A CENTRAL ASIAN VILLAGE AT THE DAWN OF CIVILIZATION, EXCAVATIONS AT ANAU, TURKMENISTAN

A Central Asian Village at the Dawn of Civilization, Excavations at Anau, Turkmenistan

A Central Asian Village at the Dawn of Civilization, Excavations at Anau, Turkmenistan

University Museum Monograph 116

A Central Asian Village at the Dawn of Civilization, Excavations at Anau, Turkmenistan

Fredrik T. Hiebert

with Kakamurad Kurbansakhatov

Foreword by Robert H. Dyson, Jr.

And contributions from Hubert Schmidt, Katherine M. Moore, Ogul'sona Lollekova, Langdon Warner, Naomi F. Miller, Alexandra Golyeva, N. M. Ermolova, Ann Forsten, James Adovasio, and Jeffery Illingworth

UNIVERSITY OF PENNSYLVANIA MUSEUM
of Archaeology and Anthropology

Philadelphia

First Edition

Library of Congress Cataloging-in-Publication Data

Hiebert, Fredrik T. (Fredrik Talmage)
A Central Asian village at the dawn of civilization : excavations at Anau, Turkmenistan / Fredrik T. Hiebert with Kakamurad Kurbansakhatov ; foreword by Robert H. Dyson, Jr. ; and contributions from Hubert Schmidt ... [et al.].
p. cm. -- (University Museum monograph ; 116)
Includes bibliographical references and index.
ISBN 1-931707-50-2 (alk. paper)
1. Cities and towns--Asia, Central--History. 2. City and town life--Asia, Central--History. 3. Villages--Asia, Central--History. 4. Asia, Central--Civilization. 5. Asia, Central--Antiquities. 6. Excavations (Archaeology)--Asia, Central. I. Kurbansakhatov, K. (Kakamurad) II. Schmidt, Hubert. III. Title. IV. Series.
HT147.A783 H53 2003
307.76'0958--dc21
2003001881

Printed in the United States of America on acid-free paper

To the memory of

Raphael Pumpelly

Contents

Illustrations ix

Foreword, Robert H. Dyson, Jr. xv

Preface xvii

1 Anau North, an Introduction 1
2 The Settlement History of Central Asia in the Village Period 15
3 The History of Investigations at Anau North 24
4 1997 Excavations: Context of Deposition and Stratigraphy 32
5 Radiocarbon Chronology 55
6 Ceramic Complexes of Anau North and Relative Chronology 57
7 Small Finds from Anau North, *with Ogul'sona Lollekova and Katherine M. Moore* 81
8 Architecture at Anau North 98
9 Burials, *with L. Warner and K. Kurbansakhatov* 116
10 The Use of Plants at Anau North, *Naomi F. Miller* 127
11 Microscopic Analysis of Soils from Anau North, *Alexandra A. Golyeva* 139
12 Animal Herding, Hunting, and the History of Animal Domestication at Anau depe, *K. M. Moore and N. M. Ermolova* 154
13 Prehistoric Behavior at Anau North 160
14 The Evolution of the Settlement at Anau North 169

Appendices
- A 1904 Excavations at Anau North, *Hubert Schmidt* 174
- B Catalogue of Small Finds from the 1904 Excavations, *Katherine M. Moore* 194
- C Botanical Data from the 1997 Excavations, *Naomi F. Miller* 201
- D A Basketry/Textile Impression from Anau North, *J. M. Adovasio and J. S. Illingworth* 216

Bibliography 220

Index 236

Fredrik T. Hiebert is the Robert H. Dyson, Jr., Assistant Professor of Anthropology and Assistant Curator in the Near East Section of the University of Pennsylvania Museum of Archaeology and Anthropology.

Kakamurad Kurbansakhatov is Departmental Director, Institute of Cultural Heritage, Turkmenistan, and former director of the Southern Turkmenistan Multidisciplinary Archaeological Expedition (IuTAKE).

James Adovasio is the Director of the Mercyhurst Archaeological Institute, specializing in ancient textiles.

The late N. M. Ermolova was a Researcher at the Institute of Archaeology, Leningrad, specializing on animal bones from Central Asia.

The late Ann Forsten was a Research Scientist at the Finnish Museum of Natural History specializing on the evolution of the horse.

Alexandra Golyeva is a Research Scientist at the Institute of Geography, Moscow, specializing in soil studies from archaeological sites.

Jeffery Illingworth, of the Mercyhurst Archaeological Center, is a specialist on ancient textiles.

Ogul'sona Lollekova, of the Department of Turkmen History at the Institute of Languages, Turkmenistan, is a specialist on useware analysis of stone tools.

Naomi F. Miller, Senior Research Specialist, Museum Applied Science Center for Archaeology, University of Pennsylvania, is a specialist on plants and agriculture of the ancient Near East and directed the archaeobotanical program at Anau in 1997.

Katherine M. Moore, Research Associate, University of Pennsylvania Museum of Archaeology and Anthropology, is a specialist on faunal remains in South America and Central Asia.

The late Hubert Schmidt was University Professor and Curator at the Staatliche Museen zu Berlin. He directed the excavations at Troy under Dorpfeld and served as the archaeological field director of the 1904 expedition at Anau.

The late Langdon Warner was Curator of the Oriental Art Department at the Fogg Museum, Harvard University. He participated on the 1904 expedition at Anau while he was a graduate student at Harvard.

Illustrations

FIGURES

1.1	Central Asia	1
1.2	Desert basins of Central Asia	2
1.3	Kopet Dag region	3
1.4	Land use along the Kopet Dag	4
1.5	Landscapes of the Kopet Dag region	4
1.6	Satellite photo of the Anau region	5
1.7	The Keltechinar River valley	6
1.8	Cultural regions of the Kopet Dag	6
1.9	The three mounds at Anau	9
1.10	Mounds at Anau in 1904	10
1.11	North Mound in 1997	10
1.12	North Mound, general topographic plan	11
2.1	The Djeitun and Anau regions	16
2.2	Djeitun site plan	16
2.3	Middle/late Djeitun sites	17
2.4	Pessejik, site plan and wall painting	17
2.5	Anau IA sites	18
2.6	Mondjukli site plan	18
2.7	Chakmakli excavations	18
2.8	Anau IB/Namazga I sites	19
2.9	Dashlidzhi depe site plan	19
2.10	Walling painting at Yassi depe	20
2.11	Anau II/Namazga II sites	21
2.12	Fortified village, Yalaganch site plan	22
2.13	Fortified village, Mullali site plan	22
2.14	Kara depe (period 2–3) site plan	22
2.15	Ilgynli depe, excavation 5 (layer 3)	23
3.1	Excavations at Anau North	24
3.2	Komarov's Trench in 1903	25
3.3	Pumpelly team at camp in 1904	26
3.4	1904 terrace excavations	26
3.5	1904 excavation technique	27
3.6	1904 stratagraphic section from Anau North	27
3.7	Ershov's 1953 stratigraphic section	29
3.8	Wall painting from Ershov's sounding at Anau North	29
3.9	Kurbansakhatov's 1977 excavations	30
3.10	Kurbansakhatov's exposure of architectural layer 6	31
4.1	Schematic section of 1997 excavations, Anau North	33
4.2	Anau North, 1997 excavation areas ANI–ANM	34
4.3	Layers 2–4, section, Anau IIA period	35

4.4 Layers 2–4, excavation plans, Anau IIA period . . . 39
4.5 Pebble-lined bin, layer 4, Anau IIA period . . . 40
4.6 Layers 2–4 ceramics . . . 41
4.7 Layers 2–4 ceramics (cont.) . . . 42
4.8 Layers 2–4 ceramics (cont.) . . . 43
4.9 Layers 2–4 small finds . . . 44
4.10 Layers 5–9, section . . . 45
4.11 Layers 5–6, excavation plan, Anau IB2 period . . . 46
4.12 Layers 7–9, excavation plan, Anau IB2 period . . . 46
4.13 Wall, layer 6 . . . 47
4.14 Layers 5–9 ceramics . . . 48
4.15 Layers 5–9 ceramics (cont.) . . . 49
4.16 Layer 14, excavation plan, Anau IB1 period . . . 50
4.17 Layer 14, circular structure section, Anau IB1 period . . . 50
4.18 Layer 14, ceramics . . . 51
4.19 Layer 14, ceramics (cont) . . . 52
4.20 Layer 14, ceramics (cont.) . . . 53
4.21 Layers 15–20, section, Anau IB1 and IA periods . . . 54
5.1 Early Village Period radiocarbon dates, Akhal region, Anau North and Djeitun . . . 56
6.1 Ceramic periods, Anau North . . . 58
6.2 Chronological distribution of ceramic types, Anau North . . . 61
6.3 Ceramic Types A.1 and A.2 . . . 63
6.4 Ceramic Types B.1–B.4 . . . 64
6.5 Slab construction of B.1–B.4 ceramics . . . 65
6.6 Ceramic Type B.5 . . . 66
6.7 Descriptive terms for ceramic motifs . . . 66
6.8 Evolution of ceramic motifs, Anau North . . . 67
6.9 *Korchagi*, 1904 excavations . . . 67
6.10 Ceramic Type C.1 . . . 68
6.11 Ceramic Type D.1 . . . 69
6.12 Ceramic Type D.2 . . . 70
6.13 Ceramic Types E.1–E.3 . . . 71
6.14 Ceramic Types F.1–F.4 . . . 73
6.15 Ceramic Types G.1–G.4 . . . 75
6.16 Relative stratigraphy of Early Village Sites in Central Asia and Iran . . . 76
7.1 Pre-Anau IA small finds . . . 82
7.2 Anau IA small finds . . . 83
7.3 Anau IB1 small finds . . . 84
7.4 Anau IB2 small finds . . . 84
7.5 Anau IB2 small finds (cont.) . . . 85
7.6 Anau II small finds . . . 86
7.7 Terracotta whorls . . . 87
7.8 Terracotta whorls . . . 88
7.9 Bone tools . . . 89
7.10 Bone tools . . . 90
7.11 Metal objects . . . 91

7.12 Flint tools . . . 92
7.13 Ground stone objects . . . 93
7.14 Ground stone objects . . . 94
7.15 Stone weights . . . 95
7.16 Beads from burial 6, layer 7 . . . 96
7.17 Ornaments . . . 96
7.18 Female figurine . . . 97
8.1 Areas of architecture excavated at Anau North . . . 98
8.2 Layers 20–19, Kurbansakhatov's deep sounding. Anau IA period . . . 99
8.3 Layers 20–15, stratigraphy, Kurbansakhatov's deep sounding. Anau IA and IB1 periods . . . 100
8.4 Layers 18–15, Kurbansakhatov's deep sounding. Anau IB1 period . . . 101
8.5 Layer 17 structures . . . 101
8.6 Layer 14, Kurbansakhatov's deep sounding. Anau IB1 period . . . 102
8.7 Layer 13, Kurbansakhatov's deep sounding. Anau IB1 period . . . 102
8.8 Layer 13 architecture . . . 102
8.9 Layer 12, Kurbansakhatov's deep sounding. Anau IB1 period . . . 103
8.10 Layer 11, Kurbansakhatov's deep sounding. Anau IB1 period . . . 103
8.11 Layer 10, Kurbansakhatov's deep sounding. Anau IB1 period . . . 104
8.12 Ershov's sounding . . . 104
8.13 Section, layers 14–6, main trench. Anau IB1 and IB2 period . . . 105
8.14 Layer 9, main trench and 1997 excvations . . . 106
8.15 Layers 8 and 9, 1980s excavations . . . 106
8.16 Layer 8, main trench and 1997 excavations. Anau IB2 period . . . 107
8.17 Layer 7, main trench and 1997 excavations. Anau IB2 period . . . 107
8.18 Layer 6, main trench and 1997 excavations. Anau IB2 period . . . 108
8.19 Layer 6 . . . 109
8.20 Layer 5, main trench and 1997 excavations. Anau IB2 period . . . 110
8.21 Layer 5, excavation 1, Anau IB2 period . . . 110
8.22 Layer 4, excavation 1, Anau IIA period . . . 111
8.23 Layer 4, main trench, Anau IIA period . . . 112
8.24 Section, layers 6–1, Anau IB2, IIA and IIB periods . . . 112
8.25 Layer 3, main trench and terrace 1, Anau IIA period . . . 113
8.26 Layer 1, main trench and terrace 1, Anau IIB period . . . 114
9.1 Burials at Anau North . . . 116
9.2 Anau IA, burials . . . 118
9.3 Burial I, layer 20 . . . 119
9.4 Anau IB1, burials . . . 120
9.5 Anau IB2, burials . . . 121
9.6 Anau IIA, burials . . . 122
9.7 Anau IIB, burial 20 . . . 124
10.1 Vegetation of the Anau region, 1997 . . . 128
10.2 Riverine woodland in the Kopet Dag . . . 128
10.3 Kopet Dag scrub vegetation and sheep tracks . . . 128
10.4 Saksaul woodland at the edge of the desert . . . 129
10.5 Barley and wheat remains from Anau North . . . 131

10.6 Wild and weedy plants from Anau North . . . 133
10.7 Wild and weedy plants from Anau North (cont.) . . . 134
11.1 Microscopic soil parts . . . 141
11.2 Soil detritus particle size . . . 148
11.3 Sample B.008 . . . 148
11.4 Unknown phytolith shapes . . . 149
11.5 Sample B.010 . . . 149
11.6 Sample B.011 . . . 150
11.7 Sample B.018 . . . 150
12.1 Camelid remains from the 1904 excavations . . . 156
12.2 Equid remains from the 1904 excavations . . . 158
12.3 Equid teeth from Anau North (1904 excavations) . . . 159
13.1 Sequence of architecture development at Anau North . . . 166
A.1 1904 excavation areas . . . 175
A.2 Gallery excavations within Komarov's trench . . . 176
A.3 Terrace 1, excavation plan . . . 177
A.4 Terrace 1, section . . . 178
A.5 Terrace 1, pebble-lined storage bin . . . 178
A.6 Terrace 1, pottery a and b *in situ* . . . 178
A.7 Terrace 1, pottery c and d *in situ* . . . 179
A.8 Terraces 4–8, excavation plan . . . 181
A.9 Terraces 4–8, section . . . 181
A.10 Terrace 5, walls . . . 182
A.11 Terrace 2, excavation plan . . . 184
A.12 Terrace 2, section . . . 185
A.13 Terrace 3, section . . . 186
A.14 Terrace 3, excavation plan . . . 186
A.15 Terrace 3, pedestalled pottery vessel . . . 187
A.16 Terrace 3, base of *korchagi* vessel . . . 187
A.17 North Digging, section . . . 190
D.1 Textile-imprinted pottery . . . 217
D.2 Schematic of textile . . . 217

TABLES

1.1 Chronological Framework for the Early Village Period in Central Asia and Northern Iran . . . 7
2.1 Kopet Dag Regional Chronology . . . 15
4.1 Descriptions of 1997 Excavation Loci . . . 36
4.2 Samples from Circular Structures, Anau IB1 Layers . . . 37
4.3 Samples from Courtyard Areas, Anau IB1, Layers . . . 38
4.4 Samples from the Deep Sounding, Anau IA Layers . . . 38
5.1 Radiocarbon Dates from Anau North . . . 55
6.1 Ceramic Assemblages and Density Estimates, Anau North . . . 59
6.2 Chronological Distribution of Wares at Anau North . . . 60
6.3 Terminological Correlates, 1904–1997 . . . 62

7.1	Small Finds by Period, 1904–1997	81
9.1	Burials at Anau North	117
11.1	Inferences from Biomorphic Data	139
11.2	Inferences from Phytolith Analysis from Natural vs. Archaeological Soils	142
11.3	Soils from Anau North, Archaeological Samples	144
11.4	Soils from Anau North, Comparative Samples	145
11.5	Detritus, Archaeological Samples	146
11.6	Detritus, Comparative Samples	147
12.1	Mammalian Remains, Anau North	155
A.1	Terrace 1, Correlates of Stratigraphy	176
A.2	Terraces 4–5, Correlates of Stratigraphy	180
A.3	Terrace 2, Correlates of Stratigraphy	184
A.4	Terrace 3, Correlates of Stratigraphy	185
A.5	Terrace 6, Correlates of Stratigraphy	187
A.6	Terrace 7, Correlates of Stratigraphy	188
A.7	Terrace 8, Correlates of Stratigraphy	188
A.8	West Dig, Correlates of Stratigraphy	189
A.9	North Digging, Correlates of Stratigraphy	189
A.10	East Gallery, Correlates of Stratigraphy	191
A.11	West Gallery, Correlates of Stratigraphy	191
B.1	Small Finds from 1904	194
C.1	Catalog of Flotation Samples Discussed in this Report	201
C.2	Plant Remains from Anau North	202
C.3	Charcoal from Anau North Flotation Samples (weight, g)	210
C.4	Charcoal from Anau North Flotation Samples (count)	211
C.5	Summary of Anau North Flotation Samples	212
C.6	Summary of Plant Names, Characteristics	213
C.7	Barley Measurements from AN97.078 (Layer 18)	214
C.8	Length:Breadth Ratios of Six-row Barley from Other Sites	214
C.9	Fragments of Charred Animal Dung and Sheep/Goat Pellets larger than 2 mm	215

Foreword

The essential first step in prehistoric archaeological investigation is to establish a reliable sequence of assemblages of material remains. Today this is done by carefully controlled stratigraphic excavation, which emphasizes careful sampling and recording. This first step is followed by the creation of a relative chronology based on comparative studies of remains at other similarly excavated sites. However, such a relative chronology by itself lacks any way of establishing absolute dating for its parts. The question of duration vexed early excavators dealing with pre-literate periods and non-literate areas, since interpretations of cultural development and movement depend upon fixed chronological structures. Since 1955 this problem has been addressed through the development of methods that independently provide absolute dates for archaeologically stratified materials, primarily radiocarbon dating. Fredrik Hiebert's work in this volume brings together an assessment of relative and absolute chronologies at the site of Anau as a background to the study of Early Village development in Turkmenistan.

The development of adequate excavation techniques for the study of local prehistory began in the Middle East at the end of the 19th century. In the initial stage, from the 1890s to 1908, work done in Egypt, at Susa in southwestern Iran, and at Anau in southern Turkmenistan, played an important part in the discussion of prehistory from the Nile Valley to the Kopet Dag mountains of Central Asia.

Egypt took priority in antiquity by virtue of its very long dynastic history, which began to be investigated early in the 19th century. Although the archaeology of predynastic Egypt was initiated in 1895, systematic excavation of early settlements only began in 1924 with Guy Brunton's work at Badari. Prior to that, in the absence of stratigraphic excavation, absolute dates were estimated from the size of cemeteries and the death rate in modern Egyptian villages. Through the study of ceramics from graves at Diaspolis Parva in 1901, Flinders Petrie initiated a system of sequence dating for the predynastic period. By comparing the number of predynastic graves at Diaspolis Parva with the number in a dated Roman cemetery, Petrie concluded that the two represented about the same amount of time. Working backward, he then set the absolute date for SD 30 at about 9000 BC, thereby creating a huge chronological priority for prehistoric Egyptian remains.

Meanwhile, in southwestern Iran, the French Archaeological Mission headed by Jean-Jacques de Morgan began a "stratigraphic" excavation (using 5-meter deep excavation units) on the Acropolis mound. Begun in 1897, the Grande Tranchée was completed in 1908, cutting through about 30 meters of deposit to virgin soil. This excavation provided a roughly defined sequence of cultural remains beginning with Susa I that became the standard reference sequence for Mesopotamia and Iran for the next twenty years. The question of absolute chronology immediately arose and was approached through the only available data, the rate of deposition of cultural material. In *Les Premieres Civilisations* (1909:27), de Morgan notes that if one applied Petrie's estimated rate of one meter of deposition per century (based on his 1890 excavation at Tel el-Hesi in Palestine), this would result in a date of ca. 5000 BC for the beginning of the prehistoric occupation at Susa (Period I). However, in the same volume de Morgan pointed out that there were many variables involved in depositional rates, and cautioned that their use was anything but "rigorously scientific" (28).

Two years later, in his small book *The Revolutions of Civilization* (1911), Petrie used somewhat variant figures to advance an alternative conclusion: "The mound of Susa accumulated 26 feet in 4000 years, and if the 50 feet of ruin below that grew at the same rate that would imply a beginning in 12,000 BC. If it only grew at the rate found in Palestine mounds, then it dates to 6000 BC." Petrie explicitly acknowledged the implications of these dates from Susa, saying, "Probably we have to deal with a culture as early as any traced in Egypt" (1911:107).

A new factor was introduced into the discussion of origins by discoveries made in 1904 at Anau, published by Raphael Pumpelly, head of the Anau expedition, in *Exploration in Turkestan* (1908). To everyone's surprise, this stratigraphically excavated site yielded painted pottery stylistically related to Susa I from its lowest levels (Anau IA). This pattern suggested a spread of related ideas or materials across the Iranian Plateau from Khuzistan to Turkmenistan. The nature of this development occupied the attention of archaeologists for the next 20 years. Again, scholars resorted to rates of deposition to estimate an absolute date. Pumpelly was a geologist, so this method seemed reasonable and even scientific. He favored a date of 8000-6000 BC based on the rate of deposition for historically dated materials from the nearby East Mound at Anau. This date made Anau IA comparable in antiquity to both southwestern Iran and Egypt.

The excavations at Anau were better recorded than those at Susa, and were far in advance of their time in the inclusion of a team of specialists who analyzed botanical, floral, and metallurgical remains (an approach that was only reinstated as standard archaeological procedure in Robert Braidwood's Jarmo Project in the 1950s in Iraq). Nevertheless, Anau was far distant and isolated from sites with comparable material, and as stratigraphic work proceeded in Mesopotamia and Iran, Anau was relegated to a kind of limbo for half a century.

By 1928 Susa still provided the only stratified cultural sequence to which isolated prehistoric remains in Mesopotamia could be related. For example, a stylistic relationship between Susa I painted ware and pottery found at al'Ubaid was used to establish a date for the latter settlement, which had been found in 1922. The chronology of Mesopotamia in the 1920s had much in common with that of Egypt in 1904, with a historical record providing dates that were reasonable back to the time of Sargon of Akkad (then calculated as ca. 2525 BC); before that time, a vague "archaic" or "pre-Sargonic" period was recognized. In 1924, Leonard Woolley had found an inscription at Ur of A-aimi-padda, son of Mes-anni-padda, who founded the First Dynasty at Ur, variously dated at that time between ca. 3100 and 2620 BC, but there was no basis for the dating of earlier remains except by long-distance comparisons.

A major shift occurred in 1929, when the German expedition at Warka excavated the Deep Pit, which established the first stratified sequence for Mesopotamia, from protohistoric levels down to sterile soil. Ubaid painted sherds were found in the lowest cultural level. This work was followed in 1930 by Leonard Woolley's deep Flood Pit at Ur, which provided a parallel stratified sequence, and in 1933 by Max Mallowan's comparable sounding at Nineveh in the north. A conference of field directors working in Iraq adopted a set of period names for prehistoric periods in southern Mesopotamia that is still in use (Ubaid, Uruk, Jemdet Nasr). In Iran, stratigraphic excavation had also begun at Tepe Hissar (1931-32) and Tepe Sialk (1933-34), but Anau was still a chronological problem. In his major synthesis *New Light on the Ancient East* (1934), V. Gordon Childe acknowledged that Anau had elements in common with the earliest cultures in the west (Samarra, Halaf, Ubaid), but also commented that its "chronology still lacks a firm basis" (1934:280).

In 1942, Donald McCown in his *Comparative Stratigraphy of Early Iran* considered Anau within the context of the prehistoric cultures on the Iranian Plateau and placed Anau IA parallel to the Samarra period in northern Mesopotamia and thus earlier than Susa I and Ubaid. Anau remained the key site for the local Turkmenian sequence until it was superceded in 1952 by B. A. Kuftin's excavations at Namazga depe, located in a similar environmental zone but farther to the east. In the absence of an integrated study of work at Anau, Namazga became the controlling sequence for Turkmenistan for the next fifty years.

In 1965, for the first time, radiocarbon determinations for western Iran were included in a presentation of Iranian relative chronology but were not themselves discussed (Dyson 1965:248). By 1992, such dates were widely available and were fully integrated in the discussion of both Iran (Voigt and Dyson 1992) and Central Asia (Kohl 1992), thus bringing the new method for absolute dating into full use for the structuring of local and inter-regional correlations.

With the discovery of radiocarbon dating, a general revolution in absolute dating began, replacing rate of deposition as a means of estimating absolute dates. For the first time, the new method provided an objective chronological framework as the background for cultural interpretation. This new framework alters some previously assumed correlations and thus opens the way for important revisions in our understanding of cultural development in the region. The present volume revisits the original Anau excavation report for the North Mound and augments it with newly recovered archival documents from 1904, data from Soviet era excavations at the site, and the results of recent American excavations. This new synthesis integrates all materials from the North Mound excavations into a reliable stratigraphic sequence with associated radiocarbon determinations, producing a reliable absolute chronology for the first time.

This revised body of data is important to an understanding of the development of Early Village life in general and in Turkmenistan and further Central Asia in particular. Radiocarbon places the beginning of the Anau IA village at ca 4500 BC, contemporary with Hissar IA and Susa I deposits dated by the same means. SD 30 (beginning Naqada I) of the Egyptian predynastic has a similar date. Ironically, while all three of the major sequences mentioned at the beginning may now be seen to begin at more or less the same time, all three are now known to be preceded by stratigraphically earlier assemblages, dated back to 5500/5000 BC and earlier.

With this book, Anau joins a growing list of re-study projects that includes Tepe Hissar, Tepe Sialk, Susa, and Gordion, among others. In re-study projects new intellectual perspectives guide small-scale excavations at sites that already have large-scale clearances, providing stratigraphic precision and the collection of types of carbon samples and other data that can yield precise chronological placement. Such precision usually leads to basic revisions in previously accepted interpretations. Fredrik Hiebert's fresh analysis of early Anau provides an excellent example of this process of knowledge renovation and clearly demonstrates that the importance of unique archaeological sites does not end with publication of the final report.

Robert H. Dyson, Jr., Professor Emeritus
University of Pennsylvania, Philadelphia

Preface

The subject had the fascination of a mirage, in which dissolving glimpses of a vanishing world mirrored the parallel progress of nature and man (Pumpelly 1908:xxiv)

In 1904, Raphael Pumpelly, an American geologist, brought the first interdisciplinary archaeological team to the desert edge of Central Asia to investigate the origins of civilization. He hoped to identify materials at the site of Anau which would predate early civilization in Mesopotamia and support his theory that the oasis setting of Central Asia had been the birthplace of agriculture and complex society. He published his results in a two-volume treatise (1908) in which specialists in archaeology, geology, zoology, and anthropology collaborated closely, in an attempt to understand the relationship between changes in the environment and the development of early civilization. Returning nearly 100 years later, that same curiosity to understand the origins of civilization has driven our continued research at Anau under the auspices of the University of Pennsylvania Museum of Archaeology and Anthropology and the Institute of Cultural Heritage of Turkmenistan.

Our analysis of the contributions of the Pumpelly expedition grew out of our interest in understanding the rise of civilization in Central Asia. One preliminary goal was to obtain materials in stratigraphic context which could be used for radiocarbon dating a time period that had never been placed in an absolute chronology. We also wanted to integrate older records of architecture and finds with comparative materials, research objectives, and methods based on research at hundreds of sites across Central Asia, Iran, and Mesopotamia.

K. Kurbansakhatov's stratigraphic excavations at Anau North provided the basic framework for revising the pioneering Pumpelly study. His 1977–1982 excavations at Anau North placed the site in the then-current synthesis of Central Asian prehistory (Kurbansakhatov 1980, 1982, 1983, 1987). For the present study, he provided full access to the unpublished field reports, inventory lists, and previously unpublished photographs. Kurbansakhatov guided us in choosing contexts for the restudy season in 1997, and a number of the original workers from the 1970s and 1980s excavations joined us. Their experience in re-excavating these same contexts was invaluable.

While the published 1908 report provided the basic framework for our re-study, without more complete information, it did not allow for the integration of the older data into the new framework. This task was formidable since the collections and papers were scattered in various institutions and largely forgotten.

Original field documents were consulted in the Pumpelly papers at the Henry E. Huntington Library in San Marino, California, and at the Carnegie Institution of Washington in Washington DC. The Pumpelly family opened the family archives, and in 1997, we extended the scope of our operations to include a small excavation of the foundations of the house where Raphael Pumpelly assembled and wrote the results of his 1904 expedition. The search for Anau artifacts in these foundations led to the discovery of the original excavation photos and letters from the field which had not been seen since the time of their storage following the publication of the 1908 volume (Hiebert 1999).

A small study collection of the artifacts from Anau given by the Pumpelly family to the Peabody Museum at Harvard University, through Dr. Lauriston Ward in the 1940s, sparked our interest in re-contextualizing the artifacts from Anau. This collection, of great comparative interest to C. C. Lamberg-Karlovsky as comparanda for his excavations and research in Iran (Lamberg-Karlovsky 1974:284; 1994: xviii), was published in Russian (Biscione 1977).

The other finds from the 1904 excavations were discovered in various ways: some of the metals from Anau were found during the renovations of the Peabody Museum in 1990; the late Anne Forsten studied the Anau equid remains stored in Bern; a small collection of ceramics transferred to the University of Pennsylvania Museum in 1965 was re-studied in 2002.

Most of the finds, however, were rediscovered in 1998 in the Museum of Ethnography in St. Petersburg where they had been accessioned in the Peter the Great collections of scientific oddities, originally called the Kunstkamera. The original field documents permitted us to situate these artifacts from the 1904 excavations within our current excavations and permitted us to employ the 1904 descriptions as if they had been made by our team.

Such a complex undertaking would not have been possible without the assistance of many individuals and institutions. We would foremost like to acknowledge the assistance of the Institute of Cultural Heritage of

Turkmenistan, the Institute of History, the Ministry of Culture, and the Ministry of Foreign Affairs of Turkmenistan for making our field research possible. We would also like to thank the Russian Museum of Ethnography, the University of Pennsylvania Museum of Archaeology and Anthropology, and the Huntington Library, for permission to use archival materials. We thank the Carnegie Institution of Washington for permission to republish the original descriptions of excavations by Hubert Schmidt and Langdon Warner.

Much of this research reflects the guidance and support of C. C. Lamberg-Karlovsky, who, with F. Hiebert, initiated the restudy program at Anau in 1993. His interest in and enthusiasm for understanding the context of Central Asian archaeology, both historically and its modern anthropological significance, are reflected in this volume.

Robert H. Dyson, Jr., of the University of Pennsylvania Museum of Archaeology and Anthropology has been a key mentor in the re-study project at Anau. He visited Anau prior to the first University of Pennsylvania field season in 1996 and has been a constant partner in the development of our research design. Without his interest and critique of our research this project would not have succeeded.

We would like to thank in particular the contributions of specialist reports by Ogul'sona Lollekova, Naomi F. Miller, Alexandra Golyeva, Katherine M. Moore, J. S. Illingworth, and J. M. Adovasio. Site supervisors in the 1997 excavations were Vladimir Zavyalov, Praveena Gullapali, Joshua Wright, and Kim Codella. Gomaa Omar, of the Earth and Environmental Studies Department, University of Pennsylvania, provided guidance in the interpretation of the ceramic petrography. Jennifer Shadel Smith and Will Dickinson worked on the excavation documents at the University of Pennsylvania.

V. M. Masson, then director of the Institute of Archaeology (Leningrad) and corresponding member of the Academy of Sciences of Turkmenistan, provided the initial initiative and supported the excavations at Anau 1977–1982. Without his long-term vision of international collaboration the continued project would never have happened. K. Kurbansakhatov expresses his acknowledgment to V. A. Alekshin, S. B. Gultov, V. A. Zavyalov, P. Pavlov, and others for their help and advice. V. I. Sarianidi generously shared his results and opened his archives on fieldwork he conducted on early village settlements of the Geoksyur region.

The Pumpelly family—in particular Raphael Pumpelly III, Lisa Pompelli, and Pauline Metcalf—have enthusiastically helped in our interest to pursue the scientific legacy of Raphael Pumpelly. We would also like to thank Pumpelly's biographer, Peggy Champlin, for sharing her deep knowledge of the Pumpelly archives.

Funding for the re-study project was provided by the University Research Foundation, the National Geographic Society, and the University of Pennsylvania Museum of Archaeology and Anthropology. Additional support came from Betty Starr Cummin, Harry Kahn, and Raymond Sackler.

The essence of Central Asian culture can be found in the Turkmen term *adam chalik*, which is roughly translated into English as "humanity." This is the elusive character of Central Asia that we have been trying to discover in the earliest layers at Anau.

1

Anau North, an Introduction

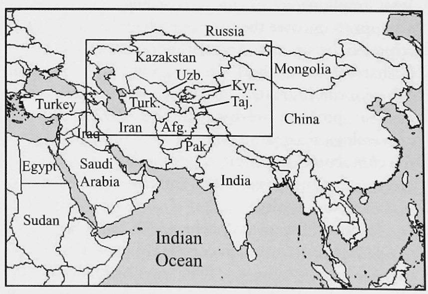
The excavations at Anau North, Turkmenistan, document one site's participation in cultural transformations in Central Asia from 4500 to 2900 BC, the Early Village Period. What we know today as Central Asia (Figure 1.1) was an extensive area of settlement in the ancient world. This region, the northeast frontier of the Near East, had its own local precursors to civilization.

The region of earliest sedentary settlement in Central Asia is along the Kopet Dag foothill region of southern Turkmenistan (Masson 1989, Masson and Sarianidi 1972). Excavations at Neolithic agricultural sites in this region date to the 7th millennium BC and provide an important baseline for agricultural settlements (Berdiev 1969, Harris 1997b, Masson 1971). Subsequent to the period covered in this volume, complex urban settlements of the 3rd millennium BC attest to the emergence of a Central Asian Bronze Age civilization (Kohl 1984a, Masson 1968) separate from neighboring regions of China, Iran, the Indus valley, or Mesopotamia (Sarianidi 2002).

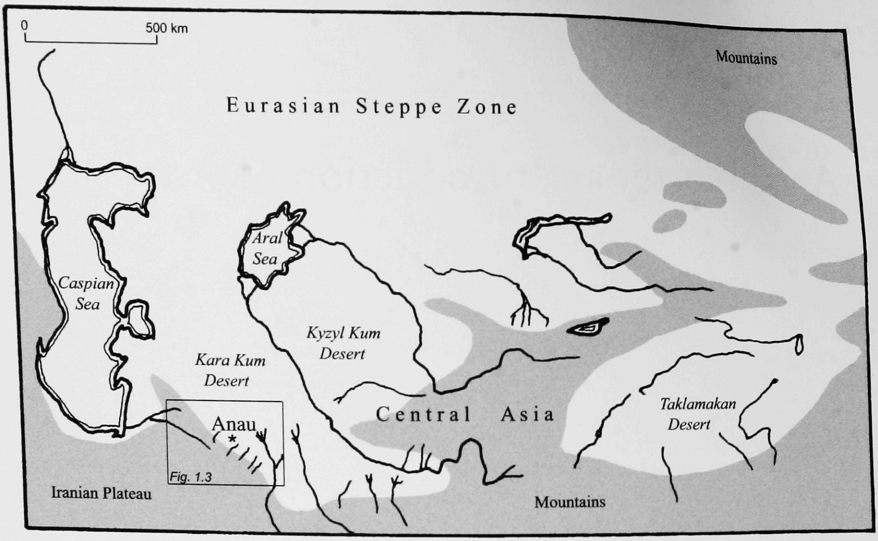
This present study has two major objectives. The first is to place the Early Village Period at Anau North into the larger context of the transformations to urbanism along the northeastern frontier of the ancient Near East. The developments at Anau North are relevant to several alternative explanations for the rise of civilization in this region.

One perspective is based on exchange and cultural interactions between settlements, such as the "spheres of interaction" approach outlined by Lamberg-Karlovsky and Tosi (Lamberg-Karlovsky 1973, 1981, 1989; Lamberg-Karlovsky and Tosi 1974; Tosi 1973, 1989; Tosi et al. 1992) and developed further in Kohl's application of "world systems theory" (Kohl 1984b, 1989).

Such network-based explanations contrast strongly with explanations outlined in the Russian literature, which tend to stress external factors. Soviet archaeologists, who conducted much of the basic excavation and description of Central Asian sites, have taken the precedence of Mesopotamia over Central Asia for granted and have typically cited migration and diffusion from Mesopotamia as the source of culture change (Berdiev 1969, Masson 1961a, Masson and Sarianidi 1972, Sarianidi 1998:18–22). Both of these explanatory models overlie a third, earlier one which ascribed the development of civilization to long-term environmental changes. In fact, Raphael Pumpelly first tested his environmentally focused "oasis hypothesis" on data



1.1 Central Asia showing modern nations.



1.2 Western desert (Kara Kum and Kyzyl Kum) and Eastern desert (Taklamakan) basins of Central Asia.

from Anau North (Pumpelly 1906)—one of the first formal attempts to archaeologically test a theory of social development (Pumpelly 1908).

The second objective of this volume is to present a full account of the basic archaeology of Anau North. This goal is not as simple as it may appear. Major excavations were undertaken at Anau North during three periods—pre-Soviet, Soviet, and post-Soviet/collaborative. It is thus an important site with which to evaluate different theoretical perspectives and traditions of archaeological practice.

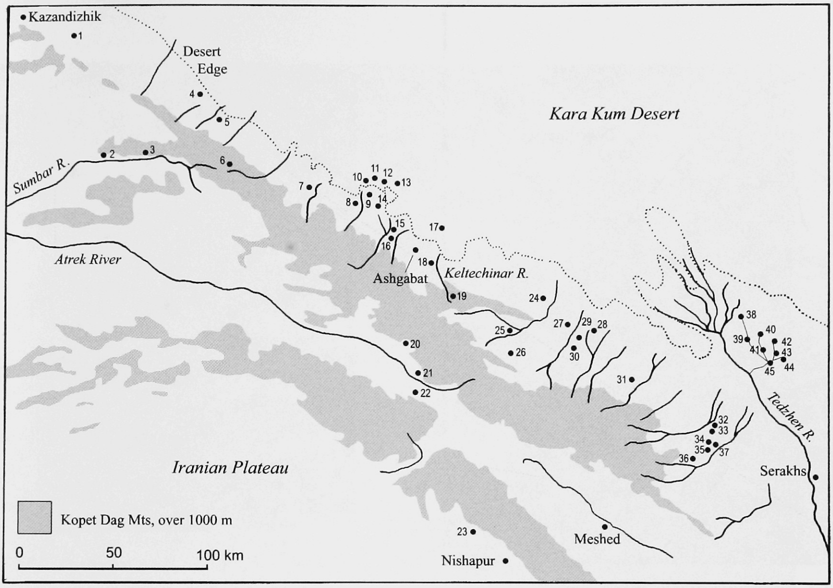
This volume identifies a common language shared by Western and Russian archaeological traditions. The commonality is found in an emphasis upon the behavioral implications of the archaeological record: an attempt to uncover the behavior which led to the construction, occupation, and abandonment of structures. Archaeological analysis which allows us to monitor behavior can ultimately help us reconstruct past strategies for problem solving (Binford 1978:453). The archaeological signature of behavioral practice involves the cumulative deposition of materials procured, manufactured, transported, used, and discarded by members of a community.

In describing ancient behavior at Anau North, we pay particular attention to contexts of deposition at the site (Schiffer 1976:fig.4.1, 1987) and highlight the significance of individual activity in the construction and formation of the archaeological record (Matthews et al. 1997). It is the repeated activity of individuals which constitutes the household- and community-level behavior obvious to us at Anau North.

Ethnographic analogy and archaeological evidence are used in this volume to explore site formation processes and the functions of objects, features, and installations. We turned to studies of small-scale societies in arid regions for insights on the use of space and settlement organization in the Middle East (in particular Kramer 1982, Horne 1994, Watson 1979, and Dyson personal communication 2002) and patterns of mobility and occupational duration in the American Southwest (in particular Adler 1990, Wilhausen 1986, and Lightfoot 1993).

Geography

The region generally designated as "Central Asia" extends in a band north of the Iranian plateau and south of the Eurasian steppe. It is bounded to the west by the Caspian Sea and to the east by the confluence of the Kunlun and Nan Shan mountains of China. This enormous region drains into the basins formed by the Kara and Kyzl Kum deserts of Western Central Asia and the Taklamakan desert of Eastern Central Asia (Figure 1.2). During Classical and medieval times settlements in these areas played a critical role in economic exchange, specifically the long-distance Silk Road trade.

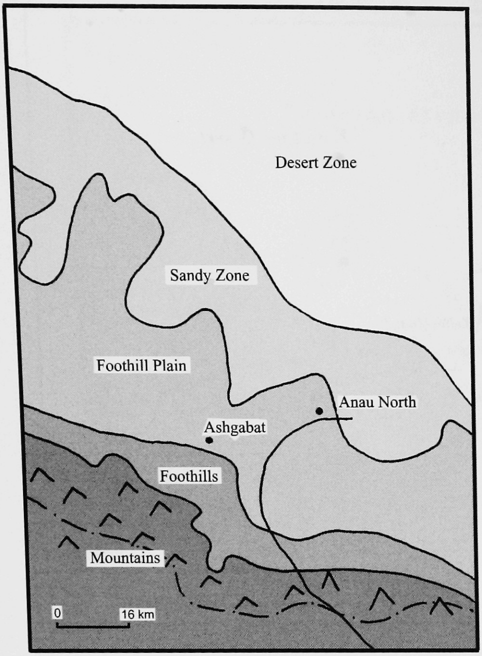


1.3 Kopet Dag region with archaeological sites marked: 1, Chingiz; 2, Parhkai I; 3, Parhkai II; 4, Bami; 5, Beurme; 6, Karantki-Tokai; 7, 73 km site; 8, Til'kin; 9, Dashli; 10, Pessejik; 11, Togolok; 12, Chopan; 13, Djeitun; 14, Ovadan; 15, Ak; 16, Ekin; 17, Yarti-Gumbez; 18, Anau North; 19, Manysh; 20, Shirvan; 21, Yam; 22, XA6; 23, Nishapur-P; 24, Kara; 25, Yarym-DG; 26, DG-19; 27, Koshut; 28, Yassi; 29, Gara; 30, Namazga; 31, Ulug; 32, Altyn; 33, Ilgynli; 34, Monjukli; 35, Chagylly; 36, Gadym; 37, Chakmakli; 38, Dashlidzhi; 39, Akcha; 40, Geoksyur 1; 41, Aina; 42, Yalangach; 43, Geoksyur 7; 44, Mullali; 45, Chong.

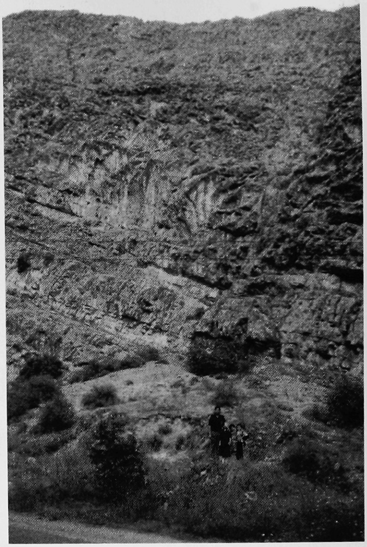
During the Bronze Age, in the late 3rd and early 2nd millennium BC, sophisticated urban settlements dotted the desert edges and oases of eastern and western Central Asia. Prior to the late 3rd millennium, however, the agricultural settlements of Central Asia were restricted to the foothill valleys at the edge of the desert. The earliest of these agricultural sites are found along the northern side of the Kopet Dag mountains in modern-day Turkmenistan (Figure 1.3).

The northern Kopet Dag foothill plain is 10–25 km wide, bounded on the north by the sands of the Kara Kum desert and on the south by the sharply rising Kopet Dag mountain ranges. These mountains, with peaks up to 3000 m in elevation, are a narrow east-west barrier between the desert lowlands to the north and the Iranian plateau highlands to the south. The Kopet Dag mountains are punctuated by valleys with small rivers or dry river courses which allow transit between the foothill plain and the plateau regions. Nineteenth century accounts of traditional Turkmen land use offer conceptual division of the local landscape (Figure 1.4). The mountains and plateau areas provided economically important forests, deposits of stone and ore, and, in the summer months, pasture and interregional passage (Figure 1.5). The foothill plain slopes north to the desert where the river deltas fan out into the Kara Kum sands. The latter, with its saltpan *takyr* deposits, provides spring pasture and refuges at wells deep in the desert (Orazov 1975).

Hot summers and cold winters mark the continental climate of this region (Suslov 1961). While today the region does not have enough rain to support dry farming, the small river deltas emptying onto the desert margin provide fertile soils and enough water to support farming communities. The Anau region today is irrigated by the waters of the Kara Kum Canal and



1.4 Land use along the Kopet Dag.



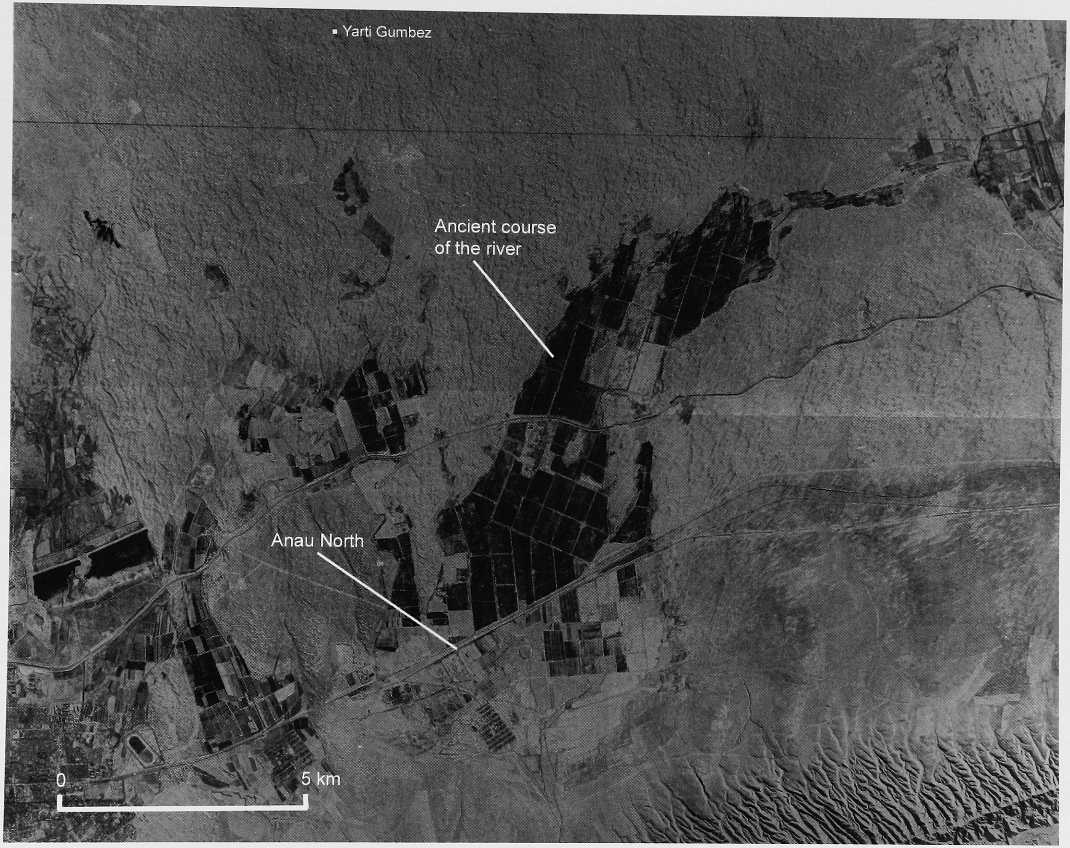
1.5 a

1.5 b

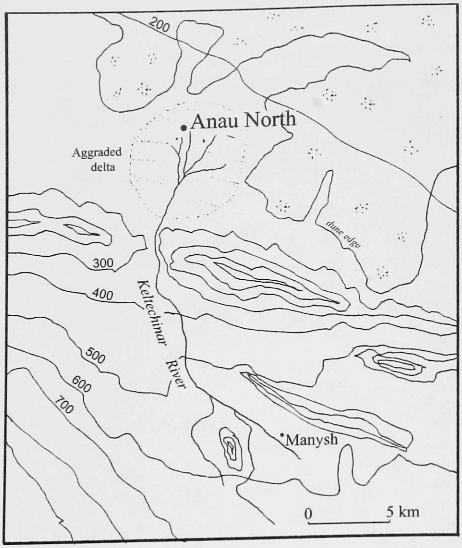
1.5 c

1.5 d

1.5 a–d Landscapes of the Kopet Dag region: *a*, Kopet Dag mountains; *b*, Keltechinar River valley; *c*, region around Anau (1904 photo); *d*, desert region north of Anau.



1.6 Satellite photo of the Anau region.



1.7 The Keltechinar River valley.

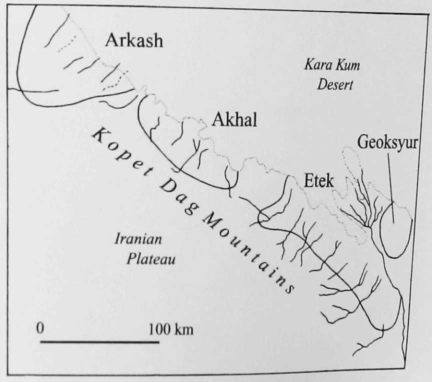
supports orchards, wheat, and other field crops. Local farmers herd small flocks of sheep and goats on field margins and fallow fields and keep cattle in individual household compounds.

A hundred years ago, when irrigation systems relied on local water, as they would have in the prehistoric past, farming was carried out on gently sloping foothill plains from 300 to 200 m above sea level. In the traditional Kopet Dag method of small-scale gravity (*liman*) irrigation, water was spread across terraced fields and orchards.

On satellite images, it is possible to see the Keltechinar River delta, where the ancient sites of Anau are located, extending toward the desert in a curved fan (Figure 1.6). The ancient channels of the river are not visible due to alteration of the land surface by modern irrigation and farming. The suburbs of Ashgabat encroach on the delta area to the west, and vineyards line the edge of the modern oasis to the east where the sands of the Kara Kum desert wrap around. The edges of the delta on all sides are criss-crossed with trails—some extending 150 km north into the desert where wells with fresh water are used by herders and were historically used by bandits as refuge areas (Orazov 1975).

The fertile Anau oasis is formed by a deltaic fan is about 8 x 10 km, with natural terraces at the mouth of the valley where the Keltechinar river exits the Kopet Dag (Figure 1.7). Along the upper part of the plain, the river is down cut 3–5 meters, and the plain is barren of settlement or fields. Here, the plain extends approximately 25 km from the foothill edge to the sands of the Kara Kum. Similar small deltaic fans are repeated in a pattern along the length of the Kopet Dag. These rivers are divided from one another by barren stretches along the dry foothills (Grave 1957).

Four regions of early settlement can be identified along the foothill plain that stretches from near the Caspian Sea to the northwest corner of Afghanistan, a distance of almost 400 km (Figure 1.8). First, the westernmost foothill, or "Arkash," region (from Kazandzhik to Beurme) has small rivers whose headwaters are found in the western Kopet Dag near the modern Iranian border. Second, the central, or "Akhal," region (from Sunchi to Gyaurs) has a series of small rivers, including the Keltechinar, whose headwaters are on the Iranian plateau. These rivers tend to flow into separate deltaic oases. Third, the eastern, or "Etek," region (between Baba-Durmez and Chaacha) has larger rivers which flow closer together, forming between them practically a single broad habitable plain. Fourth, farthest east, along the course of the Tedzhen River, the ancient "Geoksyur" delta also offered an environment likely for early settlement. The branches of the Tedzhen River delta formed a broad plain which must have been inviting to early farmers. These four areas taken together make up the core region of Central Asia during the Early Village Period. To incorporate the different scholarly traditions and terminologies that have been applied to Central Asian sites, we employ the phrase "Early Village Period" consistent with its use in Iran (Hole 1987: 30). For the most part we avoid the use of the term "Chalcolithic" or the Russian term "Aeneolithic," as these terms mix



1.8 Cultural regions of the Kopet Dag.

Table 1.1 Chronological Framework for the Early Village Period in Central Asia and Northern Iran

Developmental stage in Iran	**Developmental stage in Central Asia**	**Traditional periodization**	**Time frame addressed in this work**	**Years BC**
Fazeli et al 2001	Masson 1982, Kohl 1984	Masson 1956		
Early Bronze Age	Early Bronze Age	Namazga IV		
Late Chalcolithic	Late Aeneolithic	Namazga III		2900
Middle Chalcolithic	Developed Aeneolithic	Namazga II		3100
Early Chalcolithic	Early Aeneolithic	Namazga I	Early Village Periods	3500 3700
Transitional Chalcolithic	Early Aeneolithic	Anau Ia		4000
Late Neolithic	Neolithic	Djeitun		4500

notions of chronology and cultural developments (Table 1.1).

Theories on the Rise of Civilization in Central Asia

Ancient settlements along the Kopet Dag mountains in southern Turkmenistan were discovered in the 19th century. Some 15 km outside of the Turkmen capital city of Ashgabat, the blue-tiled ruins of a 15th century mosque were first noted atop an abandoned caravan city on the outskirts of the modern village of Anau (Roller 1889). Three separate mounded sites are located at Anau: one from the classical and medieval period, an older one to the south of it, and an even older one to the north, the focus of this book.

At the beginning of the 20th century the American geologist Raphael Pumpelly first envisaged a prehistoric Central Asia at Anau North, a place where a lush environment encouraged the local domestication of animals and the formation of early civilization (Pumpelly 1902). Pumpelly proposed that the prehistoric world of Central Asia slowly shrank back from expanding deserts, causing the local populations to shift from hunting to herding and eventually from villages to cities (1908:11–13). This was the first of the ecologically based theories concerning the growth of civilization that were to gain currency in archaeology in the 20th century. Pumpelly tested this hypothesis with careful stratigraphic excavations that set the benchmark for the study of the development of civilization for generations to come. The oasis theory of civilization came to be the fundamental basis for a school of environmental determinism, led by Ellsworth Huntington (1919), who had visited Central Asia as a member of Pumpelly's team.

From the very earliest proposal of the environmental explanation for social complexity, controversy arose about the relationship between social and geographic features in the growth of civilization. Richard Norton, who visited Turkmenistan with Pumpelly in 1903, stated:

> the lack of water [at the abandoned sites] is due, Professor Pumpelly tells me, probably to the wearing down of tops of the mountains, which catch the snow that forms the rivers, and the tilting up of the earth's crust from north to south in this region, which causes a diminution of force in the current of the stream and consequent greater evaporation along the higher reaches. This geological process can, however, hardly be the explanation of the archaeological phenomenon noted. That is

> probably due, as Dr. Hogarth suggests to me, to the desires of the founders of the new cities to avoid the ghosts and traditions of their predecessors and to get the first draw of the river water for their new gardens. (Norton 1905:199)

Contemporary archaeology still seeks to balance the importance of environmental and climate conditions and social factors in explaining local developments in social forms and settlement history.

Soviet scholars who dealt with the issue of the growth of civilization for the most part rejected factors such as environmental change in the evolution of civilization (Gerasimov 1978, Khlopin 1963b, Lisitsyna 1978). Soviet theorists focused upon internal factors such as class conflict and the development of social inequality (Diakonov 1969, 1991; Streuve 1969). These scholars based their arguments on textual materials unrelated to the Central Asian cultures, so it has been difficult to test these Marxist explanations directly on the Central Asian sites. As we argue in this volume, reconstructions of social structure in Central Asia based on burials have been strongly biased by unrepresentative sampling (Alekshin 1986).

Soviet archaeologists tended to see migration as a key factor in the social development of the region—in particular migration from the apparently older and "more civilized" culture zones of the greater Near East. Lamberg-Karlovsky (1973) points out that mass migration is inadequate as an explanation of social change in a populated world in this region, especially as no unambiguous evidence suggests that significant migrations took place after the initial establishment of farming society in Central Asia. Other factors impacting on local populations must be considered, as noted below.

Increasing population numbers and densities may be an important factor in driving social change, but evidence that population increase contributed to social complexity is not strong in this case. In fact, we feel that small settlements in Central Asia may have undergone repeated small-scale collapse and abandonment over the course of the Early Village Period. Deep deposits of alluvial silt, however, have probably hidden sites, making the estimation of early local populations on the aggrading plain of the Kopet Dag foothills difficult at best. Beyond this, little systematic survey has been undertaken in the Kopet Dag region.

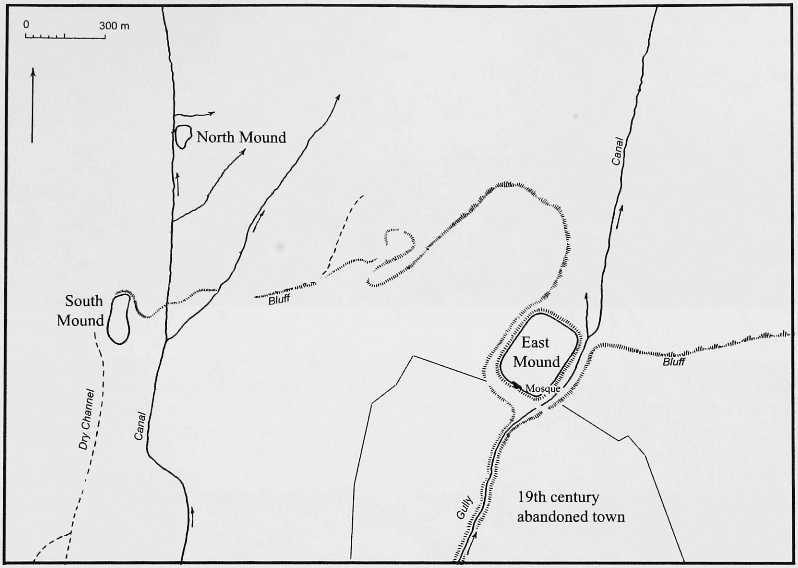
Conflict between settlements may be important in understanding settlement location, structure, and occupational history (Carneiro 1970). Historically, Central Asia was deeply marked by tribal conflict and raiding (O'Donovan 1882). We gauge the degree of conflict in Central Asia by observing fortifications, incidence of weaponry, and settlement stability. Historical records indicate the pervasive influence of conflict in social, political, and economic spheres along the Kopet Dag (Bregel' 1959). The fields around Anau were pocked with fortifications, lookout towers, and walled compounds up to the early 20th century (see Figure 1.10a) (Hiebert 1992, Levina 1952). The nature of conflict is likely also to relate to the context of population history in each region in the past.

Interregional trade over large regions of the greater Near East is seen in the distribution of semiprecious stones, ores, and other rare items. Prehistoric and protohistoric production centers—such as the Iranian plateau sites of Nishapur-P, Hissar, and Tepe Yayha—were participants in a larger sphere of interaction that included the Central Asian Early Village sites. This interaction may be gauged through the identification of materials used in prestige goods and comparative study of designs and symbols on artifacts. Similar cases of interconnections have been cited as evidence for the control of trade by emerging elites in peripheral areas (Schortman and Urban 1994), and this may also be the case in Central Asia. In the specific case of Anau North, the changing nature of the exchange of more mundane goods, such as cooking pots and stone tools, provides evidence for shifting local alliances and local networks of interaction as well.

After 1904, research in Western Central Asia became separated from research on the Iranian plateau by political and linguistic barriers and by the development of a separate research tradition in Soviet Central Asian archaeology. Soviet archaeology in Central Asia began to emphasize extensive horizontal exposure of architecture. The development of this methodology, primarily since 1945, has allowed Soviet archaeologists to study intrasite variability and to define broad archaeological complexes. The archaeological record in Central Asia, accumulated over those 50 years of intensive Soviet research, now includes numerous plans of Early Village Period architecture. Further, many contemporary Early Village Period sites were discovered in northern Iran in the late 1970s (Kohl 1992, Ricciardi 1980) but were not further investigated. As a result, our study at Anau North joins an increasing number of research projects in the former Soviet republics which explicitly incorporate both Soviet and Western methodologies and results.

The Significance of the Site and the Region

While a small site, Anau North is located at the northern end of a major pass that leads down from the Iranian plateau, channeling the important resources of



1.9 The three mounds at Anau.

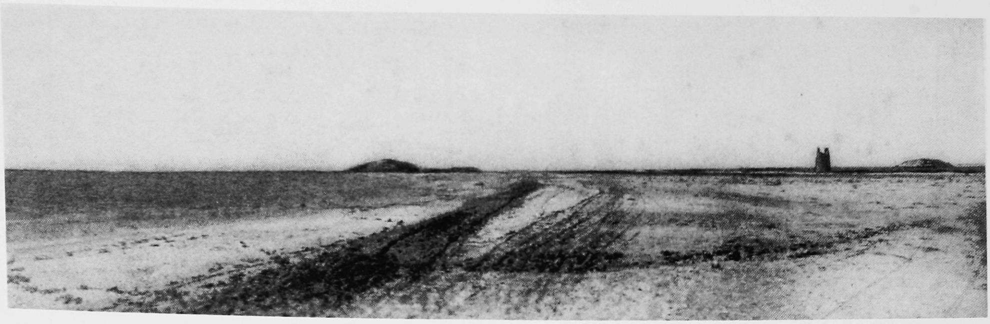
northern Khorassan to Central Asia. There have been time periods, indeed, when the term "Central Asia" included both the sites on the plateau and those along the northern slope of the Kopet Dag. The excavations at Anau North permit us to evaluate the shifting relationship with Iran through time.

The location of the Early Village Period settlements in small river valleys between the mountains and desert led to a distinctive way of life, drawing on resources from the plateau, mountain regions, and desert areas. This Kopet Dag way of life is characteristic of subsequent cultures of Central Asia. Further long-term characteristics of this tradition include fortified architecture, the use of irrigation agriculture, and the small scale of the settlements. Local traditions of metallurgy, the use of specific stones, the distribution of textile production, and the motifs drawn from textiles make up a persistent pattern that extends across language shifts, nomadic migrations, and religious and political reforms.

The various mounds at Anau represent a microcosm of the development of Central Asia from the earliest settlement (5th millennium BC) through the period of urbanism (3rd millennium BC) and its transformation into a node on the classical and medieval Silk Road (2nd–15th centuries AD).

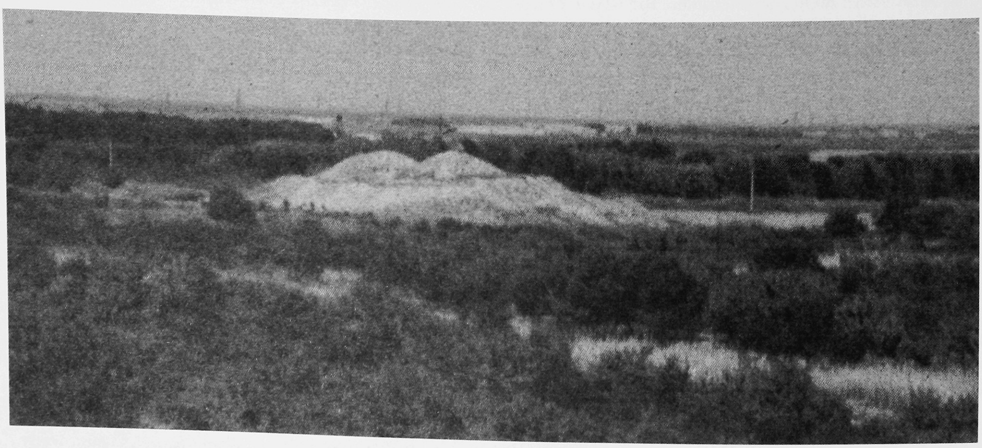
The delta around Anau has three primary archaeological sites (Figure 1.9). The East Mound at Anau (Figure 1.10a), which has architectural layers spanning the classical periods through the medieval period is the most recent (Levina 1952). During these periods, Anau served as a station along the Silk Road and was most likely known as "Gathar" on the basis of Isidore of Charax's account of his travels from Mesopotamia to India in the 2nd century AD (Pugachenkova 1985). The South Mound (Figure 1.10b) has layers dated from the mid-3rd millennium through the 1st millennium BC (Hiebert 1995). During the Bronze Age, Anau, like many sites along the Kopet Dag, grew into a small but dense urban center with highly specialized modes of production and administration (Hiebert n.d.). The North Mound (Figure 1.11) has architectural layers extending from the 5th millennium BC, when the earliest-known settlement in the Anau delta appears, through the 3rd millennium BC, when apparently both the river and the settlement shifted in location. Anau's way of life and economic and religious tradition were established at the North Mound and persisted through the course of settlement in the oasis. Thus, in a single geographic context, it is possible to investigate nearly every period of occupation in Central Asia.

1.10 a

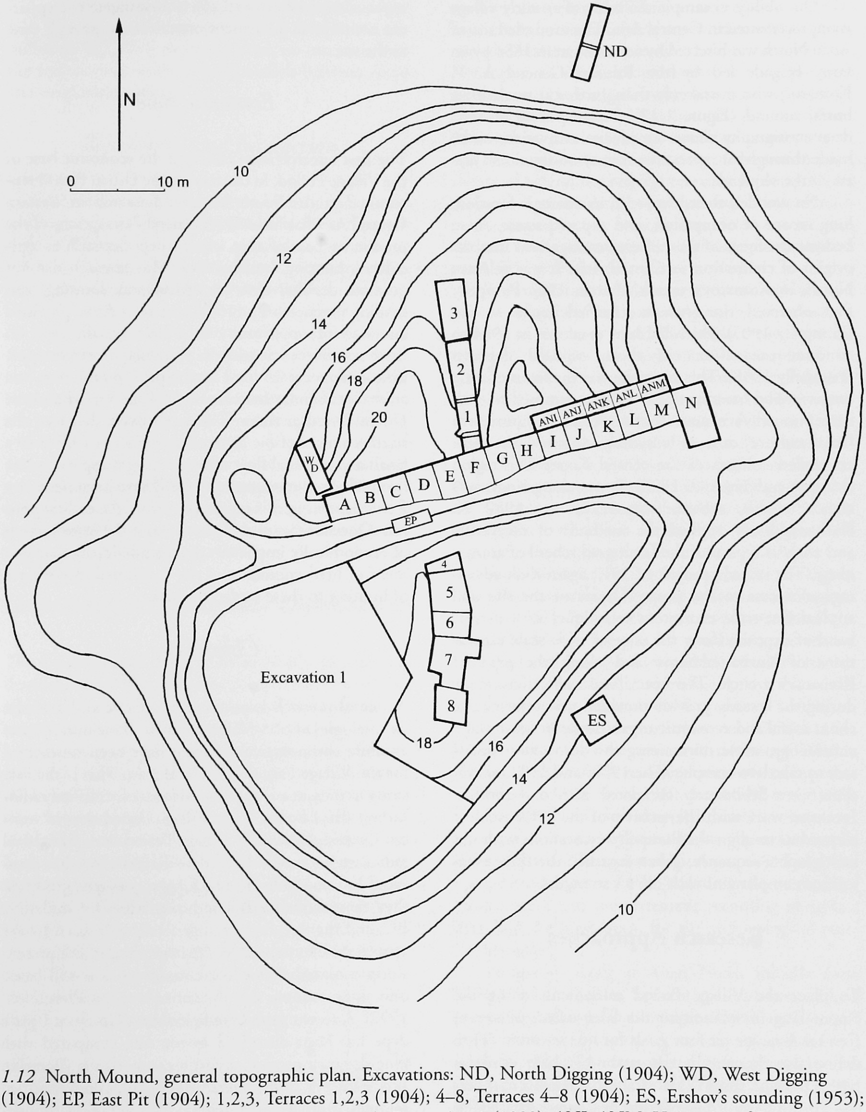


1.10 b

1.10 Mounds at Anau in 1904: *a*, East Mound showing the mosque and irrigation terraces; *b*, South and North Mounds looking west. Photos courtesy R. Pumpelly III.



1.11 North Mound in 1997.



1.12 North Mound, general topographic plan. Excavations: ND, North Digging (1904); WD, West Digging (1904); EP, East Pit (1904); 1,2,3, Terraces 1,2,3 (1904); 4–8, Terraces 4–8 (1904); ES, Ershov's sounding (1953); A–N, Kurbansakhatov's main trench (1977–1982); Excavation 1 (1980); ANI–ANM, University of Pennsylvania excavations (1997).

Our ability to sample the heart of an early village is unprecedented in Central Asia. The mounded site of Anau North was bisected by a trench cut in 1886 by an army brigade led by the Russian General A. V. Komarov, who mistakenly thought that it was a huge burial mound (Figure 1.12). The exposure of such deep stratigraphy allows for precise excavations to be made throughout more than twenty occupational layers in the sequence.

No wonder, then, that with its strategic location, long record of occupation, and exposed strata, Anau became the focus of the earliest investigations into the origins of civilization in Central Asia. It was at Anau North, in Komarov's trench, that in 1903 Pumpelly first observed the ancient stratified layers *in situ* (Pumpelly 1905) which led him to return in 1904 to conduct excavations of these exposed deposits (Pumpelly 1908). This same site was the focus of early Soviet-period investigations, which attempted to evaluate Pumpelly's claims. In the Soviet literature, the "Anau culture" came to be synonymous with the earliest settled cultures of the central Kopet Dag region (Masson and Sarianidi 1972). It was along Komarov's trench, again, where from 1977 to 1982 K. Kurbansakhatov applied the methods of excavation and analysis typical of the Leningrad school of archaeology. The restudy project of 1997 again took advantage of access to the deepest layers of the site and applied fine-scale excavation techniques to a narrow band of deposits along the edge of wide-scale excavations of Kurbansakhatov and along the edge of Komarov's trench. The specialized collections made during the restudy provide provided new information about social and economic organization in an absolute chronology, while minimizing the destruction necessary to take new samples. The 1970s and 1997 excavations were deliberately correlated with one another. Intensive work with the archives of the 1904 archives allowed us to align the Pumpelly excavations with our stratigraphic sequence. Taken together, the three excavations complement each other's strengths.

Research Approaches

To place the Village Period settlements along the Kopet Dag in relation to the later urban phases in Central Asia, we set four goals for our research: (1) to define the changes in the economic base at Anau North through time; (2) to establish a reliable chronology for the Early Village Period in Central Asia; (3) to define criteria for identifying and classifying local and non-local painted pottery production so as to study regional interaction; and (4) to investigate the apparent contrasts in settlement organization through time at the site.

Economic Base

The first research issue concerns the economic base of the Village Period, in contrast to the Urban Period represented at the South Mound. Research in western Central Asia has focused on general descriptions of the productive base of sites, using categories such as agriculture, hunting, and herding. This research did not generate detailed data on agricultural, hunting, and herding practices. Our 1997 project at Anau provided an excellent opportunity to collect specific data on these economic activities, in particular to explore possible differences in local agricultural production and animal husbandry between the Village Period and the Urban Period at Anau. The small rivers that feed the northern plain of the Kopet Dag region provide only a small and seasonal flow of water, suggesting that some form of water management would have been necessary for settlement in this region even from the earliest periods. Questions were also posed about the introduction of economically important draft animals, the management of herd animals, and the continued importance of hunting to these settled farmers.

Chronology

A second research issue involves relative and absolute chronologies of occupation at Anau. Basic questions of absolute chronological position have been unresolved for the Village Period in Central Asia. This is the first study to present a comprehensive set of stratified radiocarbon dates for the Early Village Period sites of western Central Asian Early Village Period sites. Individual radiocarbon dates from Early Village Period sites excavated in the 1960s did not form a coherent group, as they ranged from the 7th through the 3rd millennia BC, and the technique was generally dismissed by the excavators themselves. At the beginning of the present study, a tentative absolute chronology was still based only upon tenuous and distant stylistic parallels (Kohl 1992). A recent suite of radiocarbon dates from Ilgynli depe has been dismissed as too late compared with long-distance ceramic stylistic comparisons (Berezkin and Solov'eva 1998). Here, well-documented stratified samples from Anau provide a chronological foundation for regional comparisons. The radiocarbon chronology presented in Chapter 5 places the Early

Village Period in an interregional context with neighbors from Iran and South Asia during the 5th and 4th millennia BC. With these new data, we can reevaluate the stylistic and technological parallels between Anau and neighboring sites.

Boundaries and Interaction

Our third research issue concerns intersite interaction in Central Asia. The traditional basis for comparing sites in Central Asia is the painted decoration on ceramics (Masson 1989). An analysis of stylistic variation established at the site of Namazga depe has been the standard for relative chronology in Central Asia for 50 years (Masson 1956). As a relative chronological framework the Namazga sequence has been refined and reconfirmed at dozens of sites. However, the use of this single system has masked variations in style from site to site. By defining Anau's stratigraphic history on a level-by-level basis we are able to use variation in style and ceramic ware to assess local production and regional exchange of Namazga-type ceramics. The petrographic analysis of ceramics in Chapter 6 of this study establishes an objective baseline for comparisons of ceramic wares at various sites.

Architecture and Settlement Organization

The fourth research issue at Anau North, gauging settlement change through time, complements the extensive Soviet excavations that have produced a substantial sample of Early Village plans. The Soviet excavations have revealed complete ancient village plans through extensive excavations of single layers of habitation (Khlopin 1963a, Khlopin 1969, Masson 1982). These sites, however, have rarely been subjected to the type of stratigraphic excavation that Anau North affords. The Early Village sites in Central Asia show continuity of settlement in the same location leading to the formation of pronounced village mounds. It is possible with such sites to document the evolution of craft production, burials, ritual spaces, fortifications and other functions. The stratigraphy at Anau North affords an excellent opportunity to investigate this phenomenon from a technological and social perspective.

Collaborative Research in Context

The exposure of deep stratigraphy at Anau North reveals over twenty architectural levels, excavated, however, by observers with different motivations and different methods. To observe the settlement in as many occupational events as possible though time, we have developed a methodological key to the previous research and the multiple voices that have reported on this site. This study of the earliest occupation at Anau North places previous descriptions into a new synthesis and offers us a new understanding of the method and theory of behind the original research. In doing so, we realize that accumulation of archaeological information is not progressive but must be considered as a series of discrete observations which, when integrated, add to our ability to reconstruct events in the past.

Through studying documents from archives and private collections and examining artifacts in museum collections, we have been able to place the data collected in 1904 in new contexts. The records of the 1904 excavations are our sole access to some of the features of the site that no longer survive. These now-unrepeatable observations include the nature of the uppermost strata at Anau North and traditional patterns of land use in the Anau delta before modernization. By returning to the data in the 1908 publication, we are able to reevaluate the place of Central Asia among the civilizations of the Old World given 90 years of archaeological literature.

Anau North has been a key comparison for sites as far to the west of it as Troy and as far east as Yangshao (Daniel 1981). Perhaps the most important use of the Anau North sequence was for establishing the relative stratigraphy of Iran (McCown 1942). Anau North has been used as an example in evaluating the role of the environment in cultural development (Huntington 1919) and appears to have inspired Childe's oasis hypothesis for the development of civilization (Childe 1953) and Braidwood's reconsideration of that hypothesis (Braidwood and Howe 1960, Braidwood et al. 1983).

When we review Pumpelly's work at Anau, we note that the history of investigation appears to recycle points of view. The archaeological practice of observation as conducted in 1904, including the methods of measurement and the systematic recording of certain data, laid the foundation for the archaeological practice of today.

Pumpelly's work at Anau North initially drew notice, at least in part, because the site seemed like a compelling setting for early agricultural societies: the desert oasis. A century's work on early agricultural sites across the Near East has offered little support for this group of explanations (Hole 1987, Miller 1992). While agriculture was possible and sustainable in these early oasis villages, the Central Asian villages are more recent than early agricultural sites in the Near East and occur in a different environment. We now know that the early settlers of Anau were veteran agriculturalists, expert farmers with long experience of crop varieties and simple water control systems.

Another aspect of re-contextualized data is that early observations complement our unfolding understanding of the site. In some cases we were unable to collect similar data. The data collected in 1904 (both the published version and the recovered archives) add substantively to the understanding of the upper levels at the site, providing accounts of the type of construction, and the location of hearths and burials.

The analysis of the excavations conducted between 1978 and 1982 by Kurbansakhatov as a Soviet archaeological project at Anau North can be placed in a new context provided by the 1997 re-excavations. By including the wider area of the Kopet Dag, previously part of the isolated research arena of Soviet archaeologists, we are able to add a substantial and diverse culture area to the geographic extent of the known ancient world. The wider arena which results allows us to trace the prehistoric record of Central Asia and its architecture, ceramic types, etc., more accurately, and to examine the interrelationship of the Central Asian world with neighboring cultures.

We attempt, in this volume, to establish a bridge to Soviet archaeological methodology as it developed since the 1930s. Methodologies were employed which contrast strongly with those used by contemporary Western researchers, particularly the method of excavations focused on horizontal space rather than individual stratigraphic units. The basic stratigraphic unit used during excavations of the 1970s and 1980s at Anau North was the architectural layer considering all of the deposits with a building in a single unit. This level of generalization is appropriate assuming that the materials deposited within a layer form a unit of secondary deposition. In our restudy at Anau North this assumption has been upheld on the basis of the fine-scale study of contexts.

It has proven particularly efficient and informative to combine small-scale excavation (involving sampling of specific contexts) with the wide-scale horizontal excavations typical of Soviet archaeology. These overlapping research strategies have made productive use of unique archaeological resources.

Organization of this Volume

This volume provides a case study of the growth of Near Eastern–type village life outside of Mesopotamia. Our research is introduced in Chapters 2–4: Chapter 2 discusses the general context of settlement in early Central Asia; Chapter 3 reviews the history of investigation at Anau North, and Chapter 4 describes the strata and the contexts of deposition at the site, based upon our 1997 re-study season.

This sets the stage for a presentation of the rich finds from Anau North recovered during more than a century of investigation. Chapters 5–9 present the radiocarbon sequence, followed by chapters synthesizing the evolution of ceramics, small finds, architecture, and burial traditions at the site. Chapters 10–12 report the results of collaborative studies of the macro-botanical, micro-botanical, and faunal remains. These studies provide basic information on the evolution of farming, hunting, and herding. Additional micro-botanical and micro-morphological data (called “bio-morphic” analysis in Russian) collected in 1999 specifically investigated the history of the upper fill and leveling deposits.

The two concluding chapters focus on the development of the site itself. In Chapter 13, the argument is made that Anau North, like other Early Village sites of Central Asia, employed small-scale irrigation but reveals a level of settlement instability not previously documented, suggesting that village abandonment and mobility were an intrinsic aspect of early settlement in Central Asia. In Chapter 14, it is further argued that Anau North became increasingly integrated into the network of settlement on the northern frontier of the Near East, tied to the early village cultures of the Iranian plateau. Such a network responded to shifts in intensity of interaction and expansionism and the development of a prestige goods economy prior to the emergence of urbanism in the later 3rd millennium BC. The critical features of settlement organization and site formation at Anau North allow us to generate a comparative base for the examination of the evolution of village social organization and the development of social complexity.

The overall dynamic of settlement stability and instability during the Early Village Period allows us to better understand the subsequent emergence of cultural complexity and urbanization at the beginning of the 3rd millennium BC.

2

The Settlement History of Central Asia in the Village Period

This chapter outlines the broad developmental stages of Early Village occupation in Central Asia, beginning from the earliest settlement along the Kopet Dag (which pre-dates the occupation at Anau North) and from there following the basic outline of culture history presented by Soviet archaeology (Masson 1982, 1989), best known in English from the detailed translations and syntheses of P. Kohl and others (Coolidge 2001, Harris and Gosden 1996; Kohl 1981, 1984a, 1992). Absolute dates for the Central Asian sites are based on the radiocarbon chronology from Anau North presented in this volume and from the recent collaborative excavations at Djeitun (Harris et al. 1996).

The Early Village Central Asian settlements are located in the four geographic regions along the Kopet Dag and extend onto the Iranian plateau. The distribution and settlement pattern of the Early Village Period is poorly known: vast areas have been only cursory surveyed, and many settlements appear to have been buried under the continually aggrading plain. However, the wide-scale architectural plans revealed by Soviet archaeology allow a vivid picture to be drawn of early village settlement in Central Asia. The culture history of early villages is divided into four stages of Early Village settlement: Djeitun, Anau IA, Anau IB/Namazga I, and Anau II/Namazga II. The individual sites described below provide the context for the settlement history at Anau North (Table 2.1).

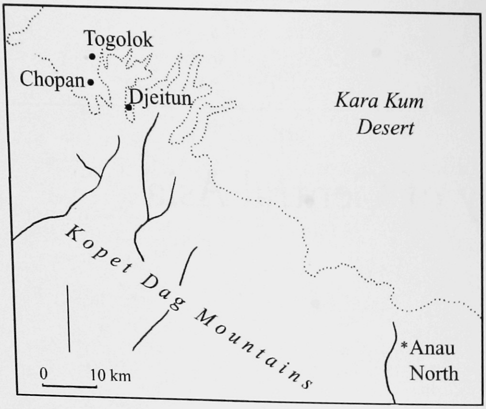
The Djeitun period (6500–4500 BC)

The earliest agricultural settlements appeared around 6500 BC, along small river deltas of the central Kopet Dag foothill plain (Figure 2.1). The initial settlement had individual rectangular houses; the inhabitants made ceramics, grew 6-row barley and einkorn wheat, and kept sheep. Thus, the Djeitun Period, or ceramic Neolithic, of Central Asia appears to represent the establishment of an already developed farming way of life: domestication and sedentism evidently entered Central Asia from elsewhere (Harris 1997b). Berdiev (1969) subdivided the Djeitun Period into three chronological phases: early, middle, and late.

The eponymous site of Djeitun was only occupied during the earliest phase (6500–5800 BC). Two other early Djeitun sites Chopan and Togolok, located nearby, have been extensively excavated in addition to Djeitun itself. Djeitun is located along the terminal runoff of the Sekizyab River probably next to a marshy or brackish delta. Five architectural layers were defined at Djeitun, all characterized by regular, single-room dwellings (ranging from 6 x 6 m to 9 x 9 m) with walls made of rounded "proto-bricks" and floors covered

Table 2.1 Kopet Dag Regional Chronology

West Kopet Dag *Arkash*	Central Kopet Dag *Akhal*	East Kopet Dag *Etek*	East Kopet Dag *Geoksyur*
SWT V	Anau IIB	Namazga III	Geoksyur
SWT VI	Anau IIA	Namazga II	Yalangach
SWT VII	Anau IB	Namazga I	Dashlidzhi
Beurme	Anau IA	Anau IA	
Bami 3 - 5	Pre-Anau IA	Late Djeitun	
Bami 1 - 2	Middle Djeitun	Middle Djeitun	
	Early Djeitun		



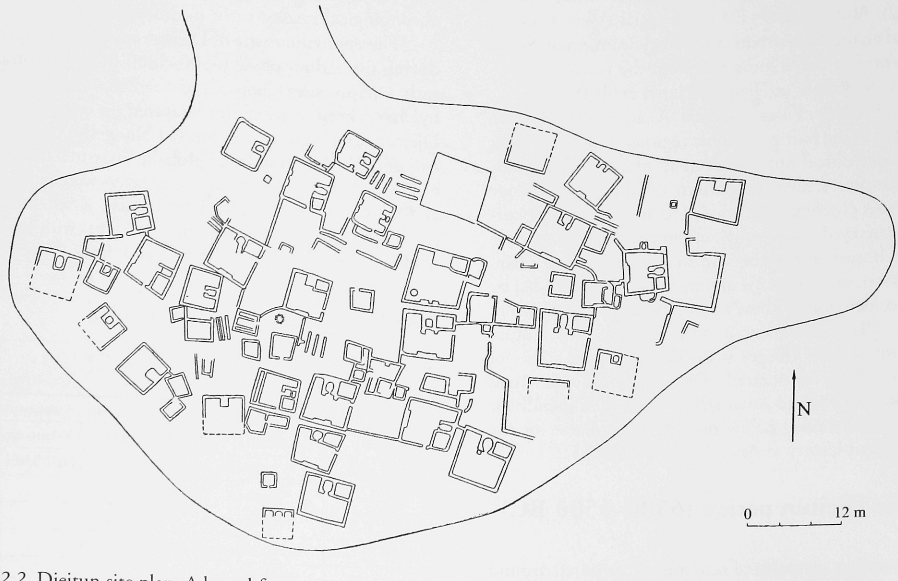
2.1 The Djeitun and Anau regions.

with lime-plaster. The houses were separated by shared courtyards, with low parallel-wall storage features and small circular storage buildings. The settlement's second architectural phase was completely excavated, revealing a mosaic of more than 28 individual houses and courtyards (Masson 1971).

