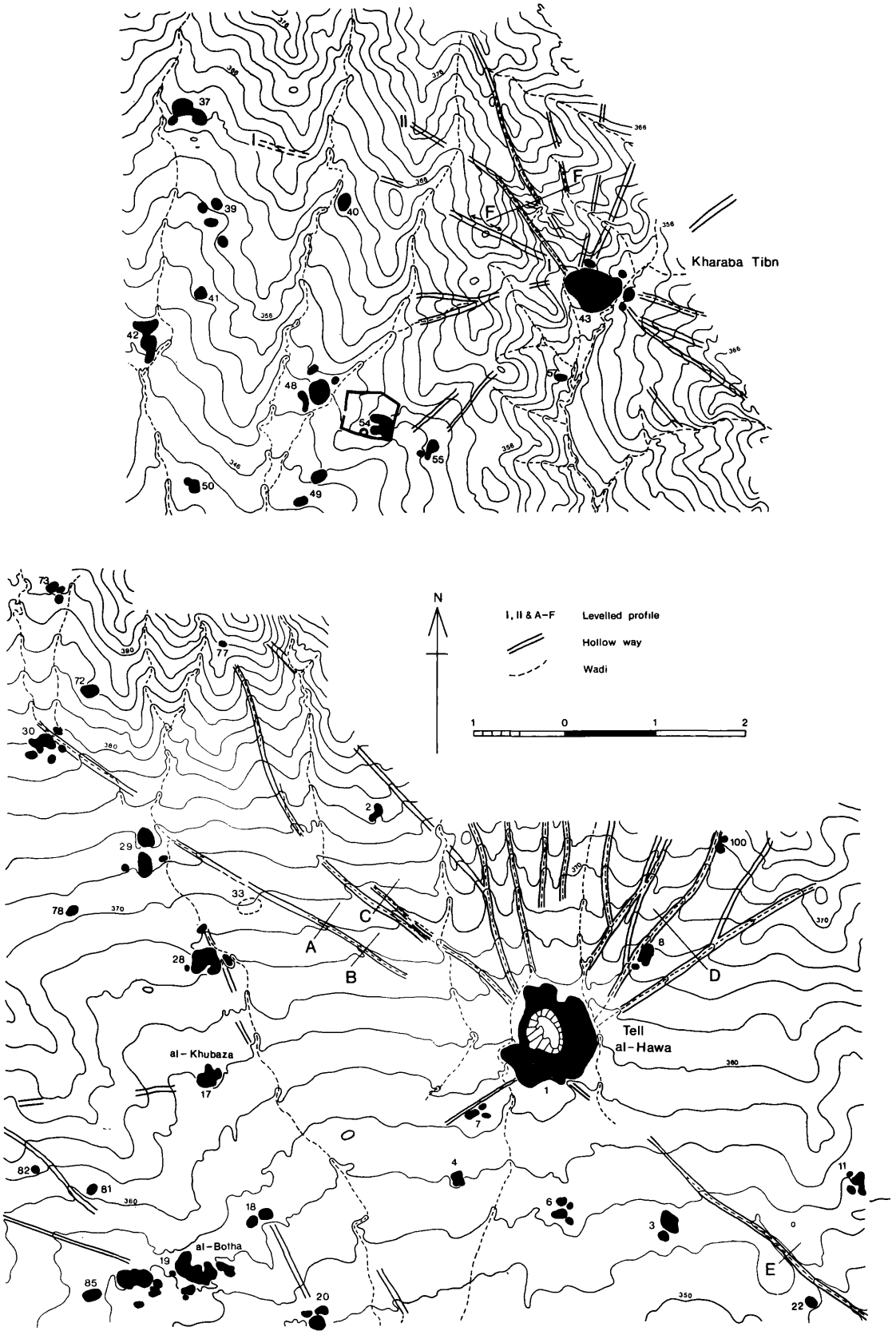

Fig.20 (above) Hollow ways around Kharaba Tibn (Site 43) and (below) around Tell al-Hawa showing their topographic context.

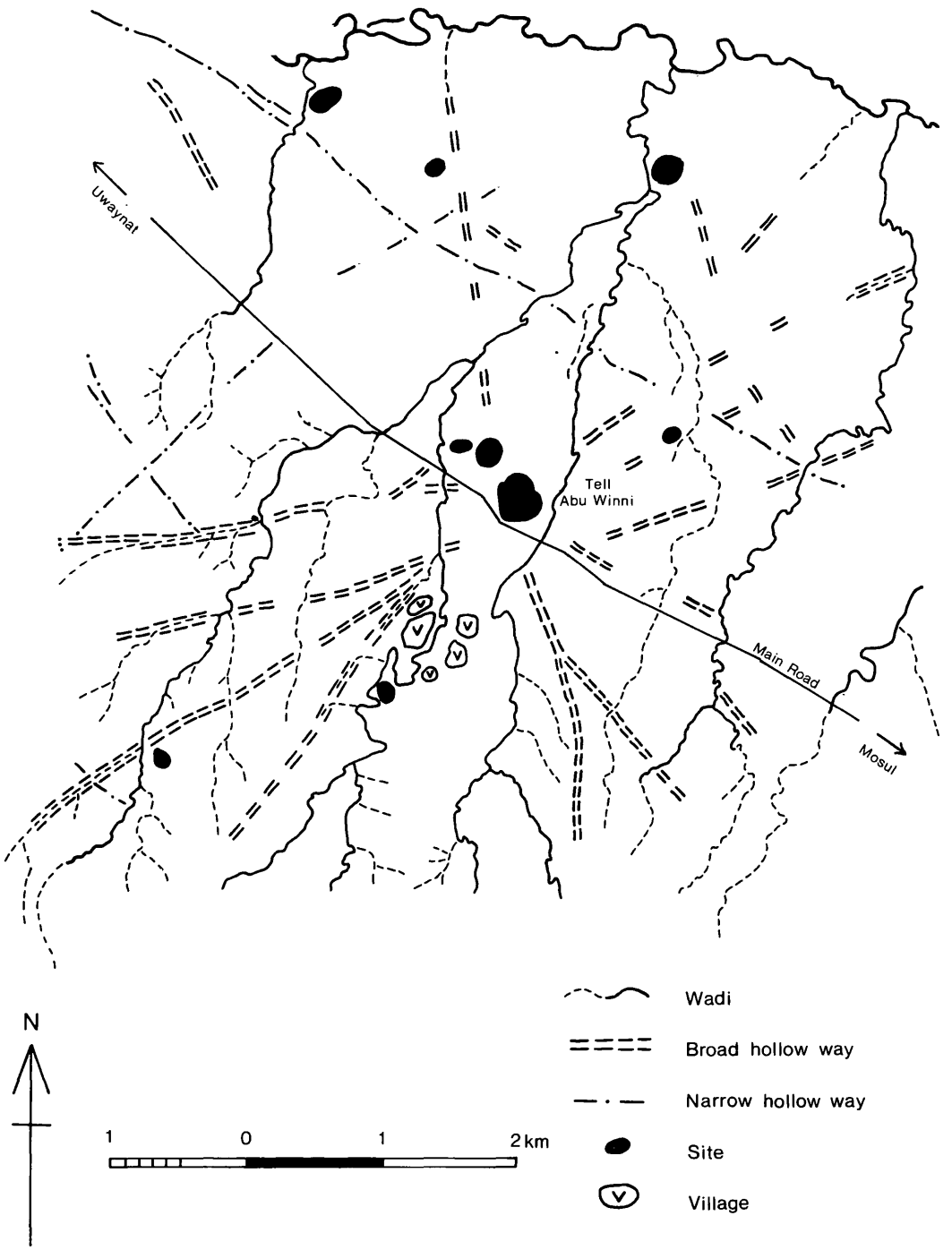

Fig.21 Hollow ways and gully erosion in the vicinity of Tell Abu Winni.

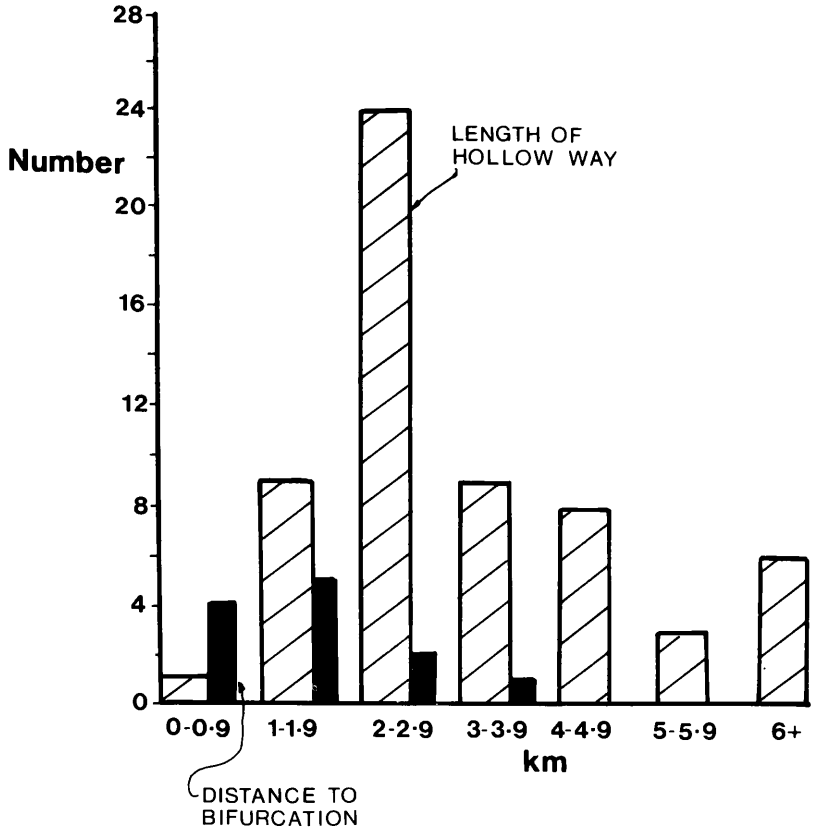

Fig.22 Length of hollow ways around the main centres of Tell al-Hawa, Kharaba Tibn, Abu Winni and Abu Wajnam, and the mean distances to their bifurcation points.

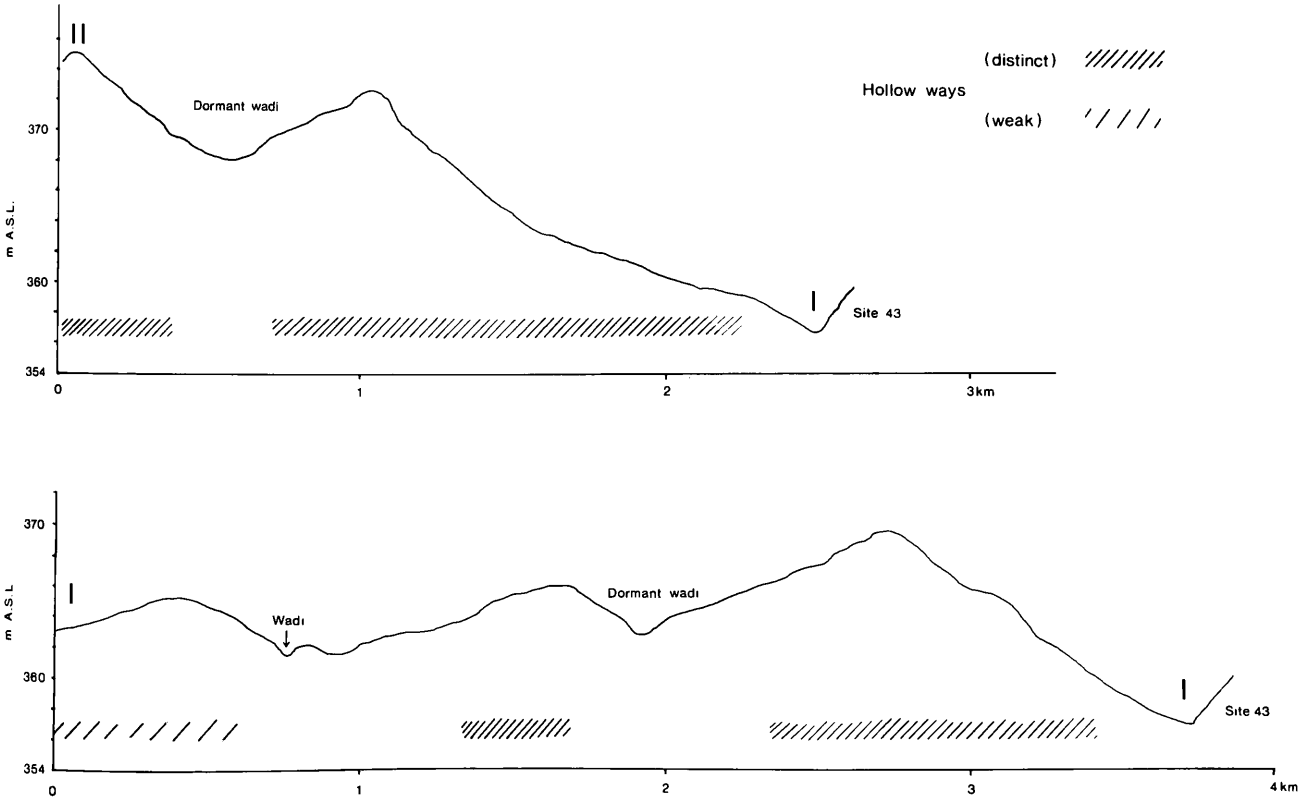

Fig.23 Long profiles of hollow ways indicated on Figure 20. Note: vertical exaggeration x 50.

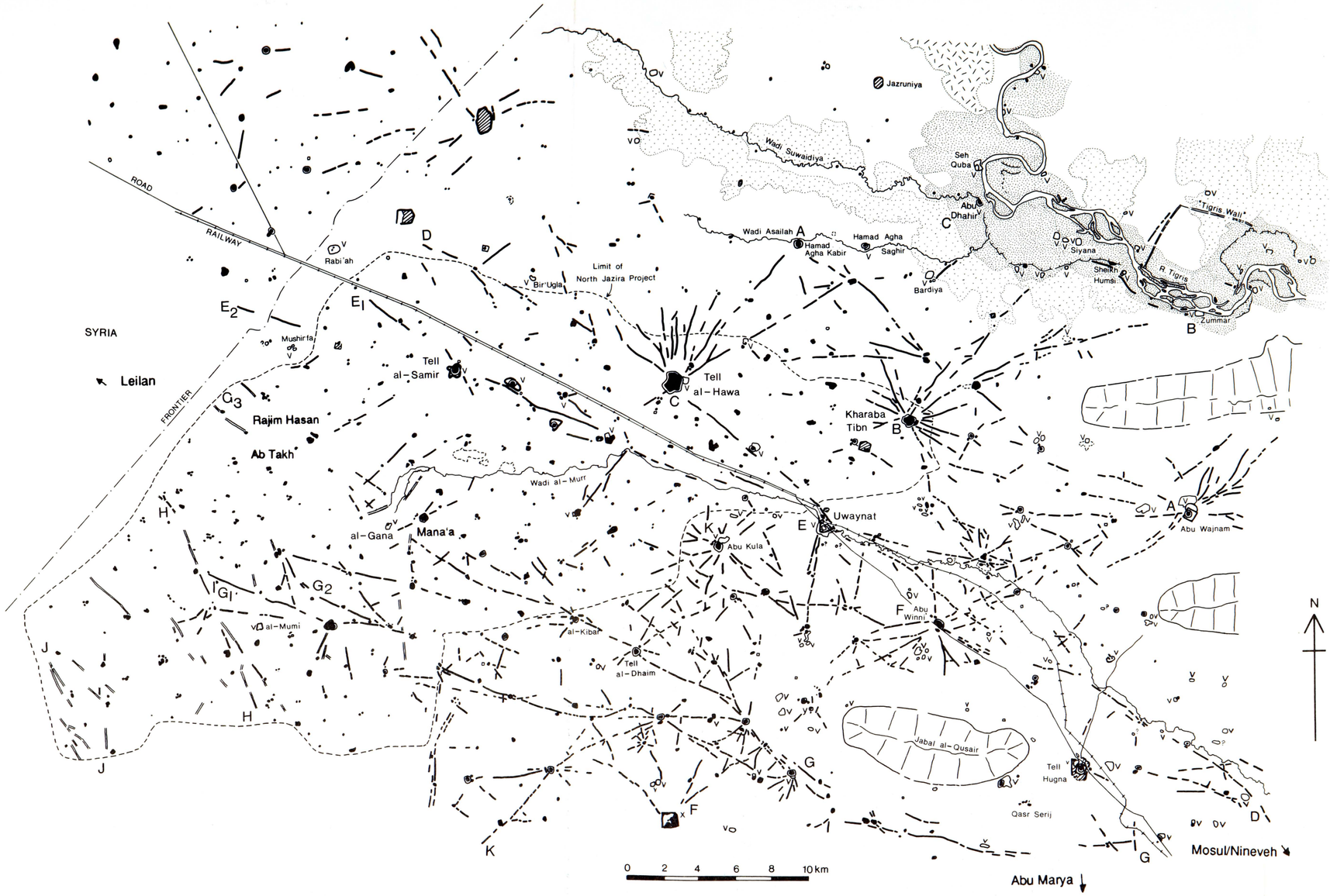

Fig.24

Main sites and hollow ways in the north Jazira plain and adjacent areas (for location see Fig.1). Where blacked in, sites and hollow ways were mapped from air photographs; where open (i.e. in extreme SW of area) they were mapped from Landsat TM images and other sources. Where blank, the terrain comprises loams and clays of varying depth that are almost everywhere cultivable. The linear feature immediately upstream of Sheikh Humsi on the Tigris is ambiguous, but may be a canal trace. Jazruniya, Seh Quba, Abu Dhahir, Siyana, Sheikh Humsi and Hamad Agha Saghir, as well as various sites around Bardiya and Zummar, are described in Ball, Simpson and Tucker (forthcoming). Other important multi-period sites with (probably) Bronze Age occupation are Tells Hamad Agha Kabir, Abu Wajnam, Abu Winni, Huqna, al-Dhaim, al-Kibar, Abu Kula and Uwaynat (cross-referenced in Appendix C). The Sasanian monastic site of Qasr Serij is described in Oates (1968).

The large enclosure ("Tigris wall") on the N (left) bank of the Tigris went unrecorded prior to the flooding of the area by Lake Saddam. On air photographs it forms an apparent narrow earthen bank or eroded mud-brick wall approximately 2-5 m wide. Towards its E end the N wall may have formed a negative feature as a result of gully erosion. Gaps in the W wall may be gates, but some are clearly eroded by wadis. What appears to be a square terminal tower is situated at the S extremity of the W wall overlooking the Tigris flood plain. It is situated opposite a possible similar tower/small enclosure at Sheikh Humsi, but these two features may not be directly related. Parallel to the W enclosure wall is a possible hollow way, of indeterminate relationship to the W wall. The "Tigris wall" is undated but, from its condition, it is not recent. The most plausible date range is from Late Assyrian to Early Islamic. Suggested functions include: a military camp, perhaps associated with Alexander's campaign at Gaugamela or with Roman to Sasanian frontier defences; a "bridgehead" to safeguard a crossing point of the Tigris. Alternatively, the area may have been a partly fortified royal park or garden as described in Dandamaev and Lukonin (1989: 143-44). Such features were favoured by the Persian kings, but could equally be Early Islamic (cf the large enclosure at Musharrahat to the south of Samarra noted by Northedge (1990: fig.25).

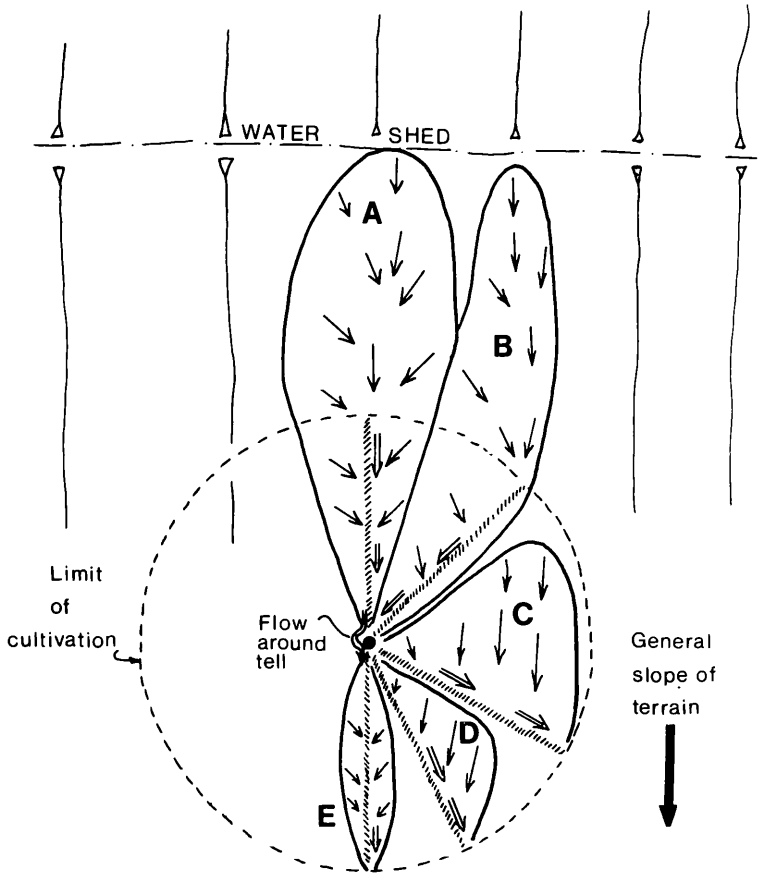

Fig.25 The effect of hollow way drainage catchments on the development of hollow ways.

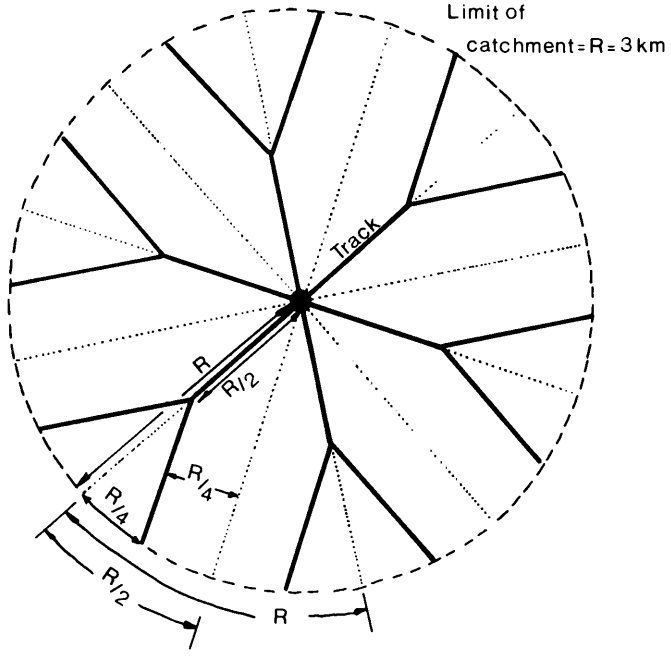

Fig.26 Idealized 6-route layout of hollow ways around central tell showing location of bifurcation points.

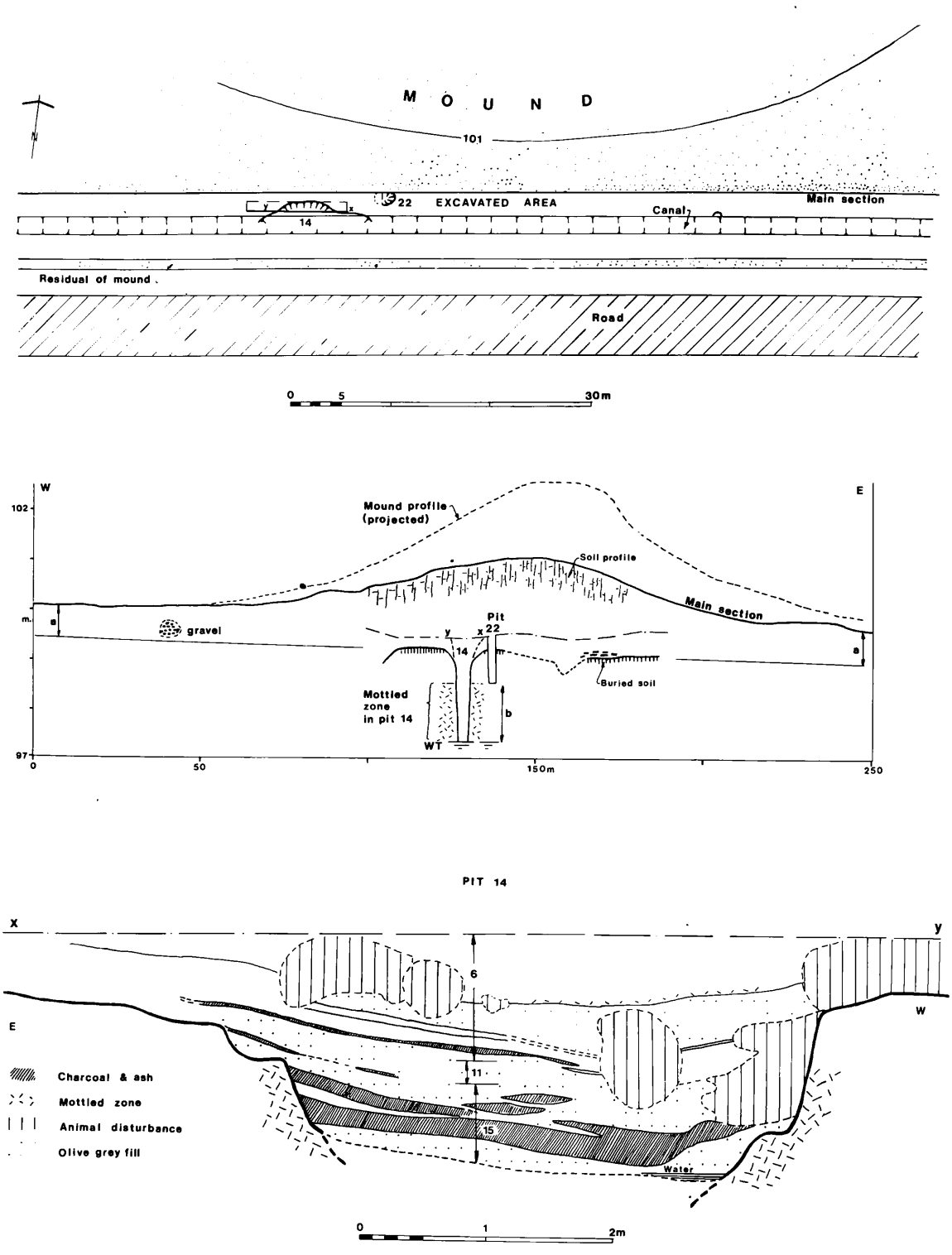

Fig.27 (above) Plan of southern part of Tell Hilwa (Site 86) showing pit 14 in context.
(centre) E-W exaggerated section through Tell al-Hilwa with pit 14 in relation to buried soil, plain surface and modern water table. Note post-occupational rise in plain level (a).
(below) E-W section through pit 14.

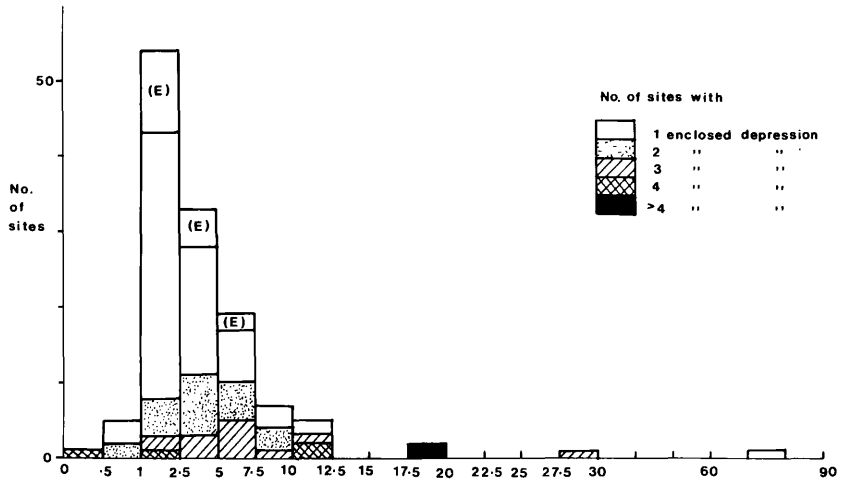

Fig.28 Number and size of sites with enclosed depressions.

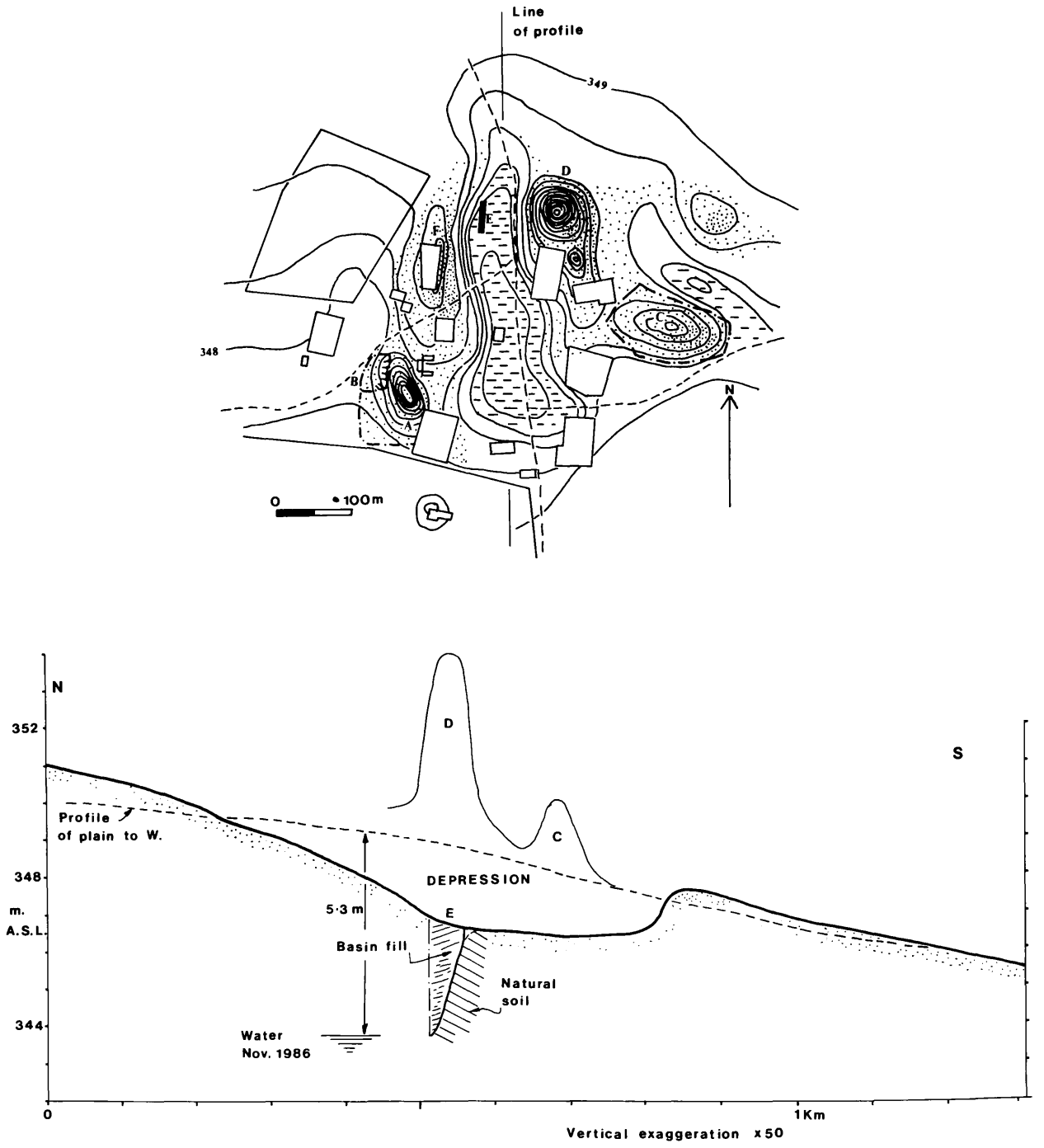

Fig.29 (above) Contour plan of Mowasha (Site 15) showing the extent and position of the enclosed depression (horizontal lines).
(below) N-S profile through Site 15.