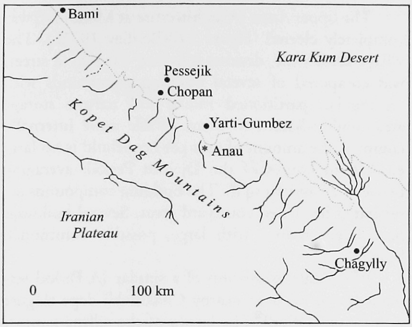
While the site is not described as planned or fortified, it is likely that the rectangular houses were initially grouped around a central courtyard, with house entranceways oriented primarily toward the interior space (Figure 2.2). The closest parallel to both the ceramics and small finds is at Sang-i Chakmaq, east (layers 5–6), located in northeastern Iran near Shahrud, suggesting that a culture of pioneer farmers may have extended across northern Iran (Harris 1997a). In 1993–1994 a collaborative British/Russian/Turkmen team collected a full suite of radiocarbon samples, as well as botanical, faunal, and micromorphological samples (Harris et al. 1996, Masson and Harris 1992). The radiocarbon dates indicate that Djeitun was occupied for a short time between 6500 and 5800 BC and that the occupations at the site are characteristically short-term. Destruction levels between architectural phases are interpreted as evidence of brief occupations—perhaps several years, but no more—or possibly even seasonal occupation.

We observe an increase in the number, type, and complexity of settlements along the Kopet Dag foothills during the middle Djeitun period. Settlement extended west as far as Bami, sites were also established in the foothill range, and settlement extended to the Etek region of the eastern Kopet Dag (Figure 2.3) (Berdiev 1969).

It is likely that a short-term occupation of the Anau delta occurred during the middle Djeitun Period: in the 1950s, middle Djeitun ceramics were observed at a site of Yarti-Gumbez, 12 km north of



2.2 Djeitun site plan. Adapted from Masson 1971: fig 5.



2.3 Middle/late Djeitun sites.

Anau North along the ancient and deltaic end of the Keltechinar River. This site has not been re-studied since the original survey, but it is located in the same type of environment as Djeitun, sandy today but probably in ancient times the swampy edge of the terminal runoff of the river.

Wide-scale excavations of the uppermost layer at Chopan depe and at Pessejik (near Djeitun) show that the architectural layout of single-room dwellings made of proto-bricks became denser and villages more compact during the middle Djeitun Period. Of particular interest is the site of Pessejik in the outer delta region. Differentiation in building size, the earliest use of architectural buttresses (Figure 2.4a), and elaborate wall paintings (Figure 2.4b) suggest an emerging emphasis on ritual structures and provide evidence of ceremonial activities.

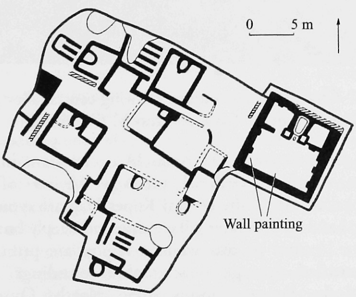
In the third stage (late Djeitun), the Djeitun population appears to have moved away from the Akhal region of the central Kopet Dag. In the far west (Arkash) region continuity of settlement from the middle to late Djeitun was demonstrated at Bami (Berdiev 1963). In the eastern Etek region, three late Djeitun sites have been excavated. Excavations at Chagylly reveal a shift from single-room buildings to multi-room architectural plans. One of the critical innovations at this time was the development of true bricks, evolving out of the earlier Djeitun tradition of proto-bricks.

The earliest finds of copper and turquoise along the northern Kopet Dag plain are from Chagylly (Berdiev 1966). While this indicates contact up to the source areas for these materials on the Iranian plateau, evidence of the formerly close relationship of the Kopet Dag settlements with those of the Tehran basin disappears. Only a few similarities with the contemporary Cheshmi Ali sites of the Tehran basin are seen.

As we suggest, the possibility of a local cultural variant contemporary with late Djeitun is likely deeply stratified at the base of Anau North. Furthermore, based on the radiocarbon chronology presented here for the subsequent Anau IA Period, the likely range of dates for early, middle, and late Djeitun may extend over a much greater chronological range than is reflected by the limited occupation at Djeitun itself at the dawn of farming settlement in Central Asia.

The Anau IA Period: 4500–4000 BC

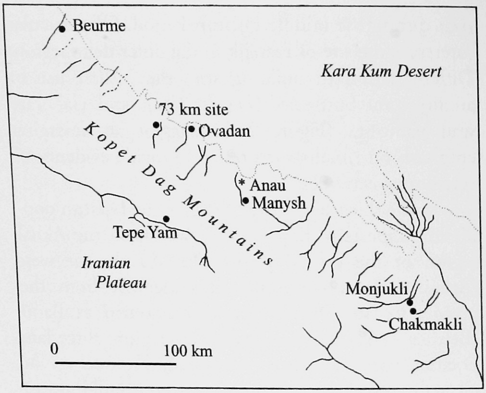
For many years the Anau IA Period was known only from the 1904 excavations at Anau North. While sev-



a

b

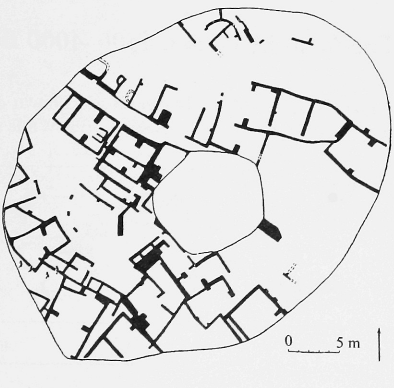
2.4 Pessejik: *a*, site plan; *b*, wall painting. Adapted from Lollekova 1988: figs 1 and 2.



2.5 Anau IA sites.

eral building levels were identified in the lowest layers of the soundings, only minimal architectural information from Anau North is available, due to the small exposure in the deep soundings. Eleven Anau IA settlements have since been recorded along the Kopet Dag (Masson 1982:17–20), and several possibly related sites have been located in the upper Atrek Valley on the Iranian plateau (Figure 2.5) (Kohl 1984a:65).

Almost all Anau IA sites in the various regions are located along the sloping terrace of the Kopet Dag foothills around 200 m asl in a similar relationship to the river delta as Anau North. The most complete excavation of an Anau IA settlement is that at Mondjukli, first excavated by Marushchenko, who argued for a local development from late Djeitun through to the Anau IA Period (Berdiev 1972b).



2.6 Mondjukli site plan. Adapted from Berdiev 1972:fig. 1.

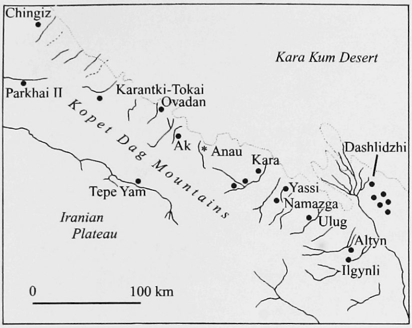
The upper Anau IA architecture at Mondjukli was completely cleared (Figure 2.6)(Berdiev 1972b). The village settlement, divided into two parts by a street, was composed of several building compounds with rectangular, partitioned rooms and narrow storage areas built adjacent to them. While more internally complex, the amount of area per household is no larger than in houses of the Djeitun Period, averaging between 24 and 40 sq m. The building compounds are separated by shared courtyard areas. Several buildings have larger rooms, with large, possibly communal, hearths.

Wide-scale excavation of a similar IA Period settlement was made at nearby Chakmakli depe (Figure 2.7)(Berdiev 1968). The layout of the village is more symmetrical than Mondjukli, and room 1 is considered to be a shrine (Berdiev 1968:28).

2.7 Chakmakli excavations showing central alley and domestic rooms. Photo courtesy V. I. Sarianidi.

In contrast to the Anau IA occupations in the east, which are terminal, the Anau IA sites of the Akhal region of the central Kopet Dag are typically the basal layer of later village sites and deeply buried. The IA sites of this western region are primarily identified through stratigraphic soundings, and include the eponymous Anau North, Ovadan, Gavych, Kashut, and the "73 km" site. Variations in ceramic decoration between the Etek and the Akhal regions during the Anau IA Period mark the beginning of the long-term separation of these two stylistic traditions.

At the westernmost IA Period edge of the Akhal region, Marushchenko excavated a deep sounding at the "73 km" site. Among the ceramics from the sounding are several fragments of hand-made incised work typical of the Caspian, suggesting a shared frontier between the IA region of agriculturalists and remnant foragers or fishers of the Caspian region.



2.8 Anau IB/Namazga I sites.

Sites from the Anau IA Period are also found on the southern side of the Kopet Dag, along the upper Atrek Valley. Scatters of Anau IA ceramics have been found near the site of Manysh, in the pass along the upper Keltechinar River between Anau North and the upper Atrek Valley (Pilipko 2000). Preliminary survey and test soundings were conducted in the late 1970s and suggest that this region was part of the Central Asian culture zone. One site, tepe Yam, located along the Atrek River course, appears to be closely related to the Anau sequence of early village and Bronze Age cultures (Ricciardi 1980). A test sounding at the site (Biscione, personal communication 2002) indicates that it has a nearly one-to-one correspondence with the ceramics and small finds from Anau North and Anau South.

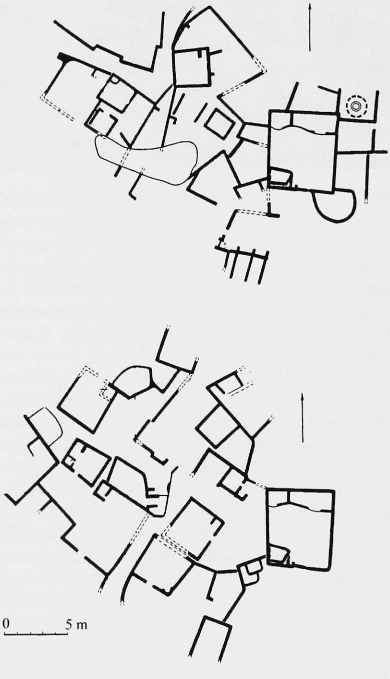
Earlier, parallels have been made with the distant but contemporary sites of Sialk, near Kashan and Susa, both in southwestern Iran (McCown 1942). Susa, where excavations were ongoing at the turn of the 20th century, and Sialk, excavated by Ghirshman in the 1930s, represented the only well-known early village sites in Iran, naturally inviting comparisons with the Central Asian sites. The parallels drawn tend to concern general ceramic motifs, the design of functional items such as spindle whorls and stone tools, and the incidence of precious materials like turquoise and lapis. Clearly, Susa and Sialk did not have privileged relationships with the Central Asian sites, but they represented one part of a nexus of settlement reaching across the Iranian plateau of which the Anau IA sites were also part.

Namazga I/Anau IB: 4000–3500 BC

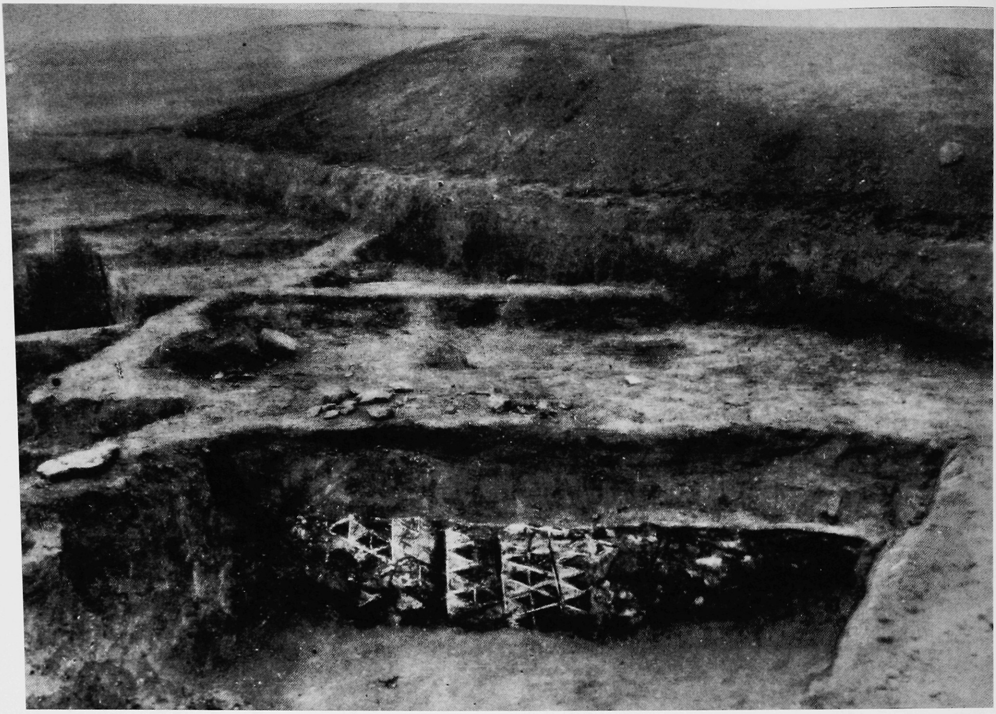
More than thirty settlements of the subsequent period of occupation along the Kopet Dag have been recorded (Figure 2.8) (Masson 1982). The sites cluster in separate geographic regions, each having local chronological sequences: settlements of the Anau IB Period are found in the Akhal, or central region; those of the Namazga I Period in the Etek (eastern) region; those of the SWT VII Period to the west, in the Sumbar Valley; and those of the Dashlidzhi Period in the far eastern Geoksyur region.

As in the earlier Anau IA Period, settlements are deeply stratified in the west and central regions, less so in the east; in the Geoksyur region, they lie practically on the surface. At Anau North, the Anau IB stratum is nearly 10 m thick and is composed of 13 architectural layers. The village at Anau North during this period can best be compared to the fully cleared architecture at Dashlidzhi depe in the Geoksyur oasis.

Dashlidzhi depe, the northernmost site of the Geoksyur region, was excavated entirely on two Namazga I levels, the third and the fourth (Figure 2.9) (Khlopin 1961). The settlement was composed of



2.9 Dashlidzhi depe site plan: top, second building level; bottom, third building level. Adapted from Khlopin 1963a: plate 17.



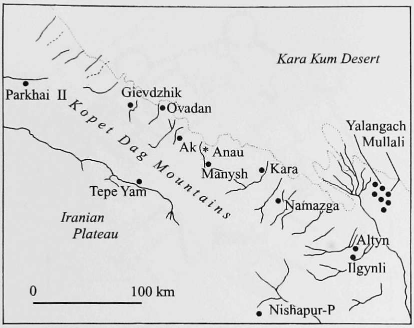
2.10 Wall painting at Yassi depe. Photo courtesy V. I. Sarianidi.

courtyards and single-room houses, with one large single-room building dominating the settlement. Of particular note, the layout of the village changed entirely from layer 3 to layer 2, except for building 1, which was rebuilt on its old foundation.

It is unclear what the environmental conditions were in the Geoksyur region along the Tedzhen River when the earliest towns were founded. Geographically the region is distant enough from the terraced plain of the Kopet Dag foothills that one would not expect to have the same sort of terraced agriculture, but we do not know what kind of agriculture was initially practiced. What we do know is that at the same time that settlements were growing, sometimes to sizes as large as 10 ha, another cluster of settlements was founded in the Geoksyur delta. It is likely that the form of agriculture was not based upon small-scale terrace irrigation but on older Djeitun agricultural traditions. It is likely the Geoksyur sites represent a continuation of these traditions along the outer reaches of the river delta, while in other areas settlement shifted up the river course.

To the west of Geoksyur, in the eastern Etek, Yassi depe was also extensively excavated. Here one finds multi-room complexes that resemble the Anau IA Period architecture at Chakmakli. Of particular note, rooms 15 and 16 at Yassi depe had polychrome wall painting and a painted floor and have been interpreted as a shrine (Figure 2.10). The architectural plans of structures from the Namazga I layers at Yassi depe and Kara depe show a considerable homogeneity. Namazga depe has several early soundings. Perhaps the biggest Namazga I sites were at Kara and Altyn depe, estimated to be as large as 10 ha (Masson 1981). The eponymous site of Namazga depe has two deep soundings that provide the stratigraphic sequence, however; lack of a detailed publication of the soundings has led to ambiguity concerning the nature of the periodization.

Namazga I materials were found at Kara depe in sounding 1 and in deep soundings made in excavations 1, 2, 5, and 6. The distribution of the soundings suggests that the settlement already, at its earliest phase,



2.11 Anau II/Namazga II sites.

covered 10 hectares (Masson 1961b:323–326). The second architectural layer of excavation 6 had rectangular multi-room structures with black painted floors and walls. Storage features included large ceramics set in the floor and "ceramic pavements." In the third architectural layer structures with red painted floors appear.

In the Akhal region, Namazga I occupation overlay Anau IA at Kashut, Anau North, and Ovadan and possibly at Mondjukli as well, in the eroded ninth layer. Many new sites were founded at this time, all located in this 300–200 m band where terrace farming was successful. The most important are Ak, Til'kin, Dashli, and Ekin. Masson holds that in the Akhal region the rivers were too small to support large villages.

Farther to the west, Namazga I sites are found in areas for the most part not previously settled by agriculturalists: along river deltas such as Parkhai, Chingiz, and Karantki-Tokai located in a high upper valley above the level where terraced agriculture would not be possible. Excavations at the cemetery of Parkhai II in the Sumbar Valley revealed a cemetery and adjacent town. Only the cemetery has been excavated, and the materials relate to the early village sequence. Unlike the lower Kopet Dag foothill plain, which is deeply covered in alluvial deposits, the ancient surface at Parkhai probably had little alluvial overburden due to the upland location of the Sumbar Valley. Thus the cemetery was accessible. Fourteen seasons of excavation revealed a total of 292 burials, providing the basis for an internal chronology. The local sequence was treated as a link between the Iranian plateau sequence and the Kopet Dag sequence, although recent survey by a British team indicates a lack of earlier settlement (Harris and Gosden 1996). It is probable, therefore, that the Sumbar valley population had its origins in the expansion of settlement from the Akhal region. Khlopin made the following correlations between the Southwest Turkmenistan sequence and the Namazga sequence: SWT VII is equivalent to Namazga I; SWT VI to Namazga II; and SWT V to NMG III (Khlopin 1997).

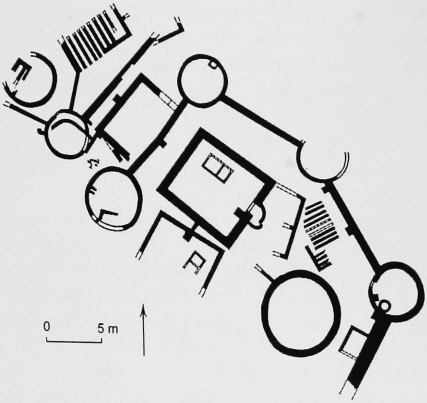
Broad connections across the Iranian plateau and Baluchistan during this period are deduced primarily from the correlation of villages which shared similar technologies, including techniques of pottery manufacture and types of stone and metal tools. The region of these shared traits was quite large, covering most of the Iranian plateau, from the edge of the Indus Valley in the east to the border with Mesopotamia on the west. Included in this cultural nexus is the deeply stratified site of Mergharh, on the edge of Baluchistan, with its wide-scale excavations, as well as Tepe Yahya in southeastern Iran, which has a single long sequence comparable with the combined sequences of Anau North and South. The same complex stretches west across the plateau to the Godin region, where the Early Village Periods have been excavated at the small site of Seh Gabi, and on to Dalma, near Hasanlu in northwest Iran.

Namazga II/Anau II(3500–3100 BC)

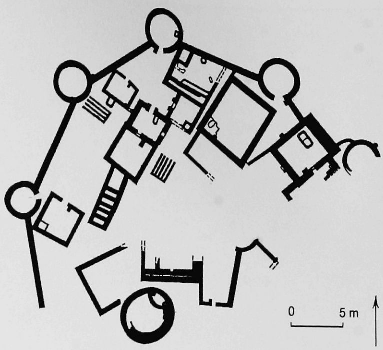
Considerable social change occurred in Central Asia from Namazga I/Anau IB through the end of Namazga II/Anau IIB. We see evidence of increasing social hierarchy, more complex craft production (fine working of soft stone, evidence of more efficient kilns, complex metallurgy); and greater availability of prestige goods through more frequent contact with the Iranian Plateau and South Asia. Fewer sites are known from the Namazga II/Anau IIA Period than Namazga I/Anau I, although some settlements are larger and denser, and signs of specialization sometimes appear. Site layouts are more complex, perhaps reflecting the development of social classes.

There are fewer recorded settlements along the Kopet Dag foothill of the Namazga II/Anau II Period (Figure 2.11), but, these settlements have been more extensively investigated than the settlements of the earlier period, as they are typically stratified above Anau IB/Namazga I settlements (as at Anau North).

As in the previous period, the widest exposed architecture of this period is from sites in the Geoksyur region. There, this period is called the Yalangach Period and settlements were more densely clustered and fortified at this time. At Yalangach depe the upper



2.12 Fortified village, Yalaganch site plan. Adapted from Khlopin 1969: plate 8.



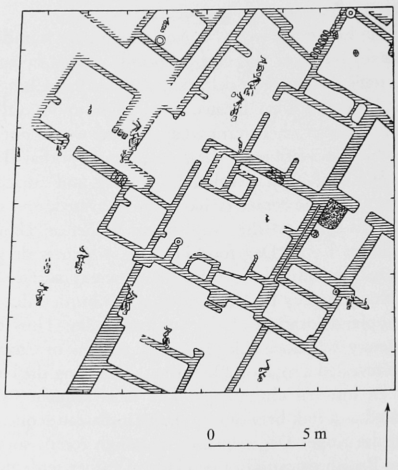
2.13 Fortified village, Mullali site plan. Adapted from Khlopin 1969: plate 17.

two architectural layers (layers 2 and 3) were each excavated over 700 sq m (Figure 2.12). In Yalangach 3, buildings of two or more small rooms and one large one—a shrine—interspersed with courtyard and storage areas, appear to be divided generally into two parts by a large wall. In Yalangach 2, the compound surrounding room 1 is organized by circular "tower" fortifications and buttressed curtain walls connecting them. Construction is rather standardized: the towers are 3–5 m diameter, with curtain walls of about 10 m stretching between them. This pattern is repeated at Mullali depe (Geoksyur 4)(Figure 2.13). A similar pattern of circular "towers" and curtain walls characterizes the four other Yalangach sites: Akcha (G-2), G-6, G-7, and G-9. The purpose appears to be defense, although the nature of the threat is unknown.

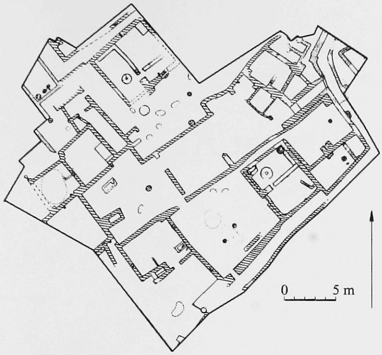
To the west of the Geoksyur region, in the Etek region of the eastern Kopet Dag, the Namazga II layers at Kara depe and Ilgynli depe have been extensively excavated.

At Kara depe the most extensive recovery of Namazga II remains were made in excavation 1, on the northern side of the site: layers 5, 6, and 7 were excavated in an area of 40 sq m here, and layers 3 and 2 in an area over 400 sq m each (Figure 2.14). The multiroom houses of Kara 3 had spacious central rooms (6 x 6 m) with storage areas and built-in hearths, which were connected to areas with 5–6 smaller, interconnected rooms with individual courtyards. The room complexes in Kara 3 and Kara 2 were packed together, and building complexes had doubled walls where they lay adjacent to one another. Throughout the Namazga II layers, from the earliest (layers 5–6) to the last (layer 2), we find burials under floors. Layer 3 also had many burial made under floors, often enclosed by small mud brick structures, and one brick structure, painted red, appears to show social or wealth differentiation. Grave goods were found in 10 out of 21 burials. The goods included animal bones, beads of stone (including a miniature lapis bracelet), and beads of gold. Layer 2 continued the tradition of burials made under floors.

At Ilgynli, ongoing excavations (1985–present) have focused on late Namazga II levels (Figure 2.15). Here, architecture seems to be organized around the same principles as at Kara 2 and 3. A striking number of the structures appear to be shrines, with plastered



2.14 Kara depe (period 2-3) site plan. Adapted from Masson 1962: plate 9.



2.15 Ilgynli depe, excavation 5 (layer 3). Adapted from Berezkin and Solov'eva 1999: fig. 20.

and painted floors and benches and an unusually high number of figurines–stone figurines placed at doorways and terracotta figurines spread around. Ritually significant circular hearths and square hearth platforms are common. Ilgynli depe apparently emerged during the Namazga II Period as a regional religious center, although each of the other settlements also seems to have maintained its own ritual structures.

The Namazga II/Anau IIA Period witnessed increased interaction among the sites of Central Asia and the regions to the southeast and southwest. At this time, both north and south sides of the Kopet Dag appear to be settled by Central Asian people. Near Anau North, recent survey of the Keltechinar Valley indicates an Anau II settlement Manysh (also called Erk-depe) up the valley toward the pass to the Iranian plateau (Pilipko 2000).

Survey in the upper Atrek Valley on the southern side of the Kopet Dag mountains on the Iranian plateau identified several prehistoric sites related to the Early Village Periods of Central Asia: tepe Yam and XA6.

Aside from the Upper Atrek Valley, almost no other areas of the northern Iranian region of Khorassan have been surveyed. An exception to this, Nishapur-P was probably, like tepe Yam, occupied by people related to those on the northern plain of the Kopet Dag. Nishapur-P, is the prehistoric settlement approximately 12 km from the well known medieval site of Nishapur (Hauser et al. 1938). The settlement of this area, both during the medieval period and in prehistoric times, was in large part due to the proximity of the largest turquoise mines of Iran, in the nearby mountains. Nishapur-P's Anau II ceramics and small-find assemblage suggest incorporation of this resource area into the Central Asian culture area during this time (Hiebert and Dyson 2002).

Conclusions

While the evidence for local cultural development in the four regions of the Kopet Dag foothills is rich, and the archaeological record, based on years of distinctive Soviet research, is extensive, few individual sites demonstrate the relationship of one period to the next. The deeply stratified remains at Anau North provide an ideal site to investigate these relationships through time.

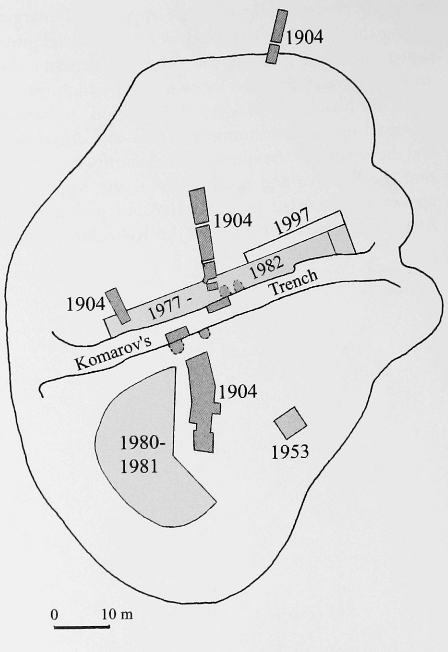
3

The History of Investigations at Anau North

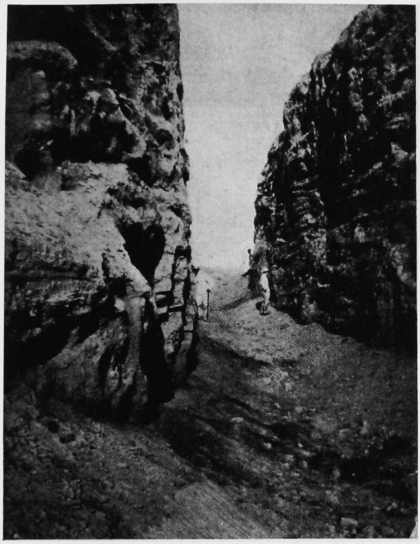
The deeply stratified site of Anau North has a long and distinguished history of excavation (Figure 3.1). The site was first sectioned in 1886, and, partly due to its easily accessible strata, became a magnet for archaeological research. Scientific excavations began in 1904 with the expedition led by Raphael Pumpelly. Further investigations included a deep stratigraphic excavation in 1953 and extensive excavations between 1977 and 1982. Our own excavations in 1997 were intended to provide a key to the previous results and gain access to the full stratigraphic column. Taken together the excavations have investigated a range of areas at Anau North, with transects both east-west and north-south, as well as deep soundings. We thus have a relatively robust sample of the site on which to base our reconstruction of its occupational history. Our goal is to provide such an overview by integrating the data from the various excavations, despite major differences in methods of excavation and recording.

19th Century Investigations

A transect was first cut through the North Mound of Anau in 1886 by General A. V. Komarov, the Imperial Russian governor of the Transcaspian area from 1883 to 1889. General Komarov was widely known for his collection of ancient artifacts and coins from the area (Komarov 1900). He organized reconnaissance excavations at various prominent archaeological sites (such as Merv, Nisa, and Meshed, Iran), using his troops as an excavation team. His 1886 excavations at Anau North bisected the mound straight through the middle (Figure 3.2). Komarov, who had previously excavated in the European part of Russia, apparently expected to find a rich "royal" burial at the North Mound. It was quite by chance that he came across a stratified archae-



3.1 Excavations at Anau North.



3.2 Komarov's Trench in 1903. Photo courtesy R. Pumpelly III.

ological settlement. Nevertheless, he showed an emerging appreciation for the process of scientific excavation and reported his findings before the Imperial Archaeological Committee in St. Petersburg. An abstract of his report was published in the Russian newspaper *Novosti*, nos. 62–64 (1888), and received wide attention. His report was republished in the newspaper of the Transcaspian area, *Turkestanskie Vedomosti*, nos. 24 21/VI and 25 28/VI (1888), and then published in full in German translation in the popular journal *Petermann's Mitteilungen* 35 (1889). He described the excavations in a straightforward manner:

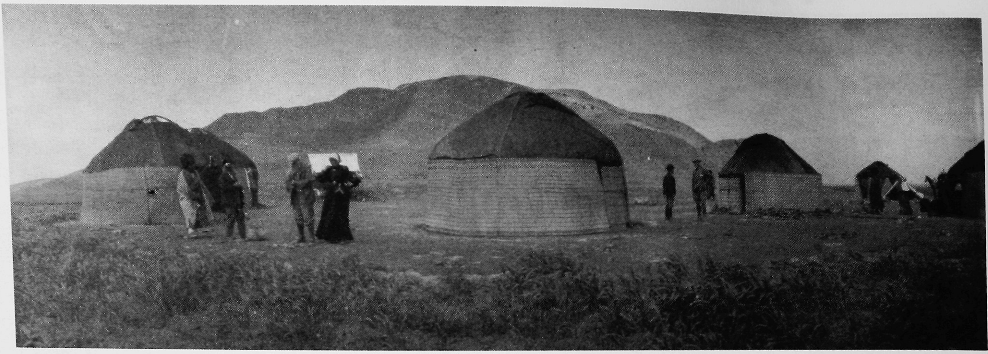
> there were two mounds there. The one that was investigated was 2400 cubic sazhens [1 sazhen = 2.125 m] at its foundation. It was of irregular form: 60 sazhens long and 40 sazhens wide. Its height was 8 sazhens. Excavations were carried out along its short axis by means of two trenches 2 sazhens wide; about 300 cubic sazhens [= 2700 cubic meters] of earth were taken out. In the top layer the remains of Muslim burials were unearthed, but at the depth of one sazhen bones, charcoal and broken fragments of ceramics were found. In the upper part of the excavated area, to the depth of two sazhens, human bones were placed in the ground with ashes, while other kinds of bones were put in round flat pots, made of Meshed stone. In the middle of the mound (half of its depth) there was a trench with big holes on both sides. They were probably made by Persian treasure-seekers who ransacked burial mounds looking for treasure. At the depth of two sazhens from the top of the mound a needle and awl made of deer antler were found. Further down was a stone ax made of quartzite, whose form is identical to that of axes found in Perm'. Further down, near a human skeleton, there was a jaw of some animal, with well-preserved teeth. According to Dr. Walter, it belonged to a cave bear. As for metallic implements, they were not found there. (Komarov n.d.:29; see also Roller 1889:162)

Though his hopes to find a rich burial were disappointed, Komarov did not fail to appreciate what he had unearthed: "The cultural achievements of this region have now been forgotten. There was a time when this area was flourishing. The artifacts found there testify to the fact that people of the Stone and Bronze Ages inhabited this territory. And the most flourishing areas were piedmont plains watered by mountain steams"(Komarov n.d.:30).

Even though the prehistory of Central Asia was first revealed by Komarov's finds at Anau, later 19th century investigations focused on more historically prominent sites such as Samarkand and Merv (Zhukovskii 1894).

Excavations of 1904

In the 1860s Raphael Pumpelly traveled from China across Central Asia on his way to Europe (Pumpelly 1918). His observations of the remains of ancient cities, in areas devoid of water and abandoned long ago, set him on a long course of study, which included the geologic history of Eurasia, the origins of races and languages, the precursors of civilization, and the nascent field of archaeology. This interest occupied a secondary place in his research, however, for throughout Pumpelly's long and illustrious career, he focused on geological exploration. Pumpelly's interest in civilization was crystallized at the beginning of the 20th century (when Pumpelly was in his sixties) by the formation of a new foundation for research: the Carnegie Institution of Washington, which was interested in sponsoring an archaeological expedition. With the



3.3 Pumpelly team at camp in 1904. From left to right: Turkmen elders, Raphael Pumpelly, Eliza Pumpelly, Hubert Schmidt, Langdon Warner, village assistants washing pottery. Photo courtesy R. Pumpelly III.

support of the Carnegie Institution, Pumpelly organized a reconnaissance expedition in 1903 to identify sites of possible prehistoric occupation in Central Asia.

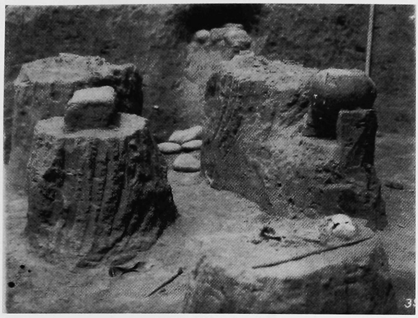
Members of the 1903 expedition explored from the Pamirs to Seistan, but it was at the deltaic oasis of Anau that Pumpelly felt he could best investigate the earliest phases of human life in Central Asia. The North Mound was particularly promising, since there, Komarov's large trench exposed clear evidence of deeply stratified remains.

Both the north mound and the south mound at Anau were excavated during the 1904 expedition. Pumpelly picked Hubert Schmidt, of the Museum für Völkerkunde in Berlin, to serve as the expedition's archaeologist. Schmidt had been trained in the most advanced stratigraphic methods of the day by Dorpfeld at Troy, and he particularly impressed Pumpelly with his skill in differentiating archaeological periods through ceramic identification (Pumpelly 1918:716). The team (Figure 3.3) also included three young men—Homer H. Kidder, Langdon Warner, and Ellsworth Huntington—who would eventually pursue distinguished careers in ethnology, Asian studies, and geography, respectively.

Methodology of the 1904 Excavations

Schmidt directed the fieldwork at the mound. Warner was put in charge of excavating burials. Excavations proceeded in each area by 50–75 cm each day (Figure 3.4), and stratigraphic data was recorded in a daily log. Distinctive finds—pottery, hearths, and burials—were typically pedestalled, and carefully excavated by Schmidt or Warner (Figure 3.5) In his memoirs, Pumpelly described the methods of the dig: "In every pit [trench] there were baskets into which went the potsherds and coarse objects collected during the day, and these objects were daily marked with number of pit, date, and height above or below the datum point on the surface of the plain. In this way all finds carried

3.4 1904 terrace excavations, looking north from Terrace 4 to Terrace 1. Photo courtesy R. Pumpelly III.



3.5 1904 excavation technique. Note brick, pot, and burial 13 left on pedestals in layer 3. Photo courtesy R. Pumpelly III.

their vertical and horizontal position in the mound. Much of the earth was screened to save small objects which the finders kept through the day in small bags" (Pumpelly 1918:793).

All excavation measurements were made in relationship to a "zero" point on the level of the surrounding plain. However, since the level of the plain has been constantly changing due to aggradation of the river delta and considerable modification of the surrounding landscape for farming, the stratigraphic relationship of the 1904 excavations with the actual stratigraphy at the mound became unclear. With the assistance of the original field notes, though, it has been possible to correlate the strata at the site today with those reported in 1904 (Figure 3.6). Schmidt's descriptions of the dig (Appendix A) are crucial for reconstructing the archaeological sequence at Anau North and hence the development of the cultures at the site.

Areas Investigated

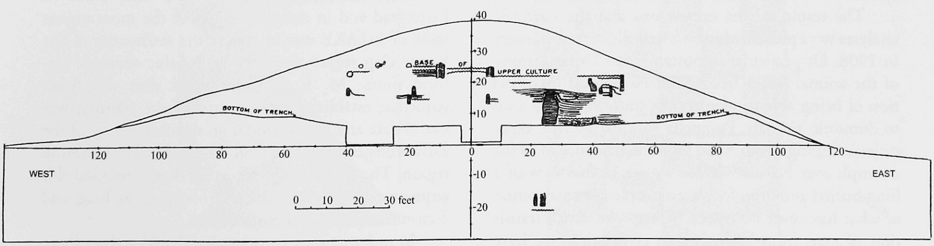
The 1904 expedition investigated the upper, middle, and lower strata at Anau North through a variety of innovative excavation techniques, including areal excavation (terraces), tunnels, and deep soundings.

The archaeological remains at the top of the mound were investigated through excavation trenches called "terraces" (Schmidt's term *Terrasse*). These were established to explore the strata associated with the walls and charcoal layers visible in Komarov's trench; taken together, the terraces created a shallow "step-trench" across the top of the site.

Terraces 1–3 were made to the north of Komarov's trench. terrace 1 (approximately 4 m x 4 m) was located at the top of the mound, perpendicular to Komarov's trench, and was excavated 4.5 m in depth. Terraces 2 and 3 (each approximately 3 m x 8 m) were extended north from terrace 1 along the flat top of the mound and were excavated to a depth of 7 m. The transition from Anau II to Anau I was noted in each terrace.

Terraces 4–8 were made to the south, again perpendicular to Komarov's trench; the excavations reconfirmed the sequence found in terraces 1–3. Excavation of terrace 4 (2 x 4 m) was stopped after the discovery of burials in the upper layers but continued to the south in terrace 5 (4 x 4 m). Terraces 6–8 extended to the south from terraces 4 and 5, forming a southern transect across the site.

In order to gain access to the strata at the center of the mound, Pumpelly and Schmidt cut into the sides of Komarov's trench, creating tunnel-like galleries. Such horizontal trench galleries had been used by Jean-Jacques de Morgan on the acropolis mound at Susa in 1897–1898 (Morgan 1899, 1900). Such gallery excavations work reasonably well as a sampling technique, provided that the strata are them-



3.6 1904 stratigraphic section from Anau North. Adapted from Pumpelly 1908: plate 1.

selves horizontal (Dyson 1966:148–167, Dyson 1968:28–29). Both the west and east galleries, hollowed out in the interior of the site, were made to avoid the debris at the bottom of Komarov's trench. The east gallery was excavated to the base of the mound, more than 6 m below the level of the surrounding plain.

On the northern edge of the mounded area, a deep sounding referred to as the "north digging," was made to test to the bottom of the cultural layers. The excavations were originally laid out in four units, but apparently only three were actually dug (north digging 1, 2, 4). north digging 2 was excavated to a depth of 8.5 m below the level of the plain.

The stratigraphy of the outskirts of the settlement was also investigated. Because it was necessary to excavate through many feet of modern alluvial deposits, deep narrow shafts were used to penetrate to ancient *in situ* deposits. Another team member, Raphael Pumpelly's son, was lowered into these shafts in order to study the evolution of the strata.

The objects and ceramics, marked with the trench, gallery, or digging designation, and absolute elevation, allow us to group the 1904 finds and architecture into contexts which we can then correlate with the strata investigated in 1997 (Appendix B).

1904 Results

Finds from Pumpelly's excavations were sent to specialists in Europe: a thousand pounds of animal bones to J. Ulrich Duerst in Bern, the human skulls to Professor Giuseppe Sergi in Rome, and the postcranial human bones to Professor T. Mollison in Zurich. The metal finds were sent to Professor F. A. Gooch in New Haven, CT, for chemical analysis, and Dr. H. C. Schellenberg in Bern examined the microscopic imprints of plant remains from ceramics and bricks.

The results of the excavations and the scientific analyses were published in two well-illustrated volumes in 1908. Of particular importance was Duerst's study of the animal bones from Anau North and his assertion of being able to identify the transition from wild to domestic animals. Pumpelly summarized the expedition's findings from Anau North as evidence of Man's triumph over Nature: "What we see in this view of a long-buried and long-forgotten people is a true picture of what has never been seen before--the actual transition of man from barbarism to civilization; we have seen the starting-point of our domestic animals and the beginning of that control of man over the horse which enabled him to revolutionize the ancient world" (Pumpelly 1908:42).

Other Early Excavations at Anau North

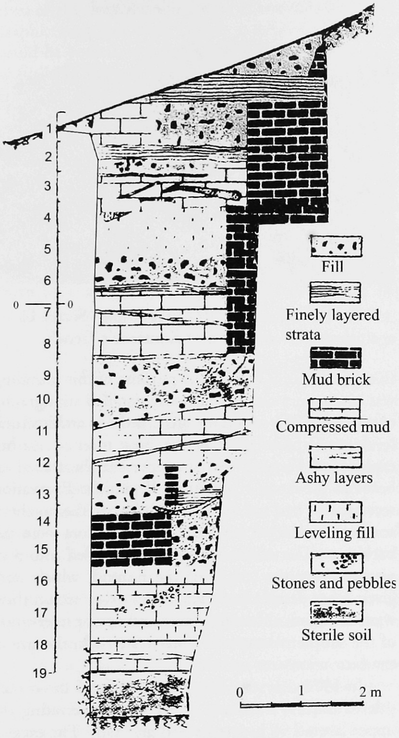
Sometime between 1906 and 1909, the excavations at the North Mound at Anau were reexamined by the eminent Russian archaeologist A. A. Semenov. Semenov conducted further excavations in an attempt to follow up on Pumpelly's research, but the results of this work were not published (Kurbansakhatov 1987).

In 1929 M. P. Gryaznov and M. V. Voevodskii conducted fieldwork at the North Mound at Anau and partially cleared the previously excavated architecture (Kircho 1999:53). They made a stratigraphic sounding at the north mound which confirmed the sequence defined by the Pumpelly expedition. (The collections from this sounding are housed at the State Historical Museum, Moscow.) The ceramics from the 1929 excavations were apparently utilized by Marushchenko in devising a twelve-stage refinement of the Anau sequence from the four-culture sequence devised by Pumpelly (Jusopov and Lyapin 1998). In a short report in 1939, prepared for the opening of the Turkmenistan Historical Museum in Ashgabat, Marushchenko suggested absolute dates for the four culture stages. These dates appear to be based on Pumpelly's revised chronology which appears in his memoirs (Pumpelly 1918:808)

Ershov's 1953 Sounding

In 1946 the South Turkmen Archaeological Complex Expedition (IuTAKE)was organized by the Insitute of Archaeology, Leningrad branch (LOIA), to study the historic and prehistoric record of the Republic of Turkmenistan. The expedition had dual bases in Leningrad and in Ashgabat. One of the most urgent tasks of IuTAKE was to review the settlement of the Kopet Dag region from the Paleolithic through historic times. M. E. Masson noted that the Anau sequence, established at the turn of the century, was out of date and urged a focus on the chronology of the early villages and cities of the Kopet Dag foothill region. The large site of Namazga depe provided this sequence, although it was not occupied as long and continuously as Anau North.

In order to investigate materials older than those found at Namazga depe, one of Marushchenko's colleagues in Ashgabat, S. A. Ershov, made a stratigraph-



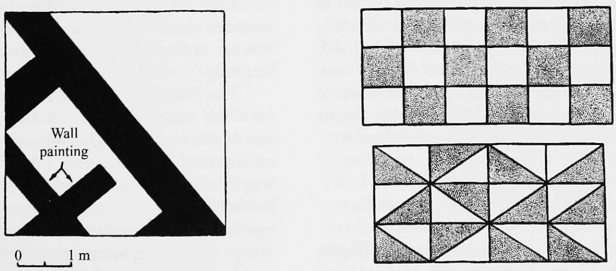
3.7 Ershov's 1953 stratigraphic section. Adapted from Ershov 1956: fig. 1.

ic sounding on the southeastern slope of the north mound in 1953. He excavated 9.1 m of cultural deposit. The sounding was 4 m x 4 m at its highest point but shrank as it deepened. Six architectural layers were identified—three from the Anau IA levels at the base of the site and three related to the earliest Namazga I layers.

Ershov had the advantage of working within the context of an already established stratigraphic sequence at Anau North. His goal was specifically to investigate the Anau IA and Anau IB layers at Anau North. While neither the excavation methods nor the individual strata are described in his short report, his contribution is nonetheless important. By concentrating on the lowest layers, he doubled the sample for the early periods at Anau, excluding the pre-Anau IA as found at Pumpelly's north dig.

The upper three layers of Ershov's sounding correspond to the earliest Anau IB layers, while the lowest 3.5 m correspond to the Anau IA layers which Pumpelly found in the north digging. The excavations revealed five architectural layers (Figure 3.7). One of the structures had traces of polychrome painting on the inner walls and is interpreted as a ritual room or a shrine (Khlopin 1963a:9). These paintings were arranged in two panels, one showing red silhouetted triangles in checkerboard pattern within a black frame, and the other a similar pattern of alternating squares (Figure 3.8). The ceramics were briefly described in Ershov's preliminary publication (Ershov 1956) and were fully published by Berdiev (1974). Selected animal bones from Ershov's excavations were identified by Tsalkin, who identified domestic animals from the lowest levels (Masson 1982).

Ershov's excavations led Marushchenko to suggest that Pumpelly's views on the appearance and development of animal domestication and herding in the piedmont of the Kopet Dag were erroneous. He connected



3.8 Wall painting from Ershov's sounding at Anau North. Adapted from Khlopin 1963a: plate 4.

Anau I culture with the time of established village life and not with the period during which wild animals had been domesticated (Marushchenko 1956).

Criticism of the excavation and means of interpretation used by previous investigators at the site and of the sequence they had developed became common (Kuftin 1954, Litvinskii 1952). Beginning in 1949 major stratigraphic work shifted to Namazga depe, 150 km to the east. The basic Namazga sequence was worked out from these excavations in 1952, under the direction of B. A. Kuftin (1956).

Kuftin's new sequence permitted the Pumpelly–Schmidt scheme to be correlated with other sites of the Kopet Dag foothill zone (Masson 1956). The late Anau I (Anau IB) Period corresponds to the Namazga I complex, and Anau II corresponds to Namazga II and III. Few remains of the Namazga III complex were found by the Pumpelly expedition, and no Anau IA remains were identified at Namazga depe.

According to V. M. Masson, between 1955 and 1962, IuTAKE and LOIA launched a new strategy in Soviet Central Asia of wide-scale (*mashtabi*) horizontal excavations as opposed to stratigraphic soundings (Masson 1982:26).

Excavations of 1977–1982

K. Kurbansakhatov began research at Anau North in 1977 to place its occupation into the context of a now much wider sample of Early Village settlements. Over the course of the next five years, Kurbansakhatov was able to sample the center of the settlement by excavating to the north of Komarov's trench. These excavations, in contrast to the single season of field research by Pumpelly's team or the stratigraphic sounding of Ershov or incidental collections of materials by others, provided sizable exposure of the Early Village architecture at Anau. Kurbansakhatov excavated by architectural construction levels, using the exposed section in the center of the settlement as a guide and following the techniques developed during years of IuTAKE fieldwork in southern Turkmenistan. Rather than revising the sequence proposed in 1908, the results of this stratigraphic work surprised many archaeologists to the extent which they agreed with and refined it.

Areas Investigated

In 1977, a preliminary stratigraphic section (Figure 3.9) was made in the northern wall of Komarov's trench, 8 m east of Pumpelly's terrace 1 (Kurbansakhatov 1980). The purpose of this sounding was to obtain a clearer and more detailed stratigraphy of the site. The sounding identified six architectural levels and indicated that the area merited further exploration because it might represent the transition between the Anau I and Anau II periods. Excavation sectors were laid out along a grid line on the northern scarp of Komarov's trench, and the sectors were cut back 5 m. The excavation area was divided into 3 m sectors along the length of the mound, which were given letter designations. Each excavation sector, thus, was 3 m x 5 m, although given the state of preservation of the southern scarp of Komarov's trench, the size of the excavation area varied.

3.9 Kurbansakhatov's 1977 excavations. Sector C, against weathered section of Komarov's Trench.

In 1978 this sounding was extended 6 m on each side of the 1977 section in Sector C, excavating the upper layers 1–4 in sectors A,B and D,E. The excavations crossed terrace A in sector E.

The 1979 excavations extended along the Komarov trench. Layers 1–4 were poorly preserved to the east, while layer 5 was not preserved in 1979 underneath the layer 4 architecture.

The 1980 season focused on layers 6–8. Layer 6 extended across the entire length of the site, providing a transect through the heart of the settlement 39 m in length.

The 1981 season shifted to examine the lower layers of the mound, layers 9–14. The excavation strategy was modified accordingly, to provide somewhat larger architectural exposure (9 m x 5 m) than afforded by restricted stratigraphic soundings. This area of the site, however, afforded an opportunity to observe the development of the edge of the settlement, with an exterior village wall having buttresses and towers.

In 1982, a deep sounding was made to investigate the lowest deposits at Anau North. The main objectives of the deep sounding were (1) to obtain a stratigraphic sequence from which a refined chronology could be constructed, based on layer-by-layer analysis of finds, and (2) to document the transition between Anau IA and Anau IB.

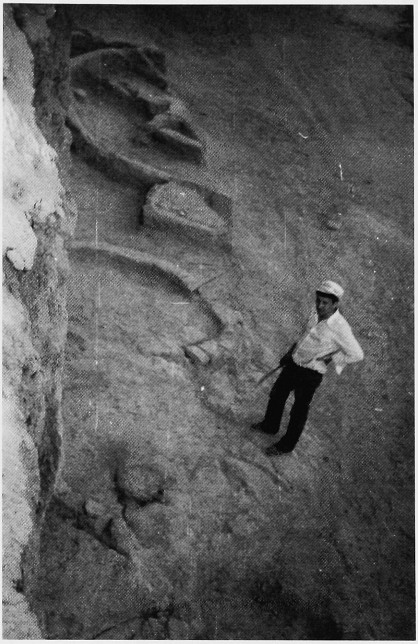
Wide-scale horizontal excavations were also carried out on the southwest part of the site to investigate the architectural layout of villages during the Anau I and Anau II periods. Kurbansakhatov's "excavation 1," approximately 10 m x 20 m, just west of terraces 4–8, revealed two architectural layers, one from each period. The Anau II settlements lay just beneath the surface of the mound; farther down, and isolated from them by a sterile layer, were the occupations of the Anau 1 period.

1977–1982 Methodology

In Russian archaeological literature the term "layer" (*sloi*) can have two different meanings: as a broadly defined term, it is equivalent to an architectural horizon; as a specific term, it refers to a thin stratum inside the architectural horizon pertaining to a specific area or activity. An "archaeological complex" or cultural layer (*kul'turnie sloi*) is a layer that includes architecture and artifacts of material culture, and it represents the primary unit of Soviet analysis (Figure 3.10). Such a complex is based upon the identification of a single, or a primarily architectural structure the layer.

During his 1977–82 excavations, Kurbansakhatov employed the following definitions: (1) *stroitel'nii gorizont*, "building horizon," a definite set of layers belonging to a restricted time period limited by floor layers and associated fill; (2) *sloi*, architectural layer, a subset of the building horizon, a particular floor level or fill. These units contrast with artificial, or "open," units of recording which measure depth. (3) *yarusi*, a 50 cm unit in a stratigraphic scale; (4) *shtik*, a unit of approximately 15 cm in the excavation scale. Though a *shtik* is an artificial excavation unit, Kurbansakhatov considered the material in it as belonging to one time period in the level deposits at Anau North due to "the relatively high rate of layer accumulation" (Kurbansakhatov 1987:26–27).

The 1977–1982 excavations at Anau North followed natural stratigraphic units (floors, walls, fill, etc.) as the principal units of excavation. Changes within a complex were tracked via *yarusi*, marked every 0.5 m in depth. Building horizons or layers were identified and described within the specific *yarus* in which they were located.



3.10 Kurbansakhatov's exposure of architectural layer 6.

Conclusions

Three stratigraphic sequences are presented here: Schmidt's 1904 description, as published by the Carnegie Institution of Washington in 1908; Ershov's 1953 deep sounding; and the more concerted excavations by Kurbansakhatov in 1978–1982.

Each group of archaeologists came at the task from a different background and with a different scientific approach. Yet, to a surprising degree, their independent observations confirm each other, the insights of each team validating, while enlarging, those of the last. Likewise, the excavations of 1997 draw on and complement those of Pumpelly and Schmidt, Ershov, and Kurbansakhatov, as will be evident in the following chapters.

4

1997 Excavations: Context of Deposition and Stratigraphy

Renewed excavations at the north mound at Anau were conducted in 1997 to create a key to the various earlier excavations. We were able to reestablish the yarus and grid systems from Kurbansakhatov's main trench. By matching a set of walls noted by Pumpelly in the cross-section of the Komarov Trench with the still-extant walls, we were able to reestablish the original datum from the 1904 excavations, and thus to incorporate the 1904 corpus of finds into our analysis. The 1997 excavations in turn allowed us to make observations about site formation processes and to describe contexts of deposition of the artifacts. These excavations also permitted us to collect samples for scientific analysis directly correlated to Pumpelly's and Kurbansakhatov's excavations.

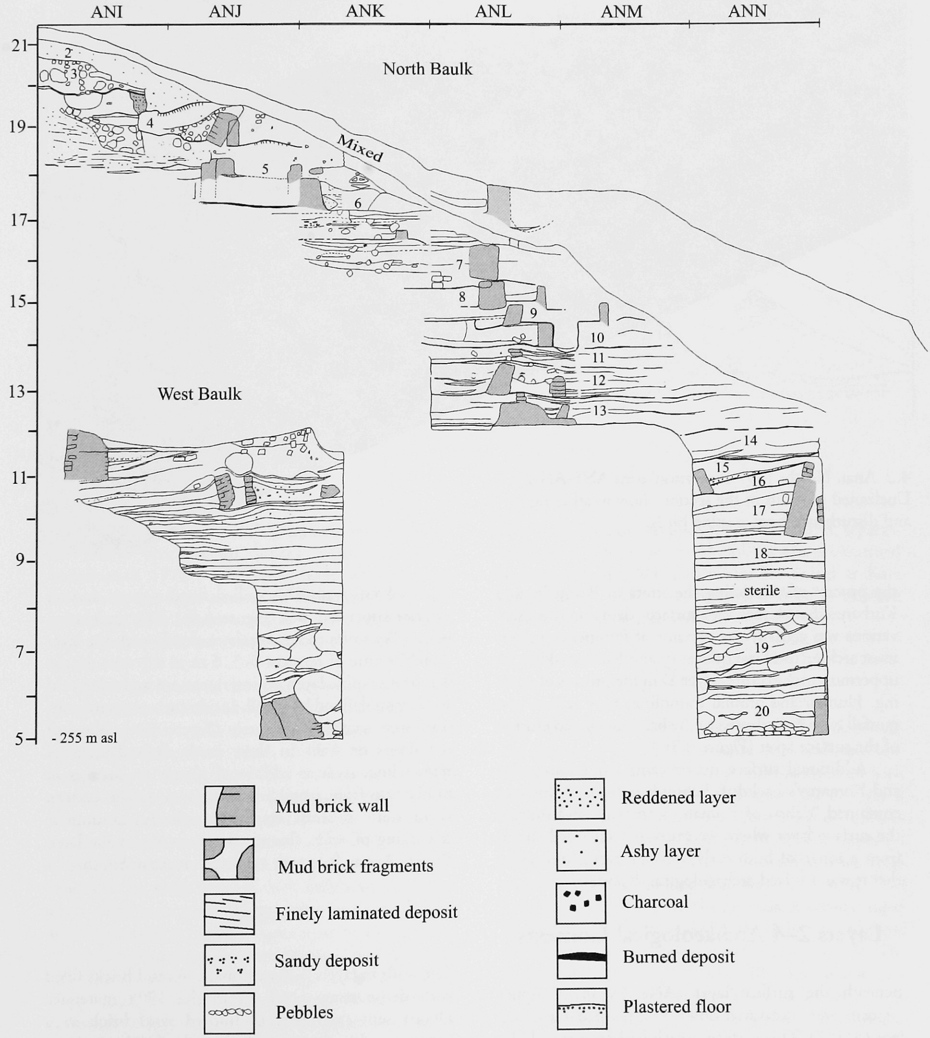
The 1997 excavations were located adjacent to Kurbansakhatov's main trench, sectors I–N (Figure 4.1). We use the term "layer," as he did (1987), to indicate each architectural phase. Each layer thus includes the original construction, the occupational debris and the upper fill. Our description of the stratigraphy employs the same grid system established in Kurbansakhatov's excavations. We use the term "sector," to indicate the 3-m part of the grid established by Kurbansakhatov. We use the term "locus" to designate the smallest definable and excavated unit (Harris 1979). For example, ANI 3 stands for Anau North sector I, locus 3 and refers to a specific area and volume of deposit, its architectural features and its artifact assemblage.

Working on the edge of a scarp 16 m high (Figure 4.2) required several different approaches to excavation. First, small-scale excavations were carried out in layers 2–5, cutting back the baulk of the Komarov trench by 1.5 m along sectors I and J. These excavations were 20 m from the 1978 excavations of these layers in sectors C and D but near the terrace 1–3 excavations of 1904. Second, excavations were carried out in layers 6–9 in sectors K and L, where we further investigated structures excavated by Kurbansakhatov in the 1980s. In this case, we were able to directly correlate our dig with previously excavated areas. Due to the dangers of excavating along a potentially unstable baulk, we were not able to excavate in layers 10–13. However, we were able to clean back the stratigraphic section from Kurbansakhatov's excavations and collect samples from the previously excavated rooms, courtyards, and fill. We were able to excavate *in situ* architecture in layer 14, in an area adjacent to Kurbansakhatov's deep sounding.

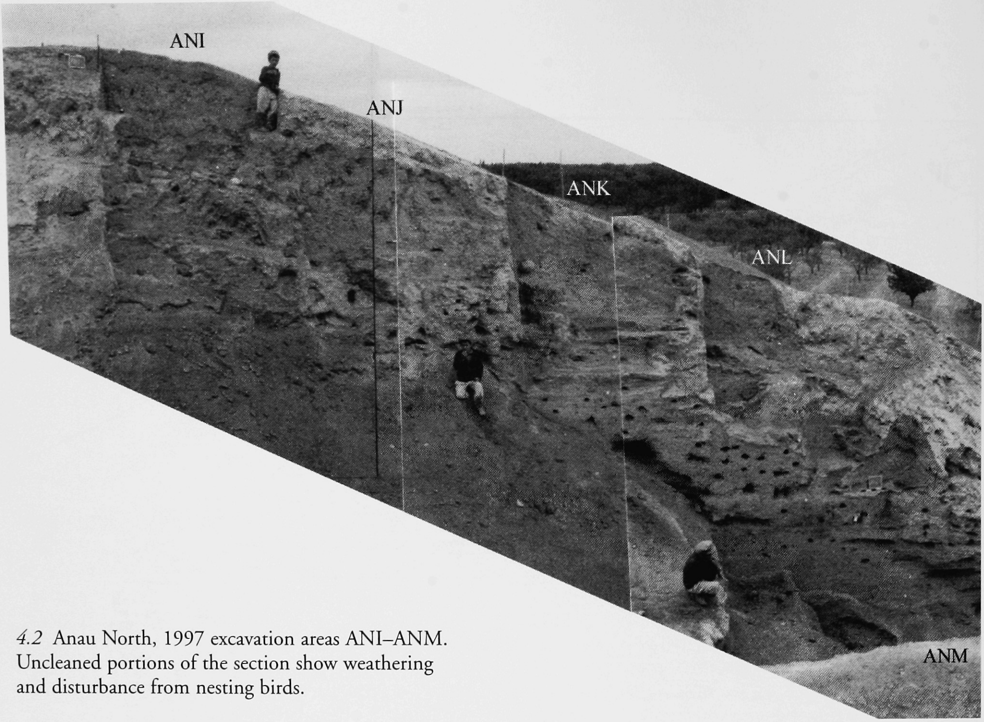
Excavations of 30 contexts ranged in depth from the surface to layer 14 (Table 4.1), in addition, soil samples were taken from layers 10–20 (Tables 4.2–4.4). The excavations and samples provided the material for the radiocarbon dating, ceramic analysis, paleoethnobotanical analysis and soil analysis presented in this study. Additional soil samples were taken in 1999 from just beneath floors and walls in layers which appeared to have been leveled after occupation ceased. These samples were part of the micro-botanical or "biomorphic" study of the deposits and were compared with soil samples taken in 1997.

Surface Deposits

As seen in 1997, the surface of the mound, especially at the top, consisted of 10–30 cm of friable, unconsolidated, archaeological deposit. It later became clear, in



4.1 Schematic section of 1997 excavations, Anau North. North baulk section shows entire sequence; west baulk is continuous with layers 14–20 of the deep sounding.



4.2 Anau North, 1997 excavation areas ANI–ANM. Uncleaned portions of the section show weathering and disturbance from nesting birds.

the process of correlating the strata of Pumpelly and Kurbansakhatov, that the "surface" debris in our excavations was actually the remains of Pumpelly's uppermost architectural layer (layer 0) and Kurbansakhatov's uppermost architecture (layer 1) in the process of eroding. Human and animal trampling, root action, and rainfall have contributed to the breakdown and erosion of the surface layer (Figure 4.3).

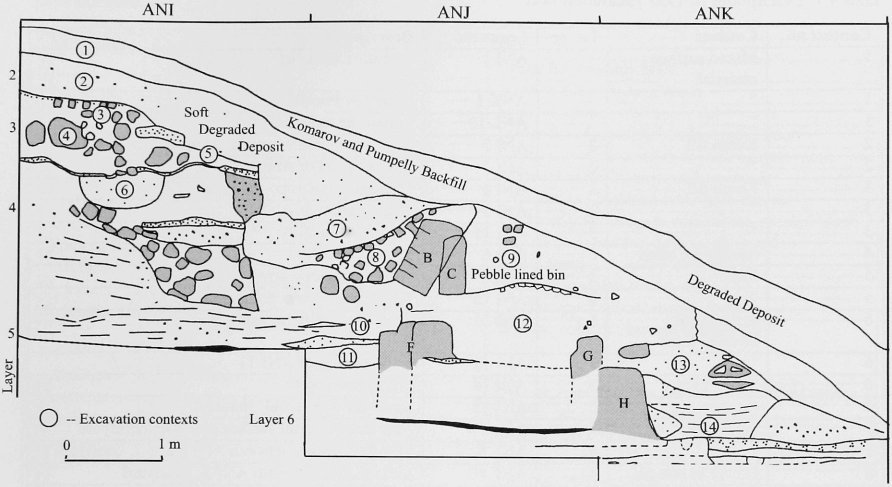
Additional surface debris came from Pumpelly's and Komarov's backdirt. Schmidt notes that this area contained "debris of Komarov's trench," and indeed, the surface layer where we excavated included sherds from a range of both early and late types, indicating that it was a mixed archaeological deposit

Layers 2–4 Archaeological Contexts

Beneath the surface layer (ANI 1), intact upper deposits were excavated down to a tamped-earth surface (ANI 2). This surface, which had no pits or holes in this area, sealed the lower deposits (Figure 4.4a). Beneath lay 40 cm of upper fill (ANI 4, 14), with a thin NW-SE wall. This wall defined a room and an exterior courtyard area (Figure 4.4b). The undulating plaster floor of a room correlates closely with the layer 3 architecture of terraces 1–3, 6 m to the west. In the 4th stratigraphic layer, an interior room and courtyard were again defined by a wall. Inside and courtyard contexts were sampled separately (Figure 4.4c). None of the floors or walls in these levels showed signs of remodeling, such as additional plaster or changes in mud bricks from rebuilding or expansion. This pattern is in stark contrast to the practically continuous reworking of walls, floors, and alleyways in the later, Bronze Age architecture excavated at Anau South.

Walls

The walls in layers 2–4 were made of mud bricks filled with dense straw chaff. From the 1904 materials, Duerst sent fragments of burned mud brick to a botanist, who determined that the brick at Anau North was tempered with wheat and barley chaff and straw (Schellenberg 1908). Most Soviet archaeobotan-



4.3 Layers 2–4, section, Anau IIA period.

ical identification at Central Asian sites has been based on plant remains in bricks (Lisitsyna 1978, Yaneshevich 1977). The bricks from layers 2–4 are notable in the high density of ceramics, bones, and even small finds incorporated in them; evidently, midden and occupational debris was used in making the bricks.

The mud bricks in the upper levels average around 36 cm x 22 cm x 10 cm (n=21 entire bricks). The walls appear to either to be mortarless or have fine mud mortar between courses. None of the walls in the 1997 excavations at Anau North had foundation trenches; several appear to have been constructed directly on a leveled surface. Wall construction varies in the upper layers. Schmidt noted in terrace 1 that header-stretcher wall construction was found in the uppermost layers (layers 0–1), while in layers 2–4, only walls of single-brick width were made. This pattern of more complex wall construction in the uppermost levels at Anau North is consistent with observations of wall construction from contemporary Namazga III levels at Kara depe (Masson 1961b) and Ilgynli (Berezkin and Solov'eva 1998). In layers 2–4 the walls were either built with bricks laid end to end (to make a thinner wall) or side to side (to make a thicker wall). Brick courses alternate throughout, as seen in layer 2. In layer 4, parallel or "double" walls were found, separated by 10–15 cm. A similar "double" wall was identified in terrace 1 in 1904, and others are found at Kara depe, layer 3, where they indicate a division between two house compounds (Masson 1961b).

Upper Fill

The fill contained in the upper parts of rooms primarily consists of mud brick collapse from walls and secondary debris stratified on top and interspersed with the decay of the structure. The upper fill of layer 3 (ANI 4 and 14) included large fragments of individual bricks and a mass of degraded brick. The upper fill of layer 4 (ANI 7) had ash lenses, small brick fragments, and abundant long bone fragments, which had been gnawed and digested by animals. A similar upper fill deposit (ANI 4) included both fox bones and those of domestic animals (sheep/goat), with cut marks. The deposits of this trashy secondary fill continued almost to the floor of most rooms. These layers appear to have been deposited after the building had mostly gone out of use. For example, in layer 4, the upper fill deposits (ANI 14 and ANI 7) lap over the edges of degraded walls. A phytolith sample (B.020) from the

Table 4.1 Descriptions of 1997 Excavation Loci

Context no.	Context	Layer	Locus no.	Description
1	Mixed surface material		ANI 1	Komorov backdirt
1	"		ANK 1	Komorov backdirt
1	"		ANL 10	Rodent disturbed deposit
2	Room fill	2	ANI 2	Western section of *in situ* deposit
2	"	2	ANI 3	Continuation of ANI 2
3	Room fill	3	ANI 4	Mud brick outcrop - bricks and fill
3	"	3	ANI 5	Continuation of ANI 4
3	"	3	ANI 15	Fill behind wall A
4	Mud brick mass	3	ANI 6	Soft *in situ* fill
5	Floor	3	ANI 9	Ashy and bricky layer
5	"	3	ANI 16	Floor deposit near pit
6	Primary pit through floor	3	ANI 11	Mud brick collapse above pit
6	"	3	ANI 12	Continuation of ANI 11
6	"	3	ANI 14	Fill above hearth
6	"	3	ANI 13	Burnt brick, ash and charcoal
7	Upper fill	4	ANI 7	Mud brick fill and surface collapse, courtyard
7	"	4	ANI 8	Mud brick mass between ANI 6 and 7, courtyard
8	Lower *in situ* fill	4	ANI 10	Midden layer beneath ANI 8, courtyard
9	"	4	ANJ 1	Bricky fill above pebble floor
9	"	4	ANJ 2	Bricky fill above zakladka floor
10	Upper fill	5	ANK 4	Hard brick and ash fill, area 1
10	Fill on floor	5	ANJ 4	Soft crumbly deposit with ash and charcoal, area 1
11	Fill on floor	5	ANK 7	Charcoal and ashy floor deposit, area 1
12	Upper fill	5	ANJ 3	Leveling fill beneath pebble floor, area 2
12	"	5	ANK 3	Crumbly undulating floor deposit
13	Floor	5	ANJ 5	Hearth deposit, area 3
13	"	5	ANJ 6	Continuation of ANJ 5
13	"	5	ANK 2	Hard, fine-grained floor deposit, area 3
14	Debris on floor	6	ANK 8	Organic debris on floor, area 3
15	Upper fill	6	ANK 4	Upper fill, east of wall H
15	"	6	ANK 10	Loose crumbly fill, courtyard
16	Fill on floor	6	ANK 11	Fill above surface
16	"	6	ANK 12	Sandy surface
16	"	6	ANK 13	Continuation of courtyard deposit
16	"	6	ANK 16	Bricky courtyard surface deposit
16	"	6	ANK 17	Floor deposit near hearth
17	Upper fill	6	ANK 5	Upper fill, west of wall H
18	Bin	6	ANK 9	Midden fill, beneath ANK 5
18	"	6	ANK 14	Waterlain deposits, near plastered bin
19	Plaster sample	6	ANK 15	Plaster from the bin
20	Brick contents	6	ANK 6	The wall itself
20	"	6	ANK 18	Sample of bricks from wall

Table 4.1 cont.

Context no.	Context	Layer	Locus no.	Description
21	Upper fill	7	ANL 0	Upper fill, crumbly brick
21	"	7	ANL 3	Western fill outside of room
22	Floor deposits	7	ANL 1	Sandy, midden filled upper fill
22	"	7	ANL 2	Lower fill of room, to black painted floor
23	Fill outside room	8	ANL 6	Western exterior midden deposit against room
23	Hearth deposits	8	ANL 4	Charcoal and ashy deposit from oven
23	"	8	ANL 5	Charcoal and burned bricks from fire-pit
24	Floor deposits	8	ANL 7	Sandy ashy fill down to room floor, painted black
24	"	8	ANL 8	Second floor surface, heavily plastered
25	Floor deposit	9	ANL 9	sandy, finely laminated deposits
26	Hearth deposits	9	ANL 11	charcoal, vitrified bricks, ash
27	Upper fill	14	ANM 1	Interior upper fill of circular room
28	Interior deposits of circular structure	14	ANM 3	Interior, reddish charcoal flecked fill
28	"	14	ANM 5	Interior, upper surface, bricks, fire cracked stone
28	"	14	ANM 7	Interior, plaster surface with ashy fill
28	"	14	ANM 9	Interior, ash and ashy fill with charcoal
28	"	14	ANM 11	Interior, midden fill above mud brick plaster floor
29	Courtyard outside of circular structure	14	ANM 2	Exterior, reddish upper courtyard fill
29	"	14	ANM 4	Exterior, undulating collapse
29	"	14	ANM 6	Exterior, sandy surface to grey clayey surface
29	"	14	ANM 8	Exterior, hard brick and ash
30	East of buttressed wall	14	ANM 10	Exterior, undulating soft fill
30	"	14	ANM 12	Exterior, soft fill

Table 4.2 Samples from Circular Structures, Anau IB1 Layers

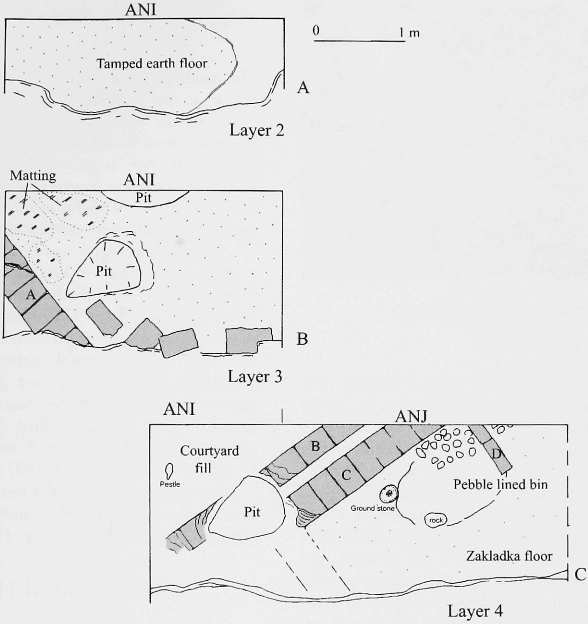
Layer	Size (m dia)	Upper fill	Floor	Soil samples	Flotation no.
10	3.1	burned	floor deposit	ANM 32	97.085
11	2.0	collapsed	floor w/finely stratified deposits and a 5-7 cm thick ash and charcoal layer on the floor	ANM 31	97.084
12	1.8	collapsed	roof debris	ANM 30	97.083
13	1.2	collapsed	ashy and charcoal lens	ANM 27	97.066
14	3.3	collapsed	red surface	ANM 3	97.034
14	"	"	hearth on red surface	ANM 5	97.035
14	"	"	gray layer beneath upper floor	ANM 7	97.037
14	"	"	gray layer	ANM 9	97.040
14	"	"	hard burnt layer on floor	ANM 11	97.045

Table 4.3 Samples from Courtyard Areas, Anau IB1 Layers

Layer	Context	Description	Soil samples	Flotation no.
15	courtyard upper fill	ash and charcoal lens in upper fill – dumping event	ANN 29	97.082
16	courtyard upper fill	upper fill ash and charcoal lens (associated with radiocarbon sample ANN 26	ANN 24	97.077
16	courtyard floor	ashy deposit above tamped earth surface, no botanical materials from the flot	ANN 25	–
16	courtyard floor	dense charcoal and ash lens on the floor	ANN 28	97.081
17	courtyard upper fill	brown, soft deposit with an ashy lens, no botanical materials from the flot	ANN 15	–
17	courtyard upper fill	dusty laminar ashy brown deposit with no visible charcoal, no botanical materials from the flot	ANN 22	–
17	courtyard floor	black stain on a surface	ANN 23	97.078
18	courtyard upper fill	soft brown charcoal lens	ANN 21	97.075
18	courtyard upper fill	large very ashy layer	ANN 17	97.072
18	courtyard floor	brown lens with fire cracked rock and charcoal	ANN 18	97.073
18	courtyard floor	charcoal deposit from inside small mudbrick hearth on the basal surface	ANN 19	97.074

Table 4.4 Samples from the Deep Sounding, Anau IA Layers

Layer	Context	Description	Soil samples	Flotation no.
19	sterile layer	laminar compact deposit, no botanical materials from the flot	ANN 16	–
19	upper	brown deposit with white flecks and charcoal	ANN 13	97.067
19	upper	charcoal and ash lens	ANN 11	97.064
19	upper	sterile layer, no botanical materials from the flot	ANN 8	–
19	floor	charcoal and ash deposit laying on the floor	ANN 10	97.063
20	upper surface	laminated (floor?) surface No botanical materials from the flot	ANN 9	–
20	upper surface	reddish brown deposit with charcoal and ash	ANN 7	97.060
20	1st upper floor surface	plastered floor. no botanical materials from the flot	ANN 6	–
20	2nd upper floor surface	soft brown homogenous plaster deposit. No botanical materials from the flot	ANN 12	–
20	3rd floor surface	lowest floor surface. Ashy lens abutting the wall of the lowest. No botanical materials from the flot	ANN 3	–
20	3rd floor surface	dense charcoal lens on floor (sample split for radiocarbon)	ANN 2	97.057
below 20	"sterile"	sandy laminated fill, some charcoal	ANN 1	97.056



4.4 Layers 2–4, excavation plans, Anau IIA period.

upper fill of layer 4 suggests that the upper fill was buried quickly during a leveling process in preparation for the construction of the layer 3 architecture. A radiocarbon sample from a dense charcoal lens provided a date for the upper fill deposit of layer 4 of 3305–2918 BC.

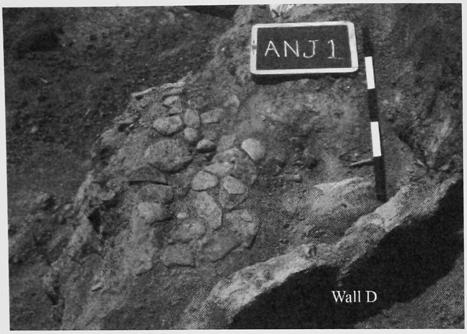
Floor Deposits

Little material relevant to the occupation of the rooms is now found on the floors. Floors both of interior rooms and courtyards appear to have been kept clean during the use of the building. The layer 2 surface is tamped earth—possibly an open courtyard. Like many surfaces at Anau North, it is relatively level, with no pitting or holes. The layer 3 floor (ANI 5 and 15) is a simple tamped-earth surface but had numerous sherds laying flat on it. Covering this floor near the wall was a large gray lens which looked like ash or burned deposit (ANI 9). Soil samples, however, indicate that it was not burned and contained no ash or charcoal but had a very high density of phytoliths. It was probably a decayed mat, and it is likely that other areas where sherds were lying flat on the floor may have also been originally covered by mats. A further floor type, referred to by the Russian term "*zakladka*," was found in layer 4 (ANI 8, 10, 16). This is a prepared floor with a layer of plaster covering a smoothed pavement of mud bricks.

The floor construction is the best index for judging the architectural context of individual rooms. The room with mats and a pit in layer 3 is an interior room, which was probably roofed or covered. In layer 4, both the micro-botanic samples from ANI 7 and the floor type suggest that this was an interior uncovered courtyard space.

Storage Features

Storage features, such as above-ground bins and underfloor storage pits, were identified in the excavations of layers 2–4. The foundation of a stone lined bin (ANJ



4.5 Pebble-lined bin, layer 4, Anau IIA period.

2) was found inside a room in layer 4 (ANJ 4). The floor of the bin consisted of a rectangle of closely placed flat pebbles (originally enclosed within a thin wall) covered with water-laid sediments (Figure 4.5). It appears to have been for storing perishable items or vessels containing liquids. Similar features were found in terrace 1 (see Figure A.5) and excavation 1 (see Figure 8.21). A brick-lined trash pit was set in the floor in layer 3. The pit was filled with ash, charcoal, and midden debris (ANI 11,13) which lapped up onto the floor. This lined pit was probably originally used for dry storage (grains?). Its use for hearth scrapings is secondary but appears to be contemporary with the later occupation of the room.

Burial Deposits

In both terraces 1–3 and 4–8, H. Schmidt reported the co-occurrence of small hearths adjacent to subfloor burials: "They had the remarkable custom of burying their children inside of their dwellings, immediately adjoining the hearths" (Schmidt 1908:121). We were able to identify this type of context in ANI. In the fill of ANI 7, which undulates over floor remains and over degraded wall stubs, was a small *in situ* charcoal lens. Several other lenses of this type were found in the fill of other rooms. Near the fireplace, the upper part of a large ceramic, filled with charcoal and ash, was dug into the floor. The stratigraphic situation matches that of the subfloor burials reported by Schmidt in terraces 1–3 and 4–8. The stratigraphy at ANI indicates that the burials were made in rooms which had fallen out of use or were in partially abandoned buildings.

Artifacts

The majority of the deposits in the upper building fill appear to be secondary deposits and are probably refuse of daily life derived from nearby dwellings. The remains of reed matting (indicated by high concentrations of phytolith layers on floors), ceramics and small finds lying flat upon or near floors (probably materials that once lay on or under mats), and hearth deposits exemplify the primary contexts in these rooms.

The ceramic assemblage from layers 2–4 provides a representative range of local forms, from small cups to large storage jars, and is further discussed in Chapter 10 (Figures 4.6–4.8). The majority of the ceramic sherds are red ware, though burnished gray and painted buff chaff-tempered ceramics also appear. Distinctive features of the red and gray burnished ceramics include high-footed bases and strong carinations on closed vessels, recalling those found on burnished hand-made ceramics from the Proto-Elamite horizon of Hissar II (Dyson 1987).

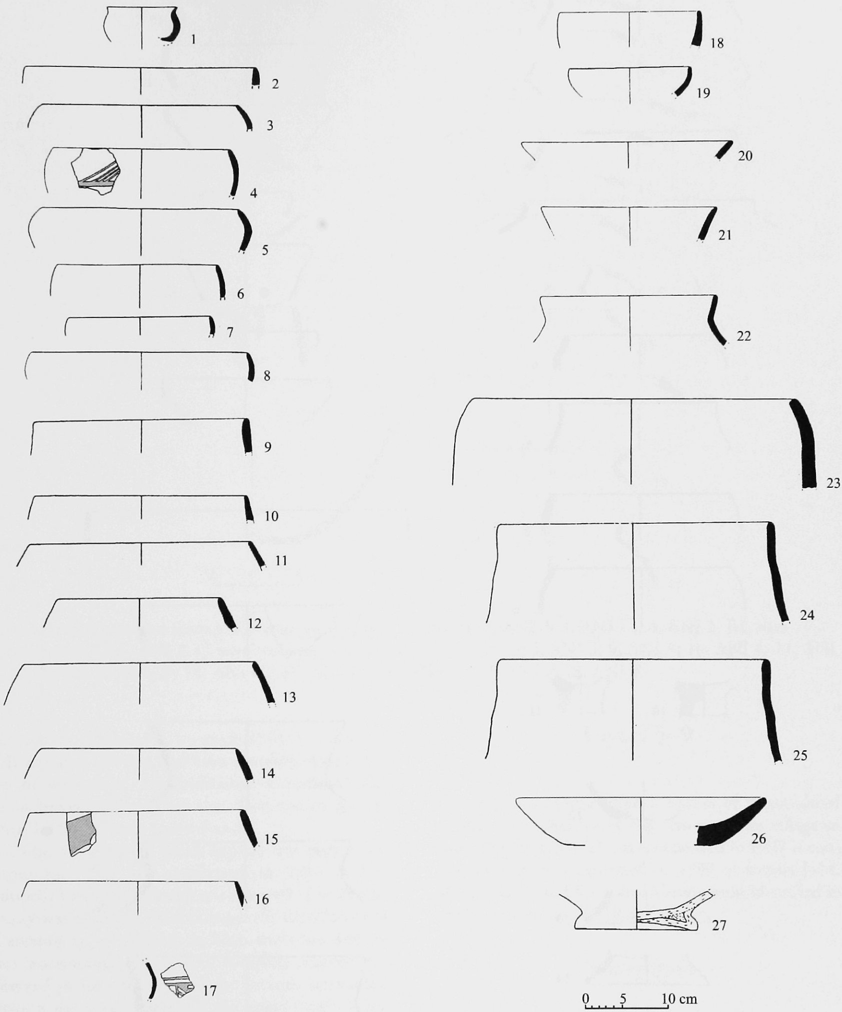
Several small stone pestles were found, as well as a spindle whorl and part of a handle of a stone weight (*gyr*), probably used in weaving (Figure 4.9).