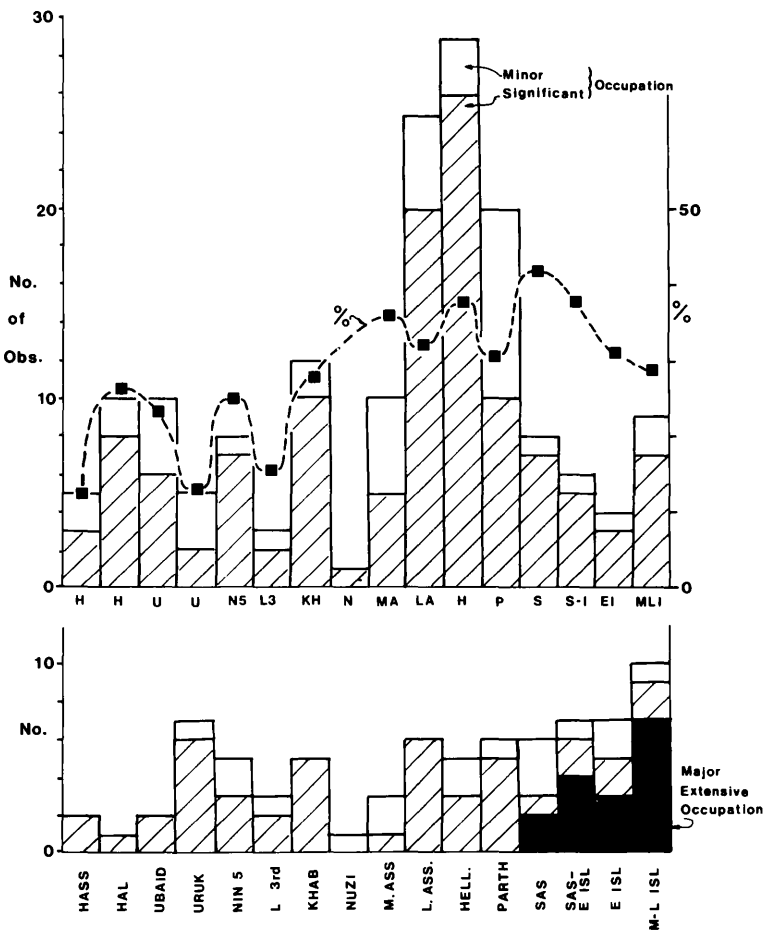

Fig.30 The number of sites with enclosed depressions according to dates of occupation.
(above) 1-2 enclosed depressions per site.
(below) >3 enclosed depressions.

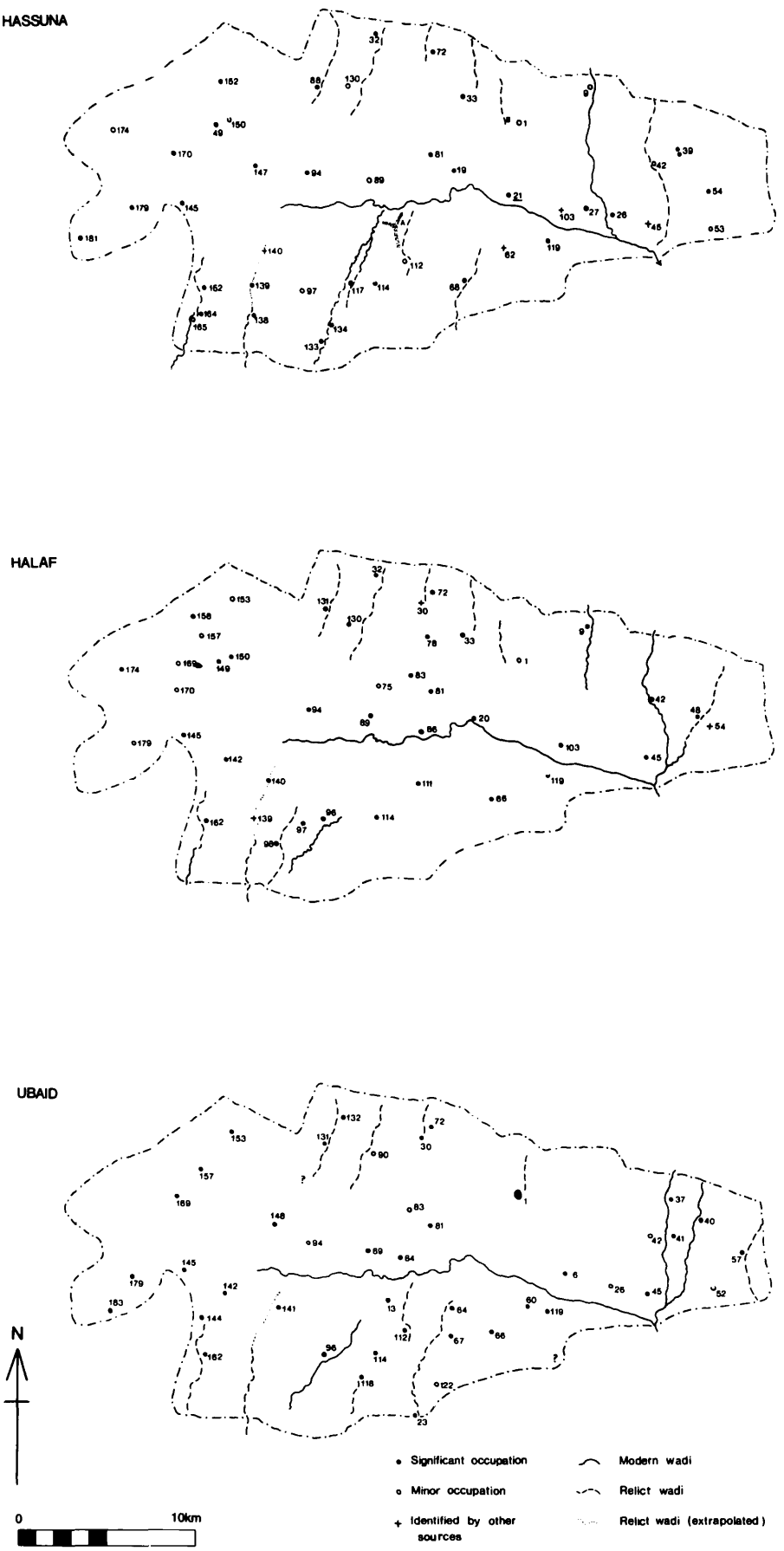

Fig.31 Distribution of Hassuna, Halaf and Ubaid sites.

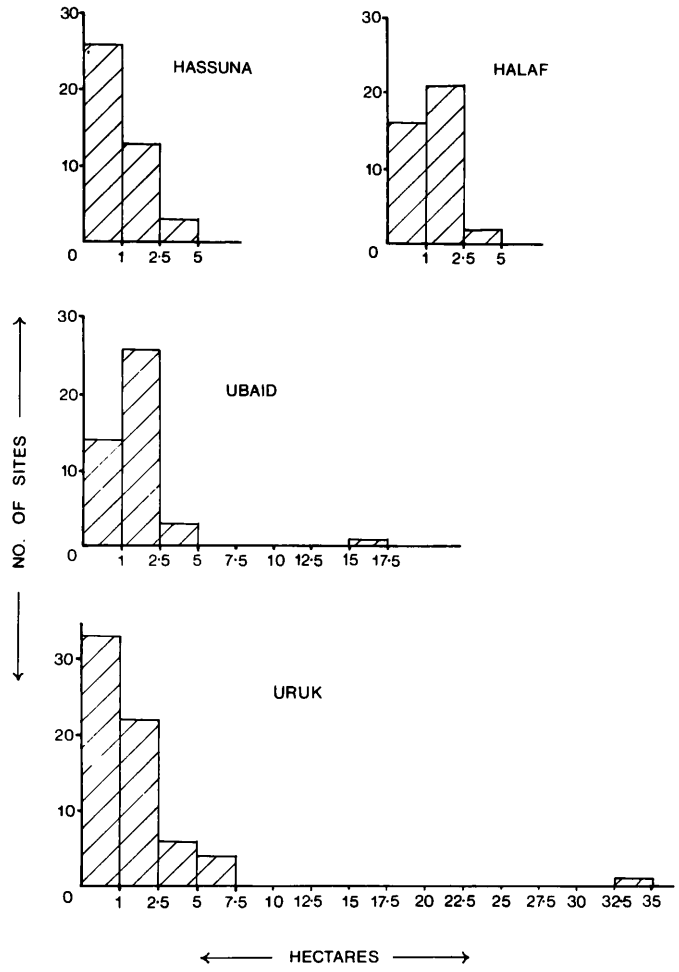

Fig.32 Size distribution of Hassuna, Halaf, Ubaid and Uruk sites.

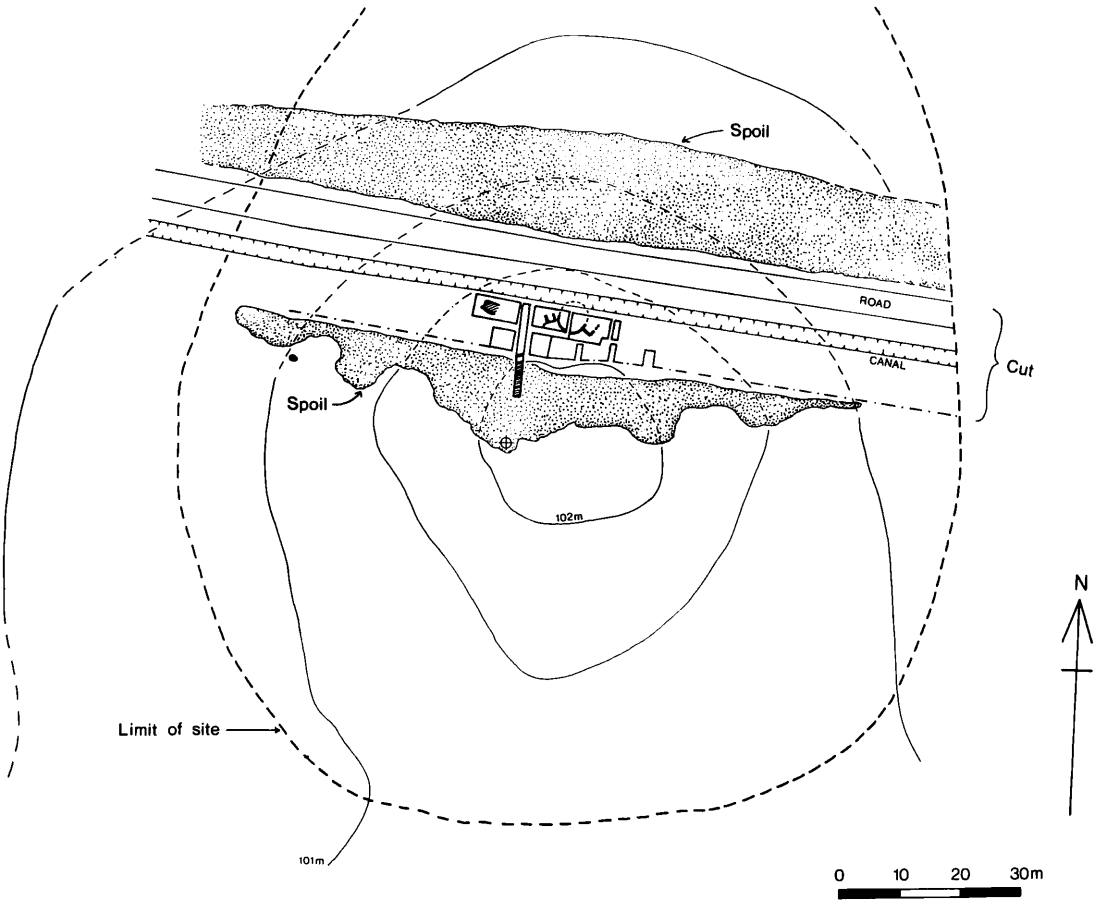

Fig.33 The Ubaid site of Khanijdal East (Site 66).

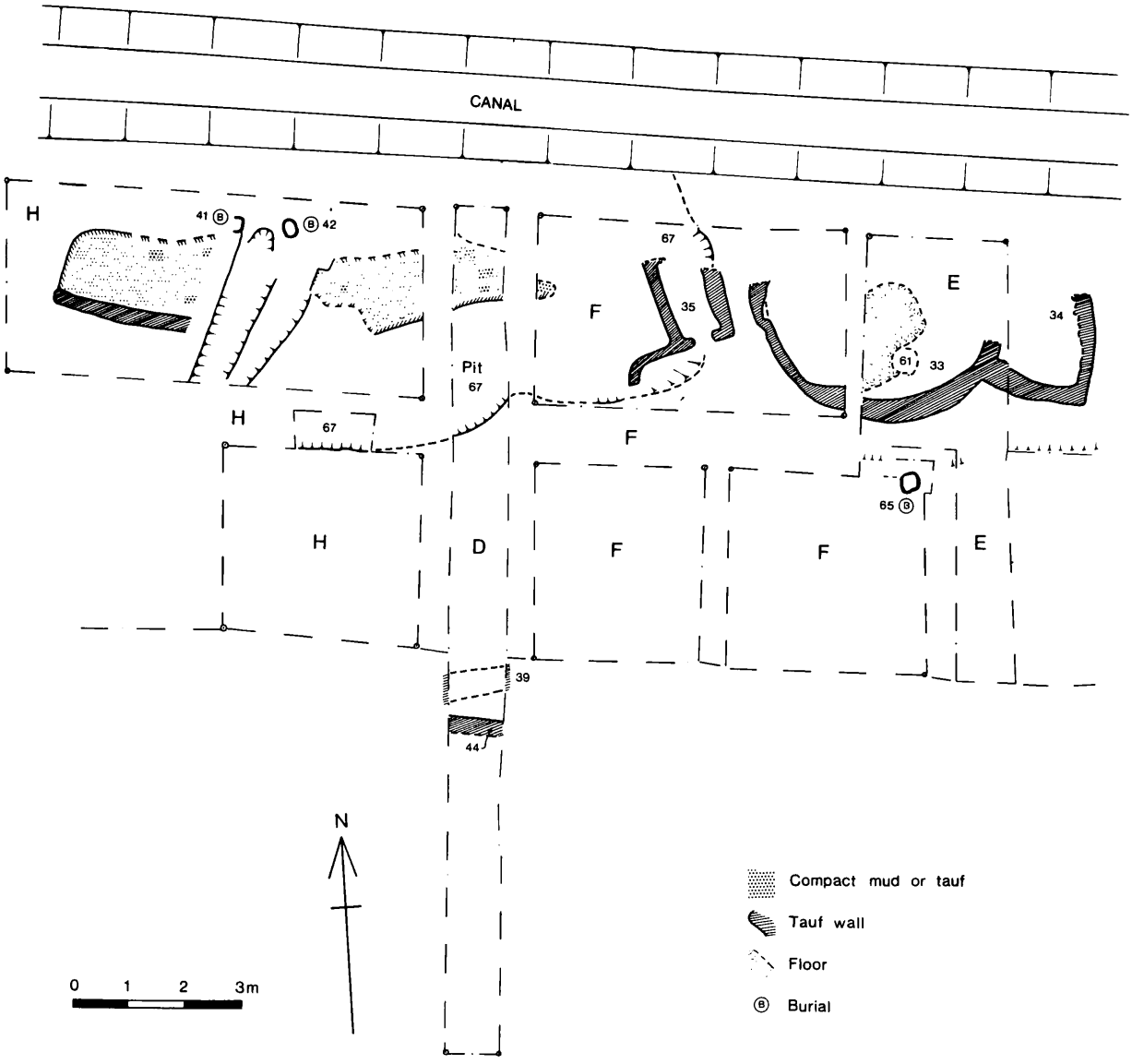

Fig.34 The excavated area at Khanijdal East showing built structures of Ubaid date.

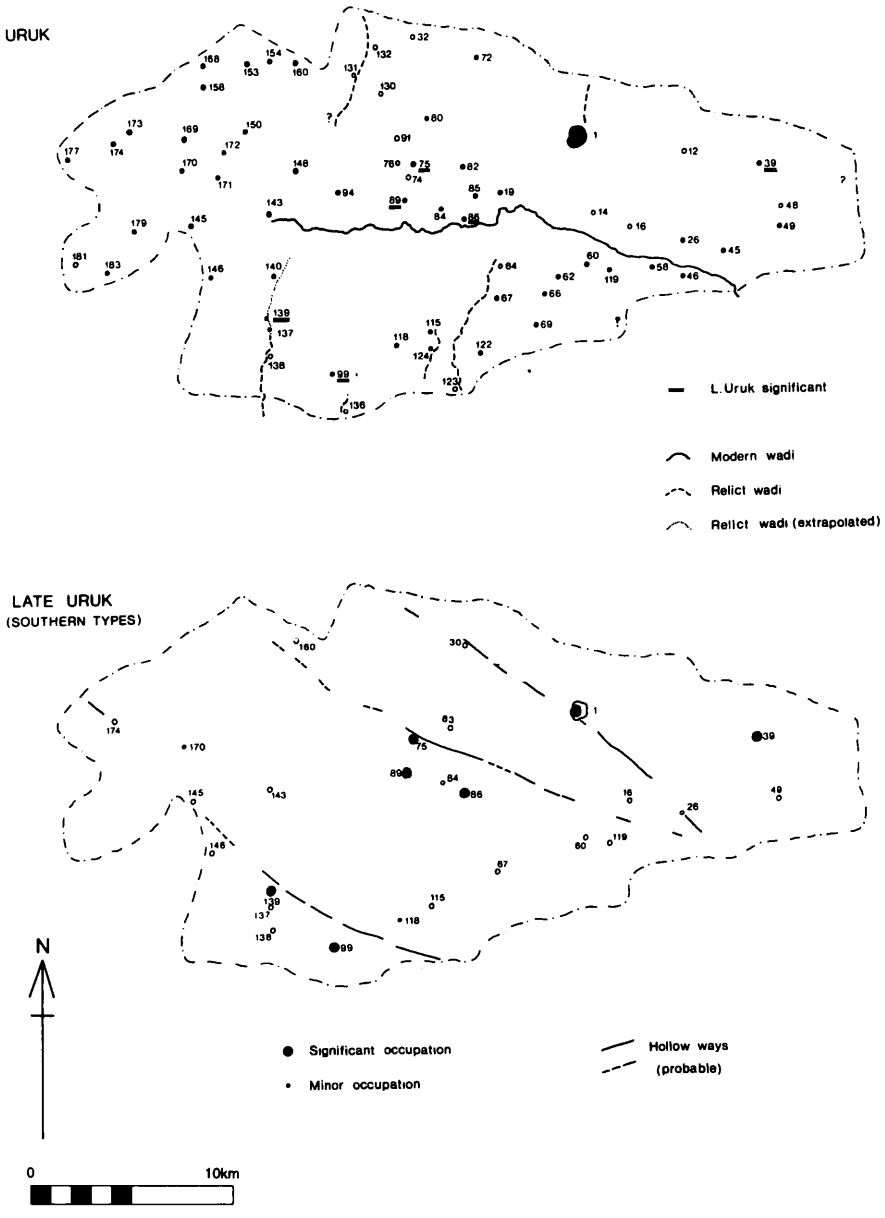

Fig.35 Distribution of earlier Uruk and Late (i.e. "southern") Uruk sites.

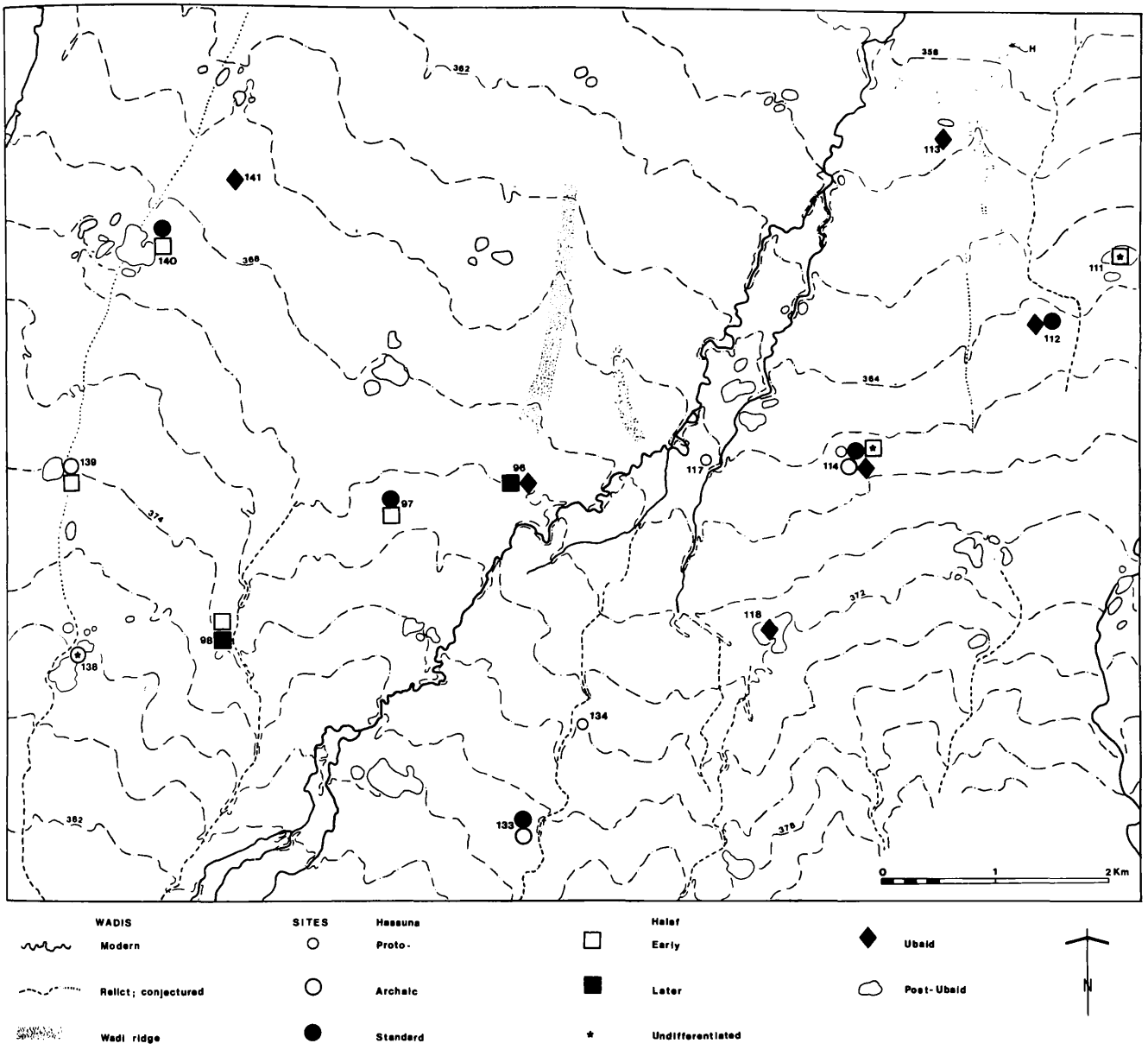

Fig.36 Detail of small area of south central part of plain showing the distribution of Hassuna, Halaf and Ubaid sites, sub-divided according to phase (detailed phasing information supplied by S. Campbell).

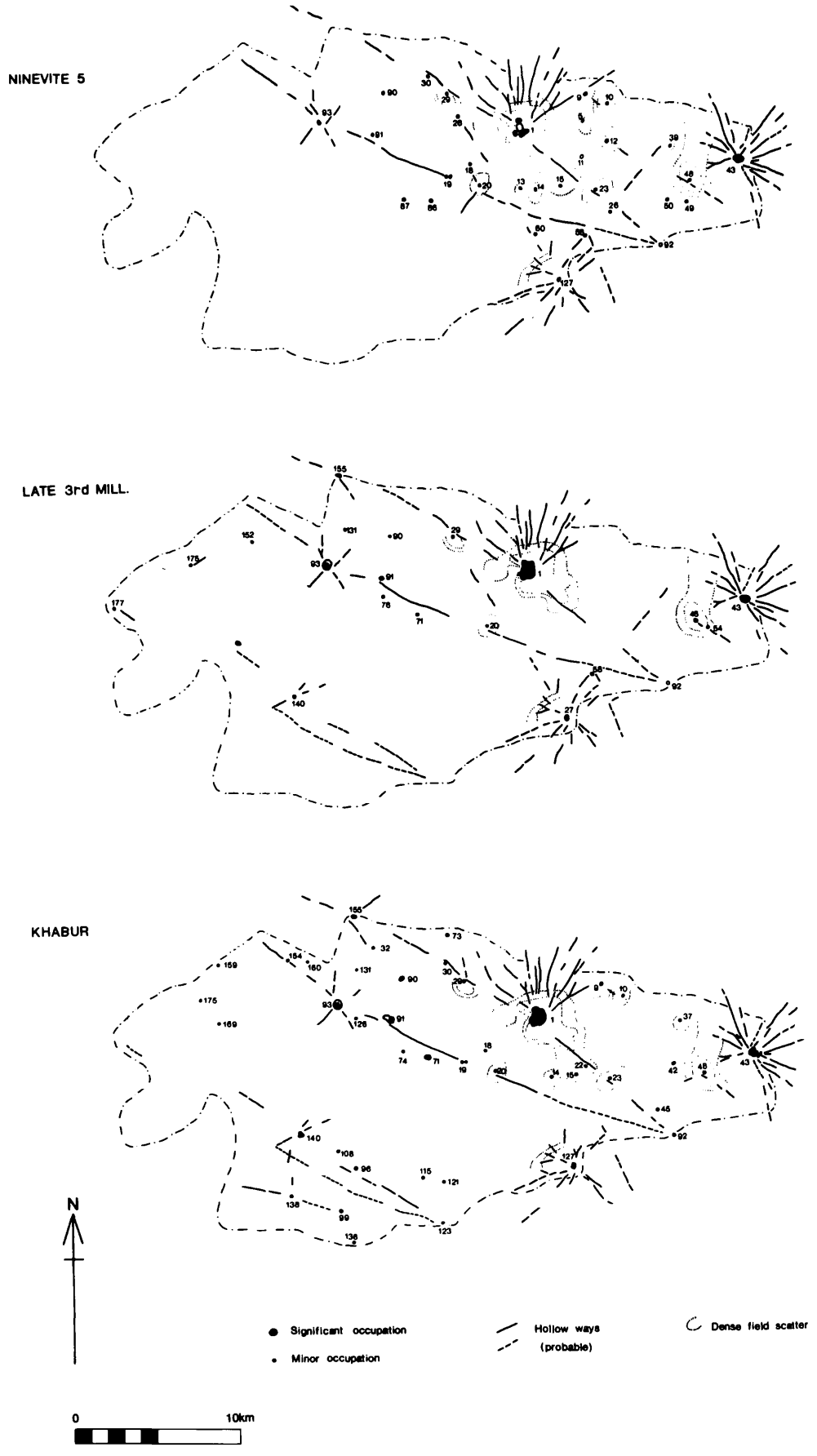

Fig.37 Distribution of Ninevite 5, later 3rd millennium and Khabur sites. For details of field scatter densities see Fig. 60 (above).

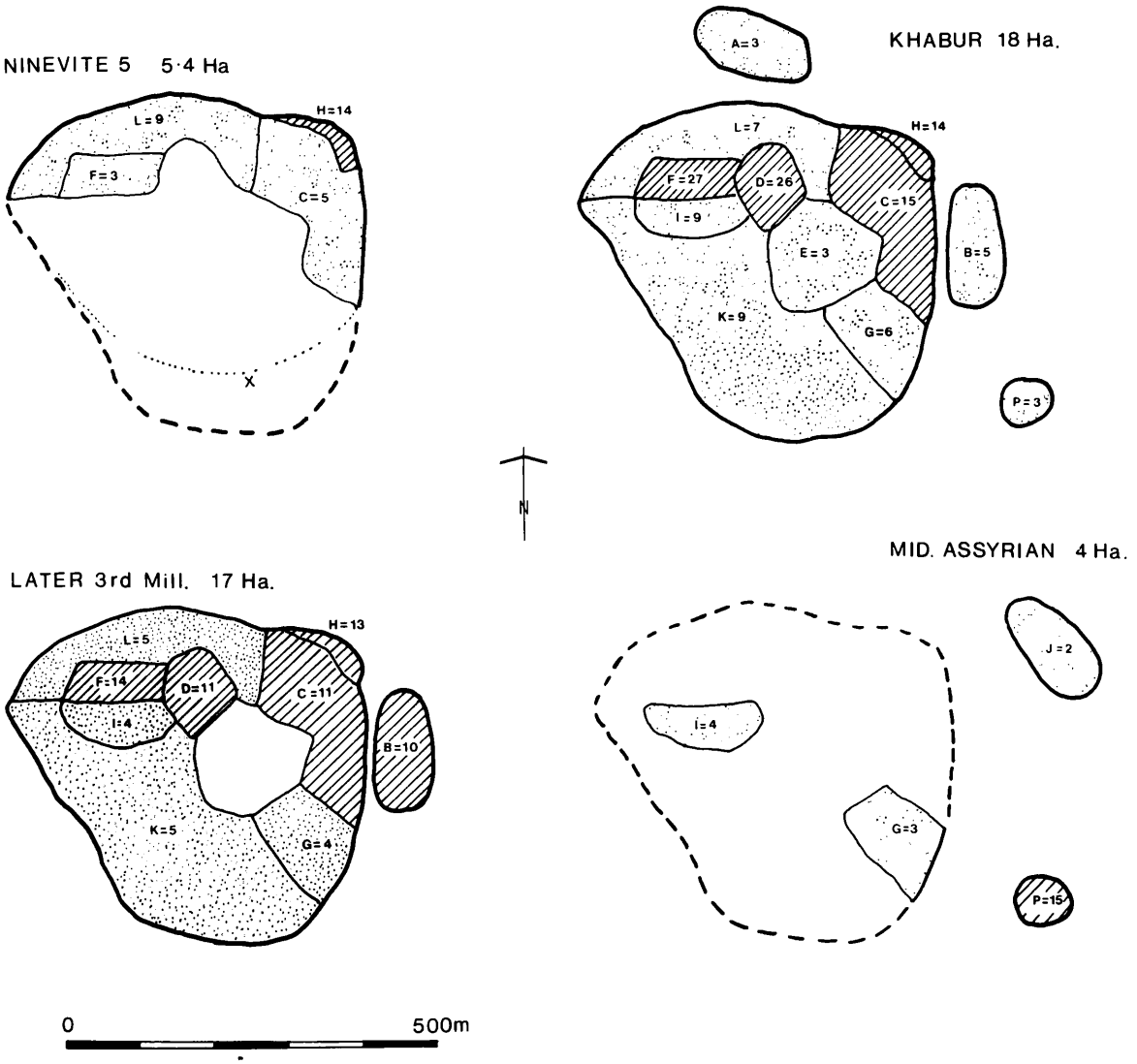

Fig.38 Phases of occupation at Kharaba Tibn (Site 43). Numbers of diagnostic sherds for each area given as D=11 etc. Stipple: <10 sherds per field collection area. Hatched: >10 sherds per area. x indicates the extrapolation (by eye) of the possible extent of the buried Ninevite 5 occupation.

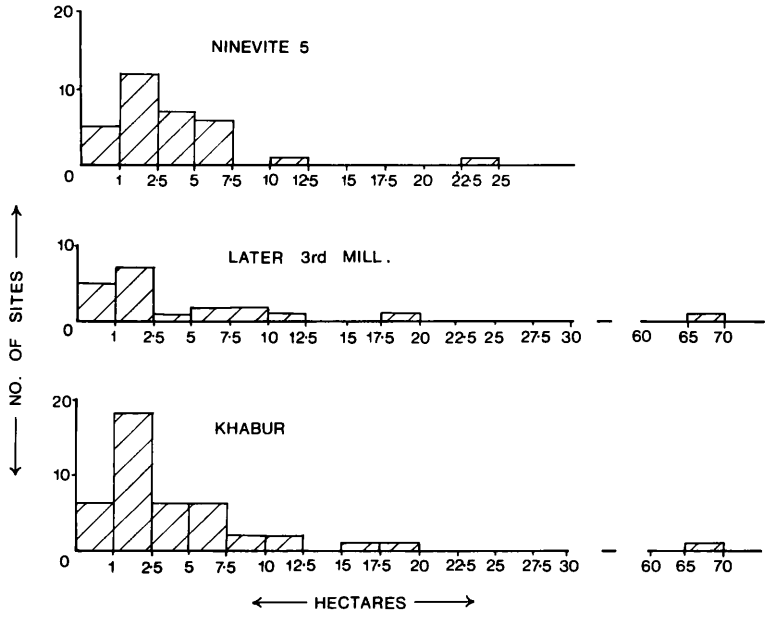

Fig.39 Size distribution of Ninevite 5 to Khabur period sites.