Occupational Hiatus

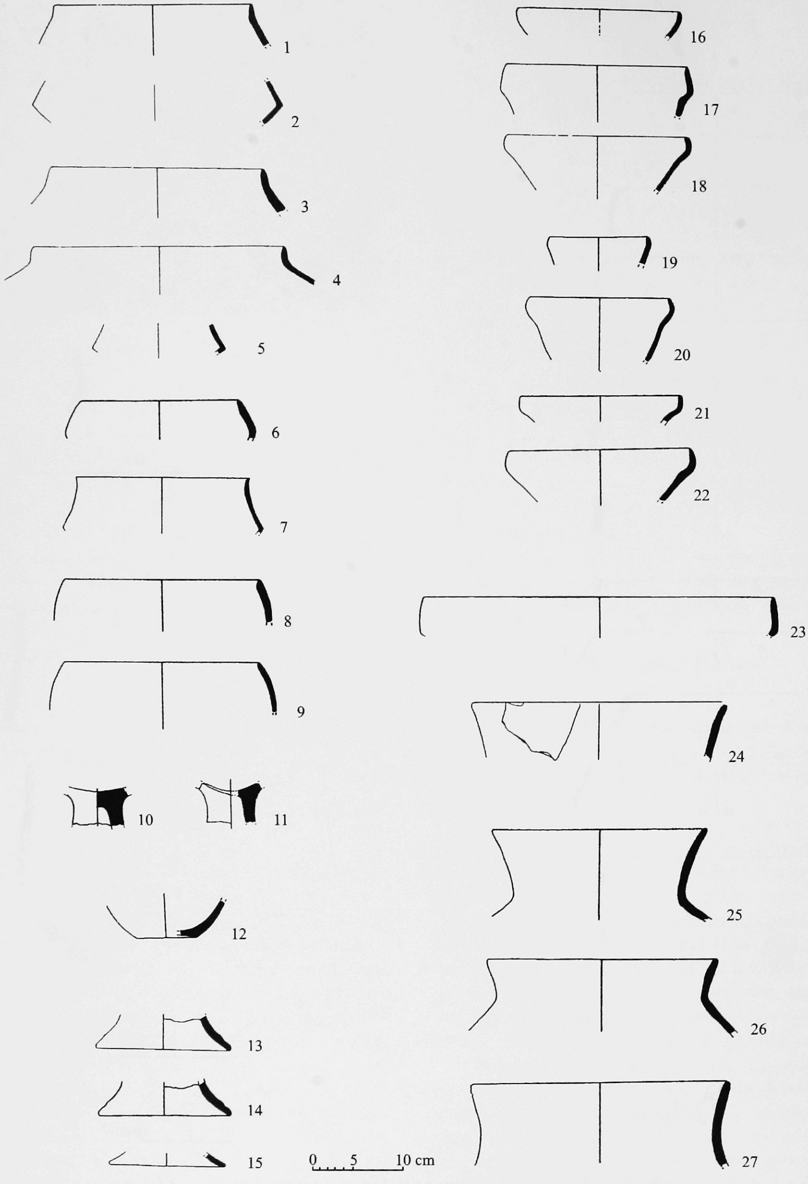
There is a stratigraphic break between layer 4 and layer 5. The floor of layer 4, which followed across the site from sector I through sector J, was built upon an erosional surface in sectors J and K.

In sector J, sealed beneath the floor of the pebble-lined bin of ANJ 3, we were able to identify the deposit related to the break between Schmidt's Anau II and Anau I, and Kurbansakhatov's layers 4 and 5. This deposit was a well-sorted, homogeneous brown sandy deposit with dense ceramics, typical of a stratigraphic break and an occupational hiatus. The high density of secondarily deposited ceramics in the 1997 excavations was also noted in the excavations of the 1970s and appears to be an index of deflation (see Table 6.1).

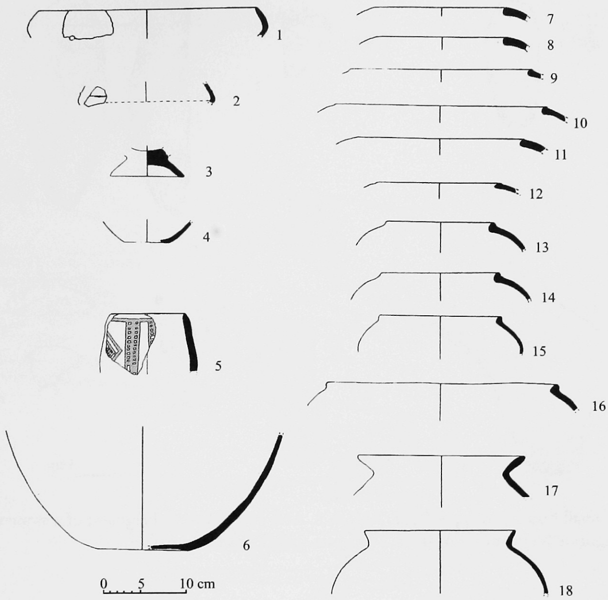
To the east, in sectors K-L, the hiatus deposit was not sealed by a visible floor. Here, the deposit mixes ceramics typical of the upper layers (including red and gray burnished ware) with those more typical of layers 5–9. Bone fragments from a child about 6–8 years old were recovered in ANK 2 from a finely sorted mound of hard, bricky wash. ANK 3 appears also to have been deflated and gradually redeposited with sediments before occupation returned in layer 4. A micro-botan-



4.6 Layers 2–4 ceramics. A ware (fine chaff ware): 1, ANI 4; 2, ANI 4; 3, ANI 4; 4, ANJ 2; 5, ANI 4; 6, ANJ 2; 7, ANI 10; 8, ANJ 2; 9, ANI 13; 10, ANI 5; 11, ANI 5; 12, ANI 13; 13, ANI 14; 14, ANI 3; 15, ANJ 2; 16, ANI 8; 17, ANI 2. B ware (coarse chaff ware): 18, ANI 13; 19, ANI 7; 20, ANJ 1; 21, ANI 4; 22, ANJ 2; 23, ANJ 2; 24, ANJ 1; 25, ANJ 1, 26, ANI 7; 27, ANI 2.



4.7 Layers 2–4 ceramics (cont.). E 1 and 2 wares (red and gray burnished wares): 1, ANI 8; 2, ANI 7; 3, ANJ 2; 4, ANI 14; 5, ANJ 1; 6, ANI 3; 7, ANI 5; 8, ANJ 2; 9, ANJ 2; 10, ANI 3; 11, ANI 2; 12, ANI 8; 13, ANI 3; 14, ANI 3; 15, ANI 7; 16, ANI 13; 17, ANI 4; 18, ANI 13; 19, ANI 14; 20, ANI 13; 21, ANI 13; 22, ANI 4; 23, ANI 2; 24, ANI 8; 25, ANI 8; 26, ANI 10; 27, ANI 13.



4.8 Layer 2–4 ceramics (cont.). E.3 ware (gray ware): 1, ANI 11; 2, ANI 3; 3, ANI 14; 4, ANJ 1. F.1 ware (Geoksyur type): 5, ANI 2. G ware (cooking pots): 6, ANI 8; 7, ANI 3; 8, ANI 3; 9, ANI 4; 10, ANI 4; 11, ANI 4; 12, ANI 4; 13, ANJ 1; 14, ANI 10; 15, ANI 13; 16, ANI 14; 17, ANI 3; 18, ANI 5.

ical sample (Chapter 11: sample B.019) taken here indicates that the area had been standing open before the soil was buried. This indication is consistent with the archaeological evidence that there was an occupational hiatus between layers 4 and 5.

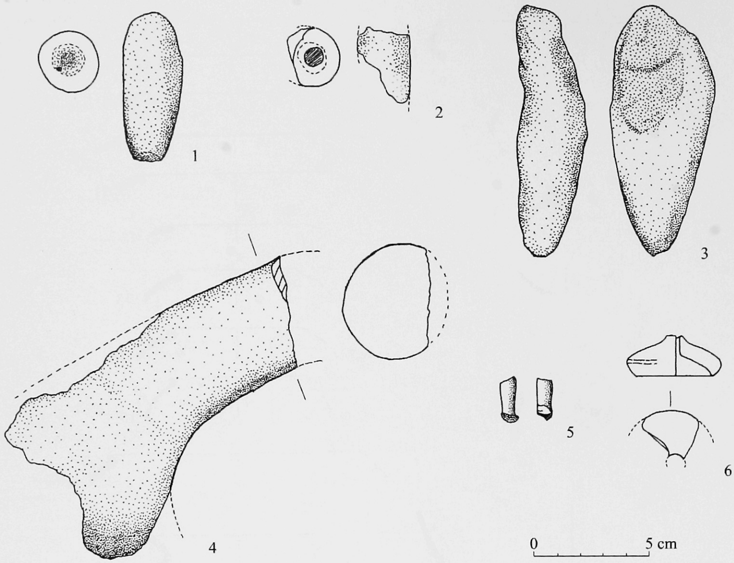
This stratigraphic break appears not only in the excavations that we conducted in 1997 but in Pumpelly's and Kurbansakhatov's as well. The discontinuity was noted in 1904 through the discrimination of ceramic types. Indeed, in both the 1904 and the later excavations, an almost complete change was observed in the character of the ceramic assemblage between the lower levels and the upper levels. While the excavators could not estimate the difference in age of the levels, the assumption was that the occupation was, in general, continuous. The different ceramics were attributed to different cultures, succeeding each other in a continuous line of occupation.

Layers 5–9

Layers 5–9 comprise some 8 meters of accumulated deposit representative of the center of the village of Anau (Figure 4.10). The area excavated in 1997 is contiguous with that excavated in 1980 in sectors J–M. Walls, rooms, and floors had already been identified in the larger exposure of 1980.

Stratigraphy

The upper deposits of layer 5 (ANJ 3 and ANK 3) were apparently deflated. They were composed of a finely sorted deposit with a high density of ceramics (see Table 6.1). In contrast, the layer below (the upper fill of layer 6), contained unsorted wall collapse inter-



4.9 Layers 2–4 small finds. Stone pestles: 1, ANI 4; 2, ANI 10; 3, ANI 1. Fragment of a stone weight: 4, ANI 11. Terracotta figurine fragment: 5, ANI 13. Terracotta spindle whorl: 6, ANI 4.

spersed with midden. Layer 5 architecture was excavated in J and K, including three interior rooms and a courtyard space. This courtyard is a continuation of the one excavated in 1980; it stretches across sectors H–J (Figure 4.11a). The intact floors of layer 5 sealed the layer 6 deposits of an interior room and part of a courtyard space (Figure 4.11b).

Interior and exterior deposits were investigated in layers 7, 8, and 9 in sector L (Figure 4.12a, b, c). As described in Chapter 8, these layers contained distinctive architecture of archaic type (recalling in form the square single room dwellings of Neolithic Djeitun architecture).

Upper Fill

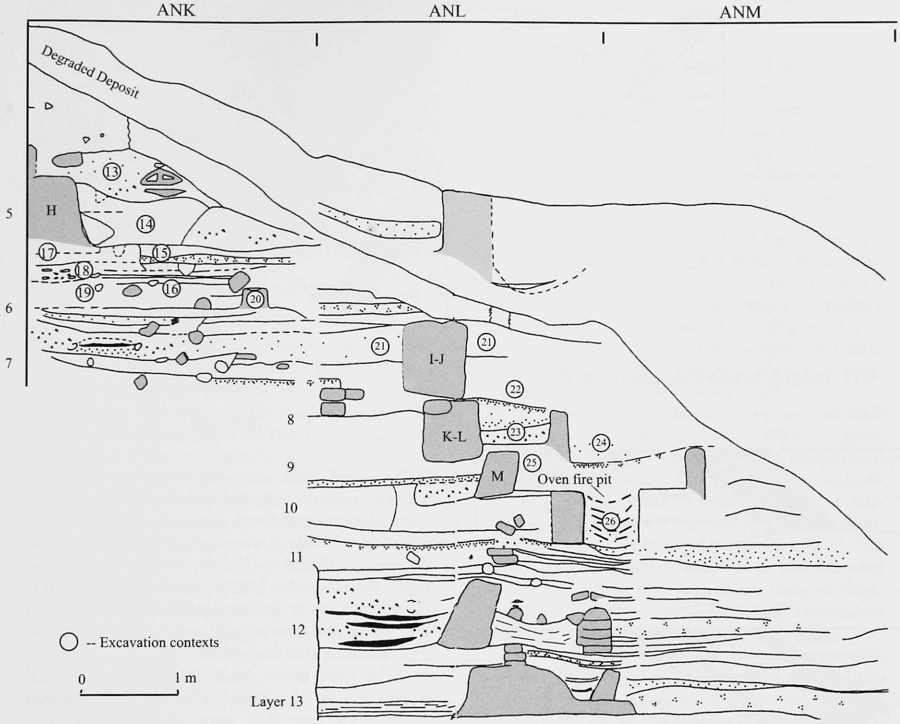
As is typical at Anau North, the upper fill is a mix of midden and brick fall. The mixed fill of layers 5 and 6 architecture lies very near to the floor surfaces. Layer 5 upper fill (ANK 3 and ANJ 3) shows evidence of being eroded without leveling. The upper fill of layer 7 shows evidence of abandonment but no leveling, while the upper fill of layer 8 indicates that walls were pushed down and debris flattened before the construction of layer 7. A similar deliberate, rapid infilling is seen in the upper fill of the building excavated in layer 9.

Storage Areas

In layer 6, area 2 had a plaster-lined bin, similar to the pebble-lined bins of layers 2–4. This bin probably had a thin wall around it, and ceramic sherds were set closely together along the interior wall in apparent water-proofing. The fill deposits of the bin (ANK 9, 14) are clearly water-lain, with fine silty deposit at the base. Other types of bins or pits were not found, nor are they apparent in these levels in Kurbansakhatov's excavations. More likely, large-scale storage was made in circular structures during this period (see below).

Hearths

In layers 8 and 9, hearths were built into the walls. Each hearth consisted of a two-part oven with a shallow oven floor and a deeper firepit, the oven typically covered with a thin brick dome. Such hearths would



4.10 Layers 5–9, section, Anau IB2 period.

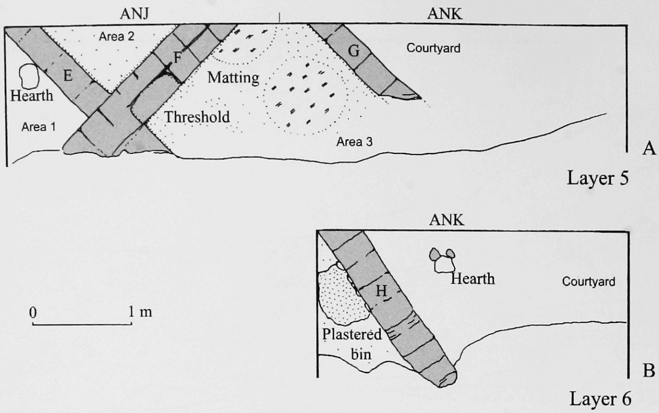
most likely have been used for domestic cooking, although ceramic production is also possible (Sarianidi 1963). In layer 8, the oven was 62 cm in length along the wall. The oven floor itself was filled with ashes and the deep pit with charcoal. The materials were compacted in layers, as if the debris came from multiple firing events.

Floor Deposits

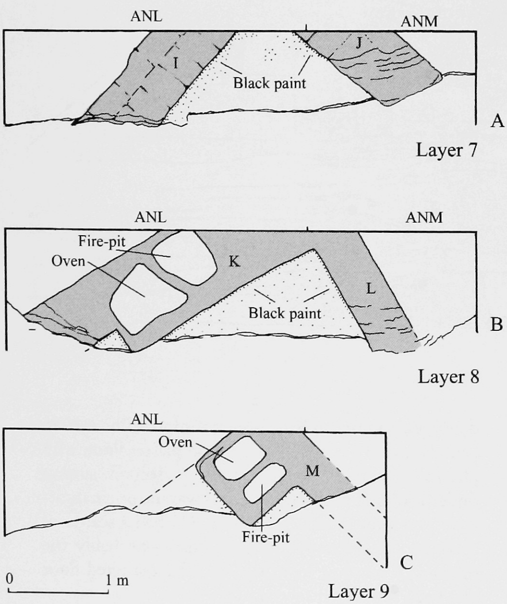
The floor surfaces of other rooms in these layers (5–9) were similar to the floors in the upper layers (2–4): in layer 5, area 1 was a tamped earth surface—part of the sector J courtyard. The surface had little material lying directly on it, although a reddened area, 25 cm in diameter, appears to have been an informal hearth. In layer 5, area 2 has a well-made mud plaster floor, with plaster continuing up the wall. A second surface underneath the mud-plaster floors was the original surface. The floor of area 3 (ANK 8, 11) had a scatter of ceramics lying flat within gray lenses—probably the remains of matting, as in layer 3. This plastered floor had been resurfaced several times.

Walls

In layers 5–9, the average brick is about 28 cm x 19 cm x 9 cm (no = 18), significantly smaller than those in the layers above. In this part of the site, curved walls are as frequent as straight ones, and single-brick wall



4.11 Layers 5–6, excavation plan, Anau IB2 period.



4.12 Layers 7–9, excavation plan, Anau IB2 period.

construction is typical. In layer 5, a low threshold (17 cm high) was found between areas 2 and 3. In layer 6 parts of two walls were found: one, a straight wall that appears to be the wall of a room and the other, a curved wall, part of a corridor (Figure 4.13).

Shrines

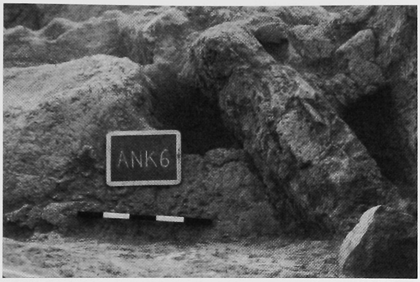
In layers 7–9, three successive rooms had distinctive wall and construction, and inside with thickly plastered, black painted floors, the plaster running up the wall surface. Buildings with similar construction—Yassi depe, rooms 15 and 16 (Khlopin 1963a:plate 9:1), and Ilgynli depe (Berezkin 1989)—have been interpreted as ritual structures or shrines (*svyatilishche*), based upon their distinctive form of architecture, their wall painting, benches and tables, and the finds within them.

The three rooms have an archaic architectural design vis-à-vis the domestic architecture described above, while they share some construction features with the surrounding architecture (single-brick wall construction with bricks laid lengthwise, no mortar, and alternating brick courses), other features of their construction are different, such as the use of larger bricks (36–40 cm x 26–30 cm x 10–12 cm), painted floors and walls, and interior benches or piers.

The fill of these rooms is also distinctive: In layer 7 the floor deposit (ANL 2) consisted of fine, windblown dust and yellow sand. The fill above the painted floor of layer 9, on the other hand, consisting of chunky purplish-gray ash and large fragments of charcoal and burned mud brick debris, suggests that this room had burned at the time of infilling.

Ceramics

We were able to sample ceramic assemblages from upper and lower room deposits, as well as courtyard



4.13 Wall, layer 6, adjacent to a courtyard (ANK 6).

deposits. No clear pattern of difference in the assemblages were found between upper and lower room loci or between room and courtyard loci. It is important to note that the overwhelming majority of the ceramics came from upper fill and room fill dating to the period of the architecture's degradation. Often the deposits, even those close to the floor, could be followed over wall stubs from secondary contexts. The ceramic assemblage from these layers shows a wide range of chaff-tempered types and demonstrates the variety of forms from these levels. These ceramics include both painted and unpainted vessels (Figures 4.14–4.15). Many were built by sequential slab construction—a technique shared widely across the Iranian plateau (Vandiver 1986). Their manufacture is typical of Namazga I ceramics along the Kopet Dag foothill (Saiko 1982).

Layers 10–14

From layer 10 and down, in sectors L, M, and N, Kurbansakhatov's team came upon circular architecture and courtyard deposits tantalizingly different from those in the layers above. The 1997 excavations indicate strong differences in the deposit to the east of the circular structures, and together with the architectural layout, suggests that this area was at the edge of the settlement during the Anau IB1 period (layers 10–14 and possibly layers 15–18 as well).

While for reasons of safety we were unable to carry out excavations in layers 10–13, we were able to clean the baulk of the old excavations and collect samples. In sector M, we continued excavation of layer 14 architecture, which provided us with a detailed example of the depositional contexts of the layers.

Layer 14 Circular Structures

A 3 x 6 m excavation area in sector M was cleared of debris down to the level to which it was excavated in 1982: the surface was re-cleared to a layer 14 architectural complex consisting of a circular building with a surrounding courtyard (Figure 4.16). The upper fill contained a coarse unsorted deposit and the remains of walls that appeared to have been purposely leveled.

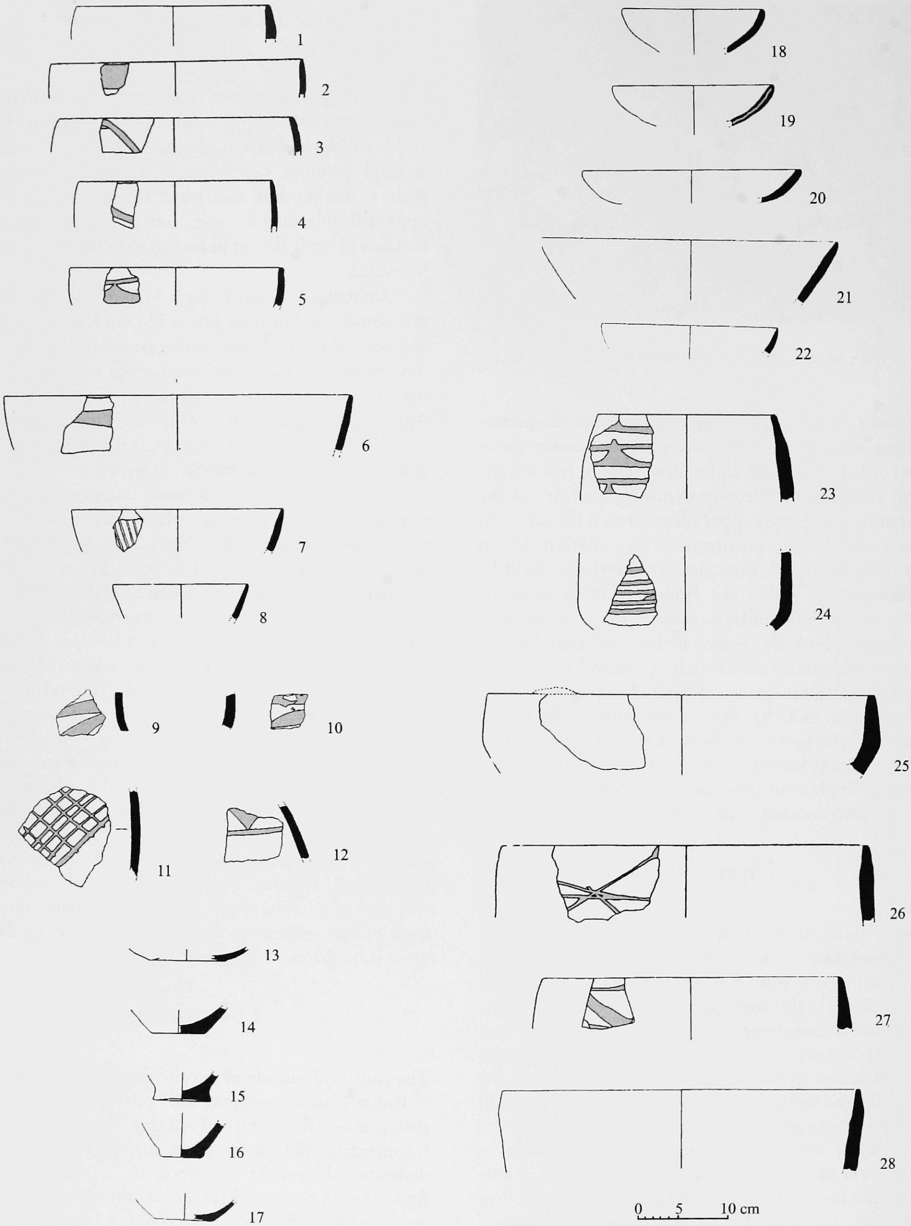
A circular structure in layer 14, 3.3 m in diameter, was constructed of mud bricks (28 cm x 20 cm x 10 cm) set end to end in alternating courses, six of which were preserved. Each brick course was inset, giving a beehive form to the structure (Figure 4.17). Approximately one quarter of the structure was excavated in 1997. The walls were built directly on a leveled surface without a foundation trench.

The upper fill included coarse fragments of brick sloping down to a series of surfaces within the structure. Some of these surfaces appear to be occupational deposits, and others have debris from storage and animal tending. The uppermost surface (ANM 3) is clearly occupational: part of it appeared to have been painted, and a small brick-enclosed hearth lay upon it. Two further surfaces (ANM 5 and 7) were also reddened from burning, with charcoal and ash lying on them. These provided the material for several radiocarbon samples.

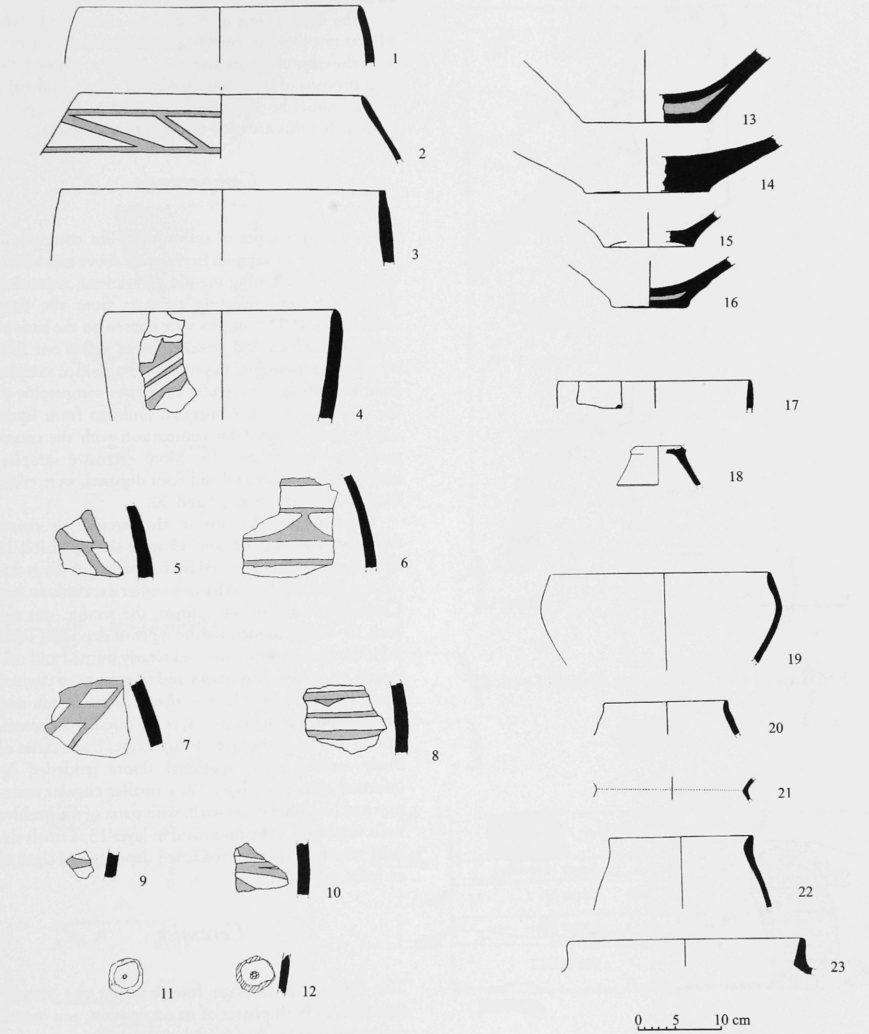
The lower fill (ANM 9) in the circular structure consisted of a thick gray deposit of degraded plant remains, similar in composition to the presumed floor mats in layers 5 and 3. Micro-botanical samples from ANM 9, however, indicate that the plant material was mechanically crushed, which suggests that the deposit was part of an animal pen. The lowest surface, thick mud plaster with white flecks, had sherds lying flat upon it, and areas that appeared to be burned.

Courtyard

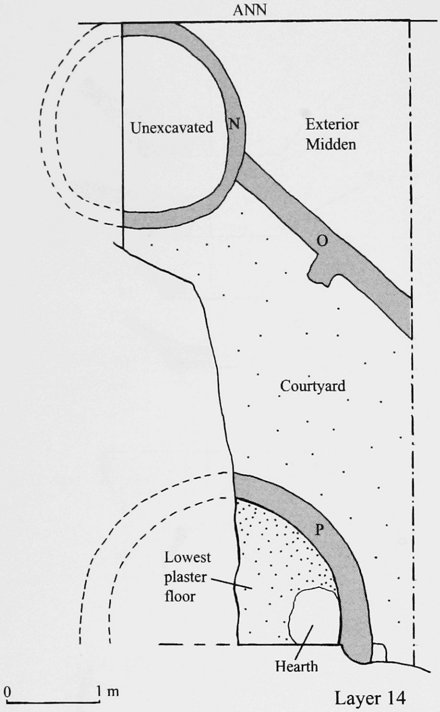
The courtyard outside of the circular structure (ANM 8) had two surfaces—a gray, ashy surface and, beneath that, one of yellow sand on hard clay. Thick storage jar fragments lay flat on the upper surface, recalling the depositional context described in terrace 8 (see Appendix A). Beneath these surfaces the fill against the outside of the circular structure contained various lenses with dense ceramics and large fragments of bone. An ash- and charcoal-rich lens (ANM 10) included a fabric-impressed sherd (see Appendix D) amid abundant



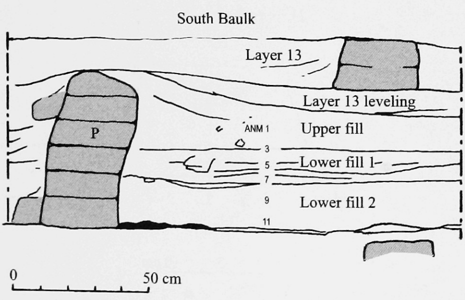
4.14 Layers 5–9 ceramics. A ware (fine chaff ware): 1, ANL 3; 2, ANK 16; 3, ANL 4; 4, ANK 16; 5, ANK 17; 6, ANK 16; 7, ANK 16; 8, ANK 16; 9, ANK 4; 10, ANK 2; 11, ANJ 4; 12, ANJ 5; 13, ANK 16; 14, ANL 10; 15, ANL 7; 16, ANL 2; 17, ANL 2; 18, ANK 2; 19, ANK 2; 20, ANK2; 21, ANJ 4; 22, ANJ 3. B ware (coarse chaff ware): 23, ANL 3; 24, ANK 5; 25, ANL 5; 26, ANL 4; 27, ANL 2; 28, ANL 7.



4.15 Layers 5–9 ceramics (cont.). B ware (coarse chaff ware): 1, ANJ 4; 2, ANK 7; 3, ANJ 4; 4, ANJ 4; 5, ANL 3; 6, ANK 5; 7, ANJ 6; 8, ANJ 4; 9, ANK 12; 10, ANJ 5; 11, ANK 2; 12, ANK 2; 13, ANL 7; 14, ANK 6; 15, ANK 3; 16, ANK 15. D.1 ware (burnished ware): 17, ANJ 4; 18, ANJ 4. D.2 ware (cooking pots): 19, ANK 7; 20, ANL 3; 21, ANK 15; 22, ANK 7; 23, ANJ 4.



4.16 Layer 14, excavation plan, Anau IB1 period.



4.17 Layer 14, circular structure section, Anau IB1 period.

charred wood remains which were sampled for radiocarbon analysis.

The deposits east of the circular structures (ANM 12) do not overlay any constructed surface, and may be at the edge of the settlement. The fill contained distinct deposits of individual baskets of debris. Still articulated animal bones were found within this deposit, suggest that this area was not trampled or swept.

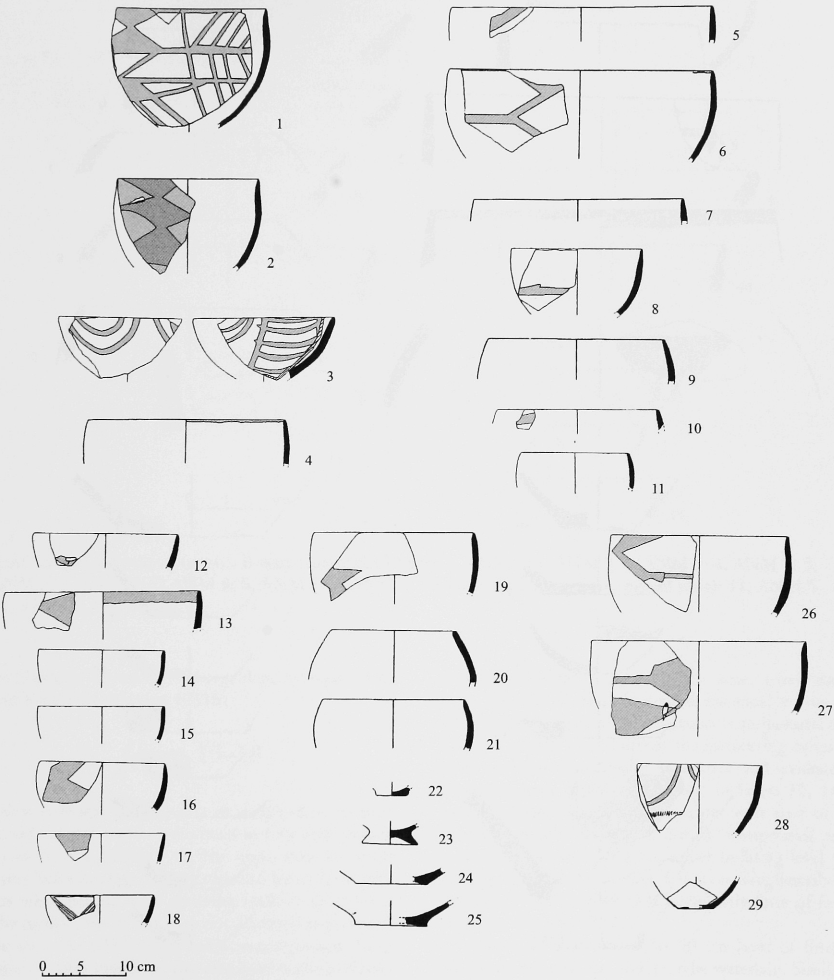
Comparanda

We collected a series of soil samples for comparison with the layer 14 samples from layers above and below. This involved cleaning the old excavations, redrawing the section, and selecting contexts from the deep sounding of 1982. Samples were chosen on the basis of likelihood of botanical preservation as well as our ability to access the strata. Layers 10–13 provided samples from the interior of circular structures comparable to the one in layer 14. Courtyard middens from layers 15–18 were sampled for comparison with the courtyard deposits of layer 14. More extensive samples, including both room fill and floor deposits, were taken from the lowest layers, 19 and 20.

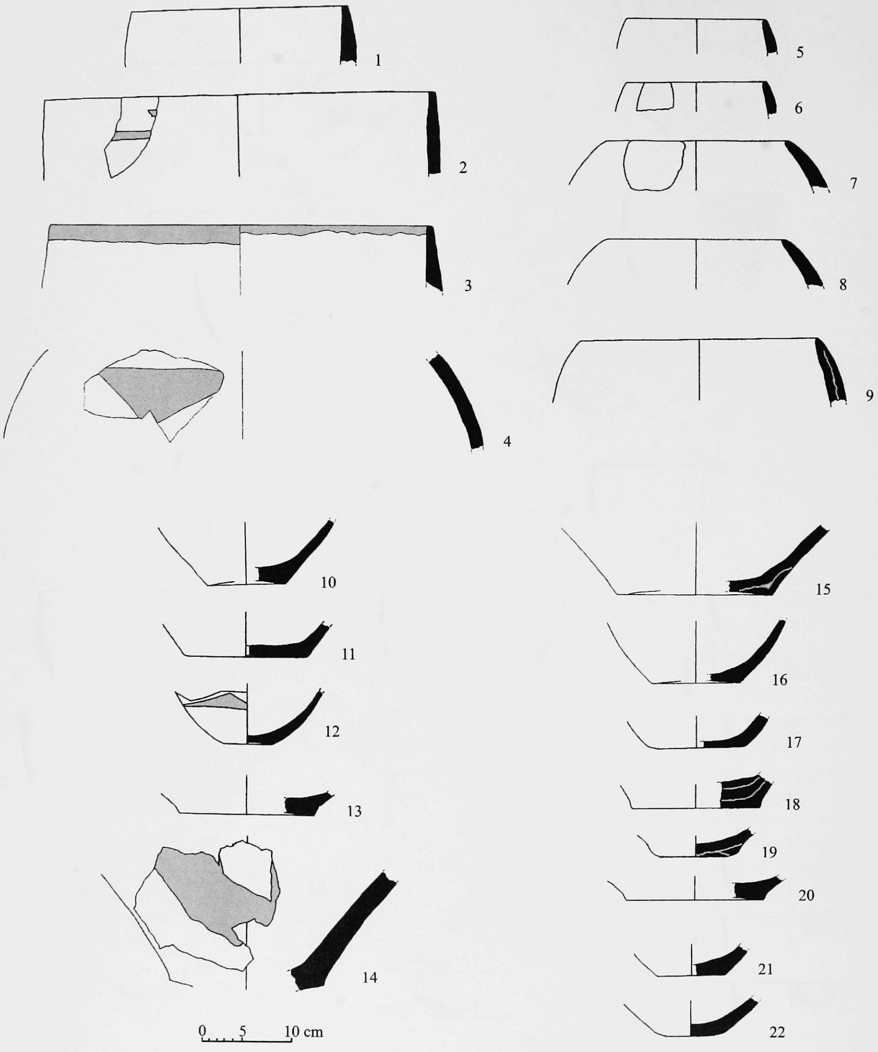
The interior deposits of the circular structures from layers 10, 11, 12, and 13 were already visible in section and could be placed in the context of the architecture from Kurbansakhatov's earlier excavations (see Chapter 8); to gain our sample, the section was cut back 10–15 cm to identify the types of deposits (Table 4.2): the layer 10 structure had clearly burned and collapsed, with reddened bricks and fragments of charred wood in the upper fill, and dense lenses of ash and charcoal on the floor; the layer 11 circular structure, similar to that of the layer 14 structure, had a series of finely laminated occupational floors reddened by informal hearths; in layer 12, a smaller circular structure had collapsed in on itself, with parts of the beehive walls tumbled on the floor; and in layer 13, a small circular structure also had reddened deposits and signs of an informal hearth.

Ceramics

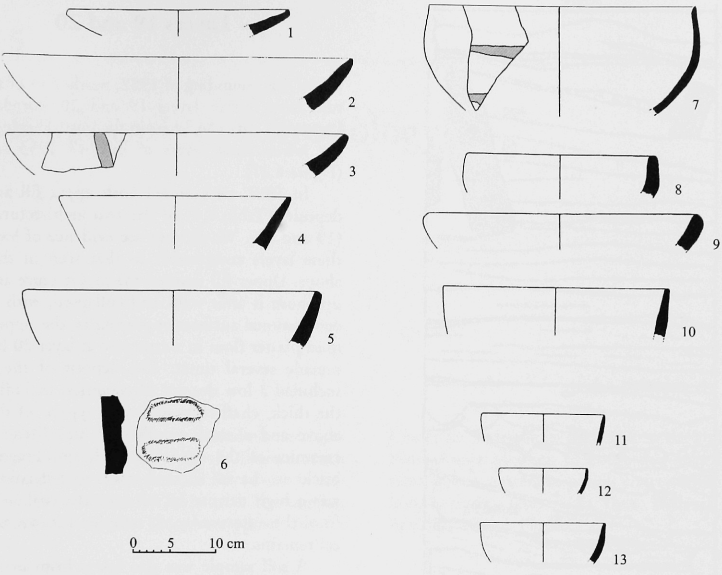
The ceramic assemblage found inside the circular structure, in both phases of its occupation, was overall more dense than that in the surrounding courtyard, but there was no clear typological distinction between the ceramics inside and those outside. Medium-sized globular bowls are the predominant form, though larger and smaller vessels appear also (Figures 4.18–4.20). The ceramic motifs can be best paralleled at the earli-



4.18 Layer 14, ceramics. A ware (fine chaff ware): 1, ANM 9; 2, ANM 11; 3, ANM 12; 4, ANM 11; 5, ANM 7; 6, ANM 9; 7, ANM 7; 8, ANM 9; 9, ANM 9; 10, ANM 8; 11, ANM 7; 12, ANM 8; 13, ANM 7; 14, ANM 1; 15, ANM 1; 16, ANM 3; 17, ANM 5; 18, ANM 9; 19, ANM 1; 20, ANM 3; 21, ANM 7; 22, ANM 1; 23, ANM 1; 24, ANM 9; 25, ANM 8. B.5 ware (sandy red ware) 26, ANM 9; 27, ANM 7; 28, ANM 4; 29, ANM 11.



4.19 Layer 14, ceramics (cont.). B ware (coarse chaff ware): 1, ANM 9; 2, ANM 7; 3, ANM 2; 4, ANM 4; 5, ANM 7; 6, ANM 9; 7, ANM 8; 8, ANM 11; 9, ANM 1; 10, ANM 11; 11, AN 11; 12, ANM 1; 13, ANM 11; 14, ANM 7; 15, ANM 5; 16, ANM 7; 17, ANM 3; 18, ANM 7; 19, ANM 7; 20, ANM 11; 21, ANM 3; 22, ANM3.



4.20 Layer 14, ceramics (cont.). B ware (coarse chaff ware): 1, ANM 5; 2, ANM 9; 3, ANM 9; 4, ANM 9; 5, ANM 3; 6, ANM 9; 7, ANM 9; 8, ANM 8; 9, ANM 8; 10, ANM 9. D.1 ware (burnished ware): 11, ANM 5; 12, ANM 5; 13, ANM 7.

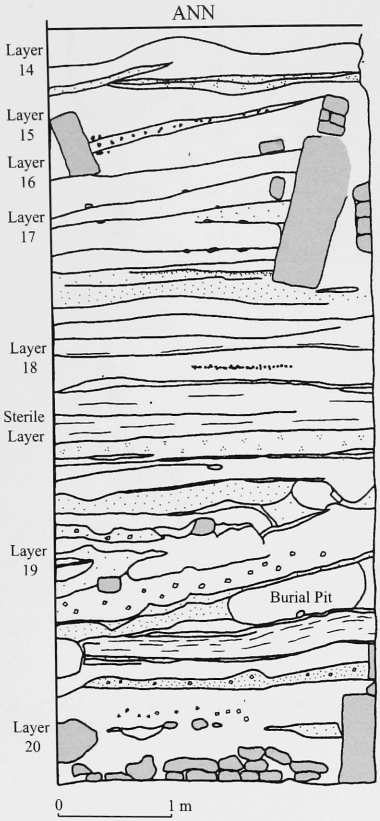
est Namazga I levels at Namazga depe (Masson 1956) and Kara depe (Masson 1961b)

Layers 15–18

Below layer 14, we were able to sample deposits from outside of the circular structures in four architectural layers (15–18) (Table 4.3). The upper deposits of the layers had abundant ash and charcoal lenses from periods when people were throwing trash in these areas. The surfaces (or floors) were not plastered or prepared, but we could see that they had been compressed. These deposits were similar to the courtyard surface of layer 14 and to those in the upper layers.

These data, along with the hearths, mats, and domestic debris on the floors, suggest that some of the circular structures at Anau North were, when first built, habitation areas. In several instances we were able to identify reuse of the structures as agricultural or livestock storage areas. Further, the connecting curtain walls between the circular structures and evidence from courtyard deposits (especially in layers 12, 14, and 16) suggest that these structures were part of a building complex enclosure. Similar compounds are seen at Mullali depe and the upper building level at Yalangach, where the circular structures were described as "towers" and considered to be an early form of fortification (Masson 1982).

Below layer 18 was a 30–50 cm layer of finely laminated deposits that appear to be waterlain. Similar to natural alluvial deposits in the region, this layer was devoid of any cultural or even microscopic organic material.



4.21 Layers 15–20, section, Anau IB1 and IA periods.

Layers 19 and 20

In the deep sounding of 1982, nearly 3 m of architecture were found: layers 19 and 20, correlating to Pumpelly's Anau IA layers in the north digging and to the lowest three layers of Ershov's 1953 sounding (Figure 4.21).

In 1997 we sampled both upper fill and floor deposits (Table 4.4) of the two architectural layers (19 and 20). We did not see evidence of leveling in these layers comparable to that seen in the layers above. Upper fill covered the architecture and piled up above it after walls had collapsed, with possible occupational surfaces appearing in the upper fill. A mud plaster floor in a structure at layer 20 had been remade several times. The deposit of these layers included a low density of ceramics, including both the thick, chaff-tempered ware typical of the layers above and a small number of high-fired, "clinky" ceramics of the Anau IA tradition. Fragments of bricks in the fill showed traces of red paint. There was a high density of ash and charcoal in samples from these lowest layers, sampled for macro-botanical remains.

A soil sample was also taken from beneath the layer 20 wall. No sherds or artifacts were found in the 50 cm of deposit beneath the layer 20 architecture. A 21 l sample from the "sterile" layer at the bottom of the trench, however, included charcoal, suggesting that this is not, in fact, a pre-occupational deposit.

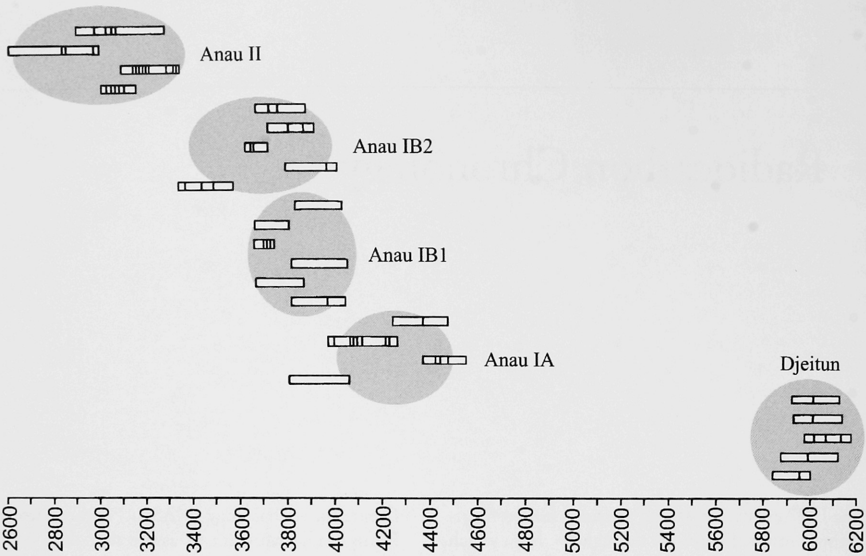
5

Radiocarbon Chronology

The 1997 excavation season provided nineteen specific contexts, in layers 3 through 20, from which radiocarbon samples were taken, all from floors or features associated with floors (Table 5.1). The samples were preprocessed at the Museum Applied Science Center for Archaeology (MASCA) at the University of Pennsylvania Museum to assure that they had sufficient carbon content to permit conventional radiocarbon analysis. They were then analyzed at Beta Analytic, Miami, Florida.

Table 5.1 Radiocarbon Dates from Anau North

Period	Sample #	Locus	Arch level	Context	Date	Calibrated date 2 σ
Anau II	Beta-110306	ANI 11	3rd	Pit below floor	4220+/-80	2898 – 2637
Anau II	Beta-110307	ANI 12	3rd	Room fill	4540+/-80	3357 – 3042
Anau II	Beta-110308	ANI 13	3rd	Floor	4420+/-50	3096 – 2916
Anau II	Beta-110305	ANI 8	4th	Upper fill	4410+/-70	3305 – 2918
Anau IB2	Beta-110311	ANL 5	8th	Room fill	4550+/-70	3618 – 3350
Anau IB2	Beta-110312	ANL 11	9th	Hearth	4910+/-50	4066 – 3807
Anau IB2	Beta-110313	ANL 33	10th	Room fill	4910+/-60	3755 – 3640
Anau IB2	Beta-110314	ANL 34	10th	Room fill	5070+/-70	3941 – 3711
Anau IB2	Beta-110310	ANL 001	10th	Room fill	5010+/-60	3896 – 3672
Anau IB1	Beta-110315	ANM 3	14th	Inside bldg.	5010+/-70	4072 – 3804
Anau IB1	Beta-110316	ANM 5	14th	Inside bldg.	4950+/-70	3788 – 3647
Anau IB1	Beta-110317	ANM 9	14th	Inside bldg.	4930+/-70	4072 – 3804
Anau IB1	Beta-110318	ANM 10	14th	Outside bldg.	4990+/-60	3886 – 3654
Anau IB1	Beta-110325	ANN 26	16th	Beneath arch	4780+/-80	3937 – 3670
Anau IB1	Beta-110323	ANN 20	18th	Charcoal lens	5130+/-70	4068 – 3801
Anau 1A	Beta-110322	ANN 14	19th	Charcoal lens	5340+/-90	4447 – 4250
Anau 1A	Beta-110321	ANN 5	20th	Charcoal lens	5220+/-70	4245 – 3980
Anau 1A	Beta-110320	ANN 4	20th	Charcoal lens	5380+/-70	4531 – 4350
Anau 1A	Beta-110319	ANN 1	20th	Charcoal lens	5160+/-70	4074 – 3808



5.1 Early Village Period radiocarbon dates, Akhal region, Anau North (this volume) and Djeitun (Harris et al. 1993).

The dates for four samples from layers 3–4 cluster around 3100 BC. Those for the five samples from layers 8–10 cluster around 3500 BC; for the six from layers 14–18, around 3700 BC. The four samples from layers 19–20 were dated at around 4300 BC. These dates support the stratigraphic evidence for two occupational hiatuses: between layers 4 and 5 and between layers 18 and 19. There is a nearly thousand-year gap between the radiocarbon dates from the Neolithic site of Djeitun (Harris et al. 1996) (Figure 5.1) and the earliest cluster of dates at Anau North.

6

Ceramic Complexes of Anau North and Relative Chronology

This chapter describes the ceramics from Anau North, integrating the 1997 excavation results with those from previous excavations. Each excavation, from 1904 onwards, yielded considerably different information about the ceramics due to differences in methods of recovery and description. The approach taken here is to present a new organization of the ceramics, first in terms of ware and then in individual types in terms of variations in size, form, and decoration through time.

Such a ware-based analysis allows us to integrate the different descriptive systems employed by Schmidt (1908) and Kurbansakhatov (1987). It also allows us to cluster the ceramics into meaningful chronological groups within the system of periodization, already in use in the older western literature (Frankfort 1924, Ghirshman 1938, McCown 1942) as well as within the long-established Namazga sequence (Kircho 1999, and Masson 1956, 1982). This new framework provides an analytical basis for future evaluations of the connections with the Iranian plateau in terms of the Iranian software horizon (Lamberg-Karlovsky 1986) and the Proto-Elamite horizon (Dyson 1987).

The ware analysis provided us with some surprises. The "Anau IA culture" consists of *only one specific type*, a fine sandy ware with only one basic form, a medium-sized globular bowl. Bowls in this ware are found within the context of a tradition of local ceramics that both precedes and outlasts the occurrence of this special type. Another surprise: that the difference between the basic ceramic groups identified by Schmidt, "Anau I" and "Anau II," is based on a major change in method of manufacture, from chaff tempering to grog tempering, and not stylistic change.

The Nature of the Ceramic Sample

The ceramic sample upon which the typology is based consists of four sets of excavated materials:

1. Ceramics from Kurbansakhatov's excavations from 1978 to 1982. The large area excavated provided a substantial ceramic corpus (Kurbansakhatov 1983, 1987). Kurbansakhatov's layer-by-layer presentation of the diagnostic painted ceramics placed this material within the context of the Namazga sequence and documented parallels from the wide-scale horizontal excavations of other sites in Central Asia. However, only selected diagnostic ceramics were collected from individual architectural levels.

2. The ceramics from the 1997 excavations. The study of smaller samples from selected strata complements Kurbansakhatov's data by providing information on the diversity of ware types, forms, and production techniques. The samples from individual loci provide rank data concerning the overall size and character of the ceramic corpus. All body fragments and diagnostic rim and base sherds were described by ware and, if possible, by type. The differences in ware are described, based on thin-section petrography conducted at the University of Pennsylvania.

3. Additional information on the Anau IA ceramics are included from Ershov's 1953 excavations. The ceramics were not originally published with the stratig-

Pumpelly Periods	Architectural Layers	Ceramic Periods
	0	Anau IIB
	1	
Anau II	2	
	3	Anau IIA
	4	
	5	
	6	
	7	Anau IB2
	8	
	9	
	10	
Anau Ib	11	
	12	
	13	
	14	Anau IB1
	15	
	16	
	17	
	18	
	19	
Anau Ia	20	Anau IA
		Pre-Anau IA

6.1 Ceramic periods, Anau North.

raphy (Ershov 1956), but his "Anau IA" ceramic assemblage was later published by Berdiev (1974) and is included here.

4. Ceramics from the 1904 excavations as described by Schmidt (1908:124–137). The 1904 materials add significantly to our knowledge concerning the uppermost layers, which were heavily eroded in the subsequent hundred years. The detailed descriptions of the ceramic assemblages of the lowest layers are also an important addition to the selective samples of the later excavations. The Pumpelly expedition did not excavate the entire stratigraphic column at Anau North. More importantly, it did not differentiate the ceramic corpus by architectural levels.

Ceramic Periodization

In this study, we number these following the original system established by Schmidt (Anau I and Anau II), with subdivisions based upon changes in ceramic ware and painted designs.

Schmidt's 1908 description of the ceramics were based primarily on manufacture: chaff-tempered painted ceramics (the y group) were classified into two types, A (fine) and B (coarse); high-fired ceramics (the m group) were classified as type C; and the painted pottery from the upper levels consisted of v and z groups.

Kurbansakhatov's much larger excavation sample and more complete stratigraphic sequence allowed him to subdivide Schmidt's Anau IB period into IB1 and IB2 on the basis of surface decoration, while otherwise confirming Schmidt's sequence (Kurbansakhatov 1983). The pottery corpus at Anau North thus divides into five chronologically distinct periods, plus a sixth, the pre-Anau IA, from which we have no published ceramics (Figure 6.1).

Ceramic Abundance Measures

In the architectural layers from Kurbansakhatov's long trench, density measures (diagnostic ceramics/volume) provide some insight into the relationship of one layer to another. Density measurements have been widely considered an index of occupational duration (Schiffer 1975, Schiffer 1987:53, Varien and Potter 1997). At Anau North, however, the largest variation in average densities appears between layers which coincide with proposed periods of the disuse of particular parts of the settlement and results from processes of erosion and deflation. This pattern allows us to propose that, at Anau North, densities above .25 would indicate fairly long periods of non-occupation. This appears to apply in particular to the layers separating Anau IA and Anau IB1, and Anau IB2 and Anau IIa (Table 6.1). These higher densities are coincident with both stratigraphic breaks and abrupt changes in the ceramic assemblages. This suggests that the abrupt ceramic changes are due to occupational discontinuity rather than sweeping technological innovations or abrupt internal cultural developments.

Ware Typology

During the 1997 excavations, two typologies were employed in the field: one for surface treatment and one for ware types. Later, the ware types were studied petrographically, and we were able to see that field "ware" categories, including divisions based on grain size and color, often represented simple variation *within* a ware type and sometimes within a single sherd.

Table 6.1 Ceramic Assemblages and Density Estimates, Anau North

Layer	Trench size (m)	Area exposed (m^2)	Estimated volume (m^3)	Number of diagnostics (ct)	Density (ct/m^3)
Anau IIB					
Layer 1	3 x 6	18	13.5	5	.37
Anau IIA					
Layer 2	3 x 6	18	18	8	.44
Layer 3	3 x 12	36	54	11	.20
Layer 4	15 x 3	45	63	12	.19
Anau IB2					
Layer 5	18 x 3	54	40.5	16	.40
Layer 6	42 x 3	126	126	16	.13
Layer 7-9	12 x 6	144	302	33	.11
Anau IB1					
Layers 10-12	9 x 6	216	454	45	.10
Layers 13-14	9 x 6	108	151	19	.13
Layer 15-18	3 x 6	72	230	51	.22
Anau IA					
Layers 19-20	3 x 3	27	81	28	.34

Based on a combination of ceramic composition and surface treatment, the typology was revised, and seven primary ceramic wares (A–G) have been identified from the excavations at the north mound (Table 6.2). A total of 25 variants are described in Figure 6.2. "Types" (listed after the major "ware" category) are based upon further variation in surface (slip and paint treatment) or temper.

Changes in types of temper are the clearest distinctions through time, with chaff (A and B) and sand (C and D) being the most characteristic fabric of the ware types of the Anau I periods (layers 20–5). Grog and fine chaff tempers (E and F) are distinctive of the Anau II periods (layers 4–0). In addition, ceramics with feldspar temper (D and G) are found consistently through the sequence and are typical of cooking vessels. The wide variety in the wares of feldspar-tempered pots suggests that cooking vessels may be a category of ceramic that was made in a variety of places by a diversity of potters.

Size categories used in this study are based upon the 1997 sample: small vessels have a mean rim diameter of 12 cm and range from 6–16 cm, medium vessels have a mean rim diameter of 24 cm and range from 17–33 cm, and large vessels have rim diameters greater in size than 34 cm. Size categories remain constant throughout the sequence, suggesting that we have not sampled specialized assemblages through time (Mills 1999). We find that there are consistently twice as many small and medium vessels as large vessels, with medium, closed vessels always predominating, and large, open vessels always the rarest.

Ware-based typologies have commonly been employed in archaeological reports from Iran and the greater Near East (see for example (Beale 1986, Voigt 1983)). Most ceramic typologies of Central Asian ceramics are, by contrast, focused primarily, if not exclusively upon variation in painted motifs (the tradition is long: see Kuftin 1954, Masson 1956, Khlopin 1963, Masson 1982). At Anau North, we

Table 6.2 Chronological Distribution of Wares at Anau North. Percentage of ware categories based upon body sherd counts from 1997 (Anau II-Anau IB1) and the 1953 Ershov material from Anau IA in the Turkmenistan National Museum (Inventory 241).

Ware categories	Anau IA	Anau IB1	Anau IB2	Anau IIa
	%	%	%	%
A. Chaff tempered fine ware	15	16	17	10
B. Chaff tempered coarse ware	50	55	52	30
C. High fired "clinky" ware	15	-	-	-
D. Mineral tempered wares	1	2	5	-
D.2 Mineral cooking	20	22	26	-
E. Grog tempered fine ware	-	-	-	33
F. Late fine painted ware	-	-	-	7
G. Late coarse mineral ware	-	-	-	20
Diagnostic Sherd Count:	n= 67	n= 383	n= 101	n= 461

employ both systems of categorization in defining the ceramics. Furthermore, in an attempt to maintain continuity in description, we use Schmidt's original type designations as much as possible. Major categories in the typology (A, B, C, etc.) are based upon the manufacture and composition of the ware, and are comparable with Schmidt's terminology (Table 6.3). Our identification of the types within these major categories is primarily based on surface treatment, type of slip, and incidence of burnishing or painting.

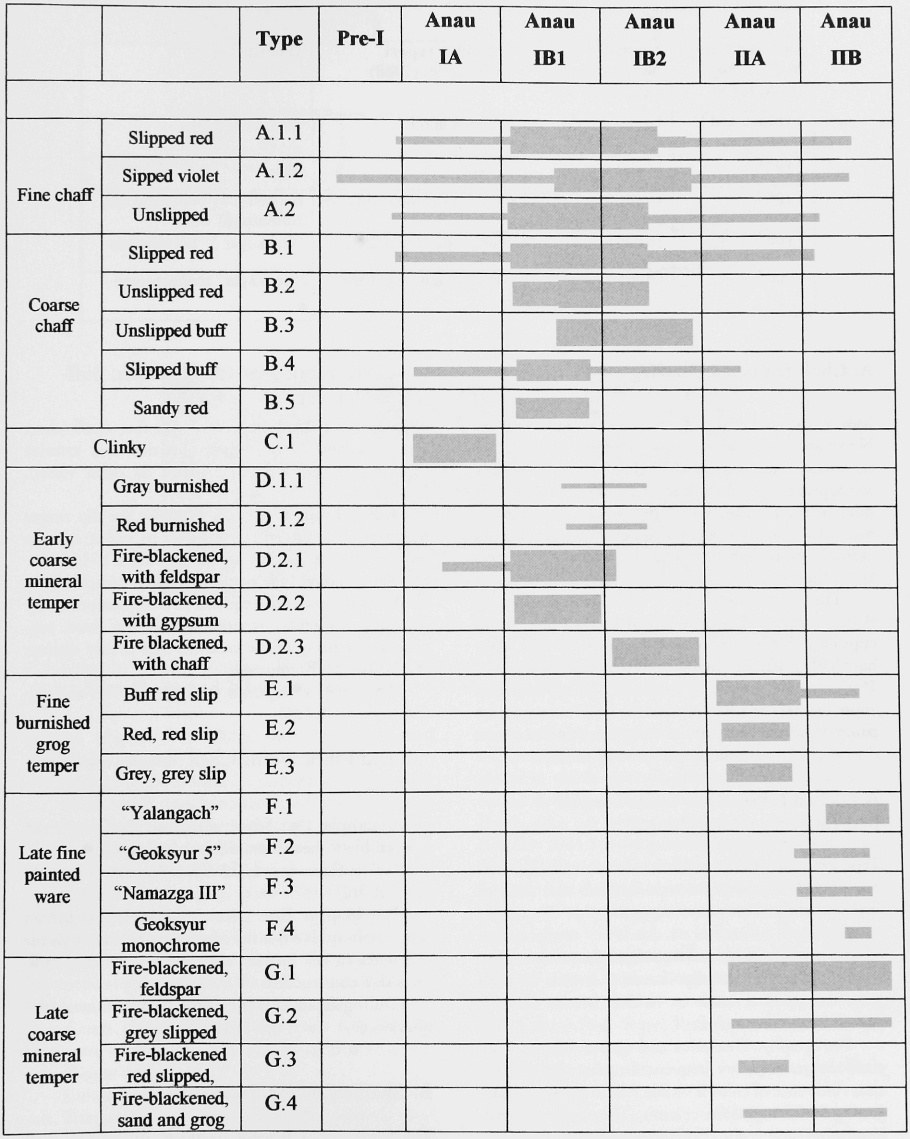
Petrographic sections were taken from each ware type to make explicit differences observed in the field. The microscopic description of the wares allows us to re-group the types into coherent units. The petrographic observations can determine type and size of inclusions, homogeneity of wares, nature of surface treatment, method of manufacture, and heat-related alteration of the minerals. However, we did not obtain statistically significant samples which would allow us to quantify our results (Stoltman 1999). Due to the extensively modified landscape of the modern delta, and the fact that the ancient surface is buried under a half-dozen meters of recent alluvium, we were not able to collect the clay samples we would have needed to confirm our subjective impressions of local production vs. non-local production.

Ceramic Types

Ceramics of the Early Tradition (Layers 20–5 - Anau I)

The predominant fabric of Anau I ceramics found throughout Central Asia and characteristic of period 1 at Namazga depe is a hand-made, chaff-tempered, buff or red, low-fired ware, typically with a thick slip and painted motifs. At Anau North, thick chaff was used as temper in both fine-ware ceramics (types A.1–2) and in thick-walled, coarse fabric (types B.1–5). These pots were hand molded and low fired (750–800 °C) in simple two-chamber kilns (Saiko 1982:168).

While this chaff-tempered ware may share production traditions with the earlier Djeitun ceramics, the range of forms and painted designs are distinctive. The ware closely resembles chaff-tempered ceramics from 5th millennium sites around the Iranian plateau, such as Dalma tepe, Seh Gabi, Mehrgarh, and Tepe Yayha (Vandiver 1986:91) which are all part of a "software horizon" with its roots in the earliest ceramic traditions on the Iranian plateau (Dyson 1965:217).



6.2 Chronological distribution of ceramic types, Anau North.

Table 6.3 Terminological Correlates, 1904–1997

Ceramic types in this study (Chapter 6)	Schmidt's field designation (Appendix A)	Schmidt's report on ceramics (1908)	Description
Types A and B	Group y	Group A and B	chaff tempered
Type C	Group m	Group C	high fired "Anau IA" ware
Type E	Group x	red and gray monochrome	red and gray burnished late Namazga II ware
Type F.2	Group v	younger painted pottery	"Geoksyur 5" polychrome
Type F.4	Group z	younger painted pottery	"Geoksyur" monochrome

A. Chaff-tempered Fine Ware

Most of the medium- and small-sized ceramics at Anau North are made with a well-mixed homogeneous fabric having abundant fine chaff (Figure 6.3). They have the appearance of fired mud brick and often have fine mica or sand inclusions as well. These wares are the most common in the assemblages; in layer 14, for example, more than 50% of the total number of sherds are of this type.

The vessels are globular or spherical in shape. Both slightly open and slightly closed bowls occur. Small cups have thicker profiles and are rarely painted. They have either flat or slightly concave bases. From the 1997 ceramic sample at Anau North, we find that approximately one-half of all of the type A ceramics are painted and that the painted designs are similar on the fine ware (A ware) and coarse ware (B ware).

A.1.1 Red Fabric, Fine Chaff Temper, Red/Red-brown Slip, Painted

Type example: Medium fabric with fine chaff (short but abundant), very smooth interior and exterior surfaces, slipped exterior (slipped inside if an open vessel).

Color: The inside and outside surface ware color is red (2.5 YR 5/8); the slip is reddish-brown (2.5 YR 5/6); the paint is black to reddish brown (2.5 YR 3/1–4/4).

Petrography: Fine mica and quartz temper. Thin chaff temper voids are frequent. In cross section, very clear difference of color is visible within the sherd, suggesting low firing of the ceramic. The slip is very visibly distinct and is also chaff-tempered.

Schmidt refers to this type as A.a (1908:125).

A.1.2 Red Fabric Fine Chaff Temper, Buff-Violet Slip, Painted

Type example: Medium fabric with fine chaff (short but abundant), very smooth interior and exterior slipped surfaces (slipped inside if an open vessel), painted exterior.

Color: Fabric is red (2.5 YR 5/8); the slip ranges from very pale brown (10 YR 8/2) to violet; and the paint is black to reddish brown (2.5 YR 3/1–4/4).

Petrography: Fine mica and quartz temper. Thin chaff temper voids are frequent. In cross-section, a very clear color difference is visible within the sherd, suggesting low firing of the ceramic. Slip is very distinct and is also chaff-tempered.

This type corresponds to Schmidt's A.b and A.g (Schmidt 1908:125).

A.2 Red Fabric, Some Chaff Temper, No Slip, Painted

Type example: Red fabric with fine chaff and mica temper, black, heat-blotched exterior, no slip.

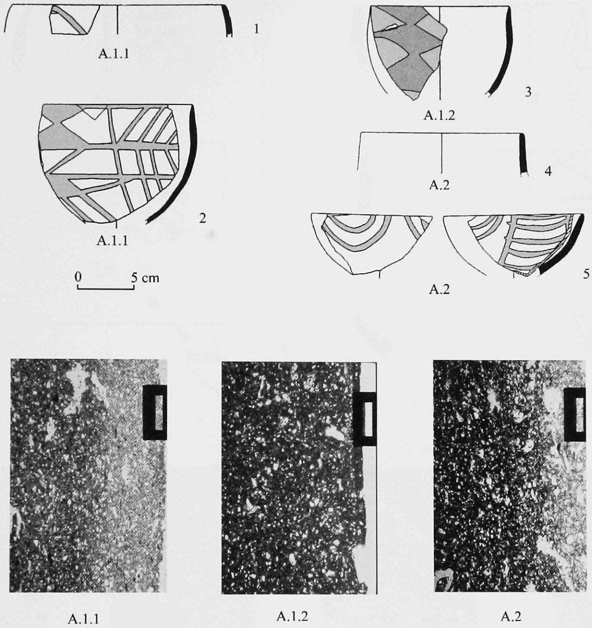
Color: Fabric is red (2.5 YR 5/8); paint is pale red (2.5 YR 4/2).

Petrography: Fine mica and feldspar, a distinct slip, visible voids from fine chaff. In one case, a visible difference in the interior clay and exterior clay indicates slab construction.

During Anau IB1, this is the most common type of A ware.

B. Chaff-tempered Coarse Ware

The five types of B ware are thick, dense, and chaff tempered and frequently carry a slip; often they are



6.3 Ceramic types A.1 and A.2. Based on 1997 excavations: 1 (see Figure 4.14.23 above); 2 (see Figure 4.14.1 above); 3 (see Figure 4.18.2 above); 4 (see Figure 4.18.20 above); 5 (see Figure 4.18.4 above).

painted (Figure 6.4). These five types are found throughout the Anau I sequence (Anau IA, Anau IB1, and Anau IB2), from layer 20 through layer 5.

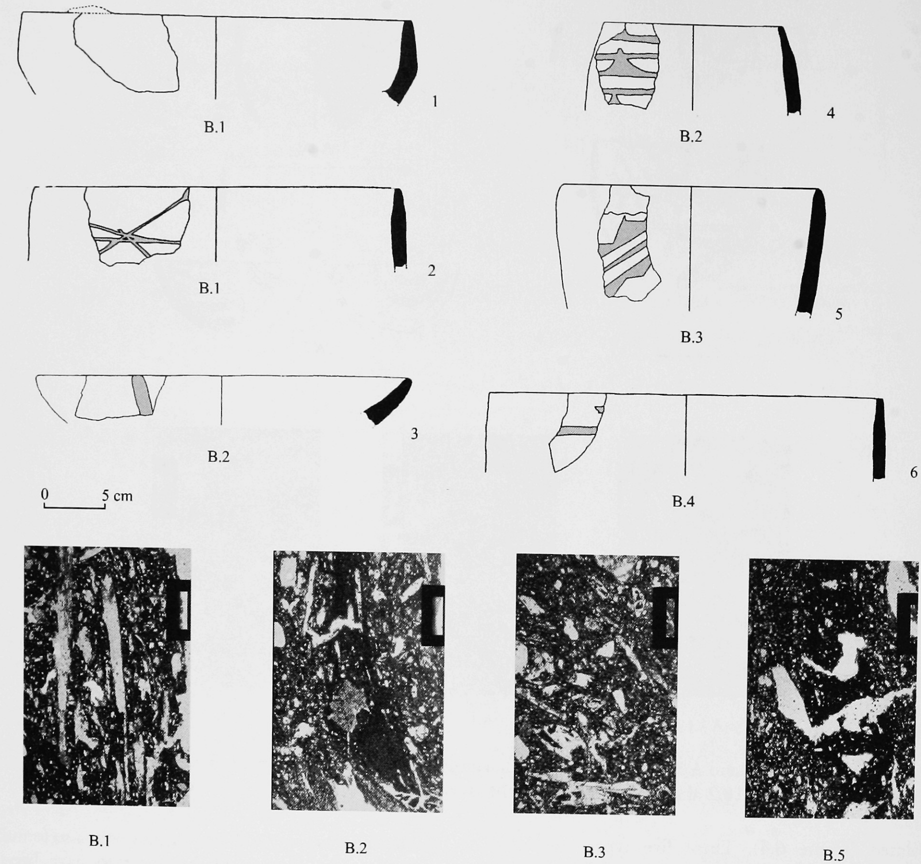
Finer, small and medium sized vessels include both storage bowls and jars as well as tableware (painted jars, bowls and plates). These more public tableware ceramics were made with finer paste. Although open trough-spouts are found at Dashlidzhi depe (Khlopin 1963a:Table 18:21) they are not found at Anau. Handles are rare, although short handles and lugs are found on medium-sized storage jars. The largest vessels have conical bases that may have been made in a mold, like later Bronze Age pots; however, no mold marks were found. Cross sections of these pots indicates that they were manufactured by sequential slab construction (Figure 6.5).

Korchagi are distinctively painted large storage vessels. They are, for the most part, slightly closed, often with an undercut or indented base for securing the vessel in the ground. Several such large vessels were found *in situ* in floors; support holes for pots were also found in floors. The *korchagi* often appear to have been placed in visible places in houses. Similarly large, decorated pots from traditional societies in Africa and South Asia are often intended for communal use (Dietler 2001:98)—a possible analogy for the Anau *korchagi*. Petrography indicates huge voids from burned out chaff, but some microfossils appear as voids, and in some cases carbonates appear to have leached from the sherd, an indication that the vessel was used for storing an acidic liquid, such as beer or wine (G. Omar, personal communication 2001).

B.1 Coarse Red Ware, Red-slipped, and Painted

Chaff-tempered coarse ware, red fabric with heavy chaff temper, red-slipped.

Type example: Coarse chaff-tempered, exterior is slipped, interior either slipped or just smoothed with spalling from the heavy chaff.



6.4 Ceramic Types B.1–B.4. Based on 1997 excavations: 1 (see Figure 4.14.25 above); 2 (see Figure 4.14.26 above); 3 (see Figure 4.20.3 above); 4 (see Figure 4.14.23 above); 5 (see Figure 4.15.5 above); 6 (see Figure 4.19.2. above).

Color: Core is dark, ranging from (2.5 Y 3/1 to 2.5 YR 5/6), exterior is very pale brown (10 YR 8/2), and the interior is pale red (10 R 6/3).

Petrography: Fine quartz and feldspar, carbonates; abundant voids from chaff temper, but non-permeable. Exterior "slip" appears to be just discoloration.

B.2 Coarse Red Ware, No Slip, Painted

Chaff-tempered coarse ware, red fabric, painted, without slip.

Type example: Thick red ware with abundant chaff temper. The fabric is evenly fired, with no color difference between the core and exterior surfaces. Exterior surface is smoothed but does not appear to be slipped; interior surface smoothed, but very exfoliated from chaff temper. Dark painted bands.

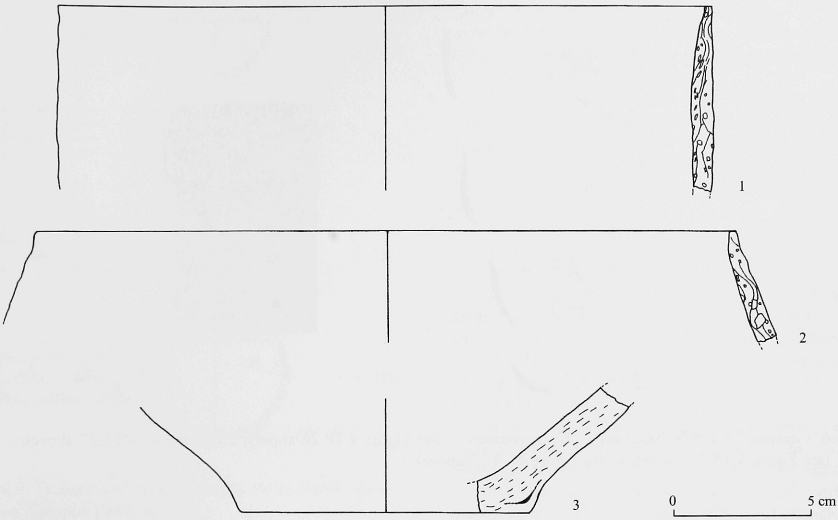
Color: Light red fabric (2.5 YR 6/8), dark reddish brown paint (2.5 YR 4/3 to 5 YR 3/3).

Petrography: Very large voids from chaff temper, medium quartz and mica temper.

B.3 Coarse Buff Ware, Painted

Type example: Chaff-tempered coarse ware, buff fabric, with heavy chaff, and paint.

Color: Pale yellow, homogenous color (2.5 Y 8/3), dark reddish brown paint (2.5 YR 4/3 to 5 YR 3/3).



6.5 Slab construction of B.1–B.4 ceramics. 1, ANM 5; 2, ANK 3; 3, ANK 3.

Petrography: Very homogenous temper, fine matrix, fine quartz, not much feldspar, no mica, enormous voids but non-permeable.

B.4 Coarse Buff-Ware, Slipped, Bi-Chrome Painted

Buff fabric, chaff temper, light red slip, and bi-chrome paint.

Type example: Coarse chaff-tempered fabric, red-slipped exterior. Exterior painted with a pale red that takes on a white appearance when dry.

Color: Core is dark reddish Gray (2.5 YR 4/1); exterior slip is red (2.5 YR 5/8) and paint is pale red (2.5 YR 4/2).

Petrography: core discoloration visible in thin section, fine quartz feldspar and mica temper. Large voids from thick chaff.

B.5 Coarse Medium Red Ware

Red fabric, medium sand temper, bright red interior and exterior surfaces (Figure 6.6). In layers (18–9), these medium-sized, slightly open, and slightly closed bowls make up 11% of the assemblage, which have painted designs similar to types B.1–5.

Type example: Red fabric, fine chaff, and medium sand with small fragments of gypsum. Smoothed inside and out, painted or fine slip on exterior surface.

Color: Red fabric (2.5 YR 5/8); dark reddish gray paint (2.5 YR 4/2).

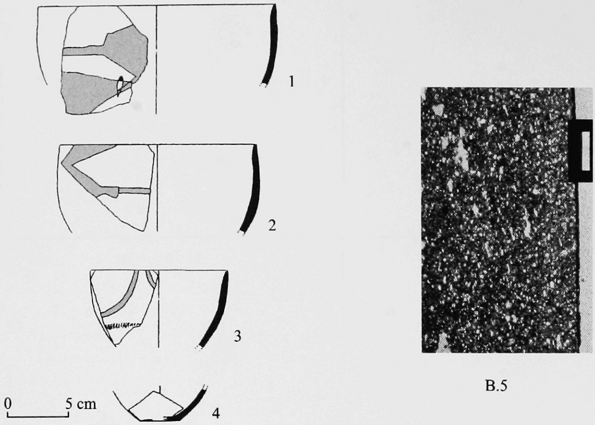
Petrography: Homogenous fabric with small voids from fine chaff, quartz, feldspar, and small chunks of gypsum. Exterior paint or fine slip is distinctly visible.

A and B Wares: Evolution of Painted Designs

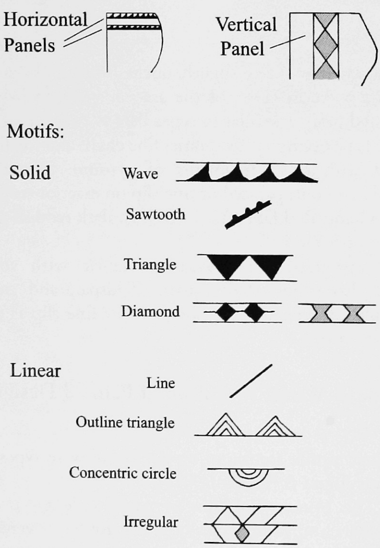
Painted motifs are found on almost all ware types of groups A and B (Figure 6.7).

The primary location of painted design is on shoulders and rims, typically in horizontal or vertical panels. The most widespread design arrangement constrains the motif within horizontal design panels.

Lines at the rim and on the upper shoulder are often used to define the panels. Schmidt calls this



6.6 Ceramic Type B.5. Based on 1997 excavations: 1 (see Figure 4.18.26 above); 2 (see Figure 4.18.27 above); 3 (see Figure 4.18.28 above); 4 (see Figure 4.18.29 above).



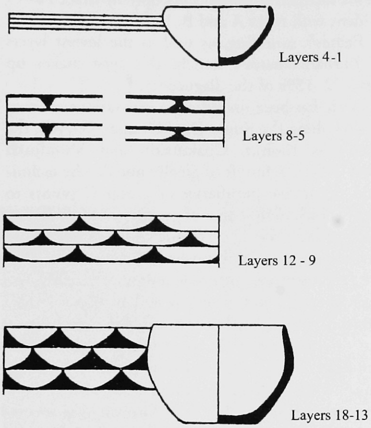
6.7 Descriptive terms for ceramic motifs.

arrangement *Reihenmuster* (1908:28), and Khlopin calls it the *Yalangach* style (1969:32). Ceramics with one or two panels at the rim are the most common. Those with three or four panels are less frequent. Occasional examples of ceramics decorated almost to the foot are also found.

The panels contain a series of geometric motifs which are repeated around the vessel: solid triangles, triangles made of multiple line strokes, inverted triangles, X-motifs with alternating solid areas, slanted lines, or triangular waves. While individual motifs tend to be repeated within a panel, in several cases, motifs are combined, giving a non-symmetric or spiderweb impression to the decoration. Much less frequent are panels of motifs which are not bounded with horizontal lines.

As Khlopin observed from his study of Yalangach ceramics, the size of the shoulder panels gradually become narrower through time (Khlopin 1969:32). This is true at Anau North as well, where the horizontal panels of motifs are wider in layers 18–13, (with a median width around 5.0 cm), gradually become narrower in layers 12–5 (with a median around 3.0 cm), and shrink still farther in layers 4–1 (with a median panel size of 1.5 cm)(Figure 6.8).

In layers 12–5, the most common design motifs are solid triangles, triangles composed of multiple fine lines, triangular waves, and X-motifs. While most of the motifs in the panels are similar to the earlier



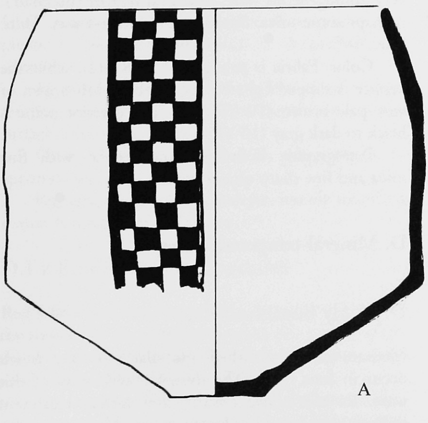
6.8 Evolution of ceramic motifs, Anau North. Based on Khlopin 1969, fig. 8.

motifs, they are smaller and more intricate. In the uppermost layers, 4–0, some bands are so close to each other as to be simply linear rim decoration, particularly so in the first architectural layer.

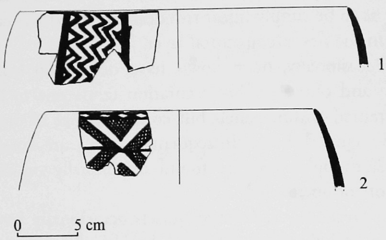
Occasionally, open bowls have decoration both inside and outside. This decoration tends not to be constrained within panels but consists rather of concentric curved lines. Infrequent as well are linear motifs, though these are found occasionally on the interiors of open bowls.