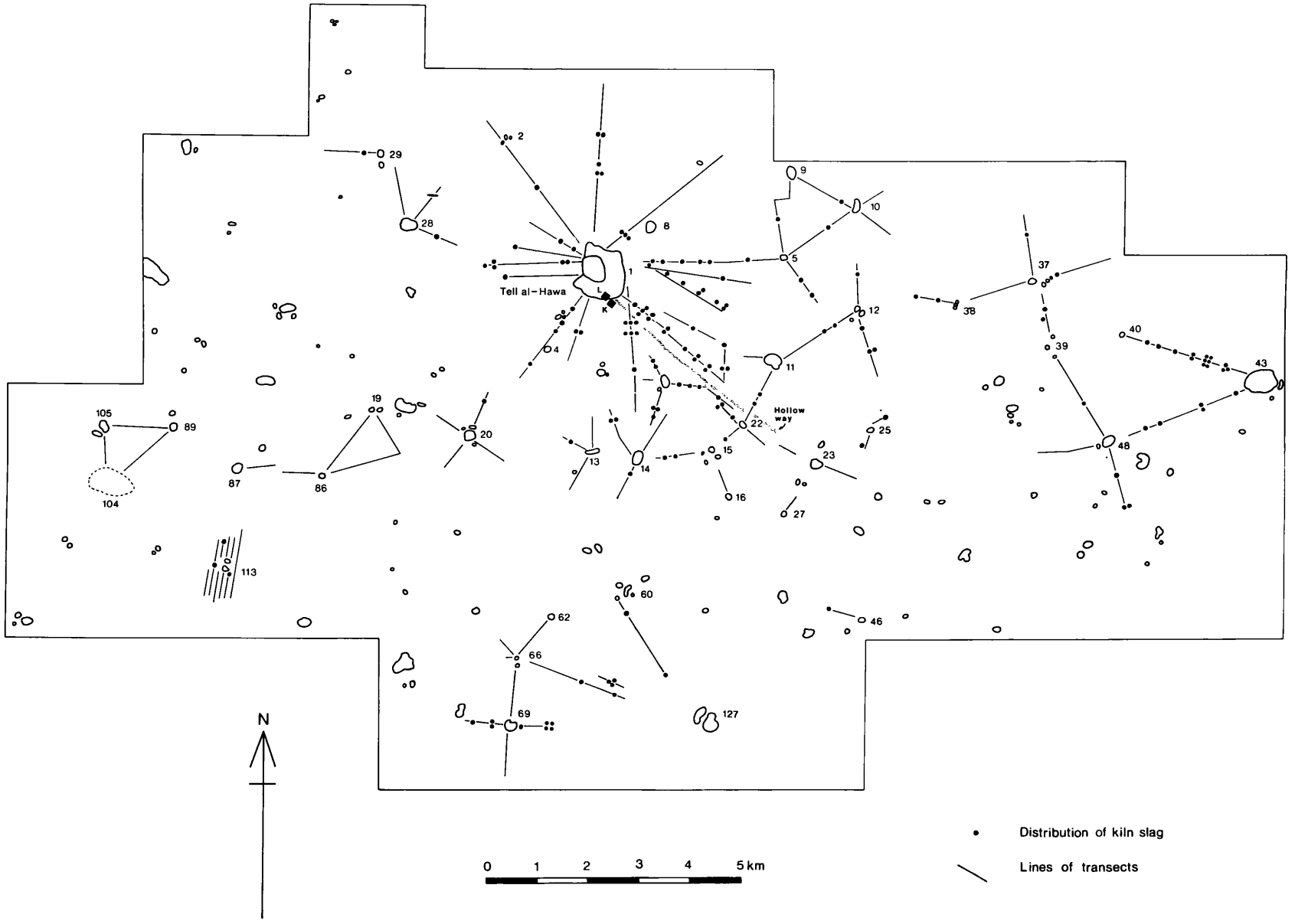

Fig.40 Distribution of kiln slag from field scatter sample squares. K and L are the later 3rd millennium kiln sites at Tell al-Hawa.

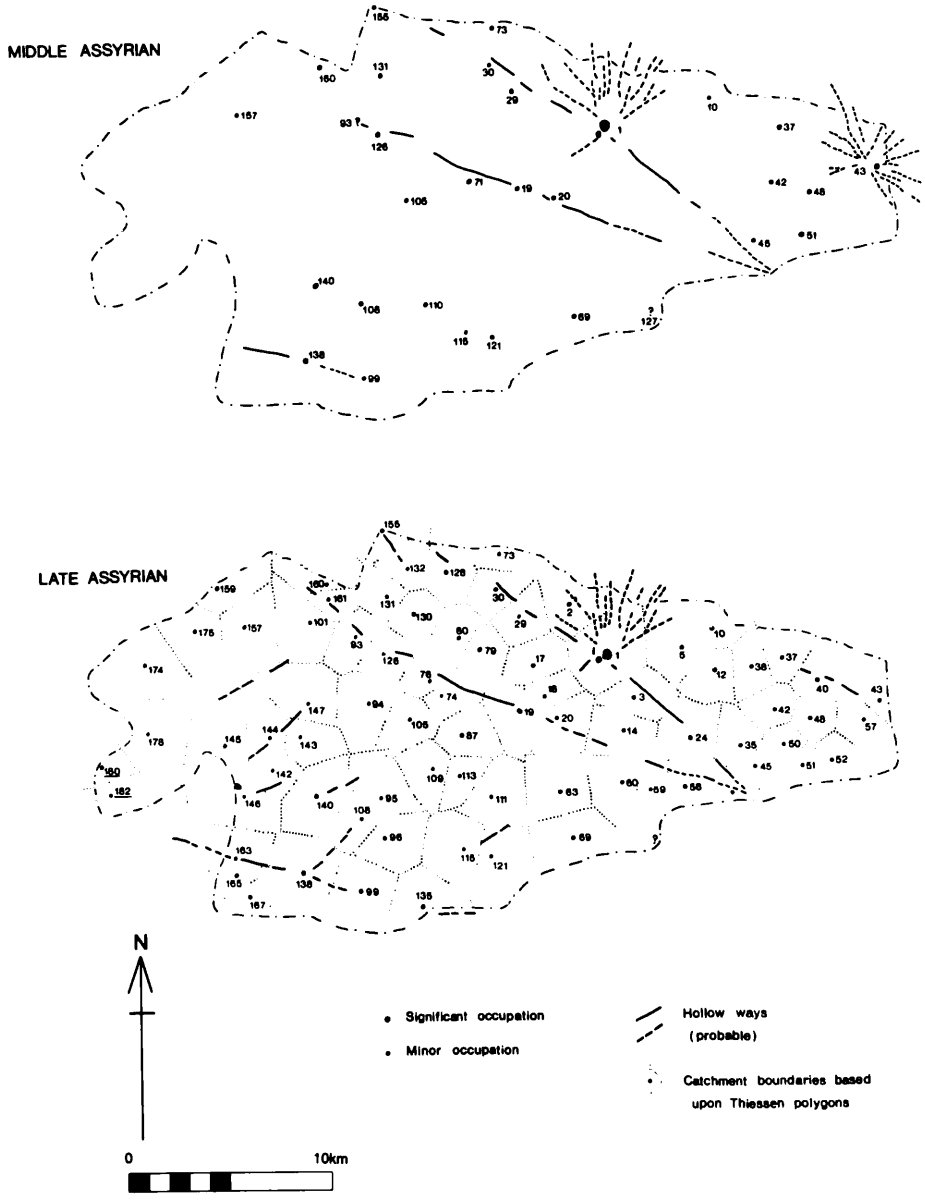

Fig.41 Distribution of Middle and Late Assyrian sites.

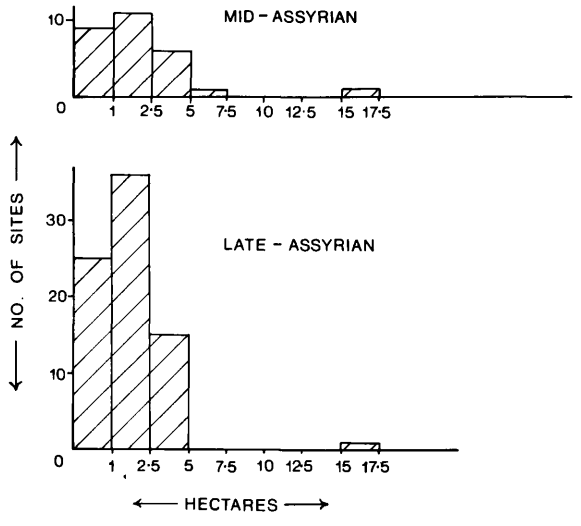

Fig.42 Size distribution of Middle and Late Assyrian sites.

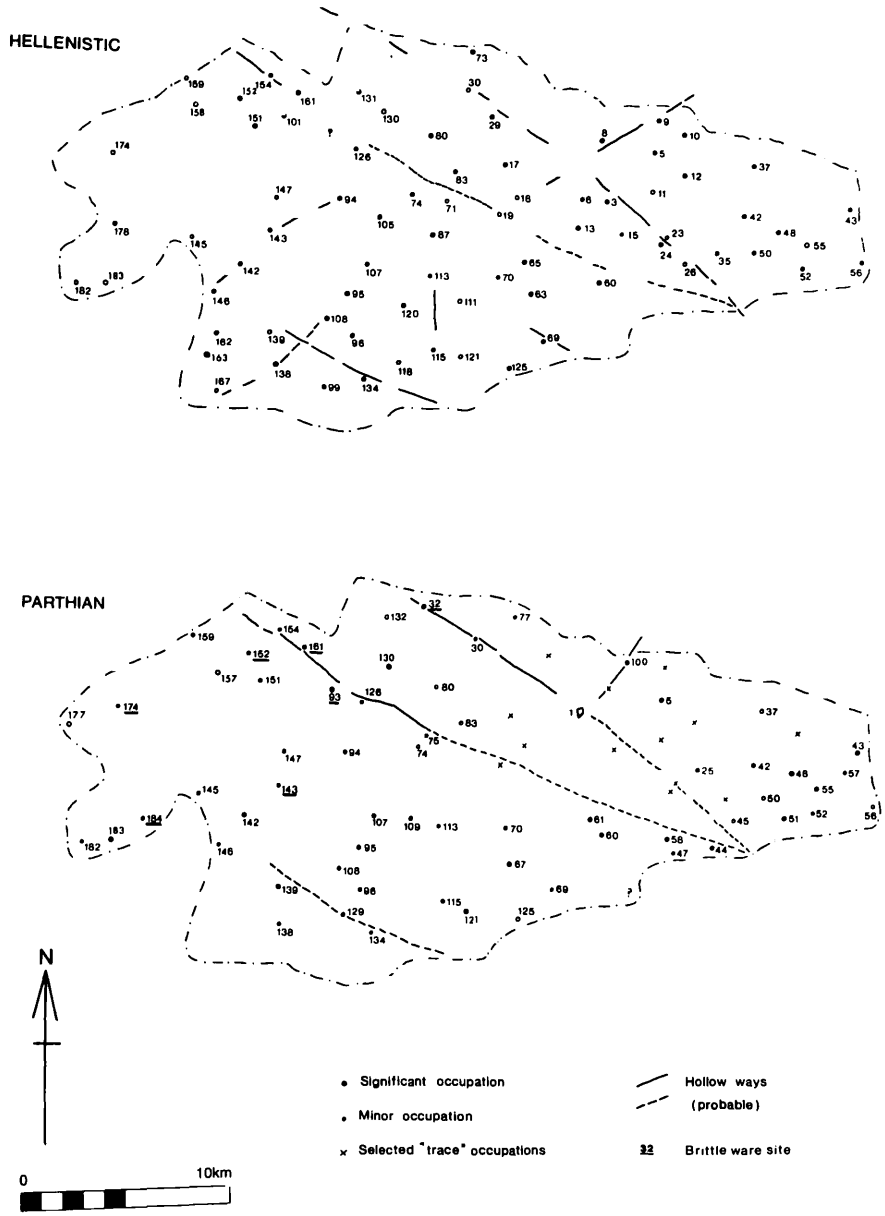

Fig.43 Distribution of Hellenistic and Parthian sites. For definition of "trace" occupation, see text p.67.

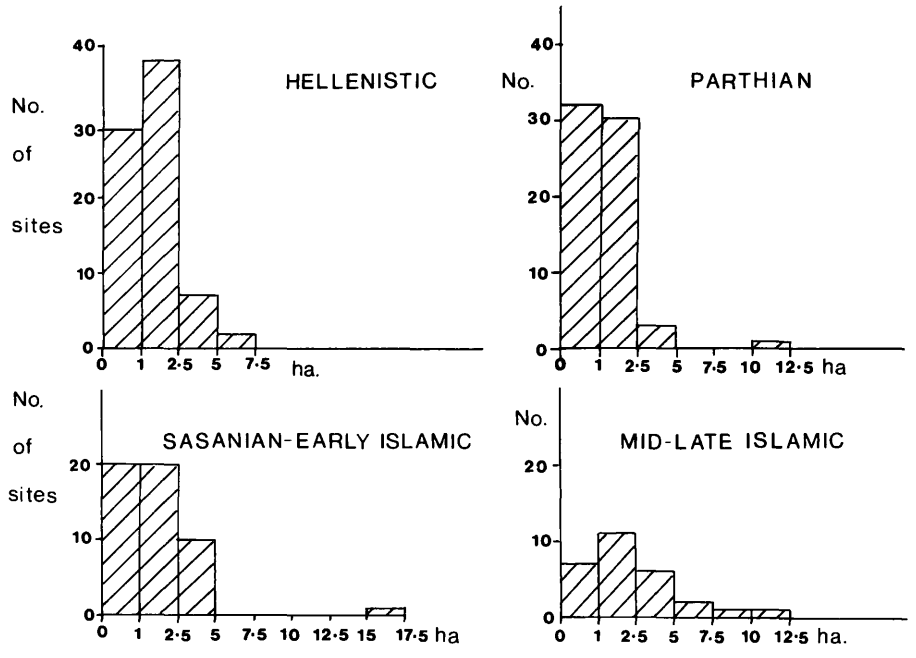

Fig.44 Size distribution of Hellenistic to Middle-Late Islamic sites.

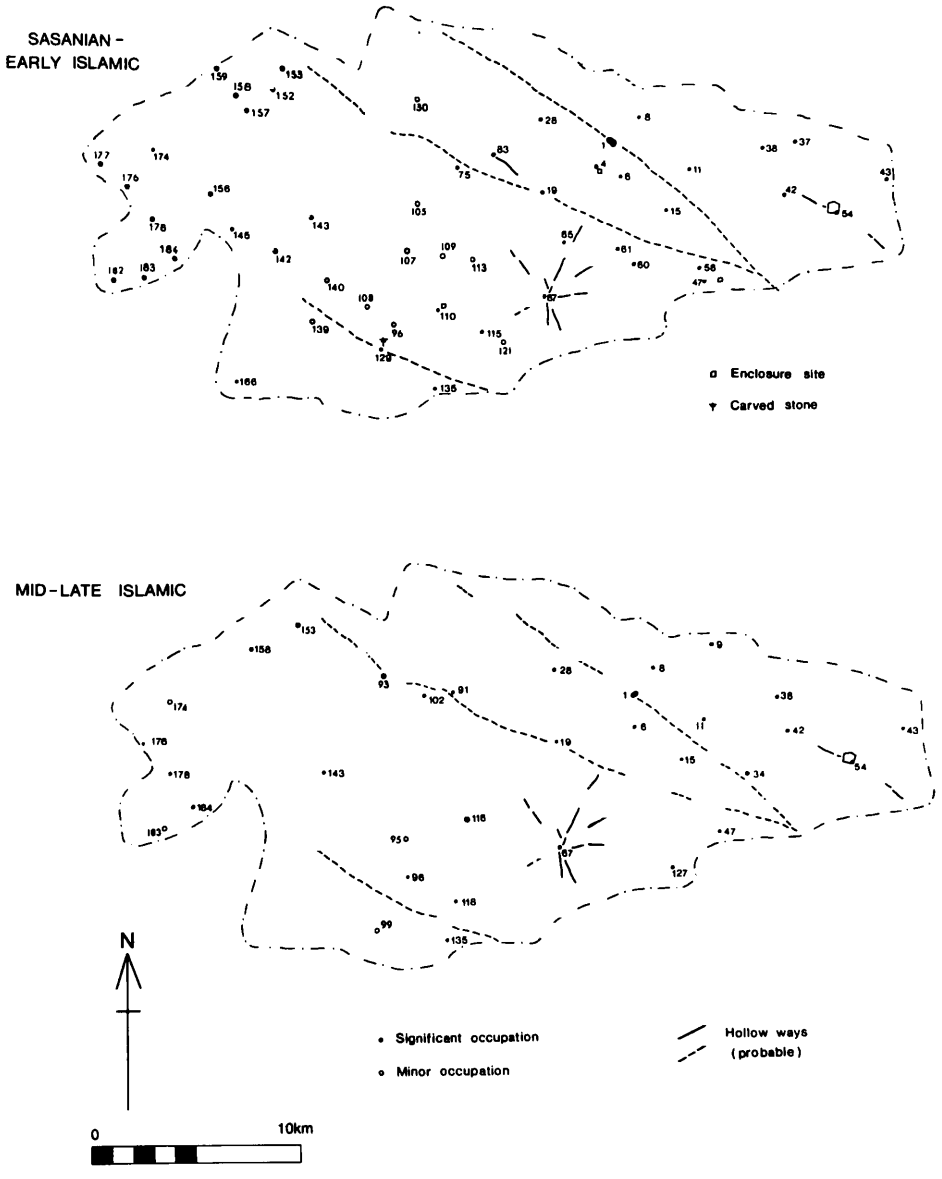

Fig.45 Distribution of Sasanian-Early Islamic sites (above) and Middle-Late Islamic sites (below).

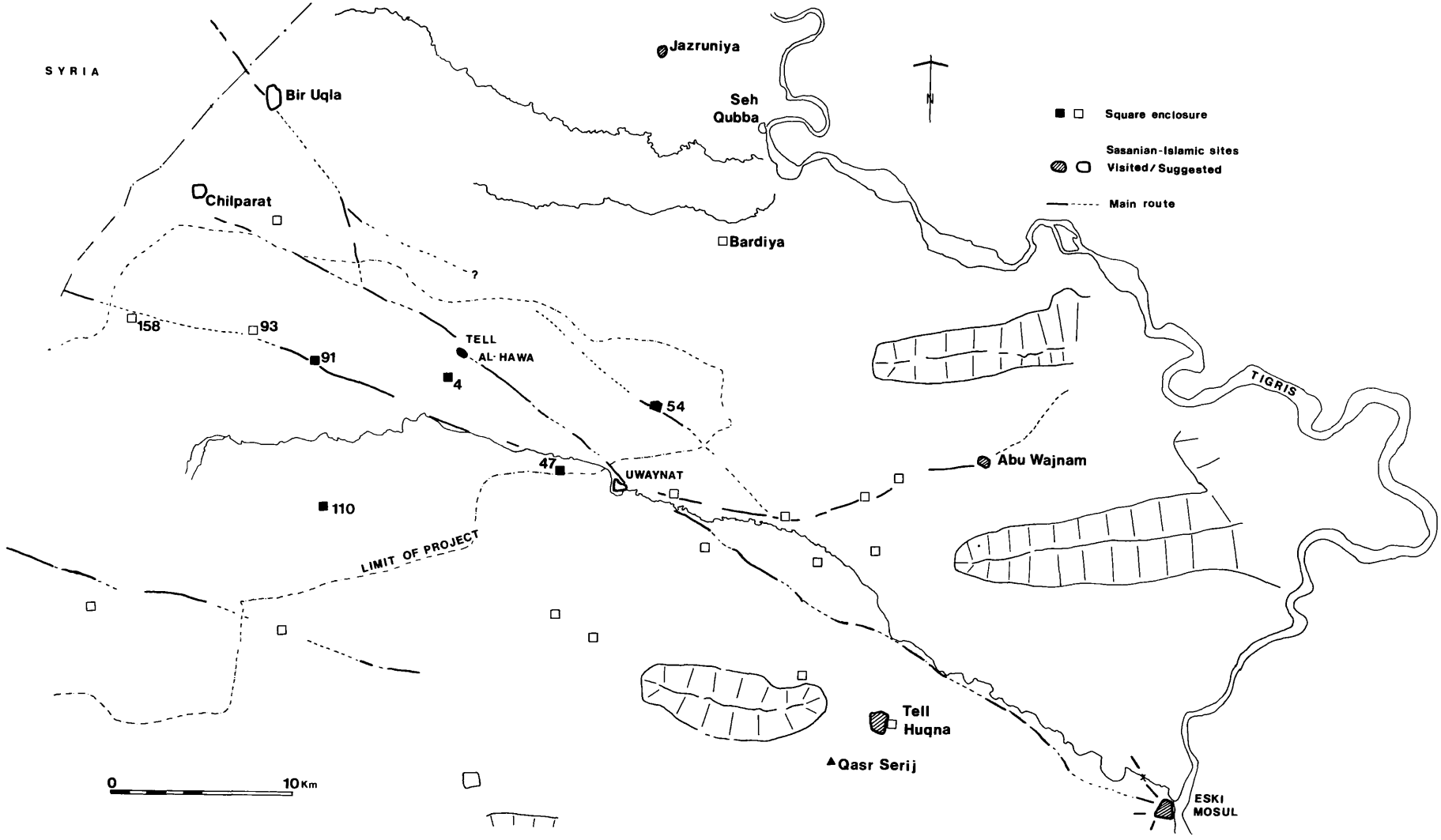

Fig. 46 Main Sasanian-Islamic sites in NW Iraq. Sites shown as infilled squares and other solid black symbols were collected as part of the North Jazira Project. Hatched sites were visited at other times. Open symbols represent updated sites which are probably of Sasanian/Islamic date. Bir 'Uqla = Barqa'id? (see text p. 72).

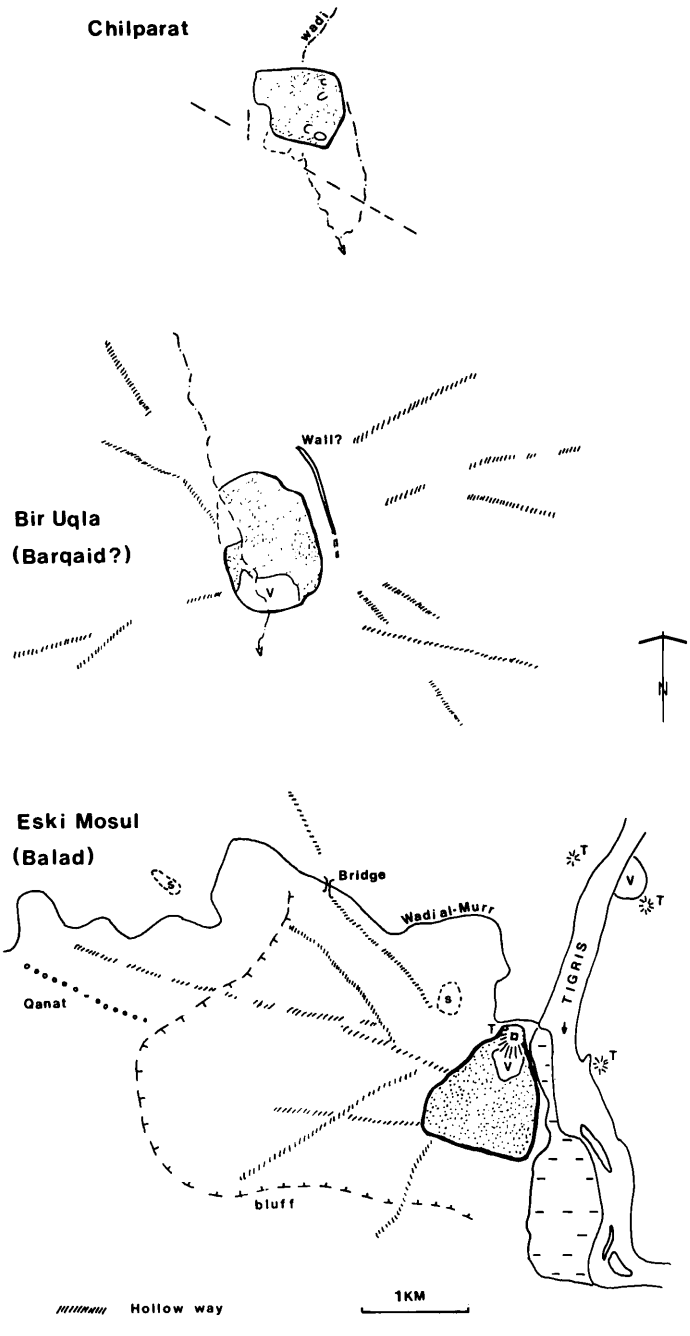

Fig.47 Sketch plans of selected Sasanian-Islamic sites. Occupation mounding stippled. T=Tell, V=Modern Village, s=site.

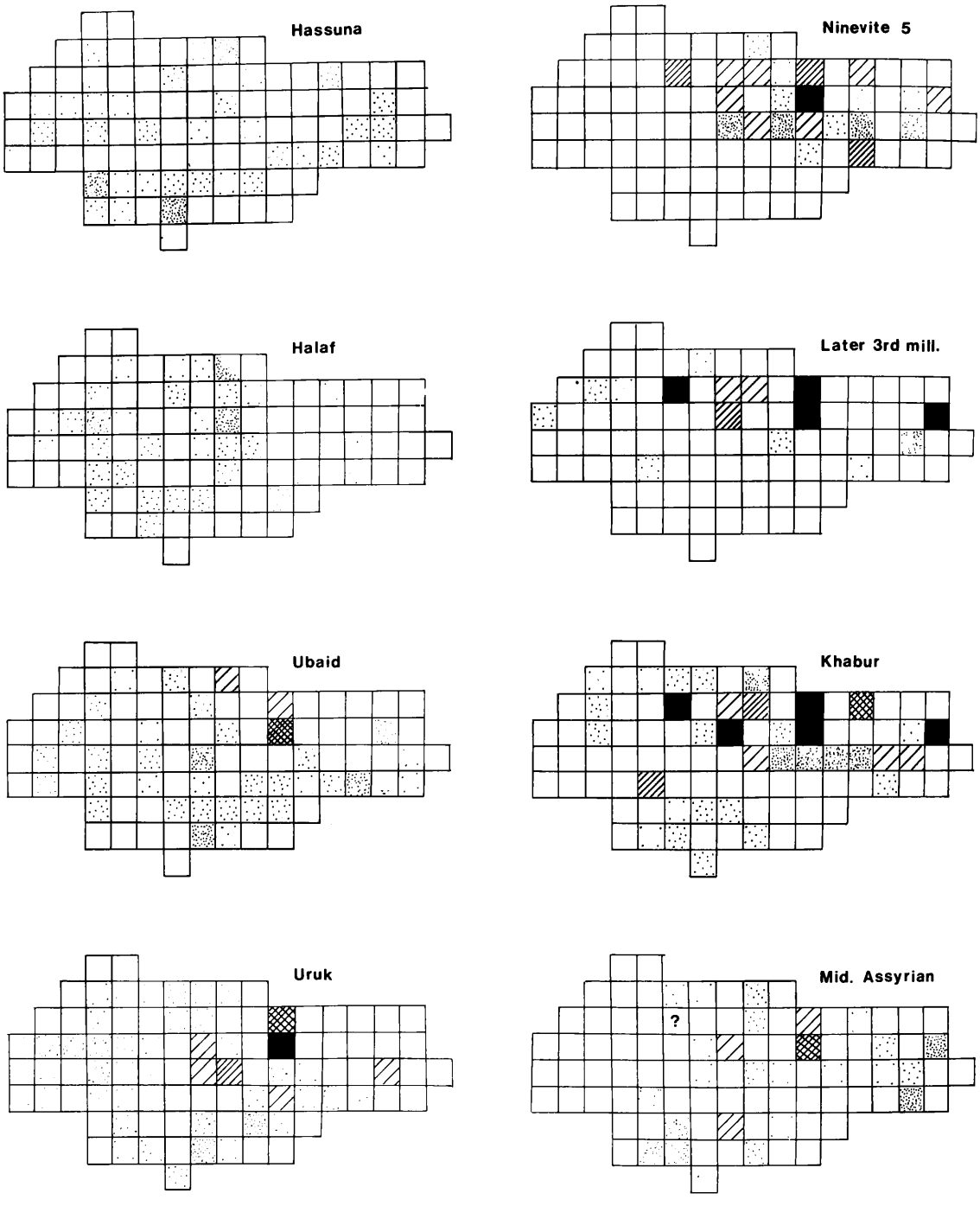

Fig.48 Aggregate site area in ha per 2.5 km quadrat (i.e. 6.25 sq km): Hassuna to Middle Assyrian. For key see Fig.49.

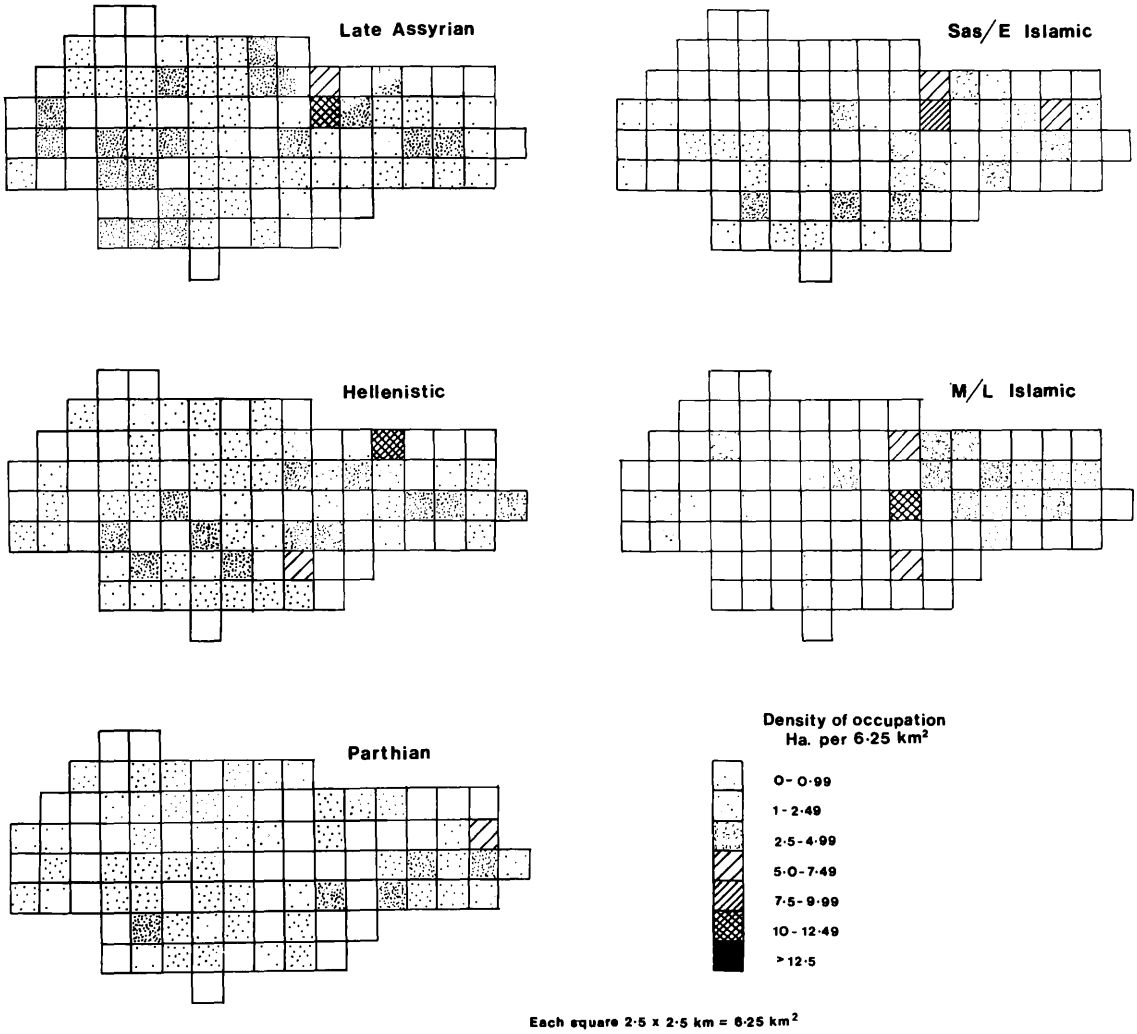

Fig.49 Aggregate site area in ha per 2.5 km quadrat: Late Assyrian to Middle-Late Islamic.