In layers 12–5, *korchagi* vessels occasionally have vertical and diagonal panels (Schmidt's *Bandmuster*) (Figure 6.9a), as opposed to horizontal panels (Figure 6.9b). From Geoksyur contexts, Khlopin identifies this decorative motif as the "pseudo-Ubaid" style, typically known from Namazga II contexts (Khlopin 1969:32–34). At Anau North it is found both on layer 12–5 ceramics and on the wall painting design of layer 17 in Ershov's sounding.

Painted ceramics of types A and B continue to be found in layers 4–0 (see type E.1 below). This ware continues and acquires distinctive decorative motifs not found in older layers, in particular, small tooth-shaped or serrated edges and small rows of triangles. These rare motifs in the upper layers of Anau North are typical in the painted examples of late Namazga II (Masson 1982:28).



6.9 *Korchagi*, 1904 excavations. Kunstkamera inventory, 948A Pottery marked "T8 6.4.04."




C.1

6.10 Ceramic Type C.1. 1904 excavations. 1, after Schmidt 1908, fig. 106; 2, after Schmidt 1908, fig. 107.

C. Brown-slipped, High-fired, Sand-tempered Ceramic

In layers 20–19, medium-sized spherical bowls are found in a distinctive high-fired clinky ware (Figure 6.10). This unique ceramic was first described from the north digging as having fine sand temper and a distinctive matte brown slip; it was called C ware by Schmidt (1908:130–132), and is commonly referred to as Anau IA (Khlopin 1963a:20, Kohl 1984a:69, Masson and Sarianidi 1972:47–48).

The patterns on the slip are mostly in a thin matte black or matte brown. The characteristic decorations are zigzag bands within a broad panel along the upper shoulder of the vessel, and geometric designs filled with a fine trellis pattern. Trellis-filled triangles can be oppositely placed and combined to form rhombic patterns. Zigzag bands occasionally alternate with triangles. Zigzag bands are themselves, at times, arranged to form rhomb patterns.

This distinctive ware occurs only in strata 20–19 coincident with types A and B. In the lowest ceramics from Ershov's sounding, as well as the lowest layers from Kurbansakhatov's trench, this type makes up between 12–15% of the diagnostics.

C ware has been identified in excavations at seven other sites along the Kopet Dag: Ovadan, Gavych, the 73 km site, Kashut, Chakmakli, and Mondjukli (Berdiev 1974). Schmidt originally noted: "the technical and decorative peculiarity of group C points to another workshop than that of groups A and B, the latter two certainly belonging to one and the same center of production. It can not, however, have been very far distant, for there are sufficient points of resemblance between group C and groups A and B to prove their relationship" (1908:132). It is possible that there was a central production area, if so, it was probably in the eastern Kopet Dag at Mondjukli or Chakmakli, where this kind of ware is found as part of a larger set of high-fired ceramics (Berdiev 1972b). However, it is equally likely, based on inclusions, that the high-fired ceramics at Anau were produced locally by people familiar with this high-firing technique.

C.1 Fine, Sand-tempered (Anau IA Type)

Light red fabric, medium-fine to fine sand temper, painted.

Type example: High-fired, brownish, medium fine very homogeneous ware, fine sand temper (no chaff), perhaps some mica. Smoothed inside and out. Thin, fine.

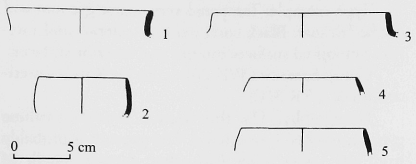
Color: Fabric is pale red (2.5 YR 5/2), while the surface is slipped light-brown, light reddish-brown or very pale brown (10 YR 7/3). The exterior paint is black to dark gray (10 YR 4/1).

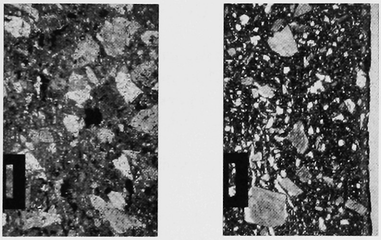
Petrography: Extremely fine matrix, with fine mica and fine sharp quartz grains.

D. Mineral-tempered Wares

D.1 Early Burnished Ware

Medium-sized, burnished, globular pots and bowls occur in four types. The diversity and rarity of this ware, the distinctive temper, and surface treatment indicate that it was not locally made. We find two distinct color variants, red burnished and gray (Figure 6.11). It is notable that their appearances are superficially similar to the later burnished wares of layers 4–0 but have different ware, finishing, and forms.





D.1.1 D.1.2

6.11 Ceramic Type D.1. Based on 1997 excavations. 1, ANK 3; 2, ANJ 4; 3, ANK 3; 4, ANJ 4, 5, ANJ 5.

D.1.1 Burnished Gray, Unpainted, Pattern Burnished

Gray, coarse white-sand temper. A very rare type; given its temper composition it is probably an import.

Type example: Abundant medium-sized feldspar temper, exterior surface-pattern burnished, interior surface smoothed.

Color: Gray core (10 YR 5/1), gray surfaces, no apparent slip.

Petrography: Temper is feldspar, heavily modified, matrix is broken up by heating.

D.1.2 Burnished Red, Unpainted

Red fabric medium-fine to fine, burnished. Based on the similarities in ware composition (see petrography), these vessels may have been made by the same potters as some of the cooking pots (D.2.1).

Type example: Rather high fired, with gray interior, homogeneous fabric with very coarse feldspar temper, red slipped and burnished exterior, smoothed interior

Color: gray core (10 YR 6/1), red exterior (2.5 YR 4/8), very dark gray interior (5YR 3/1).

Petrography: Large, chunky feldspar, highly altered, many voids (chaff?), visible discoloration of the exterior surface, and a distinct and different slip.

D.2 Cooking Ware

Medium-sized globular pots which have very coarse temper were used almost exclusively as cooking pots, as is evident from their fire-reddened and -blackened exteriors. (Figure 6.12)

Cooking directly over a fire began in the Early Village Period (Anau IA) and continued in Central Asia at least through the early Iron Age (Masson 1959:37). Fire-blackened cooking pots are not found in the earlier Djeitun sites (Berdiev 1969), and cooking pots are also lacking in the earliest layers at Hissar (Hissar I) (Dyson, personal communication 2002).

Cooking pots at Anau North consistently form around 20% of the ceramic assemblages. This percentage probably does not reflect the ratio of cooking pots to other vessels in use at any time, since cooking pots, which are repeatedly heated and cooled, have a short life span (Foster 1960). In other parts of the world cooking pots are valued for their thermal properties, and are known to be exchanged between villages independent of fine wares or table wares (Stark 1994). Thus, at Anau North, we expect that there were relatively few cooking pots but that they had to be frequently replaced, and their diversity suggests a small but active interregional exchange of cooking wares.

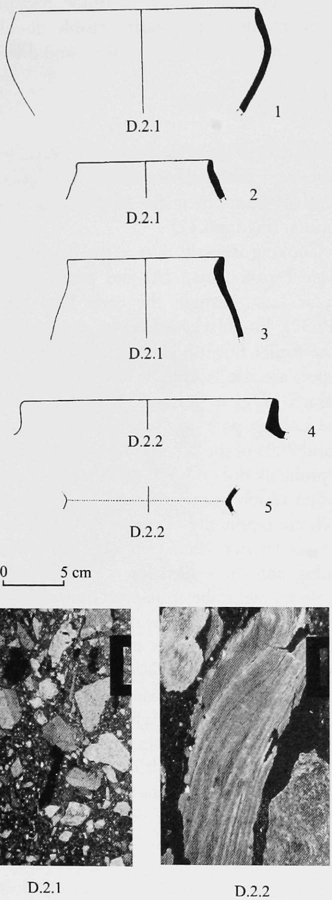
The cooking pots from Anau North have a specific and different temper from the rest of the pottery. Mica and coarse feldspar sand are often used as temper, increasing tensile strength and thus adding to the life span of these pots. Cooking vessels varied greatly in temper and manufacturing technique, suggesting that some of them were imports. In the early layers at Anau (Anau IA, IB1, and IB2), the inclusion of large chunks of gypsum in sherds suggests that people were exploiting the saltpan deposits in the desert for temper. Petrographic analysis shows that these cooking pots were heated and cooled many times, the result of heavy use before they were discarded.

D.2.1 Cooking Ware—Feldspar Temper

Red, coarse white-sand temper.

Type example: Reddish-gray, medium-coarse feldspar temper; exterior surface gray, burnished, evidence of heating

Color: Very homogeneous ceramic fabric, ranging from reddish-gray in the core to gray (2.5 Y 2.5/1 black) on the exterior surfaces.



6.12 Ceramic Type D.2 Based on 1997 excavations. 1 (see Figure 4.15.19 above); 2 (see Figure 4.15.20 above); 3 (see Figure 4.15.22 above); 4 (see Figure 4.15.21 above).

Petrography: Temper is feldspar, heavily modified by heating and cooling, coarse-grained matrix.

D.2.2 Cooking Ware—Feldspar and Gypsum Temper

Red, coarse white feldspar temper with large fragments of gypsum. This distinctive type is only found in layers 18–13. Its temper is so large that it protrudes from the surface of the vessel.

Type example: Tempered very coarse gypsum and coarse feldspar. Black core; red buff exterior and interior. Smoothed surfaces interior and exterior surfaces.

Color: Exterior (5YK 7/4); core (5YR 6/3); interior surface (5YR 3/1).

Petrography: The thin section shows crystalline gypsum temper, heat altered. The gypsum is probably from the takyr water lain takyr deposits north of Anau.

D.2.3 Cooking Ware—Chaff and Mica Temper

Red, medium chaff with mica temper.

Red fabric with fine chaff and mica temper, black heat-blotched exterior, no slip, exterior paint.

Color: Fabric is red (2.5 YR 5/8), the paint is pale red (2.5 YR 4/2).

Petrography: No sherds examined.

Ceramics of the Later Tradition (Layers 4–0) Anau II

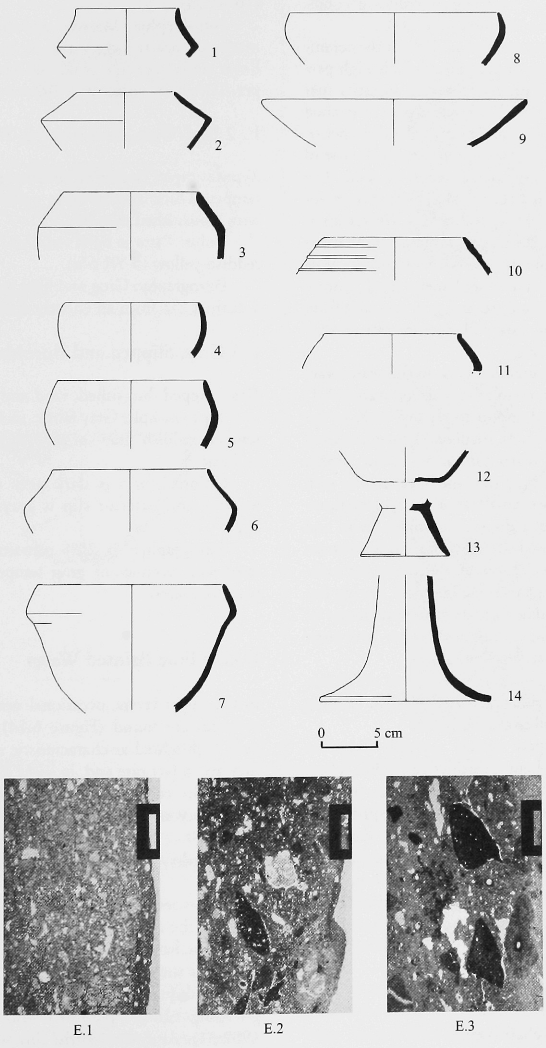
E. Burnished, Fine-slipped, Grog-tempered Ware

The most distinctive ceramics of the upper four architectural layers at Anau North are red and gray, with a fine, thick slip which is typically burnished. The specific forms of these ceramics, in particular the rims, are distinctive at Anau North (Figure 6.13). Red and gray burnished wares form a small component of the late Namazga II ceramic assemblages at Kara depe, layer 4 (Masson 1961b:pl. 5:23–27), Namazga depe, sounding 1, layers 21–18 (Ganyalin 1956:46), Altyn depe (Kircho 1972:173), and Ilgynli (Ganyalin 1959).

At Kara depe, red and gray burnished ceramics made up 8% of the ceramic assemblage in layer 4 (Masson 1962:Table 2).

Similar ceramics were also found at five Geoksyur sites: Geoksyur 1 (layer 3), Akcha, Geoksyur 6, Geoksyur 7, Mullali, and Chong (G-5) (levels 5–1) (Khlopin 1969:7–12). In the Geoksyur oasis, the forms are more generalized—for example, at Geoksyur 6 they are restricted to spherical bowls and jars (Khlopin 1969:pl. 21, 5–11).

The characteristic feature of type E, however, is the heat-spotting (*flaemmung*), which shows itself in large black blotches on the surface, primarily on the rim and upper shoulder of the vessel. This surface treatment may have had its origin in the casual method of firing. Among the Kurds of northern Iran, in the 1950s, heat-



6.13 Ceramic Types E.1-E.3. 1904 excavations. Kunstkamera inventory, 948A. 1-6,13,14, E.1; 7-9, E.2; 10-12, E.3.

spotted ceramics were produced by firing without a kiln, where fuel (in this case, dung cakes) touched the pot differentially, causing local oxidizing or reducing conditions (Dyson, personal communication 2002).

This ware makes up more than 30% of the ceramics in the Anau II layers of the mound. This high percentage, and the wide variety of forms, suggests that this is a locally made ware. The red and gray burnished ceramics at Anau North are nearly identical petrographically. Their distinctive ware feature is the use of coarse grog temper as opposed to chaff or sand. The use of grog (crushed fired ceramics) as temper does not indicate a change in firing technology (Aussavamas 1999) but probably does indicate a change in the manufacturing location to an area with access to potsherds—possibly within the settlement itself. Future investigations of burnished red and gray ceramics from other sites in Central Asia will demonstrate if they share this same tempering.

The categories of ceramics made in this ware (ware E) are similar to those of the fine painted wares (A.1) in the earlier layers and appear to replace them in the assemblage. Shapes include small- and medium-sized vessels, often with a sharp carination in the profile below the neck, mimicking the type of carination seen in wheel-made ceramics. Small jars and cups, medium-sized open bowls with a distinctive goblet form, and medium and large closed storage jars are the common shapes. These wares are also used, but rarely, for making tall-necked storage jars, most likely for storing liquids. This ware was also used in the manufacture of large, nearly cylindrical storage vessels that have their best parallels in grain storage containers.

Medium- and large-sized closed vessels are globular, with a distinctive rim flared at the collar, creating the appearance of a tall neck.

Medium-sized open vessels typically have an incurved rim, giving them a distinctive profile. These open vessels have both flat and footed bases. In some cases, tall, hollow-footed bases provide the appearance of plates on stands or tall chalices, generally similar to the Hissar II assemblage from the Iranian plateau (Dyson N.d.:fig.27). They are also vaguely similar to the ceramics from the cemetery at Parkhai II (Khlopin 1997:pl. 24–67) but different in the ware and the form of the rim.

E.1 Buff, Red-slipped, Unburnished

Buff, red-slipped, fine chaff temper.

Type example: Fabric ranges from red to buff with fine chaff temper. These vessels are not burnished but have a distinctive red-slipped exterior.

Color: Paste ranges from light brown (7.5 YR 6/4) to pink (7.5 YR 7/4). The red slip color is consistent (10 R 5/6).

Petrography: Massive aggregate within a fine matrix of mostly large grains of quartz, some feldspar, linear voids from fine chaff, and aggregate of grog temper. The slip is visible as a different clay.

E. 2 Red Ware, Red-slipped, Burnished

Type example: Red, medium paste with grog, and lime temper. Thick and obvious red slip inside and out, with a burnished exterior.

Color: Paste is light red (2.5 YR 6/8), the slip is reddish-yellow (5 YR 6/6).

Petrography: Grog and lime temper is visible, as is a distinct slip from an entirely different clay.

E.3 Gray, Slipped and Burnished

Gray, slipped, burnished, sand and grog temper.

Type example: Gray fabric, medium sand and grog temper, reddish gray to black slip, burnished inside and out

Color: Fabric is dark gray (7.5 YR 4/1); the interior and exterior slip is grayish brown (10 YR 5/2).

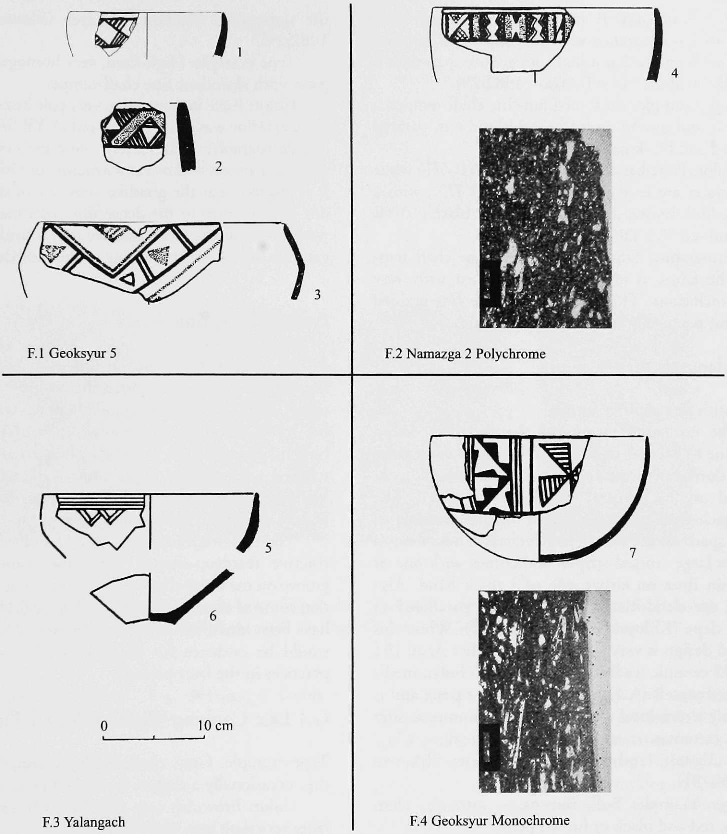
Petrography: 15–20% contain well-sorted quartz sand with nodules of grog temper (grog appears as black particles).

F. Late Fine Painted Wares

In the upper layers, occasional non-local fine-painted ceramics are found (Figure 6.14). These have often been highlighted as characteristic of Anau North, but they are in fact rare and, in some cases, not representative of the ceramic assemblage from Anau North in which they are found.

F. 1 Geoksyur 5 Ware (Chong Depe Type)

Medium-sized open bowls have a finely painted band panel at the rim, with alternating filled triangles, and distinctive hatched triangles. These are common in the Geoksyur sites of late Namazga II. Khlopin calls them the "Geoksyur 5" type (Khlopin 1969:20), part of a grouping called "pseudo-Ubaid designs" (Masson 1982:31). At Anau North, this is a rare type, found only in layers 2–4. Kurbansakhatov recorded only two examples from layer 2, and Pumpelly recorded three fragments from terrace 1.



6.14 Ceramic Types F.1-F.4. 1904 excavations. 1, after Schmidt 1908, plate 33.2; 2, after Schmidt 1908, plate 33.1; 3, after Schmidt 1908, plate 33.4; 4, after Schmidt 1908, plate 32.4; 5, Kunstkamera inventory 948A. Sherd marked "E.G."; 6, Kunstkamera inventory 948A. Sherd marked "T3"; 7, after Schmidt 1908, plate 32.1.

Type example: The ware is buff chaff-tempered, with a heavy red or orange slip and black paint.

Color: Paste has a grayish-red core (5 YR 6/6) with a pale yellow exterior surface (2.5 Y 7/3) and reddish yellow interior surface (5 YR 6/6), the paint is grayish black (10 YR 3/1).

No petrography is available, but the ware appears similar to F.2 macroscopically.

F.2 Namazga II Type Bi-chrome

This type, which appears in medium-sized open and closed forms, is quite infrequent at Anau North and only documented from secondary, probably deflated, contexts. Only one sherd is known from Kurban-sakhatov's excavations (layer 2) and two sherds from Pumpelly's, one of which is from the uppermost layer in terrace 5, our layer 0. If this ware is *in situ* in these levels, its co-occurrence with the unpainted red and gray ware suggests that it had a longer use span than is typically attributed to it (Masson 1982:29).

Type example: Buff, medium-fine chaff temper, a very fine and smooth buff slip inside and out, painted with red and black paint.

Color: Paste has a grayish core (7.5 YR 5/1) while the surfaces are very pale brown (10 YR 7/3), with a light reddish brown slip (5 YR 6/4), and black (10 YR 2/1) and red (7.5 YR 5/4) paint.

Petrography: Small voids suggest fine chaff temper. The fabric is extremely fine grained with very small inclusions. The fabric is not like fine-grained loess but practically isotropic, like glass.

F.3 Yalangach Ware

Buff, with fine chaff, painted.

The horizontal panels of the shoulder design continue to become closer together and in some cases are so devoid of decoration that they are usually considered to be stripes (Khlopin 1969:32). The Yalangach-type painted designs include non-panel use of space on the side of large vessels. These designs include large crossed stripes, sometimes with one or two thin lines on either side of a thick band. Also found are dendritic "branch" motifs paralleled at Akcha depe (Khlopin 1969:pl. 6:41–43). While this painted design is very similar to the earlier Anau IB1 and IB2 ceramic tradition of painted, globular, medium-sized vessels (A.1), it has much finer paste and is probably a non-local ware. It is most common at sites in the eastern part of the Kopet Dag region: Ulug, Altyn, Ilgynli, and the Geoksyur sites (Masson 1982:30–31).

Type example: Buff, fine paste, with fine chaff temper, red and black or brown paint.

Color: Paste has a grayish core (7.5 YR 5/1), while the surfaces are very pale brown (10 YR 7/3); the slip is light reddish-brown (5 YR 6/4).

No petrography, but macroscopically the ware is similar to F.4.

F.4 Geoksyur Monochrome

Fine buff with distinctive red wash or thin paint. Found *in situ* only in the uppermost layers (0–1) and out of context on the surface, this ware signals a shift to a different ceramic tradition. Such a shift is paralleled in the stratigraphic sequence at Kara depe, where similar pottery is found in small quantities in Kara 2, the uppermost Namazga II layer (Masson 1961b, 1982:29).

Type example: High-fired, very homogenous, fine paste with abundant fine chaff-temper.

Color: Paste in unvarying, very pale brown (10 YR 8/2); exterior wash is yellowish red (5 YR 5/6).

Petrography: Extremely fine-grained fabric, isotropic, almost without any structure or visible grains. It is possible that the glasslike structure of the paste is due to phytoliths in the dense fine-chaff melting. The wash is visible as a layer, possibly over a thicker homogeneous slip or wet smoothing of the buff clay.

G. Later Cooking Wares

At first it appears that there is little difference in basic shape or manufacture between the cooking pots of the upper levels and the earlier cooking pots. As in the earlier layers, they constitute some 20% of the assemblage, and again there is considerable variation in the temper, suggesting multiple sources of manufacture. Unlike the other categories of later, upper-layer ceramics, the variation in this ware is very great.

The upper-layer cooking pots, however, have distinctive teardrop-shaped rims, sometimes with a groove on the inner rim—a feature which may indicate that some of these pots had lids (Figure 6.15). No lids have been identified in the samples, but if found, they would be evidence for changes in food preparation practices in the later periods.

G.1 Late Cooking Ware—Feldspar Temper

Type example: Gray, coarse feldspar temper, without slip, occasionally a slightly burnished exterior.

Color: Brownish core (7.5 YR 5/3), exterior surfaces very dark gray (10 YR 3/1).

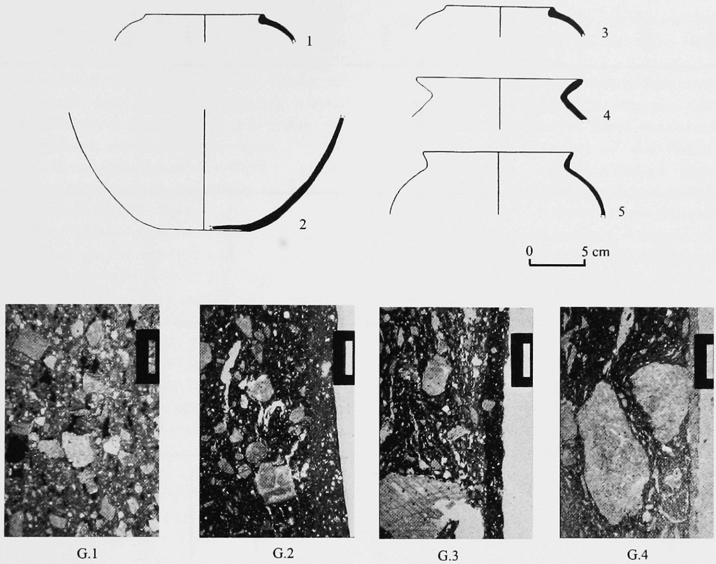
Petrography: Small grains of quartz, with many larger fragments of heat-altered feldspar. Apparently heated and cooled many times.

G.2 Late Cooking Ware

Type example: Gray fabric with thick, buff-red slip on the interior and exterior, covered with a red wash. Medium sand temper and possibly fine chaff temper.

Color: Paste is gray (10 YR 5/1), with a thick, yellowish-red slip (5 YR 5/6).

Petrography: Background is very fine, isotropic, possibly from the fine chaff temper. Occasional quartz,



6.15 Ceramic Types G.1-G.4. Type G.1: 1 (see Figure 4.8.13 above); 2 (see Figure 4.8.6. Type G.2 above): 3 (see Figure 4.8.14. Type G.3 above): 4 (see Figure 4.8.17. Type G.4 above): 5 (see Figure 4.8.18 above).

lime, and feldspar temper. The feldspar is highly altered from repeated heating.

G.3 Late Cooking Ware

Red-slipped red ware.

Type example: Feldspar, chaff and mica temper. Red slip not burnished, blackened interior.

Color: Ceramic fabric is often bi-colored, core and interior gray (5 YR 6/1), exterior reddish-brown (5YR 5/4).

Petrography: Feldspar temper is not very altered, some voids from fine chaff temper, no grog temper. Slip is thick, visible.

G.4 Late Cooking Ware

Sand and grog temper.

Type example: Red slipped red ware, burnished, with medium-coarse feldspar and grog temper.

Color: Ceramic paste is very dark gray (10 YR 3/1), exterior surface is yellowish-red (5YR 5/6).

Petrography: Very homogeneous paste, tempered with quartz, feldspar, sand and grog. Feldspar is highly altered from heating. The burnishing of the slip is visible, giving it the appearance of a very distinct surface layer.

The Anau North Sequence: Discussion

The ceramics from Anau North allow us to place the sequence within the established relative chronology of Central Asia (Figure 6.16).

Layers 20–19: Anau IA

The ceramics from layers 20–19 of Kurbansakhatov's deep sounding, the lowest three layers of Ershov's

	Iranian Plateau		Arkash	Akhal		Etek							Geoksyur	
	Yayha	Hissar	Parkhai II	Anau Region		Kara		Namazga			Altyn		Geoksyur 1	
						Sounding 1	Exc 1	Sounding 1	Sounding 5		Exc 1	Exc 11	Sounding 1	
2900			SWT 5	0 - 1	Anau IIB	5 - 8	Kara 1a	13 - 17		Namazga 3	9		1	Geoksyur
							Kara 1b				10 11/12	3 - 11	2	
3100							Kara 2				13		3	
		Hissar IIB	SWT 6	2 - 4	Anau IIA		Kara 3	18 - 19	12 - 14	Namazga 2	14 15		4	
						9- 15	Kara 4				26 - 39	12 - 17	5	
3300	Yayha IVC													
		Hissar IC/IIA		gap			Kara 5	20 - 22	15 - 19				6	Yalangach
3500							Kara 6						7	
				5 - 9	Anau IB2	16 - 17	Kara 7	23 - 25	20 - 25	Namazga 1		18 - 28	8 9 10	Dashlidzhi
3700			SWT 7			18 - 20		26 - 27						
3900				10 - 18	Anau IB1	21 - 23								
	Yahya VA													
4100						24 - 27								
	Yayha VB	Hissar IB		19	Anau IA									
4300	Yahya VC			20										
4500														
4700		Hissar IA			Pre-Anau IA									
4900	Yayha VI													

6.16 Relative stratigraphy of Early Village Sites in Central Asia and Iran.

sounding, and the lower layers of the north dig are all of types A, B, or C.1. By far the greater proportion belong to the chaff-tempered local ceramics (types A and B), only a small number are from the distinctive type C.1, Anau IA ware. While the radiocarbon dates indicate that these levels are distinctly earlier than layers 18–13 and above, our sample from layers 20–19 is too small for the establishment of definitive style or design differences in the chaff-tempered wares (types A and B) between the IA and IB1 periods.

Further, one ceramic from the 1904 excavations in the collections of the Kunstkamera has field marking indicating that it came from the north digging, below the Anau IA levels. It is a squat handle from a red ware thick chaff-tempered fine ware pot (our type A.1). The composition of its ware supports Schmidt's observations describing the pre-Anau IA ceramics as part of the basic Anau I ceramic tradition. It is thus contemporary with, but separate from, the late Djeitun ceramic tradition of the Etek region of the eastern Kopet Dag.

The Anau IA ceramic type C.1 is quite distinctive in ware and manufacture, with its sand temper, high-temperature firing, and lattice designs. These ceramics have exact parallels at three nearby sites: Ovadan (Berdiev 1974:fig. 9), Gavych (Berdiev 1974:fig. 10–12) and, farthest west, at the 73 km site along the Arvuz rivershed (Berdiev 1974: fig. 13). These sites were excavated by Marushchenko in the late 1950s and early 1960s, but the ceramics were only published later by Berdiev (1974). At these sites, as at Anau North, the C.1 ceramics are found only as a restricted set of forms—only spherical bowls—and as at Anau, they may represent a small part of the original assemblage. Anau North is the only site for which the stratigraphy and the context of these ceramics is published.

It has long been stated that the C.1 ceramics from Anau IA should be paralleled with the distinctive high-fired Cheshmi Ali ceramics (type I.A) found at sites across the Iranian plateau from near Qazvin in the northwest (Shahmirizade 1977) to the Gurgan region in the northeast (Deshayes 1967:126). McCown, for example, suggested that the Anau IA ceramics were part of the "Cheshmi Ali culture" (1942:12). Khlopin suggested that this ceramic type represented "an infiltration of a separate population from Iran" (1963a:12). However, the chronology of the Cheshmi Ali ceramic horizon—around 5500–5200 BC (Voigt and Dyson 1992), confirmed by more recent excavations reported in Fazeli et al. 2001), is much earlier than Anau IA. Comparison of the Anau IA ceramics with Cheshmi Ali ceramics collected by Dyson from the Tehran basin indicate that the original points of comparison are limited only to the "clinkiness" of the ceramic and that they differ stylistically, and in form, from the C.1 ceramics of Anau IA.

To the east of Anau North in Turkmenistan, however, a number of sites have ceramics similar to the Anau IA C.1 type in style, form, and manufacture. In the eastern Atek region of the Kopet Dag, at Chakmakli-depe, and Mondzhukli depe (Berdiev 1976), a wide range of forms in C.1 ware is found. It is likely that the C.1 ceramics have their origin there, and that a limited set of type C.1 ceramics found their way by exchange to settlements in the west such as Anau, Ovadan, Gavych, and the 73 km site. Such medium-sized globular pots would be used for cooking, transport, or water storage or possibly as containers for other products. They may also have been preferred for their clinky quality.

It should be noted that layers below layer 20 were excavated only in the north digging of 1904. In these earliest layers, wares of types A and B were found, *without C.1.* Unfortunately, ceramic finds were not labeled according to depth, so no specific pre-IA assemblage can be identified. Schmidt, in his report on ceramics, only implied the existence of the earliest layers when he observed "we must look upon [type C.1] . . . which occurred within the lowest strata, only as an older and *transitory* occurrence in the evolution of culture I" (1908:130).

Layers 18–10 (Anau IB1)

The ceramics in architectural layers 18–10 reflect a fairly simple assemblage of standardized small, medium, and large vessels. Almost half of the assemblage (based upon diagnostics) is made up of the medium and small vessels of A ware. Ceramics made of the coarser B ware account for approximately 25% of the assemblage, with large vessels being less common than in later layers.

The large forms occasionally have lug handles, and medium-sized closed vessels of B ware occasionally have spouts and short jug handles.

Painted designs are found on about 30% of the A and B ceramics, wide horizontal panels with triangle patterns predominating. Cooking pots make up some 20% of the assemblage. Of note is the diversity of this ware: coarse gypsum temper and micacaous temper, common in this level, are not typically found in the local ceramics and so may reflect interregional exchange of the pots. Another coarse ware type (B.5) has tempering like the cooking pots but is not fire reddened; it, too, may be an import.

Layers 9–5: Anau IB2

The ceramic corpus of layers 12–5 is a continuation of the ceramic traditions of the earlier layers (18–10). There is a definite increase in the number of large vessels of B ware types—in particular the appearance of B.2 and B.3: unslipped large storage vessels and *korchagi* with distinctive vertical panel designs. While several of the new motifs are considered to be typical of other sites (for example, the Yalangach style, from the Geoksyur region), the designs are found on local ceramics as well and do not appear to reflect interregional exchange. Khlopin's attempt to relate the vertical panel motifs to the Near East as "pseudo-Ubaid" (Khlopin 1969:32) is not comparable with a secure radiocarbon chronology.

In layers 5 and 8, several examples of fine pattern-burnished gray-ware ceramics have been found. They correspond chronologically to the earliest gray ware on the Iranian plateau, in Hissar Ic/IIa, although it is unclear where exactly the origin might be. Other non-local fine ceramics are found too, such as D.1.2, but no such ceramics are reported from Central Asian sites of this period, and they most likely came from the Iranian plateau or the Sumbar Valley (Khlopin 1997:25).

Anau I Ceramics in an Interregional Context

Comparison with Namazga Depe

The ceramic sequence from Anau layers IB1 and IB2 compares closely with the type sequence from Namazga depe. A and B ware types are widely found along the northern edge of the Kopet Dag. These soft, chaff-tempered wares are the hallmark of Namazga I ceramics. Kuftin and Masson, however, first defined the Namazga I period on the basis of the designs on the ceramics (Masson 1956:295–296). At Namazga depe, sounding 1 is considered to be the key chronological sounding for the Namazga sequence. Here, layers 27–23 defined the earliest layer at Namazga (Khlopin 1963a:13). Sounding 5, some 100 m distant, also identified the chaff-tempered Namazga ceramics in the lowest five levels (levels 25–20) (Masson 1956:295). The painted ceramics of Namazga I from these two soundings include relatively narrow horizontal panels, panels with spiderweb designs, and fragments of *korchagi* vessels. These motifs have parallels only in Anau IB2, not Anau IB1 or Anau IA. If we correlate the chaffy A and B wares with Namazga I ware, the earliest Namazga I occupation at Namazga depe appear to follow the Namazga I occupation at Anau North.

Comparison with Kara Depe

A similar sequence was excavated at Kara depe (Masson 1961b). The excavations at Kara depe in the 1950s provide a sequence that parallels Anau North, both in ceramic types and settlement history. While excavations of the later levels were extensive, the layers related to Namazga I were only exposed in a deep sounding, sounding 1, the same as "sounding 6" reported by Kohl 1984. Here at Kara depe, Masson was able to subdivide the Namazga I period into three levels 27–23, 22–19, and 18–16 being early, middle, and late Namazga I, respectively (Masson 1961b:322–326). The materials from Kara depe levels 27–23 were quite limited; however, Masson records that they are Namazga I ceramics, primarily red-slipped painted wares (1961b: fig. 3:13). Some are similar to Anau I B.1, while others (Masson 1961b:fig. 3:14 and 15) are similar to Anau IA (type C.1). This deep sounding at Kara depe thus provides another example of Anau IA ceramics co-occurring with early Namazga I. From levels 22–19, painted motifs have large horizontal panels, with many parallels to Anau IB1 ceramics. For example, triangles made of multiple strokes, triangular waves, and large filled triangles are best paralleled at Anau IB1 in layers 18–13. Levels 18–16 have typical late Namazga I painted designs, similar to those at Anau IB2 (see, for example, Masson 1961b:fig.1:10, and fig.2:18). Other chaff-tempered ceramics painted in brown and red motifs of chevrons and triangles and polychrome ware indicate the stylistic similarity between Kara depe and Anau IB2.

The Software Horizon

Dyson defined a software technology of chaff-tempered, handmade ceramics associated with the earliest village occupation in Iran (Dyson 1965:217). Studies of the manufacture of this type of ceramic suggest that it represents a technological horizon associated with sequential slab construction (Vandiver 1986). At Tepe Yahya, in southern Iran, excavations indicate that this technique is not restricted to the 6th millennium BC but is part of the Early Village way of life on the Iranian plateau which persists till the introduction of the fast wheel in the 3rd millennium BC.

The predominant local ceramic production in Anau I appears to belong to this shared technological horizon. Even though the chaff-tempered ceramics at Anau represent a long-term, obviously local production, there are many technological and stylistic similarities between the ceramics of layers 20–5 at Anau and periods VII–V at Tepe Yahya.

Like the large chaff-tempered wares common in periods VII, VI, and VC at Tepe Yahya, the large chaff-tempered ceramics at Anau (especially types B.1–4) appear to be slab constructed. A carinated jar from Yahya VC (Beale 1986:fig 4.5) can be paralleled at Anau (Figure 6.9) and Namazga depe (Khlopin 1963a:fig. XV).

Aside from the software tradition, other distinct parallels appear: motifs of the Soghun ware from Tepe Yahya (Beale 1986:fig. 4.13) are very closely paralleled by the painted motifs of the medium-sized slip covered, chaff-tempered fine ware (A.1.1 and A.1.2) of Anau IB1. Soghun-ware, like that found at Anau, is considered to be locally made. The motifs on the Soghun bi-chrome, though, can be convincing compared with the chaff-tempered coarse ware at Anau (B.4), which has bi-chrome painting (B.4).

Yahya's black-on-buff ware shares stylistic similarities with the fine painted ceramics of Anau IB2, especially in the increasing detail of the panel motifs through time of type A.1.2. A black-on-smooth-buff vessel (Beale 1986:fig.4.39:d) is very similar to a Central Asian *korchagi.* Parallels can also be found at contemporary sites on the Iranian plateau—at Sialk III2, for example (Ghirshman 1938:plate LXII).

Hiatus: Layers 5–4

The general lack of early Namazga II period type ceramics (for example, Masson 1962b:pl. 17) at Anau North is consistent with the stratigraphic evidence for a hiatus in occupation following the layer 5 occupation as documented in the 1997 excavations. Stratigraphic evidence of this hiatus at Anau North appears in excavation 1, Kurbansakhatov's main trench, and in the terrace excavations of 1904.

Layers 4–0: Anau II

The ceramic corpus of layers 4–0 differs considerably from that of the earlier layers; in part this is due to technological changes in the production of local ceramics, as well as to a larger area of the Kopet Dag and the Iranian plateau which was linked by exchange.

Approximately one third of the Anau II assemblage is burnished, with red or gray slip. These ceramics (types E.1, E.2, E.3) are diverse and include innovations such as sharply carinated shoulders, incurved rims, tall footed vessels, and dishes on stands. Despite the diversity of new forms and surface treatments, the lack of variation in paste, and presence of inclusions from local sources indicate that these ceramics at Anau North are probably the work of local potters.

In contrast, Anau II cooking pots are more diverse than the types in Anau IB1 or IB2, suggesting that the cooking pots, as opposed to the red and gray burnished tableware, were made outside of the region.

Other imported ceramics indicate exchange along the Kopet Dag. The Yalangach ceramics (F.3), with their finely painted branch motifs and thin parallel lines at the rim, were probably imported from the Geoksyur region (Khlopin 1969:plate 9,7–18, plate 17, 1–23).

The geometric motifs of the fine Geoksyur monochrome ceramic type (F.4) have been compared to the stepped-square and stepped-triangle motifs of the Quetta style, found at Mundigak III, 1 and IV, 1 (Casal 1961: fig. 52:44,45). The IIB layer at Anau North, in which F.4 ceramics are found well pre-dates these levels at Mundigak (Shaffer 1992:461). These ceramics appear to be part of a group of ceramic types at Anau North imported from the Geoksyur region, where they are common (Sarianidi 1964:49).

Anau II Ceramics in an Interregional Context

Several sites along the Kopet Dag foothill plain have occupational histories similar to Anau North—with Anau II (Namazga II) stratified above Anau I (Namazga I). Kara depe, in layers 3 and 4, has comparable red and gray burnished ceramics (Masson 1961b). At Namazga, Ganyalin identified red and gray burnished ceramics in layer 22 of sounding 1 (Ganyalin 1953). At Ilgynli depe, Ganyalin reported this same ceramic complex from layer 2 (Ganyalin 1959). These levels with red unpainted ceramics have been excavated extensively in areas 3 and 4 (Masson et al. 1994).

To the west, gray and red burnished ceramics are found in the cemetery at Parkhai II in the Sumbar Valley in the SWT VI period (Khlopin 1997:55), although they lack the distinctive carinations and incurving rims of E.2 and E.3 open vessels at Anau. However, while this unpainted ceramic type has something in common with the red ceramics of the Geoksyur late Namazga II sites, such as Mullali

(Adikov and Masson 1960), the similarities are only general in nature and do not include a matching array of forms.

On the Iranian plateau, red and gray wares, often burnished, are also common in this period. Hissar II, Tureng IIIB, Shah tepe and Sialk IV:2 are all part of the Proto-Elamite red, painted and burnished, gray ware horizon (Dyson 1987). At Hissar, one of five characteristic wares of the Proto-Elamite period employs a manufacturing technique in which slag is used to temper the ceramic (Dyson 1985:340). Similar technological and stylistic traditions are found even farther to the south, at Malyan, where Banesh ceramics are also distinctly tempered with grit and are red and gray burnished (Blackman 1981, Nichols 1990:Table 18). These wares were not found in the Atrek survey to the south of Anau (Ricciardi 1980:55–56), but they are part of the sequence at Nishapur-P, near the turquoise mines of Kuh-e Binalaud and the Kuh-e Shah Jahan mountain ranges (Hiebert and Dyson 2002). The occurrence of red burnished ceramics in the northern Iranian Proto-Elamite horizon may extend as far as Shahr-i Sokhta, period I (Tosi, personal communication 2002). The emergence of this burnished "horizon" on the Iranian plateau is paralleled in Central Asia in the Anau IIa period.

It should be noted as well that burnished gray and red sherds are occasionally found both at Anau IB2 and Hissar IC/IIA, but they are rare and, at Anau, have a different technique of production. It is the Anau IIa/late Namazga II period and not the later Geoksyur/Namazga III period, which is thus synchronic with the Proto-Elamite period on the Iranian plateau (see Voigt and Dyson 1992 for a discussion of the radiocarbon chronology). The radiocarbon dates from Anau confirm the synchronic relationship of the Anau IIa period with distant neighbors on the Iranian plateau such as Yahya IVC, which also have burnished gray and red (and black) ware (Potts 2001:199).

These can be paralleled with similar burnished ceramics in southeastern Iran: at Bampur in periods V and VI (De Cardi 1970:316), Shahdad phases IVC2 and IVB5 (Hakemi 1997:582), and Anjira, near Kalat Pakistan (De Cardi 1965).

The Proto-Elamite period has long been suggested to have been contemporaneous with Namazga III levels in Central Asia (Lamberg-Karlovsky and Tosi 1974). Using these new correlations from Anau North, we link Anau II (Namazga II) rather than Namazga III with the Proto-Elamite world. This is similarly seen in the small finds, with the exception that Anau II/Namazga II deposits contain no Proto-Elamite small finds such as tablets, seals, or figurines. This apparent lack of Iranian plateau culture in Central Asia contrasts with the evidence here for a strong technological and formal similarity of ceramics. As will be discussed below, the Proto-Elamite sites to not appear to represent the center of a world of which the Anau II period sites inhabit the periphery. Instead, the sites along the Kopet Dag are peers, separate from the Proto-Elamite polity.

The relationship between the northern burnished ware sites and the southern Proto-Elamite sites may well be mediated by such sites as Nishapur-P and Shahr-i Sokhta, for these are source areas for the widely distributed raw and processed materials creating the interconnectedness that we see in the ceramics at Anau North at this time.

7

Small Finds from Anau North

With Ogul'sona Lollekova and Katherine M. Moore

This presentation of small finds—tools and ornaments made of terracotta, bone, metal, chipped stone, and ground stone—from Anau North has two parts. The first section reviews a sample of the finds from a chronological point of view; the second provides a functional analysis of artifact categories. The discussion of chronology is based upon a reconstruction of the stratigraphic provenience of the small finds from the 1904 season in relationship to the more extensive excavations of 1977–1982. The chronological reconstruction was made using the Pumpelly expedition inventory records, field records, museum documentation at the Kunstkamera in St. Petersburg, and the 1908 published accounts. The functional analysis is based on the finds from the 1977–1982 excavations (Kurbansakhatov 1983, 1987), Ershov's 1953 excavations, and the 1997 excavations.

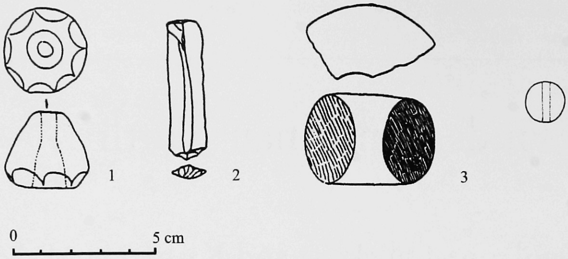
Stratigraphy of Small Finds

A reanalysis of records of the small finds from the 1904 excavations has allowed these objects to be organized by their stratigraphic position within each excavation unit—terrace, digging, or gallery. Individual finds were labeled by their absolute depth measurements and correlated with the stratigraphy and absolute dating of the later excavations (Table 7.1). The catalogue (Appendix B) is organized both by context and by material and provenience.

We estimate that the volume of deposits excavated from Anau IIA in 1904 was approximately the same as the volume excavated from Anau IB2. We estimate that the area of Anau IB1 excavated was about half the area excavated of IB2, while the area excavated of Anau IA and pre-IA was half again less. Using these esti-

Table 7.1 Small Finds by Period, 1904–1997

Period	Whorls	Bone tools	Metal objects	Chipped stone tools	Ground stone	Weapons	Sets of Beads	Figurines	Total
IIB	1		1	19	1		3		25
IIA	44		11	7	8	2	5	2	79
IB2	33		4	19	3		15		74
IB1	14	3	3	27	3	2	3	1	56
IA	8	6		33	3	3	2		55
Pre IA	1			3	1		1		6
Totals	101	9	19	108	19	7	29	3	295.



7.1 Pre-Anau IA small finds. 1904 excavations (for contexts see Appendix A). 1, terracotta spindle whorl, ND.17; 2, flint blade, ND.17 ; 3, limestone stone "macehead," ND.17; 4, terracotta bead, ND.17.

mates, we are able to assess the development of craft production at Anau and trace technological and stylistic change.

Pre-Anau IA

In the deepest section of the north digging, cultural levels continued 2 m below the lowest occurrence of "clinky" Anau IA ceramics, and these are referred to as Pre-Anau IA layers. These levels had primarily soft chaff-tempered ceramics, which, according to Schmidt, were indistinguishable from those in period IB1. Four small finds came from these lowest levels: a terracotta spindle whorl with impressed decoration around the edge (Figure 7.1:1), a flint blade (Figure 7.1:2), a ground stone macehead (Figure 7.1:3), and a terracotta bead (Figure 7.1:4). These finds—specifically the spindle whorl and the flint blade—are quite different from those of the Djeitun Period and show similarities to the later Anau ceramics and finds. Although most likely these finds are contemporary with the late Djeitun Period of the eastern Kopet Dag, the pre-Anau IA material assemblage at Anau North appears to represent an independent set of styles and industry, distinct from the Djeitun culture. Clearly—the precursor to the Anau IA and Anau IB cultures must be sought in the deeply buried layers at Anau North itself.

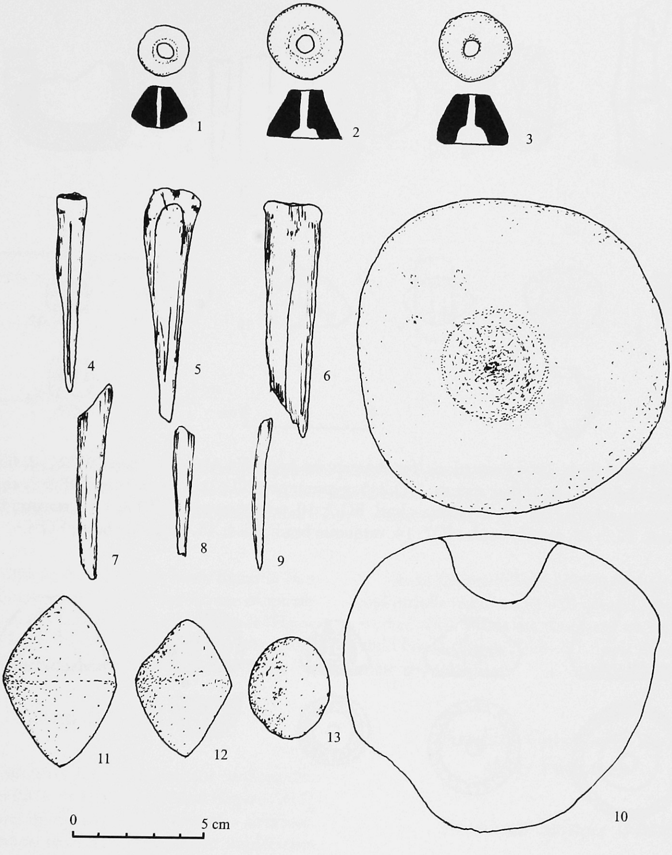
Anau IA

In 1904, the Anau IA levels were reached in the north digging and the lowest layers of the east and west galleries in the center of the mound, equivalent to layers 19–20. The finds include flint blades, small fragments of copper, drilled spherical stone beads and several terracotta conical-shaped whorls. Ershov's 1953 excavations (layers 18–12) best illustrate the finds: terracotta spindle whorls (Figure 7.2:1–3), two of which have bell-shaped cones and one smaller solid whorl; polished bone tools (Figure 7.2:4–9), a pivot stone (Figure 7.2:10), and several slingballs of unbaked clay (Figure 7.2:11–13). The slingballs have close parallels at the earlier Kopet Dag sites of Chakmakli and Mondjukli depes (Masson 1982:pl. 10).

Anau IB1

Pumpelly excavated IB1 levels in the north digging and in the east and west galleries. By estimating the volume excavated, we found that the density of artifacts in the Anau IB1 deposits was much greater than in Anau IA. The spindle whorls show a diversity of forms: terracotta spherical whorls with impressed-edge decoration(as in the pre-Ia levels) (Figure 7.3:8), biconical whorls or beads (Figure 7.3:9–10), and partially pierced spherical whorls (Figure 7.3:11). A *gyr* or stone weight (Figure 7.15:1) was found in 1997 while cutting back the deep sounding. As in the lowest levels, large stone beads (Figure 7.3:3) and flint blades were found. Debris from these layers also turned up several stone nuclei (Figure 7.3:1–2), and other small stone objects (Figure 7.3:4–5). Scatters of flint debitage were found on the lowest floors of terraces 3 and 7, in possible primary context.

Several burials of children were found with beads. One burial from an Anau IB1 context included two spindle whorls and two flint blades as burial goods. Another burial had six turquoise beads (Figure 7.3:14–15) and two perforated snail shells.

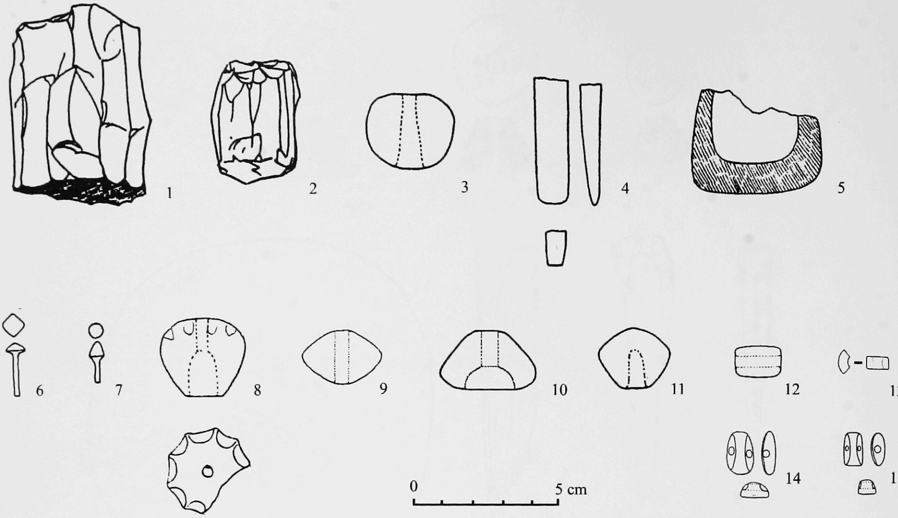


7.2 Anau IA small finds. 1953 excavations, Turkmenistan National Museum (inventory 241). 1–3, terracotta spindle whorls; 4–9, bone tools; 10, stone doorsocket or mortar; 11–13, terracotta sling balls.

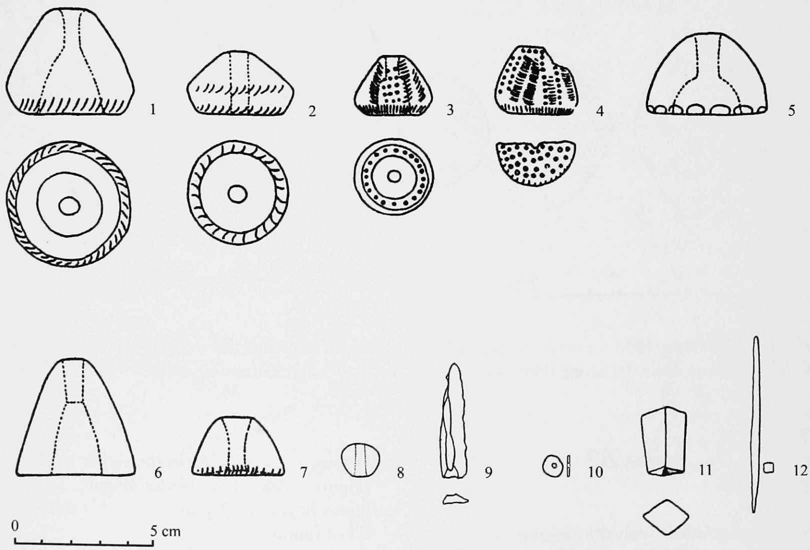
Anau IB2

Spherical spindle whorls with thumb-impressed edges were found in Anau IB2 levels, continuing a tradition that dates from the lowest layers at the site (Figure 7.4:5). In these levels the predominant decoration was fine punctuate or thumbnail impressions on the edge (Figure 7.4:1–4,7). As in the earlier levels, large beads (Figure 7.4:8), flint blades (Figure 7.4:9) and fragments of copper (Figure 7.4:11–12) were found in the fill of rooms.

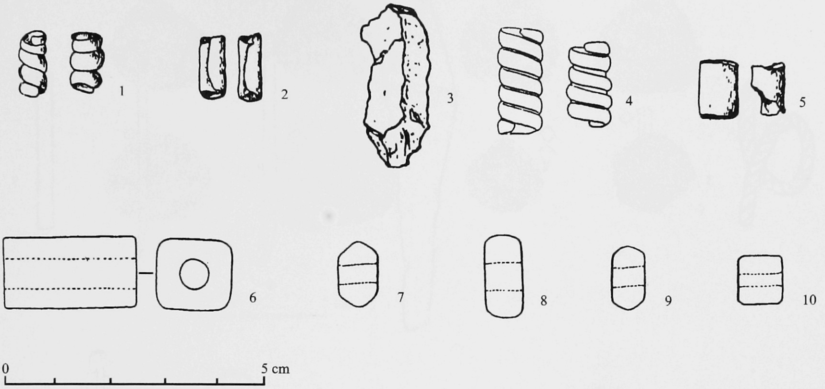
Five child burials from Anau IB2 context excavated in 1904 and another excavated in 1980 had small objects associated with them. Grave offerings consisted of beads and beaded work, including a waistband of



7.3 Anau IB1 small finds. 1904 excavations (for contexts see Appendix A). 1, flint core, WP.11; 2, flint core, WG.3; 3, stone bead, EG.2; 4, slate spatula, ND.2; 5, gypsum pot, ND.2; 6, copper pin, WP.6; 7, copper pin, T8.4; 8, terracotta whorl, ND5; 9, terracotta whorl, EG.2; 10, terracotta whorl, T7.8; 11, terracotta finial, T1.3; 12, stone bead, T2.3; 13, marble bead, ND2; 14, turquoise bead, EG.4; 15, turquoise bead, EG.4.



7.4 Anau IB2 small finds. 1904 excavations (for contexts see Appendix A). 1, terracotta whorl, T5.10; 2, terracotta whorl, T7.11; 3, terracotta whorl, T2.11; 4, terracotta whorl, T2.9; 5, terracotta whorl, T2.5; 6, terracotta whorl, T3.4; 7, terracotta whorl, ND.5; 8, terracotta bead, T2.11; 9, flint blade, T6.5; 10, slate bead, T1.9; 11, copper fragment, T2.11; 12, copper needle, T3.4.



7.5 Anau IB2 small finds (cont.). 1904 excavation burial goods (for contexts see Appendix A). 1, copper spiral bead, T2.7; 2, Copper bead, T2.10; 3, flint blade tool, T2.10; 4, lead beads, T2.8; 5, lead beads, T2.10; 6, white stone bead, T2.9; 7, alabaster bead, T2.9; 8, carnelian bead, T2.9; 9, alabaster bead, T2.9; 10, white stone bead, T2.9.

more than 1000 small white stone beads found in burial 9. One distinctive technology was the use of spirally wound copper and lead to make tubular beads (Figure 7.5:1,2,4,5). In addition to beadwork, the grave goods from burial 7 included a flint blade (Figure 7.5:3).

Anau IIA and IIB

The small finds from IIA include copper implements, pins, and a knife. A twisted copper band (Figure 7.6:1) was considered by Schmidt to be part of a necklace. The composition of three of the copper implements (Figure 7.6:3–5) was analyzed, the blade (Gooch 1908), and two pins (Hiebert 1995:57). The compositional analysis indicates no alloying with tin. The array of minor and trace elements in the copper is very similar to Bronze Age examples from the south mound at Anau, suggesting that a local source for copper was already being exploited.

Only about half as many spindle whorls were found in Anau II deposits as were found in deposits from Anau IB2, despite the fact that slightly more area was excavated. Beads were found with the two child burials from these layers. A stone macehead (Figure 7.6:12) and clay sling-ball (Figure 7.6:15) found at the IIA level, are of exactly the same form as ones found in pre-Anau IA and Anau IA contexts.

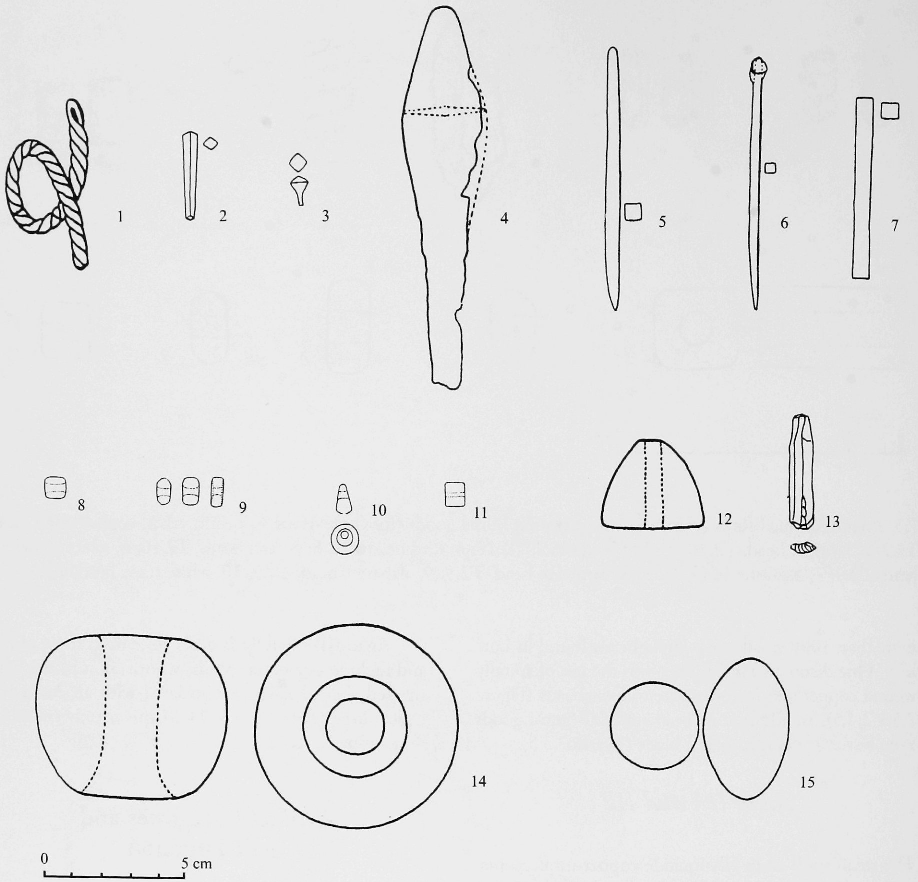
Anau IIB small finds differ little from those of IIA and include terracotta spindle whorls, flint blades, and worked shell. Beads are associated with an Anau IIB child burial (Figure 7.6:8–11). Lapis is only found in these upper layers.

Artifact Categories and their Function

Terracotta Spindle Whorls

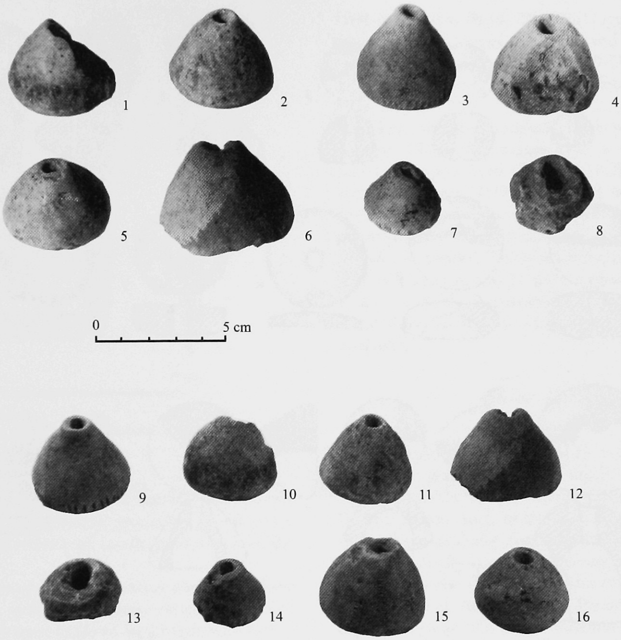
Terracotta spindle whorls form the most common non-ceramic artifact at Anau North. This is not surprising since terracotta spindle whorls are ubiquitous in Central Asian Early Village settlements (Khlopin 1961:181) and are also the most common non-ceramic artifact at the Bronze Age levels of Anau South (Hiebert 1995). At Anau North, whorls are most common in the Anau IB1 and IB2 layers. Two whorls found in the 1904 excavations of IB2 levels in terrace 2 were even found incorporated within a mud brick. Spindle whorls come in many different forms, sizes, and styles of ornamentation.

The most common form is a conical whorl with a bell-shaped hollow underneath. There is little variation



7.6 Anau II small finds. 1904 excavations (for contexts see Appendix A). 1, twisted cooper rope, T12; 2, copper implement, T12; 3, copper pin, Table A.6 context 2; 4, copper blade, Table A.6 context 1; 5, copper pin, Table A.6 context 1; 6, copper pin, Komarov's trench; 7, copper object, Table A.6 context 6; 8, lapis bead, T13; 9, lapis beads, T13; 10, lapis bead, T13; 11, bead (one of 1,066), T57; 12, terracotta whorl, Table A.5 context 3; 13, flint blade, T56; 14, stone "macehead," T56; 15, terracotta slingball, T13.

in this type between the older and the more recent levels (Figure 7.7). Some are simply pierced, while others have a small, medium, or large bell-shaped hollow. On the edge of the outer surface one often finds incised notches and lines on the edge of the outer surface (Figure 7.8:11,14,15) or a fine impressed decoration along the edge. Such ornamentation may have had functional value: perhaps with the help of these notches the thread obtained stability and did not reel. Similar conical whorls are common at other early village sites in Central Asia, such as Kara depe (Masson 1961b:pl. XIII:1–5). On the Iranian plateau, hollow cone-shaped whorls are found as early as the 6th millennium BC at Sialk periods I and II (Ghirshman 1938:pl. LII:1,4). This may indicate that the technological precedent for this type came from the Iranian plateau, since at the contemporary site of Djeitun in Central Asia, hollow cone-shaped whorls are not found (Korobkova 1969).



7.7 Terracotta whorls. 1977–1982 excavations. 1–8, Anau II period whorls; 9–16, Anau IB1 and IB2 whorls.

The second type of whorl is biconically shaped (Figure 7.7:5). Similar biconical whorls can be found at other sites in Central Asia (Khlopin 1963). They are also part of the domestic assemblages from sites on the Iranian plateau, such as Hissar in period I (Schmidt 1937: pl. XIV:H3810).

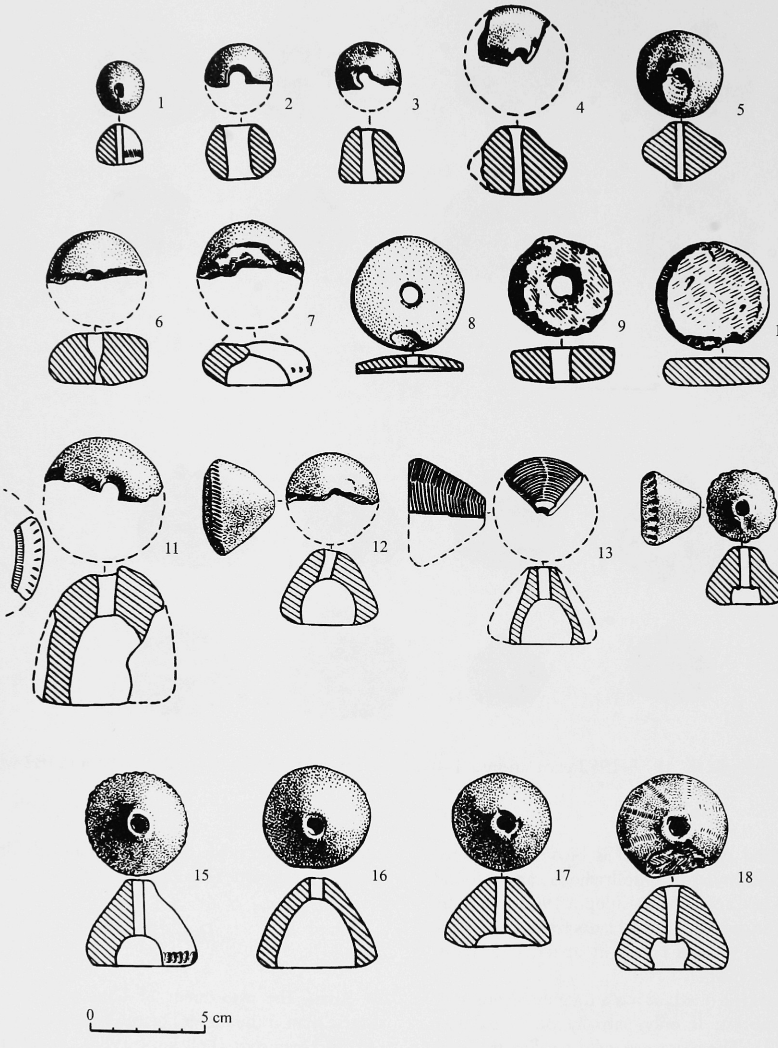
The third type of whorl has a roughly biconical or globular shape but is only partially perforated (see Figure 7.3:11). These are generally smaller than the conical and biconical whorls and are found from Anau IB1 onwards through the Bronze Age at Anau South (Hiebert 1995). Similar semi-perforated whorls are commonly found at other Early Village settlements in Central Asia (Masson 1961b:XIII:6, XIV:7,11–12). At Kara depe, they often have designs or symbols on the end (Masson 1961b, pl. 14:10,12). They may have also functioned as finials for pins or other small objects.

The fourth type of whorl is a disk like piece made from a potsherd or a stone. The central perforation could have been made by either a stationary drill or a chipping technique (Figure 7.8:8–10).

Bone Tools

At Anau, the assortment of bone tools was more diverse than at the earlier Djeitun settlements in southern Turkmenistan (Lollekova 1988). In addition to perforators, awls, and spatulas, there are blunt bone polishers which may have been used for working hides or ceramics.

Awls and punches are the most common bone tools and are made of irregular splinters of mammal bone (3.5–10 cm long) or from broken metapodial bones with the distal end used as a handle (Figure 7.9). In these pieces, the naturally pointed end was shaped and smoothed by grinding and abrasion and crafted into pointed artifacts. Most of these tools were made



7.8 Terracotta whorls. 1977–1982 excavations. 1–5, roughly bi-conical shaped; 6–10, whorls made recycled terracotta or ceramic material; 11–18, conical shaped with a bell-shaped hollow.

from sheep- or goat-sized mammals. Traces of wear can be identified by polish, striations, or scratches on the surface of the bone (Figure 7.10:9,13). Bone preservation is good at Anau, and under the microscope many of these artifacts show high polish and organized parallel striations along the longitudinal axes of the working end. These tools are discarded after considerable wear, and many have broken ends. Experimental replication suggests that this pattern would most likely result from cloth or basketry manufacture (Lollekova 1988). These types of tools are common at contemporary early village sites in Central Asia (Khlopin

7.9 Bone tools. 1977–1982 excavations.

1961:182), and thus their abundance at Anau does not reflect a distinctive economic specialization but rather the general importance of textile production in the region.

Another group of bone tools are thought to have been used for finishing ceramic vessels. Two such smoothing tools were made of long bones with highly polished distal ends (Figure 7.10:14–15). The working ends show a number of linear striations. Three others were made from fragments of rib shafts (Figure 7.10:17–18). The convex working surface of the bone is worn and has linear traces showing the motion of use. One tool was made of a wild boar tooth 7 cm long (Figure 7.10:16). Its working edge is a sharp point with striations perpendicular to the arched edge. Similar tusk tools were found at Djeitun sites (Masson 1971).

Besides awls, smoothing tools, and perforators, bone polishers for treating hides were found at Anau. These pieces are made of trimmed and ground sections of mammal ribs—the working surface of the bone is the external, convex side of the tool—and show many linear striae.

Metal Tools and Ornaments

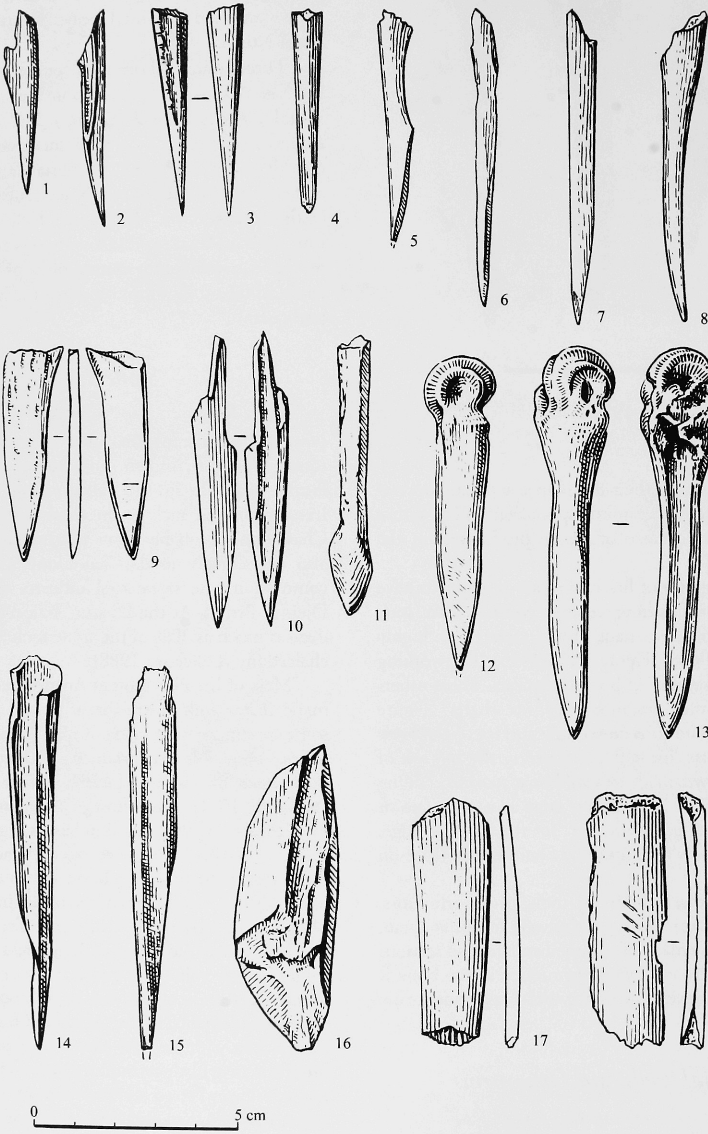
The first use of copper in Central Asia is documented from Anau North, Mondjukli, and the "73 km" site during the Anau IA period (Masson 1982). Copper artifacts were first found in Anau IA deposits from the 1904 excavations (layers 20–19). Copper artifacts are rare occurrences in the Anau IB1 and IB2 layers but became prevalent in the layers 4–0 (Anau II). Both copper and lead were used for beads found in burials at Anau North.

Three additional pieces of copper were found during the 1978–1982 excavations: a needle (Figure 7.11:1), a copper bead (Figure 7.11:2), and a miniature awl (Figure 7.11:3). This small sample does not directly reflect the use or importance of metal tools and ornaments, since typically such metal was not discarded but recycled. The gradual decline in the use of flint tools at Anau may be a more revealing indication of the increasing importance of copper. The abundance of flint tools drops off sharply after Anau IB2 in particular.

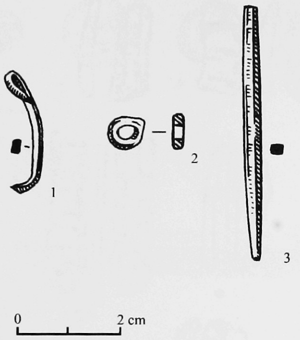
Stone Tools

Flint is the main material used to manufacture stone tools. This gray, brown, and honey-colored flint is locally available in the valleys rising up onto the Iranian plateau, such as the local Keltechinar Valley. Chalcedony, probably from the Iranian plateau, was also occasionally used. Chalcedony implements are common in the stone tool industry at sites of the Djeitun Period. At the Djeitun Period site of Gadym depe as much as 20% of the stone tools are made from chalcedony (Lollekova 1988).

Most of the flint tools at Anau were made of prismatic flakes with a straight or curved profile, while some specimens were made of more irregularly shaped flakes. Some tools were produced with retouch on both sides. Such blades are typical of earlier Djeitun sites (Sarianidi 1961). The most representative group of tools consists of blades used in harvesting grain (Figure 7.12:2–3,9–10,14–16). Five of the blades have two finely retouched edges, while the remaining specimens have only one. Both edges of the blades have sickle polish along the long edge. Fine, comet like parallel striations can be seen along the working edges. These blades would have been inserted into wooden or bone handles to form sickles—a type of compound tool abundant at Djeitun settlements. In the last stage of the Djeitun culture, sickles with serrated blades were produced, and this distinctive blade technology persisted well into the Early Village Period as recorded at such sites as Yalangach depe (Khlopin 1963b). A similar flint industry was found in period I at Hissar, where blades and a nucleus appeared in the occupational debris (Schmidt 1937:plate XVI: H3202, H2906, and H3795) and at Sialk III–IV (Ghirshman 1938:pl. XCVI top).



7.10 Bone tools. 1977–1982 excavations. 1–8, needles or perforators; 9–13, awls; 14–18, smoothing tools.



7.11 Metal objects. 1977–1982 excavations. 1, copper needle; 2, copper bead; 3, copper awl.

Comparing the flint assemblage at Anau with that of the preceding Neolithic period along the Kopet Dag, we find a much lower percentage of agricultural tools. In addition, there is a shift over time in the way the blades are finished. Sickle blades found at the early Djeitun settlements have a straight working edge. In later sites such as Chagylly depe and the upper layers of Pessejik depe sickle blades have serrate edges like those seen in the Chalcolithic periods at Anau. Experiments have shown that the serrated edge is more effective and less prone to wear (Lollekova 1988).

In addition to sickle blades, there is one drill in the Anau assemblage (Figure 7.12:11). This small tool (5 cm long, 1 cm wide) has a retouched tip and blunted side edges. Circular traces of wear are visible on the raised edges of the flake scars. Such drills were used to make holes in the small ceramic whorls, stone bearings for big stationary drills, retouchers which were also used as pendants, and shell beads. Such one-hand drills are traditional at Djeitun settlements (Masson 1971).

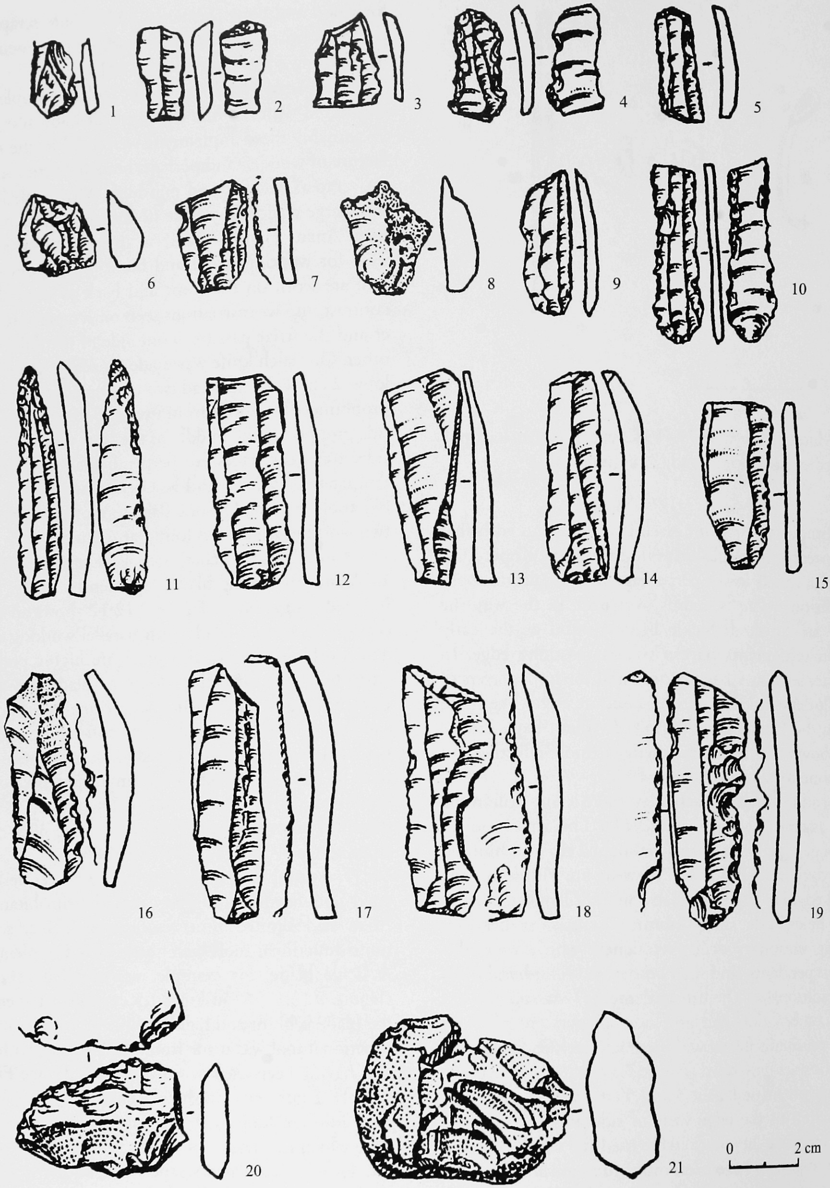
Combination end and side scrapers are made of long prismatic flakes with retouch on the back. The specific ones illustrated (Figure 7.12:7,8,13) were made of large prismatic flakes, 3 and 5 cm long. Microscopic inspection of the edge wear of side and end scrapers indicates that they were likely used for working hides. They appear to have been multi-function implements. Their edges were worn by use and highly polished. Striations from use wear are perpendicular to the edge. The lateral edges of the pieces were used to scrape the hide, while the blunt ends were used for smoothing (Figure 7.12:5,7). Such tools could also have been used for wood and bone (Semenov 1964). Side scrapers are common prismatic flakes, the working parts being one or two long edges (Korobkova 1981).

The Anau North collection includes implements connected with the fine treatment of bone and wood. Presumably these implements were used in the manufacture of wooden and perhaps bone hafts and handles for scrapers, sickles, and polishers. A two-sided blade on a large chalcedony flake (2 cm long, 0.7 cm wide) from Anau (Figure 7.12:4) is an example of a knife used for working wood and bone. Both sides of the tool are worn on the front and back of the flake. In contrast, use wear striations seen on scrapers are deeper and the striae pass from one side of the flake to the other. One such knife was made on a large flake (5 cm long, 2 cm wide) and had two cutting edges. There are pronounced striations from use on both edges, on one side grouped in the middle of the edge. On the reverse side, use wear traces are perpendicular to the blade. Similar tools were found at Djeitun-age sites. Chisel-like tools are rare, but one flake tool of this type, with two working edges, was found at Anau.

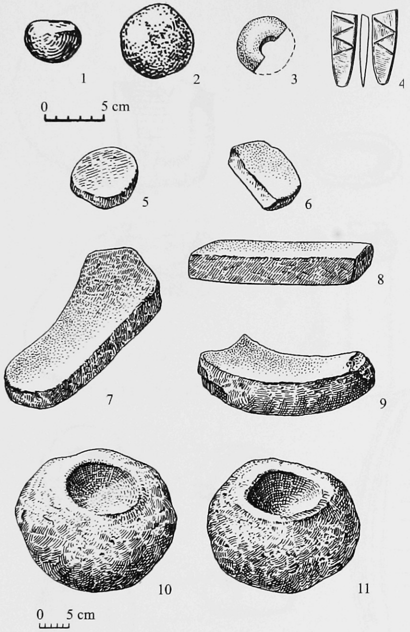
A number of butchering tools have been identified at Anau, including blades apparently made to be inserted into handles. Figure 7.12:12 shows an example of a 5 cm long blade with parallel working edges. The working edges of this piece are highly polished, with the polish extending along the blade and deeply into the retouch scars. Microscopic analysis also indicates that a small number of non-retouched flint blades appear to have been used for cutting meat. Such tools make up a much more important part of the assemblage at the earlier sites of Djeitun. At Pessejik depe, for example, they account for up to 30% of the stone tool assemblage (Lollekova 1988).

The number of flint tools that have been resharpened and reworked suggests that the inhabitants of Anau had limited flint resources available; several multi-functional tools were made of old implements. A sickle blade, for example, was recycled as a saw (Figure 7.12:17; 6 cm long, 1.5 cm wide); the end of the blade is blunt and highly polished. Another multi-functional tool was made from a sickle blade with one side having been used to work wood and bone(Figure 7.12:1). Figure 7.12:18 shows a curved, notched blade scraper, 6 cm long, with one lustrous, finely serrated edge which functioned as a saw.

Heavily retouched scrapers and burins were also made at Anau North. Retouched scrapers were made on flakes (Figure 7.12:16–19). The working edges are damaged with crushing and scratches. One of these tools was made on a large blade that shows heavy wear from working bone and horn along one edge.



7.12 Flint tools. 1977–1982 excavations. 1, 16–20, multifunctional tools; 2–5, 9, 10, 12, 14, 15, blades; 6, 7, 8, 13, scrapers; 11, drill, 21; hammerstone.



7.13 Ground stone objects. 1977–1982 excavations. 1,2, stone spheres; 3, stone ring; 4, ground and incised stone polisher; 5–9 grinding stones; 10, 11, mortars.

A piece of flint 6.5 cm long and 3 cm wide was used as a hammerstone (Figure 7.12.21). Its wide, massive part was its working end, where one can see traces of percussion, fracture, and crushing. Such hammerstones were used for fracturing nodules of flint to produce blades and flakes.

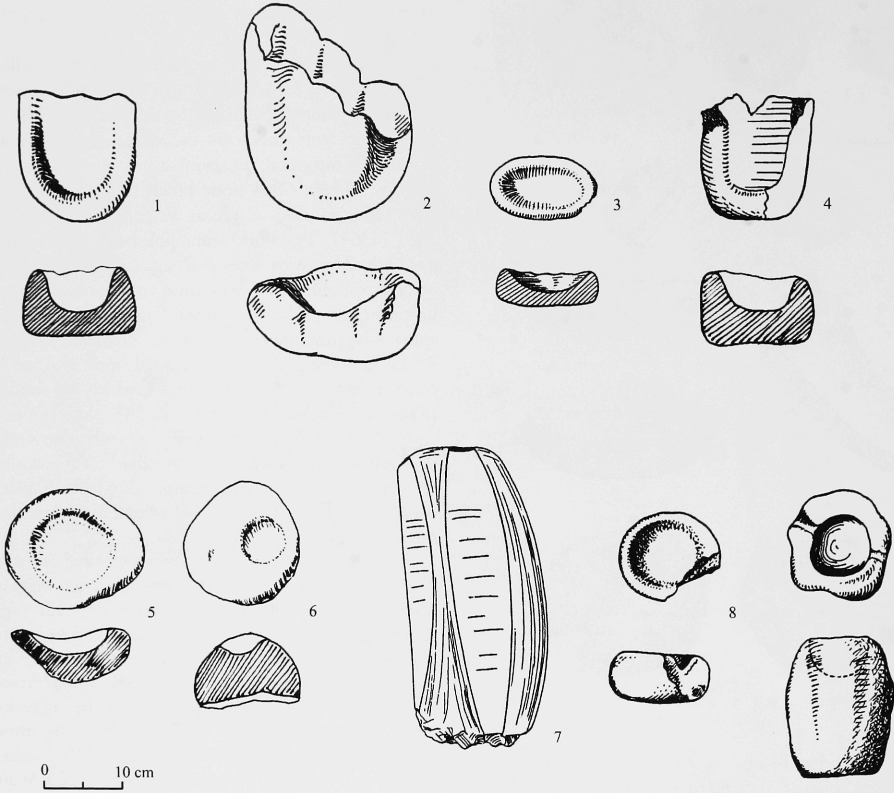
Other Stone Implements

The pecked and ground stone implements from Anau North include grinding stones, mortars, pestles, hide polishers, bearings for stationary drilling, abrasive instruments, and a fragment of a perforated retoucher. Large grinding stones (Figure 7.13:7–9; Figure 7.14:7), found throughout the sequence at Anau, are probably for grain. In contrast, two smaller ones had traces of ocher on their surfaces (Figure 7.13:5–6).

Other ground-stone implements include shallow mortars (Figure 7.14:5,6,8) similar to one at Kara depe in layer 1a context (Masson 1961b:plate XXXII:3). A tall mortar from the 1904 excavations has a groove across its top, perhaps from some secondary use (Figure 7.14:9). Oval stone bowls (Figure 7.14:1–4) have close parallels at Hissar in period II (Schmidt 1937:H3642). A ground-stone polisher was decorated on both sides with incised designs (Figure 7.13:4). Microscopic analysis reveals linear traces and a surface-luster similar to leather polish. There are also stone spheres approximately 5 cm in diameter (Figure 7.13:1,2) and a polished, egg-shaped stone in Anau II context from the 1904 excavations, which are similar to the clay slingballs from the Anau IA period. It is not clear whether spherical stones were all worked or some were natural cobbles, but their standard form and size are similar to Bronze Age ceramic slingballs. Similar stone slingballs are found at Mondjukli and are interpreted as weapons (Berdiev 1972b).

Fragments of four *gyrs* have been excavated at Anau North (Figure 7.15:1–4), probably used as weights (Alekshin 1973). Okladnikov (Masson 1953:12) suggested that these weights may have been used in irrigation technology, although their frequent occurrence in domestic debris suggests that they had a household function. Similarly large weights were observed in rug making in modern village Iran (Wulff 1966:202–204) they come from warp-weighted looms. From the 1997 excavations, gyrs were found in Anau IIA context and Anau IB1. They have been found in Bronze Age contexts at Anau South, as well. Thus, the distribution of these weights extends throughout the entire occupational period at Anau, and, indeed, they are ubiquitous at Bronze Age sites throughout the oases and foothills of Central Asia and on the Iranian plateau. The example from Anau IB1 is one of the earliest in Central Asia, though similar *gyrs* are found at Hissar, in Period I (Schmidt 1937:H2095), and at Sialk III (Ghirshman 1938:plate. LXXXV:s.223). In Central Asia, such objects can be rather crude and unadorned or extremely well made and decorated (see, for example, the finely crafted *gyrs* at Kara depe) (Masson 1961b:plate. XXII:1,4).

The uses of stone (both ground and chipped) and bone are stable over the duration of occupation at Anau North, and comparative analysis suggests a continuity in the production of these implements from the earliest Djeitun onwards (Lollekova 1988). The analysis of tool function through microwear indicates that cereal harvesting, meat and hide processing, and working bone and wood was carried out using the same types of stone



7.14 Ground stone objects. 1904 excavations (except 5 and 6—1997 excavations). 1–4, oval bowls; 5, shallow mortar, ANI 16; 6, shallow mortar, ANK 3; 7, grinding stone; 8, shallow mortar; 9, tall mortar.

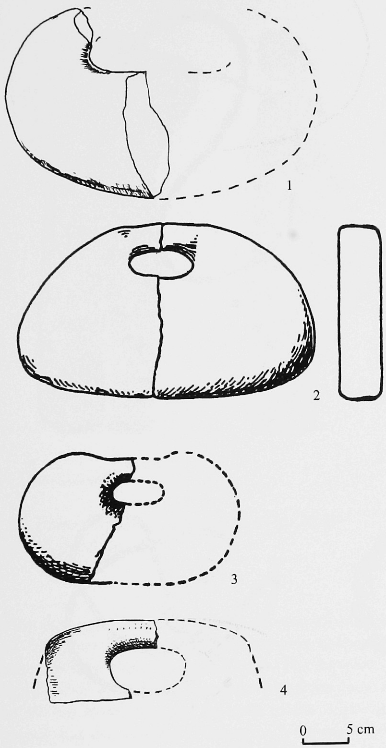
and bone tools through time. However, the density of flint and bone tools from village sites such as Anau North is much lower than that found at the earlier Djeitun sites in the region (Berdiev 1969).

Beads

The 1978–1982 excavations of fill in residential contexts yielded numerous finds of alabaster or white paste beads (Figures 7.16, 17:5–6), shell beads (Figure 7.17:3,4), stone pendants (Figure 7.17:2), and individual beads of lapis lazuli (Figure 7.17:1). The beads, like those found in the 1904 excavations, mostly came originally from burials. Three sets of beads from the 1980 season were found *in situ* with the burial in layer 6. Cylindrical drilling, not found at Djeitun period sites, is first attested to in Anau IB1 at Anau North.

Ritual Table

A single leg of a chaff-tempered and painted table was excavated from layer 6 in 1979 (Figure 7.17:11). This leg can be closely paralleled to a distinctive ritual terracotta table from one of the shrines at Ilgynli (Berezkin and Solov'eva 1998:fig.16.3). Such tables were either built into the floors of rooms or, like this fragment, were mobile furniture in a shrine.



7.15 Stone weights. 1904 excavations (except 1—1997 excavations). 1, ANM 6; 2, Table A.3 context 3; 3, context unknown; 4, T13.

Weapons

Only one flint arrowhead was found at Anau North, in an Anau IB1 context, despite the high incidence of hunted prey in the food remains. Defensive weapons are more frequently found. Stone maceheads (Figure s 7.1:3 and 7.6:14) are not highly polished or decorated and appear to have been functional weapons as opposed to ritual items. Slingballs made of terracotta and stone (Figure s 7.2:11–13 and 7.6:15) also appear to have been weapons. These weapons take on added significance in the context of the apparent fortified village plan of Anau North described in the next chapter.

Figurines

Among other implements and beads described above, there also have been finds of terracotta animal figurines (Figure 7.17:7–10). The roughly modeled zoomorphic figurines depicted medium-sized quadruped mammals. Based on the Ilgynli and Altyn depe figurines they can be generally divided into four categories (bull, ram, ibex, and dog) (Kasparov 2000). Using these analytical criteria, the Anau figurines represent bulls, with small stubs placed where horns would be.

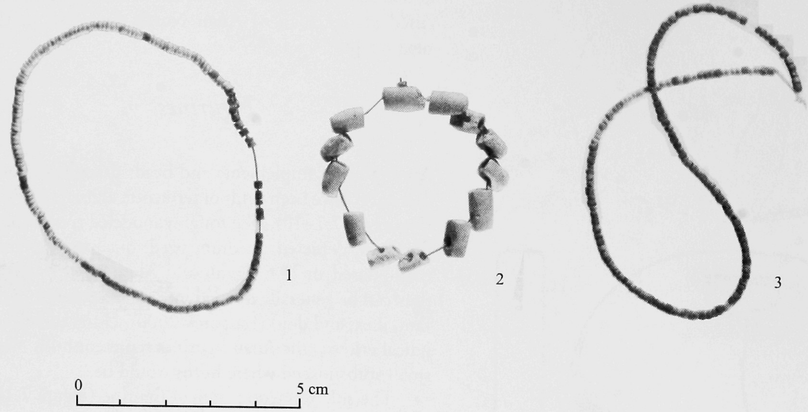
The sole terracotta human figurine (Figure 7.18) came from an Anau I context (Rempel' 1953). It was discovered during Ershov's excavations, probably in the large building with wall paintings (layer 17). This figurine has exact parallels with the figurines from layers 16 and 19 from sounding no. 1 at Kara depe (Masson 1961b:fig 4), as well as with examples from Namazga depe, sounding 5, and Dashlidzhi (Masson 1982:Table 5:type 1,1).

Summary

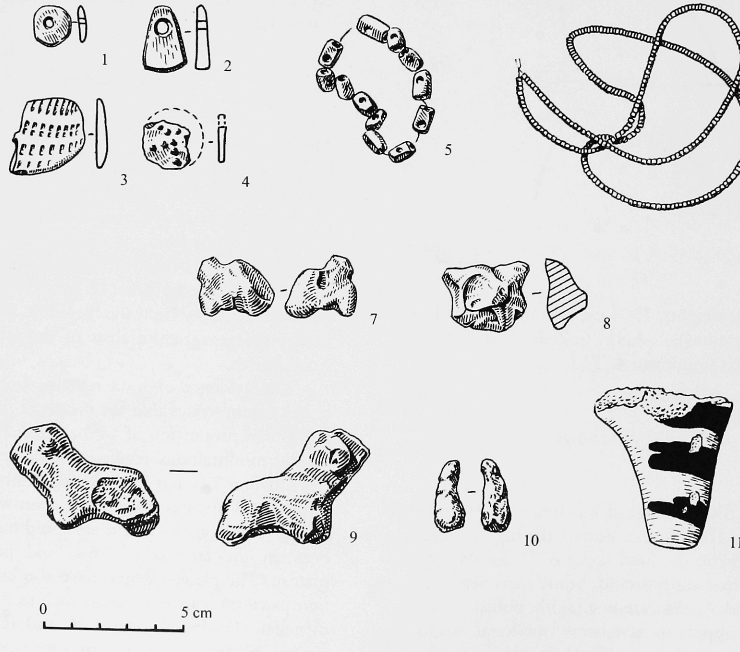
The technology of craft production at Anau North both resembles and contrasts with that of the earlier Djeitun sites and the later Central Asian sites.

From layers 20–19, the small finds compare easily with the finds from the upper levels at Chakmakli and Mondjukli (Berdiev 1972b). Taken together, the small finds from the Anau IA period reflect the transition in economy from the Neolithic Djeitun culture to the village agriculturalists of the later periods at Anau North.

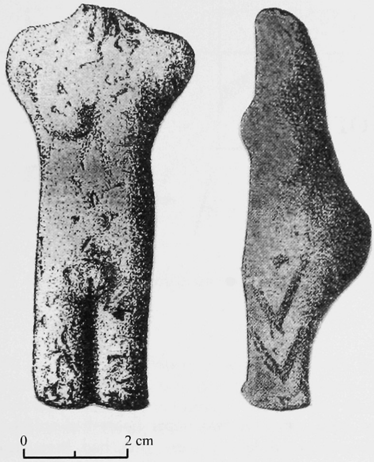
The evidence of food remains from the animal bones demonstrates that the people at Anau were eating a high proportion of wild animals from both the nearby mountainous region and the Iranian plateau (see Chapter 12), but interestingly, almost no hunting implements, such as stone or metal arrow points, were found. This suggests that there could have been trade between the farmers of Anau and people on the plateau. The plateau would have also been an important place for source materials such as flint, lapis, and carnelian. During the Anau IA and IB periods, the nearest contemporary plateau sites, the sites of the Atrek valley—tepe Yam and XA6 (Ricciardi 1980)—include ceramics practically identical to Anau North.



7.16 Beads from burial 6, layer 7. 1980 excavations.



7.17 Ornaments. 1977–1982 excavations. 1–4, shell ornaments; 5, stone beads from burial 6; two strands of alabaster or white paste beads from burial 6; 7–10, terracotta animal figurines; 11, ceramic table leg.



7.18 Female figurine. 1953 excavations. After Rempel' 1953, fig. 2.

Later, during the Anau II periods, the sites of Manysh and Nishapur-P had nearly a one-to-one correspondence with the those of Anau North. The location of these last two settlements, along the pass from Anau to the plateau (Manysh), and adjacent to the important mineral and ore deposits (Nishapur-P), suggest direct exploitation of these natural resources by people from the Kopet Dag region at the time when such materials were becoming common in Central Asian sites.

The combined excavations at Anau North for Anau IB1 and IB2 (layers 18–5) represents a large collection of small finds from this period—comparable with the assemblages from the wide-scale excavations at Namazga, Kara, Yassi depe, Dashlidzhi, and Geoksyur 1.

Spinning and weaving appear to be particularly important activities during the Anau I periods. *Gyrs*, if they are loom weights, indicate loom-based weaving, possibly even of rugs. This is consistent with the evidence for local herding at Anau and the production of wool. The density of whorls and the diversity of types of whorls increase over time, suggesting that a variety of fiber products were produced locally. The textile-impressed ceramics from layer 14 (see Appendix D) indicates that at least some of the textile production did involve plant fibers rather than animal fibers.

During the Anau II period, on a local level, assemblage at Anau North contrasts strongly with the contemporary settlement at Ilgynli, which has an abundance of human figurines and ritual objects. This contrast highlights the functional differences between the two sites: the Ilgynli site has been proposed to be a religious center, while Anau North appears to an example of a basic farming community, with ritual focused around household shrines.

On a regional level, the Anau II/late Namazga II industries from the sites of the Kopet Dag foothill plain compare closely with those from Iran, in particular from Hissar II and from Sialk IV, 1–2. The spindle whorls, other terracotta objects, flint blades, *gyrs*, and copper tools found at these sites are very similar to each other and reflect a similar type of industry and possibly exchange. Even so, parallels do not extend to symbol-bearing administrative and ritual materials from the Iranian plateau, such as Proto-Elamite tablets or seals. Despite extensive excavations of Anau II/late Namazga II sites in Central Asia, Proto-Elamite tablets and seals are thus far unknown from the north side of the Kopet Dag. Similarly, few if any, Central Asian objects adorned with local symbols have been found on the Iranian plateau at this time. The broad array of shared technologies, items of exchange, and prestige goods indicates extensive contact and interaction between these two regions, but apparently they maintained separate identities in administration and ritual.

8

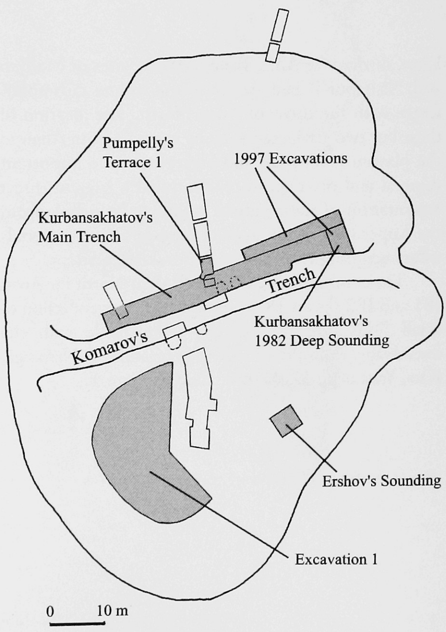
Architecture at Anau North

The 20 layers of architecture exposed during Kurbansakhatov's excavations from 1977 to 1982 allows us to place into context the architecture revealed in 1904, 1953, and 1997 (Figure 8.1). A number of key features can be tracked in summarizing the architectural shifts through time: (1) the technology of building—the way that floors, walls, hearths, and storage areas were constructed; (2) the layout of the village including the location of ritual areas, courtyards, and boundaries; (3) the history of individual structures, including length of occupation, mode of construction, alteration or reuse, and abandonment; and (4) household organization.

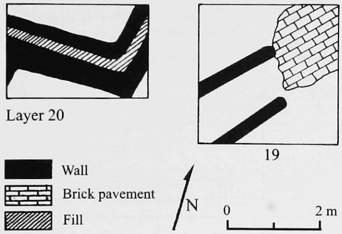
Anau IA

Anau IA layers were reached in four soundings at the site: Kurbansakhatov's 1982 deep sounding on the eastern edge of the mound (re-excavated and sampled in 1997), Ershov's 1953 sounding on the southeastern slope, the 1904 excavations at the east gallery in the center of the site, and the north digging on the northern edge of the mound.

The Anau IA architecture, as seen in Kurbansakhatov's (3 m x 2 m) deep sounding, was built upon an undulating hard surface, on which lay ceramics and brick fragments. The walls of the earliest architecture (layer 20) appear to have been repeatedly rebuilt on the same foundations. Parts of two interior rooms were excavated sharing an east-west interior wall with painted plaster on each side and a north-south exterior wall (Figure 8.2). Three distinct floor levels, each having lime plaster (in the Djeitun tradition), were identified inside, and the two upper floors had reddened, charcoal-flecked lenses where fires had been made directly on the floor. The room fill above the floors contained broken bricks (reconstructable to 40–50 cm x 20 cm x 8–10 cm) and trashy deposit from reuse of the



8.1 Areas of architecture excavated at Anau North.



8.2 Layers 20–19. Kurbansakhatov's deep sounding. Anau IA period.

area as a place for midden. Several of the brick fragments had red paint from a different structure. An adult burial (Chapter 9, burial 1) was dug into the fill of the room when the room was already out of use. It is not clear from what layer this burial originated.

After an undetermined amount of time, another Anau IA-type dwelling (architectural layer 19) was built on the same spot but in a different orientation. Two parallel walls constructed with similar sized mud bricks formed a corridor 85 cm wide, dividing two rooms. The room floors had thick layers of lime plaster. The fill above this included bricky deposit associated with the mud brick walls, preserved to 1.25 m in height, and an upper fill of midden deposit representing debris after the architecture fell out of use.

The layer 19 building was built upon a mud brick mass. This pile of brick fragments, possibly wall debris from a different structure, covered an adult burial (burial 2). It is quite likely that the layer 20 and layer 19 burials belong to the same period of interment.

Anau IB1

After the gradual abandonment of this part of the village, several areas of the site appear to have been inundated and the layer 19 architecture washed over with alluvial sands. In Kurbansakhatov's deep sounding, above the layer 19 architecture 75 cm of hard sterile deposit lay upon a thinly laminated series of water-lain deposits. No architecture or artificial surface was associated with the hard sterile deposit. It formed a clear break in the occupational sequence.

There is evidence of a more extensive occupation during the Anau IB1 Period: Anau IB1 occupational layers are found at the north digging, east gallery, Kurbansakhatov's deep sounding, Ershov's sounding, and the west shaft, 100 m northwest of the mound.

During the IB1 period a distinctive pattern of construction emerges at Anau North: the building of new structures made without consideration of the earlier settlement layout and without using the older wall stubs as foundations. This pattern is documented from at least layer 15 in IB1, through the IB2 layers to layer 4 in Anau IIA, and possibly through IIB. Similar discontinuities between architectural layers are also documented at the other contemporary sites along the Kopet Dag, but such a pattern contrasts with architectural traditions outside of Central Asia.

The architecture of Anau IB1 is best described from Kurbansakhatov's deep sounding and Ershov's sounding where eight stratified architectural layers correspond to IB1. These two areas having contrasting architecture in this period. The deep sounding excavations revealed mostly storage and courtyard areas likely on the edge of the settlement. Ershov's sounding, on the other hand, revealed well-built domestic and ritual architecture.

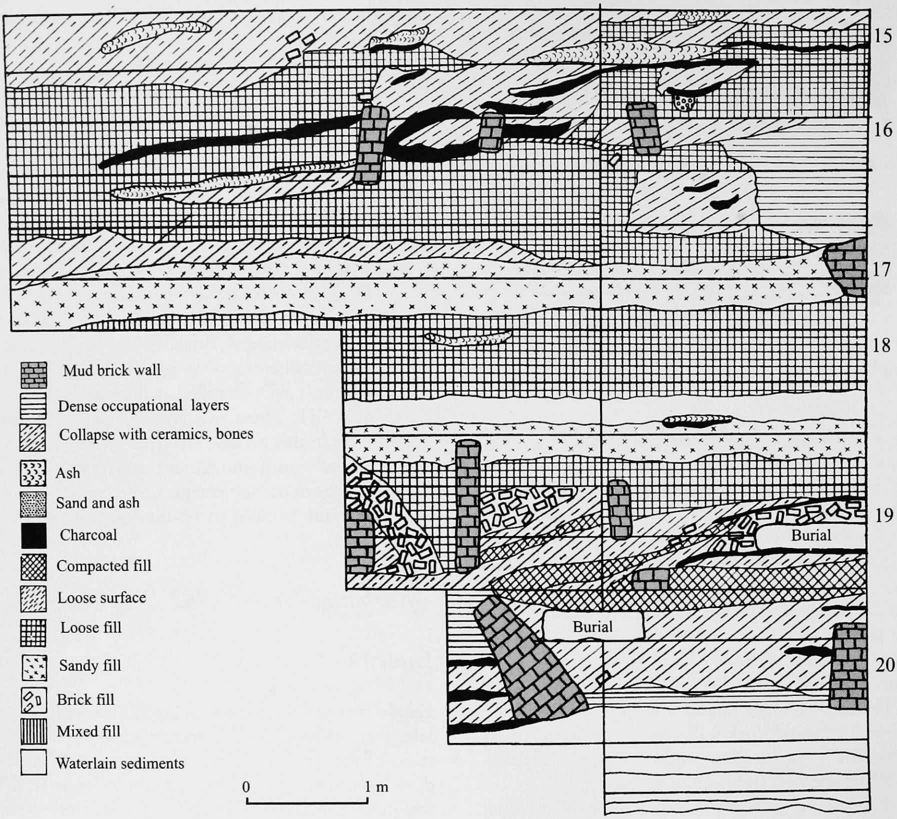
Kurbansakhatov's 1982 Deep Sounding

Layer 18

People eventually returned to Anau and built a new village upon the alluvial deposits which overlay the ruins of the Anau IA settlement (Figure 8.3). In the deep sounding, early IB1 architecture, in layers 18–15, was investigated in a very restricted area (3 m x 5 m). The earliest IB1 architecture is represented by the edge of a rectangular mud brick structure, preserved to a height of 35 cm. This wall was built upon an uneven hard deposit of degraded brick collapse which contained little cultural debris (Figure 8.4a).

Layer 17

In layer 17, two brick structures were built upon a prepared surface, one circular and one rectangular (Figure 8.4b). The orientation and construction of the walls of these structures were entirely different from that of layer 18. Both were preserved to 40 cm in height. The circular structure, the earliest found at Anau North, is 2.5 m in diameter and slightly beehive shaped (Figure 8.5). It has a narrow doorway, 45 cm in width, with a mud-plastered threshold 25 cm tall. A narrow mud brick wall abutted the circular structure near its doorway. This wall may indicate that the circular structure was part of a larger architectural ensemble rather than



8.3 Layers 20–15, Stratigraphy, Kurbansakhatov's deep sounding. Anau IA and IB1 periods.

standing alone, as is better seen in the later IB1 architecture of layers 14, 12, and 10, described below.

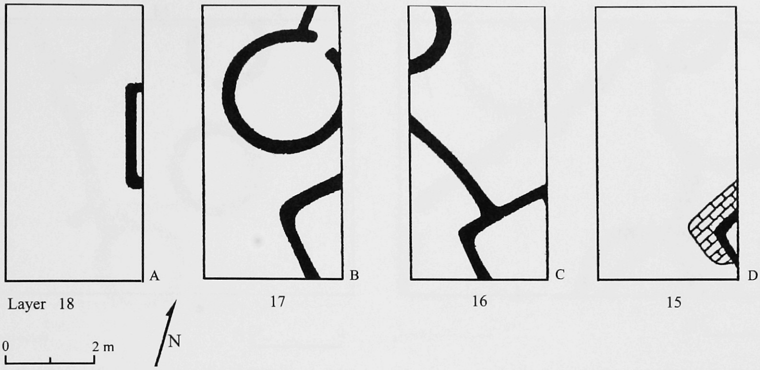
Layer 16

In layer 16, two mud brick structures-circular and rectangular—were constructed on a tamped-earth surface (Figure 8.4c). Stubs of the walls of the rectangular structure in layer 17 walls were used as foundations in the construction of layer 16 rectangular structure. While these constructions are described as a separate architectural layer, this layer is, in many ways, simply a later rebuilding of the layer 17 architecture.

The circular structure (2.2 m in diameter) had walls preserved to a height of 50 cm. The incline of the wall indicated that it was beehive shaped, as in layer 17. The upper deposits included ashy and charcoal lenses interspersed with the midden overlying the architecture. The area was used for refuse disposal after the architecture fell out of use.

Layer 15

In layer 15, only the exterior edge of a rectangular building was revealed in the deep sounding (Figure 8.4d). This building was constructed on the leveled debris of layer 16. This is the earliest example of leveling in preparation for construction seen at Anau North. The wall is single-brick thick; an adobe or mud brick pavement extends 50 cm out from the wall surrounding the exterior corner. This pavement appeared to have been constructed with the building itself. To the west, outside the

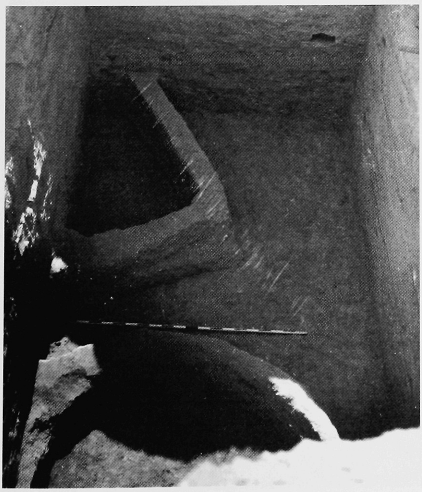


8.4 Layers 18-15. Kurbansakhatov's deep sounding. Anau IB1 period.

building, an uneven ashy surface appears to be courtyard debris. The upper deposits of layer 15 were leveled fairly evenly by the subsequent occupation.

Layer 14

Layer 14 was excavated over a larger area (9 m x 5 m) than layer 18–15, revealing a clearer picture of the



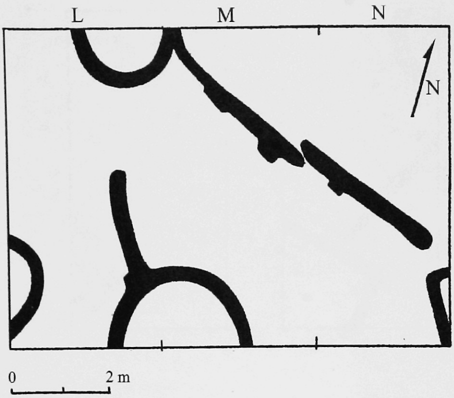
8.5 Layer 17 structures, looking north.

architectural features of Anau IB1. Here, in sectors L, M, and N, the layout includes parts of four structures. The walls of layer 14 were preserved only 25–30 cm, having been leveled by later construction.

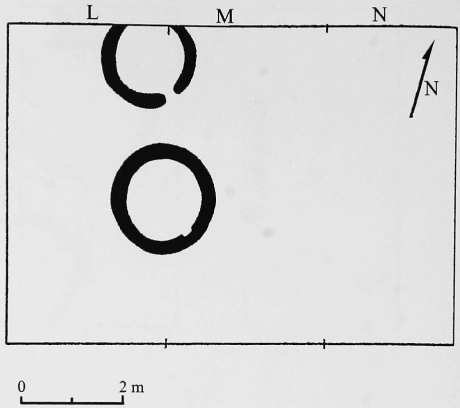
In 1982, only the upper fill of layer 14 was excavated; further excavation of layer 14 was conducted in 1997. The excavation of the southern circular structure in sector M in 1997 (see Chapter 4 for its depositional history) indicates that the structure had a variety of uses including habitation and as a barn. The rectangular structure in the southeast corner of the excavation was also investigated. Its mud brick construction, wall size, and a soil sample from its fill are similar to that of the circular structure, which suggests that there was no differentiation of function between circular and small rectangular rooms within a given architectural setting in this period.

A wall connects the northernmost circular structure in M and the rectangular structure in N. The connecting wall (a curtain wall) is narrow—one brick thick—but has interior buttressing. The deposits east of the buttressed wall were sloping middens with no constructed or obvious surfaces and the 1997 excavations suggest that this may be the edge of the settlement (Figure 8.6).

Similar buttressed curtain walls are found at later Namazga II sites of the Geoksyur region and possibly earlier at Mondjukli (Berdiev 1972b). The closest parallel is at the later Namazga II period sites of the Geoksyur region—Yalangach and Mullali depes, where wide-scale horizontal exposure villages bounded by buttressed curtain walls connecting round tower structures (Khlopin 1969).



8.6 Layer 14. Kurbansakhatov's deep sounding. Anau IB1 period.

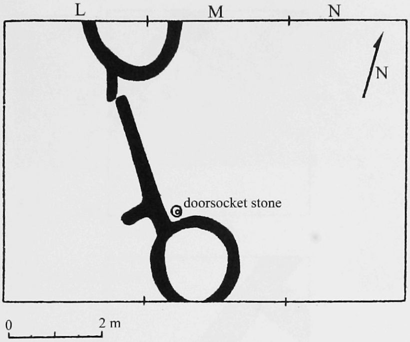


8.7 Layer 13. Kurbansakhatov's deep sounding. Anau IB1 period.

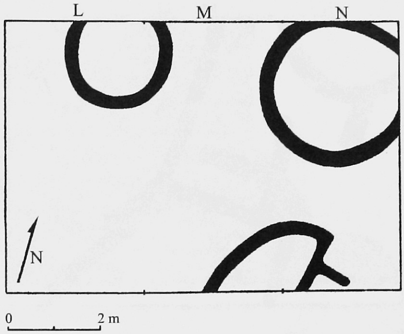
Layer 13

The surface was leveled prior to construction in layer 13. Two circular structures were built in this area in an open courtyard (Figure 8.7). These structures are preserved to a height of 30–35 cm (Figure 8.8). A doorway in the northern circular structure is approximately 30 cm wide, with a 25-cm tall threshold. The typi-

8.8 Layer 13 architecture, looking north.



8.9 Layer 12. Kurbansakhatov's deep sounding. Anau IB1 period.



8.10 Layer 11. Kurbansakhatov's deep sounding. Anau IB1 period.

cal height for thresholds in traditional mud brick houses near Anau is 20–25 cm. While such thresholds do not keep rodents out, they are said to be effective in keeping snakes and scorpions out (Said Khamritlaiev, personal communication. 2000) and are typical in both enclosed living spaces and storage areas. The profile of the circular structures in layer 13 slopes inwards in a slightly beehive shape. Whether they had separate thatched roofing or cupolas is unclear.

Layer 12

The excavations of layer 12 uncovered two circular structures, with a curtain wall running between them (Figure 8.9). Both had prepared floors. The preserved height of the walls is 25 cm; thus direct signs of doorways with thresholds is obscured. The structures were filled with crushed mud brick debris but contained no significant artifacts, although a flotation sample (Chapter 10, 97.083) indicates a density of carbonized plant remains comparable with habitation areas. While there is no evident leveling, the northern circular structure (1.75 m in diameter) is slightly offset and did not use the earlier wall stubs as foundations. The southern circular structure is smaller but similarly constructed and filled with bricky debris. The curtain wall connecting the two structures had an open doorway (without a threshold), which was later blocked. A stone doorsocket was found near the southern circular structure, although it is unclear if it was *in situ*. If it was, then there might have been another doorway along the north-south wall.

Layer 11

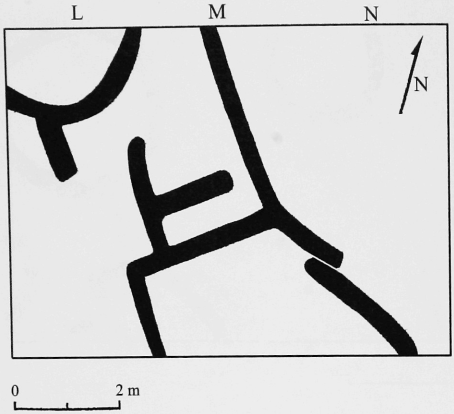
Parts of three small round structures were found (Figure 8.10) in layer 11. The round structure in sector N had a diameter of 2.8 m, perhaps originally forming a beehive shape similar to the circular structures of layers 13 and 16. To the northwest was a smaller circular structure. Floors within both circular structures were well compacted and had a sand coating. However, none had any distinctive artifacts in them. The rounded structure in sector M was smaller (2.0 m x 1.5 m), probably a storage bin.

Layer 10

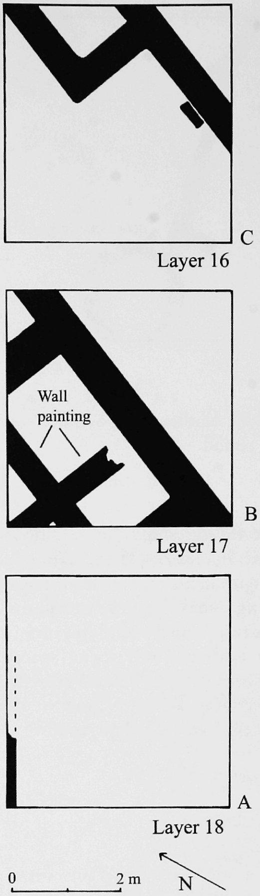
Layer 10 remains were constructed on leveled deposits but did not reuse earlier wall stubs. A narrow north-south wall, constructed in parts, divides the excavated area in to east and west parts (Figure 8.11).

To the east, no clearly defined surface was found, and the undifferentiated deposits are similar to the possible exterior deposits as seen in layer 14.

To the west, the rectilinear architecture and a circular structure may have been specifically constructed and used as storage structures, in that the surfaces were not plastered or finished in any way typical of habitation areas at Anau. The circular structure (1.8 m diameter) burned before collapsing in on itself.



8.11 Layer 10. Kurbansakhatov's deep sounding. Anau IB1 period.



8.12 Ershov's sounding, after Ershov 1956: fig. 3. Anau IB1 period.

Ershov's Sounding

While Anau IB1 architectural remains from the 1982 sounding are modest, they contrast with the corresponding layers in Ershov's sounding. The Anau IB1 layers were excavated in an area limited to 4 m x 4 m. As in Kurbansakhatov's deep sounding, alluvial deposits divided the Anau IA and Anau IB1 layers (Ershov 1956:27). Three architectural layers correspond to Anau IB1.

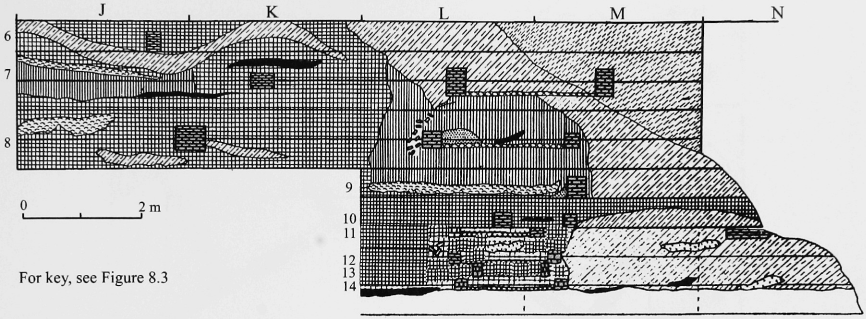
The lowest Anau IB architecture (equivalent to layer 18) has a rectilinear architecture with plastered floors, and walls in an approximately north-south orientation (Figure 8.12a).

The second architectural level (equivalent to layer 17) had rectilinear architecture in a different orientation than the earlier structure (Figure 8.12b). Here a room with 65–75 cm thick walls was found. This room, 3 m wide and more than 3 m long, had plastered and painted interior partition walls. Painted inside wall designs are stylized renditions of a checkerboard and an alternating triangle motif (see Figure 3.9). The architectural layout of the room and the type of construction at Anau North are similar to the contemporary structure at Yassi depe, where geometric polychrome painting was also found on two surfaces of a square well-built room. Masson interprets both the Yassi depe room and the Anau IB1 room from Ershov's sounding as shrines (Masson 1982:21).

Ershov's third level of Anau IB1 architecture corresponds with layers 16 or 15 (Figure 8.12c). Here two superimposed levels of walls: the lower wall was well preserved, being part of a rectilinear structure built on the foundation of the earlier architecture. The upper architecture was poorly preserved, destroyed in part, due to shifting of upper deposit at the site during the 1948 earthquake (Ershov 1956:26).

Anau IB2

The Anau IB2 period architecture is documented in two areas excavated by Kurbansakhatov: the main



8.13 Section, layers 14–6, main trench. Anau IB1 and IB2 period.

trench (layers 9–5, excavated between 1979 and 1981) and excavation 1 (layer 5, excavated in 1981).

Main Trench

Five IB1 architectural layers were excavated from the main trench, some of which could be followed from the eastern edge to practically the center of the site (Figure 8.13). In order to clarify the layout of the architecture in the main trench, the following descriptions of the architecture in each layer are made from west to east.

Layer 9

Layer 9 was excavated over an area 9 m x 5 m, in sectors L, M, and N (Figure 8.14). Here, in 1982, part of a layer 9 building was cleared in sector M, with a plastered floor and a short mud brick divider on the interior of the southeast wall. The 1997 excavations in ANL (adjacent to Kurbansakhatov's sector L) contained the excavation of this room. This building had a very archaic square form (4.5 m x 4.5 m) and repeatedly painted interior floors and walls. An oven was built into the wall on the east side of the room. The floor of the oven was plastered a number of times and was covered with thick, ashy debris. This oven is similar to those found at Dashlidzhi depe, levels 2–3 (Khlopin 1961:142–143), and at Yassi depe, room 16.

An open space (courtyard or alleyway) separated the square building from another building in the southwestern part of sector M. This building has less elaborate architectural treatment: the inside walls of the large room were plastered with mud and the floor was made of tamped earth. A storage bin was built along the southwest side of the building.

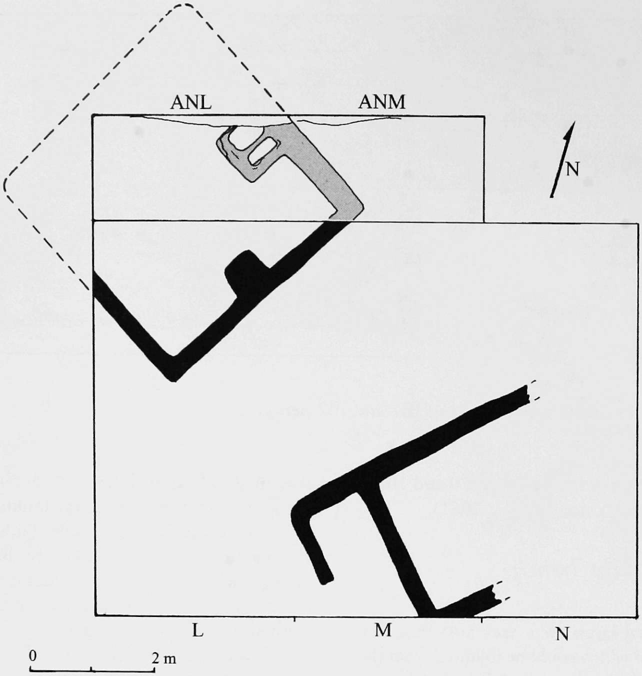
The courtyard and southern building in layer 9 in the main trench, as reported by Kurbansakhatov, were strongly leveled. The square building had been cleared out and appears to have burned. Similarly cleaned and burned rooms found at Ilgynli depe have been argued to be deliberately burned shrines (Berezkin 1992). The distinctive construction and form of the building in this layer (and the subsequent two architectural layers) appear to fit the Ilgynli shrine type.

Layer 8

In sectors J, K, L, and M the layer 9 architecture was leveled before the new construction was made (Figure 8.15). Two layer 8 structures were separated by a courtyard: a double-room storage facility to the west and a multi-room building to the east, with a courtyard to the south (Figure 8.16).

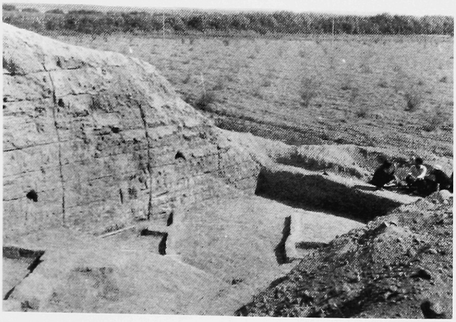
The storage building in sectors J and K consisted of two square rooms (2 m x 2 m) neither painted nor plastered. No doorways are visible, but it is probably because the subsequent leveling left only some 15–20 cm of preserved walls in most areas. Most likely the storerooms had portals with higher thresholds much the way circular structures were shown to have in earlier layers.

A series of rooms sharing walls was excavated in sectors L and M. A thin wall forms an open entrance toward the southern courtyard. A large, carefully constructed room with plastered floors and plastered interior wall was excavated in 1981. Near the eastern wall was a stone doorsocket, indicating that the room probably had a separate doorway above a threshold into the



8.14 Layer 9, main trench and 1997 excavations.

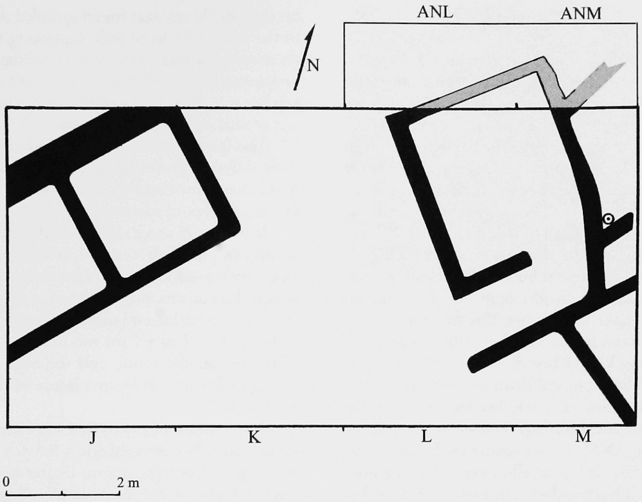
room to the east. In the adjacent sector of ANM, excavations in 1997 found that the northwest interior wall of this room was painted black, typical in ritual architecture in Central Asia. This type of room, like the one in layer 9, is best compared to the shrines of Ilgynli depe (Berezkin 1992).



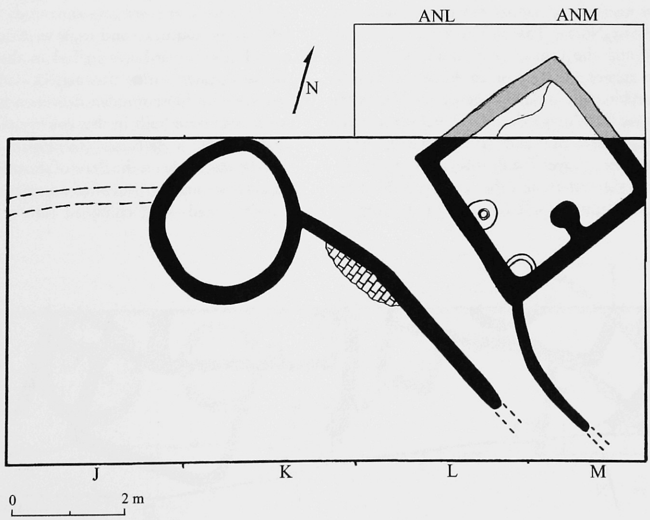
8.15 Layers 8 and 9, 1980s excavations, looking east.

In sectors J, K, L, and M, the layer 8 architecture was evenly leveled by the later constructions. Farther west, in the center of the mound, the compacted layer 8 walls and surfaces can be traced along the length of the exposed scarp of Komarov's trench. Pumpelly also observed this distinct and continuous architectural layer: "a horizontal red layer at about 35 feet above the base extends through the kurgan and undoubtedly records a conflagration. This would seem to show also that the houses of that time were thatched; and this would indicate a climate that favored a more abundant vegetation than now obtains" (Pumpelly 1908:41).

It is still possible to trace several leveled and stratified architectural layers along the exposed upper scarp of Komarov's trench (in particular layers 8, 6, and 5). Micromorphological samples from this layer, however, found no evidence of a village fire or catastrophic change in layer 8. Most likely the red layer observed by Pumpelly was simply dense occupational and leveling debris.



8.16 Layer 8, main trench and 1997 excavations. Anau IB2 period.



8.17 Layer 7, main trench and 1997 excavations. Anau IB2 period.

Layer 7

Layer 7 architecture was excavated in areas J–M.

A curved wall stretching from J to M bounds an oval courtyard (Figure 8.17). The courtyard surface, to the south, was poorly preserved except for near the wall, where traces of an adobe or mud brick pavement could be seen. A circular structure built into the wall is rather large (2.2 m in diameter). The fill of the circular structure consisted of ash with an admixture of charcoal, which may have been from burned roof debris.

An alleyway divides this round structure from a square building. This square building is 3 m x 3 m, with an interior mud brick divider built into the southern wall. Like the layer 9 structure, this structure has an archaic single-room layout, recalling earlier house forms at Djeitun, Pessejik and Chagylly (Masson 1971). While no hearth was found in the structure, two storage features were identified: a mud-plastered basin in the southeast corner and a *korchagi* set into the floor. In the adjacent sector, ANM, the remainder of this room was excavated in 1997. It had a yellow sand-plastered floor that was painted black and appears to have been roofed.

Layer 6

In 1980, Kurbansakhatov's excavations in the main trench were carried out across practically the entire center of Anau North. The architectural transect of layer 6 bisected the central part of the settlement, exposing an area of 39 m x 3 m. In the sectors of J, K, and L the architecture of layer 6 generally follows the pattern of layer 7, although the layer 7 architecture had been leveled rather evenly, and the layer 6 architecture did not make use of layer 7 wall stubs as footings.

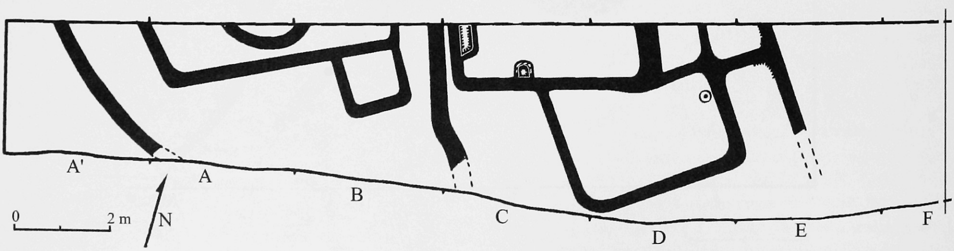
On both the eastern and the western ends of the excavation, the deposit is soft and slopes away from the mound. Brickbats were found tumbled down the slope to the west of a curved wall, suggesting that there was an ancient faulting of the lower deposits. The exterior on the east side is less clear. The deposit is sharply broken between K and L: the crumbly, trashy debris to the east eroded away in recent times.

The long exposure of layer 6 architecture reveals three different parts sections: a complex of rooms in A'–E, a courtyard area with circular structures in E–I, and another set of rooms in I–L (Figure 8.18).

In sectors A' and E, north-south exterior walls surround two blocks of rooms. A doubled wall (also running north-south), in sector C separates the two room groups. Part of a rectangular room in the northern part of A'–B is set within an interior courtyard to the south. A storage bin (1 m x 1 m) was built along the outside of the rectangular room, and the edge of a rounded (storage?) feature was located inside of the rectangular room as well.

A second set of rooms in C–E includes two large rooms (the fully excavated one is 3.5 m x 2 m) and part of a larger rectangular room. Plaster and white paint was also found on the interior walls of the larger room. The three smaller rectangular rooms of this structure appear to be auxiliary to this room. A stone door socket (Figure 8.19) in one of the auxiliary rooms suggests that the rooms had access through doors with tall thresholds, although the doorways are not preserved. An interior courtyard also surrounds this room complex to the southeast and southwest sides.

The courtyard area in E–I in the central part of the settlement during this period, had an unprepared surface with loose midden debris on it. Three circular structures were built in this courtyard—1.5 m, 1.8 m and 1.5 m in diameter (see Figure 3.10). A small hearth was made on the floor of the middle of the three circular structures. Traces of organic roofing debris—possibly reed—had collapsed into the center, a fact

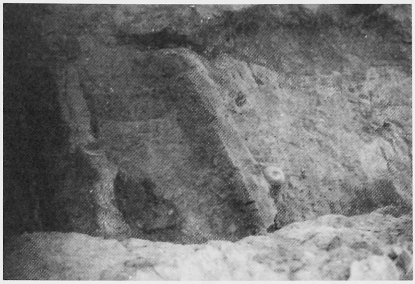


8.18 Layer 6, main trench and 1997 excavations. Anau IB2 period (continued on next page).

which supports Pumpelly's claim that the structures originally had thatched roofs.

An oval building and an alleyway were found in sectors I, J, K, and L. The alleyway is formed by a curved wall in sector M. The oval structure which had tamped earth floors and domestic debris is divided into two parts by a north-south partition wall. Storage features were built on either side of the partition wall, including a small plaster-lined bin on the west side of the wall. Another storage feature, a pebble-lined bin, was built on the outside of the oval wall.

Much of the architecture of layer 6 (A'–K) appears to have been leveled during the construction of the later layer 5 architecture. Only in the east section of J, K, and L are the deposits less flattened.



8.19 Layer 6, looking north.

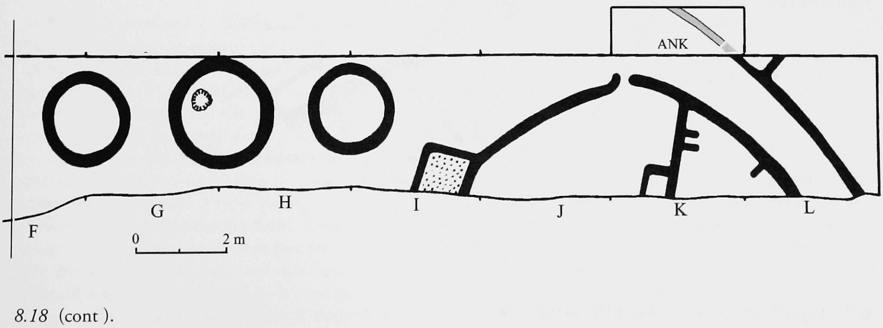
Layer 5

Layer 5 was well preserved in the eastern part of the site, in sectors F–K (Figure 8.20). The excavations revealed small rooms—probably storage facilities within a curved exterior wall. The southern edge of sector K appears to be part of a domestic area, and a hearth was constructed inside the room. The southern rooms of sectors H, I, and J appear to be part of an interior courtyard with facilities for storage (such as a *korchagi* on the floor in sector H). Similar large vessels were placed within the floor at Kara depe (layer 7) and at Yassi depe, room 1, where typically one or two *korchagi* would be found per three-room house (Khlopin 1963:pl. 11:1). A domestic area was excavated in sectors F and G. The floors were well made, and probably a doorway led from sector G to H across the low preserved wall via a threshold. A door socket remained *in situ* near the wall. A two-part oven—typically an interior feature—was found in G.

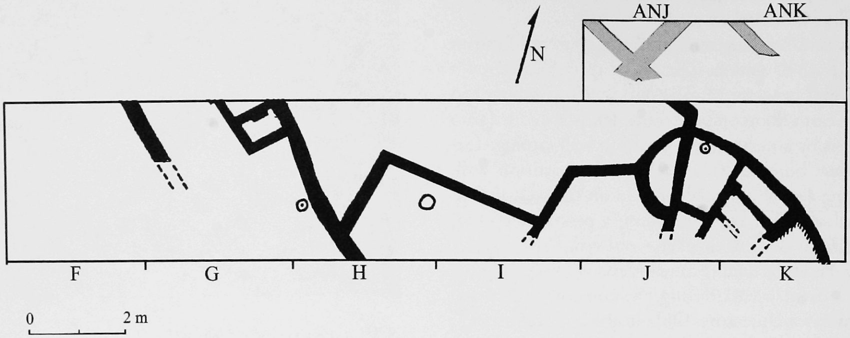
Excavation 1

Wide-scale horizontal exposure of architecture was made in excavation 1, a large flat area to the west of terraces 4–8. Two architectural layers were cleared, the lower of which appears to correspond to architectural layer 5, on the basis of both artifact and ceramic assemblages and stratigraphic correlates across the Komarov trench.

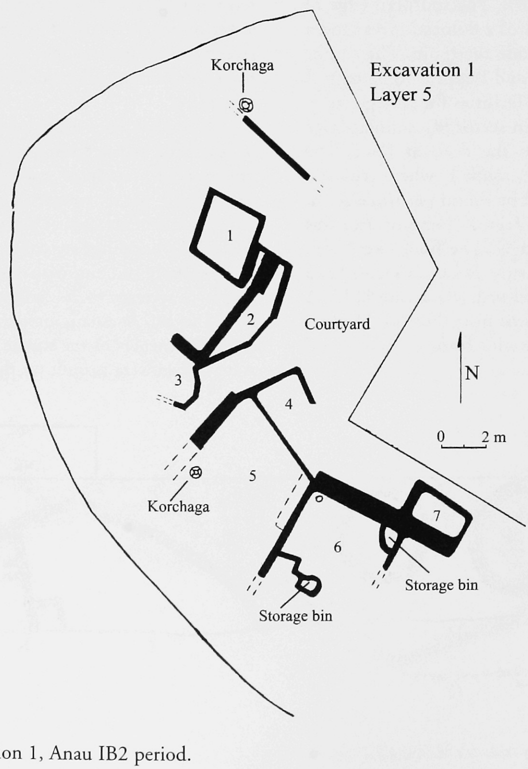
Kurbansakhatov excavated this uppermost layer of Anau IB2 architecture over a wide area (375 sq m). He found a mosaic of courtyard, and occupational and storage spaces similar to those at contemporary village settlements such as Kara and Yassi depe (Figure 8.21). The buildings are composed of three complexes, irregularly laid out, with courtyard spaces between. Room 6 appears to be a large rectilinear room (c. 20–25 sq m). At Anau, interior storage bins are located in the corners of the square building. A small separate storage area is built on the outside of the struc-



8.18 (cont).



8.20 Layer 5, main trench and 1997 excavations. Anau IB2 period.



8.21 Layer 5, excavation 1, Anau IB2 period.

ture. Adjacent to this room complex, rooms 4 and 5 form a second enclosed complex. Room 5 has a well-made floor with a mud brick sofa on the east side. A storage jar was found buried in the floor of this room. The third room complex lies farther north, separated from the others by an alleyway. Here, a large room with a well-made floor is surrounded by three large storage areas.

1904 Excavations

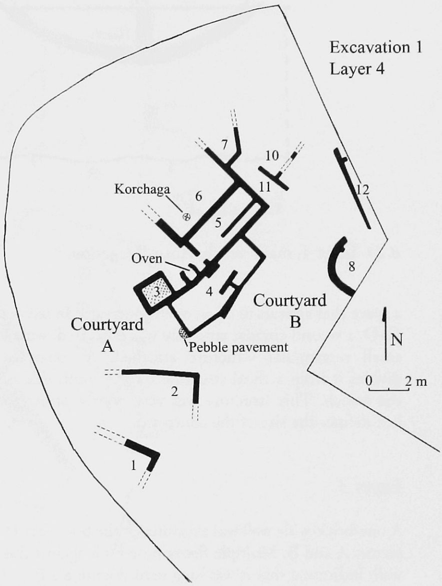
In situ Anau IB2 architectural features but no walls were found in terrace 6–8 and terrace 2. These included hearths, burials under floors, ceramics set into floors, and the floors themselves. In terrace 3, closest to Kurbansakhatov's sectors G and H, floor levels were found corresponding to layers 6 and 5. Terraces 6, 7, and 8, adjacent to excavation 1, have large vessels set into floors; hearths on the floor and burials beneath floors correlate to layers 7, 6, and 5. While Schmidt recorded floors, the visibility of walls must have been low in the freshly excavated deposit. No walls were recorded, even though it is apparent from the features on floors that walls must also have been preserved, as these are features generally found within architecture.

Anau IIA

Architectural remains from the Anau IIA period at Anau North are best documented in Kurbansakhatov's main trench, layers 4–2, in excavation 1, and the 1904 terrace excavations.

Excavation 1: Layer 4

Architecture correlated to layer 4 was revealed (Figure 8.22) in the broad exposure of excavation 1. A group of six rooms to the east of the courtyard (rooms 3–7, 9) was uncovered. The layout of the walls, the types of doorways and floors, and the regular, rectilinear plan indicate that this is a single multi-room structure built as a unit. Room 4 (1.5 m x 5 m) had a well-made floor and was divided into two halves by a small wall with small bins on each side. A stone paving at the southeast corner probably marks the threshold. Room 3 (1.25 m x 1 m) is a small storage room or bin, paved with pottery sherds. Room 3 adjoins a well-fired circular hearth or bread oven (75 cm x 85 cm) built into the wall. This hearth nearly blocks access to Room 5. Room 5 is long



8.22 Layer 4, excavation 1, Anau IIA period.

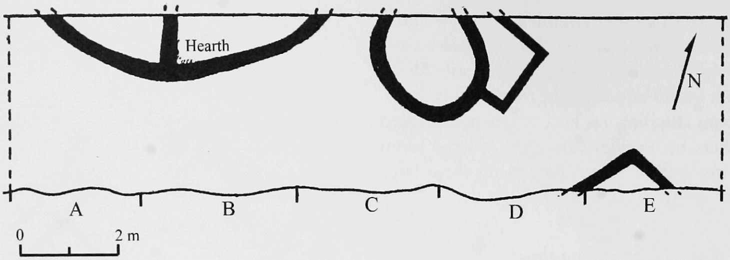
and narrow (1.5 m x 3.75 m), divided into two even narrower spaces, and does not have a threshold; it may be an auxiliary or storage room. Room 6, only the western half of which is preserved, had a tamped-earth floor with a storage jar dug into it. Room 7 appears to be part of this building complex. It is likely that both the area to the north and south of the room complex are open courtyard spaces. This organization is similar to the courtyard arrangement found in A–E, although there the architecture is more curvilinear.

Main Trench

Layer 4

Deposits were investigated in the western sectors (A–E) in the fourth architectural layer (Figure 8.23).

Part of an oval structure was excavated in sectors A–C. It was divided into two rooms, with a hearth on the floor in the eastern room. This small hearth had accumulations of ash and charcoal and reddened the walls of the room. Outside this room, to the south, is



8.23 Layer 4, main trench, Anau IIA period.

a space that appears to be an open courtyard. In sectors C–D, a second circular structure was excavated, with a small rectangular structure attached. A courtyard divides it from a third structure on the south side of the trench. This structure was very poorly preserved but defines the size of the courtyard.

Layer 3

A one-brick-wide wall was excavated at the boundary of sectors A and B. Multiple floors were built against this wall, indicating that it was long used (Figure 8.24).

Farther east, in sector D, a two-brick-thick wall (40 cm wide) was identified just outside of the excavation area, visible in section. Thick, stratified layers of ash, charcoal, and midden lapped up against this wall and extended 9 m east to the edge of sector G. Based on the finds from this fill, this area was probably a courtyard where ceramics were made or where manure was burned as a smudge fire. In this courtyard, in sector E, a small, poorly preserved wall lay partially covered by debris. Farther east, this mass of midden ash and burned debris abutted a collapsed wall in sector G.

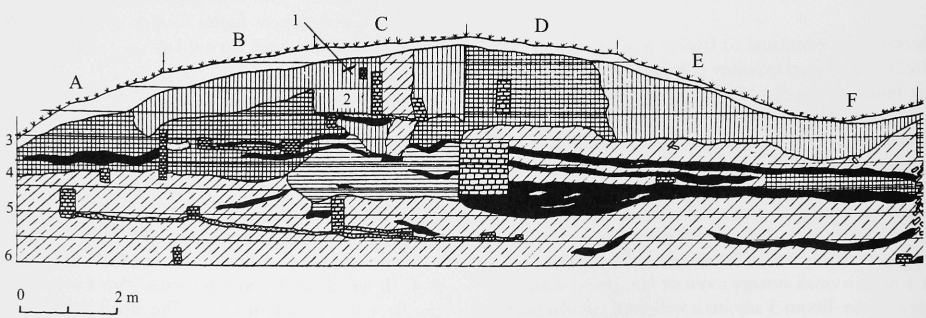
The architecture in layer 3, stretching from sector A to sector F, appears to be part of the same construction as the building with a floor at +29 revealed in 1904 in terrace 1. This structure further correlates with the structure in ANI excavated in 1997.

Layer 2

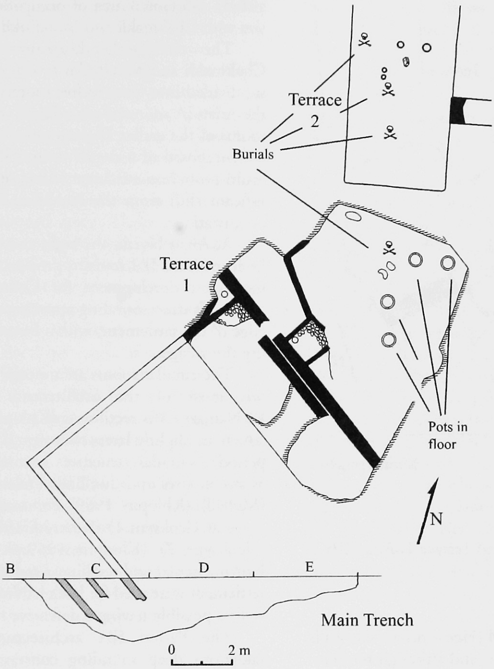
In layer 2 remains in sectors C and D form part of an narrow interior room (3.2 m wide) constructed of thin (one-brick-wide) walls. The room had an interior partition wall preserved to a height of 45 cm and a black-painted floor.

Terrace Excavations

The 1904 excavations revealed architecture in the upper layers, where the ancient mud-brick walls had



8.24 Section, layers 6–1, Anau IB2, IIA and IIB periods.



8.25 Layer 3, main trench and Terrace 1, Anau IIA period.

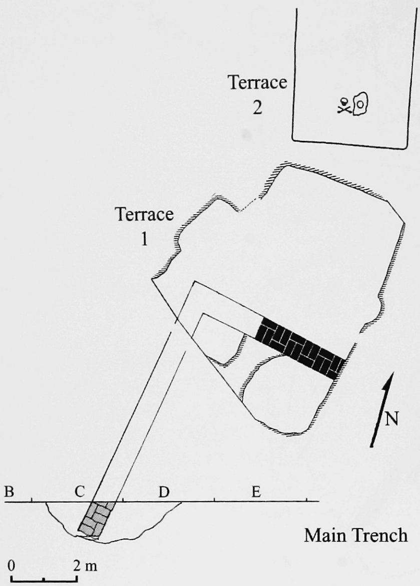
dried hard due to exposure to the air adjacent to Komarov's trench. In terrace 5, two walls excavated in 1904 can be correlated to layer 4. Layer 4 remains in terraces 6, 7, and 8, however, included floors and floor features but no walls.

Terrace 1 contained architecture which appears to be part of the same architectural complex as revealed in Kurbansakhatov's layer 3, sector D–G (Figure 8.25). Terrace 1 had architecture at +31 feet, including a northwest oriented doubled wall forming parts of two compounds. To the west a small perpendicular wall formed a corner with a pebble-lined bin similar to that found in layer 4 of the 1997 excavations in ANJ. In the context of Kurbansakhatov's excavations of layer 4 in the main trench, it appears that the area to the west of the northwest wall in terrace 1 was part of the same courtyard described in sectors D–G. This courtyard did not have burials placed underneath the floor.

To the east of the northwest wall in terrace 1, Schmidt reported clearly defined floors having hearths, burials, and pots placed into the floor, and burials made under the floor. A pebble-lined storage bin was built along the wall. This area appears to be within an interior room although no other walls were identified farther to the north.

Anau IIB

The uppermost layer of the mound at Anau North with *in situ* remains (thus, layer 1) was excavated in 1977 and 1978 in sectors C (called A in 1977). A poorly preserved floor was found, upon which was constructed a header-stretcher wall, also poorly preserved. This wall lay in a west-northwest direction. This wall is perpendicular to, and constructed in the same header-stretcher technique as the uppermost wall



8.26 Layer 1, main trench and Terrace 1, Anau IIB period.

in terrace Ia excavated in 1904 (Figure 8.26). The walls are approximately 10 m apart, and although no floor, surfaces, or features can be traced between them appear to be part of the same building.

No architecture is associated with layer 0 deposits. However, burials made into the layer 1 deposits were considered by Schmidt to derive from architectural layers which were no longer extant in 1904.

Regular, planned layouts of village walls are typical of the late Namazga II/early Namazga III architecture at Kara depe (period 2 and 1b) and Geoksyur 1. The upper architecture at Anau North also likely shifted to a more regular planned layout at this time.

Summary

The Anau North settlement of the IA period can be compared best with Chakmakli and Mondjukli in the eastern Etek region of the Kopet Dag. Red-painted plastered floors appear in domestic structures at all three sites, and brick sizes are similar (Berdiev 1976). The extent of the Anau IA settlement is indicated from the north digging and in the east gallery, evidence of an already substantial area of occupation, comparable in size with Chakmakli and Mondjukli (Masson 1982).

The wide-scale horizontal excavations at Chakmakli and Mondjukli reveal, on average, houses subdivided into three to five rooms. At these two sites the Anau IA rooms are smaller in area than individual rooms of the earlier Djeitun period, where the houses are composed of a single room. The overall area of a multi-room house is larger (84 sq m), suggesting a significant shift from the Neolithic Djeitun household organization.

At Anau North, the eight successive architectural layers of Anau IB1 remains present a unique picture of settlement development for Central Asia. Kurbansakhatov's deep sounding appears to have revealed the edge of the settlement, with a buttressed wall delimiting the village.

The circular rooms are unusual for this time period: most of the architecture at other Anau IB/Namazga I is rectilinear (Khlopin 1963a). At sites which are slightly later–Namazga II and III (Anau IIA period)—circular structures become common—used as storehouses and dwellings (Yalangach), for defense (Mullali) (Khlopin 1969) communal burials (called *tholoi* at Geoksyur 1) (Sarianidi 1961), and as shrines (Geoksyur 7) (Khlopin 1969:pl. 24:1). At Anau North, circular and rectilinear rooms at the edge of the settlement were used for both habitation and storage as well as possibly having a defensive function.

The Period IB1 architecture from Kurbansakhatov's deep sounding contrasts with that from Ershov's sounding. Ershov found more massive architecture, with distinctive wall treatment comparable with ritual structures at other Namazga I sites.

Anau IB1 courtyard, habitation, and ritual spaces can be distinguished, and while no single entire house was excavated, this architecture compares well with the multi-room houses most likely for nuclear households which comprised Central Asian village architecture.

One of the distinguishing features of Anau North architecture, beginning with period IB1, is that the walls, floors and features were rarely modified, rebuilt, or added to. The builders did not employ the previous wall stubs as foundations for construction. The overall impression is one of low investment in building and maintaining the possible settlement, and a lack of long-term residence and land tenure.

In the architecture of Anau IB2, and in layers 9–5, alleyways differentiate blocks of rooms. While circular structures are still found, they appear to have been built and used for storage. Several rooms had an archaic single-room architectural layout and special wall and floor treatment; these are likely shrines or ritual spaces.

While elaborate wall paintings are not found as in IB1, in period IB2, elaborately painted large *korchagi* jars are often set into floors as architectural features.

The typical period IB2 dwelling at Anau is a multi-room complex with enclosed courtyard area, most comparable to Dashlidzhi depe. Estimated space for a single household is slightly larger than earlier, 120 sq m based on the average of the estimated compounds in excavation 1 and main trench, layers 5 and 6. In addition, in layer 6 the households appear to have also shared general courtyard space. These compare well with the household compounds revealed at Dashlidzhi depe, which have similar sized buildings composed of 3–5 rooms with both enclosed and shared courtyards.

The Anau IB2 architecture includes several domestic rooms that are much larger than others (room 6 of excavation 1, and the large room of sector C). Yassi (Masson 1961b), Ilgynli (Masson et al. 1994) and Dashlidzhi depe (Khlopin 1961) have tri-modal room sizes, and Anau North, beginning in IB2, appears to have the same. At Ilgynli, the appearance of such large rooms is considered to be evidence of emerging social differentiation (Berezkin and Solov'eva 1998).

The heart of the settlement is revealed in layers 6 and 5 of the Kurbansakhatov main trench, which show room blocks and several circular storage facilities in the central courtyard. It is likely that some of these circular structures, located between compounds, represent pooled storage facilities. The circular structures (as seen in layers 7 and 6) have fewer functions than in the IB1 architecture. Here they appear to be primarily storage features without prepared floors or plaster finishing or connecting curtain walls. Furthermore, these layers from the main trench reveal evidence of shrines or ritual rooms set apart from the rest of the architecture by their being more highly decorated with lime plaster and painted walls and floors.

The behavior of not re-using the older wall stubs, continues in Anau IB2. This is also identified at other sites in Central Asia appearing a village-wide phenomena at sites such as Yalangach and Dashlidzhi (Khlopin 1963a). At Anau North, however, the long-term nature of this behavior is clearly seen.

The sample of architectural exposure for the Anau II period is small but compares readily with the other more fully excavated Central Asian sites of Kara depe and Geoksyur 1. A particularly striking change is observable between layers 3 and 2, both in the 1978–1982 excavations and in the 1904 excavations at terrace 1: distinctive doubled walls appear in the later layer, as well as an elaboration of interior as opposed to courtyard storage features, such as pebble-lined bins and subterranean pits. This type of architecture is particularly well documented at Kara depe, where houses appear larger and more complex than the three-room complexes which characterized the earlier sequence.

9

Burials

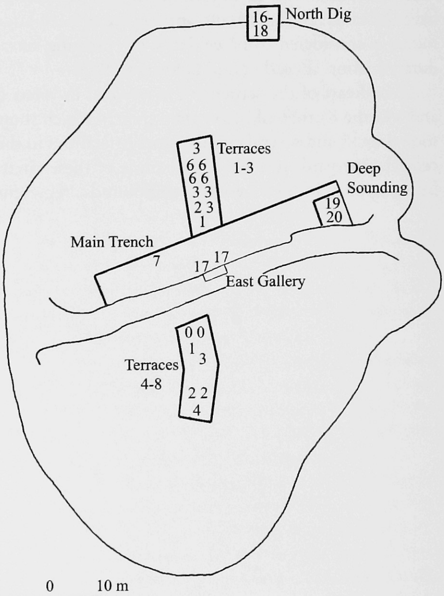
With L. Warner and K. Kurbansakhatov

During the excavations of 1904 and 1978–1982, the remains of 23 individuals were discovered within the settlement at Anau North. This chapter reports on the architectural context of the intramural burials and the treatment and position of those bodies (Figure 9.1).

The Anau North intramural burials provide comparanda for other Early Village sites along the Kopet Dag foothills: Two earliest burials (Anau IA) can be compared to the burials at Mondjukli depe (Alekshin 1976). The eight burials from the IB1 and IB2 layers shed light on interment practices during this period for which till now had only two exemplars, one from Namazga depe and one from Kara depe. The thirteen burials from the IIA and IIB layers can be compared with intramural burials at Kara depe (Masson 1955).

The intramural burials contrast with the contemporary cemetery burials at Parkhai II in the Sumbar Valley (Khlopin 1997). It is likely that at Anau, as at Parkhai, a separate cemetery was located somewhere off site, today deeply buried under the surrounding alluvium. In contrast with the mortuary practices observed in cemeteries of contemporary sites, the mode of interment, investment in mortuary goods, and location of the burials *within* the settlement reflect a domestic approach to death.

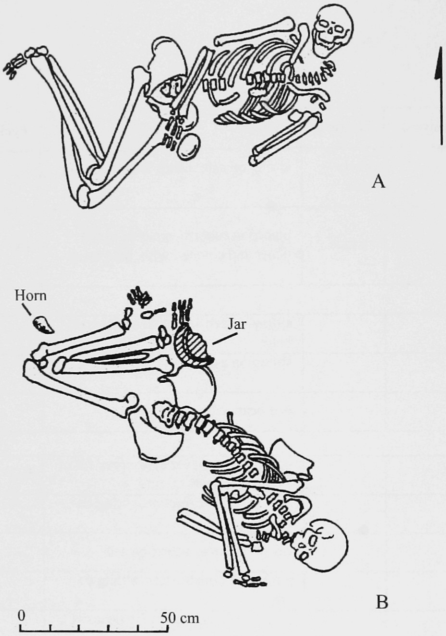
The bulk of the burials at Anau North was excavated during the 1904 season under the direction of Langdon Warner, and the following descriptions are taken largely from Warner's 1908 report, with additional illustrations from archival materials. Three comparable burials were revealed during the 1977–1982 excavations and are also included here (Table 9.1).



9.1 Burials at Anau North. Numbers indicate distribution within layers.

Table 9.1 Burials at Anau North

Burial No.	Context	Layer	Field no.	Age	Artifacts	Orientation	Physical	Deposit	Period
1	on floor surface	20 – lowest layer	Murad	adult	none	E	likely male	sitting on ash. hands were tied (?)	IA
2	placed in room fill	19 – lowest occup ation	Murad	young adult	deep bowl, bull horn object	SEE	female	placed in rubbish, covered in red ocher and covered with mud brick	IA
3	ND.6	16-18	18	child	none	NEE		sitting on ash, charcoal and burned bone	IB1
4	EG.4	17	17	child	turquoise beads	NEE		sitting on ash	"
5	EG.4	17	16	child	2 spindle whorls, 2 flints	none		in a heap, sitting on ash	"
6	upper fill	7	Murad	child	100s of beads, object of horn	NNW		under wall of layer 6, or upper fill of 7, placed on woven mat	IB2
7	T2.9	6	14	child	Copper & lead beads	NE		mud brick construction, sitting on ash	"
8	T2.9	6	13	child	Fine beads, copper & lead	none		animal burrow, sitting on ash	"
9	T2.8	6	12	child	Beads	NW		mud brick construction, sitting on ash	"
10	T2.7	6	11	child	Beads	NE		sandwiched between ashy deposits	
11	T8.2	4	8	child	None	NE		no ash	IIA
12	T2.1	3	7	adult	None	NW	worn teeth female	no ash	"
13	T2.1	3	6	child	None	NE		burial in or near hearth jar. Burial was shoved in to the jar	"
14	T3.2	3	4	young adult	None	NW	worn teeth	no ash	"
15	T1.5	3	3	child	None	NE		no ash	"
16	T5.7	3	9	child	1065 beads	NE		No ash mentioned	"
17	T1.5	2	2 "B"	child	None	NE		burial sitting on 5 cm of ash	"
18	T7.2	2	15	child	None	none		poor condition	"
19	T7.2	2	10	child	None	none		disturbed by an animal burrow	"
20	T1.3	1	5 "A"	child	Lapis beads, necklace	SE		surrounded by mud brick, sitting on ash	IIB
21	T5.4	1	1 "z"	child	?	S		upper fill	"
22	T4.2	0	0 "b"	several children	?	none		upper fill	"
23	T4.1	0	0 "g"	child	?	S ?		upper fill	"



9.2 Anau IA, burials. A, burial 1; B, burial 2.

We will begin with Warner's account of the excavation process:

> In every case where it was practicable, a large circle was drawn around the remains as soon as they were discovered and the men carried on their work outside its limits. In this way the floor of a terrace would be carried down 3 or 4 feet, leaving the skeleton untouched on a pedestal. This method was found to be of great help when the actual clearing of the bones was begun.
>
> The material of the kurgan was so closely packed as to make fine work extremely difficult, and nearly all the skeletons were so delicate that exposure to wind and sun destroyed them. I found that a soft brush and a fine knife-blade were often none too nice for the work. When air-dried bricks appeared, often the only way of detecting them was by the faint outlined contours in the cutting, for they were as easy to work in as the material of the hill itself. The layers of ashes and charcoal that so often occurred under the skeletons as well as in other places came as a pleasant relief to the workers.
>
> The human remains were uncovered from above and drawn and photographed while still embedded enough to be supported. When this was done the upper bones were removed and the position of the hidden portions carefully noted. Then the earth for some distance around was thoroughly searched for burial objects. In taking out the minute beads found with some of the skeletons, notably No. 9, it was found that even a very close sieve could not be trusted and that the fingers were more sensitive and sure. In this way many square feet of earth passed through my hands, and though the work was delayed it proved well worth while, for from that burial alone we took 1066 drilled beads, each scarcely larger than a pin-head. [Warner 1908:484-85]

Description of Burials

Anau IA

1. An adult burial was in layer 20 of the deep sounding [Figure 9.2a]. The upper part of the burial was in the northwest corner of the sounding and the skeleton was unearthed by a special excavation in the baulk. The individual lay in the upper fill in loose ash deposits. Its initial position may have been on its back (less probable) or slightly turned to the left side with knees brought upward, the left arm bent with the hand in front of the face, and the right arm flexed with the hand near the hips. The position of the left hand supports the supposition that the hands may have been tied together. According to this reconstruction, the rope at the right hand decayed quickly and it changed its position, though its original position might have been as it is now. The skull (the burial is oriented to the east) has been dislodged towards the right shoulder and turned upward so that its eyes are no longer turned to the north. The preservation of the skeleton was poor, but it was an adult. Based on the on stature and robusticity of the skeleton, the individual was probably a male. [Kurbansakhatov 1987: Layer 20 burial].

2. A burial in layer 19 was found in the southeast corner of the deep sounding [Figure 9.2b]. The excavated area exposed the upper part of the

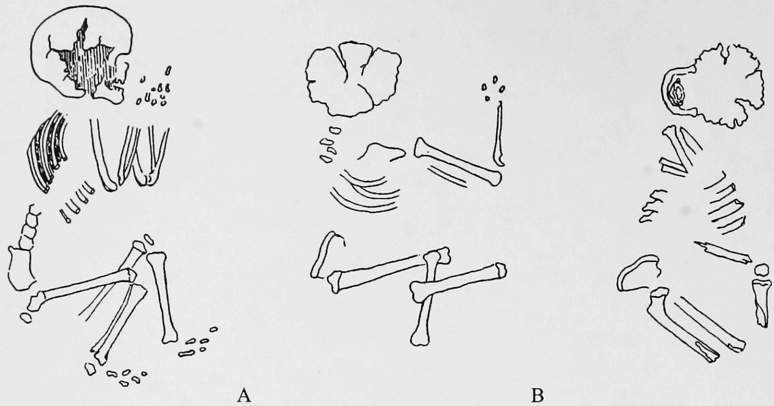
9.3 Burial 1, layer 20, looking northwest.

skeleton down to its pelvic bones. The excavated area was extended into the wall, 1.15 m wide and 0.5 m deep. Judging by the long bones and pelvic bones, which were not totally fused, the individual was young, about 18–20 years old, most probably female. The body was placed on the left side in a contracted position, with head turned to the east, its arms bent at the elbows to bring the hands to the face, and the left ulna and radius resting on the scapula. The bones of the leg were tightly flexed in front of the body, with the femur and tibia almost parallel [Figure 9.3]. There was an archaeologically intact deep bowl close to the right foot; at the knees a bovine horn core was found base down. After burial, the vertebrae were dislodged and the sternum broken. The burial was made in a loose layer of rubbish and covered with mud brick. Under the skeleton was a layer of red ocher. It is likely that the individual was powdered with ocher at the time of burial. [Kurbansakhatov 1987: layer 19 burial].

Anau IB1

3. The lowest of all the human remains which we found in the North Kurgan [in 1904] occurred in the north digging No. I at a depth of -11 feet [Figure 9.4a]. The bones were immature and the position was contracted, with the main axis southwest and northeast. The body lay on its left side, with the hands in front of the face, and beneath it I found ashes and charcoal mixed with occasional bits of burnt bone [Warner 1908: Skeleton No. 18].

4. The burial was at level -8 feet beneath datum in the east gallery [Figure 9.4b]. The bones were those of a child in the familiar contracted position. The main axis was southwest and northeast. The body had lain on its left side with the right leg drawn up to a right angle with the main axis and the left leg seemingly disturbed. The arms were bent to bring the two hands, one over the other, in front of the face.



9.4 Anau IB1, burials. A, burial 3; B, burial 4; C, burial 5. After Warner 1908.

From the earth between the knees and the lower jaw I took 6 flat bean-shaped turquoise beads and two pierced snail shells. When the bones were removed a layer of ashes and charcoal over fire-hardened earth came to light. [Warner 1908: Skeleton No. 17].

5. Skeleton 16 [Figure 9.4c] was in the east gallery off from General Komarov's trench, at a level of 8 feet below datum on the plain. It was that of a young child and lay on its face, with the top of the cranium crushed in. The arm bones were jumbled together in an indistinguishable mass. The left leg was straight from the trunk, but the right knee was pulled up at an angle. Five vertebrae were found inside the skull. With the body I found two clay spin-whorls and two flint edges. Below was a layer of ashes and bits of charred wood over fire-hardened earth. [Warner 1908: Skeleton No. 16].