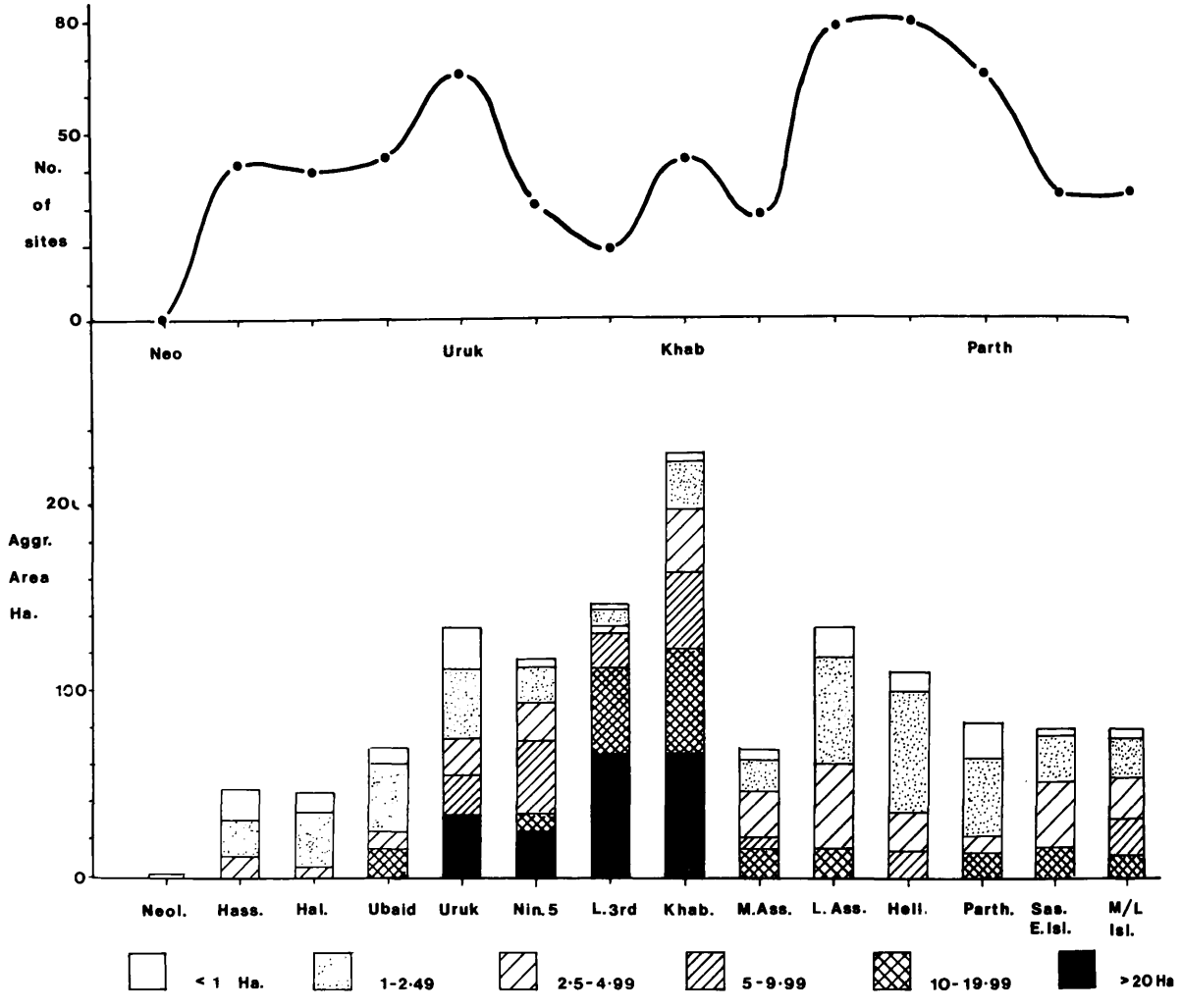

Fig.50 *(above) Number of sites within the survey area, Neolithic to Middle-Late Islamic (n=184 sites). (below) Aggregate site area for each period. Shading indicates the aggregate area of sites of each size class.*

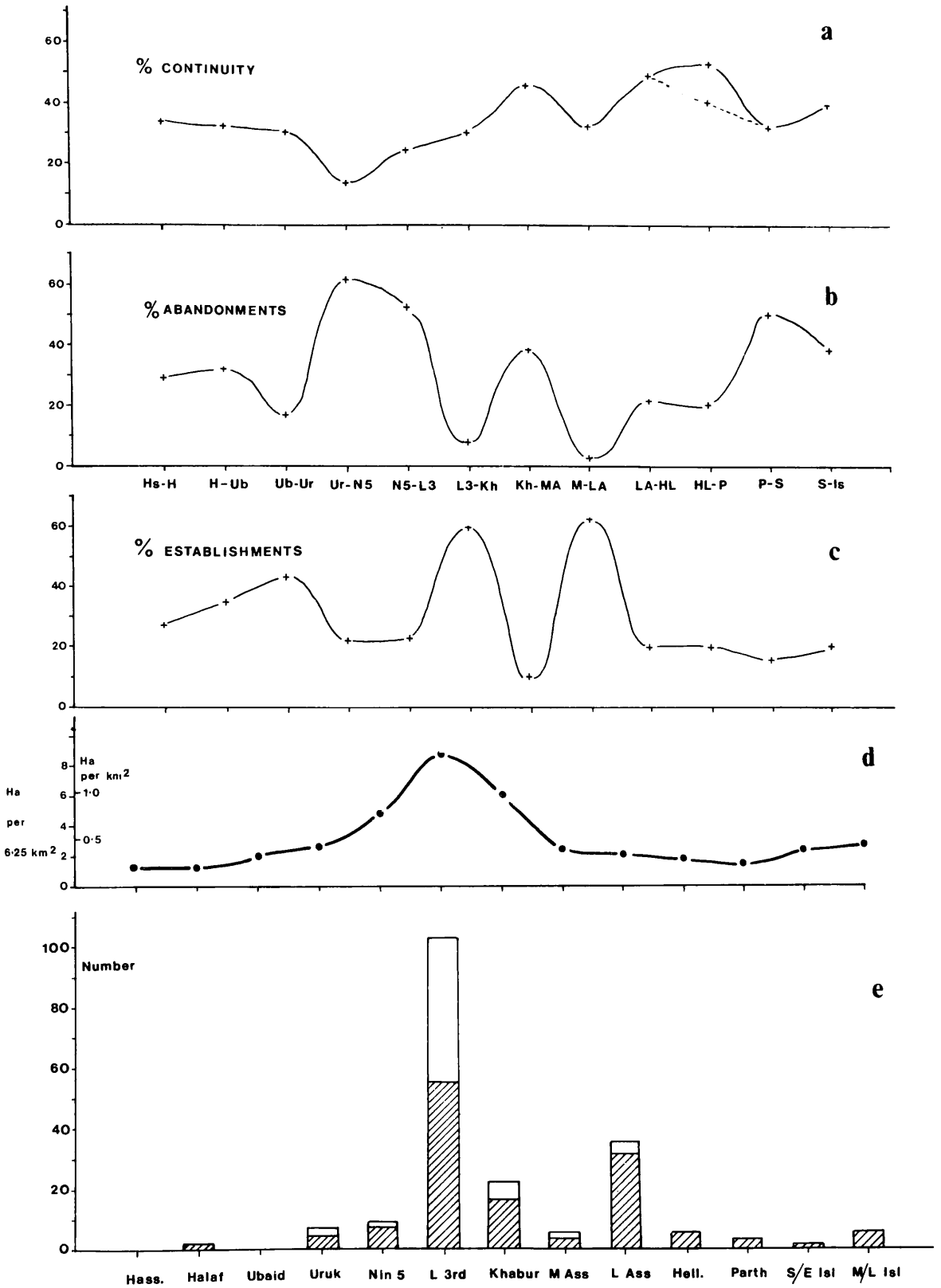

Fig.51. *a) % continuity of occupation between successive periods: Hassuna-Halaf (Hs-H), Halaf-Ubaid (H-Ub) etc.*

b) % of sites abandoned between successive periods.

c) % of new sites established between successive periods. For explanation of derivation of these statistics, see text Chapter 9.

d) Mean density of occupation in ha per 2.5 km quadrat through time (i.e. local population density or population concentration).

e) Number of diagnostic sherds within field scatter sample squares for each time period (taken as rough guide to the intensity of manuring in antiquity). Reliable diagnostics (according to Type Series) are hatched; probable diagnostics are open.

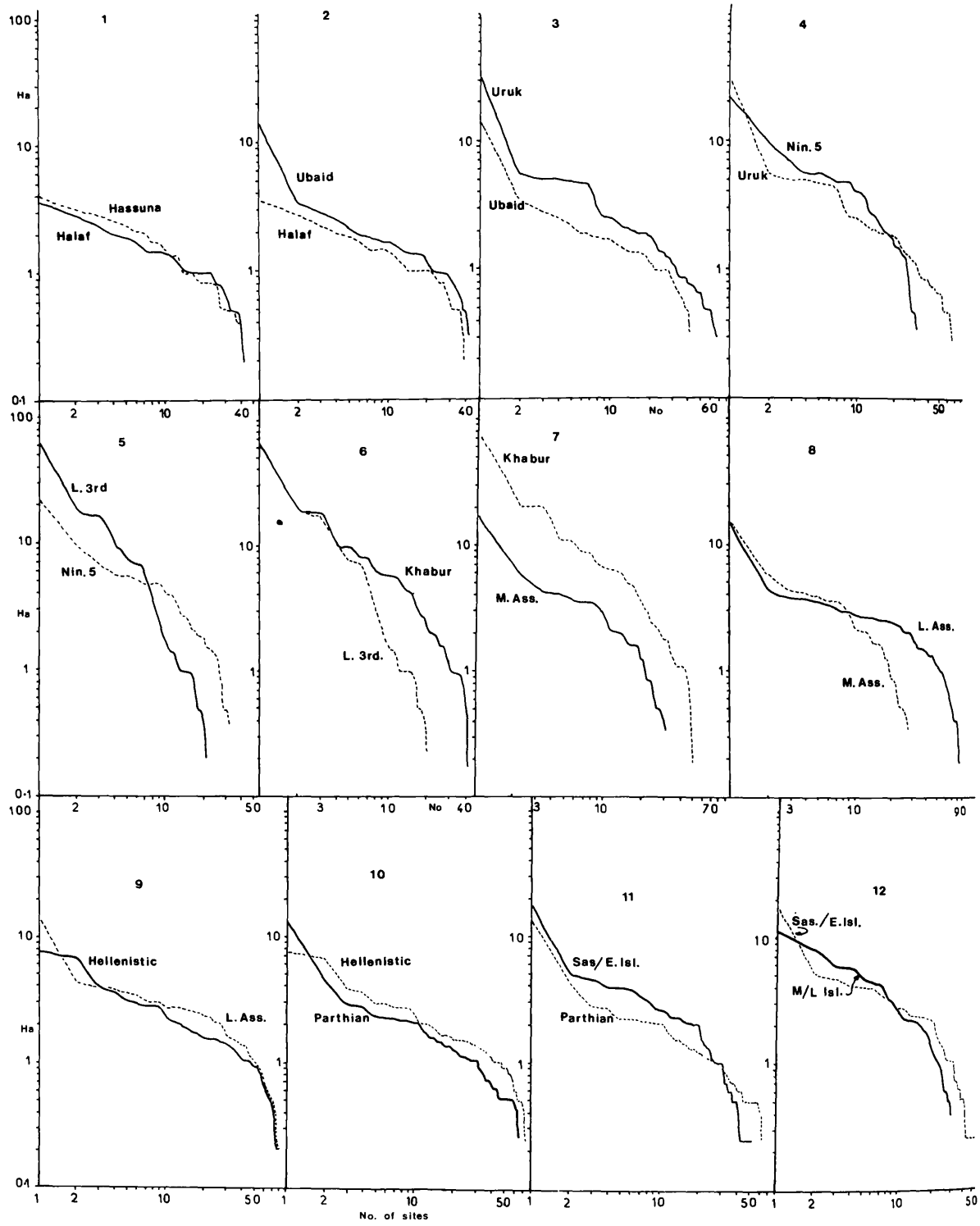

Fig.52 Rank-size plots of settlement size through time. Note: for comparison the preceding phase is indicated by a broken line; scales are log-log.

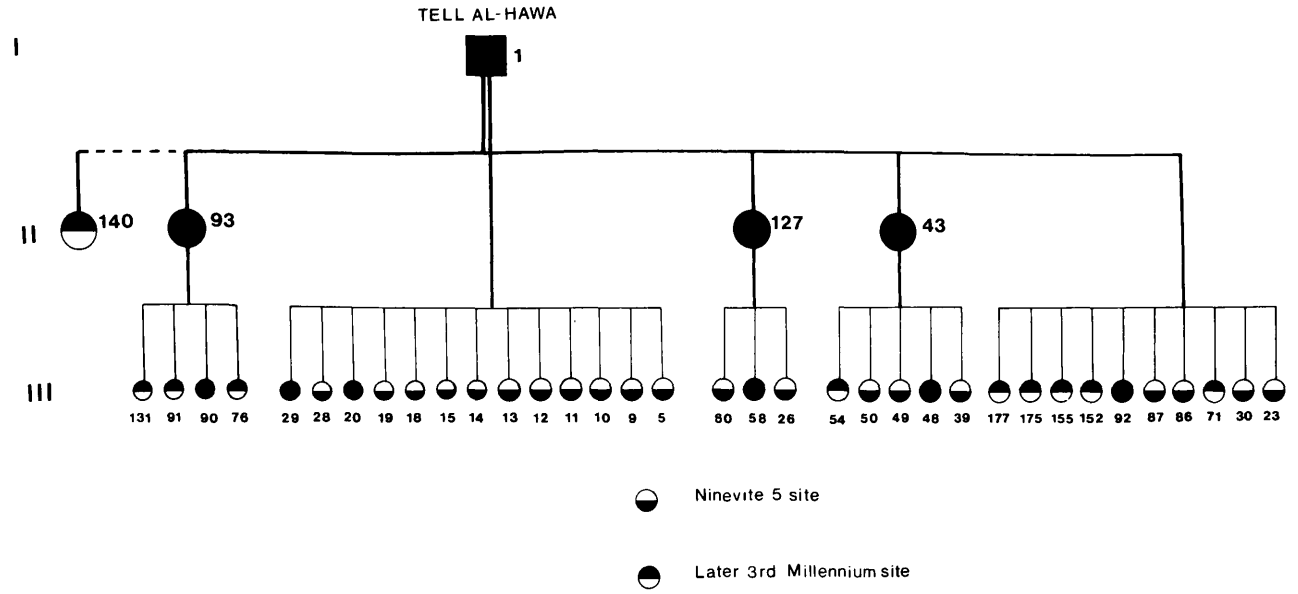

Fig.53 Settlement hierarchy of 3rd millennium sites within the surveyed area. Note: Site 140 was only lightly occupied during the 3rd millennium but became a more important centre during the Khabur period. Sites 29-5 are considered to be satellites of Tell al-Hawa, 177-23 were not obvious satellites of any centre.

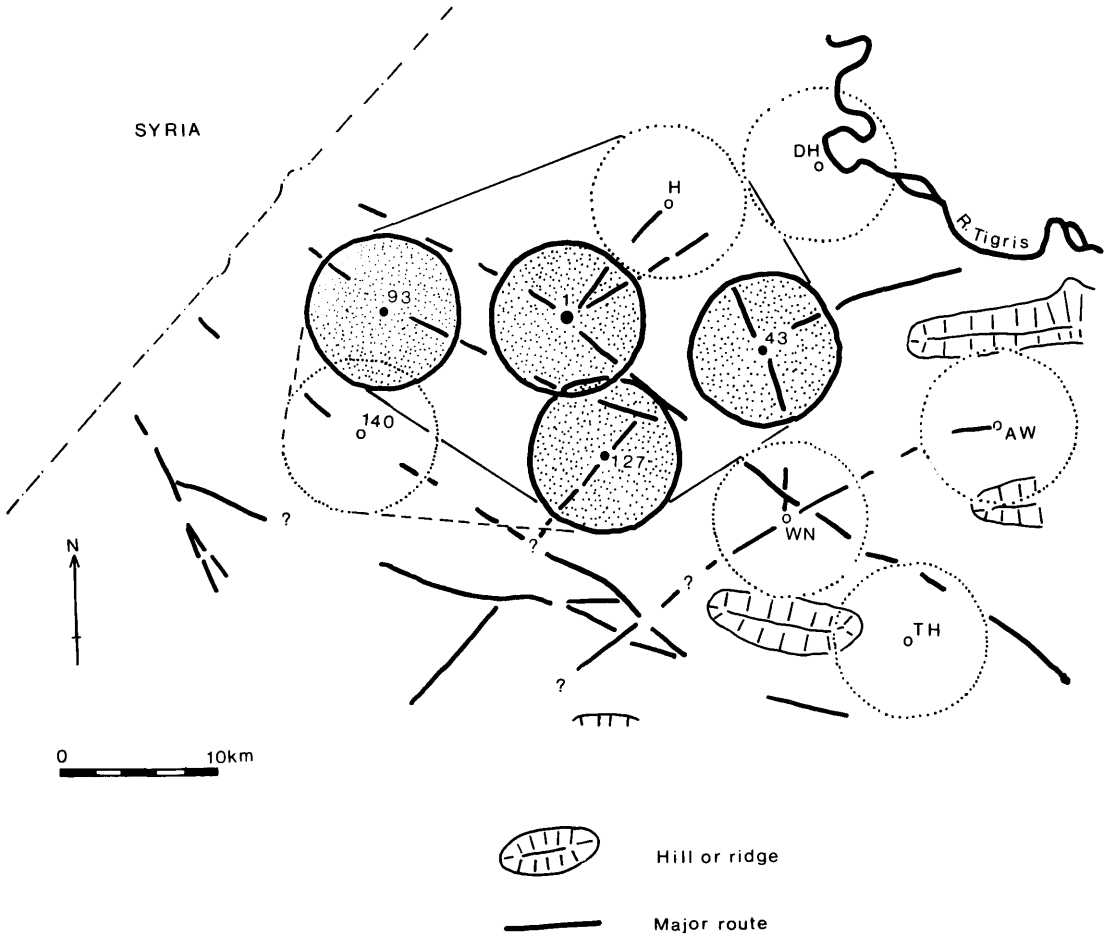

Fig.54 The North Jazira Project and adjacent areas during the Early Bronze Age indicating 5km radius territories for each centre. Territories lying within the survey area are stippled. Sites surveyed or excavated by BAEI teams are indicated by solid circle. Major long-distance hollow ways are shown as thick lines. H=Hamad Agha Kabir; DH=Tell Abu Dhahir; WN=Tell Abu Winni; AW=Tell Abu Wajnam; TH=Tell Huqna; ? indicates possible outlying smaller centres.

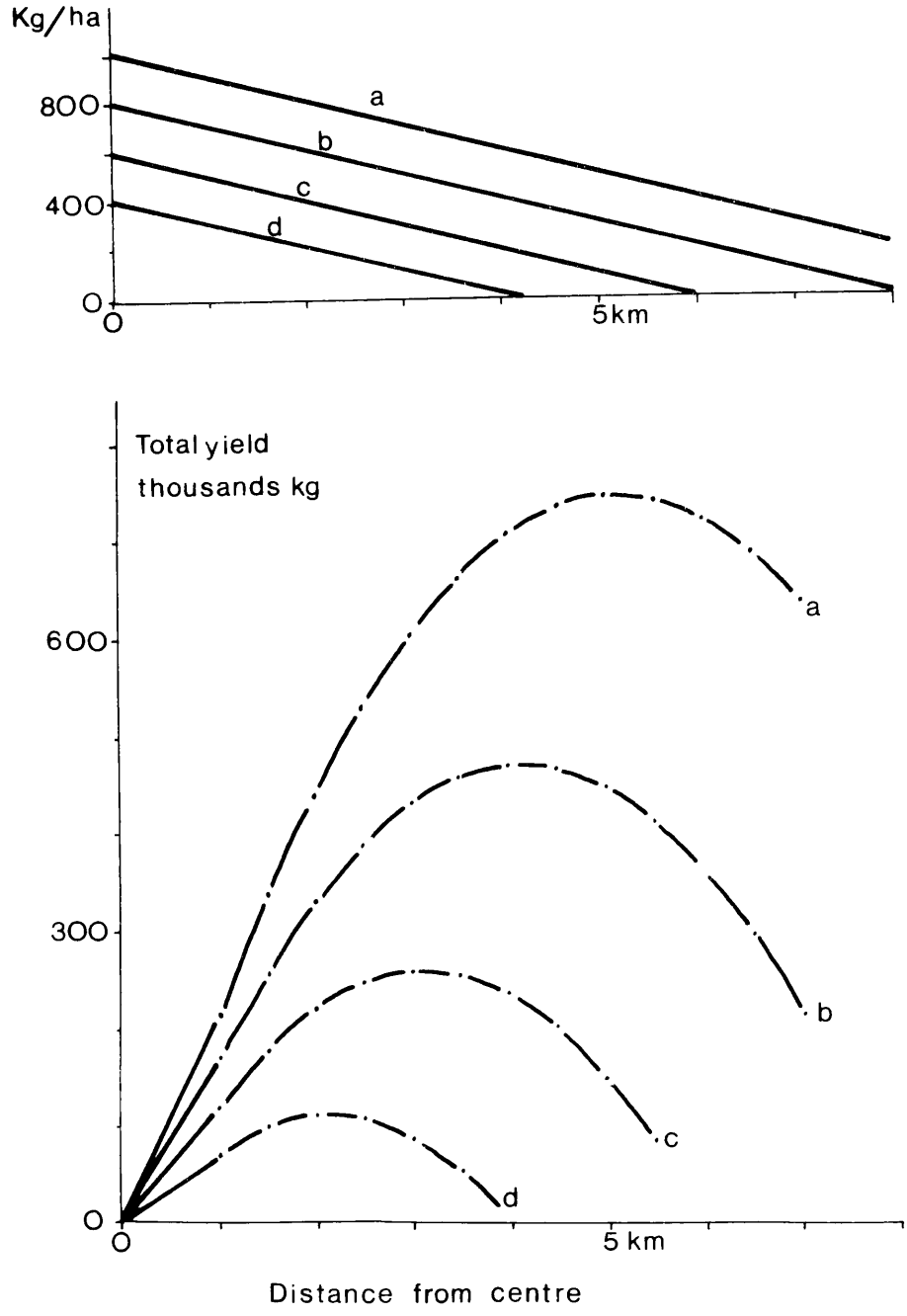

Fig.55 (above) Selected cereal yields declining away from centre at rate of 100 kg/ha per km.
(below) Gross production per 0.5 km wide ring away from centre, based upon yield declines a-d from upper diagram.

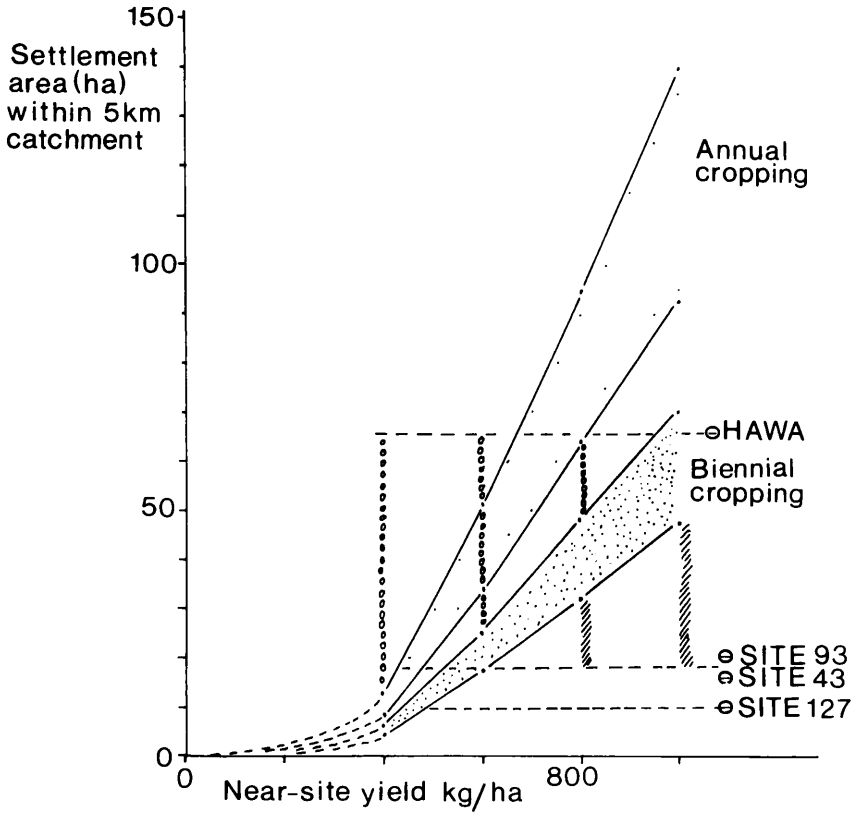

Fig.56 Approximate area of settlement that could be supported by yields given on Fig.55 and Table 13.

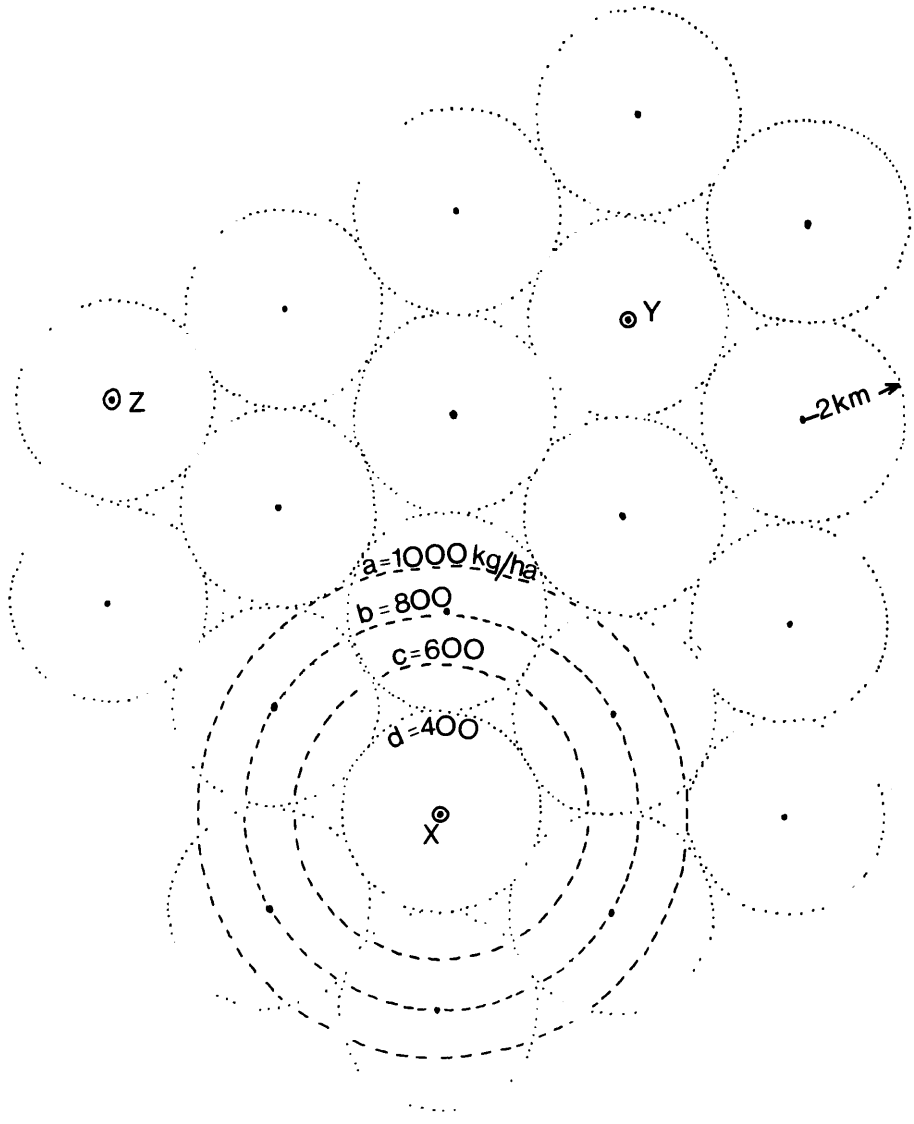

Fig.57 Theoretical development of land use around a growing Chalcolithic settlement (x). Growth is from a pre-existing network of minor centres so that as population grows at the centre x, crop productivity is expanded through the stages indicated on Fig.55 to eventually encompass and incorporate adjacent minor centres as satellites. Increments of growth a-d as for Fig.55.

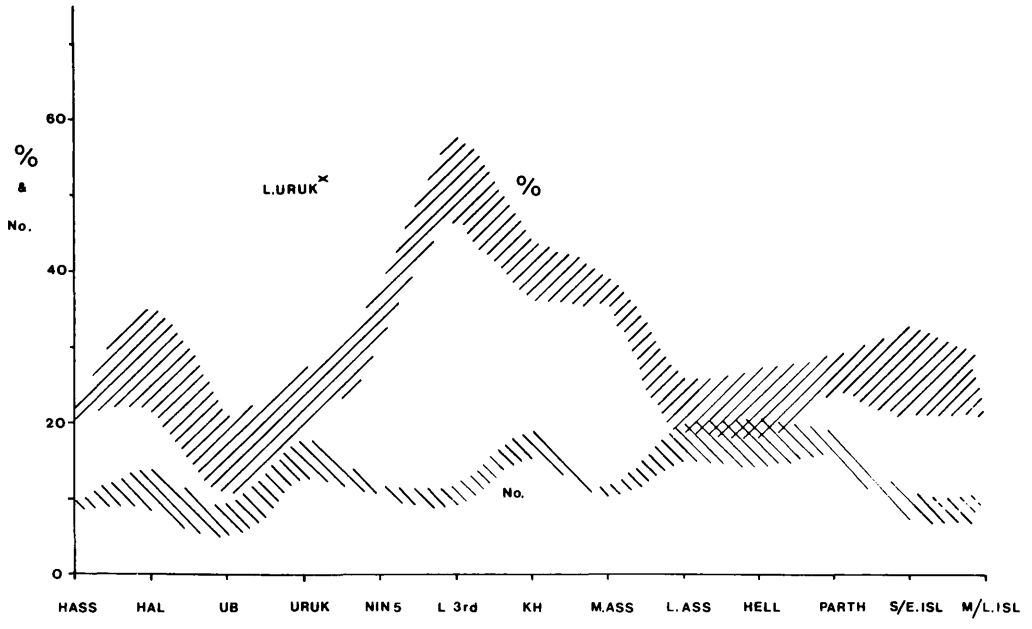

Fig.58 Percentage of sites of any given period on or adjacent to major hollow ways. The width of hatching allows for the subjective range of judgement as to what constitutes a site on or adjacent to a hollow way.

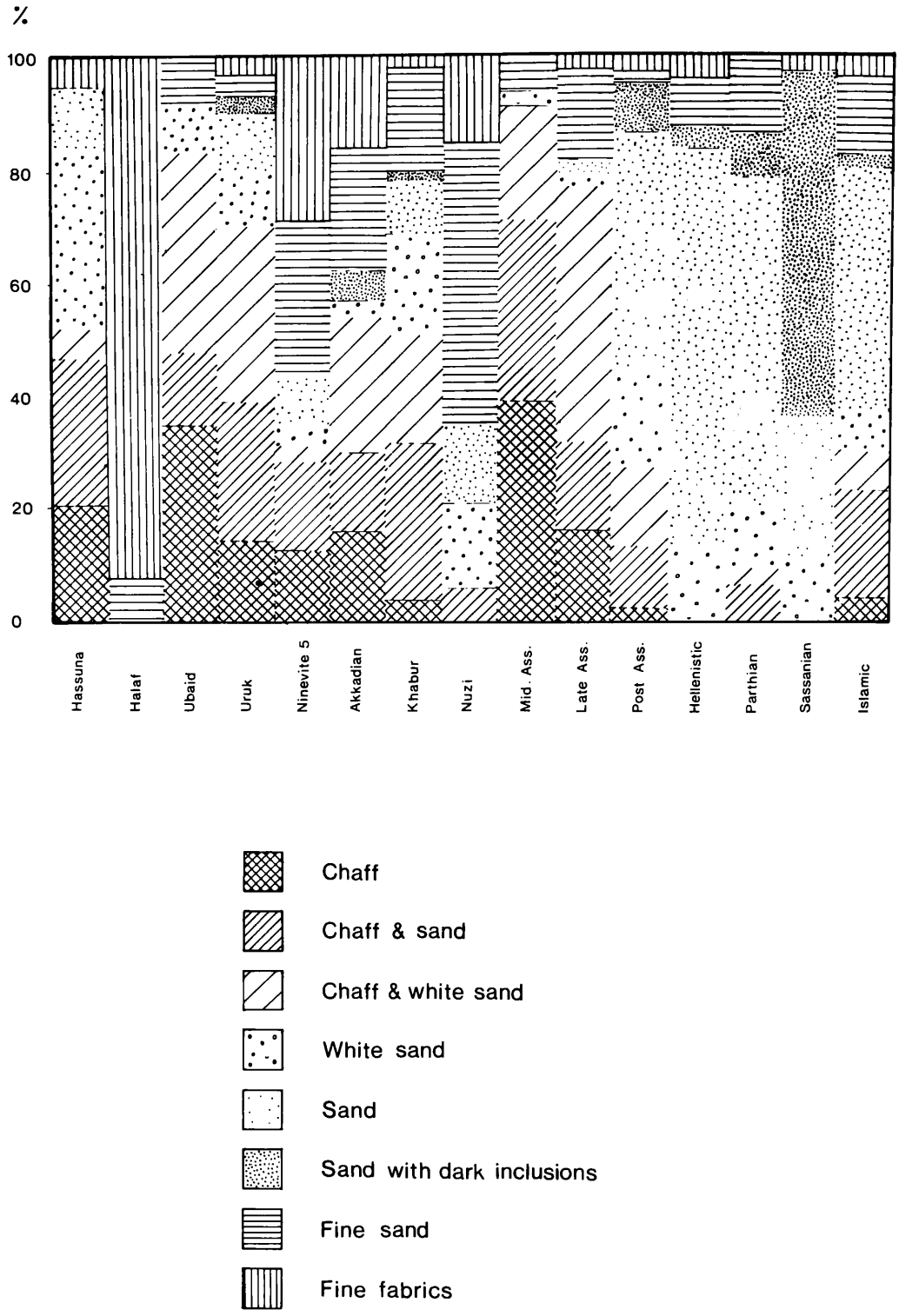

Fig.59 Dominant pottery fabrics from described type series sherds (per cent).