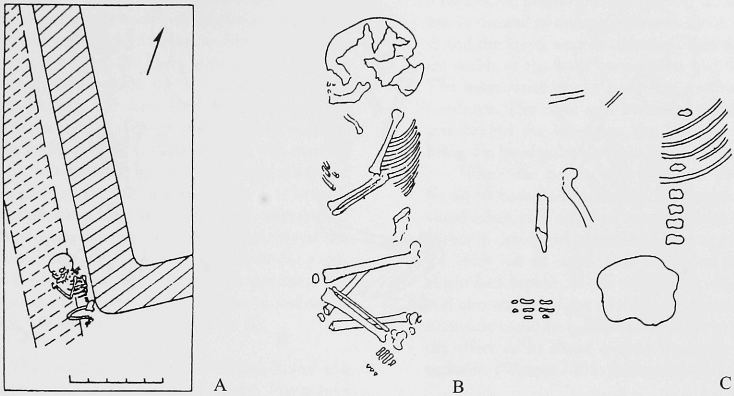
Anau IB2

6. A child's burial was in the upper fill of layer 7, under the wall of layer 6 at the intersection of sectors B and C [Figure 9.5a]. On the basis of the dental development, the individual is approximately 7 years old. The skeleton lay on its right side with flexed legs and feet. The skull had moved away from its articulation with the spine, and there is a small hole in its occiput. The head of the body is to the south, facing to the west. Near the neck and waist of the child there were several hundred small and larger beads made of translucent limestone. These had probably been sewn to the dress of the child. Under the upper part of the spine there was a cattle horn core placed vertically, which may have been responsible for the hole in the skull. The skeleton appears to have been placed on a woven reed mat. [Kurbansakhatov 1987: Layer 7 burial].

7. In terrace II, at +22.5 feet lay the remains of a child contracted on the right side with the left knee drawn up slightly higher than the right. The left upper arm lay parallel with the main axis (southeast and northwest) with elbow bent so as to bring that hand on a level with the pelvis. The right arm lay extended under the body and parallel to it. As in nearly every other case, the cranium was crushed by the weight of the earth. [Figure 9.5b].

In connection with this burial were taken out three bits of spirally wound tubes of copper and two plain lead tubes and one flint edge. Air-dried bricks were traceable along the main axis before and behind the body, and the whole was on a layer of ashes and charcoal with fire-reddened earth beneath. [Warner 1908: Skeleton No. 14.].

8. Again, at the same altitude in terrace II, I came upon traces of a child's skeleton in the midst of the



9.5 Anau IB2, burials.. A, burial 6, after Kurbansakhatov 1987; B, burial 7, C, burial 10, after Warner 1908.

caved earth of an animal's burrow. The cranium and many other parts of the skeleton were entirely lacking. Among the jumbled bones, however, lay 2 small white beads of stone and 3 spirally wound cylinders of lead, possibly beads. Beneath the body was a layer of fine white ashes, below which the earth was burnt hard and red. [Warner 1908: Skeleton No. 13].

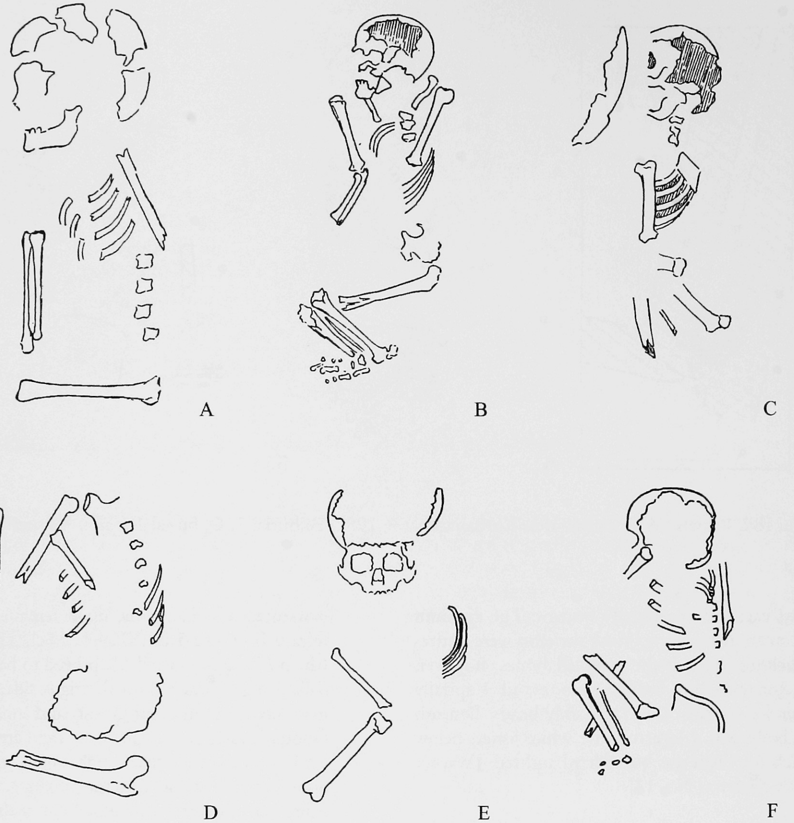
9. In the same terrace (II) and at 22.5 feet, but about 5 feet north of No. 11, we uncovered a child's bones lying in the position now so familiar–contracted on the right side, with the main axis southeast and northwest. The right knee lay under the left, but doubled to a slightly sharper angle. The left arm was bent so as to bring the hand in front of the face, while the right lay along parallel with the vertebrae, the fingers underneath the pelvis. From between the lower jaw and the collarbone, I took 67 small white beads, like those found with skeleton No. 11. Along the back and beyond the head, at a right angle to the main axis, were traces of air-dried bricks as in skeleton No. 5, and, as in that case, the whole lay upon a layer of charcoal and ashes. [Warner 1908: Skeleton No. 12].

10. From the last skeleton which occurred on the south slope of the kurgan I was summoned by the workmen, who had come upon remains again in terrace II at +22.5 feet [Figure 9.5c]. This burial, which I have numbered 11, proved to be that of a child lying contracted on the right side, with the main axis running southwest and northeast. I found no traces of the right leg or right arm; but the left knee was drawn up at a right angle, and the left upper arm ran parallel with the vertebrae, the elbow being bent so that the hand lay out at the level of the pelvis. From near the collar-bone I took out 58 small white stone beads, many of them double-conical. One larger white stone bead of a cylindrical shape and 11 flat beads of red carnelian.

To reach this skeleton it was necessary to remove a hearth-like layer of hard-burnt earth topped by a layer of ashes 1 to 3 inches thick; and after the bones had been lifted I came upon a similar hearth beneath, extending over about 4 feet square. [Warner 1908: Skeleton No. 11].

Anau IIA

11. The burial we came upon in terrace VIII was at +25.5 feet above the established datum [Figure 9.6a]. The bones were those of a young child and, though much lacking, it was possible to determine the main axis of the body as southwest and north-



9.6 Anau IIA, burials. A, burial 11; B, burial 12; C, burial 13; D, burial 14; E, burial 15; F, burial 16.

east. It was lying contracted on the right side with the left upper arm (all that remained of that member) stretched back of the body at an angle of about 40 degrees with it. The right upper arm bones were absent, but the lower arm was traceable, extending along the main axis. The little that remained of the cranium showed the sutures still open and the walls of almost paper-like thinness. [Warner 1908: Skeleton No. 8].

12. In terrace II, I uncovered the uppermost adult remains excavated [Figure 9.6b]. The skeleton lay contracted on the right side, with the knees drawn up to a right angle with the main axis, which was southeast and northwest. The left arm lay extended down along the body, but the right was bent enough to bring the hand opposite the pelvis.

Although the bones were too fragile to admit removal without elaborate gluing, and this was not thought advisable, the cranium showed the sutures well closed, and the teeth were worn flat and dull. The extreme length of the skeleton in position was 53 inches and the extreme width 15.5 inches. [Warner 1908:Skeleton No. 7].

13. At a height of +26 feet in the second terrace the workmen broke with their picks into the skull of a child's body that on examination gave fewer

evidences of deliberate burial than any others excavated up to that time [Figure 9.6c]. In general the trend of the body was southwest and northeast. The broken skull lay on its face, with a slight lean to the right, the knees were so bent that the lower leg bones stuck up to a height that would have brought the feet, had they been present, above the level of the top of the skull. It seems as if the body must have fallen in such soft material that it was partially buried at once and a support thus given to the feet and lower legs. Just beneath the skull was a large fragment of the bottom and side of a great earthen jar. Filling the cavity of this inverted fragment was a greenish-white slag partly fused with ashes; and under both potsherd and skeleton was a layer of rough charcoal and wood ashes. [Warner 1908: Skeleton No. 6].

14. The next burial [Figure 9.6d] was found at a height of +27 feet in the third terrace. The cranial sutures were not, however, closed and the ossification of the epiphyses was not complete in the limb-bones. The body lay contracted on its right side with the main axis southeast and northwest. Both arms were drawn up as if to bring the hands (which were lacking) in front of the face, the left above the right. From the top of the badly broken cranium to the end of the spine measured 23 inches and from the back of the spine across to the ends of the leg bones was but 13 inches. [Warner 1908: Skeleton No. 4].

15. In terrace I, we came upon two other skeletons at the same level (+28 feet) [Figure 9.6e]. One, very small, was left unexcavated in the east wall of the terrace, but the other, also in the east wall, I laid bare. The main axis of the body was southwest and northeast as far as could be determined by the few bones preserved. The body had evidently lain on its back, with the skull propped up in such a way that it now was set squarely on its base and lower jaw fitted over the first two vertebrae so as almost to suggest a dislocation of the neck. The left leg was extended straight down the main axis northeast from the skull, but the right knee was slightly bent and thrown over to the right above it. Only six of the ribs remained, all on the left side, and the top of the cranium had broken down, leaving only the side-walls and lower portions in place. [Warner 1908: Skeleton No. 3].

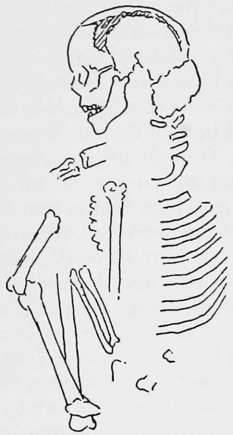
16. The next burial in order of altitude appeared in terrace I at +28 feet [Figure 9.6f]. It was the skeleton of a young child lying on its right side in a contracted position. From the top of the cranium to the end of the spine measured but 13 inches and the knees were so drawn up that the greatest width of the body in position was 8 inches. The main trend of the body was southwest and northeast. The right arm bones lay parallel with and behind the vertebrae, the left arm bent to bring the hand palm down in front of the face.

When the bones were removed they were found to have been laid on a horizontal layer of wood-ashes and charcoal varying from 2 to 3 inches in depth and extending a foot or so beyond the body on all sides. The weight of the earth above had broken in the skull along the sutures and also warped it out of shape, so that no measurements could be made, but as it lay in position the effect of its shape seemed markedly brachycephalic. [Warner 1908: Skeleton 2 "B"].

17. Skeleton No. 9. On April 7, in terrace V, we came upon a child burial at a height of 29 feet. No traces of the cranium could be found, though four teeth lay in an orderly row as if there had been no disturbance. The main axis of the body was approximately southwest to northeast. In the softer earth about the pelvis and lower limb-bones, I took out 1066 minute white beads, apparently of stone. They were cylindrical, about 1/16-inch in diameter and length, and so delicately bored that a very fine needle was required to thread them. Their presence on the leg-bones and pelvis, and their absence on the upper parts of the body suggest that they might have been sewn to a girdle or other garment, and not used in strings, as were the larger beads we found later. [Warner 1908 Skeleton No.9].

18. In terrace VII, and at the same level, +29.5 feet, though nearer the outer edge of the hill, were found the cranium and a few vertebrae and long bones of a young child. The position in which the body had lain was indeterminable, and the bones fell to pieces as soon as they had dried. [Warner 1908: Skeleton No. 15].

19. In terrace VII on the southerly slope of the kurgan, the workmen came upon traces of human remains at +29.5 feet. These proved to be the jumbled bones of a child, evidently hauled about and dislocated by an animal, for I found a burrow extending straight down through the middle of it all. Two feet below this level, in what



9.7 Anau IIB, burial 20.

seemed to have been the bottom of the burrow, the missing bones that belonged above were found, together with two crania of small rat-like rodents. The loose earth that had filled the hole from the hillside above had allowed so much dampness to enter that all the bones were in an extremely fragile condition. [Warner 1908: Skeleton No. 10].

Anau IIB

20. No. 5 [Figure 9.7] lay at an altitude of +30 feet in terrace I. The bones were those of a young child, for the cranial sutures gaped wide and the epiphyses separated off the long bones. The body was placed on its right side, lying in a contracted position, with the head toward the southeast. The left arm was bent in such a position as to bring the hand opposite the face and on a level with it, while the right arm was extended down at an angle of 40 degrees with the trunk.

In front of this body and parallel with its main axis lay two air-dried bricks, 7.5 inches long by 2.5 inches wide, set on edge. At a right angle with these, 1.5 inches from the top of the skull, I came upon another brick of indeterminable length, but the same thickness. The three were laid in so deliberate a fashion as to suggest an attempt at sepulture. Between the heels and the end of the spine four lapis-lazuli beads came to light, drilled from both flat surfaces so that the hole was roughly double-conical. Four inches back of the neck appeared a smooth, clay, plummet-shaped object, possibly also a burial gift. Skeleton, bricks, and gifts all lay on an even bed of ashes mixed with small pieces of charcoal, resting on a layer of hard-burnt earth. [Warner 1908: Skeleton No. 5 "A"].

21. "Z" in terrace V [layer 1, period IIB]. Terrace V at +30 feet 2 inches above datum. Ca. 20 cm under the level of the plaster layer, to the southwest, near the excavated wall, were found the remains of a badly preserved child's skeleton. The child skeleton is 62 cm long. The head was to the south on its right side, but out of place and crushed in the shoulders. The torso was on its back but twisting to the right, left arm to the left side, left hand in the pelvic cavity, right arm fragmented; left leg to the left side and bent at the knee, right leg only incompletely recovered, right femur to the right and pulled up, right shin missing. [Schmidt's field notes, April 4, 1904].

22. "B" in terrace V [layer "0," period IIb]. Terrace V. Near the ceramic vessel (i.e., +34 feet), a little under its level, a skeleton was uncovered and under these remains was a deeper vessel (i.e., +33 feet). Mr. Warner exposed the skeleton; it was a tangled heap of several children's skeletons which were beside it. [Schmidt's field notes, April 5, 1904].

23."G" in terrace IV [layer "0," period IIb]. Terrace IV at +36 feet. This was another skeleton of a child laying in a flexed position on its right side. Exposed and photographed by Mr. Warner. There were no offerings. [Schmidt's field notes, April 2, 1904].

Discussion

Lower Levels (Anau IA, IB1, and IB2)

The two earliest burials from Anau North were interred in upper fill of Anau IA architecture, apparently not dug in from upper floors. The only burials from the Anau IA period other than Anau North were found at Mondjukli depe (Alekshin 1986:17–18), where several burials were found on the outskirts of the town, and an isolated child's burial from the sounding at the 73 km site in the far western Arkhash region (Berdiev 1976).

The burials from Mondjukli do not represent intramural interments, and most likely represent the edge of a cemetery. This can be compared with the mortuary pattern at the earlier Djeitun sites, in which burials were typically made outside of the architecture. In the extensive excavations of Djeitun period architecture, the only exceptions to date are individual interments from Chopan depe (Berdiev 1972a:73–74) and Chagylly depe (Berdiev 1966), which Masson considers to indicate settlement and cemetery overlap (Masson 1971:49). It thus appears likely that the Anau IA burials at Mondjukli depe follow the older Djeitun Period tradition avoiding intramural interment. This situation may likely apply for the two Anau IA burials at Anau North, as well.

In contrast, by the beginning of Anau IB, burials were made within the context of existing structures at the site. The stratigraphic situation of the eight burials of the IB1 and IB2 periods at Anau North indicate that they were made while the structures were still extant. While the sample is small and comparable burials from other sites very rare (Sarianidi 1961: 292), there seems to be a significant contrast between the three Anau IB1 burials and those of Anau IB2. The IB1 burials appear to be hasty; burial orientation is lacking, and only simple burial goods, such as spindle whorls, are provided. The five IB2 burials were made on prepared or burned surfaces and the bodies were more carefully oriented (usually on a southeast-northwest axis). Most of these burials include beads, most likely from bead decorated clothing of the interred individual.

Kurbansakhatov's layer 7 burial provides one example of the context of the burials of period IB1: this child burial was interred on a prepared surface—probably on a mat placed deliberately between fallen wall debris some time shortly after the abandonment of the structure; the dress was adorned with beads and a small offering was made in a horn core.

Upper Levels

Nine burials were found from the Anau IIA period. These can be compared with 20 contemporary intramural burials excavated from Kara depe, and contrasted with the 31 burials from the contemporary cemetery at Parkhai. As seen in the 1997 excavation of layer 4, the rooms where these burials were made had small fireplaces or burned features on the midden deposit near the floor, with nearby ceramic vessels fixed in the floor near the hearths. The hearths showed evidence of repeated fires which were not, as typical at the site, cleaned out, and were intermixed with midden and wall collapse. These burials with surface hearths likely represent secondary or final use of the rooms. If this is so, then it appears that funerary ritual involved returning to the grave site after interment. It is likely that this was also the pattern at Kara depe in period 3.

From the Anau IIB period we have four child burials. Occasionally, in Anau IIB, small mud brick enclosures surround the grave, and in general the quantity and value of mortuary goods is greater than in IIA. These can be compared with the 25 burials found in layer 1B (early Namazga III)at Kara depe. As at Anau North, most burials at Kara depe were found under floors, occasionally with mud brick enclosures (although poorly preserved at Kara depe). There were few mortuary goods or ceramics, but often beads.

Alekshin (1976) interprets the lack of burial goods in both Kara 2 and 3 (Namazga II) and Kara IB (Namazga III) as indicating that there was little or no social stratification in the society. However, this lack of diversity in the burial population might also mean that there was a separate cemetery, where persons of greater status were buried, as there was at Parkhai depe. Such a situation may be true for Anau as well. Without excavations at the settlement of Parkhai, however, we cannot say if they placed young or marginalized individuals in abandoned rooms of the settlement, as took place at Anau North and Kara depe in addition to using the cemetery, or whether there were two independent burial traditions in the region (Khlopin 1997).

Physical Anthropology

Nine skulls from the 1904 excavations were studied by Sergi (1908). Crainometric studies were conducted but provided little racial information since only two adult individuals (both from period IIA) could be measured according to the standards of the day (for comparison see Hemphill et al. 1997). Both individuals 4 and 7 had very worn teeth. Burial 4 is of note because it is a young adult (about 20 years old), but with teeth markedly ground down. Eating grain ground on sandstone implements (as was done at Anau North) would have resulted in such relatively accelerated toothwear.

The post-cranial bones from Pumpelly's excavations were studied by the anatomist Thomas Mollison (1908). It must be noted that these long bones were separated from the skulls, making it impossible to correlate the post-cranial remains with individual burials. Although these materials were not labeled as specific individuals, Mollison's study of the adult femurs from three skeletons indicates that one robust individual (presumed to be male) had an estimated stature of 170 cm. A second adult, interpreted as a female, had a stature estimated at 149 cm.

Given the period of study (1908), it is interesting to note that Mollison considered a racial diagnosis impossible "since in the bones of the extremities functional influences come so strongly into action that it is difficult to distinguish between peculiarities due to such functional action and those inherent in the race" (Mollison 1908:464).

As the analysis of the 1904 Anau materials proceeded, it is clear that Pumpelly found a racial explanation for the rise of civilization untestable and dropped his plan to include a chapter on "Aryans" in the 1908 volumes (Champlin 1994:193-198). Instead, he focused on describing the rise of a unique early civilization.

Conclusions Relating to Burials

The burials from Anau North documents the development of the informal interment within settlements—at least for some categories of persons—in the Early Village Period of Central Asia. At Anau South intramural burials continue through the Bronze Age and only end at the beginning of the Iron Age, where no burials have been encountered at all (Hiebert 1995, Warner 1908).

The burials under floors and in fill at Anau North indicate a private ritual with few burial goods, few formally constructed graves, and little evidence of social status of the individuals. We must keep in mind, however, that these burials represent a small sample taken from a limited area of the site, and the predominance of child burials in this sample underscores its narrowness. The fact that the burials within the settlement were mostly of children and sometimes contained whorls and beads suggests that these interments may have been predominantly women's activities. In any case, these burials, made within architectural spaces (and in period IIA, placed underneath the floors of rooms), indicate the close relationship of whomever performed the rite with the village space itself.

In contrast, fewer than 10% of the individuals interred at the Parkhai cemetery were children. This suggests that children were buried elsewhere, possibly at the still unexcavated village site itself, as at Anau. Conversely, the low incidence of intramural adult burials at Anau North, combined with the evidence from Parkhai, points to the possibility that separate, formal cemeteries constructed outside of the settlement area might be typical during the Early Village Period in Central Asia. If Anau had such a cemetery, however, it is likely to be deeply buried under the alluvium.

A pattern of intramural burials made just beneath floor levels is also found at both Ilgynli (Berezkin 1992) and Kara depe (Alekshin 1976) during Namazga II and III.

Such a burial pattern evokes a scenario where individuals would return to an abandoned area of the settlement or out-of-use room to bury kin or complete funerary rituals for kin already buried there. Our sample from Anau North shows that this tradition extends back to the beginning of the 5th millennium BC, during Anau IB1.

10

The Use of Plants at Anau North

Naomi F. Miller

A major goal of the 1997 excavation at Anau was to retrieve a chronological sequence of plant remains from archaeological strata that could be correlated with the earlier excavation of Kurbansakhatov on the north mound of Anau. The remains provide evidence for the state of the vegetation, fuel gathering, and agricultural practices.

Botanical and Archaeobotanical Background

Irrigated grain fields (wheat and barley) and orchards (apricot, plum, apple, almond, quince) surrounded the site in 1997 (Figure 10.1). By 2000, the Anau collective farm had stopped caring for the trees; without irrigation, most died Recent and present-day agriculture provide no mode for vegetation and land use in antiquity. There are, however, some less disturbed areas within 20 km of the site. The following remarks are based on sources published in English and on some limited botanizing in the spring of 1994 and 1997; Dr. Antayev Eke Antayvich of the Institute of Botany in Ashgabat identified many of the voucher specimens; one of our assistants provided Turkmen plant names.

The distribution of vegetation on non-agricultural land tends to follow topographic bands, thanks to a fairly steep rainfall gradient between the Kopet Dag to the south and the desert to the north. Precipitation at the base of the Kopet Dag is as much as 350–450 mm but rapidly declines to the north on the piedmont plain; annual precipitation at Ashgabat is 230 mm (Orlovsky 1994: fig. 4, Table 5). Anau, situated only a few kilometers north of the mountains, was probably at or just outside the boundary for dry farming.

According to one of our Russian colleagues, until the construction of the Kara Kum Canal in the 1940s and subsequent increase in sedentary population, forest covered the Kopet Dag, even near Ashgabat. Today there are very few wild-growing trees in this region, except in the steep and inaccessible crevices of the mountains or along streams. With regard to the central Kopet Dag, Galina L. Kamakhina says that juniper was the major constituent of the lower mountain woodland in this area:

> [paleobotanists] have demonstrated that the cutting of junipers in the low northern foothills of Kopet Dag started as long ago as the 6th to 5th millennia BC. During the last 40 to 50 years, areas occupied by juniper woodlands have decreased by 30 to 40%; the total debit of water in mountain rivers has fallen by 50%; and many mountain springs have dried up. As a result, the altitudinal boundary of junipers has been elevated by 500 to 700 m from its ecological optimum, which has transformed many other plant communities. . . . The place of exterminated juniper woodlands was first occupied by mountain xerophytes, then by grasslands of *Elytrigia trichophora*, and finally by sagebrush [*Artemisia* sp.] and ephemeroid desert vegetation. (Kamakhina 1994: 145)

At the base of the mountains above Ashgabat on the road to Pöwrize, the landscape includes much bare rock, grasses, and small shrubs, and other evidences of

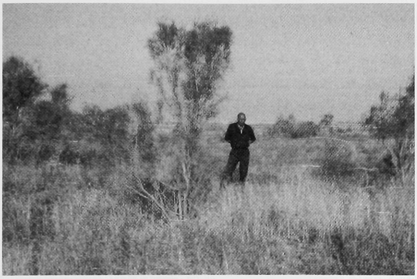
10.1. Vegetation of the Anau region , 1997 (compare with Figure 1.5c—same view in 1904).

grazing (Figure 10.2). Scattered small trees, mostly growing at the base of scarps where water can collect, include *Celtis caucasica* (hackberry), *Ficus* sp. (fig), *Cerasus microcarpa* (wild cherry=*it üzüm*, literally "dog grape") and *Ailanthus altissima* (tree-of-heaven). Shrubs covering the hillsides between grasses, other plants, and bare ground include *Lycium kopetdaghi*, *Capparis* sp. (caper=*go'ul*), *Zygophyllum fabago*, *Ephedra* sp., *Artemisia* sp. (wormwood). Along the stream, a popular picnic spot, grow trees such as *Ulmus carpinifolia* (elm=*garagach*, literally "black tree," as in Turkish), *Colutea atabajevii*, *Platanus* sp. (plane), *Morus* sp. (mulberry), and New World natives *Acer negundo* (box elder), *Catalpa*, cf. *Robinia pseudoacacia* (black locust).

In the foothills south of Anau, small shrubs (especially *Artemisia*) provide the only woody vegetation in a highly over-grazed landscape (Figure 10.3). Emerging from the foothills is a small stream, the Keltechinar, another popular picnic spot. The most common tree growing along the river is *Tamarix* (tamarisk=*yilgin*). There is also some *Salix* (willow) and *Ailanthus altissima*. In antiquity, the Keltechinar River ran out onto the plain not far from the site. Undisturbed, the characteristic *tugai* vegetation, which grows along the rivers as they flow through the foothills and lowlands, includes poplar (*Populus pruinosa*, *P. euphratica*), *Elaeagnus orientalis* and *Tamarix* (Popov 1994: 183). Unlike today, Syrian ash (*Fraxinus*

10.2. Riverine woodland in the Kopet Dag.

10.3. Kopet Dag scrub vegetation and sheep tracks.



10.4 Saksaul woodland at the edge of the desert.

syriaca) was once a significant component of *tugai* vegetation (Lisitsyna and Popov 1988, Popov 1994).

The first range of the Kopet Dag rises quite steeply in many places, but there is a narrow strip of rolling terrain that has enough moisture from rain or runoff to support shrubby vegetation. I was able to collect in one such spot a few minutes by car east of Anau (Figure 10.4). At least two shrubby types grow broadly interspersed among grasses–*Calligonum* sp. (=*ngandim*) and a member of the Chenopodiaceae (=*sazak*). These types, along with Haloxylon (= *saksaul*) and *Tamarix*, have greatly reduced leaves or green stems (presumably to reduce water loss). Many are also salt-tolerant. There are tracts of such shrubby steppe-desert vegetation along the main highway between Ashgabat and Namazga to the southeast. At the archaeological site of Abiverd, plants in bloom in mid-May included caper (*Capparis* cf. *spinosa*) and wild rue (*Peganum harmala*). The land between the base of the Kopet Dag and the desert to the north has probably changed from open woodland to grassland with scattered trees to steppe. Today, for example, the main vegetation on the Anau North Mound, which may be lightly grazed, consists of various grasses, including *Poa bulbosa* and *Hordeum murinum*.

Archaeobotanical Work during the 1997 Field Season

The earlier excavators at Anau North did recover some plant remains; ancient wheat and barley grains demonstrated that the inhabitants were agricultural people. Lisitsyna (1981) mentions bread wheat (*Triticum aestivum*) and two-row barley (*Hordeum vulgare* var. *distichum*) for Anau IB, layers 18–5. Relatively abundant quantities of wood charcoal suggested a richer botanical environment than today. The same summary fairly well describes the results of the current work (the 1997 samples are primarily *Hordeum vulgare* var. *vulgare*, six-row barley). Previously reported (Harrison and Miller 1995) and not yet analyzed material from the Bronze Age levels of the Anau South mound will enable us to trace even longer term change through time.

Sampling and Archaeological Contexts

First, reachable parts of the north and west baulk of Kurbansakhatov's excavation in sectors ANI–ANM were cleaned and drawn. It was possible to excavate up to a meter into the baulk of the upper strata in order to collect intact samples. The samples from this area were taken during the course of excavation from areas of obvious archaeological interest, like rooms and floors, not just because there was visible charcoal. Indeed, most of the samples can be tied to corresponding structures and areas recorded in Kurbansakhatov's earlier excavations. The Anau II deposits (layer 3) are represented by a few ash lenses and hearth deposits in ANI. Most of the samples were taken from Anau I deposits (layers 5–18) in ANJ, K, L, M, and N. In addition to ashy deposits, samples were taken from non-ashy deposits inside and outside several structures.

The earliest deposits were accessible only from the north and west baulks of ANN. To avoid contamination from falling debris from above, samples were extracted from the lowest layer to the highest. In ANN, soil samples were cut primarily from areas that were rich in charred material. Mean density of the ANN samples is therefore relatively high. Ancient functional context is more difficult to discern than in the later deposits. The chronological ordering of the upper and lower samples is reasonably straightforward, since most samples were excavated from at or near a clean section.

Sampling was designed to maximize the amount of botanical information for the volume of earth removed. An unfortunate but inevitable side effect of this strategy is that there is no comparable faunal assemblage to elucidate pastoral or hunting aspects of the economy; excavation was on just too small a scale. A second drawback is that archaeological context of some samples is not as clear as we would like. We can reasonably presume much of the material to be from redeposited hearth sweepings, but it is hard to evaluate a few anomalous samples. Even so, a remarkable number of samples can be directly tied to specific structures in the earlier excavation, and most of the charred remains seem to have come from secondary trash deposition. Details of these samples are presented in Appendix C, Tables C.1–C.9.

Deposits charred *in situ* are few; some of the hearths appear to have post-use fill. Only one other sample with a high density of charcoal (apparently from the rectangular building in layer 9, AN97.085), seems to be from a burnt room. Other deposits with a large amount of charcoal are ash lenses, perhaps hearth sweepings. There are no grain or other seed deposits. Most of the samples collected and analyzed come from trashy, ashy deposits. The charred remains are primarily fuel remnants (wood charcoal). Charred seeds probably come from burned dung and occasional crop-processing debris or other trash (Table C.1).

Flotation

Running water was not available, and a barrel flotation system was set up at the field laboratory. The volume of an entire soil sample was measured in a bucket with liter markings. A cup or two at a time, the soil was then poured into a large strainer lined with 1.0 mm mesh cloth. To speed the process, the large strainer was agitated. Floating material was scooped up with a tea strainer with a smaller mesh. For the most part, the soil dissolved quickly in water. When the tea strainer was full, it was emptied onto a cloth. The sample in cloth was hung up to dry in the shade. Bones, sherds, and other items from the heavy fraction were saved.

The Taxa

The archaeobotanical taxa are listed in alphabetical order by family in the data tables (Tables C.2, C.3, C.4). Table C.5 summarizes the assemblage, and Table C.6 presents some botanical and ecological information about the different types.

Cereals

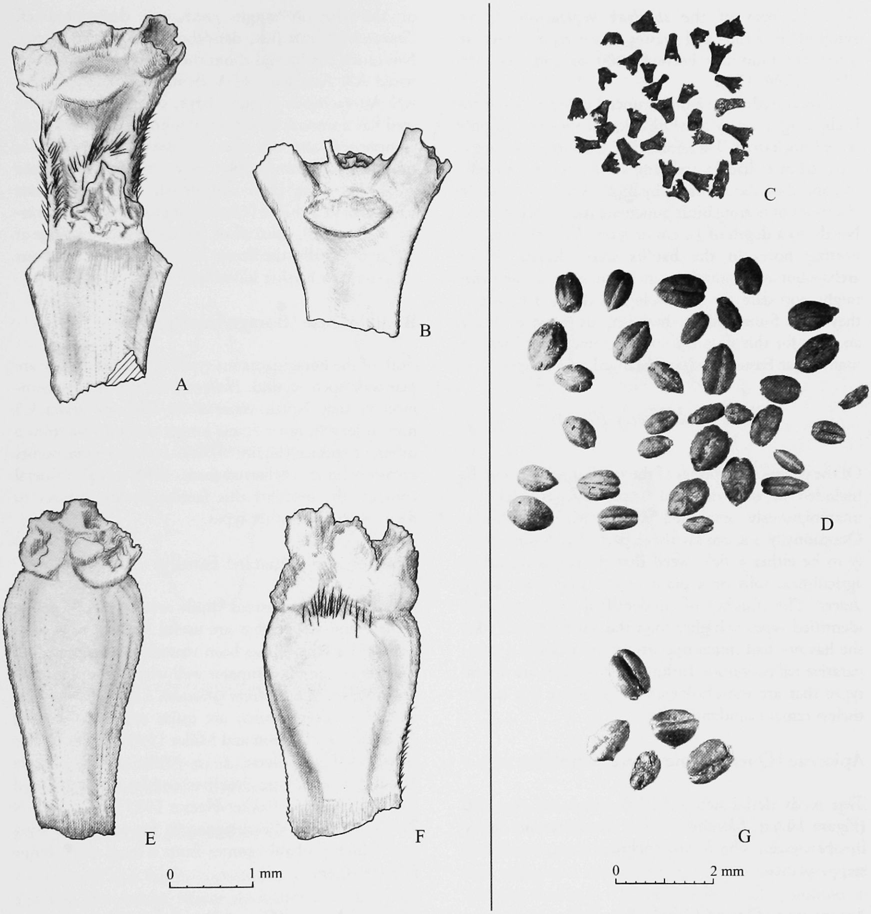
Hordeum vulgare var. *vulgare* (six-row barley)

The barley from the 1997 Anau North samples is the six-row type. The strongest case for this identification comes from the rachis internodes. Of the ones sufficiently well preserved to be identified, all are from the six-row type, with pedicellate (i.e., stalked) rather than sessile lateral spikelets (van Zeist and Palfenier-Vegter 1981:142) (Figures 10.5a–c). Also consistent with six-row barley is that many of the grains are twisted, but this characteristic is subtly expressed and in some cases could be the result of deformation during charring. The grains generally appear rather plump (Figure 10.5d), and they tend to be rounded in cross-section, which suggests the barley is naked rather than hulled. It is possible that some of the straight grains in our sample come from the two-row type. Indeed, Lisitsyna (1981) identified only two-row barley from the Anau samples she examined.

One sample, a dark lens from the earliest Anau IB level excavated (AN97.078), had a number of measurable barley grains (Table C.7). Compared to the six-row barley from other sites, these grains have a low length to breadth ratio (Table C.8). The glumes of hulled six-row barley seem to constrain the breadth but not the length of the grains, and so it is not surprising that the hulled grains from Yarym Tepe I (Bakhteyev and Yanushevich 1980), Karana 3 (Costantini and Costantini Biasini 1993), 'Oueili (Neff 1991), Ur (Ellison et al. 1978), and Tell Madhhur (Renfrew 1984) have higher L:B ratios than the naked barley of Anau. On the other hand, the Anau barley compares well with naked barley grains from the Iranian plateau (Costantini and Dyson 1990) and Pakistan (Costantini 1987). Measurements for Mehrgarh barley are not reported, but Costantini (Costantini 1984) describes it as having "small rounded seeds." The Anau grains are plumper than those of naked six-row barley from Erbaba, Turkey, a site where irrigation was not practiced (van Zeist and Buitenhuis 1983: 63–64).

Triticum aestivum s.l. (bread wheat)

The characteristics of the wheat rachis internodes from Anau North point to bread wheat (Figure 10.5e,f); among the criteria mentioned by Hillman (1983 (nd)) which also describe our wheat internodes, are: (1) only the lowest part of the glume base is present ("glume-base deciduous"), (2) the nodes below the point of glume insertion are inconspicuous, (3) many are "conspicuously shield-shaped" and (4) many show "longitudinal lines near the outer edge of the convex face." The grains, like those of the barley in these samples, tend to be plump, but the number of grains is too small to provide meaningful measurements (Figure 10.5g).



10.5 Barley and wheat remains from Anau North, A–D, barley; E–G, wheat.

Fruits

Rosaceae, cf. *Prunus*

In AN97.005, a fragment of the base of a cf. *Prunus* has traces of an angular edge with longitudinal groove. The outer surface is relatively flat. Broadly defined, the genus *Prunus* includes plum, cherry, apricot, peach, and almond, and is closely related to Cerasus; the fragment is a little thinner than *Cerasus microcarpa*, a wild cherry that grows in the Kopet Dag, but otherwise resembles it.

Ulmaceae, Celtis (**hackberry**)

The most numerous tree fruit in the samples is *Celtis*, whose uncharred seeds were found in several deposits. The wood of *Celtis* was not encountered. Today, *Celtis* is to be part of the *shiblyak* vegetation (spiny xerophilous shrubs and grasses which replace overcut forest communities) between 800 m and 1600 m (Popov 1994: 179).

Celtis seeds have a high mineral content, frequently charring to a gray or white color, or they may be preserved uncharred. Therefore, they tend to be over-represented in archaeological samples. *Celtis* fruits are edible, and they also are eaten by birds. A large number of chambers of nesting birds punctuate the baulks of Anau North, to a depth of 10 cm or more. Even though the nesting holes in the baulks were cleared before archaeobotanical samples were taken, some of the *Celtis* might post-date the archaeological deposits in which they were found. Most, however, are most probably ancient, for this type is found in mineralized form in many Near Eastern archaeobotanical assemblages.

Wild and Weedy Plants

Of the genera and species of the small shrubs and herbs included in the wild and weedy category, few are unambiguously associated with particular habitats. Occasionally one can say that a particular taxon is likely to be either a field weed that thrives in disturbed agricultural soils or a plant of the steppe or steppe desert. The number of unidentified and tentatively identified types is higher than the author would like; she has not had much opportunity to develop a comparative collection for Turkmenistan. There are several types that are morphologically distinctive but nevertheless remain unidentified.

Apiaceae (Queen Anne's Lace Family)

Two seeds designated AN Apiaceae-1 are recorded (Figure 10.6a). Members of this family usually thrive in open areas. The family includes many weeds and steppe plants.

Asteraceae (Daisy/Thistle Family)

The Asteraceae is a large, diverse the plant family, which includes shrubs and herbs. Most of the members prefer open ground. Several members of this large family are recorded in the samples. One type, cf. *Artemisia* (wormwood), is a characteristic small shrub of the steppe-desert (Figure 10.6b). In more favorable climates, where the climax vegetation is grassland, it may be indicative of overgrazed pasture. It is eaten by herbivores. Today it was seen growing in degraded pasture in the foothills and front range of the Kopet Dag south of the site. A single seed was designated cf. *Taraxacum/Crepis* (i.e., dandelion or a similar plant). Not much can be said about the two small seeds designated AN Asteraceae-1. A second unidentified type, AN Asteraceae-2, is quite large, ca. 4 mm long; the seed has a smooth surface, is not angled, but is a little compressed, and the apex or base of the pappus is rounded. Of comparably large, smooth Asteraceae seeds that have been considered, this type is not *Centaurea* or a thistle (*Cirsium alatum*, *Picnomon acarna*, or *Carduus*), since all of those types have a ridge at the apex. Finally, the flower head of an Asteraceae was seen, but not further identified.

Boraginaceae (Borage Family)

Both of the boraginaceaous types in the assemblage are plants of open ground. *Heliotropium* is relatively common at Anau North; most of the seeds are under 1.5 mm in length, but a single longer one may be from a different species (Figure 10.6c). *Lithospermum* occurs occasionally in uncharred form. With a high mineral content, the seeds of this family are less subject to decay than most other types.

Brassicaceae (Mustard Family)

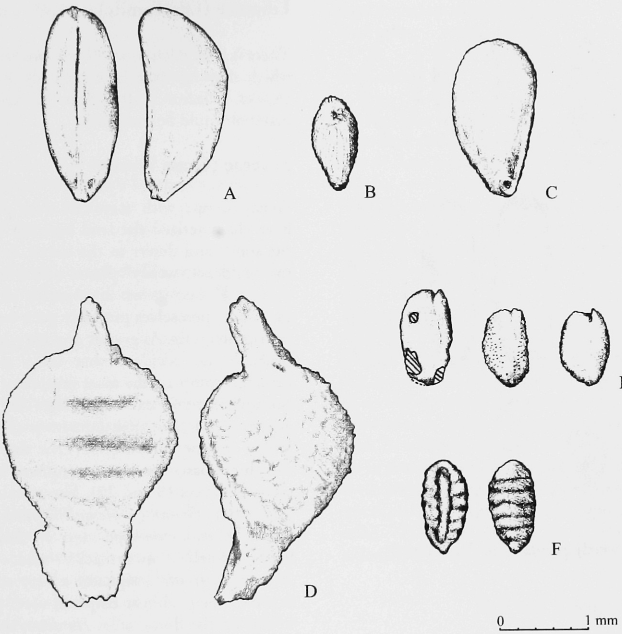
Members of the mustard family are commonly plants of field and steppe that are useful for fodder. A relatively flat seed type has been tentatively designated cf. *Alyssum* because it compares well with *Alyssum linifolium*. Siliques of *Euclidium syriacum*, a monotypic genus with indehiscent fruits, are quite common here, at Anau South (Harrison and Miller 1995), and at Gonur (designated Cruciferae 1 in Miller 1993) (Figure 10.6d). Another type closely resembles *Neslia* pictured by (van Zeist and Bakker-Heeres 1985:fig. 2.12). AN Brassicaceae-1 is the designation for a small oblong type which probably comes from a long, thin silique (Figure 10.6e).

Capparidaceae (Caper Family)

Most *Capparis* (caper) types are spiny shrubs. The fleshy fruits are edible for both people and animals, and in the Mediterranean world the buds and other parts of the plants are pickled, even the shoots. Seeds of *Capparis* occur in Anau IB and Anau IA levels.

Caryophyllaceae (Pink Family)

The pinks are usually small herbaceous plants; many are good fodder. A few seeds designated AN



10.6 Wild and weedy plants from Anau North.

Caryophyllaceae-1 were encountered, mostly in the lowest layer of Anau North (Figure 10.6f).

Chenopodiaceae (Goosefoot Family)

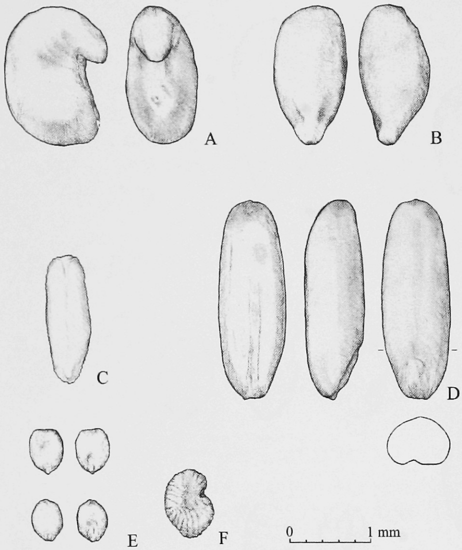
Members of this family include herbs and both small and tree like shrubs. Many are adapted to salty soils and open ground. *Atriplex* is represented in a single sample by two fruits encased in their bracts. Although unspecified Chenopodiaceous seeds occur in small quantities throughout the sequence, only a single *Chenopodium* was recognized (in an Anau IIA context). The most common of seeds of this family are cf. *Salsola*, distinguished by a curled embryo that is relatively flat, and so not quite like the *Salsola* depicted by van Zeist and Bakker-Heeres (van Zeist and Bakker-Heeres 1985:fig. 8). In addition, a few *Suaeda* seeds have been tentatively identified from the Anau IB layers.

Cyperaceae (Sedge Family)

The sedges are typically plants of relatively moist open ground: the sides of streams and ditches, swales, marshy areas. *Carex* and *Scirpus* have been tentatively identified, along with two other types: AN Cyperaceae-1 and AN Cyperaceae-2. They occur in small quantities in layer 8 and below.

Fabaceae (Legume/Clover Family)

Leguminous plants are found in all kinds of habitats and growth forms. Many of the legumes provide very good fodder and are characteristic of undegraded steppe. With a few exceptions, distinguishing genera from seeds alone is problematic. Two samples had some pod segments of *Alhagi* (camelthorn), which is a small spiny shrub with a very deep tap root that thrives in fallow fields and overgrazed pasture. *Alhagi* has been found in greater quanti-



10.7 Wild and weedy plants from Anau North (cont).

ties on the Iranian plateau at 4th millennium Hissar (Costantini and Dyson 1990) and 3rd millennium Gijlar (Costantini and Biasini 1984). *Astragalus* and possible *Trifolium/Melilotus* (clover/melilot) occur at various points in the sequence. One of the most frequently occurring and numerous types in the assemblage is *Trigonella*, though more than 85% of the 1672 *Trigonella* seeds come from a single sample, 97.078 (layer 18). *Trigonella*, *Trifolium/Melilotus*, and *Astragalus* all provide high-quality forage. Finally, one-as-yet unidentified legume is designated AN Fabaceae-1 (Figure 10.7a).

Lamiaceae (Mint Family)

The mints comprise another widespread and diverse family whose members thrive in a variety of habitats. Though scattered throughout the sequence, the total number of seeds of this family is small. Only one has been tentatively designated to a genus, *Ziziphora*. Three more seem distinctive, but are not in the comparative collection at MASCA, AN Lamiaceae-1 (Figure 10.7b), AN Lamiaceae-2 and AN Lamiaceae-3 (Figure 10.7c).

Liliaceae (Lily Family)

There is not much to say about two rare types, one of which may not even be a member of the lily family (AN cf. Liliaceae-1). It is clear that more comparative material would be invaluable.

Poaceae (Grass Family)

Grassy steppe with scattered trees probably would have characterized the land between the foothills to the south and desert to the north. Indeed, many of the "wild and weedy" plants mentioned in this section could have grown interspersed among the grasses, which themselves probably grew between sparsely distributed trees. As grasses provide good pasture, it is probably no accident that they, along with the legumes, comprise the most important component of the archaeobotanical assemblage. Of the identified grasses, *Aegilops* is most numerous and occurs in the largest number of samples. Like the *Aegilops* seeds, the glume bases are most prominent in the Anau IA samples (layers 19 and 20). The remaining identified grasses (cf. *Bromus*, *Phleum/Eragrostis*, *Eremopyrum*, *Hordeum murinum*-type, and cf. *Setaria*) occur in very small quantities and percentages. *Phleum/Eragrostis* designates a very small (less than 0.1 mm long) almost elliptical seed. *Eremopyrum* is keeled on the dorsal side. *Hordeum murinum*-type is similar in shape to domesticated two-row barley, but is quite a bit smaller. There are also quite a number of unidentified (AN Poaceae-1 to -8) (Figure 10.7d) and unidentifiable types. AN Poaceae-1 is a significant part of the assemblage. It is very similar in shape to *Setaria*, but is quite small, well under 1.0 mm long (Figure 10.7e).

Fumaricaceae (Fumitory Family)

Fumaria, a small herbaceous plant eaten by animals, is represented by a total of two seeds.

Portulacaceae (Purslane Family)

A single tentatively identified *Portulaca* (purslane) seed was seen. Portulaca has a succulent leaf and the greens are very tasty in salad or cooked. The Turkmen name is *semzik* (*semizotu* in Turkish).

Primulaceae

Two deposits provided a total of four *Androsace* seeds.

Ranunculaceae (Buttercup Family)

Two members of the buttercup family were encountered, both of which are plants of open ground, *Adonis* and *Ceratocephalus*.

Rubiaceae

Galium has a consistent though low presence here.

Unidentified Types

There are several unknown types. The most distinctive, AN unknown-3, is illustrated in Figure 10.7f.

Woody Plant Taxa (Charcoal)

For discussion of the distribution of these types today, see discussion of modern vegetation above.

Cupressaceae

Three pieces identified as *Juniperus* (juniper) were encountered. They had no resin ducts. The pits seemed to be cupressoid. A fourth piece at first looked like it had a resin duct, but the absence of fenestroid pits and, more importantly, the absence of pine in the forests of Turkmenistan (Kurbanov 1994: 107) encouraged a reconsideration; it is listed as "conifer" in Tables C.3 and C.4, and the "resin duct" may be a hole made by a rootlet.

Chenopodiaceae

A few pieces of Chenopodiaceous charcoal were identified. One type looked like *Haloxylon* depicted by Fahn et al. (1985). It also compared well with the unvouchered "saksaul" given to me at a picnic; "saksaul" is the common Turkmen word for *Haloxylon*, which can grow to the size of a small tree. The other type compared well with the wood of a vouchered small shrub called "sazak" by our driver, a Turkmen (though not yet identified, *Arthrocnemum*, *Halocnemum*, and *Anabasis* are under consideration; this type is not *Salsola dendroides*, also called "sazak" by our driver).

Oleaceae

Two pieces of *Fraxinus* (ash) were identified from the earliest layer. Ash would have been a constituent of *tugai* (riparian thicket) vegetation of the Keltechinar river valley.

Salicaceae

Populus/Salix (poplar/willow) was identified from vessel and ray pattern in cross section only. The radial section of three pieces in AN97.085 seemed to be homocellular, which supports an identification of poplar. (The identification is difficult because the rays of poplar and willow are so narrow it is difficult to get a clear view.) Poplar would have been a constituent of *tugai* vegetation.

Tamaricaceae

Tamarix (along with cf. *Tamarix*) is the most important wood in the charcoal assemblage, comprising over 71 to 94% by count and weight of the charcoal indentified in each phase. It is present in all samples examined. In addition to vessel pattern and ray width visible in cross section, where possible I checked the radial section for storied vessels and parenchyma and heterocellular rays (procumbent, upright, and square cells). Tamarisk would have grown along the Keltechinar river, as it does today.

Animal Dung

Fragments of animal dung occur, sometimes clearly charred (Table C.9). Dung fragments have a fibrous texture. Occasionally enough of the outer shape and texture is preserved to recognize fragmentary or whole sheep/goat pellet. In at least one sample, the laminar structure of the fibrous remains suggests stable litter; even today at Anau kolkhoz the accumulated dung of penned sheep and goats is periodically dug out in flattened chunks that makes a very good fuel. Judging from the overall high densities and proportions of wood charcoal in the samples, animal dung was at most a minor, supplemental fuel.

Three samples are noteworthy for having fairly dense dung-like deposits:

1. AN97.031, layer 3 was from a burnt floor in a structure. It has a low density of charred material, so it may just be a from a room that was swept clean.
2. AN97.045, layer 14 is from a burnt layer inside a round, c. 1.4 m diameter structure. It has a low density of charred material. The control sample (AN97.036) from outside the building had a similar low density of material, but no evidence of dung use, either.

3. AN97.073, layer 19 has a moderate density of charred material.

A fourth sample discussed below, AN97.078 from layer 18, has a moderate density of charred material that includes a substantial amount of sheep/goat dung pellets and fragments.

Analysis

Taphonomy

Most plant materials at Anau were preserved by charring. For that reason it is likely that the charred wood and seeds come primarily from fuel—wood, brush, and dung (Miller 1984)—though accidental inclusions of some material cannot be excluded. Most of the deposits with high densities of material are redeposited rather than burned in place. Only one high-density deposit is likely to have come from a burnt building, and so is not comparable to the others.

Quantification

Like individual potsherds, individual seeds are interpretable only at the most basic level (identity, ecological requirements of the taxon, likely source). Similarly, one may identify a sample from a single deposit as, say, a hearth deposit, if stratigraphic and contextual information supports the interpretation, but it is really not possible to evaluate one sample in isolation from others of the assemblage. For example, if we do not know what charcoal densities to expect for cultural fill, how can we know if a hearth deposit has *in situ* fuel remains or just some background amount of charcoal? On the other hand, at many sites the variability between samples is so high as to make average values meaningless. There are, however, quantitative ways of considering the samples that can be useful.

Density

For purposes of this report, "density" is measured by the weight in grams—of charred plant material (wood, seeds, other parts) caught in a 2-mm sieve—per liter of soil. Because the bulk of the burned material is wood, samples with a high density of charred material tend to have a lot of wood charcoal. Samples with overall low densities of material cannot really be interpreted, since the charred material probably consists of "background noise" rather than some kind of *in situ* deposit.

Seed-to-Charcoal Ratio

Two forms of this measure are the proportion by weight of seed material larger than 2 mm (essentially cereal) to charcoal larger than 2 mm, and the proportion of wild and weedy seeds (by count) to weight of charcoal. I suggest that both help us assess the relative amounts of dung-to-wood fuel in the assemblage. As the number of seeds in dung is seasonally variable (Bottema 1984), this measure is only applicable to groups of samples. At Anau, both proportions are relatively low (Table C.5), and are close to the proportions found in samples at Malyan, in the heart of the Zagros forest zone, with average ratios of under 0.05 (by weight) for seed material and about 8 wild and weedy seeds per gram of charcoal (Miller 1982, 1990). Those numbers are quite different from the site of Hacinebi in southeastern Turkey (the comparable ratios are 0.46 by seed weight and 281 by seed number; data in Miller 1996). That is, dung supplemented wood fuel at Anau, but was relatively unimportant.

Wild and Weedy-to-Cereal Ratio

Insofar as the seeds originated in dung fuel, the values of this ratio could be used to assess reliance on pasture relative to cultivated fodder (Miller 1998). This figure at Anau is not that useful, because random factors of sampling interfere with interpretation with such small amounts of seed material.

Spatial Distribution

Of the four hearth deposits sampled, two (AN97.002, AN97.006) have moderate densities of charred material, almost entirely wood charcoal, and two (AN97.013, AN97.035), with low densities of charcoal, are more likely to have post-abandonment trash.

Most of the samples from layers 3 to 18 can be directly related to structures and other deposits in the 1978–1982 excavations. The Anau IB round structures could have been used for storage or animal pens. Only one such structure (AN97.045, layer 14) had *in situ* evidence for dung and a low density of charred material, which strongly supports the view that it was an animal pen. The material in other round structures appears to be trash deposited after the buildings' abandonment; it is likely, though not provable, that they, too, were animal pens.

The sample from a square structure (97.085) in layer 7 has a very low density of seed remains, but quite a bit of wood charcoal and reed culm nodes. The charcoal includes many large chunks (about 1.5 cm) of poplar and tamarisk. Long straight poplar poles are a common source of roof beams in Iran and Afghanistan Reeds are layered between the beams and mud roof plaster (Szabo and Barfield 1991: 135–37). It thus seems likely that this deposit is primarily fallen roof debris mixed in with stored firewood or furnishings.

One sample, AN97.078, stands out. Along with quite a bit of charred sheep/goat dung, there was a tremendous number of wild seeds—more than half the seeds in the wild-and-weedy category come from this one sample (2399 out of 4290 total)—and the most grain (barley) and charred dung (Table C.9) of any sample examined. Most of the wild seeds were of *Trigonella*. Although this sample has a high proportion of seed (both wild and domesticated) relative to charcoal, the proportion of wild seed to cereal is close to the median for the assemblage. Described as a "dark lens outside of architecture," the deposit could just be an undisturbed ash dump from a domestic hearth that provided the only sample in the entire assemblage with substantial remains of dung fuel.

Finally, one might consider the sample from the very bottom of the excavation in ANN in layer 20. At first, we thought the deposit had no occupation debris, but flotation revealed a small amount of wood charcoal, along with a well-preserved barley grain. It is unlikely that any of this material is intrusive. Subsequent to the excavation, Hiebert discovered some notes of Pumpelly that documented an extension of the site below the modern plain. Therefore, sterile soil was not reached in this part of the excavation.

Vegetation, Agriculture, and Landscape

Originating as fuel, the charcoal assemblage is the best evidence for woody vegetation growing near the site. The importance of wood charcoal and predominance of tamarisk strongly suggests the inhabitants of Anau had easy access to *tugai* vegetation. This is not surprising, as until recently this was the typical plant cover along streams like the Keltechinar. Ash (*Fraxinus*), which seems to have largely disappeared by the Bronze Age (Lisitsyna and Popov 1988), comes only from the earliest excavated layer. Poplar, too, would have formed part of this association. These taxa constitute at least 85% of the charcoal assemblage by count or weight in all periods. This suggests that *tugai* vegetation grew near Anau. Evidence for dung fuel use (the seed:charcoal ratio) supports the view that the human impact on the vegetation was negligible; it does not change much between Anau IA and Anau IB phases.

Two upland forest products, juniper and cf. *Prunus*, are absent in the Anau I deposits. Similarly, the Chenopodiaceous shrubs from the steppe or degraded pasture are more prevalent in the later phases. Although the data are too scanty to make firm pronouncements, they suggest that the Anau IB residents were more likely to go further afield for fuel gathering. In the case of the Chenopodiaceous woods, perhaps grazing or land clearance for agriculture or fuel increased the area of degraded pasture.

The settlement history of Turkmenistan from Neolithic times on cannot be understood without a consideration of the water supply for farming. Anau is situated at the very edge of the rainfall agriculture zone, so irrigation could have been an important factor enhancing crop security. Watering practices are reflected in archaeological crop remains thanks to ancient crop choice and the way the seeds of those plants respond to moisture conditions.

Some crop types are more drought tolerant than others. For example, due to its shorter growing season, under rainfed conditions, barley tends to need less water than wheat, and two-row barley needs less water than the six-row type. Where both two- and six-row barley are grown, and irrigation is practiced, six-row is more likely to be irrigated (Harlan 1968). The wheats, too, vary in their moisture requirements. Hans Helbaek (1969) considered the arrival of bread wheat (*Triticum aestivum*) on the Deh Luran plain in Iran as evidence of irrigation. In the semi-arid environs of Anau, six-row barley and bread wheat would not be the most likely crops under rainfed conditions. Not only is precipitation rather low for dry-farming, but both of these crops have a relatively high water requirement compared to alternatives, like two-row barley or, as had been grown earlier at Djeitun, einkorn wheat (Harris et al. 1996). A second bit of evidence is grain shape; with irrigation, grains tend to get plumper. As discussed above with regard to barley, the Anau grains have a low length to breadth ratio compared to those at other sites. Therefore, the main crops evidenced to date at Anau North, six-row barley and bread wheat, almost undoubtedly were irrigated, perhaps by simple gravity flow (see Miller 1999).

In summary, the people of Anau settled in a landscape dominated by renewable *tugai* vegetation. Fields probably were cleared along the stream, perhaps interspersed with *tugai* thickets, and herds grazed on nearby steppe. Human activities had only a negligible impact on the vegetation in the period considered here. Over time, however, fields may have expanded at the expense of pasture and *tugai* in the immediate vicinity of the settlement.

11

Microscopic Analysis of Soils from Anau North

Alexandra A. Golyeva

In Russian soil science "biomorphic analysis" refers to the combined study of phytoliths, spores, pollen, diatoms, sponge spicules, cuticle casts, detritus, and other microscopic plant parts (Golyeva 1997). Most soils—including natural strata, plowed fields, pastures, and cultural layers—contain different and distinctive arrays of these microscopic plant remains. The primary purpose of biomorphic analysis in Russian soil science is the determination of evolutionary trends of soils and anthropogenic sediments and the determination of modern and past environmental conditions. For archaeological purposes, a combined biomorphic analysis increases the reliability of individual data and truthfulness of the reconstruction of a behavioral activity or depositional context (Table 11.1). This approach combines paleoethnobotanical techniques (Pearsall 1989) with the study of detritus and grain size as used in soil micromorphological studies (Courty et al. 1989).

While this type of analysis has been developed to study naturally deposited soils, its application in archaeology is being developed in the steppe regions of

Table 11.1 Inferences from Biomorphic Data

Biomorphic data	Potential interpretations from archaeological samples
Pollen and spores	Composition of local flora, plant use information, season in which the soil was buried
Phytoliths	Plant use information, indication of anthropomorphic disturbances, erosional processes, character of irrigation systems, nature or function of specific contexts, use of cereal plant parts
Diatoms and sponge spicules	Relative indicator of the use of water adapted plants
Silicified cuticle casts	Indication of rapid soil burying
Charcoal and xylem	Identification of burning, and near-by hearths, open or closed areas from winds, indication of cultural layers, composition of economically important woods
Detritus	Diagnostic of cultural layers and surface layers, indication of the nature and intensity of post-depositional modification (crushing)

Eurasia, where ancient soil surfaces preserved underneath datable burial mounds provide a eco-data baseline in relationship with early herding activities on the steppe (Golyeva 1999). Today, we can include this type of analysis in archaeological and paleoenvironmental research as an effective technique in the documentation of archaeological contexts.

The present research is an attempt to try this type of analysis in a new environment—Central Asia. However, it must be noted that Anau is practically mythical in the history of paleoethnobotanical science because it was the place where the investigations identified some of the first microscopic plant parts from archaeological contexts (Schellenberg 1908). At Anau, we have sampled archaeological contexts from both the north and south mounds which have re-opened old questions of how humans used the environment with new data. We had many questions about the nature of the deposits through time—whether they were anthropomorphic or naturally deposited, and in some cases biomorphic data helps to differentiate between these. In 1999, ten further samples were taken from the upper fill of rooms to provide information on other soil contexts within an archaeological site. This complementary analysis is a preliminary attempt in differentiating between occupational debris and naturally deposited strata.

Analytic Categories

Pollen and Spores

Pollen and spore analysis is based on three factors: (1) the abundant pollen and spores that plants created during flowering; (2) the microscopic plant parts have, in each specific region, distinctive forms which allow for their identification to a certain degree; (3) pollen and spores are very durable and stable which allow them to remain in different deposits for a long time

In some depositional conditions the degree of pollen preservation is very low. They do not preserve if they are burned, thus are not a complementary database for charcoal samples from hearths. In arid environments, such as Anau, pollen is often destroyed due to aerobic conditions and high microbiological and biochemical activity. The favorable conditions for pollen preservation is where the grains are buried quickly and deeply and where high concentrations of flowering plants permit the quantity of pollen to be adequate for analysis.

Phytolith Analysis

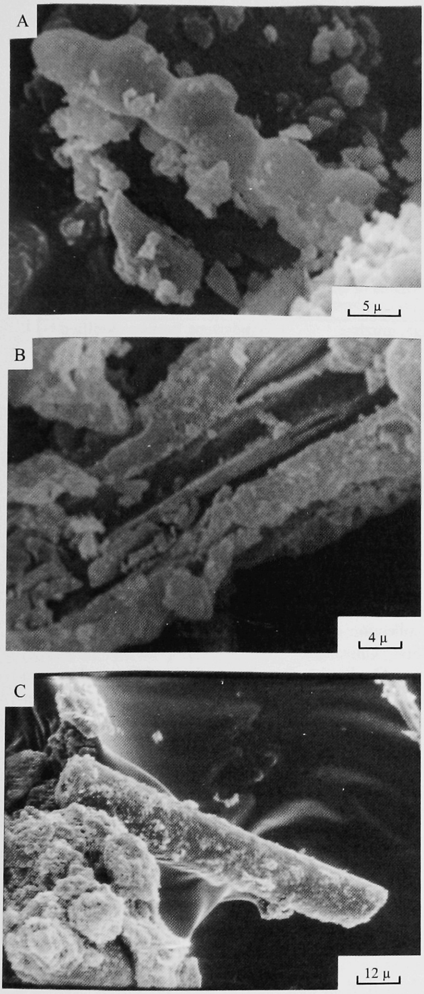
Where pollen is not preserved, phytoliths often provide an alternative to understanding the plants in use in a certain deposit (Golyeva 1995, Golyeva et al. 1995). Phytoliths are immune to aerobic microbial destruction, but do melt in high fires. In contrast to pollen, phytoliths do not participate in aerial migration and in most cases characterize the plant communities of the local area. Phytoliths (Figure 11.1a) represent microscopic opal plant "stones" that form in living plants owing to intracellular precipitation of silica. The morphology of phytoliths resembles that of the host plant cells. Therefore, these bodies can be used as diagnostics of vegetation and investigation into the evolution of the plant cover (Piperno, 1988).

Biogenic silica enters the soil and accumulates in fine fractions forming assemblages characteristic of the local plant communities. Phytoliths can, however, migrate through deposits, and the stability of phytoliths in deposits is connected with the depth of their occurrence (Jones and Beavers 1964). There are some important differences in the interpretative possibilities of phytoliths from natural vs archaeological deposits (Table 11.2). Color can be used to estimate post-depositional effects on the deposits; morphology provides information on plant diversity. Abundance of phytoliths in the samples is a measure of the amount of plant debris in the deposit and can provide information in conjunction with other archaeological indices on the nature of the deposit. The phytolith complex, can, in certain cases, be used as a measure of the plant community represented in a specific deposit. Further, differences of the phytoliths size allow for the differentiation of the ancient irrigation from dry-farmed crops (Rosen 1994).

Phytolith data must be treated like other categories of archaeological data—the interpretation of the data can only be done with a full understanding of the archaeological context of the sample. To this end, a close interactive working relationship with the field archaeologists has been essential for the combined biomorphic approach to be effective.

Detritus

Microscopic plant detritus (Figure 11.1b) is composed of the remains of skeletal plant tissue that protect all parts of a plant from rupturing and breakdown. Sometimes, the cells of these tissues represent dead and cellulose-impregnated cells within the body of a plant.



11.1 Microscopic soil parts.

These tissues are relatively good at resisting decomposition; therefore, they can be preserved in the cultural layers.

Plant detritus is subdivided into arboreal and herbaceous, which differ from each other in their microscopic form. Occasionally detritus preserves in archaeological samples that have no preserved pollen, phytoliths, or spicules. In these cases, the detritus can indicate the nature of the deposit—whether the detritus was arboreal or herbaceous (roots), and in some cases can be useful in determining season of deposition. The pattern of plant tissue in the detritus is partially diagnostic of a specific plant or plant part, and can be used for the generic identification of a plant.

This type of microscopic plant material is very important in the archaeological investigations. For example, the occurrence of large detritus from grass roots is indicative of exterior soil surfaces. The size of generic detritus is indicative of the nature of the deposit. If the amount of small detritus particles was more then 95—96%, it indicates that intact plants were not at this site. If less than 95% of the detritus is small, it is indicative that intact plant materials (grass or/and wood) were at the site. It helps us to determine whether plants were mechanically crushed (by people or animals) or not.

Large plant detritus (more than 40x40 m) indicate that decomposed plants in the deposit; abundant middle sized parts (between 20x20 m and 40x40 m) indicate that vegetation was crushed in the deposit; small plant detritus (less then 20x20 m) plants were absent here, they were removed by winds. Wood detritus indicates decomposed wood or woody vegetation in a deposit. Analysis of plant detritus is especially informative with respect to cultural layers of urban soils and settlements and helps to reveal intensity in the economic activity of human society. Together with other archaeological data, the size of the particles can be used as an indication of the intensity of occupation (Golyeva 2001).

Here it is important to note that this is a preliminary study, and that it will realize more effective results with the development of a comparative atlas of plant detritus. Such work has began for the steppe region, and we can use this as a beginning for the study of the Central Asian plant detritus, but that since the plant communities are different between the steppe region and the foothill region of southern Central Asia, our inferences from detritus samples at Anau remain preliminary.

Sponge Spicules and Diatoms

Microscopic fresh-water sponges have shells composed of spicules (Figure 11.1c). Sponge spicules have an

Table 11.2 Inferences from Phytholith Analysis from Natural vs. Archaeological Soils

Phytolith characteristics		**Interpretation**	
		Natural soils	**Archaeological soils**
Color	colorless	naturally decomposed plants	plants were used and naturally decomposed
	black	Burnt plants, range or forest fires	location of hearths, near-by hearths and hearth sweepings
Morphology of separate grains		Diagnostic of specific plants in the local ecology	Indicative of use of specific plants at the site
Abundance	very abundant	Artificial substrate – manure, etc	Plant use. Functions such as animal pens, bedding, matting
	abundant	Upper soil horizons or cultural layers	A deposit which had plants growing in them, or mixed in
	few	Erosion, tillage, grazing	Windswept, human modified deposits (swept areas), such as interior rooms, and courtyard surfaces
	absent	Erosion, mineral drift	Deposits without plant remains
Phytolith complex		History of plant communities and evolution of landscapes	Use of plants by people and animals

elongated and rounded form with a tubular central channel that serves as the main diagnostic feature of sponges. Diatoms are one-celled Protozoa, which absorb silicon from water and accumulate it in their outer shell. Different varieties of diatoms which live in fresh waters are found in Central Asian soils. The identification of the siliceous spicules of sponges or diatoms shell are indicative of soils from nearby water, such as a river or canal.

Source Materials

Three source materials were studied in this preliminary investigation: comparative cultivated cereal grains; soil from those samples collected by Miller for macrobotanical study—primarily from ancient hearths and floor deposits; and soil samples collected from upper fill, courtyard fill, and beneath walls.

Comparative Plants

Based on information about the differences of the characteristic form of the silica long-cell walls of cereals and wide grasses (Rosen 1992), we looked at the phytoliths of the main cereals used at Anau: wheat (*Triticum aestivum*) and barley (*Hordeum vulgare*). Comparative samples of Central Asian (from steppe and desert environments of Turkmenistan and Kazakstan) were provided for our study from the plant collection of the Soil Science Department, Moscow State University.

Qualitative phytolith analyses of the modern cereal parts shows that there are at least two strong differences in phytolith forms between straw and seeds skin which permits us to distinguish between straw and grain of cereals (Golyeva 2001). The ability to identify specific parts of plants were found in all of the comparative samples of wheat and barley, and it allows us to distinguish to a greater degree of precision the nature of the deposits and the specific economic use of various plants.

Archaeological Samples

A total of 20 soil samples from the North mound at Anau were studied. Eleven of the soil samples were collected by Miller for flotation analysis and were subsampled here for phytolith and biomorphic analysis. Further samples were collected in 1999 from upper fill ("comparative samples"). Thus, the microscopic plant parts for these samples directly complement the macrobotanical analysis in Chapter 10. This study is part of a larger, ongoing study of microscopic plant parts, which compares micro-debris from the urban Bronze Age remains at Anau South with Anau North.

Results

Separate treatments were made for phytolith, pollen and detritus extraction following standard techniques (Moore et al. 1991, Piperno 1988) and both quantitative and qualitative analyses were done. The results of the preliminary analysis of the samples are presented in sets of data: samples from primary deposits on floors or from hearths, sub-sampled from flotation samples (Table 11.3); and samples from upper deposits (Table 11.4).

In every sample 300 parts of detritus were counted in 3 repeats. The percentage distribution of detritus in the floor samples are listed in the Table 11.5 and in the upper fill samples in Table 11.6 and Figure 11.2.

Anau IB1 (4000–3700 BC)

B.001

Context: This sample was taken from the courtyard surface, outside of the circular structure, layer 14 (ANM 6). Miller notes (97.036) a low density of charred material, with few seeds.

Biomorphic analysis: This sample included charcoal fragments, grass detritus, cuticle copies, phytoliths, and pollen. This biomorphic assemblage typically is found from open areas, where grasses (such as wormwoods) grow, and winds carry ash from nearby hearths. The high level of pollen preservation indicates that this deposit was buried very quickly.

B.002

Context: this sample is from the ashy fill on a reddened floor inside of the circular structure in layer 14 (ANM 9). Miller notes (97.040) a high density of charred material predominately of wood. A moderate amount of weedy seeds found.

Biomorphic analysis: This sample had dense small particles of woody detritus, indicative of woody bedding. The amount of medium detritus is high—9% of all particles. The material was mechanically crushed—possibly by animals if this area was used as an animal pen. The deposit was burnt *in situ*.

B.003

Context: this sample is from a gray layer inside of the circular structure in layer 14 (ANM 7). Miller notes (97.037) that that this deposit had a relatively high density of charred material, with a few cereal grains from an ashy layer in a re-used structure.

Biomorphic analysis: This sample had numerous fragments of large and small charcoal detritus. Two sponge spicules represent water adapted plants that were brought from the running river or canals nearby.

B.004

Context: This sample was taken from outside of the building, beneath the surface of ANM 7, layer 15 (Comparative sample 9). Sampling from beneath the surface upon which the layer 14 circular structure was built.

Biomorphic analysis: This sample differs considerably from others because it has dense pollen. All pollen grains are from Chenopodiaceae plant family (arid and semiarid grasses). Most of them are in clumps, as opposed to being separate. This indicates that the deposit was vegetated just before burial. Such high preservation of pollen is atypical in arid areas such as Anau. This unique depositional context suggests that: (1) burial occurred during the summer; (2) the burial process was intensive in a short time and had a large volume; (3) the burial process was likely natural (for example, due to an earthquake).

B.005

Context: The sample was taken from just beneath the wall of layer 12 (comparative sample 8). This is just beneath one of the circular structures, and should represent, more or less, the "natural" environment.

Biomorphic analysis: This sample has only small particles of detritus without visible root debris. As in sample 7, there were no plants on the surface when the soil was formed or buried within the soil.

B.006

Context: The sample was taken from beneath the wall and floor of layer 10 (comparative sample 7).

Biomorphic analysis: This sample has only small particles of detritus without visible root debris. This is

Table 11.3 Soils from Anau North, Archaeological Samples

Sample number	Sample	Context	Charcoal	Wood detritus	Grass detritus	Spicules/ Diatoms	Cuticle imprints	Phytoliths	Pollen	Interpretation of deposit
B.001	ANM 6	Outside of walls	+++	-	+++	-	+++	+++	+++ *Artemisia*	Grassy surface Open area Quickly buried
B.002	ANM 9	Lowest floor of circular structure	-	+++ Small	-	-	-	Single	-	Mechanically crushed Repeated trampling
B.003	ANM 7	Secondary floor of circular structure	+++ Large	++	+++	2	++	++	1	Wind blown ash, detritus and sand
B.007	ANL 7	Floor deposit	+	+	-	-	-	Single	+	Wind drift or cleaned surface
B.008	ANK 17	Ashy/dung layer on floor	+++	+++	+++ Very abundant	-	+++ Very abundant	++	++ *Artemisia* Cicoreacea	Exposed surface, dungy deposit
B.009	ANK 16	Bricky collapse	+++	+++	+++ Very abundant	-	+++ Very abundant	++ Many unknown forms	++ *Artemisia*	Exposed surface, overgrown with grasses
B.010	ANK 12	Sandy floor surface	-	++	+++ Very abundant	1	+++ Very abundant	+++ Many unknown forms	+++ *Artemisia*, Chenopodia ceae	Exposed surface deposit, with grasses and cereals
B.011	ANJ 5	Hearth deposit	++	+++	+++ Large	-	+++ Very abundant	+ Large	-	Many grasses, cereals
B.016	ANI 9	Floor deposit	+++	+++ Very abundant	++	-	Single	-	+	Naturally decomposed wood (branches, logs) some ash
B.017	ANI 13	Hearth deposit	+++	++ Coniferous	+++	-	+	+	-	Wood and dung ash
B.018	ANI 14	Fill above the hearth of ANI 13	+++	+++ Large	-	-	-	+	1	Wind drift, with some ash

Table 11.4 Soils from Anau North, Comparative Samples

Sample number	Comparative sample	Context	Detritus	Cuticle imprints	Phytoliths	Pollen	Other organic material
B.004	9	Upper courtyard, Layer 14	+++	-	-	+++	-
B.005	8	Between layers 13 and 12	+	-	-	-	-
B.006	7	Between layers 11 and 10	+	-	-	-	-
B.012	6	Between layers 9 and 8	+++	+++	++ Arid grasses	-	Large roots
B.013	5	Open yard, between layers 8 and 7	+++	-	-	-	-
B.014	4	Zakladka, Layer 7	+++	-	+ Arid grasses	-	-
B.015	3	Upper fill, Layer 7	+++	+++	++ Arid grasses, small number of domestic cereals	-	-
B.019	2	Upper fill, Layer 5	+++	Single	-	-	Single roots
B.020	1	Upper fill, layer 4	+++	Single	-	-	-

indicative of an open area where plants did not grow, nor were plants parts preserved from architectural construction.

Anau IB2 (3700–3500 BC)

Five archaeological samples from layers 9 through 5 were studied. Five comparative samples were taken from the uppermost fill deposits.

B.007

Context: This sample is from a soft fine brown soil sample laying upon the painted floor of layer 8 square room (ANL 7). Miller notes (97.030) the sample has a low density of charred material with few seeds.

Biomorphic analysis: The sample practically has no microscopic plant material. Small parts of detritus predominate in the sample—98% of all detritus (Figure 11.2a). Apparently the room was kept very clean and the deposit represents fine windblown mineral drift.

B.008

Context: This sample is from a discrete hard ashy layer on the floor of room 3, layer 6 (ANK 17). Miller notes (97.015) low density of charred material or seeds.

Biomorphic analysis: The detritus in this sample has larger size: large detritus is 3% and medium is 7%

Table 11.5 Detritus, Archaeological Samples

Sample number	Sample	Context	Smaller than 20 x 20 µ	Larger than 20 x 20 µ	Smaller than 40 x 40 µ	Larger than 40 x 40 µ
B.001	ANM 6	Layer 14	90	10	9	194
B.002	ANM 9	Layer 14	94	6	4	2
B.003	ANM 7	Layer 14	93	7	5	2
B.007	ANL 7	Layer 9	98	2	2	0
B.008	ANK 17	Layer 6	90	10	7	3
B.009	ANK 16	Layer 6	89	11	7	4
B.010	ANK 12	Layer 6	89	11	7	4
B.011	ANJ 5	Layer 5	91	9	5	4
B.016	ANI 9	Layer 3	90	10	7	3
B.017	ANI 13	Layer 3	88	12	9	3
B.018	ANI 14	Layer 3	90	10	6	4

(Figure 11.2b). The sample includes cereal straw, woody detritus, wormwood and chicory stems with flowers. The biomorphic composition is typical of dung, however, the sample did not have a dung-like macro-structure. It may be that the sample may have come from pulverized dung on the surface of the floor.

B.009

Context: this sample is from a soft sandy soil brown deposit on the floor of a possible courtyard (room 3) of layer 6 from under a bricky collapse (ANK 16). Miller notes (97.017) a low density of charred material, near absence of seeds.

Biomorphic analysis: Abundant grass detritus is found in this sample (Figure 11.3a). Some phytolith forms are suggestive of plants from moist areas (Figure 11.3c), indicating that the plant debris was brought in by people or animals probably from a well-watered area. There were phytoliths of barley straw, grain scale, wheat, and weeds suggesting that cereals were in the storage. Phytoliths with large unknown forms were also found in the samples (Figure 11.4). The samples had abundant pollen of wormwoods (*Artemisia*) and plants from the Chenopodiaceae family. In contrast to ANK 12, sample ANK 16 had a lot of microscopic charcoal. This sample appears to be from an ashy lens derived from a storage area which was quickly buried in spring.

B.010

Context: The sample is from a sandy soil deposit with dense ceramic sherds and bones on the same floor as ANK 16, a possible courtyard (room 3) of layer 6 (ANK 12). This appears to be an *in situ* floor deposit. Miller notes (97.021) a near absence of charcoal or seeds.

Biomorphic analysis: Phytoliths of barley straw, wheat, and grain scale were identified in this sample (Figure 11.5a and b). This sample also has abundant microscopic grass and unburned woody detritus (Figure 11.5c). Well preserved pollen from the *Artemisia* and *Chenopodiaceae* families suggest rapid burying of this deposit. Large amorphous phytoliths indicative of water adapted plants were found here.

Table 11.6 Detritus, Comparative Samples

Sample number	Sample	Context	Smaller than 20 x 20 μ	Larger than 20 x 20 μ	Smaller than 40 x 40 μ	Larger than 40 x 40 μ
B.004	9	Upper courtyard, Layer 14	95	5	4	1
B.005	8	Between layers 13 and 12	97	3	3	-
B.006	7	Between layers 11 and 10	99	1	1	-
B.012	6	Between layers 9 and 8	90	10	5	5
B.013	5	Open yard, between layers 8 and 7	92	8	3	5
B.014	4	Zakladka, Layer 7	93	7	5	2
B.015	3	Upper fill, Layer 7	89	11	6	5
B.019	2	Upper fill, Layer 5	92	8	4	4
B.020	1	Upper fill, layer 4	91	9	4	5

This sandy midden deposit appears to be derived from storage and threshing activities.

B.011

Context: This sample is from a small hearth feature comprised of burned soil and charcoal in layer 5 (ANJ 5). Miller notes (97.010) that this sample had a moderately high ratio of seeds compared to charcoal. Most of the seeds were cereals, although a discernible number were weeds.

Biomorphic analysis: Grass detritus (Figure 11.6a) barley straw (Figure 11.6b) and grain scale (Figure 11.6c) were in the sample. The detritus size is relatively small, similar to the other archaeological samples from Anau IB2. The sample had abundant phytoliths, however, the phytolith forms are unknown. No pollen was found. The abundant non-wood detritus and charcoal suggests that this hearth may have been used for cooking in an open courtyard surface.

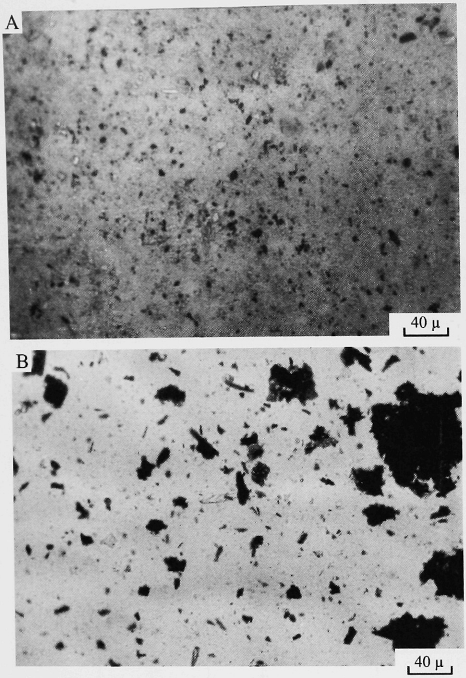
B.012

Context: The sample was taken from beneath the wall and floor of the hearth of layer 8 (comparative sample 6).

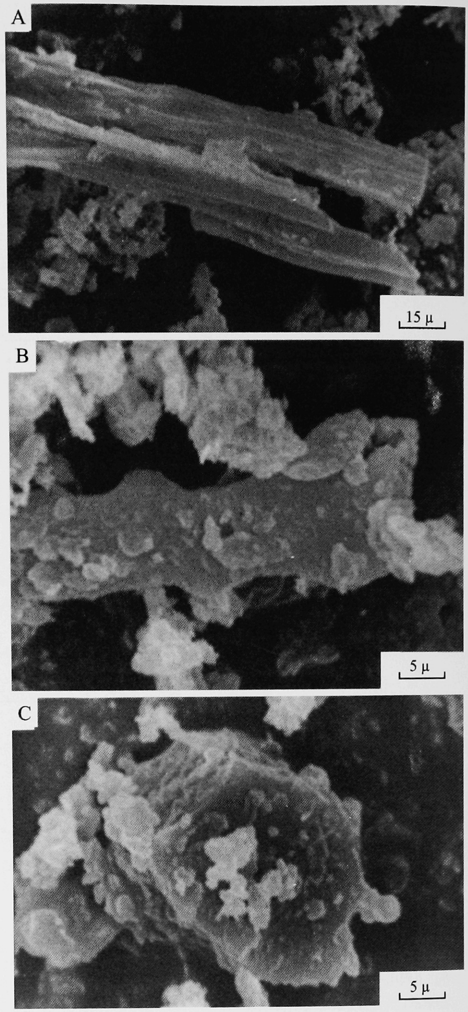
Biomorphic analysis: This sample has many large particles of wood (including coniferous species), grass detritus, and cuticle cusps. Grass phytoliths are moderately dense. Root detritus was moderate. The results indicate that grasses rather than cereals grew here when this deposit was formed. Some wood, perhaps from construction was here before the soil was buried. Perhaps this wood was an architectural element or was incorporated into the soil at the time of burial.

B.013

Context: This sample is from a soft fine soil taken from beneath the wall of layer 7 and located just above the top of a layer 8 wall (comparative sample 5).



11.2 Soil detritus particle size. A, small, from sample B.007; B, large, from sample B.008.



11.3 Sample B.008.

Biomorphic analysis: Large wood detritus was preserved—however, no phytoliths, cuticle remains or pollen was preserved here. This is indicative that the deposit originated from a open surface.

B.014

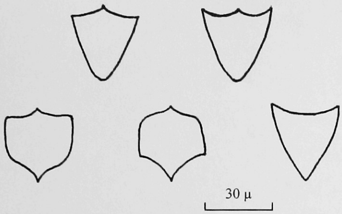
Context: This sample is a soft brown deposit from the surface of a "zakladka" brick pavement or fill, in layer 7 (comparative sample 4).

Biomorphic analysis: Many large parts of detritus are in the sample. All phytoliths belongs grasses (not cereals). This sample appears to be purposeful bedding from between bricks or plant parts mixed into building material (bricks).

B.015

Context: This sample was taken from a hard, brown soil beneath a wall of layer 6. The sample is from the upper fill of a room in layer 7, which had no intrusive pits or foundation trenches from the layer 6 architecture (comparative sample 3).

Biomorphic analysis: This sample has a high density of detritus, large cuticle casts, and phytoliths. All phytoliths belong to arid and semiarid plants, and there are rare cereal forms among phytoliths. The composition of the sample suggests, in contrast to the other



11.4 Unknown phytolith shapes.

upper fill samples, that the area had stood exposed for some time—perhaps not leveled in following layer 6 architectural construction.

Anau IIa (3300–3100 BC)

Three archaeological samples from the 1997 excavations at the north mound, layer 3, were studied. Two comparative samples were taken from the uppermost fill of layers 4 and 3.

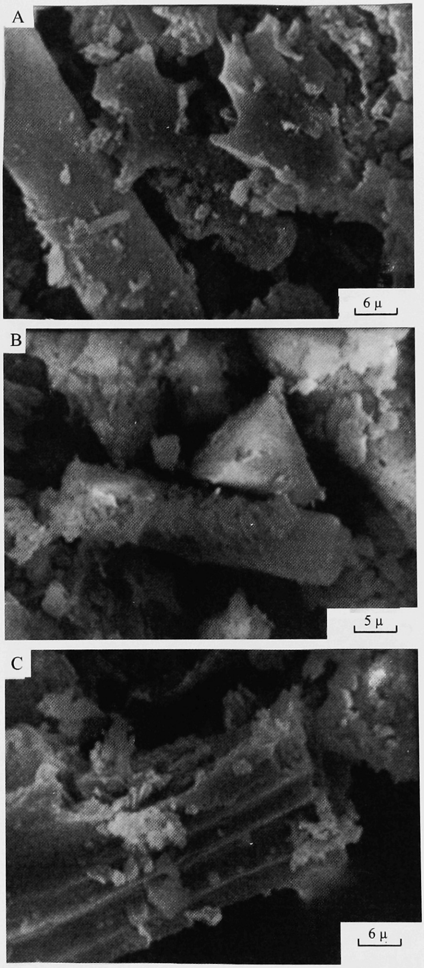
B.016

Context: Fill above the floor in layer 3. This soil sample was from a gray dense clumpy deposit on a plastered surface of the floor (ANI 9). Miller notes (97.031) that the density of charred material is low, with moderate amount of weedy seeds to charcoal, suggesting that this includes room sweeping.

Biomorphic analysis: This sample has dense woody detritus and abundant grass parts. The occurrence of fly eggs in the detritus indicates that this is naturally decomposed and was not a burned deposit. This deposit appears to be from decomposed matting on the surface of the floor. The charcoal fragments in the sample may be explained by the samples proximity to a hearth.

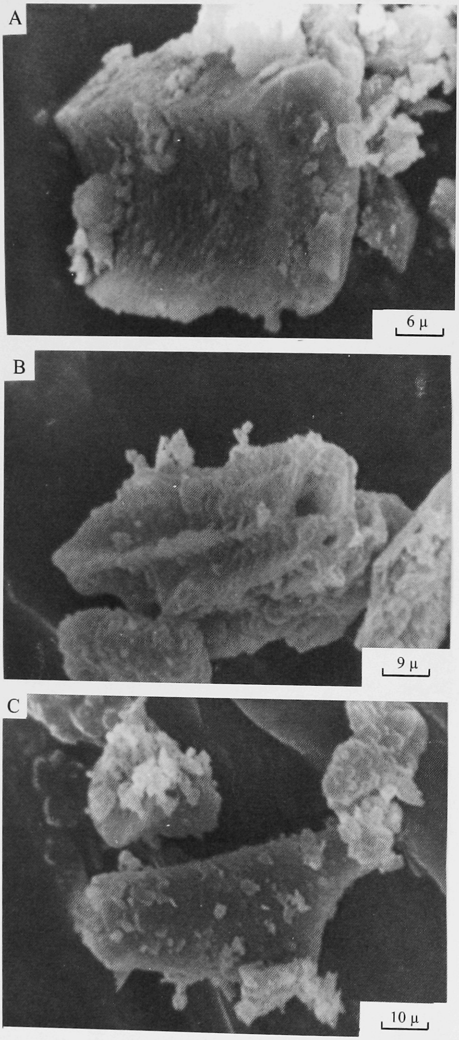
B.017

Context: Fine dark ashy deposit from above a floor surrounding a pit in layer 3 (ANI 13). Miller notes (97.005) that this sample had moderate amount of charred matter, no dung, with some cereal grains present.



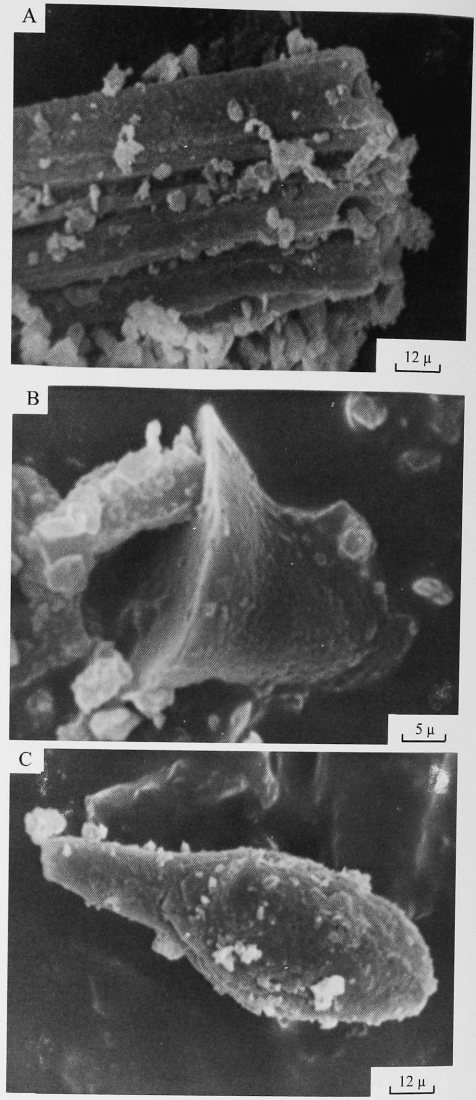
11.5 Sample B.010.

Biomorphic analysis: The sample includes both burnt and unburnt grass and woody detritus. Decomposed coniferous detritus was present, most likely juniper, a wood used in traditional architecture in Turkmenistan. On the basis of charcoal analysis,



11.6 Sample B.011.

Lisitsyna notes that juniper was abundant on the north slope of the Kopet Dag from contemporary levels at nearby Kara depe (Lisitsyna 1968). Possibly this reflects the rejuvenation of the Kopet Dag forests after an earlier phase of deforestation (Miller 1999).



11.7 Sample B.018.

B.018

Context: Ashy deposit in the fill above the layer 3 hearth (ANI 14). Miller notes (97.006) that this sample has a moderately high density of charred material, almost entirely charcoal with no dung and very few seeds.

Biomorphic analysis: This sample has abundant charcoal, with many large particles of wood detritus which were unburnt and naturally decomposed (Figure 11.7a). Single phytoliths of barley straw (Figure 11.7b) and grain scale (Figure 11.7c) were in the sample. The sample includes both charred and uncharred wood, indicative of a mixed deposit from hearth sweeping.

B.019

Context: A fine grained light brown soil sample was taken from beneath the ANJ wall of layer 4. This is the uppermost fill deposit of layer 5, from the archaeologically observed "abandonment" layer of the site (comparative sample 2).

Biomorphic analysis: Large detritus remains constitute 8% of the sample. Both pollen and phytolith are absent. The non-cereal grass roots are indicative that the deposit was from a vegetated, non-agricultural environment. We can conclude that rare grasses grew in this soil prior to its burial.

B.020

Context: A medium fine-grained soil was sampled immediately beneath the lowest floor of layer 3. The sample comes from intact upper fill—without brick fragments, or intrusions from pits or foundation trenches (Comparative sample 1).

Biomorphic analysis: The sample has abundant unburned wood and grass detritus. Cuticle cusps are rare, phytoliths absent. The large plant parts suggest that this deposit was quickly buried and had plants growing on it prior to burial. Such a biomorphic complex, not burned and without pollen, is typical of an exposed surface subsequently buried.

Interpretation of Biomorphic Data

Detritus

Most of the samples had plant detritus with different stages of decomposed particles and/or carbonized particles. The differences of detritus size provides several types of information on the nature and deposition of the soil (Golyeva 2001): a preponderance of small detritus (less then 20 m x 20 m) suggests that plants did not constitute part of the original deposit and plants probably did not grow there (as in ANL 8 for example). When the amount of medium and large detritus is more than 6% (samples ANK 12, ANK 13, ANK 17, ANM 9, etc.) it is indicative of plants (grasses or woody material) grew in the soil. If the amount of medium detritus was around 7—9% of total particles (for example, samples ANM 9, ANK 17) it suggests that plants were mechanically crushed. This allows us to make additional inferences about plants in their architectural context.

The amount of phytoliths and pollen are also indications of plant use. These microscopic indices aid in our description of the nature of an archaeological context. Together with abundance of cutical fragments which are indicative of leaves and twigs it is possible to identify floors that had been covered with bedding or mats, based upon density of phytolith remains from floor remains. This is seen in ANI 9, the floor of an interior room, or ANM 9, the floor of a circular structure.

Phytoliths

Phytolith analysis proved to be useful of the biomorphic analyses for this environment. Most of the 21 samples had phytoliths, in contrast to the paucity of pollen preserved here. Quantitative distribution of phytolith types indicates different vegetation content and reflects different use of the local vegetation at the site.

Qualitative phytolith analysis had shown an interesting level from one room in the Anau IB2 phase (about 3500 BC). Samples from the fill and floor of this room (ANK 12, ANK 16, and ANK 17) had a distinctive set of phytoliths among the samples from Anau. From different types of fill and floor deposits were phytoliths which are typical particularly of water-adapted plants. Since these come from multiple deposits within the room, it may be that this reflects some specialized activity at the site. We will be interested to try to identify what this signature means in our future study of the microstratigraphy of the site.

Pollen

Pollen was absent or scarce in most of the samples. It indicates not only low preservation of these grains in the arid climate but also that the rooms were closed and that flowering plants were not used in mats and vegetation bedding.

Samples (layer 6:ANK 12, ANK 16 and ANK 17) (layer 14:ANM 6), had abundant pollen grains which allows to compare pollen samples across time. Pollen preservation in such quantity was unexpected, and may be due to the burial of the soils in spring when there would be a maximum number of flowering plants. Pollen of plants in these samples indicate that *Artemisia* and *Chenopodiaceae* (typical arid flora) absolutely predominant in the samples. In comparison with the composition of other microscopic plant remains, the pollen indicates a much wider spectrum of plants, more reflective of the natural environment than simply plants used at the site.

Spicules and Diatoms

The near absence in the samples of water-adapted micro-organisms is indicative that soils from near-by rivers or canals were not brought to the site at the points sampled. The exception to this were samples from ANK 12 (B.012) and ANM 9 (B.002), both associated with potential animal features or courtyards.

The Lack of Plant Particles

Samples from various periods—Anau IB1 and Anau IB—had almost no microscopic plant remains. This situation is observed in deeply buried natural soils, but not in our previous experience in cultural layers (Golyeva et al. 1995). Perhaps, samples such as B.002 represent well-maintained living surfaces or fine wind-blown deposits. These observations must be compared with further collections of modern comparative samples that will help us to identify patterns mean.

Charcoal and Ash

Practically all samples from the cultural levels were taken from hearths or ashy deposits and thus had abundant charred remains. Differences between hearth deposits can be seen in the biomorphic samples. In several samples (ANM 7) and (ANI 14) these particles were large. It indicates that that the hearths were closed from winds. Other samples included both cereals and wood charcoal indicative of cooking hearths. Non-hearth samples often had fine wind-blown ash and charcoal particles, while others (ANM 9 and ANK 12) had no charcoal particles. These observations do not provide a full description of the deposit or depositional history by themselves, but they complement the macrobotanical and stratigraphic observations.

Interpretation of Specific Types of Contexts

Floors

Biomorphic data from the floor surfaces cannot show us changes in the environment. It is clear that the difference between the samples indicates only the difference of human use and formation of the deposit. In these samples it is possible only to tell about use of plant material and their exemplary composition. Our results suggest that we can differentiate between interior floors and courtyard or street surfaces.

It is quite possible that the floors of the main rooms of Anau IB1 and Anau IB2, as well as samples from the Bronze Age buildings on the south mound, were covered by mats, where we find dense, large detritus in the samples. Degraded organic mats were first identified from biomorphic analysis in the Bronze Age kurgans in Kalmykia (Golyeva 1999). Biomorphic analyses of thee mats suggests they were made of a combination of grasses and twigs in their structure. Based upon plastered matting found at Anau south in the late Bronze Age levels, it is probable that the Anau mats were also made in two layers: wicker of woody twigs in one direction and grasses in another (Hiebert 1995). Vegetal fibers were also used at Anau North in the production of the chaff-temper pottery, as evidenced by the sherd from ANM 10 (see Appendix D). Here, no woven structure of matting was preserved, but the lack of pollen in the samples indicates that only stems were used in the mats (without flowering parts).

Streets and Yards

Exterior surfaces were sampled from all periods at the North Mound. While no clear streets were sampled at Anau North, the south mound excavations provide clear archaeological context of a street or alley, and this provides a baseline for examining other samples. These samples had abundant fine charcoal, indicative of regularly being windswept and continuously crushed. Courtyard samples showed a similar incidence of being swept but not methodically crushed. Courtyard deposits sampled at Anau North often were formed of secondary "sweepings" seen microscopically by the mixing of burned and unburned materials as well as poorly sorted sediments. Grass and root detritus were found in both street and courtyard samples, indicative of exterior deposits.

Animal Enclosures

A sample from the circular structure in Anau IB1 (ANM 9) had distinctively finely crushed woody detritus. By combining the stratigraphic and macrobotanical data, we should be able to determine if an area was used for animals. A similar preliminary observation was made at the late Bronze Age building complex of Gonur south, based upon a soil sample analyzed by Paul Goldberg (Hiebert 1994:117). Traditional Central Asian village architecture includes considerable space devoted to animal enclosures (Karmysheva 1969). Biomorphic samples, taken in conjunction with macrobotanical samples, permit us to test for archaeological evidence of stables and animal enclosures within village areas. Comparative samples from modern animal enclosures will allow us to refine our interpretation of these samples.

Sampling the Upper Fill

In addition to sampling floor and hearth deposits, we began a program of sampling various upper room fills, and deposits just underneath construction layers. These samples contrast with floor deposit in that the samples from upper fill mostly appear to represent open deposits. These samples indicate either vegetated grassy space or eroded/deflated deposits. While this analysis is preliminary, it provides insight into site formation processes that have not been addressed at Central Asian sites as elsewhere (Rosen 1986).

In at least one case (under the layer 14 floor) the deposit appears to have been quickly buried. This may be indicative of the actual event of architectural leveling. It will be of interest to compare this data with the historically documented record of earthquakes in this region (Berberian and Yeats 2001) to collect comparative data on rapid burying of archaeological deposits.

Conclusions

This preliminary study indicates that different contexts (streets, yards, courtyards, interior floors, animal enclosures) can be identified on the basis of specific biomorphic complexes. Most of the samples had phytolith remains from chaff and straw rather than grains. The straw of barley was used more then straw of wheat which is an indirect argument that more barley was grown than wheat. This biomorphic investigation also revealed that fiber matting covered some floors, forming a context in which small items, such as pot sherds, beads, and parts of items of everyday life, could have become embedded, forming a unique record of activities during the use of the room.

It is equally important to note that our biomorphic data of *anthropomorphic deposits* at Anau do not reflect climate change, as it can in natural soil horizons, since the archaeological deposits are so strongly patterned by human consumption and production. The biomorphic results reinforce Miller's indications that botanical information from archaeological sites overwhelmingly reflects the human use the environment (Miller 1999, Harrison and Miller 1995).

Continued biomorphic analyses at the site of Anau, in coordination with archaeological, macrobotanical, and faunal analyses, will make it possible to determine the different types of activities at the site, reconstruct the vegetation use, and other anthropogenic and natural influences on the local vegetation.

12

Animal Herding, Hunting, and the History of Animal Domestication at Anau depe

K. M. Moore, N. M. Ermolova, and Ann Forsten

The work by J. U. Duerst (1908) on the animal remains from Anau North was a foundation for the study of the origins of animal use in a developing food producing economy. Working without precedent, Duerst drew attention to the significance of archaeological remains for studying geographic variation and evolution in domestic mammals. His analysis of taxonomic abundance showed differences across the stratigraphic sequence, allowing him to speculate on the process of economic change. He made careful observations of traces which he interpreted as cultural modification, but he had only distant analogies to the remains from Neolithic Switzerland for most of his interpretations.

The study of faunal remains from Anau North provides a baseline for comparison with other periods at Anau, as well as complementing data from contemporary sites in Central Asia and on the Iranian plateau. Here we present the most important findings from the excavations of the 1978-1982 excavations at Anau North in the context of Duerst's main conclusions (Ermolova 1985). In addition, we place in context the recent reexamination of equid (horse/ass) bones from Anau North (Forsten 2000).

Duerst was sent one-half ton of bones from the 1904 excavations, marked in the field with preliminary excavation contexts from the north, south, and east mounds. From the north mound excavations, the bones were marked with period "I, II, or III", equivalent to Anau IA, Anau IB and Anau II respectively, in this study. Of this massive collection, 3500 identifiable bones were catalogued, studied, and published in 1908. Duerst claimed to have identified remains of horse, wild ox, wild sheep, gazelle, and wolf in the lowermost strata (Anau IA) and to have found bones of horse, wild ox, wild sheep, pig, red deer, gazelle, and fox in the strata above (Anau IB). In the uppermost strata of the North Mound (Anau II) Duerst identified remains of horse, wild ox, pig, sheep, camel, dog, gazelle, and rare bones of other fauna.

The ability to key Duerst's uppermost and lowermost samples into the present day sequence provides us with faunal samples from a large spectrum of layers at Anau North including layers of the earliest and latest occupations of the site for which no other samples are available. Duerst's large sample of faunal materials from Anau North provides evidence of a significant number of young sheep- and goat-sized animals throughout the sequence. This pattern is comparable with the data from Ilgynli depe concerning herd composition, a strong indication that animals were tended at the site (Kasparov 1994b). In the uppermost layer (our Anau IIB), Duerst noted the appearance of a hornless domestic sheep in contrast to the horned sheep of the earlier levels.

Duerst identified a substantial proportion of hunted animals in relation to herd animals throughout the sequence, as much as 25% of the food remains deriving from hunting (Duerst 1908:341). Duerst also observed a general decline in the importance of wild fauna in the collections of the uppermost layers (Anau IIA and IIB). While these observations could not be repeated at Anau North due to heavy erosion of the upper levels, the appearance of a smaller, more docile herd animal prior to the shift to a larger-scale urban occupation of the Anau delta is consistent with results found at the slightly later levels at the site of Ilgynli depe (Kasparov

Table 12.1 Mammalian Remains, Anau North

Species	Period: Layer:	IIB (0-1)	IIA 2	IIA 3	IIA 4	IB2 6	IB2 7-9	IB1 14	IB1 15-18	IA (20)
Domestic										
Cattle		16	4	17	23	9	13	9	27	41
Sheep		17	15	13	28	8	18	12	70	33
Goat		7	2	5	7	2	10	14	19	0
Domestic Pig		2	3	0	20	13	18	16	1	0
Dog		0	0	0	0	2	0	0	0	16
Bactrian camel (?)		0	1	1	0	0	0	0	1	0
Sp/gt/gz		26	20	36	26	19	61	14	40	–
Wild										
Foothill/tugai										
Wild Pig		0	0	0	0	0	0	0	1	0
Red deer		2	0	0	0	0	0	0	0	0
Onager		38	15	23	22	27	36	20	65	30
Fox		0	0	0	0	0	0	0	0	0
Desert										
Gazelle		2	3	2	0	0	20	2	19	30
Mountain										
Mtn Sheep		0	0	2	1	0	0	2	7	–
Mtn Goat		0	0	1	1	0	0	5	0	–
Wolf		0	0	0	0	0	0	0	1	0

1994a), as well as with the faunal assemblages of the later urban Bronze Age sites of the Kopet Dag foothill plain (Ermolova 1968, 1983).

New Studies of the Faunal Remains

The stratigraphic excavations of the North Mound at Anau from 1978 to 1982 produced an additional corpus of osteological material that included more than a thousand identifiable bones (NISP) (Table 12.1) (Ermolova 1985). The stratigraphic excavations in 1997 provided further information on the smallest fauna from the site such as rodents, fox, birds, and tortoise, expanding the picture of the site's local environment, but do not change the overall picture of a sheep-cattle herding economy.

Cattle

At Anau North a large number of long-horned cattle bones were identified for the first time from the Kopet Dag region. Cattle were an original part of the local pastoral herd structure. Cattle bones make up 30-40% of the domesticated animals, but when unidentified bone of the sheep and goat size class are added to this sample, they make up only 10–25% of the domesticated animals. Still, these large animals would have represented much more meat than an equal number of bones of sheep and goat. Measurements show that large-sized individuals were most common. Duerst thought large bovids from the Anau IA stratum belonged to a wild predecessor, whose features lay between *Bos primegenius* and *Bos nomadicus*. Duerst found smaller bones belonging to domesticated cattle from the upper layers. On this basis he suggested that Anau North documented a shift from a hunting economy to a herding economy (Duerst 1908).

Today, domestic cattle remains are known from earlier Kopet Dag sites—Neolithic Djeitun, for example (Kasparov 1992, Legge 1992), indicating that the Anau data do not represent a sequence of local domestication. The large size of these domestic animals is similar to those at Anau North previously considered wild. In Ermolova's sample from Anau, both large- and small-sized domestic cattle were identified in the same

12.1 Camelid remains from the 1904 excavations. 1, cervical vertebrae, 2, 1st phalanx.

levels (Ermolova 1985:85). The prevalence of large-size cattle is probably not due to the occurrence of the wild form but to the diversity of the population.

The size and proportion of bovid metacarpal bones, which might have revealed significant differences between wild and domestic forms, do not, in fact, shift over the course of several millennia. These measurements are practically indistinguishable from those of first millennium BC cattle (Ermolova 1984).

The large size of the cattle from Anau North is particularly clear when compared to analogous metrical data from cattle from Early Village sites in the Levant. The width of the proximal metacarpal bones from Anau ranges between 71.0 mm and 87.5 mm, whereas the Near Eastern measurements span 49.0mm to 55.4 mm (Ducos 1968). The size of large individuals in the Anau North cattle is closer to large Ukrainian gray cattle (Tsalkin 1970).

Sheep and Goat

Bones identified as sheep and goat bones are the most numerous at Anau North, as is the case at most prehistoric sites in Turkmenistan (Kasparov 1994a). Remains of sheep outnumber those of goat in every case with an range of 64% to 88% and an average of 74% sheep to goat for the entire sequence. Both adult and juvenile individuals are present. There are rare old individuals, based on dental wear patterns. These older animals might reflect the typical pattern of husbandry along the Kopet Dag foothill zone where dairy or wool are important products (Kasparov 1994b).

There is an increase in the number of hornless sheep in layers 1–0 (Duerst 1908). The hornless individuals are probably female, and this shift appears to reflect a change towards the population seen in the subsequent Bronze Age at Anau South.

Remains of domesticated goats are less common than those of sheep; and they belong mostly to adult and even to elderly animals. A metatarsus of an old male goat was identified by Ermolova (1985:85), where the bone had been broken but healed out of alignment. The animal would have been lame, but the bones shows the careful tending by herders, who may have thought it had some special properties.

Horn cores of goats were found which range from strongly twisted to straight ones. The positive horn twisting, an indication of domestication, varied greatly among the Anau goats. Such diversity of horn morphology is typical of goats in Turkmenistan today. Female goats were particularly straight horned.

Pig

Cattle, sheep, and goat are well known from other Early Village sites along the Kopet Dag foothills, but the pig was first identified for this area at Anau North. Pig bones were reported in all the strata of the site; they were particularly numerous in layers 18–5. Pig breeding indicates the settled character of the site since pigs are ill suited to nomadic life or the arid conditions of desert pastures. The remains belong to a variety of pig much smaller than modern wild pig from the Kopet Dag foothill zone. Duerst (1908:356) provides measurements of the third lower molar from nine individuals that show the shift from wild to domestic pig (Payne and Bull 1988). The predominantly young individuals appear to have been managed for meat production, with individuals having just attained their maximum weight when killed. No remains of piglets were recorded, either from the 1904 excavations or from the 1978–1982 excavations.

Camel

Duerst attributed the camel remains—a cervical vertebrae and a second phalanx (Figure 12.1)—found in the upper layer of Anau North to the domesticated

Bactrian camel (Duerst 1908). With a larger comparative sample, Gromova (1940) also suggested that these remains belonged to a domesticated animal. Camel was identified by V. Tsalkin in the faunal remains from Ershov's sounding, either from Anau IA or IB layers (Ershov 1956:32).

Ermolova identified several examples of camel from Anau North. A camel astragalus was recovered from Anau IIA layers at Anau North (layers 2–4) in 1978. The small size and considerable width of this specimen showed that it belonged to the Bactrian camel and not the dromedary (Ermolova 1985:86). A large fragment of the distal epiphysis of a humerus came from layer 18. It is unclear from the remains whether these early camels represent hunted wild animals or isolated finds of domestic animals being used for transportation. The condition of the bones, and the presence of both axial and leg and foot elements, suggests that while camel bones are rare, they are present in the deposit as a result of cultural behavior rather than as chance inclusions. Whatever their function in the economy, the remains from Anau North indicate that a form of camel existed in Central Asia, at least by the early 4th millennium BC.

Holocene remains of a wild predecessor of Bactrian camel are so far unknown in Central Asia. Bones of an extinct camel of Pleistocene age related to the Bactrian camel were discovered at a Late Paleolithic site in the vicinity of Samarkand in Uzbekistan (Dzhurakulov et al. 1980).

Dog

Judging from the bone remains from layers 18–5, the dogs of Anau North varied in size from medium to large (from the size of a Scottish terrier to that of an Eskimo dog). The presence of dogs at the site is evident from the gnawed, digested, and scattered bones in layers throughout the sequence. Damage to bone surfaces and fragmentation from carnivore gnawing are common in the Anau faunal sample, and can probably be attributed to such dogs. We cannot say if the dogs were also used for hunting or herding. Judging from the jaws that were found, there were no long-muzzled ones at Anau that would have been similar to borzois, the ancient hunting dogs of open landscapes.

Wild animals

Although herding domestic animals was the core of the local economy, hunting still important at Anau, a pattern found at other Early Village Period sites along the Kopet Dag. Hunting of onager (*Equus hemionus onager*) was particularly intensive and remains of onager at Anau North are in some cases more numerous than those of domesticated animals. In contrast, other wild species, such as gazelle, are quite rare. Samples of mountain fauna, such as bezoar goat (*Capra aegagrus*) and the wild mountain sheep (*Ovis ammon*), are extremely rare. This may indicate that hunting was focused on the area around the site or further out on to the desert rather than into the mountains or onto the Iranian plateau. Onager compete with sheep for pasture and especially for access to water in the summer (Heptner et al. 1961:700). The intensity of hunting for onager may also indicate the limited importance of animal herding in the 4th and early 3rd millennia. Now protected, onager were most commonly hunted by ambush near water sources or by communal drives (Heptner et al. 1961:715).

Most of the onager bones belong to younger adult animals. No remains of juvenile animals are reported. Onager bones reveal considerable variability in size, in the morphology of the distal limb joint surfaces, and in the structure of the folds of tooth enamel. This high degree of morphological variability may indicate that few predators, aside from humans, preyed upon the onager herds.

Onager and Horse at Anau

Duerst's claim to have identified the most ancient domesticated horse, though widely cited seems to have resulted from an erroneous identification of onager as horse. Duerst may have been led to this mistaken identification by the great variability of onager bones as well by a lack of appropriate comparative material in European museums.

Brauner and Antonius (Antonius 1936) and Hilzheimer (1935) contested Duerst's identification of the equid bones as those of a horse and believed them to belong to the wild ass (Lundholm 1947). Lundholm (1947:Figs. 9, 31) and Gromova (1949) compared Duerst's measurements on the equid bones from Anau with those of the wild ass and concurred with the three previous authors.

Forsten had the opportunity to reexamine several specimens from the Duerst collection from Anau at the Natural History Museum in Bern. The specimens were labeled in the same way as those illustrated in the original study, with Duerst's stratigraphic designations: period I (Anau IA); period II (Anau IB1 and

12.2 Equid remains from the 1904 excavations.

Anau IB2); and III (including Anau IIa and IB1) and individual specimen numbers (Figure 12.2:1–3).

The specimens consist of a fragmentary pelvis (I no.142), a distal radius (II no. 946), a calcaneus (III no.267), two astragali (II no. 44, II no.1396), a magnum (I no.28), two complete proximal phalanges (II no.1170, II no.1228) and a fragmentary one (III no.243), two medial (III no.557, III no.657) and two distal phalanges (III no.682, III no. 1131), and six loose cheek teeth representing five individuals. Of these specimens, nos. 1170, 1228, 557, and 657, all phalanges, are mentioned individually by Duerst (1908:394). Other limb and foot elements may be ones listed by Duerst using stratigraphic designations rather than specimen numbers. There is no mention of pelvic fragments in Duerst's report, perhaps because the bone would not have been measureable. The teeth made available to Forsten do not appear in the tables or photographs of Duerst's report, in which only a single set of maxillary teeth are illustrated.

Of these specimens, the teeth, and the proximal and distal phalanges show that the species represented is the wild ass, not a horse. On the cheek teeth, folds of the enamel offer the clearest distinction between the two groups. The protocone is rather long but the pli *caballin* (the caballine fold) is absent in the moderately worn upper cheek teeth including P2 and P3-4 (Figure 12.3:1), M1-2 (Figure 12.3:2), and M3 (Figure 12.3:3). In the P3-4 the *pli caballin* is not absent, but it is very small. A weak to absent *pli caballin* is common in the asses, but this character is rare in the horse. Two specimens of mandibular or lower cheek teeth were studied. The P3-4 (Figure 12.3:4) and M1-2 (Figure 12.3:5) had a double knot like that of an Asiatic ass, not of a true horse. In addition the ectoflexid of the M1-2 is shallow. A *pli caballin* is well developed in the little-worn P3-4, but only slightly indicated in the moderately worn M1-2.

The toe bones were also compared to contemporary standards for distinctions between onager and horse. The two measurable proximal, probably anterior, phalanges fall among those of *E. hemionus* from Turkmenia (Dive and Eisenmann 1991), when plotted for their mid-shaft breadth to total length. The two distal phalanges are small and rounded (Figure 12.2:4,5).

This small sample of confirms that Duerst's equid from Anau is an onager, supporting the comparisons and conclusions of Lundholm (1947) and Gromova (1949) which had been based on the published material only. The Anau equid, the onager is not the ancestor of any of the breeds of the domestic horse. Domesticated horse makes its appearance along the Kopet Dag foothill zone only much later at the end of the third millennium BC (Ermolova 1983). Reliably documented, although rare, remains of horse have been found at the sites of that time in the Murghab delta at Gonur, Taip and Kelleli (Moore et al. 1994). Horse became common in these areas during the 2nd millennium BC.

Conclusions

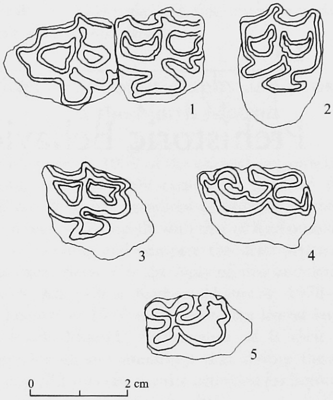
Animal bones indicate a mixed strategy of hunting and herding at Anau North during the Early Village period. Remains of domesticated animals outnumber those of wild ones for all the strata (see Table 12.1). Domestic animals such as cattle, sheep, goat, pig and camel were kept from the first occupation of the Anau North site. The use of wool is indicated by the occurrence of spindle whorls from the earliest levels, and the slaughter ages of the sheep and goat are consistent with herds managed for fiber as well as meat.

Onager were the most important wild prey item for the Anau hunters. This hunting tradition could be related to the relatively short-term patterns of residence suggested by architecture in Chapter 8. We speculate that social rights to critical resources such as water for domesticated flocks would not have been established during a period of such relatively intensive hunting, particularly of an animal that would have competed with domestic flocks.

Comparisons with Ilgynli indicate a comparable pattern of hunting/herding. Approximately 30% of the remains came from hunted animals at Ilgynli. The occurrence of young animals in the food remains, both at Ilgynli and Anau, indicates herd compositions that reflect animals from resident herders, and not animals from specialized herders.

Contrasts between Anau and Ilgynli include a stronger representation of younger animals at Ilgynli. This contrast, however, may be due to sampling, taphonomic destruction, or actual difference in herding. No camel remains have been found in the extensive excavations of contemporary levels at Ilgynli. This difference may be due to Anau's proximity to a gentle pass crossing the Kopet Dag and the role of the site as an exchange center. Further, goats are prominent at Ilgynli, in contrast to Anau. No domestic pig remains are found at Ilgynli, while significant pig remains at Anau were identified as domestic as noted both in the samples of Ermolova and in Duerst.

The Anau faunal record at the North Mound also provides a baseline for the examination of the later Bronze Age remains at the south mound. This continuing research will allow us to track the development of the local economy over long periods of development within the Anau delta.



12.3 Equid teeth from Anau North (1904 excavations). Anau IB1 period: 1, left upper P2 (Duerst no. 102) and P3–4 (Duerst no. 133); 2, right upper M 1-2 (Duerst no. 98); 3, left upper M3 (Duerst no. 134). Anau IB2 period: 4, right lower P3–4 (Duerst no. 1369). Anau II period: 5, left lower M 1–2 (Duerst no. 794).

13

Prehistoric Behavior at Anau North

Having provided a detailed description of the Anau North stratigraphy based upon the 1997 study season, we have been able to integrate the descriptions of architecture, ceramics, small finds, and specialty reports from the earlier excavations. However, in order to describe the evolution of the settlement through time, we need to return to the description of the stratigraphy and examine how the deposits were formed and assess the evidence revealed for past behavior.

In this chapter we analyze the site formation processes that are at the heart of understanding the cultural development at Anau North. First, we outline the variables in site formation as the basis for reconstruction of past behavior. The focus of this analysis is on the individual actions involved in the construction, occupation, and abandonment providing a correlation of stratigraphy and behavior. This permits us in the concluding chapter to propose a culture history of the site of Anau North and to define the implications of its development in the larger regional context.

Cycles of Research at Anau North

One issue in dealing with the multiple methodologies, the different voices of the excavators at a site such as Anau North, is the tendency for each generation to ignore or dismiss the information and insights accumulated by the generations before it.

Pumpelly's research design in 1904 was inspired by his background in geology to treat the evolution of culture as an aspect of natural history (Champlin 1994:177). The detailed descriptions of ceramics, small finds, botanical remains, animal bones, and human remains was consistent with the comprehensive reports of natural historians of 100 years and more ago but quite unusual for an archaeological expedition of that time (Daniel 1981:134).

The 1908 Anau North report was perhaps the first archaeological report to employ multiple voices, since Pumpelly published both his version of the stratigraphic reconstruction and Schmidt's version. Pumpelly and Schmidt did not agree on the dating of the levels at Anau North. Pumpelly, the geologist, deduced the age of the deposits by estimating the rate of sediment deposition. He suggested a date for the founding of the settlement as early as the 9th millennium BC (Pumpelly 1908:55–57). Schmidt, the archeologist, attempted to find stylistic parallels for Anau materials, assigning each "culture" at the north mound to an arbitrary 500-year period in the 3rd and 2nd millennia BC (Schmidt 1908:186). Fundamentally, Schmidt was determined that the Anau sequence should fit into the then known Near Eastern sequence, while Pumpelly was attempting to establish the distinctiveness of Central Asian culture. Pumpelly noted: "in these conservatively suggested datings, Dr. Schmidt is guided by the presence or absence of European and Mediterranean analogies among the finds, together perhaps with an unexpressed inclination to seek western origins for the culture" (Pumpelly 1908:186, fn). However, it was for this multivocality that the Anau report received much criticism in the West (Ghirshman 1938:104, Peake and Fleure 1927:115). It was not so much that the expedition's excavating and recording methods were criticized. Ghirshman's Sialk report mirrors the organization and reporting of the site closely, and H. Frankfort appreciated the detail which Schmidt employed in his description (Frankfort 1924:84). However, Western archaeologists could not accept the ambivalent chronology or the idea of Central Asia as a locus of a separate unique civilization (Champlin 1994:199–200).

Research by Soviet archaeologists and other scientists initially followed in Pumpelly's footsteps, investigating the local origins of Central Asian civilization (Atagarriev and Berdiev 1970, Bartol'd 1966 (1907):141–153, Kohl 1984a). While they followed the concept of local origins of Central Asian civilization, they strongly criticized the previous research as having not been properly excavated and using inadequate and poor understanding of the stratigraphy at Anau North, and they therefore dismissed the early data (Kohl 1984a:18, Litvinskii 1952, Marushchenko 1939, Masson 1989:142). More recent Soviet research on early village sites of the Kopet Dag region concentrated on wide horizontal architectural exposure (Khlopin 1963a, Masson 1982, Sarianidi 1965). No fewer than 23 early village mounds have been tested with soundings; many have been partially excavated, and several have been entirely excavated at a single level. As a result, a methodology separate from that of the West was created (Masson 1982).

Ironically, even though the Soviets criticized the Pumpelly expedition, their surveys and excavations confirmed what he suspected: that out in the Anau delta Bronze Age urbanism had emerged from village life within a local context. During this time, the Soviet practice of recording basic data in a system of unpublished reports, written in Russian and only internally available, led to a further separation of Soviet and western archaeological literature. The invisibility of excavation methodology in the published accounts of Soviet archaeology made it almost impossible to incorporate data from Central Asia into the broader synthesis of the rise of civilization in the West. In the Central Asian archaeological research, this methodological divide meant that few scholars conducted small excavations that systematically sampled ecological and economic data. The methods in Central Asian archaeology focused on larger, coarser samples which provide a panoramic understanding of settlement, and only occasional and brief descriptions of deposits were published.

By integrating this broad perspective with the sampling of specific contexts, we reap the advantages of both the wide-scale and fine-scale methods and greatly enhance our database.

Correlates of Stratigraphy and Erosion on the North Mound

The discovery in 1999 of the original excavation documents from the 1904 excavations at Anau North (Hiebert 1999) has permitted us to correlate the zero datum used by Pumpelly with that of Kurbansakhatov and to combine and compare the descriptions from these excavations. On the basis of this correlation it appears that neither Kurbansakhatov in 1978–1982 nor Hiebert in 1997 excavated to the lowest levels at the North Mound. Furthermore, it is clear from Pumpelly's off-site soundings that during the Anau IB1 and IB2 periods, the site extended far beyond the present mounded area of the site.

In 1997, the process of erosion was observed in the north mound's surface layer. The normally compact archaeological deposit had been worn away by trampling, wind, and rain, and was now soft and friable. This upper cortex layer contains *in situ* materials, however, in soft and crumble matrix 10–30 cm thick. All activity on the surface—animal grazing, foot traffic, and in particular the roots of grasses—disturbed this layer. Plowing and continuing renovation of village buildings, walls, canals, and roads have apparently eliminated surface traces of a large number of mud brick buildings which had been standing at the turn of the last century. This recent destruction dramatizes the continuous alteration of the delta area through time (R.W. Pumpelly 1908:304–5). Further changes to the site appear to have been accelerated by local earthquakes. Seismologists have identified at least three historic earthquake events along the Kopet Dag fault line, leading them to suggest a 1000-year cycle for earthquake activity in the region (Berberian and Yeats 2001). The possibility of a deterioration rate of up to 1 m per 100 years must be considered when attempting to reconstruct sequences of past events at the Anau mounds.

The correlation of excavation reports revealed that the mound had eroded approximately 1 m during the years from 1904 to 1978. The uppermost levels, layers 0–1, recorded in Schmidt's excavations, were not preserved for present-day examination. This information helps us understand some of the instances in which Pumpelly's expedition identified and published material not recorded by later expeditions and for which his expedition had been criticized for "mixing" layers.

Contexts of Deposition

The 20 architectural levels now documented from the north mound at Anau provide a series of specific contexts with which to examine the development of an Early Village sequence in Central Asia. These are divided into two main categories: primary deposits and secondary deposits.

Archaeological strata which were formed as a direct result of human behavior in their original context, secondary deposits are archaeological strata that were removed from the context in which they were originally made but retain temporal and inherent archaeological information. It is argued here that since the bulk of the remains at Anau North are in a secondary context, that a secondary context approach is the appropriate level of analysis for the bulk of the materials from the site.

Primary Deposits

Primary depositional contexts are observed at Anau North, although they represent an insignificant proportion of the deposits excavated. Three categories of relatively intact deposits were observed: (1) floors and the materials lying directly on them, (2) burials, (3) hearths and materials dumped from hearths which are discrete and unmixed even though they are not in their original locations.

Only a few descriptions of building floors were made in the 1904 or 1978–82 excavations. From the 1997 study, it is clear that occasionally floors were prepared or treated with plaster, but many buildings simply had compacted floors. The compacted floors often had thin traces of matting—often only preserved as a layer of whitish phytolith-dense deposit just above the floor. Walls of most buildings were set more or less level with the surface, without foundation trenches. In addition, few deep pits or other disturbances seem to have cut through floors and the deposits underneath them. In comparison with the architecture of later periods (i.e., the recent excavations of Bronze Age buildings from Anau South), floors are relatively free of later gouging, pits, or disturbances from wall foundation trenches. From ethnographic observations, where floors are swept clean, the only materials resting on them in maintained spaces are objects too big to move or too little to collect (Kamp 1991). This observation appears to be valid at Anau, where large stone door sockets and large storage vessels, often set into the floor, appear to be in their original locations. However, in certain locations, ceramic sherds, some small finds, and small debris lay flat on the surfaces of plastered floors and of tamped-earth areas in courtyards. Golyeva's micromorphological data suggests that these *in situ* floor deposits may have been formed from materials sifting through or getting lost underneath reed mats and then trampled into maintained surfaces. Schmidt described scatters of flint debitage on a floor in the West Gallery, layer 17 (Anau IB1 period), which probably reflects an activity area, and "abundant flakes of flint which occur as refuse of the workshop in all layers of the hill" (Schmidt 1908:164–5).

Burials and associated burial features can also be considered as primary deposits, though they are intrusive into the layers through which they cut. Several adult burials were found in the remains of the earliest buildings, in layers 20–19. The exposure in these earliest levels is too small to determine the relationship of the burial to the building; however, the practice of interment in the settlement area appears to contrast with the earlier pattern seen at Djeitun, where no burials were found in the excavation of the entire village settlement of its second layer (Masson 1971). By the Anau IB1 and IB2 periods, only child burials are found in the settlement at Anau North. It appears likely that from this time onwards a cemetery for adults was located off site.

Such an arrangement occurs at a contemporary Early Village in the Sumbar valley, 200 km to the west of Anau. The Parkhai II cemetery is located on a natural mound, approximately 600 m to the east of the mounded settlement of Parkhai tepe (Khlopin 1997). At the Parkhai II cemetery, two of the three periods (SWT VII–SWT VI) of burials were found, corresponding to the time period of Anau North. Of the more than 144 graves at Parkhai II, most were for adults; only rarely does a child's grave appear (Kholpin 1997). Probably the Parkhai tepe inhabitants buried their children in the settlement area just as the people at Anau did. At Anau North, burials within the settlement site were predominantly of children, and this appears to be the case at Parkhai tepe as well. Such an off-site cemetery at Anau North, however, would be deeply buried under the modern alluvium.

In layers 0–1 and 2–4 children were interred just centimeters beneath the floors of rooms associated with small surface hearths, and storage vessels were placed in the floor near the burial. In general, the buildings with such rooms appear to have been abandoned at the time of the burial, with the hearth debris left intact. Schmidt considers that the occurrence of a small (but constructed) hearth, sometimes with a vessel placed in the floor nearby, marked the location of a child burial for people returning to the abandoned room.

Hearth debris not associated with burials is also considered to be in a primary context that the materials are discrete and unmixed, even though they may have been deposited away from the location of burning. These burned deposits represent the closest approximation to a behaviorally caused coherent deposit of charred plant remains at Anau North. Where the ashy lenses are not located in their original burned context, such deposits have been interpreted as rapid dumping and are treated as a secondary deposit, but still considered to be an internally consistent depositional event. Similar deposits elsewhere in Central Asia have been good sources of information about economic activities and fuel selection and have provided contexts for radiocarbon samples (Hiebert and Moore 1993).

Neither Pumpelly's specialists at Anau (Schellenberg 1908) nor Soviet archaeobotanists at other sites (Lisitsyna 1968, 1978) sampled hearth or ashy lens deposits, but both reported uncarbonized botanical remains from inside mud bricks and carbonized remains from inside vessels.

Secondary Deposits

The excavated contexts consist mainly of secondary deposits of building collapse, room fill, and midden debris interspersed with rare primary contexts of hearths, burials and floors. In most cases, the artifacts and waste are shown to have been discarded away from the locus of use. A cycle of construction and use of walled space was followed by a cycle of abandonment, leveling, and reuse. That is the primary process forming the archaeological record at Anau North.

Our expectations for contexts in a village setting are based on ethnoarchaeological observations at traditional Near Eastern villages. While room sizes, finish, and architectural features closely reflect the original use, the bulk of artifacts and waste from daily life are discarded away from the locus of use (Horne 1994). A wide array of discard and storage behavior is recorded: Kramer notes in Iran, for example, that no extensive communal deposits of garbage were made, but debris was scattered thinly over alleys and village commons (Kramer 1982:89). Watson (1979:37) describes a least effort pattern of deposits being made in courtyards adjacent to hearths, while living rooms were continuously used and swept. In Northern Iran, Dyson (personal communication 2002) observed caching useful potentially useful and doubtfully but possibly useful materials in various areas of the settlement—some of which became part of the depositional record in that spot. Most observations suggest that little primary *in situ* materials except for very small fragments would be found in occupied interior spaces or courtyards.

This pattern matches observations of floor deposits at Anau North, where for the most part the micro-artifactual debris and mixed and damaged condition of many categories of artifacts (particularly visible in the small finds, bones, seeds, and biomorphic debris) confirm the secondary nature of the contexts.

In the Soviet tradition of reporting in Central Asia, archaeologists did not attribute artifacts from the excavations to specific rooms or activity areas, but to the layer—each layer containing a cycle of deposition for a building, from construction through occupation to abandonment. At Anau North, the rapid rate of architectural construction and reconstruction at the site, and the relatively small amount of disturbance from one layer to another attributed to digging wall footings or other subsurface features allows for relatively good stratigraphic control through time, in contrast to the above-noted inability to define functional assemblages of artifacts. We highlight the secondary nature of these deposits for it provides the framework for integrating the level of generalization in the descriptions and analyses made by Schmidt, Ershov, Kurbansakhatov, and Hiebert.

Secondary-deposits Approach

Analysis of the level of the architectural layer is appropriate for most ceramics, small finds, and economic information from seeds and bones. Below are some general observations from this level of analysis. Kurbansakhatov's analysis (1987) of the stylistic variation of ceramics from individual architectural layers substantiates the original categories of ceramic types and designs that Schimdt identified in 1904. Ceramic thin-sections provide an additional measure of ware type definition, formalizing the ware typology while showing that variation in pastes from layer to layer within periods was almost nonexistent. Measures of the relative abundance of ceramic types throughout the sequence confirm Schmidt's observations that the "IA" ceramics represented a phase of production within an ongoing and continuous local Anau I culture rather than a separate "culture." The thin-section analysis also showed that the finely made, thin bowls of IA were of local origin and differed little in manufacturing technology from the typical finely made, thin bowls of Namazga I type. Despite the presence of 14 levels of architecture in Anau IB, and 2 architectural layers of the Anau IA variant, no clear changes in manufacture were observed in the ware analysis. On the other hand, Anau II ceramics appear suddenly in level 4 with little overlap, stylistically and technologically. As seen at other archaeological sites, such an abrupt shift in ceramics suggests occupational discontinuity (Montgomery 1993) and can be compared to the processes of abandonment and reoccupation observed at other Central Asian sites of this time.

Stone, metal, bone, and terracotta objects in the deposits indicate the range of activities that took place within the site. These observations are based primarily upon the 1904 and 1970s excavations, which produced a much larger sample of small finds than did the later work at the site.

By far the best-represented category of craft production is spinning and weaving. Spindle whorls, loom weights, and bone tools with surface indications that they were used with textiles or skins were found throughout the sequence. Artifacts for hunting, harvesting, and herding were among those associated with food acquisition. Grinding stones at Anau North are relatively rare, most likely because they were so durable and therefore highly curated. Most grinding stones were deeply worn and broken, indicating long use. Most beads and objects of personal adornment were found in the context of burials—more than a thousand beads in one context. Occasional beads found throughout the deposit (and occasional fragmentary human bone) in part originated from burials that had been disturbed.

Evidence of ritual or expressive art at Anau North is limited to several simple figurines. In contrast, villages of the same period along the Kopet Dag produced more elaborate finds of this type. At Ilgynli, for example, excavators recovered more than 100 painted terracotta figurines from c. 3000 sq. m of excavations. This difference suggests considerable intersite variation in site activities, or perhaps reflects the small scale of Anau North in the regional settlement pattern (V. M. Masson personal communication 2000).

Unlike their Western counterparts—see, for example, the approach employed at Hajji Firuz (Voigt 1983:295–321)—Soviet archaeologists have not focused on describing activity areas within individual architectural layers in early village levels. The 1904 excavations at Anau North did, however, identify the provenience of individual small finds. Using archival documents from the expedition, we have been able to group artifacts by excavation context and elevation, effectively creating a stratigraphic sequence for the 1904 small finds (Appendix B). The distribution of small finds, such as spindle whorls, does not vary significantly between excavation units or levels within periods. This overall stratigraphic stability supports the Soviet-era approach of analyzing small-find assemblages in terms of categories of materials.

Charred plant remains were recovered from flotation samples of hearth contents, floor sweepings, and a variety of depositional contexts inside and outside of structures, on floors and in fill. These contexts, some representing intact deposits, do not directly reflect the preparation and consumption of the remains as food, but rather, the incidence of burning.

Two major findings issue from the analysis of macrobotanical remains. The first is that from the beginning of the sequence wheat and barley grains are plump, probably because they were irrigated. The form of irrigation used was most likely similar to the traditional methods of small-scale or gravity (liman) irrigation practiced along the Kopet Dag foothills in later historic times (Dolukhanov 1981:372–373). This form of irrigation agriculture involved modifying the delta through the creation of terraces (Pumpelly 1902:33–35; R. W. Pumpelly 1908:325–327). The simple terraces and gardens observed by Pumpelly's team and the terraced fields as described by early Soviet hydrographers (Bukinich 1924:129) were likely similar to those used for irrigation in this region since the Early Village Period.

Both the botanical evidence for irrigation agriculture at Anau North and the location of the settlement, however, contrast with what we find at Djeitun, occupied some thousand years earlier. There farming appears to have been based on rainfall (Charles and Hillman 1992), possibly during a time of wetter climate when lakes formed at the end of the small rivers of the Kopet Dag (Harris and Gosden 1996). *Liman* irrigation, involving the construction of terraces and low retaining walls, appears to be similar to the south Asian system of gabarband irrigation, involving terracing and low diversion dams. Gabarband irrigation is known to have been used at least the mid-3rd millennium BC (Raikes 1965, Raikes and Dyson 1961), and appearing possibly as early as 4500 BC at Mehrgarh, where Costantini claims that the plump water-swelled grains reflect such small scale irrigation (Jarrige et al. 1995:318–319).

The second major finding concerns the use of fuel at the site and the way it reflects the availability of wood resources (Miller 1999). Hearths or hearth deposits provide evidence concerning human selection of fuel. Miller concludes that the foothill region supported enough forests at this time to allow wood to be used in construction as well as for fires. In the hearth and hearth deposits sampled from Anau North, the ratio of charred seed to wood was consistently less than 0.05, which led Miller (1999) to conclude that not only was wood available, but that wood came from various ecological regions including *Juniperus* from the mountain foothills, *Tamarix*, *Populus* from thickets along the river land.

However, we cannot reconstruct the natural environment in detail on the basis of data from this archeological site or any other similar anthropogenic deposit taken in isolation. All plant materials from such sites are a biased sample collected either by human beings or animals rather than a general reflection of the environmental setting. For such a reconstruction, we need a stratified local deposit which preserves a record of local environmental change. For example, on the Eurasian steppe, Golyeva has been able to reconstruct the local environment using the buried natural soils underneath burial mounds (Golyeva 1997). This is not possible with the Anau North strata, where the deposits were the result of human activities.

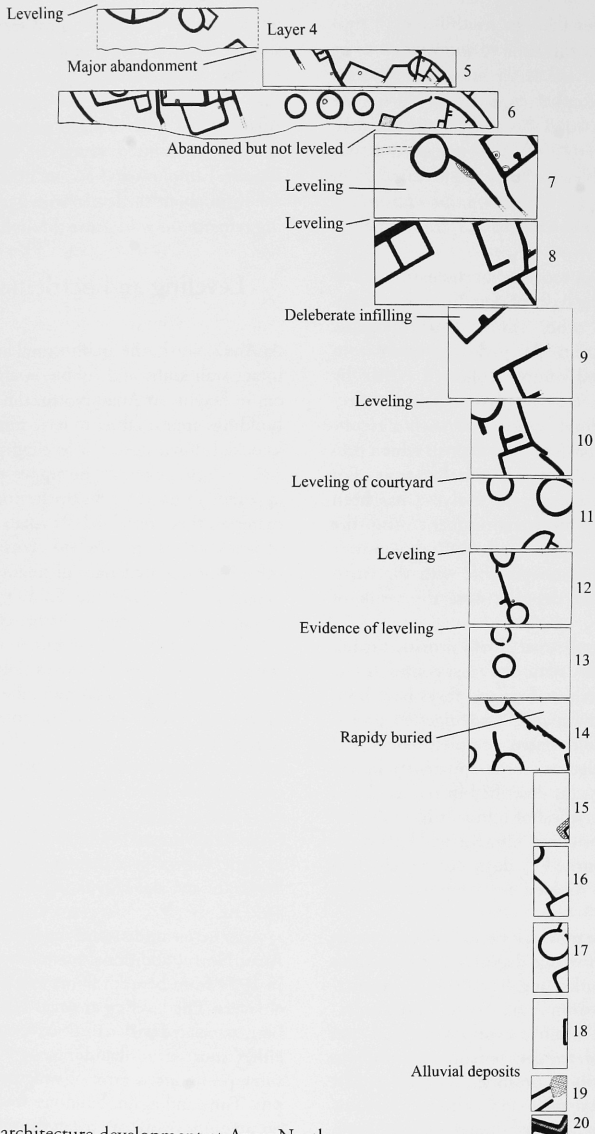
Faunal remains from Anau North provide further evidence of the secondary nature of most contexts. The action of scavengers such as dogs and foxes have been identified by the many gnawed and digested bones. Duerst and later workers noted complete bones and articulated rodent skeletons, some apparently in the remains of animal dens (as described in terrace 7 and 8). This occurrence is typical of middens in traditional villages, where deposits not immediately buried are constantly being overturned by dogs, curious children and people using the midden for temporary storage (Watson 1979: 37, 115–6).

Despite the degree to which bones had been modified and rearranged in village deposits, it is clear from fragmentation, cut marks, and body part representation that animal bone from Anau North mostly represents food remains. Certain exceptions to food use, however, are also found: red deer remains, according to Duerst, appear primarily to be antler, dropped as part of the animal's seasonal cycle and collected as a raw material for craft production. Faunal samples from both the 1904 season and the 1978–1982 seasons provide relative estimates of the dietary importance of species, although they do not offer data on body part distribution or food processing. While the fine-scale excavations in 1997 did not provide large enough faunal samples for Moore to reevaluate Ermolova or Duerst's species lists, both Moore's screened excavation units samples and the control samples from flotation suggest that the overall ranked data are sound and that no small food species had been completely missed. In that case, one of the most interesting aspects of the Anau North Early Village sequence is the high percentage of hunted fauna in the animal remains. Duerst, Ermolova and Moore noted this high percentage throughout the levels, with a trend toward decreasing reliance on wild game through time.

Leveling and Settlement Stability

At Anau North, the architectural layers are made up of intact wall stubs and rubble rarely more than 30–40 cm in height. At Anau North, the walls of abandoned buildings appear either to have tumbled down or been knocked down during a leveling process. As in most sites in arid regions, the upper parts of walls were apparently mined for the brick, wood or other valuable materials they contained. At Anau North, the amount of brick debris and the low density of ceramics and other cultural materials distinguish these upper fill deposits and indicate the rapidity of their deposition. In almost none of the 20 architectural layers at Anau North were the stubs of earlier walls reused as the foundations for new buildings (Figure 13.1). In layers 14–4, in the area of excavation, the site of former habitation was leveled and architecture was built without reusing the older architectural elements, such as wall stubs as foundations. This pattern of architectural replacement differs considerably from contemporary early village sites on the Iranian plateau, such as at Sialk (Ghirshman 1938), or Hajji Firuz (Voigt 1983) at Tepe Gawra in northern Mesopotamia (Rothman 2002), or at Çatal Hüyük in Anatolia (Matthews et al. 1997).

To better understand the leveling phenomenon at Anau North, additional phytolith samples were taken in 1999 from beneath floors and between architectural layers. The leveling at Anau North appears to have been associated with a distinctive occupational pattern: either short-term abandonment of the entire site or some pronounced form of widespread spiral stratigraphy. Time and again, buildings were leveled after their occupation. By this we mean that mud brick structures were deliberately razed and new structures erected on a leveled surface without the reuse of the older walls. This pattern appears to be both widespread over the site at Anau North and persistent through time as well. The leveling process creates a horizontal stratigraphy which, at first, we took to be an illusion created by the Soviet practice of excavating in artificial levels (by



13.1 Sequence of architecture development at Anau North.

shtick and yarus). This is, in fact, not so: the layers at Anau North are indeed very level horizontally.

Initially, we considered that the leveling was probably a *localized* phenomenon of so-called spiral stratigraphy. In such an occupational sequence, individual rooms in one architectural level are successively abandoned and reoccupied in a gradual cycle of reuse. However, the leveling events occurred across the entire cross section of the site, as seen in the section of Komarov's trench, in the red layer drawn by Pumpelly (which falls between layers 7 and 8), and in Kurbansakhatov's section across the entire site in layers 5 and 6 (see Figure 4.5). Such site-wide leveling is seen in other Early Village Period sites in Central Asia and is particularly clear in the wide-scale horizontal excavations at Yalangach depe (Khlopin 1963b), Ilgynli (Berezkin 1992), and Dashlidzhi (Khlopin 1961), where entire site plans are available. It is clear that the Central Asian tradition is not to reuse wall stubs as foundations for later levels. Berdiev noted this as well in the deeply stratified sites of Mondjukli depe (Berdiev 1972b), and this pattern of architectural discontinuity from level to level is also characteristic at Djeitun (Berdiev 1969).

Enlightening historical and ethnographic analogies can be made with villages on the Iranian plateau. In Turan, a region of eastern Iran where mud brick architecture was the principal construction material, up to 20% of the region's villages were entirely abandoned at any given time (Horne 1993). Kramer found that the village that she studied could not be traced back more than a generation (Kramer 1982). In both cases nearby crumbling remains of abandoned villages provided evidence of previous villages which no one could remember. Recently, at the archaeological site of Malyan, the local village was abandoned, and when asked why, the village leaders gave as a reason that the buildings were too old and too costly to replace. It was cheaper to build a new village several hundred meters away (Abdi 2001).

Unfortunately, few long-term studies have been made on the life history of mud brick structures. Most ethnographically documented mud brick structures have thicker, more permanent walls than the Chalcolithic constructions in Central Asia (Szabo and Barfield 1991). Such structures, with walls often a meter thick, leave a mounded remain of .60 m to 1.5 m in depth, and if well maintained, their life span is often 50–75 years (Dyson personal communication 2002). Small mud brick structures in southeast Europe, with life spans of 15–20 years have been compared to Near Eastern archaeological remains. These generally leave 30 cm of deposit when they collapse (Coles 1973).

At Anau North, in contrast to the ethnohistoric cases, the village was not relocated to a new site (or apparently even to a new part of the site); instead the old abandoned structures were leveled and the new ones built. One of the features that we can observe in the 20 architectural levels at Anau North is that despite the leveling and/or temporary abandonment, traditional use of the same area was maintained from one architectural layer to the next. For instance, courtyard space and circular structures were replaced in the same area through ten rebuildings from layer 17 to 7, suggesting some kind of long-term land tenure or ownership. The settlement remained stable in its location and only periodically renewed itself approximately every 35 years, the probable lifetime of the structures involved. No serious permanent abandonment is indicated.

One possible explanation for the continued reoccupation of some temporarily abandoned village space is the reuse of ritually important locations. Throughout the sequence at Anau North, interior rooms can be distinguished through the identification of thresholds at doorways and the treatment of interior walls and floors with plaster and occasionally paint. Among such interior rooms are those seen to be distinctive enough in treatment as to suggest ritual use. Ritual spaces in prehistoric Central Asia have long been identified by Soviet archaeologists, and yet criteria for the identification of ritual space are almost impossible to establish in the absence of ethnohistoric correlates. In Central Asia, certain types of hearths, room surface treatments, and artifact assemblages (despite the secondary-context approach) have been used to identify ritual space. The best attempt to identify ritual spaces has been made at Ilgynli depe, where certain structures were infilled or burned, often with distinctive objects on the floors (Berezkin 1992). In Namazga II levels, ten such rooms have been identified that had been specially burned and infilled during the leveling process (Berezkin 1992).

The intentional burning of mud brick structures may not be particularly easy, as the British army discovered in Afghanistan the 1920s (Gordon 1953); it requires concerted effort to open the structure for oxygen flow. On the other hand, a one-story village house at Hasanlu, Iran, burned very quickly in a windy environment leaving scorched standing walls as a ruin (Dyson personal communication 2001). We are not provided with information on what was outside of the burned Ilgynli rooms, making comparison with other sites very difficult. A reuse pattern, however, is documented at Dashlidzhi depe, where the entire site was leveled and then rebuilt; only the one ritually important room was rebuilt on its original foundations (Khlopin 1961). This follows a common principle of sanctified ground, e.g., the series of temples of different dates and religions at the temple of Luxor in Egypt (Muhammad 1968) and the rebuilding of the Temple of Ianna over centuries at Nippur (Zettler 1992).

In the American southwest, several aspects of Pueblo kiva architecture, documented both historically and archaeologically, suggest other ways for archaeologists to identify ritual space: (1) ritual rooms (kivas) are often "killed" at the point of site abandonment by infilling; (2) older ritual rooms are reused among the ruins of earlier village spaces; (3) and the ritual architecture reflects a return to an archaic style of architecture (Adler 1993, Wilhausen 1986).

At Anau North, several buildings, throughout the sequence, stand out as following the older Djeitun style of architecture. Such a room, excavated by Ershov in layers 16 and 17, revealed wall painting and construction techniques best paralleled at Yassi depe (Khlopin 1963a:13–14, pl.11). Elsewhere, in levels 7–9, rooms with careful interior paint were excavated in 1980 (by Kurbansakhatov), and its continuation was excavated in 1997. The plan of the room in layer 7 is best paralleled to architectural style of the earlier Djeitun period (Masson 1971). This room was rebuilt with the same orientation in nearly the same place in three successive architectural levels (a unique case among the structures excavated at Anau North). Miller's botanical samples from this room suggest that it was burned down. According to phytolith evidence from that layer (sample 4), the surrounding rooms were abandoned for some time, highlighting the difference between this room and the others.

It is thus through the understanding of the depositional contexts and their relationship or non-relationship to the architectural elements that we are able to draw inferences from and create testable hypotheses about the excavated remains in Central Asia.

14

The Evolution of the Settlement at Anau North

The settlement of Anau North is later by one thousand years than occupation at the site of Djeitun and the constellation of early-Djeitun sites in the Akhal region. Over the course of the Djeitun period, settlement shifted east, to the region between the Meana and Chaacha Rivers. The traditional single-room Djeitun building, constructed with proto-bricks which were molded in place, was replaced with multi-room dwellings in the late Djeitun period. Excavations at the late-Djeitun sites of Mondjukli and Chagylly show the use of preformed mud bricks with more or less standard sizes, also the pattern seen in the earliest-known Anau architecture.

Specific antecedents for Anau North in the Anau delta are poorly understood. A small late-Djeitun scatter of ceramics was recorded near the Yarti-Gumbez well, 12 km north of Anau North, but this site has not been reinvestigated and its presence has not been reconfirmed since the construction of the Kara Kum Canal. The Anau IA settlers at Anau North may have come from that late-Djeitun base in the Anau delta. The development of small terraced fields opened the area near Anau North to agriculture and made occupation possible this far upstream.

Foothill Pioneers: Anau IA 4500–4000 BC

By at least 4500 BC the Anau delta was settled by people who herded domestic sheep and cattle, hunted in the nearby deserts and mountains, and farmed using some form of irrigation. The plump wheat and barley grains are typical of the *liman* irrigation system of agriculture employed during the subsequent village and urban periods along the small rivers north of the Kopet Dag.

Anau 1A period settlements have been found along many similar small river valleys on the north side of the Kopet Dag mountains. The first Anau IA farmers may have moved upstream from a more swampy environment further out along the river delta when this system of irrigation was developed.

The Central Asian world of Kopet Dag was at this time already part of the network of settlements across the Iranian plateau. The use of copper and turquoise and styles of spindle whorls and figurines compare well with similar artifacts from sites along the northern tier of the Iranian plateau stretching from Hissar (period IA/B) to Sialk (period III_{1-3}). Yet, the scale of exchange was limited; and the previous proposal of a widespread horizon of high-fired ceramics connecting Cheshmi Ali ceramics of central northern Iran and Anau IA is not supported by the revised chronology presented here. The stratigraphic position of the materials at Anau North indicate that the Cheshmi Ali ceramics are earlier than Anau IA by 500 years.

The bulk of the ceramics of the Anau IA period were made of soft chaff tempered ware. These ceramics are also found earlier (from the materials in the north digging which pre-date Anau IA) and later (in Anau IB), indicating a continuity of ceramic manufacturing traditions from Djeitun through the Anau IB/Namazga I periods. Today, the identification of the Anau IA clinky ceramic as an indicator of a separate "culture" (McCown 1942:12), and suggestions that this culture had originated in Iran (Masson and Sarianidi 1972, Berdiev 1972) appear unlikely, given that the ceramic type is limited to a very small range of forms within an on-going tradition.

Petrographic analysis indicates that these bowls were most likely locally made. Yet they are stylistically and technologically similar to the clinky ceramics of other sites along the Kopet Dag, such as Mondjukli (Berdiev 1976). The appearance at several sites of locally produced ceramic ware fired at the same temperature and ornamented with similar motifs suggests an open flow of information between potters in different locations or the mobility of the potters themselves.

Defining the Central Asian Way of Life: Anau IB 4000–3500 BC

During the 14 Anau IB occupational layers at Anau North, distinctive features of the Kopet Dag way of life emerged. The architecture of these layers shows a pattern of repeated occupation and abandonment, delimited spaces of ritual importance, and internally fortified or access-controlled compounds. The domestic architecture of Anau North IB1 and IB2, like other Early Village sites in Central Asia, consisted of clusters of courtyards, storage areas, and domestic areas of related nuclear families, similar to that seen in other parts of the greater Near East (Flannery 2002). The estimate of the size of the Anau North settlement during the Anau IB1 period must take into consideration off-site soundings conducted in 1904 which showed that intact Anau IB1 occupational levels extend at least 100 m to the west of the mounded area. Given the fact that the architectural remains from three locations in the mound (Ershov's trench, Kurbansakhatov's deep sounding, and Pumpelly's north digging) all indicate substantial construction in the Anau IB1 period, the size of the Early Village settlement at Anau North seems to be comparable in size with the largest of the contemporary Central Asian settlements, such as Ilgynli, Geoksyur 5, or Namazga depe (Masson 1982:Table 6).

At Anau North, the Anau IB1 and IB2 architecture showed relatively low investment in buildings: the walls and floors rarely indicated rebuilding, modification or maintenance. Instead, a pattern of building abandonment and subsequent leveling before new structures were built is most often seen. The uppermost architectural layers of Anau IB (layers 9–5) provide the most compelling examples of the tradition of architectural leveling. Here, such leveling is visible along the entire length of the transect of Komarov's trench. Micromorphological samples from beneath floors suggest, at least after architectural layer 7, that there was a period of long-term abandonment followed by leveling.

While the small exposure of the earliest Anau IB1 and IB2 architecture in the deep sounding is not large enough to determine the nature of the site as a whole, the diversity of architecture at Anau North, and the tradition of shifting architectural plans, can be compared to a number of contemporary settlements where single occupational layers were excavated across the entire area of the settlement. At Dashlidzhi depe, for example, three architectural layers were fully excavated to the preserved edge of the site (Khlopin 1961) (two layers are illustrated in Figure 2.9). The Dashlidzhi village was composed of an irregular arrangement of small rooms, storage areas and courtyards. Each architectural layer was constructed, occupied, abandoned, and, as at Anau North, leveled to a wall height of 20–40 cm. As at Anau North, new buildings were constructed without consideration for the earlier wall stubs, except for room 1. This room, considered to be a shrine, was rebuilt upon its older foundations (Khlopin 1964:73).

The key to maintaining spatial organization across leveling and abandonment events may well have been the location of the ritually important rooms in the settlement. At Anau North, the layer 9 room with its painted and plastered floors and walls—reminiscent of the ritual rooms at Yalangach and at Ilgynli—is one of the rare instances in this sample where buildings appear to have been re-built in successive layers. Its distinctive form, harking back to the Djeitun architectural canon of single-room buildings, may have been readily identifiable even as a ruin. If the interpretation of these spaces as having ritual importance is correct, then the reuse of these structures may have dictated or directed the use of other spaces at the site across leveling and abandonment events.

The circular structures appear to be multi-functional, with a diversity of sizes and a diversity of remains inside. The combined excavation results for layer 14 suggest that these structures served primarily for storage, but others at Anau North have doorways and appear to contain occupational debris. Some also have architectural functions: the circular units form towers for building compounds (for example, in layers 14 and 12). Examples of this usage can be found at the later sites of Mullali and the upper level at Yalangach (Khlopin 1969), where these towers and the connecting walls enclose building compounds and are the possible precursors of more formal fortifications. Those at Anau North provide an even earlier context for these distinctive Central Asian structures. They potentially form an early local tradition of enclosed building compounds, ultimately manifested in the fortified Bronze Age desert oasis architecture of the BMAC (Bactria Margiana Archaeological Complex) (Francfort 1979, Hiebert 1994:17–28).

The identification of circular buildings in the early village architecture of Central Asia may provide a key, in the future, to understanding the wider connections between other village cultures with circular structures of the circum-Caspian region (Kurbansakhatov 1987:129–145). In particular, this architecture aligns activities and traditions in Central Asia with those in early village cultures of the Caucasus that have a long tradition of circular buildings with domestic, storage, and defensive functions (Munchaev 1975:88–89, Munchaev and Merpert 1981:161–198). The identification of Early Village sites in the southern circum-Caspian region, including the Tehran basin (Fazeli et al. 2001), Qazvin (Majidzadeh 1981) and the southern Caucasus (Kushnareva 1997, Trifinov 1997), and our ability to place these in a coherent chronological context will allow us to evaluate interaction between early villages along the northern regions of the greater Near East.

The conservative ceramic and small-find tradition across the 14 architectural layers, taken together with the close clustering of radiocarbon dates from layers 18–5, suggests that there was rapid turnover in the occupation and abandonment of structures at Anau North. If the elapsed time of 500 years (based on the radiocarbon dating) is accurate, it follows that new buildings were created every generation, perhaps every 25–35 years. This rate of replacement is consistent with the insubstantial wall construction and the lack of modification or rebuilding.

The abandonment of the site or parts of the site was a repeated and persistent pattern. These events were probably responses to the many insecurities of village life in this area: earthquakes, plagues, drought, soil exhaustion, conflict, as well as individual cycles of family expansion and decline. Such short-term sedentism appears to have been an expectation in Early Village Central Asia, and was reflected in the architecture and settlement pattern.

Emergence of Anau in an Interregional Arena: Anau II 3300–2900 BC

The episode of abandonment between layer 5 and layer 4 was exposed over a wide area (300 sq m) in Kurbansakhatov's excavation 1. Micromorphological sampling as well as a pronounced ceramic shift mark this hiatus as abandonment, perhaps longer and involving less spatial reuse than those which occurred during earlier layers. Radiocarbon dates suggest a gap of potentially 300 years.

Above this hiatus, five architectural levels spanning two periods (3300–3100 and 3100–2900 BC) were investigated. The ceramic assemblages permit us to evaluate the upper levels at Anau within the context of the Central Asian world at this time, as well as within the contexts of the developments of the late 4th-early 3rd millennia on the Iranian Plateau. Despite the small sample of layers of this period at Anau North, the comparison of late period architecture with other sites along the Kopet Dag foothill plain suggests that Anau North layers have both elite and non-elite architecture, reflecting a new level of social differentiation. Two sites along the Kopet Dag offer relevant comparisons to Anau North—the nearby site of Kara depe, and the eastern Kopet Dag site of Ilgynli depe.

Overall, the Anau II architecture has closest features to Kara depe (level 2,3): areas with substantial architecture and doubled walls, and other areas with less substantial architecture having burials under floors. The excavators of Kara depe suggest that the burials were made during the active occupation of non-elite rooms (Masson 1961b:332). Based on observations of the multiple reuse of hearths, the pattern may be different at Anau North, or the hearths at Kara depe (level 2,3) may represent a late-phase, atypical use of the rooms in a non-elite area of the site. Features of the domestic architecture of Anau North, layer 4 (Kurbansakhatov's main trench, area A-D, and excavation 1), parallel those broadly exposed in level 2 at Kara depe. The irregular architectural layout of Anau North contrasts with the more rectilinear architecture in terrace 1 from the 1904 excavations, in particular, the construction of bins, walls, floors, hearths, from terrace 1 at Anau North recall these similar features of the elite architecture at Kara depe.

The site of Ilgynli depe, in contrast to both Anau North and to Kara depe, appears to have developed into a specialized center with a much higher proportion of ritual items than have been found at the other sites. This evidence for more intensive ritual activity at just one site suggests that a regional system of interaction emerged along the Kopet Dag foothills by this time.

It is during the Anau II period, toward the end of the fourth millennium, that village settlement in Central Asia expanded for the first time outside of the region of the Kopet Dag foothill plain. The Anau II site of Manysh, along the upper valley of the

Anau's Keltechinar river valley, is situated at the pass to the Iranian plateau. Nishapur-P, located near turquoise mines, produced an assemblage that closely matched that of Anau IIa. Sarazm, along the upper Zerafshan valley of Tadzhikistan founded at the same time has been suggested to be a satellite of the Kopet Dag population—with up to 40% of the pottery being typical of the Kopet Dag region (Lyonnet 1981, 1996). The settlement at Sarazm was established in a region more than 700 km from the Kopet Dag, but in an area on the edge of the Eurasian steppe that was rich in mineral resources (Lyonnet 1996). This expansion of the Central Asian world outside of the Kopet Dag may be related to the acquisition of prestige goods—such as the lapis and turquoise found in the Anau II burials.

The region of local interaction all along the Kopet Dag appears to be defined by individual valleys, with evidence of occupation and resource exploitation expanding to include all of the environmental zones of the Kopet Dag region, including the mountains themselves, the intermountain valleys, the foothill plain, and the sands and salt flats of the Kara Kum desert. Resources such as gypsum from the takyr in the desert, wood from the intermountain valleys, stone and metal ore from the plateau, and hunted wild animals from the desert and the foothills were recorded.

Similar multi-zone local interaction areas may have extended along the interface between mountain and desert in each of the valleys to the east of the Kopet Dag and even perhaps to northern Afghanistan. Vinogradov's survey of northern Afghanistan reported a hunting/farming occupation with lithics similar to the Kopet Dag region (Vinogradov 1979). However, intensive archaeological surveys have not identified any mounded settlement sites similar to those along the Kopet Dag foothills in northern Afghanistan (Sarianidi 1976, Gardin 1998, Lyonnet 1997). Even so, we still might expect Central Asian Early Village Period in this region, since finds of lapis lazuli from northern Afghanistan were found in the upper burials at Anau North and other late Namazga II and early Namazga III sites (Sarianidi 1968).

With the absolute chronology established in the upper levels at Anau North, Central Asia can be placed in the context of developments on the Iranian Plateau. The red and gray burnished pottery of Anau IIa belongs to the broader tradition of the northern Iranian Proto-Elamite horizon. These unpainted ceramics, frequently overlooked in the Central Asian ceramic sequence, relate directly into this northern Iranian horizon, which had close technological and stylistic parallels with ceramics and small finds of Sialk IV,2 (Amiet 1985), Hissar II (Dyson 1987), and even possibly the very beginnings of settlement at Shahr-i Sokhta (Sarianidi 1983).

These Iranian sites, however, are marked by the occurrence of a distinctive symbol system, artistic tradition, and the use of Proto-Elamite cuneiform tablets (Pittman 1994a, 1994b, 1997, 2001). Despite the wide-scale horizontal exposure of many sites of this age along the Kopet Dag, no Proto-Elamite tablets, inscriptions, or artistic motifs have been found. From late Namazga II/Anau IIa levels at Anau North, Kara, Yalangach, and Ilgynli, other designs and symbols occur on public artifacts—figurines, terracotta plaques, whorls—suggesting a separate Central Asian iconography which sets the Kopet Dag culture apart from the contemporary sites of northern Iran.

Foundations of Central AsianUrbanism

Rather than suggesting that the typical Central Asian settlement was a stable, long-term occupation, the excavations at Anau North suggest that abandonment of settlements occurred regularly during the periods prior to urbanism. A similar pattern was observed by Horne in her ethnoarchaeology of villages in northern Iran (Horne 1993). A record of occupational instability over the last several hundred years has been documented in Persian and Khivan accounts of southern Turkmenistan (MITT 1938–1939). Bregel''s reconstruction of shifting settlement locations along the Kopet Dag foothills during the 16th, 17th, and 18th centuries in many ways parallels the rapidity of settlement shifts which we observe in the prehistoric past (Bregel' 1959). Bregel''s study implies that these changes were primarily political. Obviously, issues such as the availability of water and access to agricultural lands were significant, potentially political, issues that bear on the settlement of a particular deltaic region.

The investigations at Anau North have not revealed the cause of the shift of settlement from the north mound to the south mound. While the Anau IIa and IIB levels are poorly preserved, they still can be seen to follow the village traditions of organization as seen at the lowest layers of Anau North. The later Bronze Age architectural tradition at Anau South reflects notions of space use different from those seen at the north mound. The later settlement shows a greater importance of public and ritual space and a shift from short-term sedentism to long-term settlement at the site. Perhaps social stratification emerged as a way to solve occupational instability with urbanism as a result. We will only be able to address this possibility after comparable research at the south mound.

If our interpretation of short-term sedentism in Central Asia during the Early Village Period is upheld, then we need to address the question of what led people to return to the same sites to rebuild time and time again. The source of the answer lies in an enlarged understanding of such issues as land tenure (was there ownership of land which was maintained after leveling of the older buildings?) and the role of ritually important structures that are rebuilt in nearly the same spot after being leveled. It is these issues that will be addressed when we further investigate the levels of the Anau South settlement dating to the subsequent period of urban development, when settlement stability and nucleation was established and complex social organization and craft specialization began to emerge.

Appendix A
1904 Excavations at Anau North

Hubert Schmidt

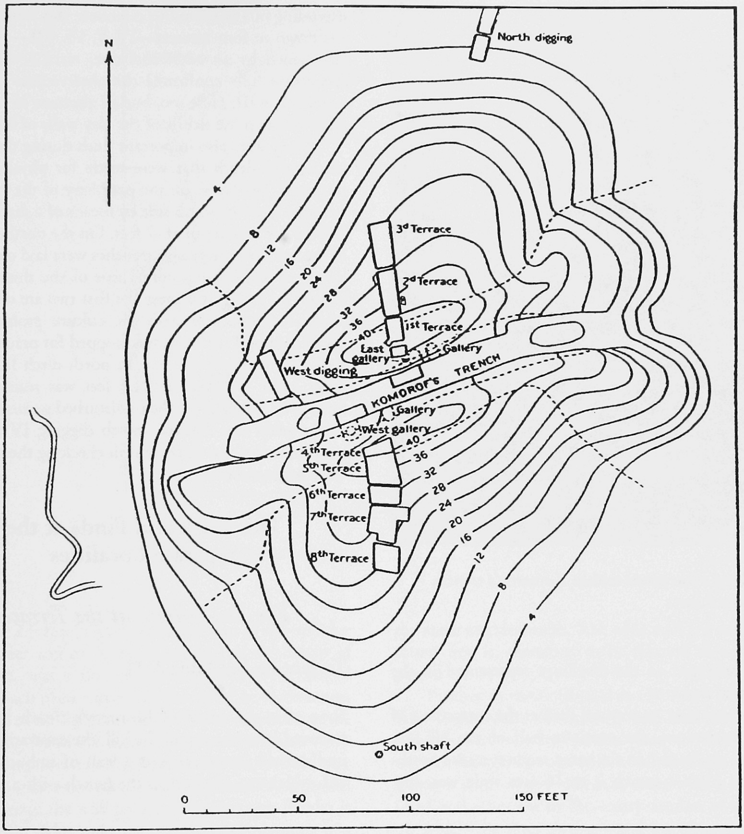
Hubert Schmidt's report in the 1908 Pumpelly volume has been criticized both in the Western literature and in the Russian literature for using absolute depths, as opposed to stratigraphic level, for fixing the period of the archaeological materials at Anau. However, what has been overlooked by this criticism is that the excavations were made in relatively restricted areas. In the context of these limited excavation areas, the absolute depth measurements allow us to relocate the artifacts and ceramic complexes within a stratigraphy based on architectural levels. Thus, with information on each excavation unit and its depth, we are able to correlate this material with the later stratigraphic studies presented in this volume. Added to the descriptions of the individual excavation areas are tables that provide correlations of the excavated contexts from 1904 with the stratigraphy of 1997, and correlations of the ceramics from the earlier excavations and the new excavations.