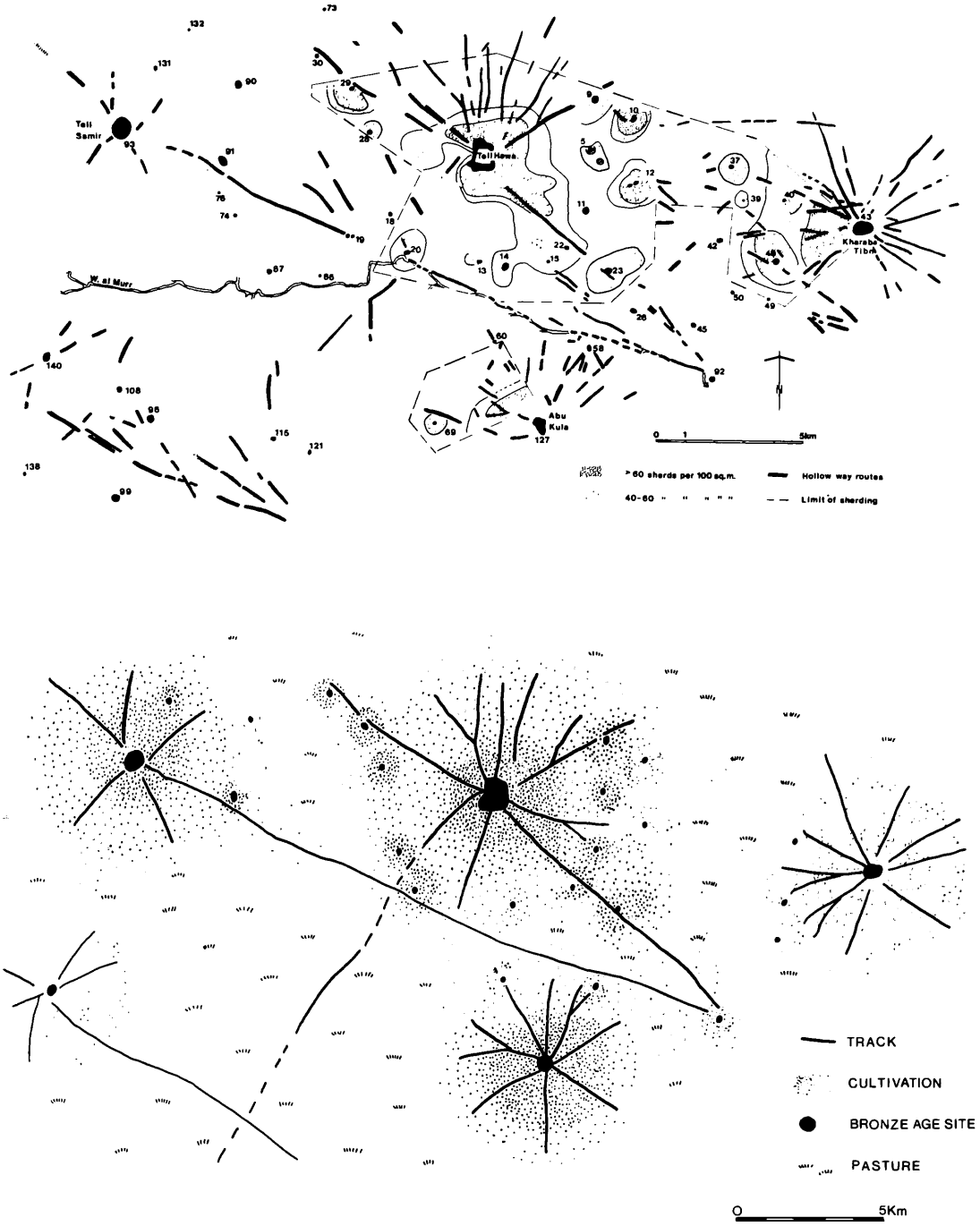

Fig.60 (above) Landscape map of intensively surveyed area around Tell al-Hawa. Note that off-site field scatter sampling was limited within the area enclosed by dot-dash line (simplified from data on Fig.14).

(below) Sketch map showing some major features of the North Jaziran landscape during the Early Bronze Age. Grass symbol=pasture; sparse stipple=low intensity cultivation; dense stipple= high intensity cultivation around settlements; solid lines=hollow ways (Based on Fig.60 (above)).

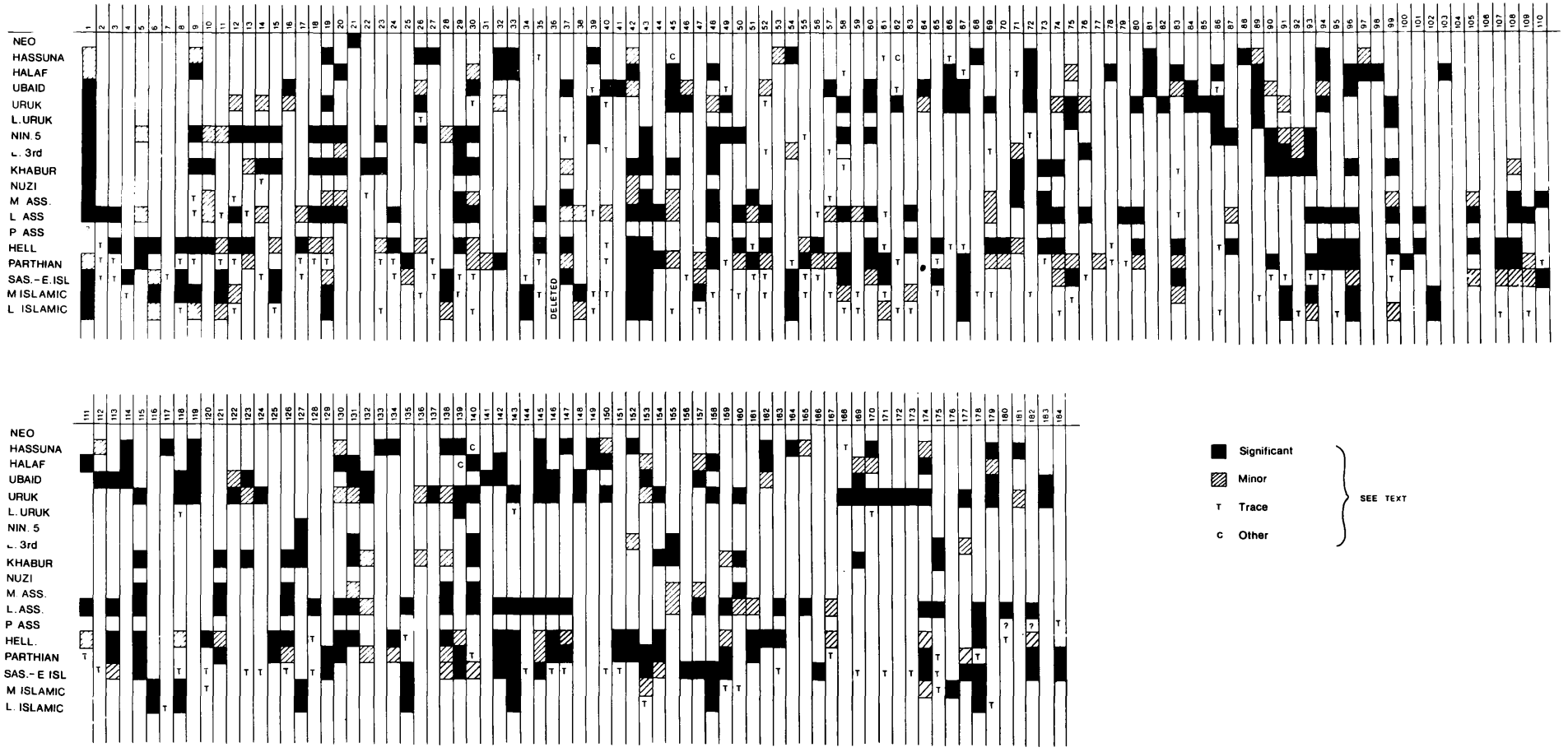

Fig.61 Occupational phases of surveyed sites (numbered). Significant occupation >6 diagnostics of period; minor occupation 3-5 diagnostics; trace occupation 1 or 2 diagnostics. "Other occupations" are based on data supplied by Campbell and others.

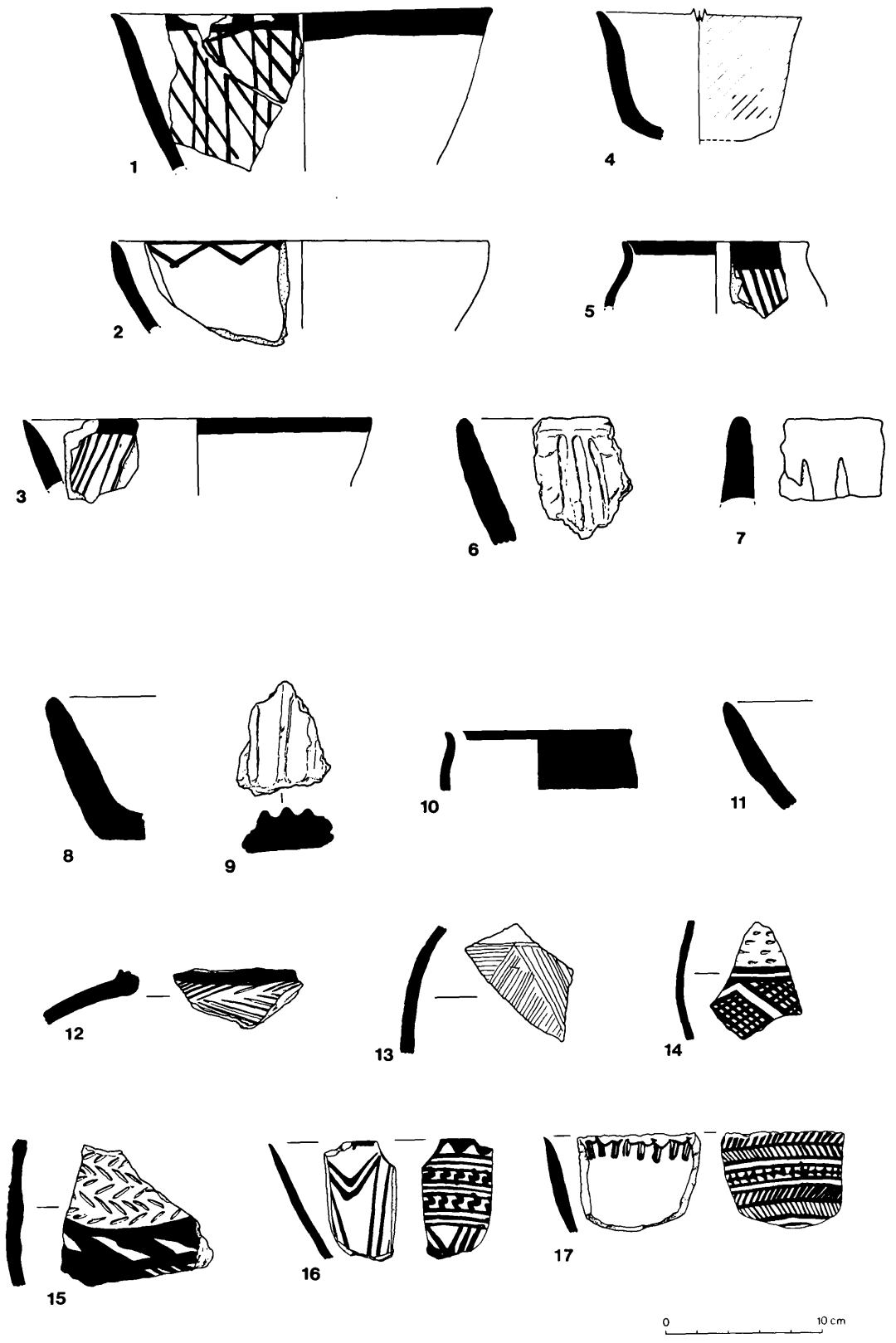

Fig.62 Hassuna. Type 1, nos. 1-5; Type 2, nos. 6-9; Type 119, no. 10; Type 124, no. 11; Type 125, nos. 12-15; Type 126, nos. 16 and 17. Scale 1:4.

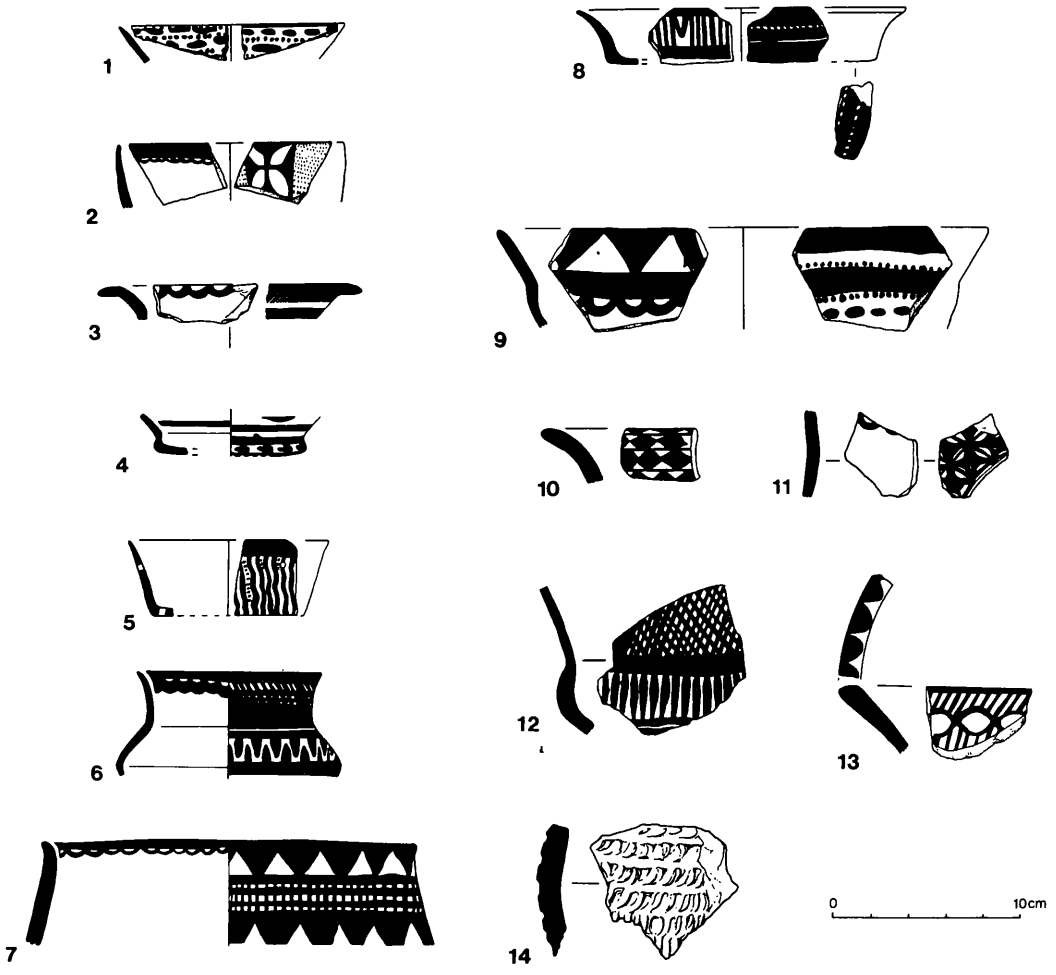

Fig.63 Halaf. Type 3, nos. 1-13; Type 137, no. 14. Scale 1:4.

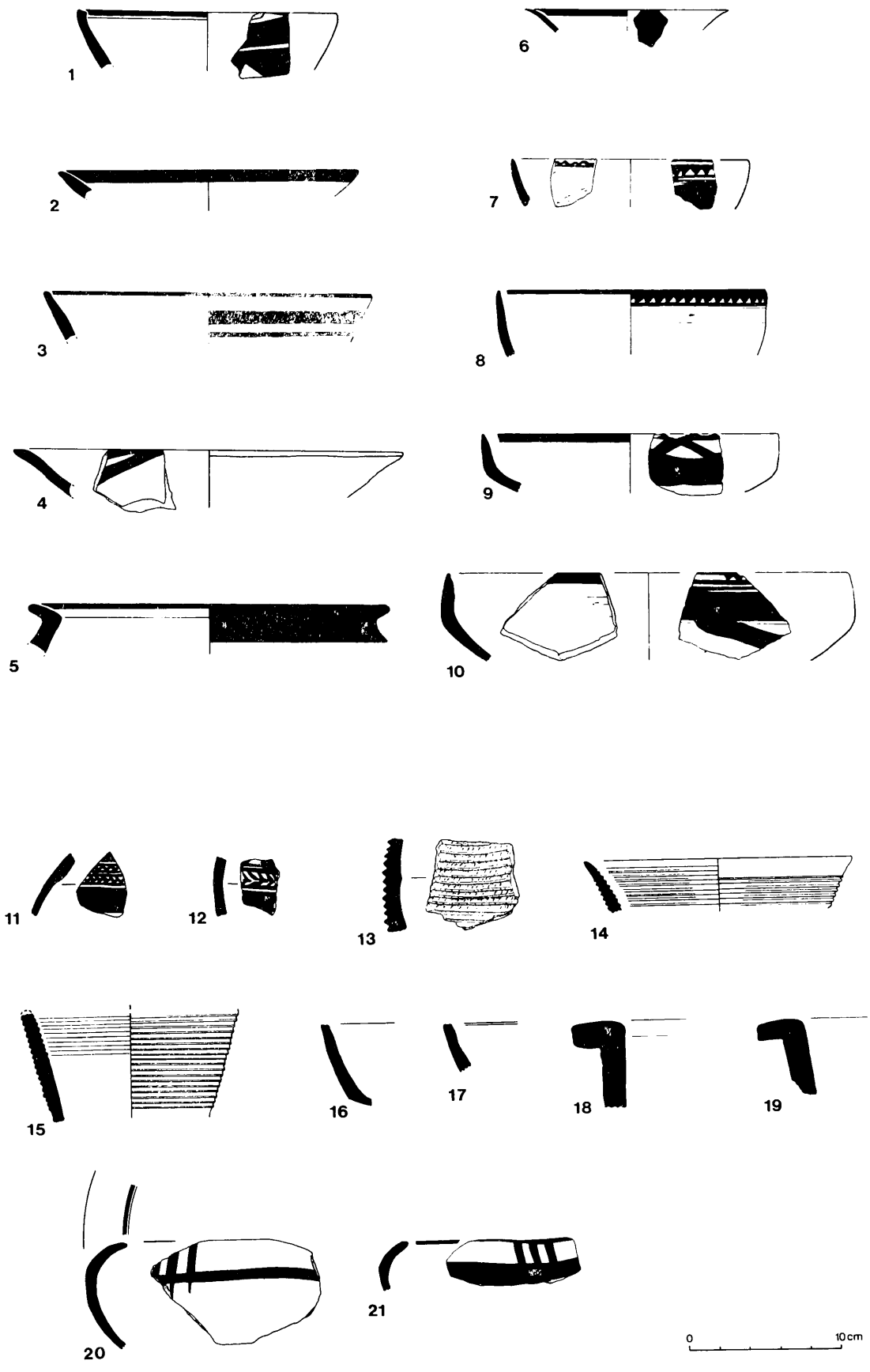

Fig.64 Ubaid. Type 4, nos. 1-12; Type 5 nos. 13-15; Type 135, nos. 16 and 17; Type 147, nos. 18 and 19; Type 148, nos. 20 and 21. Scale 1:4.

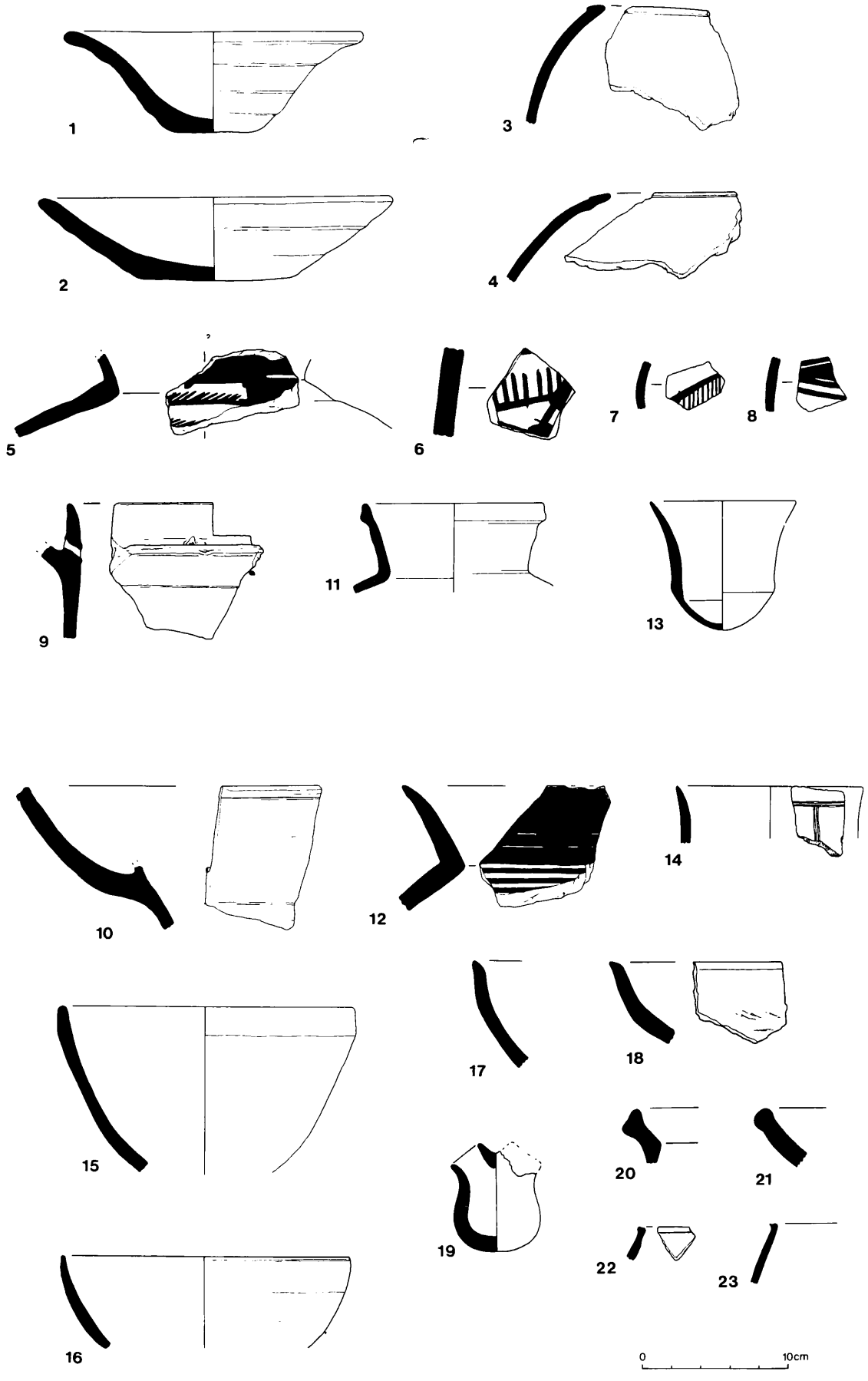

Fig.65 Uruk. Type 7, nos. 1 and 2; Type 8, nos. 3 and 4; Type 9, nos. 5-8; Type 10, nos. 9 and 10; Type 13, nos. 11 and 12; Type 16. nos. 13 and 14; Type 17, nos. 15 and 16; Type 21, nos. 17 and 18; Type 55, no. 19; Type 138, nos. 20 and 21; Type 150, nos. 22 and 23. Scale 1:4.

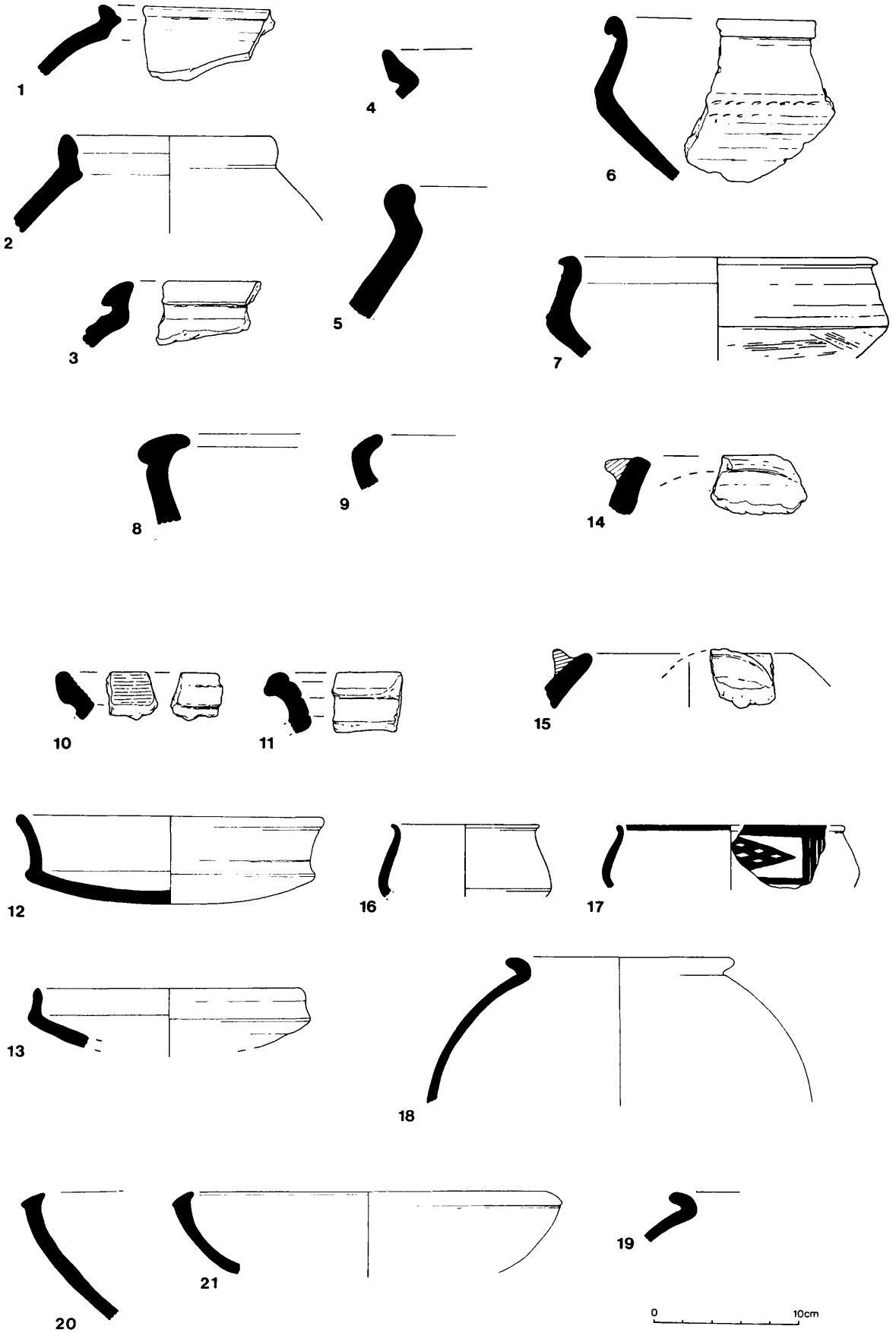

Fig.66 Uruk. Type 12, nos. 1-5; Type 153, nos. 6 and 7; Type 152, nos. 8 and 9; Type 14, nos. 10 and 11; Type 15, nos 12 and 13; Type 18C, nos. 14 and 15; Type 20, nos. 16 and 17; Type 121, nos. 18 and 19; Type 140, nos. 20 and 21. Scale 1:4.

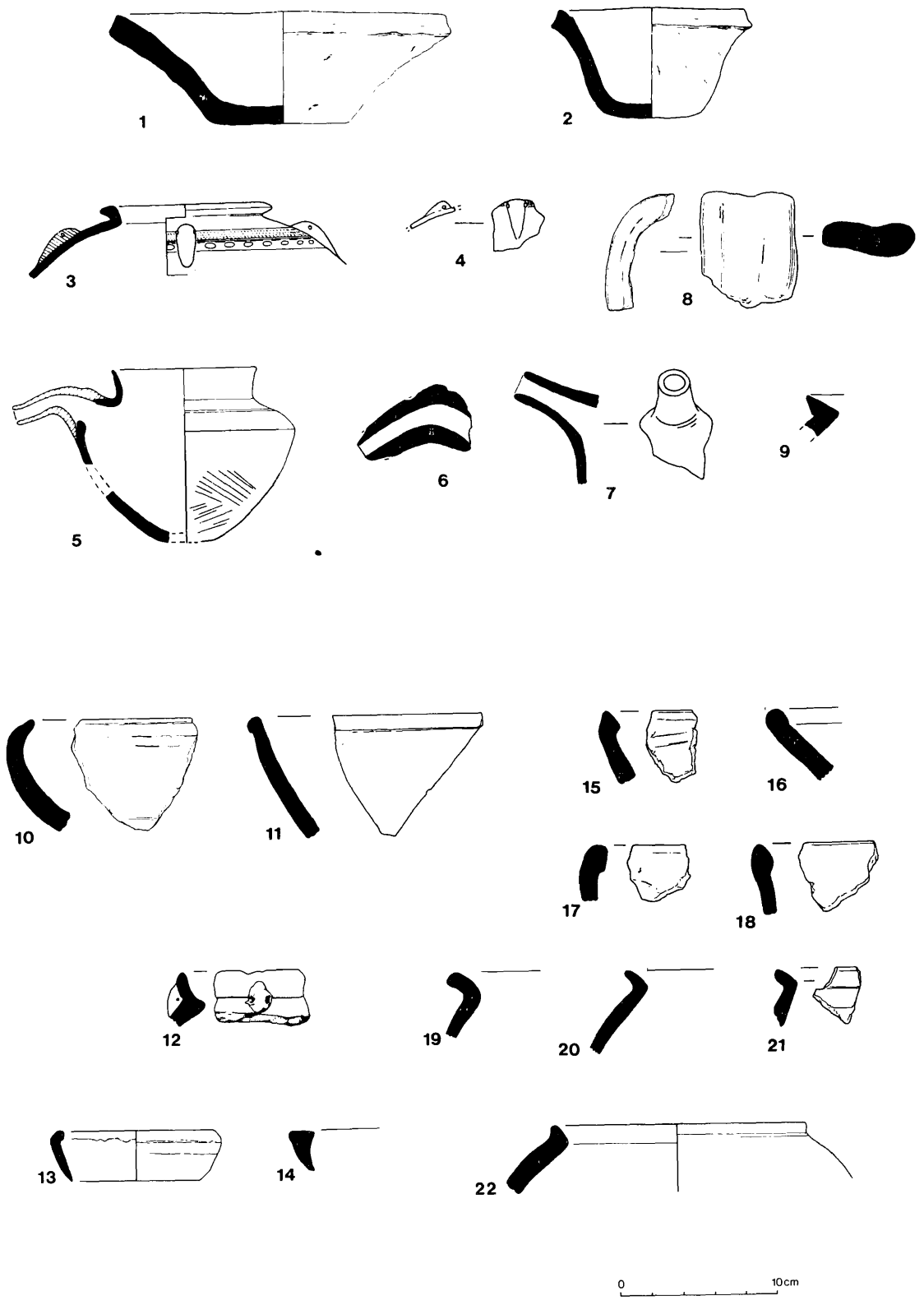

Fig.67 *Uruk. (Southern Uruk types nos. 1-9). Type 6, nos. 1 and 2; Type 18A. nos. 3 and 4; Type 19, nos. 5-7; Type 120, no. 8; Type 151, no. 9; Type 11, nos. 10 and 11; Type 18B no. 12; Type 106, nos. 13 and 14; Type 134, nos. 15-18; Type 149, nos. 19-22. Scale 1:4.*

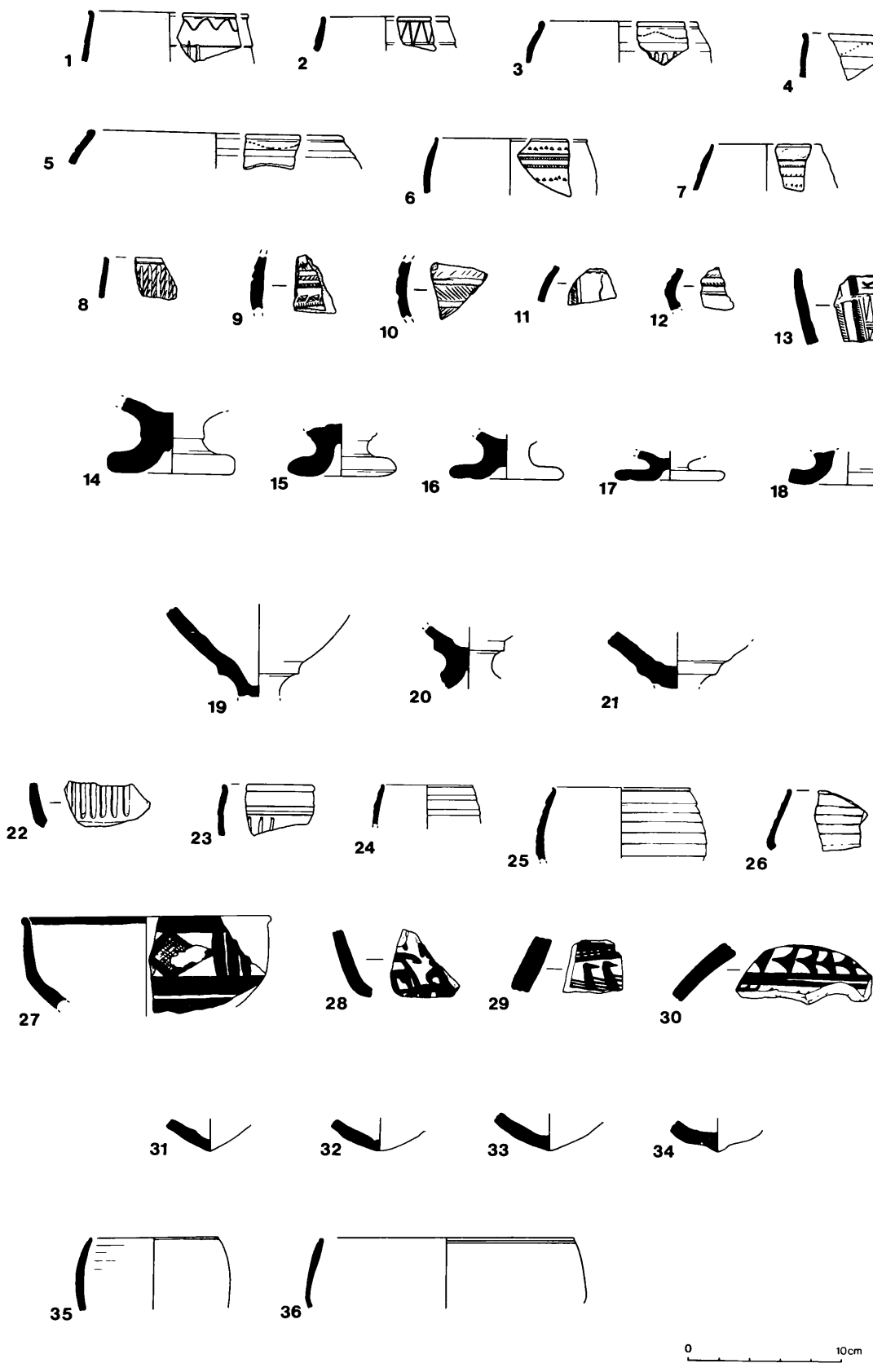

Fig.68 Ninevite 5. Type 22, nos. 1-7; Type 23, nos. 8-13; Type 24A and 24C, nos.14-18; Type 24B, nos. 19-21; Type 25, nos. 22 and 23; Type 26, nos. 24-26; Type 27, nos. 27-30; Type 28, nos. 31-34; Type 133, nos. 35 and 36. Scale 1:4.

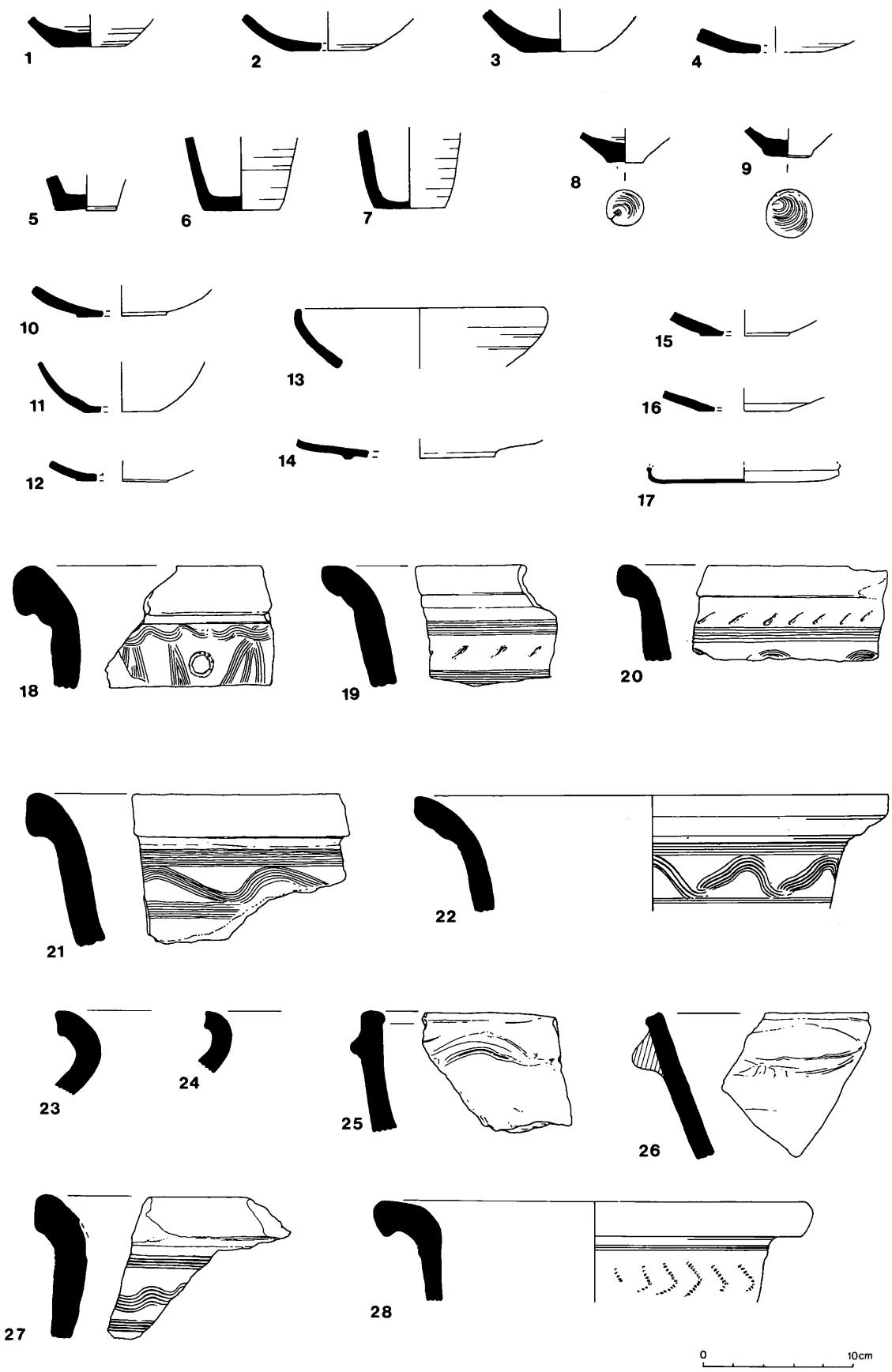

Fig.69 Later 3rd mill. Type 29, nos. 1-4; Type 30, nos. 5-7; Type 31, nos. 8 and 9; Type 33, nos. 10-17; Type 32, nos. 18-22; Type 103, nos. 23 and 24; Type 154. nos. 25 and 26; Type 155, nos. 27 and 28. Scale 1:4.

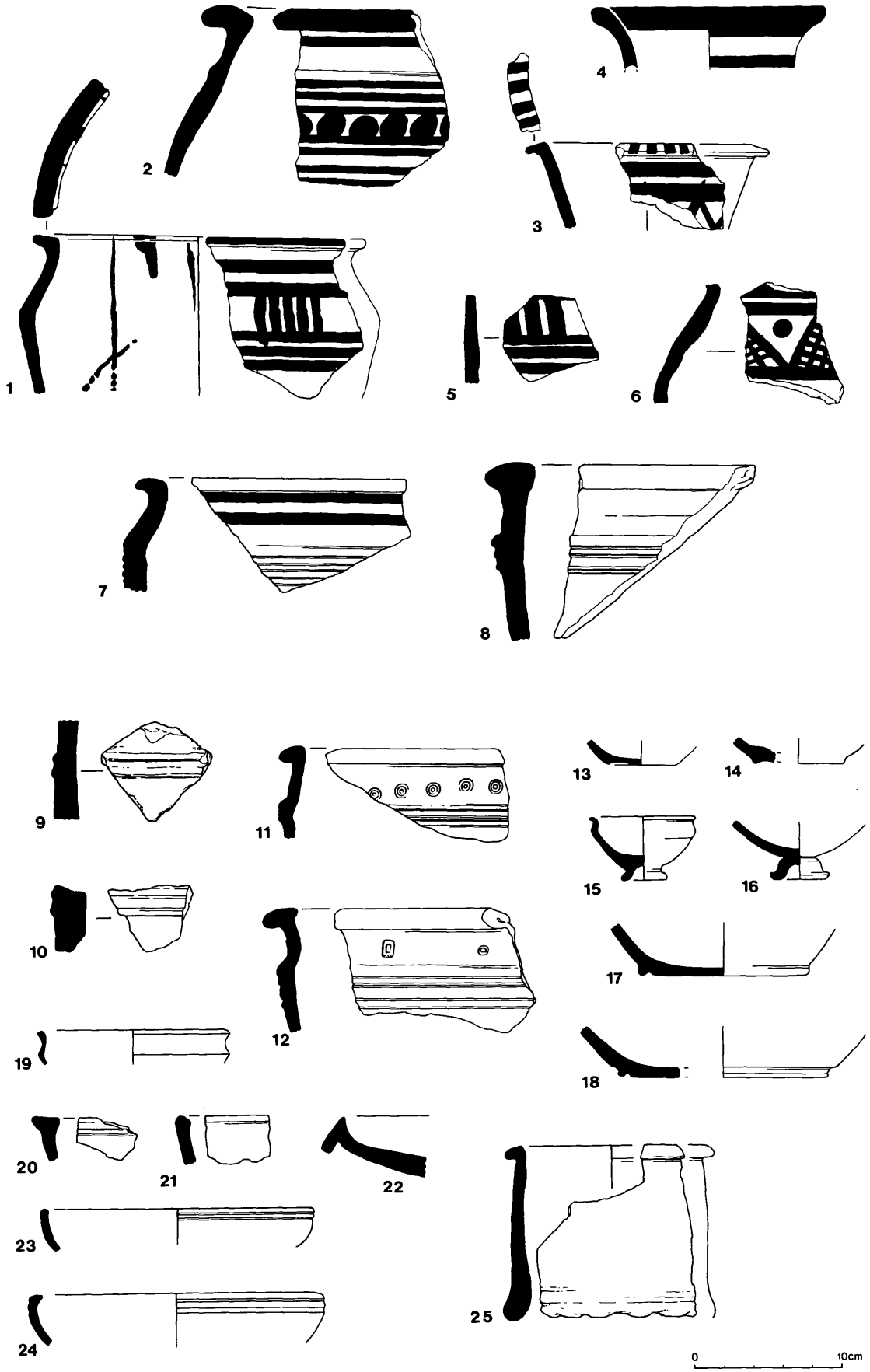

Fig.70 Khabur. Type 34, nos. 1-6; Type 35, nos. 7 and 8; Type 36, nos. 9 and 10; Type 37, nos. 11 and 12; Type 38, nos. 13 and 14; Type 39, nos. 15 and 16; Type 40, nos. 17 and 18; Type 41, nos. 19-22; Type 42, nos. 23 and 24; Type 109, no. 25. Scale 1:4.

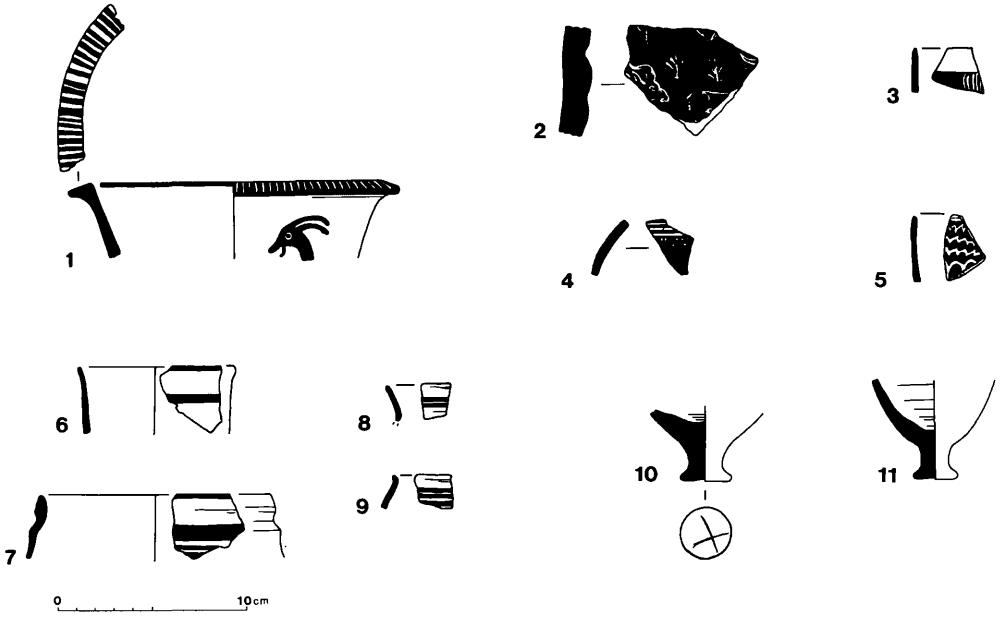

Fig.71 Nuzi. Type 43, nos. 1-5; Type 44, nos. 6-9; Type 45, nos. 10 and 11. Scale 1:4.

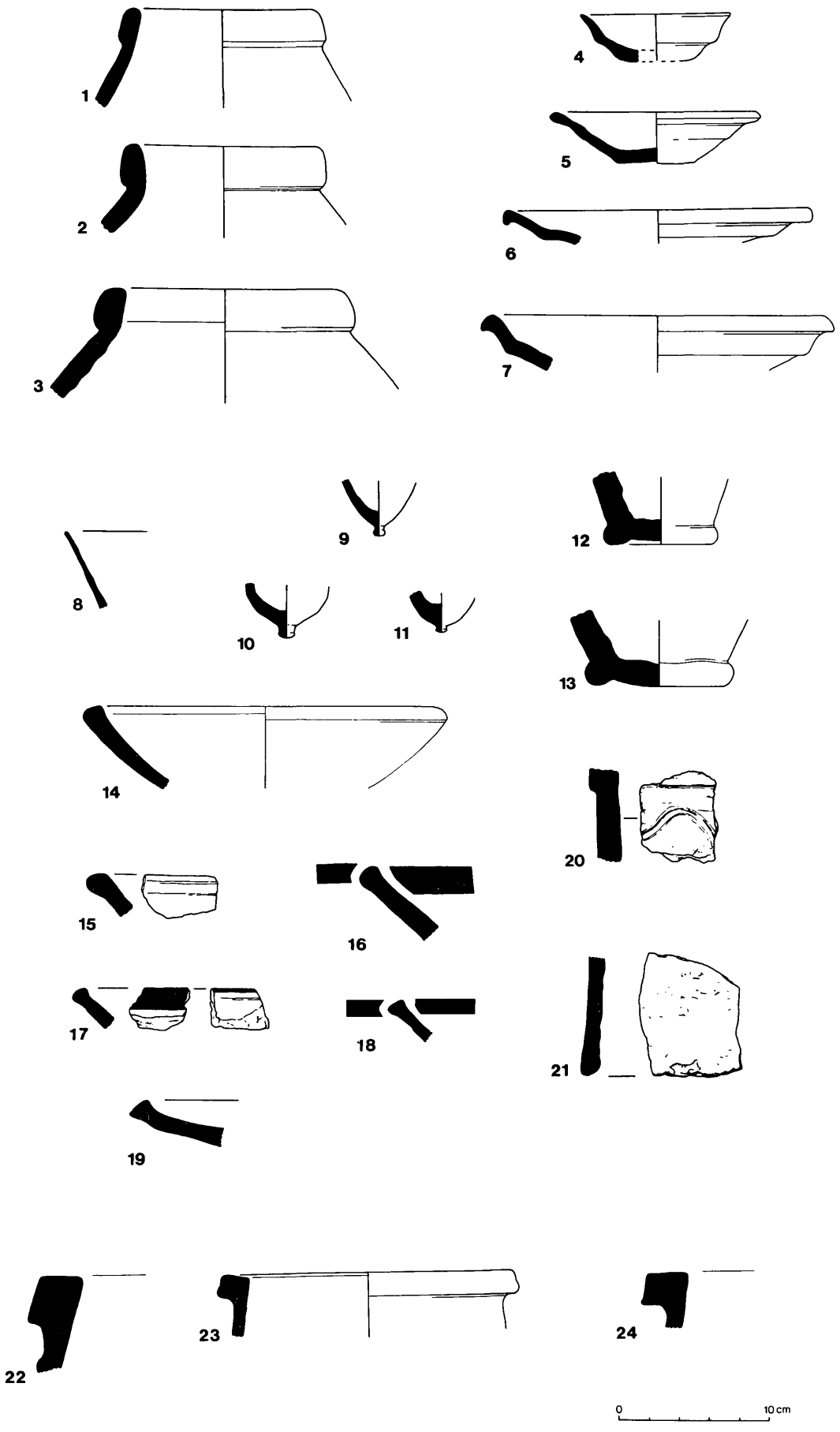

Fig.72 Middle Assyrian. Type 47, nos. 1-3; Type 48, nos. 4-7; Type 49, no. 8; Type 50, nos. 9-11; Type 51, nos. 12 and 13; Type 52, nos. 14-19; Type 53, no. 20; Type 54, no. 21; Type 56, nos. 22-24. Scale 1:4.

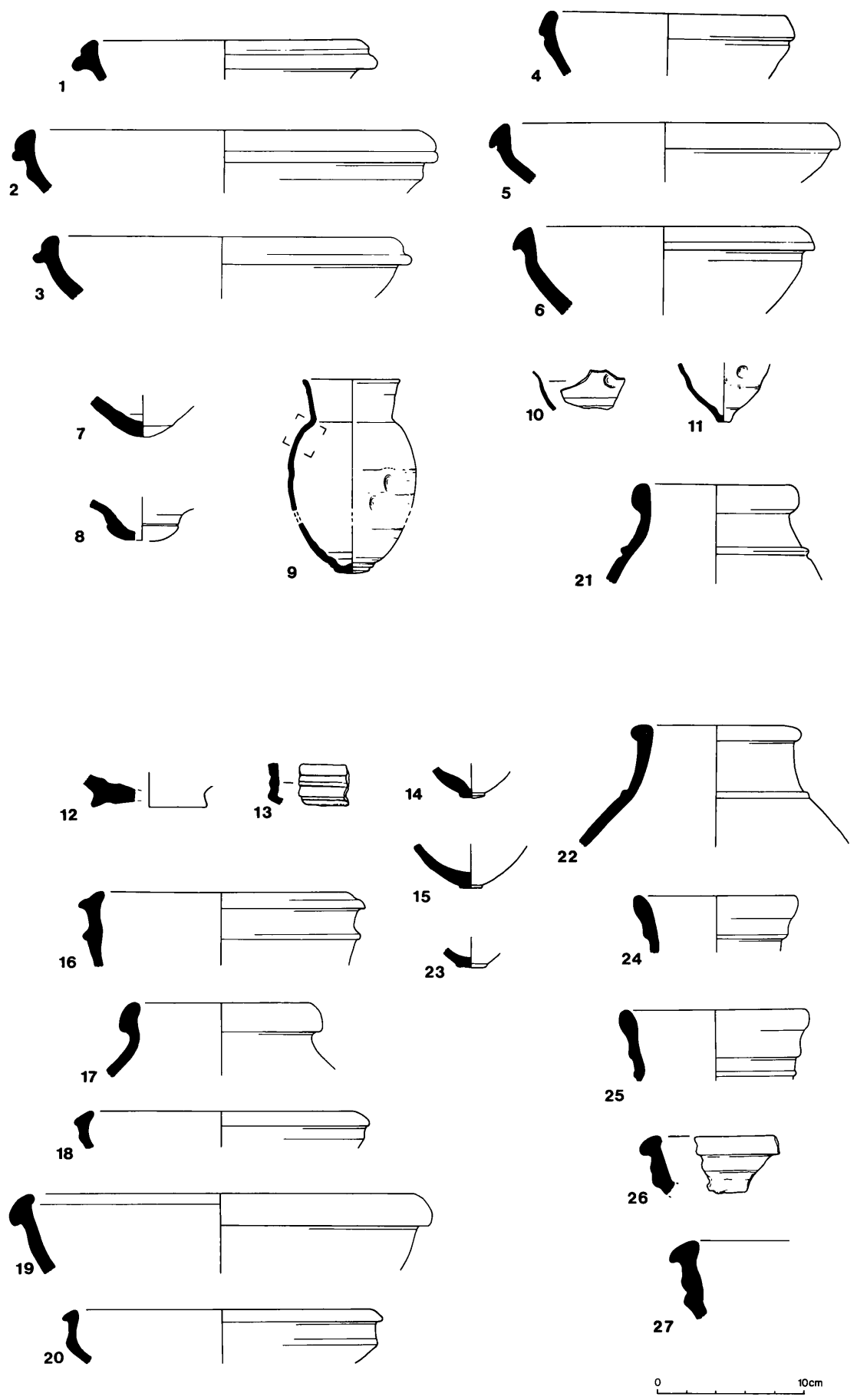

Fig.73 Late Assyrian. Type 57, nos. 1-3; Type 58, nos. 4-6; Type 59, nos. 7 and 8; Type 60, nos. 9-11; Type 61, no. 12; Type 62, no. 13; Type 63, nos. 14 and 15; Type 105, no. 16; Type 11, no. 17; Type 112, nos. 18 and 19; Type 113, no. 20; Type 114, nos. 21 and 22; Type 118, no. 23; Type 132, nos. 24 and 25; Type 156, nos. 26 and 27. Scale 1:4.

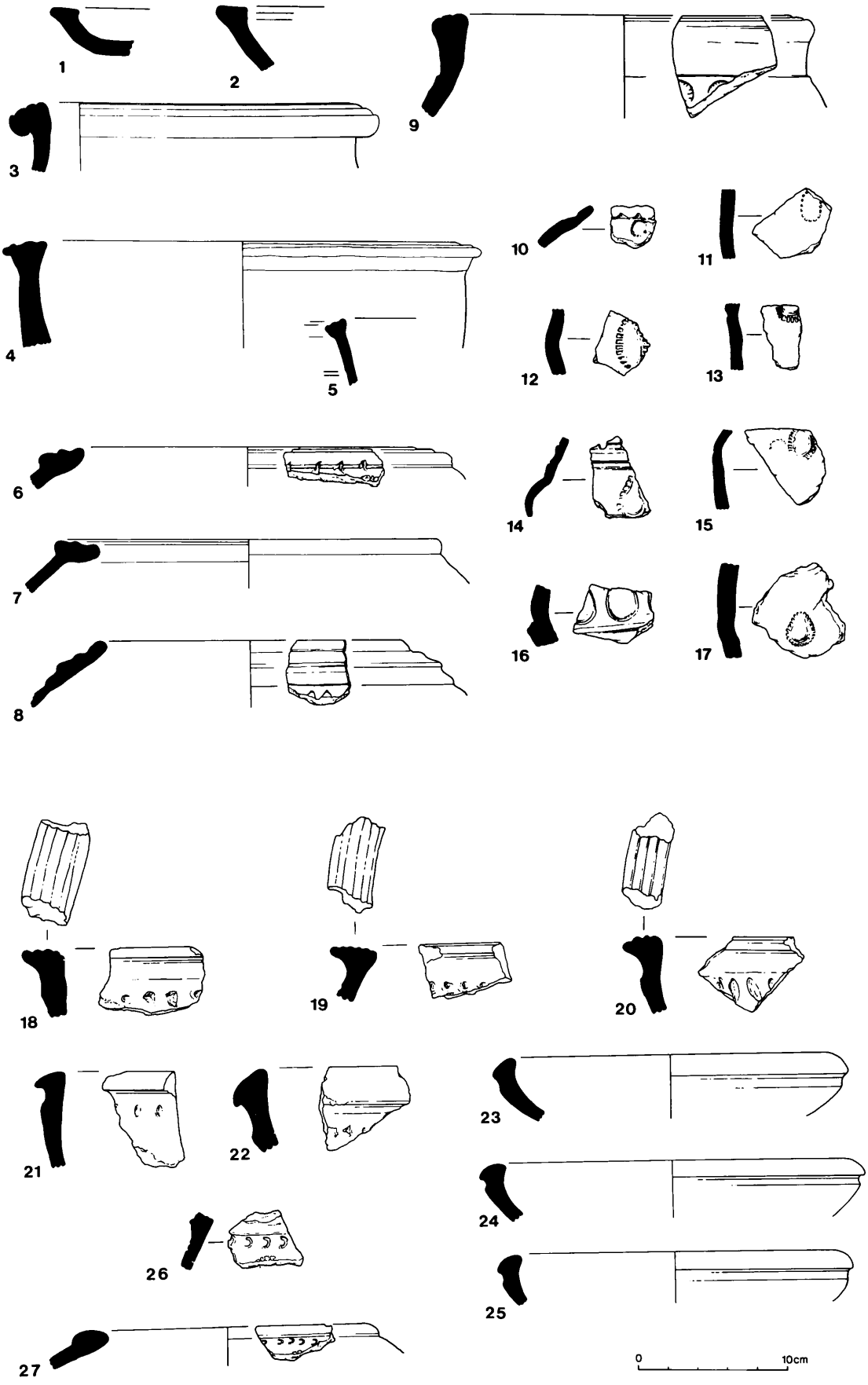

Fig.74 Post-Assyrian. Type 102, nos. 1 and 2; Type 104, nos. 3-5; Type 142, nos. 6-8; Type 143, nos. 9-17; Type 144, nos. 18-20; Type 145, nos. 21 and 22; Type 146, nos. 23-25; Type 157, nos. 26 and 27. Scale 1:4.

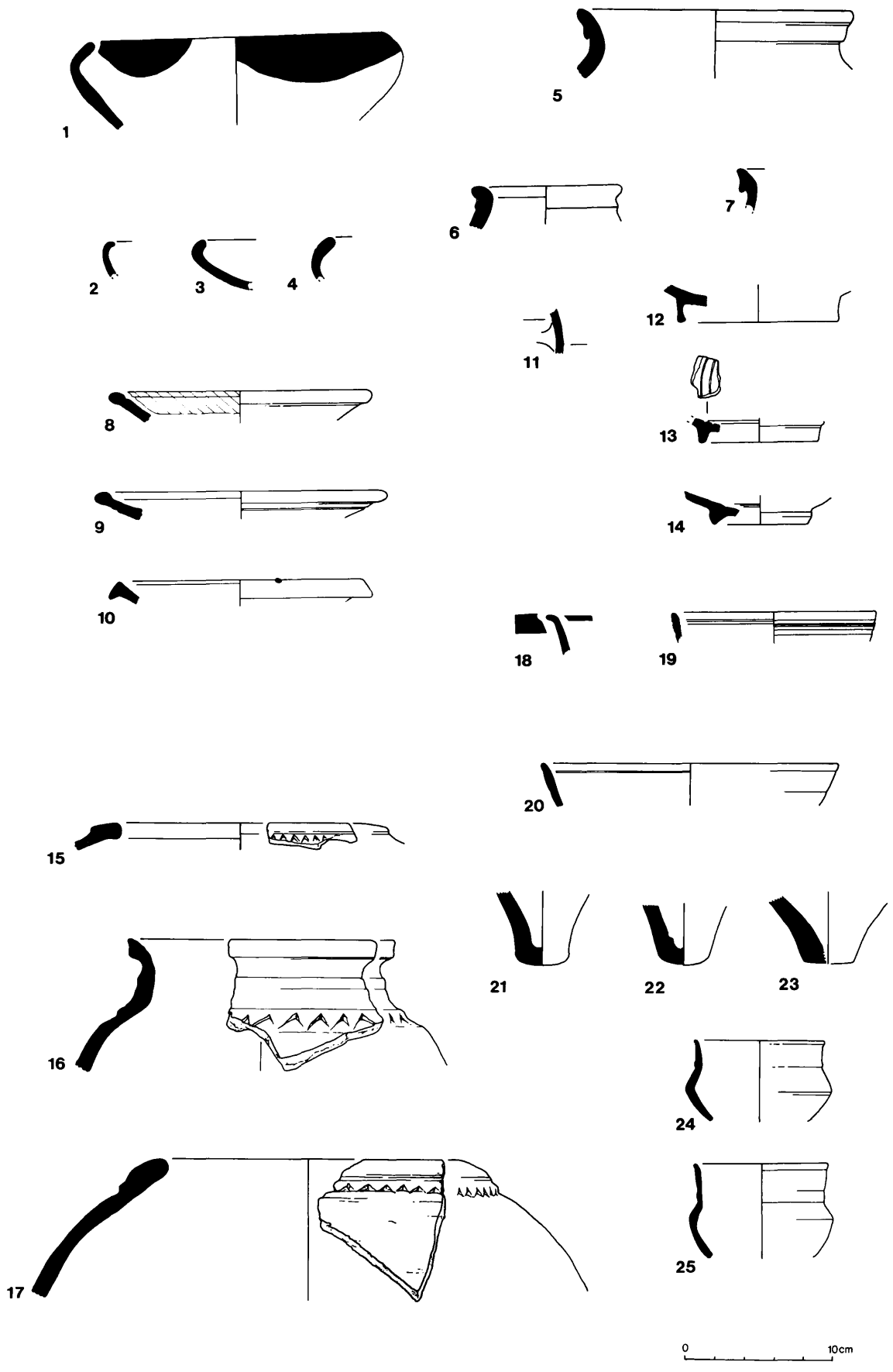

Fig.75 Hellenistic. Type 64, nos. 1-4; Type 65, nos. 5-7; Type 66, nos. 8-10; Type 67, no. 11; Type 68, nos. 12-14; Type 108, nos. 15-17; Type 116, no. 18; Type 117, nos. 19 and 20; Type 158, nos. 21-23; Type 159, nos. 24 and 25. Scale 1:4.

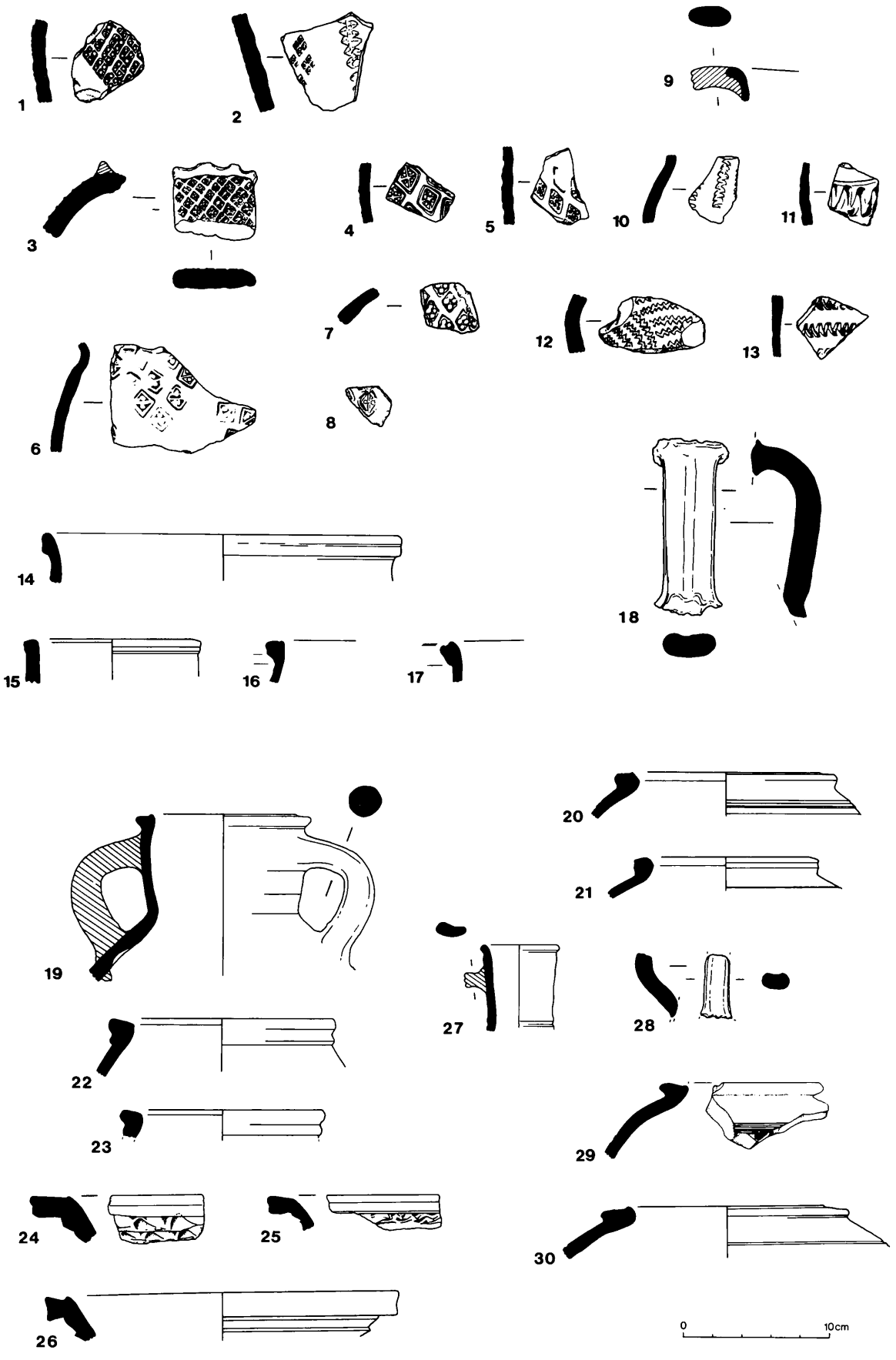

Fig.76 Parthian. Type 76, nos. 1-8; Type 100, no. 9; Type 107, nos. 10-13; Type 115, nos. 14-17; Type 127, no. 18; Type 128, no. 19; Type 129, nos. 20 and 21; Type 130, nos. 22 and 23; Type 131, nos. 24-26; Type 163, nos. 27 and 28; Type 164, nos. 29 and 30. Scale 1:4.

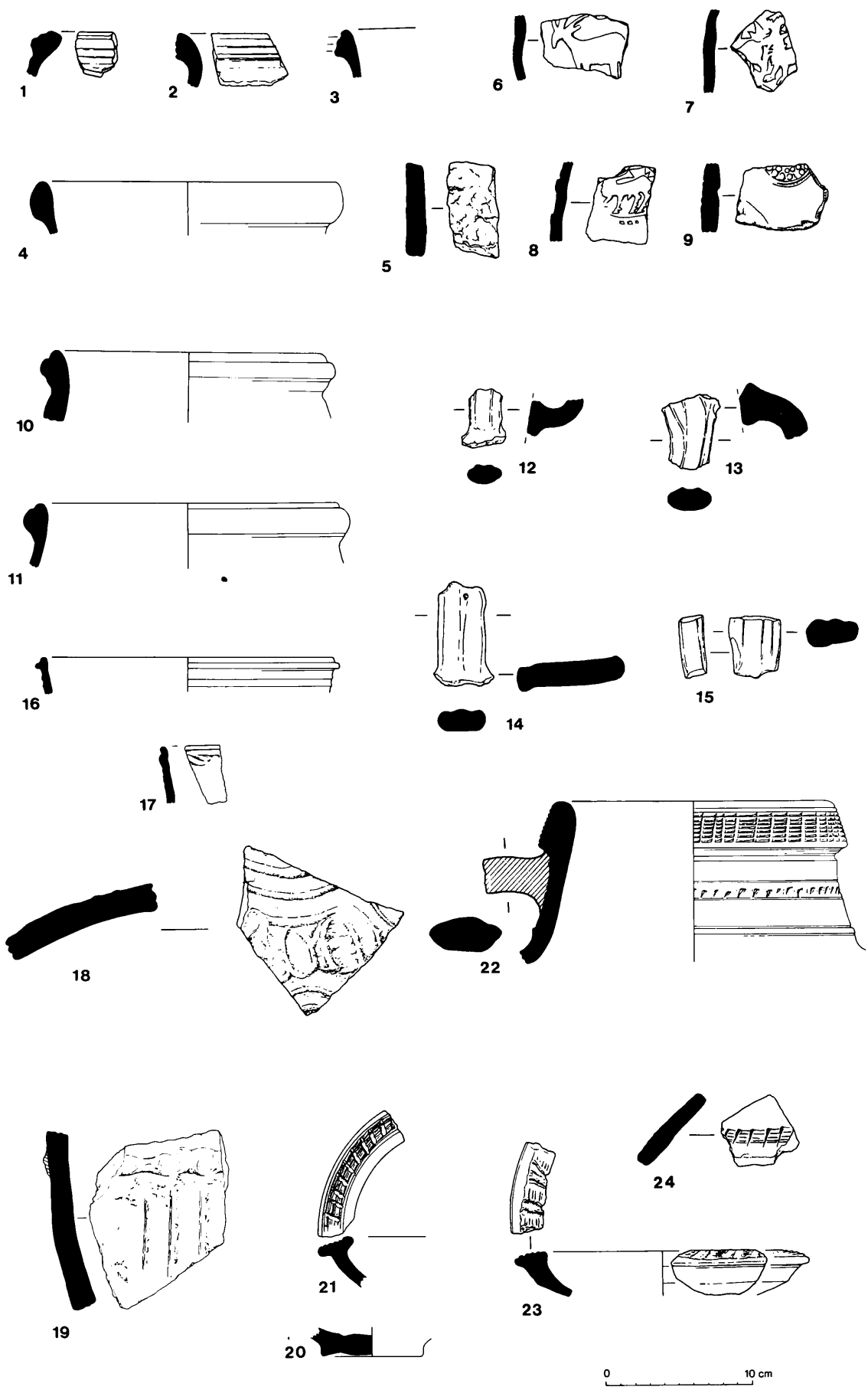

Fig.77 Sasanian and Sasanian-Early Islamic. Type 69, nos. 1-3; Type 70, no. 4; Type 77, no. 5; Type 78, nos. 6-9; Type 71, nos. 10 and 11; Type 72, nos. 12 and 13; Type 73, nos. 14 and 15; Type 75, nos. 16 and 17; Type 79, nos. 18 and 19; Type 136, no. 20; Type 139, nos. 21-24. Scale 1:4.

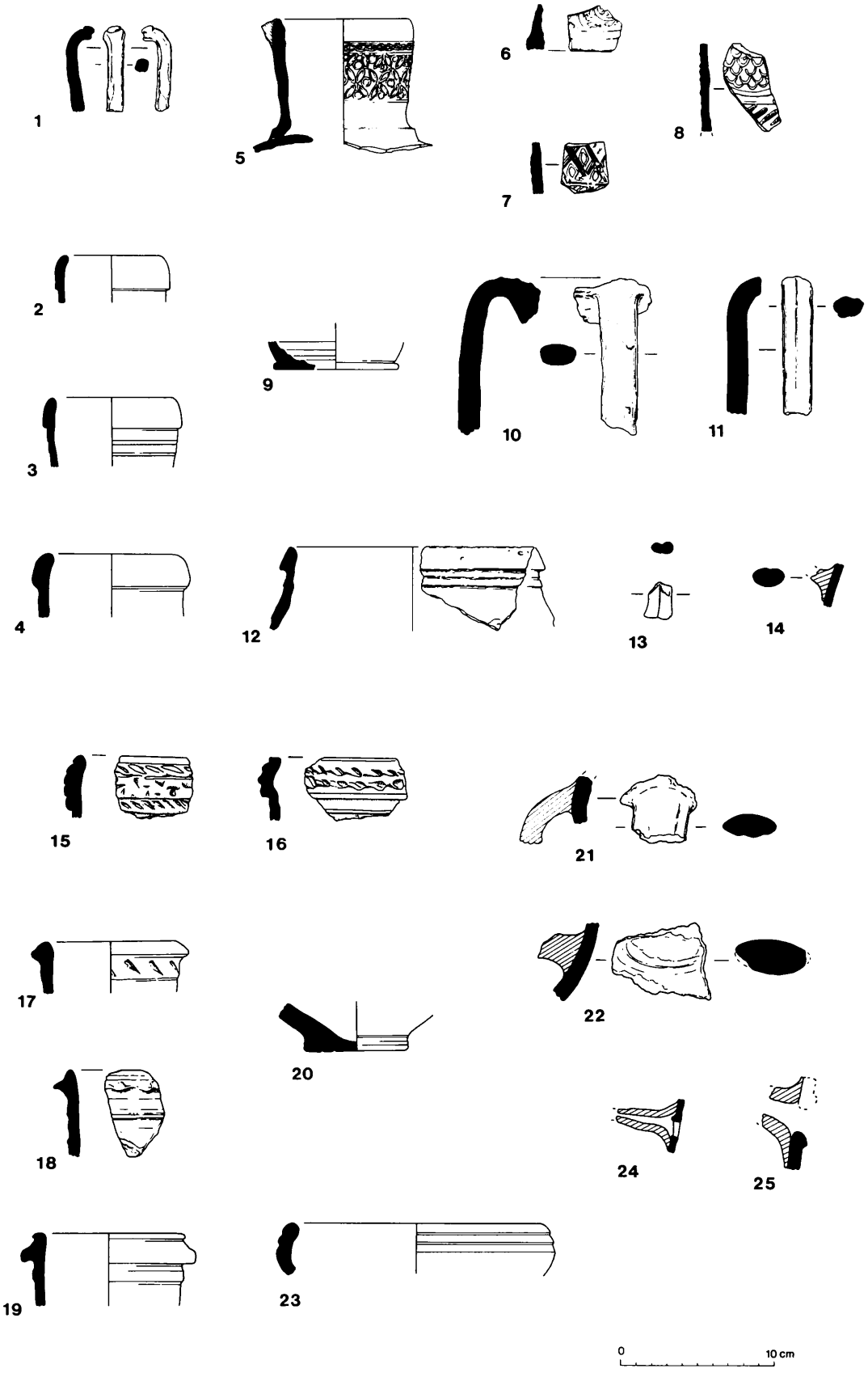

Fig.78 Early Islamic and undifferentiated Islamic. Type 80, no. 1; Type 81, nos. 2-4; Type 83, nos. 5-8; Type 84, no. 9; Type 123, nos. 10 and 11; Type 160, no. 12; Type 161, nos. 13 and 14; Type 85, nos. 15 and 16; Type 86, nos. 17-19; Type 87, no. 20; Type 89, nos. 21 and 22; Type 90, no. 23; Type 162, nos. 24 and 25. Scale 1:4.

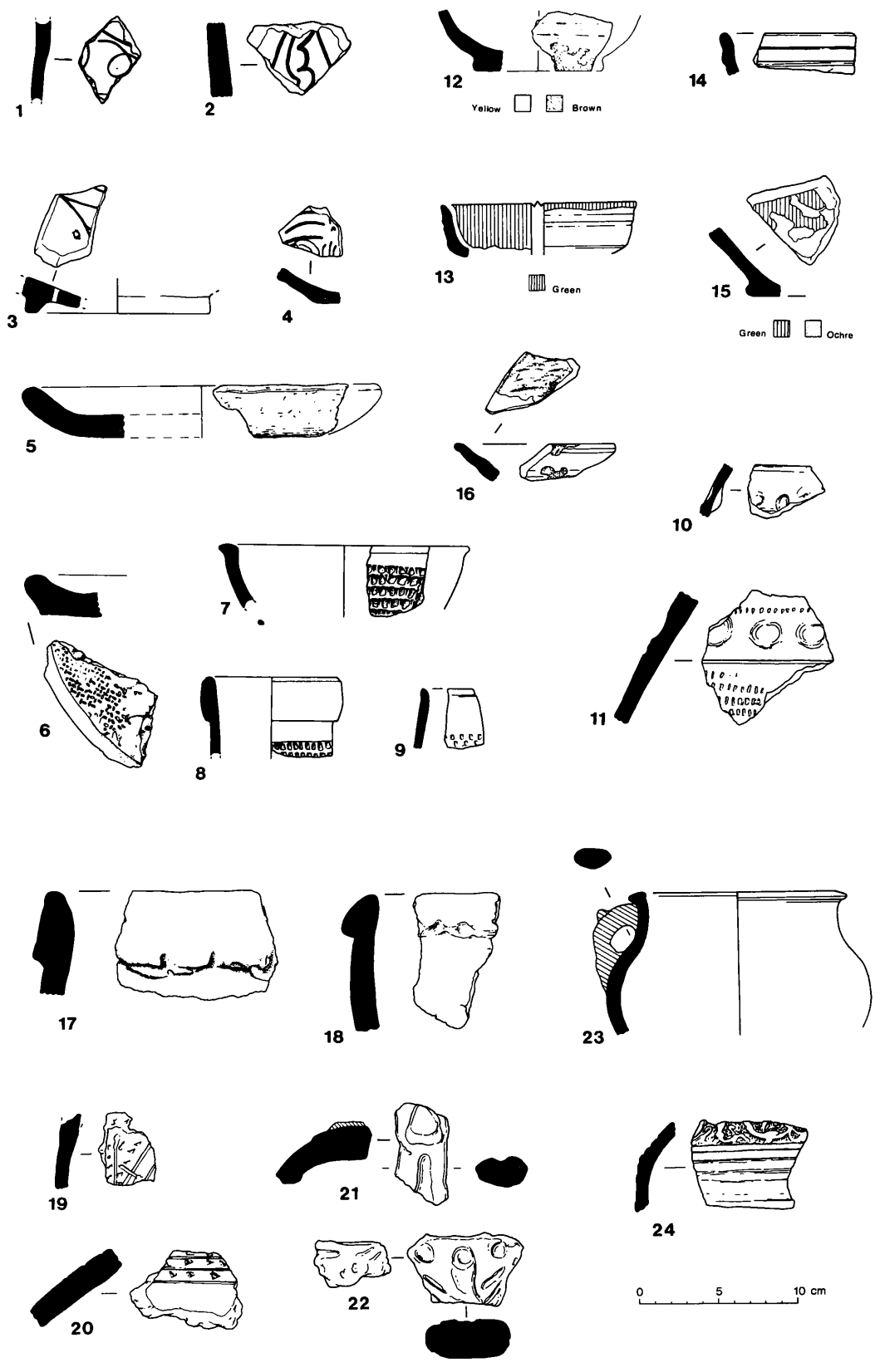

Fig.79 Middle-Later Islamic. Type 82, nos. 1-4; Type 91, nos. 5 and 6; Type 92, nos. 7-9; Type 93, nos. 10 and 11; Type 94, nos. 12-16; Type 95, nos. 17 and 18; Type 96, nos. 19 and 20; Type 97, nos. 21 and 22; Type 98, no. 23; Type 122, no. 24. Scale 1:4.

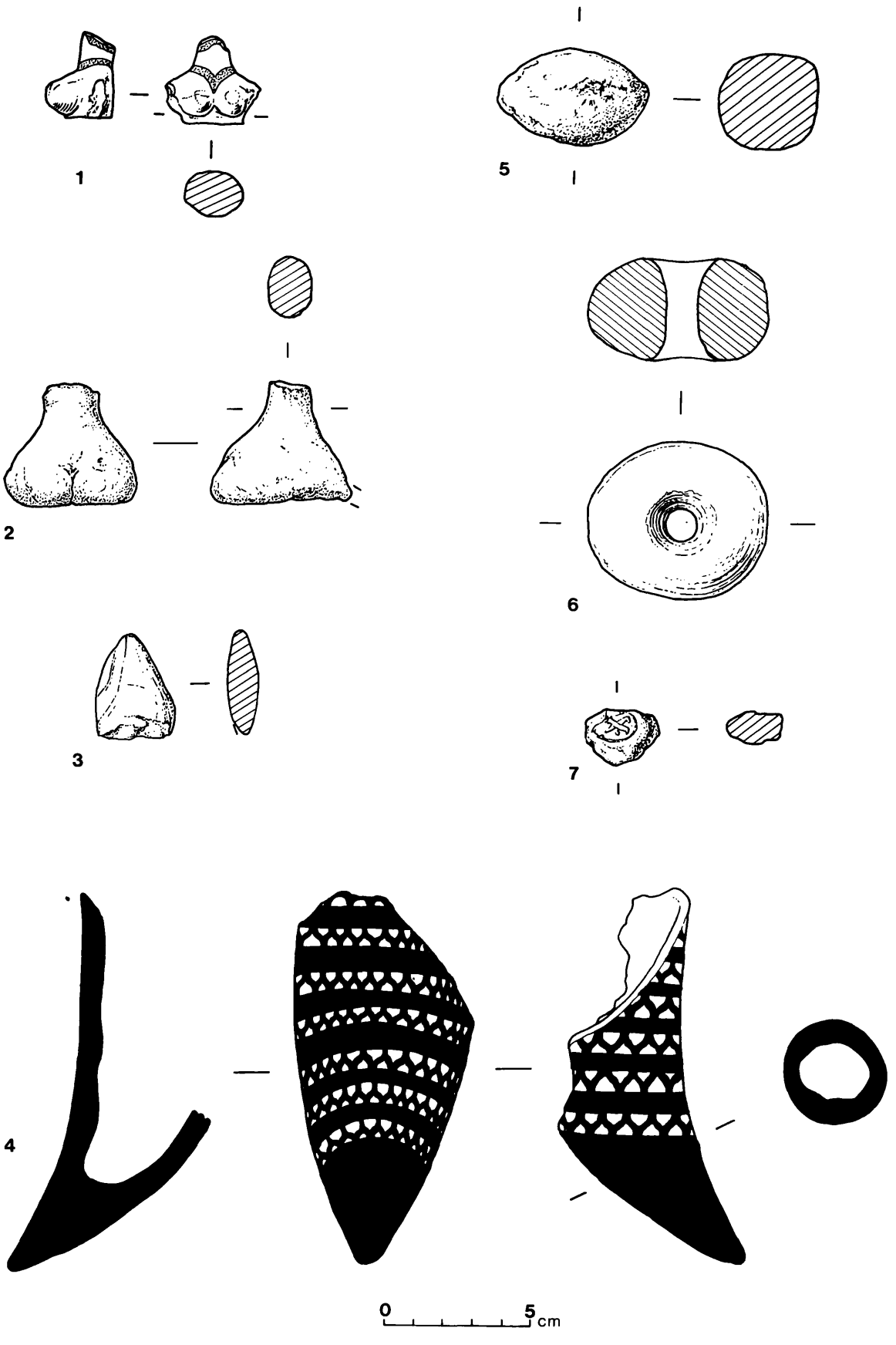

Fig.80 Noteworthy finds from surveyed sites: Halaf to Uruk. Scale 1:2.

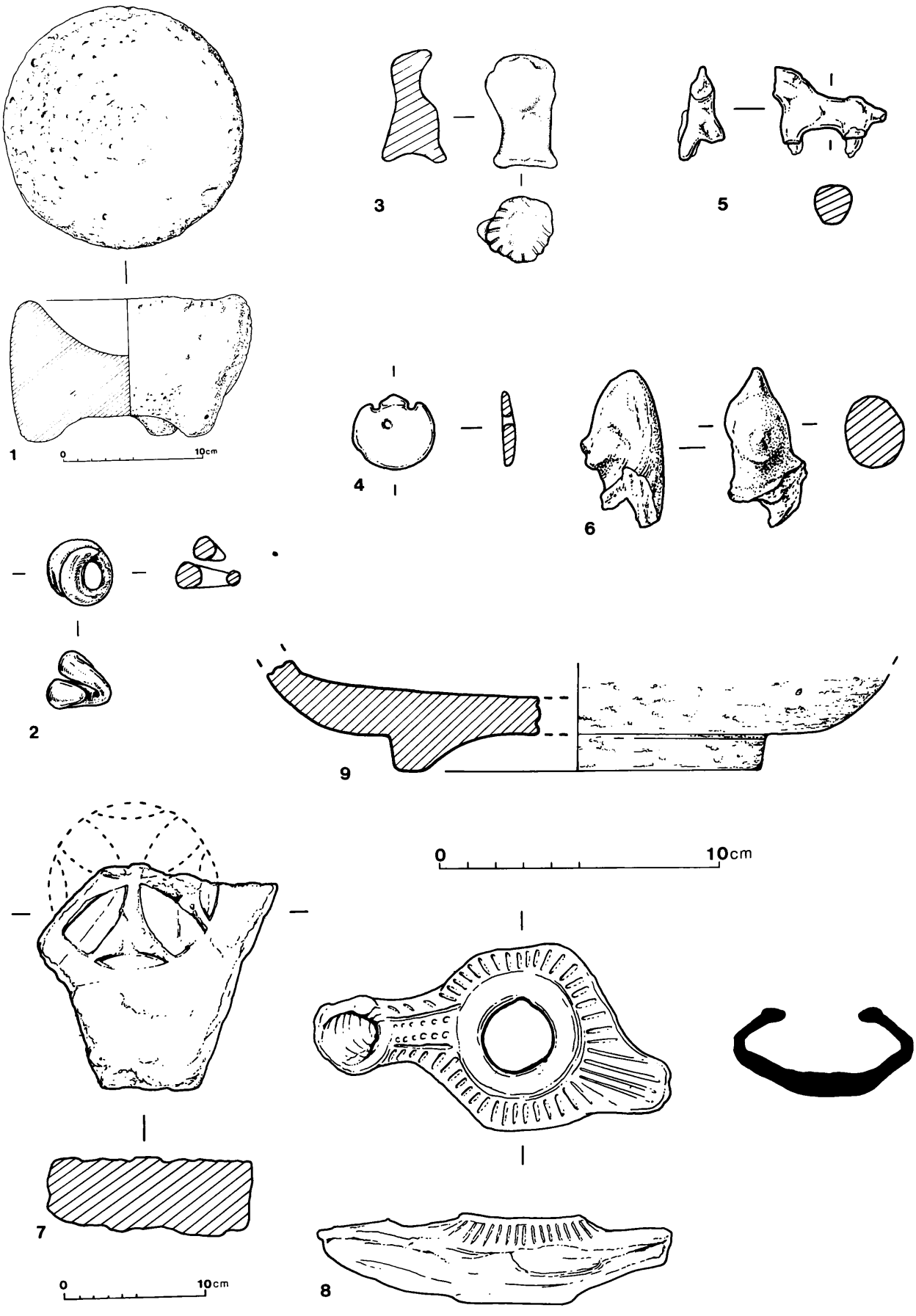

Fig.81 Noteworthy finds from surveyed sites: later 3rd millennium BC to Sasanian/Early Islamic. Scale 1:2 except for nos. 1 and 7 at 1:4.

Plate 1a General view of Tell al-Hawa and plain from south-east

Plate 1b Tulul al-Biyadir from north-west

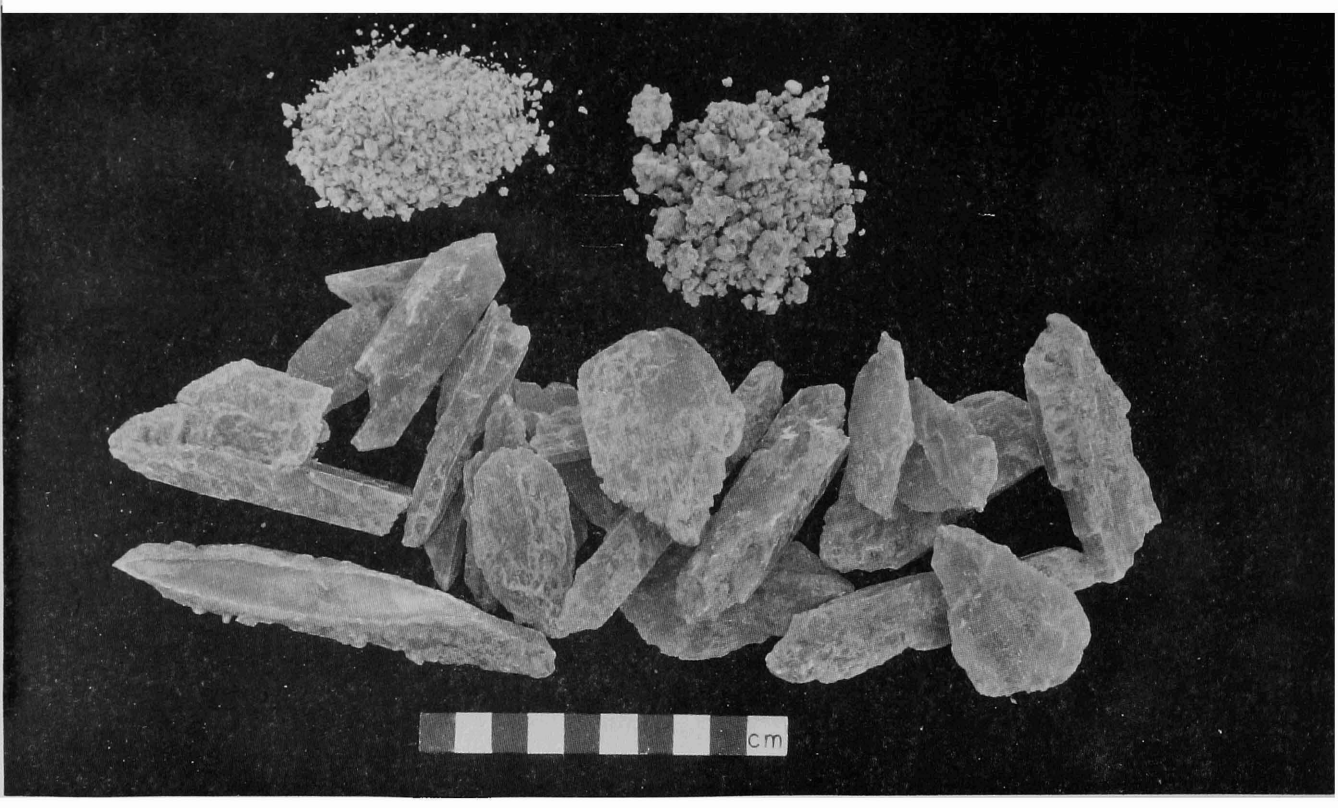

Plate 2a Gypsum crystals from Tulul al-Biyadir (by J.Wilkinson)

Plate 2b Major hollow way (near E, Fig.20) looking towards Tell al-Hawa

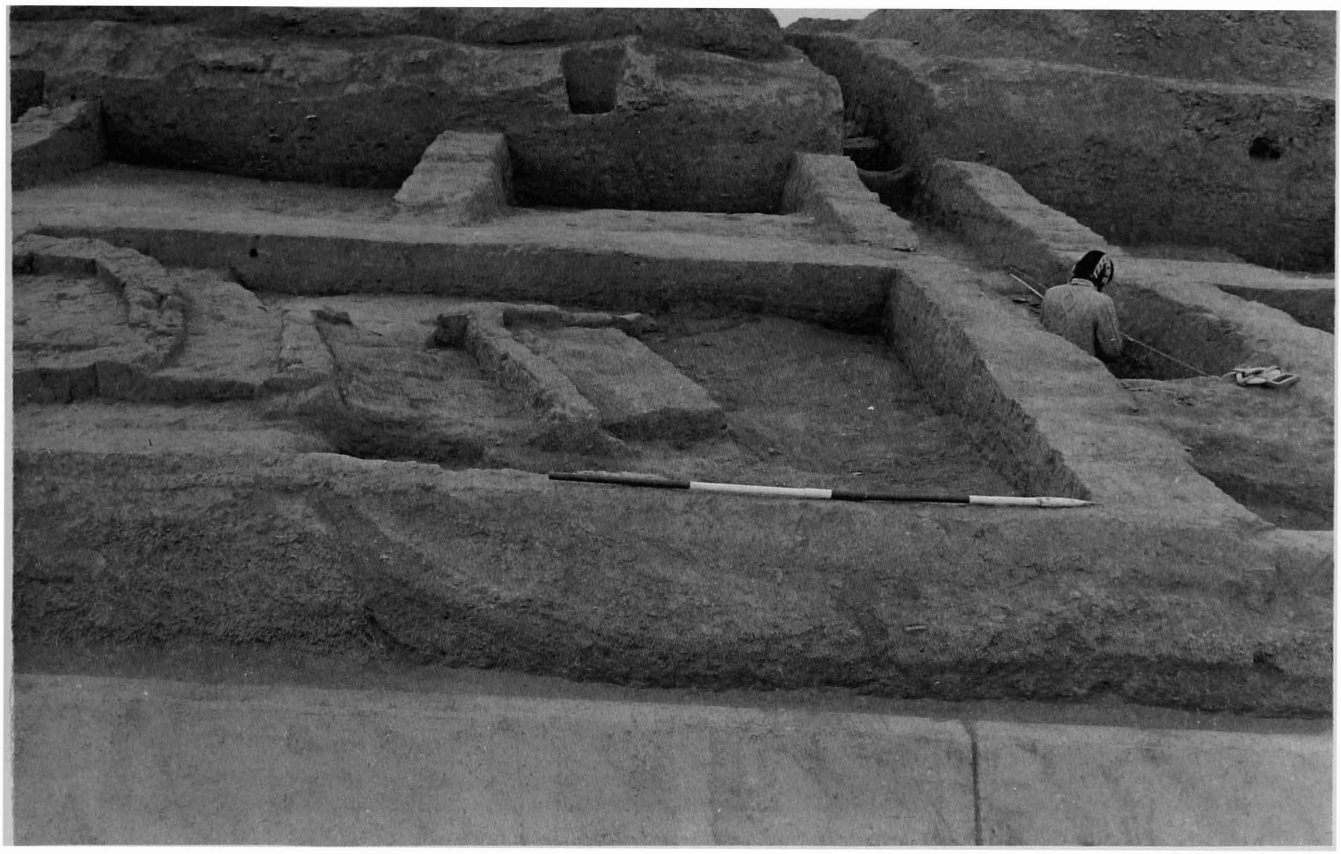

Plate 3a Khanijdal East (Site 66) from north showing structure 35 built over pit 67 (by J.Wilkinson)

Plate 3b Khanijdal East from south with rectangular structure (35) to left and circular building (33) to right (by J.Wilkinson)

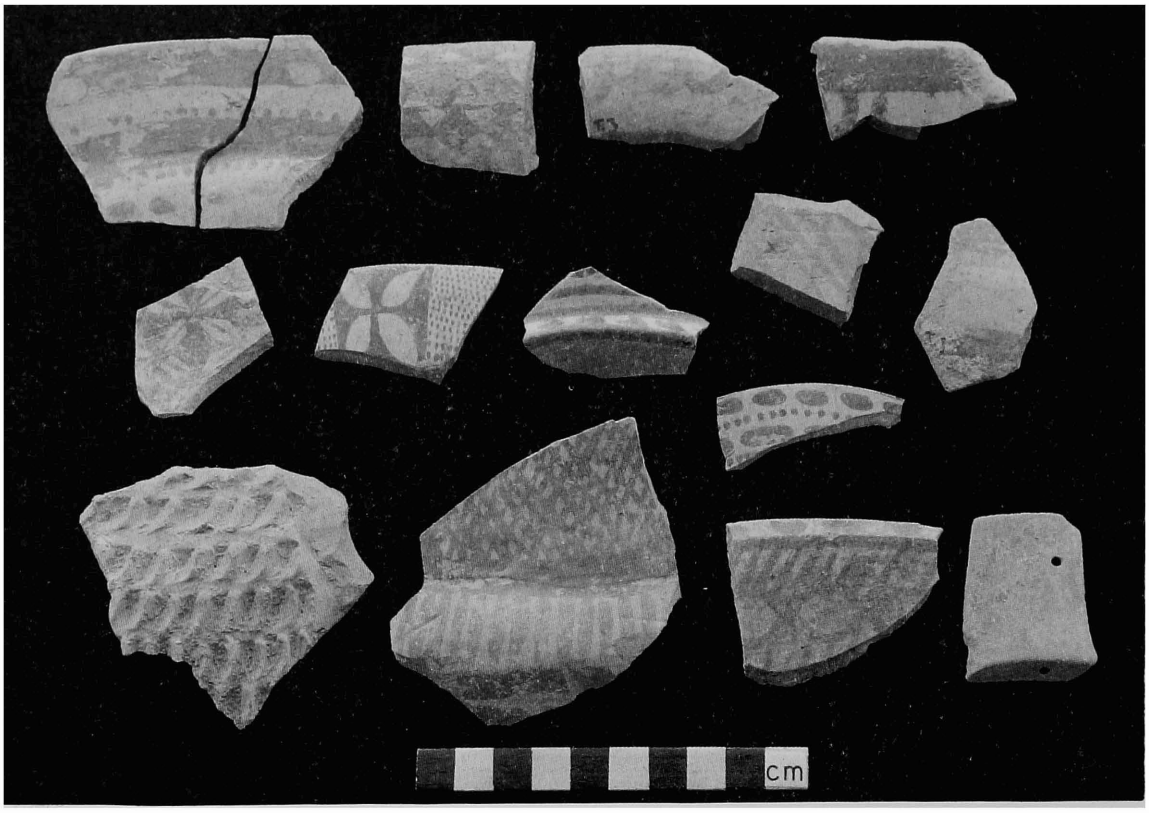

Plate 4a Halaf pottery from type series (by J. Wilkinson)

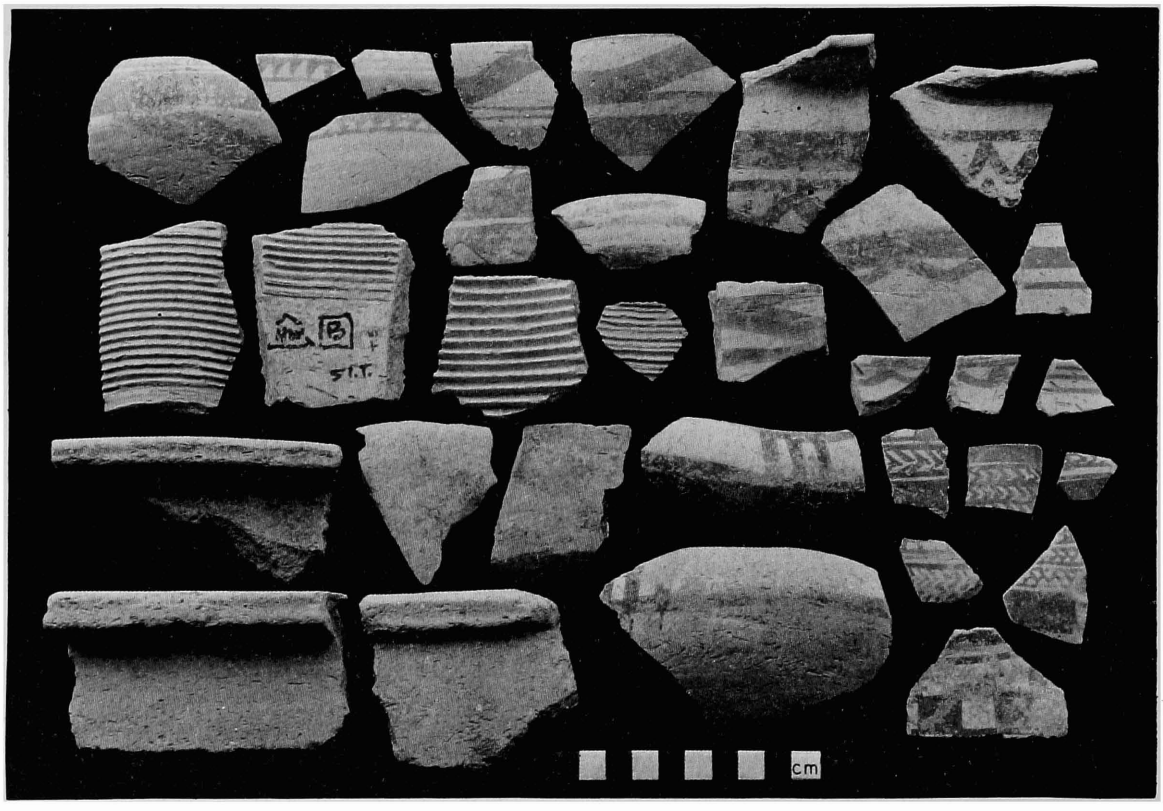

Plate 4b Ubaid pottery from type series (by J. Wilkinson)

Plate 5a Parthian stamped pottery from type series (by J.Wilkinson)

Plate 5b Halaf "drinking horn" or rhyton from Site 162B (Fig.80 no.4; by J.Wilkinson)

Plate 6a Gold hair ring from Site 162A (Fig.81 no.2; by J.Wilkinson)

Plate 6b Potter's stamp from Site 63B (Fig.81 no.3; by J. Wilkinson)

المَلاحق

مُلحق A

قائمة بالأنواع الفخارية التشخيصية المستعملة خلال عملية المسح يعقبها أوصاف للكسر الفخارية المُصورة.

مُلحق B

لُقى أثرية جديرة بالملاحظة مُصوّرة من عملية المسح.

مُلحق C

فهرسٌ بالأسماء الجغرافية ووصف المواقع الممسوحة ١-١٨٤. خلاصة بالأدوار السكنية لجميع المواقع قُدمت في الشكل ٦١.

يُظهر نموذج لنظام مستوطن من العصر البرونزي مناطق إستعمال الأرض الرئيسية ومن المحتمل أشكال الطرق أيضاً (الشكل ٦٠). هناك مناطق ذات حراثة أو مراعي قليلة الكثافة تقع ماوراء المنطقة المحروثة الرئيسية (تبدو مُنقطة على الشكل ٦٠) كانت ستسخدم لرعي القطعان الكبيرة للأغنام والماعز التي لابُد وأن كانت موجودة. ومن المحتمل أن المناطق غير المسكونة المفتوحة الواقعة في الجنوب الغربي من منطقة المسح والتي ظهرت خلال المراحل المُبكرة من التمديُن كانت قد زودت أيضاً بمصادر إضافية للرعي.

الفصل ٩ إعادة نظر شاملة: المستوطن، إستعمال الأرض والمواصلات خلال الزمن

عندما أصبحت المستوطنات المركزية أكبر حجماً خلال القرنين الثالث وأوائل الثاني ق.م، تناقص عدد المواقع الى الحد الأدنى (الشكل ٥٠). وبالتباين مع عدد المواقع، فإن المجموع الكُلي لمساحة الموقع (أي المساحة الكُلية لمواقع أثرية تعود الى أية فترة) تكون على أغلب إحتمال متناسبة مع مجموع السكان الكلي. يدل هذا الإحصاء على إنه كان قد تم البلوغ الى الحد الأعلى للسكان في أوائل الألف الثاني ق.م ولكن تضخماً سكانياً كان قد حصل أيضاً فيما بعد خلال الألف الثالث والفترة الآشورية المتأخرة (الشكل ٥٠). لقد حصل تناقص مستمر في السكان في الفترات التي أعقبت العصر الآشوري المتأخر. وبما أن دليل الاستيطان المبكر غالباً مايُحجب بواسطة دليل الأدوار المتأخرة، فإن إستيطانات ماقبل العصر البرونزي ليست ممثلة بصورة تامة بالتأكيد بعملية المسح.

إن كثافة الإستيطان، المُعبّر عنها كمنطقة سكنية في هكتارات الموقع لكل منطقة واحدة، كانت قد وصلت القمة خلال أواخر الألف الثالث ق.م. ويتطابق هذا مع الزمن الذي كان قد أُستعمل فيه التسميد بصورة مُكثفة جداً كما أستدل على ذلك بعدد الكسر الفخارية التشخيصية في المواد المصنوعة المُتبعثرة خارج الموقع (الشكل ٥١ ث، ج). وهكذا يمكن المناقشة بأن الكثافة الزراعية وإنتاج المحاصيل وصلت حدها الأعلى خلال فترة الكثافة السكانية الأعلى لكل منطقة واحدة.

إن كل مكان مركزي يعود الى العصر البرونزي كان على مايُحتمل يتمتع بالإكتفاء الذاتي وكان يستلم معظم طعامه من الحبوب من ضمن دائرة يبلغ نصف قطرها حوالي ٥ كم (الشكل ٥٤). وكان لايزال ممكناً تزويد تل الهوى بالمؤن من المراكز الثانوية الخارجية ومناطقها خلال السنوات التي يتناقص فيها المحصول ويفُترض حصول ذلك بصورة رئيسية في سنوات الجفاف.

كان هناك تناقص في عدد المواقع من ٧٧ موقعاً في الفترة الهلنستية الى ٦٦ في الفترة البارثية، ثم نزولاً الى ٥١ في العصور الساسانية/الإسلامية المبكرة (الشكل ٤٥). لقد كانت المواقع الساسانية/ الإسلامية المُبكرة أكبر قليلاً من القُرى البارثية الصغيرة أو المزارع ومبانيها، ولكن كان هناك أيضاً زيادة مهمة في عدد الإستيطانات "الخفيفة". وتتميز هذه بوجود عدد صغير جداً من الانواع الفخارية التشخيصية الساسانية/ الإسلامية المبكرة، ربما نتجت من إستيطانات بدوية قصيرة. في نفس الوقت تطور عدد من المستوطنات التي تضم مناطق مُسيّجة مُربعة أو هندسية الشكل. وربما كانت هذه لغرض السيطرة على السكّان البدويين المتزايدين، أو بالعكس لغرض الدفاع "بالعمق" عن الحدود مع الامبراطورية البيزنطية الواقعة بالقرب من نصيبين. لايمكن تأريخ أي من المناطق المُسيجة ذات الشكل المربع الصغير المُتميّز الى الفترة الرومانية.

إستمر عدد المواقع بالتناقص إستمراراً الى الفترة الإسلامية الوسطى-المتأخرة (أي مابعد القرن الثاني عشر) حيث تم العثور على حوالي ٢٨ موقعاً فقط ضمن منطقة المسح. لقد ذكر الرّحالة الأوروبيين الأوائل وجود منطقة مهجورة بصورة أساسية خلال القرنين الثامن عشر والتاسع عشر، وقد إستمر هذا الوضع حتى القرن العشرين عندما تطور شكل المستوطن الحالي للقرى والمزارع المتفرقة.

الفصل ٨ الإستقرار والتدهور: بعد الآشوريين

بعد سقوط نينوى في العام ٦١٢، دخل الاقليم السابق كادموخ فترة الغموض الأثري.

لقد أظهرت التنقيبات الاثرية التي جرت في المستوطن الآشوري المتأخر، الهلنستي والبارثي خربة علوكي (الموقع ١١٣) بأن هذا الموقع كان قد هُجر خلال الفترة الآشورية المتأخرة ولكنه أُحتل مرة أخرى خلال الفترة الهلنستية. من ناحية أخرى، يقترح توزيع المواقع بأنه كان هناك إستمرارية كبيرة في الاستيطان خلال الألف الاول ق.م وغالباً ما تتواجد بقايا الاحتلال الآشوري المتأخر والهلنستي في نفس الموقع، ولو أن ذلك في أجزاء مختلفة منه. إن تل الهوى ، الذي ربما ظل العاصمة المحلية في العصور الآشورية المتأخرة، كان قد هُجر خلال أو مباشرة بعد هذه الفترة.

لقد ظل عدد المستوطنات الهلنستية (٧٧) نفسه تقريباً كما كان خلال الفترة الآشورية المتأخرة وظلت هذه المواقع بصورة غالبة صغيرة، ذات طبيعة ريفية ومتفرقة (الشكل ٤٣).

إن نموذج المستوطن في الفترة البارثية (حوالي ١٠٠ ق.م - ٢٥٠ م) يشبه النموذج السائد في الفترة الهلنستية، وكان هناك درجة كبيرة من الاستمرارية في الاستيطان، وكانت طبقات الاستيطان البارثية والهلنستية تُشارك نفس المواقع. لقد أُعيد إستيطان تل الهوى، ولكن حصل ذلك على الروابي الجنوبية السُفلى وليس على التل الرئيسي. ومع أن سهل الجزيرة الشمالي كان يقع ضمن الامبراطورية الرومانية بين أوائل القرن الثاني وأواسط الثالث الميلادي، فلم يكن بالإمكان التعرف على مواقع رومانية مُحددة. من ناحية ثانية هناك مواقع قليلة ذات فخاريات من النوع الروماني "فخاريات هشة"، تقع بصورة رئيسية على طُرق مُجوّفة محلية-داخلية طويلة، تقترح، بأن النفوذ الروماني، والفعاليات التجارية والعسكرية كانت موجودة ومن المفترض بأنها كانت تُمارس على أشدها على طول هذه الطرق (الشكل ٤٣).

من الصعوبة التعرف على المعالم الإستيطانية لفترة نوزي وذلك لأنه على الرغم من كونها متميزة بمجموعة فخارية متميزة، فمن المحتمل أن مثل هذا الفخار كان خاص بالمواقع ذات المنزلة العالية ولايمكن بناء على ذلك من التعرف عليه في جميع المواقع. وبما أن مواقع قليلة أنتجت فخاريات نوزي، فلم يكن من الممكن تقديم خارطة توزيع لهذه الفترة. إن أكبر مجاميع فخاريات نوزي والفخاريات ذات العلاقة جاءت من تل الهوى وتل حميدة (الموقع ٧١)، وقد نُقب الموقع الأخير من قبل بول زيمانسكي واليزبيث ستون.

إن العدد الكلي للمواقع المحتوية على فخاريات الخابور (٤٣) كان أكبر كثيراً من تلك المواقع التي تحتوي على فخاريات الفترة الآشورية الوسيطة (٢٨؛ الشكل ٤١)، مما يقترح حصول تقلص هائل في الاستيطان. كان هناك أيضاً تدهور واضحاً في المراكز لذلك تضاءل حجم تل الهوى الى حوالي ١٥ هكتارا وتل التبن الى مجرد ٤ هكتارات. وبصورة عامة، بدلاً من التخلي عن مناطق كبيرة، كان هناك تخفيف عام في شكل المستوطن خلال الألف الثاني.

لقد أصبحت هناك مستوطناتٌ صغيرة متفرقة فوق جميع المنطقة خلال الفترة الآشورية المتأخرة (الشكل ٤١)، وإزداد العدد الكلي للمستوطنات من ٢٨ الى حوالي ٧٨، وأصبحت العديد من المناطق المفتوحة الموجودة سابقاً في المشهد ممتلئة. وحتى العاصمة السابقة في تل الهوى كانت ذات مساحة أكبر بقليل من ٧ هكتارات (الشكل ٤٢). إن الزيادة في نسبة الاستيطان القروي ربما نتجت عن سياسة الحكّام الاشوريون الجُدد القاضية بإعادة تأهيل "الصحراء"، بالأسرى القادمين من الأقاليم المقهورة. ويبدو أن الزيادة الحاصلة في السكان كانت قد أدت الى زيادة في تسميد الأرض، كما أستُدل على ذلك بواسطة الزيادة الخفيفة في عدد القطع الفخارية التشخيصية التابعة لهذه الفترة والتي وُجدت ضمن الكـ . الفخارية المتبعثرة خارج الموقع (الشكل ٥١).

الفخارية المُتبعثرة خارج الموقع على عدد أقل من فخاريات الخابور (الشكل ٥١ e)، وربما كان ذلك بسبب تناقص شدة إستعمال الأرض.

إن وجود أعداد مهمة من مواقع نينوى ٥، ومواقع أواخر الالف الثالث والخابور على طول الطرق المُجوّفة الرئيسية يقترح بأن الممرات المحلية الداخلية كانت قد أصبحت ذات أهمية في هذا الزمن. إن أحد طرق فترة الخابور الممتد خلال الكِبار وتل المنّاع (الموقعين ١٢٣ و ١٤٠)، يقع على خط مستقيم بين تلول أبو مريم وليلان (آبقو وشُبات إنليل على التوالي وربما كان هذا طريق إمار إتينيراري البابلي القديم).

كانت جميع المواقع التي تحتوي على فخاريات نينوى ٥، والبالغ عددها الكُلي ٣٠، متمركزة في الجزء الشمالي الشرقي من منطقة المسح، في منطقة تل الهوى (الشكل ٣٧)، والتي تحتل مساحة قدرها حوالي ٢٤ هكتارا. ونمت أيضاً مراكز ثانوية في خرابة تبن، ومن المحتمل تل السمير (موقع ٩٣) وأبو كولا (موقع ١٢٧). بالإضافة الى ذلك، كان تل الهوى مُحاط بحلقة متميزة من مستوطنات تابعة صغيرة تقع على مسافة ٤-٥ كم.

كان الإستيطان متركزاً حتى بصورة أكثر في أواخر الالف الثالث (بما فيها العصرين الاكدي وأور الثالثة)، ولابُد أن تل الهوى، بمساحته البالغة ٦٠-٧٠ هكتارا، كان يهيمن على كل المنْطقة. لقد تأسست المراكز الثانوية ذات المساحة البالغة بين ١٠-٢٠ هكتارا بصورة جيدة في خرابة تبن (الشكل ٣٨)، أبو كولا وتل السمير، ولكن يبدو أن حلقة المواقع التابعة حول تل الهوى كانت قد تضاءلت الى مواضع سكنى ثانوية قليلة. لقد ظل الجزء الجنوبي الغربي من المنطقة غير مسكون الى درجة كبيرة بإستثناء النمو الذي حصل لموقع أو إثنين من المستوطنات الثانوية كالموقعين ١٤٠ و ١٧٢ مثلاً (الشكل ٣٧).

إن الكسر الفخارية المتبعثرة خارج الموقع التي لوحظت في الفصل ٢ إحتوت على كمية كبيرة من الكسر العائدة الى أواخر الألف الثالث وكان قد أُقترح بأن إستعمال الأرض كان مُكثفاً الى درجة كبيرة في هذا الزمن كنتيجة للإستعمال المتكرر للأسمدة المستخرجة من المستوطن في الحقول من أجل زيادة المحاصيل الحقلية.

وعلى الرغم من أن النموذج المتمدين للمستوطن كان مستمر، فقد كانت المواقع في عصر الخابور تظهر مرة أخرى في الأجزاء الجنوبية والغربية من المنطقة كما ظهرت ثانية حلقة المواقع التابعة (الشكل ٣٧). إحتوت الكسر

لقد غطى موقع خانيجال شرق الذي يؤرخ الى أواخر عصر العبيد حوالي هكتارا واحداً (الشكل ٣٣) وكان ذو إرتفاع يبلغ حوالي ١.٥ مترا. لقد كشفت التنقيبات عن جزء من بناء دائري الشكل من الطوف (رقم ٣٣ الشكل ٣٤) وبناء مجاور للخزن (رقم ٣٥)، والذي كان قد بُني بدوره فوق حفُرة كبيرة (رقم ٦٧). تقترح اللُقى الاثرية وكذلك التعاقب الطبقي بأن الموقع كان قد أستوطن على ما يُحتمل لبضعة أجيال فقط خلال أواخر عصر العبيد.

لقد شهد عصر الوركاء الشمالي زيادة هائلة في عدد المواقع من ٤٣ الى ٦٦ (الشكل ٣٥)، ولو أن جزء من هذا ربما يُعزى الى أن أكثر من دور فخاري واحد كان موجوداً خلال هذه الفترة المعقدة من الناحية الفخارية. ومع أن معظم مواقع الوركاء كانت متميزة بفخار من نوع محلي، فإن عدداً قليلاً إحتوى على مجموعة من نوع الوركاء الجنوبي (الشكل ٣٥).

الفصل ٥ فترة قرى ماقبل التاريخ

بعد خلاصة تناولت المحيط البيئي لشمال العراق خلال العصر مابعد الجليدي، تم وصف دليل المسح الذي يخص مستوطن ماقبل التاريخ.

في الواقع إن الدليل الذي يتعلق بالعصر التالي مباشرة للعصر الحجري القديم وأوائل العصر الحجري الحديث ضئيل جداً على السهل وان أقدم موقع تم تسجيله هو موقع جنيك (موقع ٢١)، الذي نُقب من قبل ستيوارت كامبل. لقد أظهر هذا الموقع طبقة سكنية غير فخارية على مايُحتمل على القاعدة تعلوها طبقة سكنية تعود الى فترة العصر الحجري الحديث الفخارية (أي قبل فترة حسونة).

كان هناك إزدياد سريع في عدد المواقع خلال فترة حسونة، وتم تسجيل ٣٨ مستوطناً (الشكل ٣١). كما تم تسجيل بعض البقايا العائدة الى سكنى حسونة تحت تراكمات رسوبية طبيعية (مثلاً موقع ٣٣).

إن الزيادة الطفيفة في عدد المواقع من ٣٨ الى ٤٠ الحاصلة في عصر حلف ليست ذات مغزى مهم، وإن التوزيع الكلي للمواقع ظل كما كان سابقاً، ولو ان مواقع مختلفة تم إحتلالها (الشكل ٣١). بالمقارنة مع حسونة، حيث بلغ معدل مساحة المواقع حوالي ١ هكتارا، فإن مواقع حلف كانت أكبر قليلاً حيث كان معدل حجمها يتراوح بين ١-٢,٥ هكتارا.

لقد بقي نموذج المستوطن مشابهاً خلال عصر العبيد ومرة أخرى حصلت زيادة خفيفة في عدد المستوطنات من ٤٠ الى ٤٣. كما إزداد أيضاً حجم المواقع بصورة قليلة وظهر في تل الهوى مستوطن مركزي يغطي مساحة تبلغ حوالي ١٥ هكتارا.

إن مثل هذه المنخفضات كانت أكثر شيوعاً في مواقع الفترة الاشورية المتأخرة وما بعدها وكانت المنخفضات المُسيجة المتعددة أكثر شيوعاً في المواقع المتأخرة (الشكل ٣٠). إن نسبة تكرارها في المواقع المتأخرة ربما يُعزى ببساطة الى أنه لم يمضي عليها فترة طويلة من الزمن كافية لملئها بالترسبات. ومن المُعتقد بأن المنخفضات كانت قد حُفرت لغرض الحصول على الأتربة المستعملة في صناعة الطابوق وان هذه العملية ستكون ذات فعالية أكبر إذا ماحصلت بالقرب من مصدر للمياه، وهذه نفسها صفة محفورة. وحالما تظهر هذه المنخفضات في الصورة فسوف تمتلئ بمياه الفيضان لتزود بمصدر إضافي للمياه للمجتمع المحلي.

جاء الدليل على ثقوب المياه من عدد من المواقع التي كانت قد تعرضت للقطع أوالشق بواسطة قنوات المياه. لقد أظهرت مثل هذه الشقوق ترسبات طينية ذات ألوان مزيجة من الاخضر والبرتقالي والتي نتجت عن طريق التشبع بالمياه في بيئة "مختزلة" من الناحية الكيمياوية. بإستثناء الأمثلة التي وُجدت في الموقع ١٤٣، والتي كانت ذات تاريخ يعود الى الفترة الساسانية أو فترة الوركاء، فقد وُجدت هذه الترسبات في مواقع تعود الى عصور ماقبل التاريخ وذات تاريخ يسبق الالف الثالث ق.م.

تم عمل مقطع في كشف من الترسبات المشبعة بالمياه في تل الهوى وْظهر بأنها تملأ حُفرة عميقة غير منتظمة الشكل تحتوي على كمية وافرة في فخاريات ألوركاء الشمالية (الشكل ٢٧). وإستناداً الى شكل الحُفرة الغير المنتظم وكُبر حجمها، يبدو من غير المحتمل بأنها كانت قد حُفرت لغرض إستخراج المياه فقط، ومن المحتمل أيضاً بأنها كانت قد أستخدمت لغرض استخراج الاتربة المستعملة في صناعة الطابوق.

في موقع قار سور الذي يعود الى فترة حسونة-سامراء (موقع ٣٩)، قام ستيُوارت كامبل بتنقيب كتلة كبيرة من ترسبات ممتزجة وُجدت داخل منخفض ذو شكل مخروطي معكوس الى عمق ٤,٥ م تحت مستوى الأرض. لقد فُسّرت هذه الصفة أيضاً على كونها موضعاً مُبكراً للمياه الذي تم حفره لغرض رفع مستوى المياه المحلية.

هناك مواقع عديدة أحتوت على منخفضات مُسيّجة، غالباً مايبلغ مساحتها ١-٢ هكتارا، ضمن مُجمع روابيها الأساسية. ويزود موقع مواشة أحد الأمثلة الأكبر حجماً. يغطي هذا حوالي ٣,٥ هكتارا وإمتد الى حوالي ٥م تحت مستوى السهل في المكان الذي تعرض فيه للقطع بواسطة حُفرة حديثة (الموقع ١٥، الشكل ٢٩).

الفصل ٣ المشهد الأثري ٢: طُرق مُجوّفة

تبدو الطرق المجوفة كأنها وديان سطحية مستقيمة تتشعب إما من مواقع أو عبر المنطقة بصورة عامة وتربط بينها. ويعتقد بأنها كانت قد نتجت من مرور البشر والحيوانات وما يتسبب عن ذلك من ضغط وتشويش التربة مما يؤدي الى تسهيل عملية التآكل بواسطة المياه والرياح وهذا يؤدي بدوره الى إنخفاض مستوى الارض وتكوين تجويفاً متميزاً. وقد يصل عُمق هذه الطرق الى ٤ أمتار وذات عرض يتراوح في الغالب بين ٣٠-٤٠ مترا، (الشكل ١٩). لقد صار البعض منها ممتلئاً بالاتربة ويظهر كعلامة داكنة فقط أو كخطوط نباتات.

إن خطوط التشعب ذات معدل طول يبلغ ٥ كم إبتداء من الموقع المركزي، وبعضها مثل الطرق التقليدية، ذات مَفرق على مسافة ١-٢ كيلومترا. ومع أن ٥-٦ خطوط توجد في العادة حول المواقع، فإن تل الهوى يحتوي على ١٤ خطاً محصورة الى جانبه المنحدر الى أعلى (الشكل ٢٠). وبخلاف الوديان، فإن بإمكان الطرق المجوفة عبور سطح الأرض بصورة مائلة الى المنحدر السائد (الشكل ٢٠) وعلى عكس القنوات فإن بإستطاعتها المرور فوق مستجمعات المياه (الاشكال ٢٠ و ٢٣). إن أفضل النماذج المتطورة تتشعب من مراكز تعود الى الألفين الثالث والثاني ق.م، ويمكن تفسيرها كطرق تؤدي الى الحقول أو المستوطنات الخارجية.

إن بالإمكان التعرف على أحد عشرة صفة طويلة المسافة عبر المنطقة. وتكون هذه في بعض الأحيان ضيقة وغير متصلة، ويبدو بأنها تمثل طُرقاً ذات مسافات طويلة (الشكل ٢٤). إن أفضل مثل هو الصفة المتشعبة التي تنفصل في عوينات وتؤدي الى الشمال الغربي خلال تل الهوى أو تل السمير (الاشكال ٦ و ٢٤).

أظهرت عملية أخذ سلسلة من النماذج الأثرية على طول خط مستقيم خارج الموقع بأن الكسر الفخارية والصيوانيات ونفايات الافران المتزججة كانت فعلياً تنتشر بصورة مستمرة عبر السهل. ومن أجل توضيح توزيع مثل هذه المواد المتبعثرة فقد تم تخطيط مربعات عيّنات بقياس ١٠ X ١٠ م بين كل ٥٠ الى ٣٠٠ مترا على طول الخطوط المستقيمة المذكورة أعلاه والتي إما تتشعب من أو تمتد بين المواقع. لقد أظهر برنامج العينات بأن المواد المتبعثرة كانت مستمرة عبر جميع المنطقة، ولكنها كانت أكثر كثافة حول مراكز العصر البرونزي الرئيسية (الاشكال ١٢-١٤). لقد أظهرت المواضع المقطوعة في القناة بأن المواد المبعثرة لاتمثل في الواقع مواقع مستوطنات وان التفسير الاكثر قبولاً هو أنها كانت قد نتجت عن طريق استعمال الأسمدة في الازمنة القديمة. وقد نتج عن هذا بان النفايات العضوية المستحصل عليها من المستوطنات القريبة سوف لايبقى منها بعد نشرها في الحقل وبعد بلاء العنصر العضوي سوى المادة المقاومة فقط (الكسر الفخارية..الخ) في التربة.

الفصل ٢ المشهد الأثري رقم ١: مواقع ومصنوعات مبعثرة.

إن بالإمكان تصنيف مواقع المستوطنات الاثرية كتلال عالية ذات أدوار متعددة، غالباً مايحيط بها عدد من الروابي المنخفضة؛ واحياناً تتجمع الروابي ذات الاحجام الصغيرة الى المتوسطة حول منخفضات أو مصادر مياه؛ إن الروابي الصغيرة البسيطة، ذات تاريخ يعود في الغالب الى عصور ماقبل التاريخ؛ أما الروابي المعقدة من الناحية الطوبوغرافية فيعود تاريخها بصورة رئيسية الى الفترات الساسانية أو الإسلامية وكذلك فإن المناطق المُسيّجة الهندسية، مربعة الشكل في العادة، يعود تاريخها مرة أخرى الى العصور الساسانية أو الاسلامية.

صنف متميز آخر من المواقع الأثرية كان متمثل بتلول البيادر (١٠٦) والذي ظهر بواسطة التنقيب بأنه يتكون من روابي ذات أتربة تحتوي على نُفايات كان قد تم حفرها من التجاويف المتخللة. ويبدو أن هذا كان لغرض استخراج المعادن، وربما للترسبات الكلسية المحلية (الاشكال ٨-١١).

جرى خلال عملية المسح تخصيص أرقام المواقع إما لروابي منفردة، في حالة كونها منعزلة، أو الى مجموعة روابي إذا كانت متجاورة مع بعضها بصورة متقاربة. كما تم تخصيص الحروف A, B, C...الخ لاغراض المجموعة الفخارية، والى الروابي المنفردة ضمن المجموعة المرقمة أو الى مناطق متميزة من موقع مُعيّن. تم التقاط حافات الاواني، القواعد، والكسر الفخارية المزخرفة (أي التشخيصية) من كل قسم موقع ثانوي مُرقم وقد زودت هذه الملتقطات بالأساس لتأريخ المواقع. كما تم إلتقاط اللُقى الصغيرة أيضاً، وتم تسجيلها قبل أن تُرسل إما الى تل عفر أو الى المتحف العراقي. بالإضافة الى ذلك، فقد تم الحصول على ملتقطات ممثلة من المواد الصيوانية. تم مقارنة الكسر الفخارية التشخيصية مع قائمة ومجموعة من الانواع التشخيصية المؤرخة، محفوظة الآن في مديرية الآثار في تل عفر، وبذلك ساعدت على تعيين فترات إستيطان تقريبية.

إن الطرق الممتدة عبر السهل تتجنب الممرات المحصورة في وادي دجلة، وتتبع بدلاً عن ذلك أحد الطرق الرئيسية للهلال الخصيب، الذي يمتد من نينوى (الموصل) شمال غرب عبر نصيبين، راس العين، جيرابلس والفرات الأعلى بإتجاه حلب وأواسط سوريا.

الفصل ١ : المدخل والخلفية الى المشروع

يُلخِصُ هذا التقرير نتائج أربعة مواسم من الأعمال الحقلية الأثرية التي تم القيام بها بين الأعوام ١٩٨٦ و ١٩٩٠ والتي شملت مساحة ٤٧٥ كيلومترا مربعاً من شمال العراق الواقعة شمال جبل سنجار، الى الغرب من نهر دجلة والى الشرق من الحدود السورية. لقد كان الهدف مسح جميع المواقع الأثرية الواقعة ضمن منطقة مشروع ري الجزيرة الشمالية، وكذلك لتجهيز سجل كامل للمشهد الأثري. بالإضافة الى المركز المحلي في تل الهوى، الذي تم تنقيبه من قبل (وورِك بول) "Warwick Ball" في عامي ١٩٨٧ و ١٩٨٨، فقد تم تنقيب مواقع صغيرة بصورة جزئية في كل من تلول البيادر (موقع رقم ١٠٦)، وتل الحلوة (موقع رقم ٨٦)، وموقع خانيجال شرق (موقع رقم ٦٦) وخربة علوكي (موقع رقم ١١٣)؛ (فيما يتعلق بمواضع المواقع انظر الشكلين ٢ و ٦).

إن السهل الذي يمتد بصورة معتدلة محروث لمعظم السنين لغرض زراعة محاصيل الحبوب التي تعتمد على مياه الأمطار بإستثناء مزارع صغيرة تُسقى من مياه الآبار العميقة والتي تزود بالخضروات. لاتوجد هناك مياه دائمة الجريان في قنوات الوادي في الوقت الحاضر، ومع إنه كان يوجد في يوم ما ينابيع في عوينات، فإن المياه المستعملة لأغراض منزلية تأتي بصورة عامة عن طريق الأبار، وذلك إما بواسطة الضخ أو بواسطة اليد أو إستخدام الحيوان.

إن التربة الطينية الغرينية ذات اللون البُني الضارب للحُمرة مؤهلة للمحافظة على إنتاج محاصيل حقلية معتدلة طالما تستلم كمية كافيه من مياه المطار (٣٠٠-٤٠٠ ملم كل سنة). إن بالإمكان تطبيق نظام الأرض المُراحة وذلك للإحتفاظ بنسبة مئوية من مياه الامطار المتساقطة في السنة السابقة للسنة التي يتم فيها زرع المحاصيل. إن مثل هذا الإرجاء الذي يبلغ نسبة تتراوح بين ١٥-٢٠٪، يكون في الغالب كافياً للحيلولة دون فشل المحاصيل في السنوات الأكثر جفافاً.

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