Additionally, in the archival papers located in New Hampshire, new photos were identified which provide a vivid record of the text as described by Schmidt and are included here. In providing the original text of Schmidt, we gain access to the level of detail that was achieved in the published 1908 report, and the logic of the excavations strategy.

The excavations began March 24, 1904, with the cleaning out of the Komarov trench and the deepening of its ends, which were somewhat higher than the middle [Figure A.1]. Starting from the bottom of the trench, two "galleries" were driven a short distance into each wall, opening to this extent the heart of the hill. In the eastern half of the northern wall the east galleries, 6 feet wide, were opened and in the western half of the southern wall the west galleries, 8 feet wide. In this way the middle layers of the hill could be examined between +18 and +8 feet (the datum is the level of the plain on the west side of the kurgan) [parenthetical note by Raphael Pumpelly].

At the same time the upper layers on the north half of the hill were attacked by two trenches running nearly parallel to each other. The larger one of these extended from the summit northward down the northern declivity of the hill and was divided into three sections by leaving narrow partitions, portions of the original earth, standing between them (terrace IA, B, terrace II, and terrace III). This division was important, both because it facilitated the excavation in horizontal layers and because the observations could be sharply defined for each terrace. These terraces have a width of to 11 feet and are sunk in the heart of the hill to +22, +18.1, and +15 feet, respectively. The other and much shorter trench was dug with a width of 6 to 7.5 feet on the western declivity of the northern half of the hill (west digging) and opened the middle layers from +25 and +20 to +8.6 feet. In this way a certain relation was established through the west digging between the terraces and the galleries. The separate observations made at each locality would tend to supplement and corroborate each other.

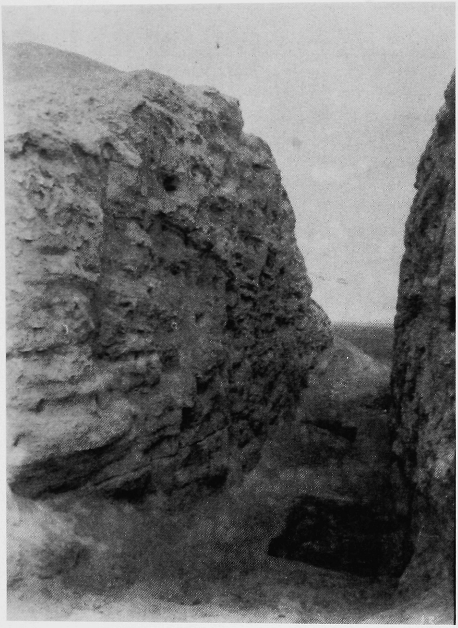
For the purpose of studying the deeper layers, two pits were dug in the bottom of the Komarov trench, immediately adjoining the galleries, these pits having a width of 6 feet and a length of 15 and 16 feet, respectively (trench, eastern and western pits). Work was stopped on them, however, as soon as it was discovered



A.1 1904 excavation areas.

that they were being sunk in the debris which General Komarov had dumped into his trench; and instead, two shafts were sunk in the "galleries." In both these shafts the culture-strata were opened to a depth of -21.5 feet [Figure A.2].

The finds which were made in the above-mentioned localities gained in importance through the simultaneous discovery of burials. On March 26, several skeletons were exposed in terrace IA, to the south of a wall of unburnt bricks. They were, however, destroyed by the picks of the workmen. During the following days more skeletons came to light in all three of the terraces. Their significance in connection with the finds that were being made became clear after the discovery that a skeleton grave found on March 30 in terrace I was that of a child buried in contracted position (*Liegender Hocker*), and that a skeleton unearthed on March 31 in terrace III was also, in all probability, buried in contracted position. Since similar skeletons appeared in terrace II and in deeper layers, it was impossible to consider these as later burials, and the find in terrace I left no question that the skeleton



A.2 Gallery excavations within Komarov's trench, looking northeast.

graves belonged to the dwellings represented in the horizontal strata.

Nevertheless, to test still further the correctness of these conclusions, the southern half of the hill was attacked on April 1 in the same manner as the northern one. Here a trench 1 to 16 feet wide was dug, extending in a north-south direction; this trench being cut down in four terraces—IV, V, VI, VII—and later lengthened by an additional one, terrace VIII. This excavation fully confirmed the observations made in terraces I to III. Here too, burials alternate in horizontal layers with the debris of the clay walls of houses.

There were also important finds during the examinations in depth that were made for physiographic purposes. The layers on the periphery of the hill were examined, on the south side by means of a shaft (south shaft) sunk to a depth of -7 feet. On the northeast side of the hill three successive trenches were laid out in the direction of the longitudinal axis of the shaft (north diggings, I to III). Of these the first two are of importance in connection with the culture problems. In north digging I the work was stopped for practical reasons at a depth of -13 feet. In north ditch II, on the other hand, a depth of -24.5 feet was reached; and here, as in the galleries, the undisturbed natural surface of the plain was reached. north digging IV and the west shafts are also important in checking the observations made elsewhere.

The Work and Finds at the Separate Localities

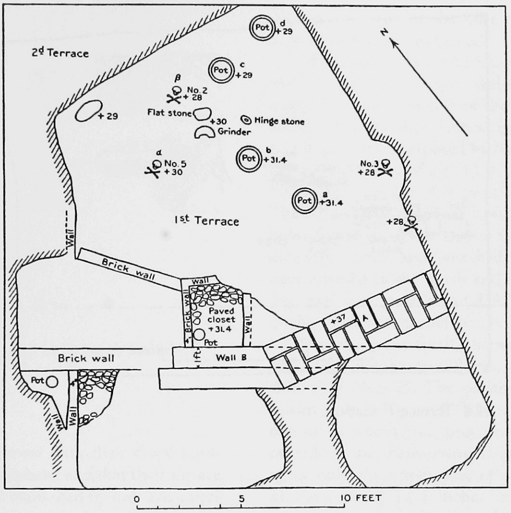
The Excavations at the Terraces

Terrace Ia, b. [Table A.1]

Soon after the debris of Komarov's trench had been removed from the top of the hill, the excavation in the undisturbed layers exposed a wall of unburnt bricks (A), which extended across the trench with a thickness

Table A.1 Terrace 1, Correlates of Stratigraphy

Context Code	Level	Context	Layer	Period
T1.1	+36/+33	Upper room, Wall A	1	IIB
T1.2	+31.5	floor w/ fire pits & pots in floor. Stones on floor with doorsocket, and pots a and b in floor	2	IIA
T1.3	+30	child, burial 20, associated with the above floor	2	"
T1.4	+29	floor with pots c and d, firepits	3	"
T1.5	+30/+28	child, burial 17 associated with above floor child, burial 15 associated with above floor	3	"
T1.6	+28/+27	Fill	4	"
T1.7	+27	Fill	4	"
T1.8	+27/+25	transitional pottery	4	"
T1.9	+25/+23	Fill	5	IB2
T1.10	+23/+22	Fill	5	"

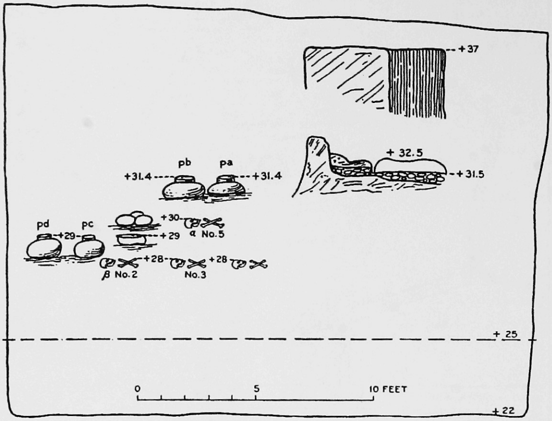


A.3 Terrace 1, excavation plan.

of about 2.5 feet [Figure A.3]. The top of this wall lay at +37 feet and on its northern side, at the height of 31.5 feet, was a floor marked by two fire-reddened places. Each place surrounds the top of an earthenware pot sunk to the lip in the floor, the top diameters of the pots being 9 and 8.8 inches, respectively [Figure A.4]. The assumption that this floor and its clay vessels were contemporaneous with the wall just mentioned proved to be wrong; the wall proved to be younger. Under it were found older and narrower walls (B), running in a different direction; and adjoining it on the north there was exposed a peculiar quadrangle of irregular form (2.8 and 2.6 feet), of which one corner was destroyed. The floor of this quadrangle was paved with small flat pebbles and the inner walls of its lower part were incrusted with fragments of pottery. The quadrangle, with thin walls running towards the west, is shown in [Figure A.5]. In following the walls towards the west a similar small room was found, also incrusted with small fragments of pottery. Further examination of these rooms was not practicable under our general scheme of work, on account of the overlying mass of earth. However, since the floor of the quadrangle stood at the same level with the fireplaces and the tops of the pots (+31.5 feet), and the bottom of the narrow walls had the same elevation, they must all have belonged to the same establishment. The wide wall (A) which was found first is, therefore, to be referred to a younger period.

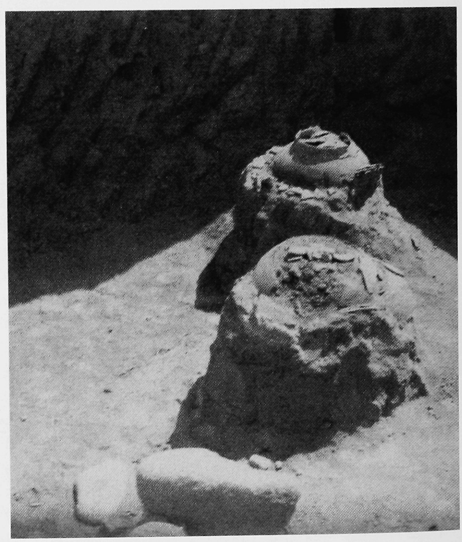
Further to the north and at +30 feet—that is, 1.5 feet deeper than the hearths and the tops of the pithoi—there occurred several stones. Among these were an elongated stone with a round depression, evidently a door-stone—that is, a stone with a hole polished and scratched by the rotary motion of the pivot on which the door swung—and an elongated stone standing on its broken end, with a deep longitudinal groove, presumably a whetstone. The positions of the stones and the pithoi are shown in [Figures A.6 and A.7] and in the vertical section.

The greatest interest attached naturally to the examination of the earthenware vessels standing in the floor. Pot a, standing nearest the wall of the terrace, had a cavity of 6.6 inches depth, filled with loose earth, mixed with ashes and charcoal. Pot b, standing nearer the center of the excavation, contained unburnt earth in the upper part; under this a whitish, fine mass; still deeper, reddish-yellow burnt earth mixed with charcoal; and below this a quantity of the same white substance that was observed near the top. Further examination, after exposing the outside of the pots, showed that they had no bottoms, but had been placed in the

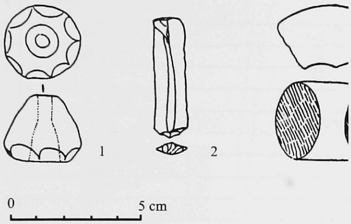


A.4 Terrace 1, section.

A.5 Terrace 1, pebble-lined storage bin, looking southwest.



A.6 Terrace 1, pottery a and b in figure A.3, looking south.



A.7 Terrace 1, pottery c and d in figure A.3, looking north.

earth as if without the lower half, their shape representing practically a hemisphere; and that their surface, originally red, was much blackened by fire. The interior was largely plastered over with clay, which was also burnt red; even the base on which the half-pots rested showed, to a considerable depth, red color due to burning. The long-continued and repeated use of these hearths is shown by the remains of an older pot under pot b. When this pot became useless, it was evidently replaced by pot b.

What is the significance of these pots surrounded with traces of fire? The hard-burnt earth surrounding the outside of the pots and filling the interior, and the charcoal and ash-like white mass found in the interior, allow only one interpretation. The pots must have been bake-ovens heated from the interior. Similar pot-like forms are still used as ovens in Turkestan, where I myself have seen them, and Mr. Huntington assures me that they are used also in Persia.

South of wall A, in terrace Ia, workmen had exposed on March 26 several skeletons at a depth of about 4.25 feet under the original surface of the hill, but they had so completely destroyed them with their picks that an examination of their position and of other conditions was impossible. That these were burials seemed probable because beads were found with them and a feeding-cup was found near the remains of a child's skull; we are in all probability justified in considering these as having belonged to the burials. The feeding-cup is of the same red monochrome ware already found in the terrace. It was proper, therefore, to assume that the burials belonged to the same people whose culture remains have already been discovered in the highest layers of the hills. This assumption was soon to be further confirmed.

When the terrace was lowered for the examination of pots a and b, a skeleton ("A", no.5) was exposed on the west side of the terrace, at about the same level as the three stones mentioned above—that is, +30 feet. It was exposed by Mr. Warner and proved to be the skeleton of a child lying in the regular contracted position (Hocker position) on the right side. The burial gifts—beads of lapis lazuli- agree with the beads found in terrace Ia [see Chapter 7]. When the skeleton, stones, and pots had been removed, there were exposed in the north end of the terrace, at +29 feet, two more pots, c and d, in position; near these, in the northwest corner of the terrace, the half of a mealing-stone; and finally, between this and the pots, but a little deeper, at +28 feet, another skeleton of a child ("B", No. 2). The position of this skeleton is shown in [see Figure A.7] by a small board. Of the two newly-found pots, only one (the western one, c) resembles the bake-ovens already described. Here again only the upper part of a pot was found, the diameter being 12.4 inches. Its contents are earth mixed with charcoal and a white ash-like substance, and the earth below it is burnt red; while, on the other hand, the earth surrounding the pot above is scarcely reddened. The eastern pot, d, stands full formed in the earth and is much blackened on the outside. The contents differ from those of the bake-ovens. They also consist, indeed, of much charcoal and earth, but this is so loose that one must assume it to have fallen in from above, while the earth in the bake-ovens is smeared on the walls and burnt hard. We may, therefore, consider pot d to have served for cooking; its bottom must have stood in the earth, so that fire could be built around it.

However, the combination of bake-oven, kettle, mealing-stone, and child's skeleton corresponds wholly with the overlying layer, its pots, and its skeleton; so that we have here two successive periods of culture. The pots c and d must already have been out of use and buried when pots a and b were put in position; but they must also have been older than the child's skeleton "A", No. 5, which lies in the layer between pots a, b and c, d. Skeleton "A", therefore, must be referred to those inhabitants of the hill who used bake-ovens a, b, while the lower skeleton belongs to the older period. The highest layer—that is, the youngest period—is, however, represented by the skeletons destroyed in terrace IA, and by the thicker diagonal wall A. Therefore, at least three successive periods have left their remains between the surface of the hill (+40 feet) and the level of +27 feet.

Table A.2 Terraces 4–5, Correlates of Stratigraphy

Context Code	Level	Context	Layer	Period
T4.1	+36	Burial 23 (child)	0	IIB
T4.2	+34	burial 22 (child)	0	"
T5.3	+36/+32	floor with pot e and fill	1	"
T5.4	+30.2	burial 21 (child)	1	"
T5.5	+32.5	floor with pot f and flat stones	2	IIA
T5.6	+32/+28.5	ashy fill on floor at 30.6	3	"
T5.7	+29	burial 16 (child)	3	"
T5.8	+28.5/+27	fill of room with wall	4	"
T5.9	+27/+25	red burinshed level	4	"
T5.10	+25/+23	chaffy ware level	5	IB2
T5.11	+23/+22	more chaffy	5/6	"

In the east wall of terrace I still another skeleton (No. 3) was excavated at the level +28 feet, besides another left in the earth.

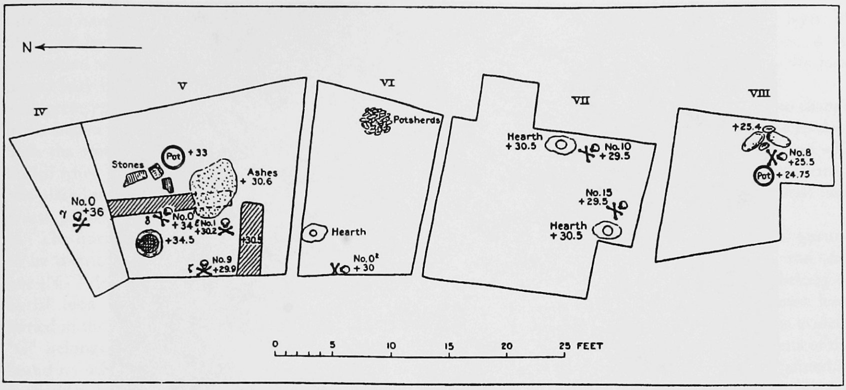
The question then arises whether these periods differed in their culture characteristics. In all probability they did not, for the beads in terrace IA resemble those found with the child's skeleton in IB, and the pots a to d, as regards form and technique, are in all respects similar. The similarity in culture will be more evident when we consider the pottery that is characteristic of these layers.

When the upper terrace was begun on March 25, it yielded within three hours a great quantity of fragments of different kinds of pottery, the greater part belonging to a gray or red monochrome ware. The red was especially characterized by a good polish, while in the gray fragments one was struck by the excellent quality of the clay and of the technique. I will designate this monochrome variety for the present as group x. Besides this group x, there occurred painted ware of an entirely different technique—both finer and coarser vessels—which we were obtaining at the same time from the galleries; that is, from the middle layers of the hill. These fragments may for the present be called group y, in contradistinction to the others, or group x. The relation of these two groups, however, on their appearance in terrace I, was such that the monochrome was predominant at the top, but diminished in favor of group y the deeper we dug. Thus on March 31, after the removal of bake-ovens a and b and the accompanying child's grave, the red polished ware was still predominant among the "mixed" pottery; but on the following day, when the excavation entered the layer of the older pots, c and d, and the still deeper level of the second skeleton, the "mixed" ware consisted principally of the painted group y, while there was a rare occurrence of the monochrome x. Very different, however, appeared the character of the finds on April 5, when the layer of the older pots c and b had been removed and the terrace had been sunk to between +27 and +25 feet. The monochrome variety x was entirely lacking; there appeared only the group y. This corresponded with the finds in the "galleries," where to a depth of +22 feet the only fragments found were those of the pottery of group y.

It was already possible to draw the conclusion that the monochrome variety x was the younger. Considering the manner of its occurrence, it was also probable that it belonged to the same culture as that to which the walls, bake-ovens, kettles, and skeleton of terrace I belonged, for the feeding-cup which was buried in the child's grave is of the same kind as the great mass of monochrome pottery of the upper layers. The question, to which period of house-construction the red monochrome ware was to be referred, was completely solved by the discovery of the quadrangles, for the pottery fragments with which the walls of these cabinets were incrusted were of this characteristic ware. The only doubt possible was in regard to the gray ware, which technically is far superior to the red. The occurrence of the older varieties of vessels of group y in the upper layers is, however, sufficiently explained when we consider that the inhabitants of these layers must have materially disturbed the older layers, including their pottery, in establishing their own dwellings. As a matter of fact, no pure layer of either group was found in this transitional level of unmixed and monochrome ware, and such a pure layer appears not to have existed.

Terraces IV and V [Table A.2]

[Figures A.8 and A.9].—The finds in terraces IV and V correspond to the finds in terrace I. Soon after the

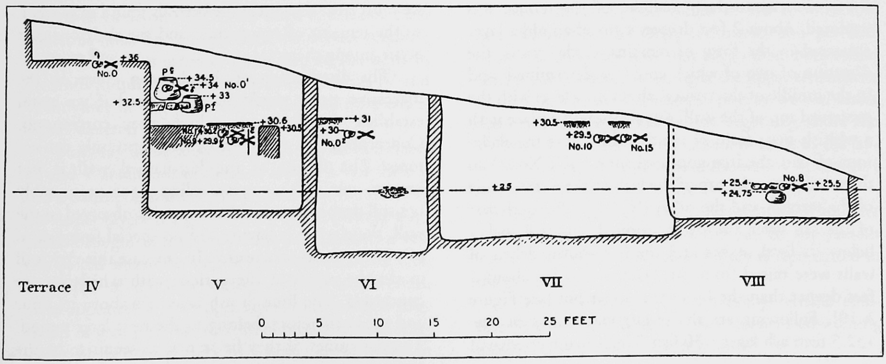


A.8 Terraces 4-8, excavation plan.

debris of the older excavations was removed and the undisturbed earth of the hill was attacked, a child's skeleton ("g") was found in contracted or Hocker position, and lying on its right side [see Chapter 9, burial 23]. Its position is designated as in terrace IV. The horizontal layer of terrace V, corresponding to the location of the exposed skeleton "G" has almost wholly disappeared, as the original surface of the hill there falls off abruptly to the south. In terrace V there occurred first *in situ* a pot (e) of the kind found on the northern half of the hill. To the east of this pot, and a little below the level on which it stands, several skeletons were found lying in a heap ("b" No. 0); and farther east, near these, were the remains of a deeper-lying pot (f) *in situ*, of which the lip was destroyed [Figure A.10].

This stratiform succession of pots and skeletons resembles closely the finds in terrace I. The levels are as follows:

Skeleton, Terrace IV +36 feet;
lip of the upper pot (e), Terrace V, +34.5 feet;
skeleton heap "b", +34 feet, near pot e;
preserved edge of lower pot (f), +33 feet.



A.9 Terraces 4-8, section.

A.10 Terrace 5, walls, looking south.

Many small stones and fragments of stones occurred in the layer between the pots and around the older pots, and even somewhat deeper. Presumably the earth had been disturbed here. After removing the skeleton there were found several flat stones and the fragments of a mealing-stone near the lower pot (J), 1.5 feet below its preserved lip, these representing the floor belonging to the lower pot. These stones, as well as the pots, were left temporarily *in situ*, while the remainder of the terrace was explored. About 2 feet deeper, signs of an older layer appeared in the form of remains of clay walls, the direction of two of which could be determined; and in the middle of the terrace, about on a level with the preserved top of the wall, there appeared a place with a whitish mass (ashes?). At the same time the skeletons of two children appeared, one ("Z", No. 1) to the north, near the top of the wall in the western side of the terrace, and the other ("D", No. 9) southwest of the ash layer already mentioned, about 8 inches below its level. Ashes and the hard-burnt debris of walls were raised from this layer, which lay about 4 feet deeper than the lip of the upper pot [see Figure A.10]. Following are the levels: Flat stones *in situ*, +32.5 feet; ash layer, +30 feet 7 inches; upper edge of wall, +30.5 feet; child's skeleton "z", +30 feet 2 inches; child's skeleton "d", +29 feet II inches; visible lower edge of wall, +28 feet 1 inch.

Stratigraphic Succession North Kurgan, Terraces IV and V

If, now, we wish to make clear the relative ages of the enumerated finds and their stratigraphic succession, we must treat separately the utensils found in place, i. e., the remains of occupation, and the skeletons that occur among them.

The distribution of the skeleton graves in the successive strata would be determined if we could establish the floors to which they correspond. Concerning this, however, we can form only conjectures. The height of the last-named wall is not known, while the corresponding floor presumably lies still deeper than the deepest point observed in the wall, the clay walls having had no special foundation of which we can take notice. In any case this clay wall marks the oldest of the periods with which we are concerned. The lime or ash layer lies above its floor and must, therefore, belong to the next later period. The flat stones, if they lie *in situ*, as seems to be the case, can have been laid in position only when none of the ash layer was still visible, and they presumably correspond to the floor of a third period. To this third period may be referred pot f. Its lip is, indeed, not well preserved, but it can not possibly have been much higher than level +33 feet. On the other hand, both the stones and pot f must already have been buried when pot e, of which the lip is well preserved, was placed in position. Pot e, therefore, belongs to a fourth period.

The question now arises: how are the skeletons to be distributed among these layers? The highest one ("G") determines the youngest layer. When the burial took place pot e must already have been buried in the floor and out of use; therefore skeleton "G" belongs to a fifth period, of which we have found no other remains. The skeleton heap "B" lies in the plan between the two pots e and f and also in a vertical plan between the levels determined by these pots. Therefore, the bodies can have been buried only after pot f was already out of use. We must, therefore, ascribe this burial to the same people by whom pot e was used; that is, skeleton "B" belongs in the fourth period. The burial was very shallow, being immediately under the floor, which perhaps explains the very bad condition in which the skeleton was found. The child skeleton at +30 feet 2 inches may have been buried by the people who had pot f in use and who placed the flat stones at +32.5 feet; but this, of course, is uncertain. Skeleton "Z" might, however, be brought into connection with the lime or ash layer near by if we suppose that the body, as in the case of skeleton "B" was laid immediately under the floor. It must, therefore, remain uncertain whether skeleton "Z" is to be referred to the third or the second period. This must also be the case with skeleton "D." This only is certain: both skeletons must be younger than the deeper-reaching wall. We have to assume, therefore, on the basis of the finds in question, five periods for terraces IV and V, for three or four periods of which we have established skeleton graves.

Not only is the succession of the layers in terraces IV and V analogous to those of terrace I, but there is also a correspondence in the character of the finds. In the upper layers the greater part of the pottery fragments brought to light were of the well-polished vessels of red monochrome. With these occurred relatively few of the gray variety. On the other hand, there appeared in the upper layers only isolated fragments of group y. But with these occurred also fragments of painted pottery of a kind not observed in terrace I, and entirely lacking in the deeper layers of the hill, which, from its technique, appeared to belong to a later age than the lower layers. We may call it group z.

Generally speaking, however, there was no change in terrace V as regards the pottery above the level of +32.2 feet, excepting that between +36 feet and +32 feet 2 inches fragments of polychrome ware occurred, painted black and red. These may be introduced here as group v.

The "mixed" pottery—i. e., about equal quantities of fragments of groups x and y—was found only below the level of the flat stones which belong at +32.5 feet, the level of the floor which must have borne the older pot (f); but here also it was evident that the deeper we dug the more the fragments of the group x decreased, while those of group y gained in numerical proportion. Between +28 feet 5 inches and +25 feet we found group y almost exclusively represented. Still lower this group ruled alone; therefore it is only below pots e and f, found *in situ*, that the real "mixed" layer begins.

The skeletons lying in this "mixed" layer are referable to the epoch in which the older pot (f) was in use. It is not certain whether the deeper standing walls were built during the use of the ceramic group y.

For the relative age of the gray monochrome ware, the observations in terraces IV and V yield definite data. It occurs in the "mixed" layers, together with the red monochrome, as far as the level +28 feet 5 inches; but, like the V red monochrome ware, it is wholly absent below the level of +25 feet. It must, therefore, have been contemporaneous with the red monochrome ware. Only the later analysis of forms and technique can show whether it went through the same evolution.

Now, since the pots found *in situ* in terrace V agree throughout in form, technique, and position with those of terrace I, we may assign them both to the same period of house-building as the upper settlements of the hill. On the basis of the pottery we can assert that this building period had its beginning above the level of +25 feet. Its end is marked, in so far as the layers are still preserved, by the thick wall A in terrace I and by the skeleton of terrace IV.

Below the level of +25 feet lie the strata of an older culture. Regarding these, we can say, at the present stage, only that their peculiar pottery is represented in the group y.

To what extent do the remaining terraces complete this picture? What do they teach us concerning the deeper layers of the older culture?

Table A.3 Terrace 2, Correlates of Stratigraphy

Context Code	**Level**	**Context**	**Layer**	**Period**
T2.1	+26	burial 13, (child) burial 12, (adult)	3	IIA
T2.2	+26.5	Floor	4	"
T2.3	+25	floor hearth	4/5	IIA/IB2
T2.4	+24.5	2 "pithos" (*korchagi*)	5	IB2
T2.5	+25/22	room fill	6	"
T2.6	+24/22	room fill	6	"
T2.7	+22.5	burial 10, (child)	6	"
T2.8	+22	burial 9, (child)	6	"
T2.9	+22.5/20.5	burial 8, (child) burial 7, (child)	6	"
T2.10	+20	"pithoi" (*korchaga*)	6	"
T2.11	+20/+19	Fill	7	"
T2.12	+20/+18	Fill	7	"

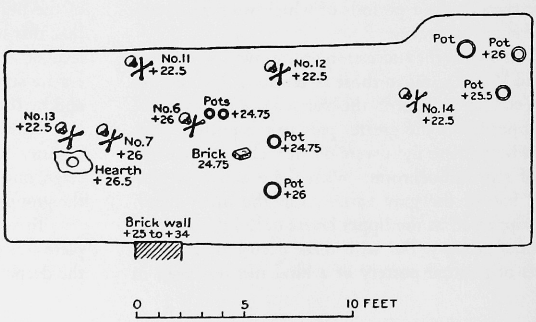
Terrace II [Table A.3][Figures A.11 and A.12]

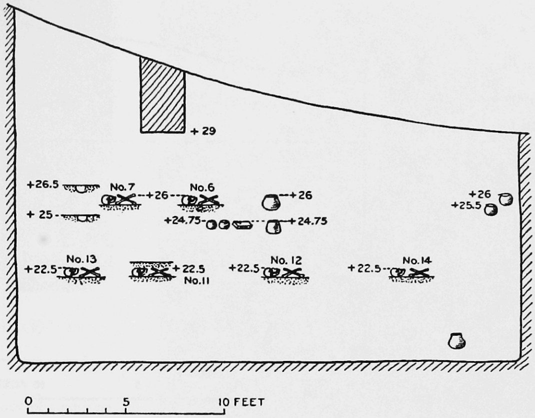
[In terrace II] several layers have grown one above the other. It is true that in the upper layers of this terrace bake-ovens and pots of the same kind as those found in terraces I, IV, and V, are lacking. On the other hand we have here, as there, similar places with depressions, which are filled with white ashes, one at the level of +26 feet 5 inches, and the other immediately under the first at +25 feet—i.e., two different superimposed layers. Considering the smallness of these depressions, it is not probable that they served the same purposes as the bake-ovens in terraces I and IV. Rather must we assume that these holes served for the protection of the smoldering charcoal and for the collection of ashes—i. e., that they were open fireplaces or hearths.

The two skeletons lying at +26 feet (Nos. 6 and 7) must certainly be younger than the deeper-lying fireplace at +25 feet; but they can scarcely be considered in connection with the upper fireplace, since the difference of level is too slight. They probably belong, therefore, to a higher and now vanished younger layer. Since in terrace I the lowest skeleton belonging to pots c and d lies at +28 feet, we would have to assume still another intermediate layer of which no trace was found in either terrace I or terrace II.

The second terrace has particular importance because it contains noteworthy remains of the older culture. The two pithoi standing at +24.75 feet belong in technique and form to the older ceramic group y, and are particularly valuable on account of the remains of painting which they bear. To the same layer (+24.75 feet) is to be referred the broken pot of ordinary technique and probably also the erect stone mortar whose lip stood at +25 feet 10 inches. Whatever occurs below this must equally belong to the older culture; therefore the four skeleton graves, together with their burial gifts

A.11 Terrace 2, excavation plan.





A.12 Terrace 2, section.

of copper and bead ornaments, are of especial value as being the first burials of the older culture to be found.

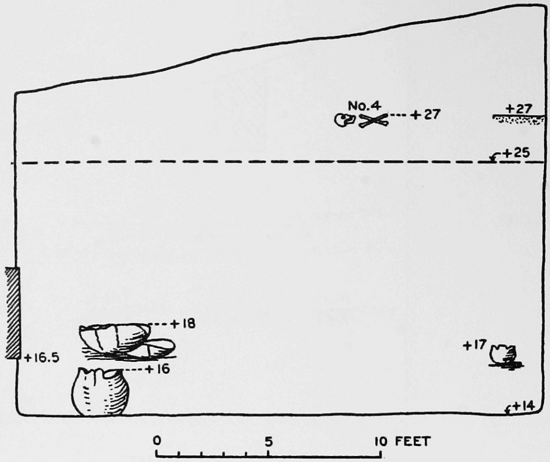
The only question that could arise is whether the pottery fragments found in the succession of layers may not invalidate their evidence. In terrace n, as well as in terraces I, IV, and V, the upper layer abounded in fragments of the red and gray monochrome ware of group x, and fragments of the y group were relatively rare. As we dug deeper the relation between these two varieties changed, until at last they were reversed. The red monochrome ware occurred only in isolated cases below +26 feet. Still, it is remarkable that in terrace II this isolated occurrence of the group x reaches somewhat deeper than in terraces I and IV, and the group disappears wholly only below +22 feet 5 inches. This circumstance might be explained by the accidental falling of fragments during the excavation; but it is also possible that in ancient times they by chance became buried deeper here than elsewhere. A third explanation would be that the skeletons at +22 feet 5 inches was younger than the pithoi *in situ*. In this case the skeleton graves with their burial gifts would have to be assigned to the younger culture, and the deeper-lying pottery fragments of group x would have to be explained as belonging with the burial. This, however, I consider improbable; for the number of the younger pottery fragments is too small, only one or two having been found daily in these lower layers. We shall be much more correct in assuming that the four bodies were buried by the same people who used the painted pithoi. In any case, these pithoi are an infallible proof that at the level of +25 feet we are already in the strata of the older culture. Henceforth we may assign to the older culture all layers in which similar pithoi are found *in situ*.

Terrace III [Table A.4][Figures A.13 and A.14]

Terrace III, excavation of which began on March 31, lies with its upper edges lower than terrace II, much

Table A.4 Terrace 3, Correlates of Stratigraphy

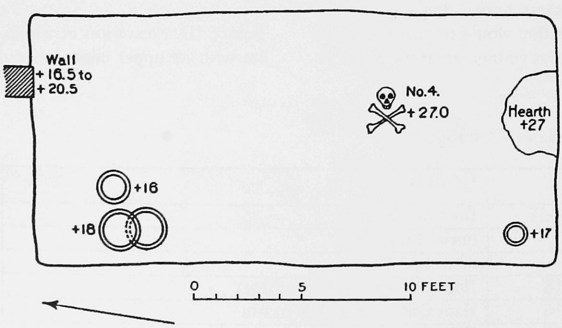
Context Code	Level	Context	Layer	Period
T3.1	above +27	floor of a clay bin	3	IIB
T3.2	+27	burial 14, (adult)	3	"
T3.3	gap	disturbed deposits		
T3.4	+20/+18	floor with "pithoi" (*korchagi*)	6	IB2
T3.5	+17/+16	floor with cooking pot in situ	7	"
T3.6	+17/+15	Fill	8	"
T3.7	+15	Fill	8	"



A.13 Terrace 3, section.

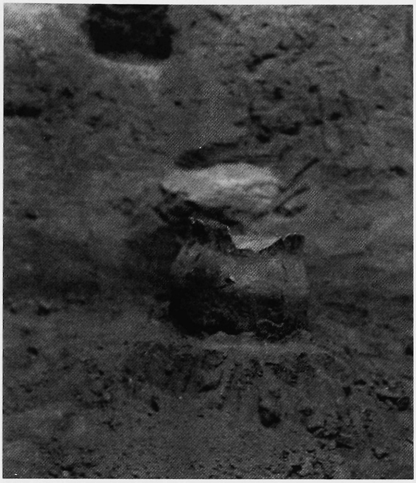
lower than terrace I. Below the surface we soon came, at the south wall, upon pottery fragments, upright and close together, resembling the incrustation on the earth walls in the quadrangle of terrace I. It was not possible, however, to determine either the thickness or the trend of the earth walls or the character of the potsherds, which were light-colored and very poorly preserved. Near by, in the middle of the digging, a skeleton was discovered at +27 feet and uncovered by Mr. Warner. It was probably contracted in Hocker position, but this is not certain, because the skull and leg bones were almost destroyed by the workmen.

Lower down, at +17 feet, in the southwest corner of the digging, there were found *in situ* the bottoms of two painted pithoi, their positions warranting the conclusion that one of them had become useless and the other had been placed upon its remains [Figure A.15]. They are, therefore, as in terrace II, evidences of settlements of the older culture. After removing these, there came to light, *in situ*, at the still deeper level of +16 feet, in about the same part of the terrace, a coarse domestic vessel with a diameter at top of 11.5 inches and a height of 24 inches. It is of a different technique from that of the painted pithoi, and as the exterior is heavily incrusted with soot and the earth in the interior and around the external surface is much mixed with charcoal, the vessel would appear to be *in situ* and to have been employed as a kettle for cooking



A.14 Terrace 3, excavation plan.

A.15 Terrace 3, pedestalled pottery vessel "+17" (see Figure A.14).



A.16 Terrace 3, base of *korchagi* vessel "+16" (see Figure A.14).

[Figure A.16]. Here also, then, is evidence of a succession of superimposed settlements belonging to the older culture.

The skeleton uncovered above, however, must belong to the younger culture. It cannot have been an inserted burial of later times, as its position immediately under the surface of the hill might at first sight indicate, because the finds accompanying it and surrounding it do not differ in specific character from those of the terraces. Here, too, the fragments of pottery found on the surface and immediately under it were chiefly of the red and gray monochrome group, with very little of the painted variety of group y. At the level of the skeleton, on the other hand, there occurred almost exclusively the last-named variety, and under this only the "unmixed" culture layers containing pottery of group y.

Terrace VI [Table A.5][see Figures A.8 and A.9]

Near terrace V the trench, descending the southern half of the hill, bends a little toward the southwest, on account of the irregular form of the surface. Just here a shallow basin-shaped depression was observed on the surface, the explanation of which appeared in the deeper layers. In the northern wall of the trench there came to light at the level of +31 feet a broad and extended hearth filled with ashes. Near it, but below its level, there was extracted a modern and but slightly rusted iron nail; and the digging soon exposed a great hole which, in the form of a roomy passage, extended into terrace V and could be followed underneath a wall which was discovered there at the level of +28 feet. Presumably this passage was the work of some animal and belongs with other tunnel-like passages which appear in the walls of Komarov's trench and which need especial attention during excavation. This passage had at one time had an opening on the surface, and the basin-like depression was caused by its caving in. Where such occurrences have taken place, the lay-

Table A.5 Terrace 6, Correlates of Stratigraphy

Context Code	Level	Context	Layer	Period
T6.1	+31	hearth with ash	2	IIA
T6.2	+30/+28	animal burrow		
T6.3	+28/+25	Fill	4	IIA
T6.4	+25/+24	floor with large storage vessels crushed on it	5	IB2
T6.5	+24/+22	Fill	6	"
T6.6	+22/+19.5	Fill	6	"

Table A.6 Terrace 7, Correlates of Stratigraphy

Context Code	Level	Context	Layer	Period
T7.1	+30.5	surface with two hearths above the two burials	2	IIA
T7.2	+29	burial 19 (child), burial 18 (child) associated with floor above	2	"
T7.3	+28/+26	Fill	3	"
T7.4	+28	fill above surface	3	"
T7.5	+28/+25	Fill	4	"
T7.6	+26/+24	surface at 24.2 feet	5	IB2
T7.7	+24/+23	Fill	6	"
T7.8	+23	Fill	6	"
T7.9	+24/+22	Fill	7	"
T7.10	+23/+21	Fill	7	"
T7.11	+21/+20	Fill	8	"

ers must necessarily have become mixed and afford no basis for trustworthy inferences.

About 1 foot below the level of the hearth a child's skeleton was exposed in the western half of the excavation; and on the opposite side of the terrace, at +25 feet, an accumulation of potsherds was found, together with fragments of different large pithoi. Here, therefore, begin the older culture layers of group y. The upper mixed layers also contained a predominating quantity of the older pottery. Nevertheless, if we follow the order of succession observed in the layers elsewhere in the hill, we must assign both the hearth and the child's skeleton found in this terrace to the younger culture and recognize a causative relation between them. They correspond to the flat stones (+32.5 feet), or the somewhat lower-lying ash layer (+30 feet 7 inches), in terrace V. The excavation of the deeper layers in terrace VI was rendered difficult and even dangerous through the undermining already referred to, and nothing new was discovered above the level of +19 feet 5 inches.

Terrace VII [Table A.6][see Figures A.8 and A.9]

In the southern extension of the upper trench, a little below the surface, we came upon two hearths at the level of +30.5 feet, one of which had a hole filled with an ashy earth, as in terrace II. Immediately adjoining each of these, but lying 10 or 12 inches deeper, there occurred skeletons (Nos. 10 and 15). No further finds *in situ* were found, although the terrace was sunk to +21 feet.

The pottery found in the upper layers belonged chiefly to group y, i.e., to the older culture; there was much less of the red and gray ware. Isolated fragments of red monochrome were observed as deep as +24 feet 2 inches, but below this they disappeared entirely. The conclusions expressed above also apply here: the hearths and the skeletons must be assigned to the younger culture, since they stand at the same level with the ash layer, +30 feet 7 inches, and the upper edge of the wall, +30.5 feet, in terrace V.

Terrace VIII [Table A.7][see Figures A.8 and A.9]

The predominant monochrome pottery disappears in the somewhat lower-lying parts of the southern declivity and the surface contains only isolated fragments of the red polished ware. The great mass of the fragments belong to group y. On the south edge of the trench, just under the surface, at +25 feet 5 inches, there occurred

Table A.7 Terrace 8, Correlates of Stratigraphy

Context Code	Level	Context	Layer	Period
T8.1	+28	Fill	4	IIA
T8.2	+25.5	Burial 11 (child), four grinding stones	4	"
T8.3	+28/+24	floor with painted storage jar (*korchaga*)	5	IB2
T8.4	+24/+23	Fill	6	"
T8.5	+22.5	Fill	6	"

Table A.8 West Dig, Correlates of Stratigraphy

Context Code	Level	Context	Layer	Period
WD.1	+18/+10	room fill, very close to areas A-C	5-7	IB2
WD.2	+18/+13	Fill	5-7	"
WD.3	+18/+8	Fill	5-7	"

the remains of skeletons and four mealing-stones. Immediately adjoining these to the west, and but 7 inches deeper, there appeared the lip of a painted pithos (top diameter 19 inches, height 13 inches). With its broad vertical bands painted in chess-board pattern, it is an excellent specimen of this kind of vessel produced by the older culture, of which we found indications to the depth of +22 feet 5 inches in this terrace.

Excavations at Other Points on the Kurgan

West Digging [Table A.8]

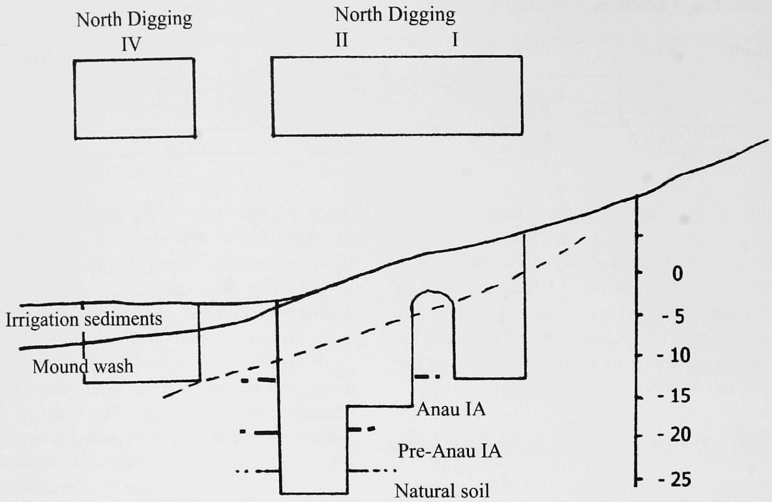
No new facts were contributed to the history of the kurgan by the finds in the west digging. An earth wall trending in an easterly and westerly direction had been cut through between the levels of +18 feet and +10.5 feet. From its height and the finds accompanying it, this wall must belong to a building of the older culture. The only significance of the west digging in connection with the history of the kurgan consists in the finds of pottery made there, which connect the layers exposed in the terraces with those of the "galleries" in the Komarov trench. The digging yielded almost exclusively fragments of group y. Even on the surface no fragments were found of the younger pottery which represents the later civilization of the kurgan. This fact agrees with the observations made in the lower-lying terraces; in terraces III and VIII the older culture was met with directly under the surface. The traces of the younger culture must also have disappeared at the west digging, the highest edges of which stand at the level of +25 and +20 feet. Upon the surface here there was found the bottom of a coarse, light-colored vessel made on the wheel; but this stands entirely apart from all the rest of the pottery as a piece lying accidentally on the surface and in no wise connected with the development of the cultures of the kurgan.

North Diggings [Table A.9][Figure A.17]

Similar specimens of a probably recent pottery were found, together with flat, square, burnt bricks, near

Table A.9 North Digging, Correlates of Stratigraphy

Context Code	Level	Context	Layer	Period
ND.1	-10/-12	Fill	16-18	IB1
ND.2	-8/-11	Fill	16-18	"
ND.3	-4/-8	unmixed IB1 fill	16-18	IB1
ND.4	-10	Wall	16-18	"
ND.5	-10/-12	Walls	16-18	"
ND.6	-11/-13	mass of ash, burial 3 (child)	16-18	"
ND.7	-12/-13	fill	16-18	"
ND.8	-13/-16	fill	19-21	IA
ND.9	-14	fill	19-21	"
ND.10	-16/-19	fill	19-21	"
ND.11	-17	fill	19-21	"
ND.12	-17/-19	fill	19-21	"
ND.13	-19/-20	fill	19-21	"
ND.14	-19/-20.5	fill	19-21	"
ND.15	-20	Chaffy, painted pottery		Pre-IA
ND.16	-20/24	fill		"
ND.17	-20.5/24.5	fill		"
ND.18	-22	fill		"
ND.19	-24.5/-26.5	natural surface of the plain		"



A.17 North Digging, section.

the foot of the hill, 2 and 3 feet below the surface in north digging I, which at that point is almost on the level of the plain. The other finds at this level, consisting of older and younger pottery, show that the soil here consists of surface wash. Unmixed deposits of the older culture begin only in deeper layers at about the level of -4 feet; the greater part being derived from the older culture, though now and then a younger monochrome fragment turns up. Consequently one can, without hesitation, refer to the older culture the traces of earth walls which were discovered in north diggings I and II, between -11 and -12 feet, as well as a mass of ashes that occurred at the northwest corner near these walls, at about 6 feet 5 inches under the lowest edge of digging II. The circumstances of the finds are important in connection with the discovery of a skeleton grave near this ash layer in north digging I, at -11 feet. The skeleton was exceedingly well preserved and is one of the best specimens of the contracted or *Liegender Hocker* position, which throws such an interesting light upon the burial customs of the ancient inhabitants of the kurgan. The skeleton belongs to the older culture period, although its relation in time to the neighboring wall and ash layer can not be absolutely determined, since layers belonging to the younger period of the hill can not be found in these depths. Still deeper, between -13 feet and -19 feet, there occurred numerous fragments of a pottery not found in the higher layers, which we will call group m. They are fragments of deep cups made from well-washed light-brown clay, burnt very hard, the clay being covered with a fine light-brown coating and this in turn with mat-black painting. The occurrence of pottery of such excellent technique at such a depth seemed strange at first, and claimed our special attention; but in connection therewith it was even more important to find painted fragments of the group y still deeper, between -20 feet and -24 feet inches, as this group has come to stand as a witness of the older culture of the kurgan in the deeper layers of the terraces and of the west digging. At -24 feet 5 inches in north digging II the natural surface of the plain was reached.

South Shaft

Excepting one fragment of the red polished ware, which was found between -1 and -5 feet and which had evidently fallen from above, fragments of only the coarse and fine-painted older ware of group y were found in the south shaft in the layers between +5 feet and -7 feet. It is remarkable that here, in contrast with the conditions at the north diggings, the layer of surface wash and mixed pottery is missing. This difference is explained by the fact that the southern declivity is more exposed to the influences of weather, wind, rain, and sun than is the northern. The deformation of the hill must, therefore, have been more rapid and extensive here.

Table A.10 East Gallery, Correlates of Stratigraphy

Context Code	Level	Context	Layer	Period
EG.1	+18/+8	Gallery into the side of the mound, above the Komorov trench. Fairly large area: 8 x 10 x 10'	9-15	IB1
EG.2	+2.5/–3	within the gallery beneath the level of the Komorov trench	16	"
EG.3	-3/-6 -6/-8	fill	17	"
EG.4	-8	burial 5 (child), burial 4 (child)	17	"
EG.5	-9	fill	18	"
EG.6	-8/-10	fill	18	"
EG.7	-10/-15	fill	19	IA
EG.8	-15/-17	fill	20	"
EG.9	-17/-19	fill	21	"

West Shaft

The shafts sunk at a distance of about 200 paces on the west of the hill show that the deeper culture-strata of the settlement had a wide extent, for here, at the level of - 1 5 feet, a wall of air-dried brick was passed through. The pottery that was raised corresponded to that of the middle and lower layers of the kurgan and assigned the construction to the lower culture period.

The Excavations in Komarov's Trench

East and West Galleries, East and West Pits, in Bottom of Komarov's Trench [Tables A.10 and A.11]

The excavation of Komarov's trench promised to expose the undisturbed strata of the center of the kurgan, but in the course of the examination it soon became clear that the finds made here could not be accepted without question and could merely serve the purpose of checking in part the observations made on the surface.

As has been said, on March 25 and 26, the galleries were driven in the sides of Komarov's trench to examine the layers of debris occurring between the visible vertical walls. These galleries, whose floors stood at +8 feet, penetrated 7 to 9 feet into the sides of the trench, with a height of about 10 feet. On both days the layers yielded a mass of broken stones and a great quantity of fragments of coarse, thick-walled pithoi, reddish or greenish light-yellow, in part painted; also some fragments of a finer painted ware and especially some lip-pieces of cups, without profiling, all these belonging to group y. On the first day, however, there occurred specimens of the other variety, the red monochrome technique with a polish and the lip-piece of fine gray ware—i. e., fragments of group x—which

Table A.11 West Gallery, Correlates of Stratigraphy

Context Code	Level	Context	Layer	Period
WG.1	+7/0	fill	15	IB1
WG.2	0/-7	fill	16	"
WG.3	-2/-3	fill	17	"
WG.4	-3	fill	17	"
WG.5	-7	fill	17	"
WG.6	-7/-14.8	fill near a wall and floor	18	"
WG.7	-15/-20	fill	19-21	Ia
WG.8	-20	fill	19-21	"
WG.9	Beneath -20	fill on the natural surface of the plain	19-21	"
WP.10	Refuse	erosional fill from the bottom of Komorov's trench		..
WP.11	+9	in situ deposit?		IB1

occurred in great quantities on the surface of Terraces I, II, IV, and V.

In the eastern and western pits in the bottom of Komarov's trench, into which we started on March 25 for examination of the lower layers, the finds were only partially of the same kind as those of the galleries, for there occurred very many red and gray monochrome fragments. Besides this, the stratification and texture of the earth was different from that in the galleries. The earth here was loose and easily removable, while in the galleries the workmen had to exert all their strength in order to make progress. There were lacking, also, the masses of fragments of large thick walls, painted pithoi, and broken stone, which were peculiar to the galleries. It became evident that we were digging in a different kind of debris from that in the galleries—in an earth-mass, the origin of which requires a different explanation.

In order to verify the observations made in these pits in the bottom of Komarov's trench, we began on March 29 to sink shafts from the bottoms of the two galleries which adjoined the pits. A partition wall of the original undisturbed earth was left standing to separate the pits in the trench from the shafts, which were sunk in obviously undisturbed culture-strata. To a depth of +1 foot, the observations here corresponded throughout with the finds in the gallery layers above, with the single exception that an isolated piece of monochrome ware was observed. But when the partition wall fell in after about two days' work, and the digging proceeded without separation in the pits and the shafts, there came, in the west gallery at the datum-level, not only larger numbers of fragments of the suspicious monochrome ware, but even a piece of a modern iron band.

The paradox presented by these contradictory facts was explained on March 31 by R. W. Pumpelly, who demonstrated the existence in the west pit of a line or plane separating the different kinds of earth and coinciding with the plane that would represent the downward continuation of the wall of Komarov's trench. It was thus found that Komarov's trench continued in depth and extended much deeper into the middle of the hill than the level at the time of our arrival gave us reason to expect. This central and deepest part of the trench had been filled in by General Komarov, thus bringing into these depths earth from different ages of the kurgan, together with modern iron articles. This discovery compelled us to abandon all excavation in the trench bottom, confining ourselves to the shafts sunk from the galleries. In spite of this precaution there appeared from time to time pieces of pottery such as we had been accustomed to find only in the upper layers of the kurgan. Thus, in the shaft between -1 foot and -14 feet 8 inches we came upon three fragments of gray ware, among them being a lip-piece, a hollow foot, and between -24 feet 7 inches and -29 feet, as represented by the workmen, another piece of gray ware. Farther on, in the east gallery shaft, as represented by the workmen, there occurred between -6 feet and -8 feet some fragments of red and gray monochrome ware; but these were in all cases accompanied by the ordinary painted ware of the middle layers, which occurred throughout in the lowest culture-strata of the kurgan. Only in the shaft of the west gallery, between -14 feet 8 inches and -24 feet 7 inches, did we find the fine painted ware of group m, such as was found in the north digging between -13 feet and -19 feet. It must, therefore, have only a relatively small and transitory importance in connection with the culture of the lower layers. The mixing of these old finds with the red and gray monochrome ware, in these deeper layers of the east and west gallery shafts, can, as stated, be of only secondary origin; for in the terraces mixed layers were, as a rule, observed no deeper than +25 feet, at which level the strata of the older culture began. We must, therefore, explain the occurrence of younger pottery in the gallery shafts as being due to the contact of the earth raised from the shafts with the debris of which the bottom of Komarov's trench was composed.

There is still an important find to be mentioned. At the level of -8 feet, in the shaft of the east gallery, there occurred two skeletons, one with bead ornaments as burial gifts, and the other, according to Warner, with two flint knives and two spin-whorls [Chapter 9:burial 5]. They are a sure proof that the inhabitants of the lower strata practiced burials within their dwellings, and they thus supplement the data afforded by the skeleton graves of north digging II.

Other Finds—Character of Culture—Chronology

The pottery enables us to distinguish older and younger epochs in the history of the development of the kurgan, and its forms and decoration permit us to form an opinion as to the artistic powers of the inhabitants of the settlements; but it does not enlighten us concerning the quality of the civilizations or the culture character of the finds. Our information on these points is obtained from the whole culture equipment, and from all the special finds of metal, clay, and stone which were collected daily from the strata as places of settlement were opened up. Here we can only refer to such facts as serve to indicate the kind of civilization and the relative chronology of the finds. Now, flint objects were found in all the layers of the hill, the most numerous objects being so-called knives or long scrapers. That these objects were also made on the spot is proved by the many flakes of flint and several flint-nuclei which occurred with them.

Nevertheless, we must not think we have to do with the stone-age culture. Iron is indeed excluded, only modern iron being found in the debris of Komarov's trench, and the absence of iron in such large masses of earth as were removed during the excavations leads us confidently to conclude that this metal was unknown to inhabitants of the North Kurgan. However, objects and fragments of copper occurred so frequently, not only in the upper layers with the deposits of the younger culture, but also in the middle strata, that we are justified in referring the hill to the metal age. The absence of objects or fragments of metal in the lowest strata would not warrant us in concluding that the metal was unknown in the oldest period of the kurgan, for the pottery of the middle strata was so regularly followed downward into the lowest level of the hill that, notwithstanding the appearance of a special kind of vessels in the lower strata, we can not speak of different cultures or of a change of cultures between the lowest and the middle strata. On the other hand, on account of the different ceramic groups x and y, we must distinguish between the two different periods of early metal age in the evolution of the hill. The distribution of all other finds through these periods will be shown in a systematic treatment of the finds and of the conditions under which they occurred.

Appendix B
Catalogue of Small Finds from the 1904 Excavations

Katherine M. Moore

Table B.1 Small Finds from 1904, Sorted by Material and Provenience.

Description	Material	Excavation Unit	Date	Index no. (Schmidt 1908)	Period	Context (Appendix A)
Small bone awl	Bone	East gallery	4-Apr-1904	118	IB1	EG.6
2 Fragments polished bone implements	Bone	West gallery	30-Mar-1904	18	IB1	WG.1
3 Animal teeth, cut	Bone	West gallery	31-Mar-1904	40	IB1	WG.4
Tusk	Bone		26-Mar-1904	8b		
Tooth	Bone		30-Mar-1904	22		
Spindle whorl, clay	Clay	East gallery	1-Apr-1904	67	IB1	EG.3
2 fragments spindle whorls	Clay	East gallery (?)	2-Apr-1904	88	IB1	EG.3
Round worked potsherd, painted black	Clay	East gallery (?)	4-Apr-1904	109	IB1	EG.4
Fragment spindle whorl	Clay	East gallery	4-Apr-1904	111	IB1	EG.5
Fragment spindle whorl	Clay	East gallery	4-Apr-1904	117	IB1	EG.6
Clay knob	Clay	North dig, I and II	1-Apr-1904	57	IB1	ND.1
Spindle whorl	Clay	North dig, I and II	1-Apr-1904	60	IB1	ND.1
Fragment of handle, clay	Clay	North dig, I and II	1-Apr-1904	61	IB1	ND.1
Painted potsherd	Clay	North dig, I and II	1-Apr-1904	64	IB1	ND.1
Rounded, perforated potsherd	Clay	North dig	5-Apr-1904	132	IA1	ND.10
Clay rod	Clay	North dig	6-Apr-1904	182	IA1	ND.13
Spindle whorls and fragments	Clay	North dig	6-Apr-1904	154	IA1	ND.14
Spindle whorl	Clay	North dig	7-Apr-1904	196	Pre IA	ND.17
Clay bead	Clay	North dig	7-Apr-1904	219	Pre IA	ND.17
Fragment spindle	Clay	North dig	31-Mar-1904	37	IB1	ND.2
2 fragments spindles	Clay	North dig II	31-Mar-1904	41	IB1	ND.2
Clay knob	Clay	North dig II	31-Mar-1904	42	IB1	ND.2
2 Spindle whorls	Clay	North dig	2-Apr-1904	86	IB1	ND.7
Fragments spindle whorls	Clay	North dig	4-Apr-1904	107	IA1	ND.9
Clay bead	Clay	T I A	28-Mar-1904	11	IIB	T1.1
Clay Marble	Clay	T 1	29-Mar-1904	14	IIA	T1.3

Table B.1 cont.

Description	Material	Excavation Unit	Date	Index no. (Schmidt 1908)	Period	Context (Appendix A)
Egg shaped clay object	Clay	T 1 (near child skeleton)	30-Mar-1904	25	IIA	T1.3
3 Spindle whorls	Clay	T 1	1-Apr-1904	71	IIA	T1.6
Fragment clay animal form	Clay	T 1	1-Apr-1904	72	IIA	T1.6
Fragments spindle whorls (11)	Clay	T 1	5-Apr-1904	119	IIA	T1.8
Fragment spindle whorl (?)	Clay	T I	5-Apr-1904	126	IIA	T1.8
Rim fragment of feeding cup	Clay	T I	5-Apr-1904	141	IIA	T1.8
Spindle whorls and fragments	Clay	T 1	6-Apr-1904	148	IIA	T1.9
Fragment spindle whorl	Clay	T I	7-Apr-1904	190	IIA	T1.9
Perforated potsherd	Clay	T I	7-Apr-1904	214	IIA	T1.9
Fragments spindle whorls	Clay	T II	5-Apr-1904	122	IB2	T2.11
Cylindrical bead (whorl)	Clay	T II	5-Apr-1904	140	IB2	T2.11
Fragments spindle whorls (3)	Clay	T II	7-Apr-1904	191	IB2	T2.11
Clay knob, form two cones	Clay	T II	7-Apr-1904	197	IB2	T2.11
Small clay object "zapfchen" (peg, plug)	Clay	T II	7-Apr-1904	207	IB2	T2.11
Clay lid handle	Clay	T II	7-Apr-1904	208	IB2	T2.11
Spindle whorl, two fragments, broken out of a clay brick	Clay	T II	4-Apr-1904	115	IB2	T2.4
Spindle whorl, clay	Clay	T II	31-Mar-1904	51	IB2	T2.5
Spindle whorls and fragments	Clay	T II	6-Apr-1904	149	IB2	T2.6
2 Spindle whorls	Clay	T II	2-Apr-1904	74	IB2	T2.7
Fragment spindle whorl	Clay	T II	4-Apr-1904	116	IB2	T2.7
Fragment spindle whorls, clay	Clay	T III	31-Mar-1904	52	IB2	T3.3
Spindle whorl	Clay	T III	4-Apr-1904	96	IB2	T3.4
Half ornamented spindle whorl	Clay	T III	5-Apr-1904	124	IB2	T3.5
Fragments spindle whorls	Clay	T V	7-Apr-1904	192	IB2	T5.10
Fragment spindle whorl	Clay	T V	8-Apr-1904	224	IB2	T5.11
Clay marble	Clay	T V	8-Apr-1904	230	IB2	T5.11
Spindle whorls	Clay	T V below skeleton	2-Apr-1904	77	IIB	T5.3
2 painted sherds	Clay	T V, found with no. 94	4-Apr-1904	95	IIA	T5.6
Fragments spindle whorls (5)	Clay	T V	5-Apr-1904	120	IIA	T5.8
Spindle whorls and fragments (6)	Clay	T V	6-Apr-1904	150	IIA	T5.9
Clay marble	Clay	T V	6-Apr-1904	166	IIA	T5.9
Spindle whorls and fragments (4)	Clay	T VI	4-Apr-1904	102	IIA	T6.3
Spindle whorl	Clay	T VI	5-Apr-1904	125	IB2	T6.4
Spindle whorls and fragments	Clay	T VI	6-Apr-1904	151	IB2	T6.5
Fragments spindle whorls	Clay	T VI	7-Apr-1904	193	IB2	T6.6
Fragments spindle whorls	Clay	T VII	7-Apr-1904	194	IB2	T7.10
Fragment spindle whorl	Clay	T VII	8-Apr-1904	225	IB2	T7.11
Round potsherd	Clay	T VII	8-Apr-1904	228	IB2	T7.11
Rounded, perforated potsherd	Clay	T VII	8-Apr-1904	229	IB2	T7.11
3 Spindle whorls	Clay	T VII strata below fireplaces	2-Apr-1904	76	IIA	T7.2
Spindle whorl	Clay	T VII	4-Apr-1904	104	IIA	T7.3
Fragments painted potsherds	Clay	T VII found with 104	4-Apr-1904	105	IIA	T7.3
Fragments spindle whorls (3)	Clay	T VII	4-Apr-1904	103	IIA	T7.5
Fragments spindle whorls (5)	Clay	T VII	5-Apr-1904	123	IIA	T7.6

Table B.1 cont.

Description	Material	Excavation Unit	Date	Index no. (Schmidt 1908)	Period	Context (Appendix A)
Spindle whorls and fragments	Clay	T VII	6-Apr-1904	152	IB2	T7.8
Fragment spindle whorl	Clay	T VIII	4-Apr-1904	106	IB2	T8.1
Fragments spindle whorls (7)	Clay	T VIII	5-Apr-1904	121	IB2	T8.3
Clay plastering with imprint of reeds	Clay	T VIII	5-Apr-1904	142	IB2	T8.3
Spindle whorls and fragments	Clay	T VIII	6-Apr-1904	153	IB2	T8.4
Clay plastering with imprint of reeds	Clay	T VIII	6-Apr-1904	168	IB2	T8.4
Fragments spindle whorls	Clay	T VIII	7-Apr-1904	195	IB2	T8.5
Clay bead	Clay	West dig	30-Mar-1904	24	IB2	WD.2
Clay bead	Clay	West gallery	31-Mar-1904	32	IB1	WG.3
Spindle whorl, clay	Clay	West gallery	1-Apr-1904	69	IB1	WG.6
Clay form frag	Clay	Komorof trench fill	30-Mar-1904	15		
Fragment spindle whorl	Clay	North dig III	8-Apr-1904	226		
Spindle whorl	Clay			238		
Spindle whorls (6)	Clay			242		
Spindle whorl (2)	Clay			253		
3 Flint knives, 5 flakes, cut	Flint	East gallery	31-Mar-1904	27	IB1	EG.2
Flint knife	Flint	East gallery	1-Apr-1904	65	IB1	EG.3
Flint arrowhead	Flint	East gallery	2-Apr-1904	89	IB1	EG.3
Flints (3 pieces)	Flint	East gallery	4-Apr-1904	110	IB1	EG.5
Flint, flake	Flint	East gallery	6-Apr-1904	163	IA	EG.8
Small knife, chalcedony	Flint	North dig, I and II	1-Apr-1904	56	IB1	ND.1
Flint, scraper	Flint	North dig, I and II	1-Apr-1904	58	IB1	ND.1
Flint knife	Flint	North dig, I and II	1-Apr-1904	59	IB1	ND.1
Flint knife and fragments (7 pieces)	Flint	North dig	5-Apr-1904	128	IA1	ND.10
2 Chalcedony pieces	Flint	North dig	5-Apr-1904	131	IA1	ND.10
Fragments of flint borer	Flint	North dig	5-Apr-1904	130	IA1	ND.11
Flints (6 pieces)	Flint	North dig	6-Apr-1904	156	IA1	ND.14
Flints (3 pieces)	Flint	North dig	7-Apr-1904	200	Pre IA	ND.17
Flint knife	Flint	North dig	31-Mar-1904	36	IB1	ND.2
Flint knife	Flint	North dig	31-Mar-1904	35	IB1	ND.5
Small knife of chalcedony (found Apr. 2)	Flint	North dig	6-Apr-1904	183	IB1	ND.6
2 Flints	Flint	North dig	2-Apr-1904	85	IB1	ND.7
Flint knives, fragments and flakes (10 pieces)	Flint	North dig	4-Apr-1904	92	IA1	ND.8
Flint knife and fragments (4 pieces)	Flint	North dig	4-Apr-1904	108	IA1	ND.9
2 Fragments flint knives	Flint	T I A	28-Mar-1904	10	IIB	T1.1
Flint flake	Flint	T I A	28-Mar-1904	12	IIB	T1.1
Flint flake	Flint	T 1 s of cross wall	31-Mar-1904	55	IIA	T1.5
Flint knife	Flint	T 1	2-Apr-1904	73	IIA	T1.7
Flint	Flint	T 1	6-Apr-1904	157	IIA	T1.9
Small flint knife, burial object	Flint	T II	6-Apr-1904	185	IB2	T2.10
Flint, scraper (2 pieces)	Flint	T II	6-Apr-1904	158	IB2	T2.11

Table B.1 cont.

Description	Material	Excavation Unit	Date	Index no. (Schmidt 1908)	Period	Context (Appendix A)
Flint knife	Flint	T III	4-Apr-1904	99	IB2	T3.4
Flint	Flint	T III	6-Apr-1904	159	IB2	T3.5
Flint scraper	Flint	T III	7-Apr-1904	202	IB2	T3.6
Fragment flint knife	Flint	T III	8-Apr-1904	231	IB2	T3.7
Flint knife and fragments (5 pieces)	Flint	T V	8-Apr-1904	227	IB2	T5.11
Flint	Flint	T V	2-Apr-1904	80	IIB	T5.3
2 small flint knives	Flint	T V	4-Apr-1904	101	IIA	T5.6
Flint knife	Flint	T V	6-Apr-1904	160	IIA	T5.9
Flint	Flint	T V	6-Apr-1904	164	IIA	T5.9
Flints	Flint	T V	6-Apr-1904	173	IIA	T5.9
Flint pieces (2)	Flint	T VI	5-Apr-1904	129	IB2	T6.4
Flint	Flint	T VI	6-Apr-1904	161	IB2	T6.5
Flint	Flint	T VI	7-Apr-1904	199	IB2	T6.6
Flint, flake tool	Flint	T VII	5-Apr-1904	138	IIA	T7.6
Flint	Flint	T VII	6-Apr-1904	176	IB2	T7.7
Small flint knife	Flint	T VII	6-Apr-1904	186	IB2	T7.7
Flint knife	Flint	T VII	6-Apr-1904	162	IB2	T7.9
Flint nucleus, cut	Flint	West gallery	30-Mar-1904	17	IB1	WG.1
Flint knife	Flint	West gallery	31-Mar-1904	29	IB1	WG.2
Nucleus	Flint	West gallery	31-Mar-1904	31	IB1	WG.3
Flint knife	Flint	West gallery	31-Mar-1904	30	IB1	WG.4
2 Flint knives	Flint	West gallery shaft	2-Apr-1904	91	IA	WG.8
Flint	Flint		26-Mar-1904	8a		
Flint nucleus	Flint	West pit in cut	28-Mar-1904	9	IB1	
Flint	Flint		28-Mar-1904	13		
Nucleus and flint knife	Flint	Komorof trench fill	30-Mar-1904	16		
Flint knife	Flint	West pit	30-Mar-1904	19		
Flints (2 pieces)	Flint	North dig III	7-Apr-1904	201		
Flint	Flint			234		
Flint	Flint			237	IB1	
Fragment bronze implement	Metal	North dig II	31-Mar-1904	48	IB1	ND.2
Small piece bronze	Metal	North dig	2-Apr-1904	87	IB1	ND.7
Copper fragment	Metal	Above T 1	26-Mar-1904	3	IIB	T1.2
Fragment copper ring, 2 other fragments of copper	Metal	T 1	26-Mar-1904	4	IIA	T1.2
Fragment copper pin	Metal	T 1 from under skeletons	31-Mar-1904	34	IIA	T1.5
Fragment small copper knife (?)	Metal	T I	6-Apr-1904	189	IIA	T1.9
4 Fragments copper and 2 lead tubes, burial objects	Metal	T II	6-Apr-1904	185	IB2	T2.10
Fragment copper weapon, prob. spearhead	Metal	T II	6-Apr-1904	188	IB2	T2.11
Copper fragment	Metal	T II	7-Apr-1904	198	IB2	T2.11
Copper fragment, spirals, and sheaths, burial object (see Warner burial report)	Metal	T II	2-Apr-1904	81	IB2	T2.7

Table B.1 cont.

Description	Material	Excavation Unit	Date	Index no. (Schmidt 1908)	Period	Context (Appendix A)
Lead spirals (2), burial objects of disturbed skeleton	Metal	T II	5-Apr-1904	143	IB2	T2.8
Copper awl	Metal	T III	4-Apr-1904	98	IB2	T3.4
Copper pin	Metal	T V, 20 cm under stone ball	4-Apr-1904	93	IIA	T5.6
Copper spear head or dagger head	Metal	T VII	2-Apr-1904	83	IIA	T7.1
Fragment copper pin	Metal	T VII	2-Apr-1904	75	IIA	T7.4
2 Fragments bronze pin	Metal	T VII	2-Apr-1904	82	IIA	T7.4
Fragment copper implement	Metal	T VII	5-Apr-1904	145	IIA	T7.6
Copper pin-head	Metal	T VIII	6-Apr-1904	187	IB2	T8.4
Copper pin	Metal	West pit	30-Mar-1904	20		
Metal	Metal		30-Mar-1904	21		
Copper pin-head	Metal		6-Apr-1904	167	IB1	
Ocher	Mineral	East gallery	7-Apr-1904	216	IA	EG.9
Galena (?)	Mineral	North dig, I and II	1-Apr-1904	62	IB1	ND.1
Calcite crystal	Mineral	North dig, I and II	1-Apr-1904	63	IB1	ND.1
Calcspar	Mineral	North dig	5-Apr-1904	133	IA1	ND.10
Pieces of ocher	Mineral	North dig	6-Apr-1904	172	IA1	ND.13
Gypsum	Mineral	North dig	6-Apr-1904	178	IA1	ND.13
Ocher	Mineral	North dig	6-Apr-1904	179	IA1	ND.13
Chalk (?)	Mineral	North dig	7-Apr-1904	209	Pre IA	ND.16
Ocher	Mineral	North dig	7-Apr-1904	218	Pre IA	ND.17
Gypsum	Mineral	North dig	7-Apr-1904	220	Pre IA	ND.17
Hematite	Mineral	North dig	7-Apr-1904	221	Pre IA	ND.17
Piece ocher	Mineral	North dig	31-Mar-1904	39	IB1	ND.2
Kaolin-like stone	Mineral	North dig II	31-Mar-1904	47	IB1	ND.2
3 Uncertain minerals	Mineral	T II	7-Apr-1904	203	IB2	T2.11
Slag	Mineral	T II	7-Apr-1904	215	IB2	T2.11
Galena	Mineral	T II east corner	31-Mar-1904	54	IB2	T2.4
Small piece crystalline gypsum	Mineral	T III	4-Apr-1904	97	IB2	T3.4
Hematite	Mineral	T VI	6-Apr-1904	165	IB2	T6.5
Crystalline gypsum	Mineral	T VII	6-Apr-1904	174	IB2	T7.7
Hematite	Mineral	T VII	6-Apr-1904	175	IB2	T7.7
Piece hematite (ground)	Mineral	West dig	30-Mar-1904	23	IB2	WD.2
Piece ocher	Mineral	West gallery	31-Mar-1904	33	IB1	WG.5
Ocher, 2 pieces	Mineral	West gallery	1-Apr-1904	68	IB1	WG.6
Piece hematite	Mineral	Gallery	28-Mar-1904	12a		
Bits of fruit seeds embedded in clay	Plant	North dig	6-Apr-1904	171	IA1	ND.13
Resinous material	Plant	North dig	6-Apr-1904	177	Pre IA	ND.15
Fruit seed	Plant	North dig	7-Apr-1904	223	Pre IA	ND.18
Fruit seeds	Plant	T I	7-Apr-1904	210	IIA	T1.9
Fruit seed	Plant	T II	6-Apr-1904	170	IB2	T2.11
Fruit seeds	Plant	T V	7-Apr-1904	211	IB2	T5.10
Fruit seed	Plant	T VIII	6-Apr-1904	169	IB2	T8.4

Table B.1 cont.

Description	Material	Excavation Unit	Date	Index no. (Schmidt 1908)	Period	Context (Appendix A)
Perforated snailshells (2)	Shell	East gallery with skeleton	4-Apr-1904	113	IB1	EG.4
3 Snailshells	Shell	North dig	5-Apr-1904	134	IA1	ND.12
Perforated shell	Shell	North dig	5-Apr-1904	135	IA1	ND.12
2 Snail shells, one perforated	Shell	North dig	6-Apr-1904	180	IA1	ND.13
Snail shells	Shell	North dig	7-Apr-1904	217	Pre IA	ND.17
2 Snail shells	Shell	North dig	8-Apr-1904	232	Pre IA	ND.19
2 Snail shells	Shell	North dig	31-Mar-1904	38	IB1	ND.2
Snailshell (c.f. 38)	Shell	North dig	31-Mar-1904	53	IB1	ND.4
Petrified shell	Shell	T V	2-Apr-1904	79	IIB	T5.3
Snailshell	Shell	West gallery	31-Mar-1904	55a	IB1	WG.2
Snail shell	Shell	West gallery	1-Apr-1904	70	IB1	WG.6
Half perforated stone sphere	Stone	East gallery	31-Mar-1904	28	IB1	EG.2
Spindle whorl, stone	Stone	East gallery	1-Apr-1904	66	IB1	EG.3
Beads, turquoise (6)	Stone	East gallery with skeleton	4-Apr-1904	113	IB1	EG.4
Stone with traces of being worked	Stone	East gallery	5-Apr-1904	146	IA	EG.7
Stone fragment, possibly worked	Stone	East gallery	5-Apr-1904	147	IA	EG.7
Stone marble	Stone	East gallery	6-Apr-1904	184	IA	EG.8
Worked piece of turquoise	Stone	North dig	5-Apr-1904	136	IA1	ND.12
Whetstone	Stone	North dig	7-Apr-1904	213	Pre IA	ND.18
Half of small vessel of crystallized gypsum	Stone	North dig II	31-Mar-1904	43	IB1	ND.2
Chisel-form implement of slate	Stone	North dig II	31-Mar-1904	44	IB1	ND.2
Implement of slatey stone	Stone	North dig II	31-Mar-1904	45	IB1	ND.2
Knoblike worked stone object	Stone	North dig II	31-Mar-1904	46	IB1	ND.2
Fragments stone slab, colored with ocher	Stone	North dig	2-Apr-1904	84	IB1	ND.7
2 Carnelian beads, 1 blue-white bead, 2 pendants	Stone	T 1	26-Mar-1904	1	IIA	T1.3
Lapis lazuli bead Cf. No. 50	Stone	T 1 (in child grave)	30-Mar-1904	26	IIA	T1.3
4 Lapis lazuli beads	Stone	T 1 childs burial	31-Mar-1904	50	IIA	T1.5
Perforated slate disk	Stone	T I	6-Apr-1904	181	IIA	T1.9
2 Stones (pocketbook)	Stone	T II	5-Apr-1904	139	IB2	T2.11
Fragment of whetstone	Stone	T II, beside skeleton near pithos	5-Apr-1904	137	IB2	T2.4
2 stone beads, burial object of disturbed skeleton	Stone	T II	5-Apr-1904	143	IB2	T2.8
Polished stone	Stone	T V	2-Apr-1904	78	IIA	T5.3
Perforated stone ball	Stone	T V, 90 cm under rim of pot in situ	4-Apr-1904	94	IIA	T5.6
Fragment cylindrical stone implement, centrally perforated	Stone	T V	4-Apr-1904	100	IIA	T5.6
Small cylindrical beads (n=1065) burial object some wrapped separately	Stone	T V child's skeleton 9	7-Apr-1904	222	IIA	T5.7

Table B.1 cont.

Description	Material	Excavation Unit	Date	Index no. (Schmidt 1908)	Period	Context (Appendix A)
Piece of marble	Stone	T VII	7-Apr-1904	204	IB2	T7.10
Polishing stone	Stone	T VII	7-Apr-1904	205	IB2	T7.10
Marble of stone	Stone	T VII	5-Apr-1904	127	IIA	T7.6
Ball of uncertain material, burial object of disturbed skeleton		T II	5-Apr-1904	143	IB2	T2.8
Marble		West gallery shaft "well"	2-Apr-1904	90	IA	WG.8

Appendix C
Botanical Data from the 1997 Excavations

Naomi F. Miller

Table C.1. Catalog of Flotation Samples Discussed in this Report

layer	locus	flot. no.	
3	ANI 9	31	burnt level beneath ANI/6; inside?
3	ANI 11	2	hearth over pit; dark soil
3	ANI 13	5	mud brick/burnt/ashy layer (bag 3)
3	ANI 13	6	hearth; dark soil
3	ANI 15	9	ashy room fill west of wall
5	ANK 3	25	build-up above surface, waterlain? see AN97.026
5	ANK 3	26	build-up above surface, waterlain? see AN97.025
5	ANJ 5	10	area 3, floor deposits with small hearth
5	ANJ 6	13	hearth, see AN97.010
6	ANK 8	23	area 3; upper clean fill above surf. (west) (bag 1)
6	ANK 11	22	area 3; fill above surface, very clean
6	ANK 12	21	area 3; fill above surface
6	ANK 16	17	fill just above ANK/17 surface (bag 1)
6	ANK 17	15	material above ashy surface
8	ANL 4	28	upper fill near oven
8	ANL 4	29	upper fill near oven
8	ANL 7	30	above floor (painted) of lower architecture
9	ANL 32	85	inside rectangular bldg
11	ANL 31	84	inside later circular bldg
12	ANL 30	83	inside earlier circular bldg
14	ANM 2	32	courtyard surface w/ some ash
14	ANM 3	34	red surface layer inside circular structure
14	ANM 6	35	hearth, on red surface inside circular structure
14	ANM 6	36	outside circular structure; sandy surface
14	ANM 7	37	inside circular structure (gray layer, bag 2)
14	ANM 9	40	inside circular structure (ashy fill)
14	ANM 11	45	inside circular structure (burnt layer)
16	ANN 29	82	ashy deposit on living floor
18	ANN 28	81	laminar gray-brown or 17-lower
18	ANN 24	77	ashy deposit
18	ANN 23	78	dark lens outside of archit.; earliest Anau IB1
19	ANN 10	63	ashy floor
19	ANN 13	67	upper ashy lens
19	ANN 17	72	trashy ashy lens; pit?
19	ANN 18	73	charcoal lens near pit
19	ANN 19	74	topmost ashy charcoal layer
19	ANN 21	75	topmost deposit of layer 19
19	ANN 11	64	ashy lens in fill
20	ANN 07	60	upper fill inside bldg
20	ANN 02	57	inside bldg; lowest archit. level
20	ANN 27	66	outside room
"sterile"	ANN 01	56	deep sounding

Table C.2. Plant remains from Anau North

Layer	**3**	**3**	**3**	**3**	**3**	**5**	**5**	**5**	**5**	**6**	**6**
Section	**AN.I**	**AN.I**	**AN.I**	**AN.I**	**AN.I**	**AN.K**	**AN.K**	**AN.J**	**AN.J**	**AN.K**	**AN.K**
Locus	**9**	**11**	**13**	**13**	**15**	**3**	**3**	**5**	**6**	**8**	**11**
Sample no.	**97.031**	**97.002**	**97.005**	**97.006**	**97.009**	**97.025**	**97.026**	**97.010**	**97.013**	**97.023**	**97.022**
volume (l)	10	8	9	3	8	8	11	12	8	8	8
charcoal (>2mm; g)	8.69	15.06	21.18	16.92	1.07	2.58	0.64	6.89	5.77	3.67	1.72
seed (>2mm; g)	0.18	0.02	0.04	0.01	.	+	.	0.27	0.02	0.02	0.03
misc (>2mm; g)	+	0.01	.	.	.	.	+	0.01	0.02	0.01	.
wild & weedy (#)	342	21	4	1	1	8	.	88	90	8	5
density	0.89	1.89	2.36	5.64	0.13	0.32	0.06	0.60	0.73	0.46	0.22
seed/charcoal	0.021	0.001	0.002	0.001	+	+	.	0.039	0.003	0.005	0.017
wild & weedy/charcoal	39.36	1.39	0.19	0.06	0.93	3.10	.	12.77	15.60	2.18	2.91
Food plants											
Hordeum	0.10	0.01	.	0.01	.	+	.	0.01	.	0.01	0.02
Triticum aestivum	0.04	.	.	.	.	.	.	0.03	0.01	0.01	.
Triticum sp.	.	.	.	.	.	.	.	.	.	.	.
Cereal	0.07	0.01	0.01	+	+	.	.	0.03	+	.	0.02
cf. *Prunus*/Rosac.	.	.	0.03	.	.	.	.	.	.	+	.
cf. *Vitis*	.	.	.	.	.	.	.	.	.	.	.
nutshell?	.	.	.	.	.	.	.	.	.	.	.
cf. pulse	5	.	.	.	.	.	.	.	.	.	.
Wild & weedy											
AN Apiaceae-1	.	.	.	.	.	.	.	.	.	.	.
cf. *Artemisia*	.	.	.	.	.	.	.	.	.	.	.
cf. *Taraxacum/Crepis*	1	.	.	.	.	.	.	.	.	.	.
AN Asteraceae-1	.	.	.	.	.	.	.	1	.	.	.
AN Asteraceae-2	1	.	.	.	.	.	.	.	.	.	.
Asteraceae indet.	.	.	.	.	.	.	.	1	.	.	.
Heliotropium-1	1	1	.	.	.	.	.	1	1	.	1
Heliotropium-2	.	.	.	.	.	.	.	.	.	.	1
cf. *Alyssum*	5	.	.	.	.	.	.	1	.	.	.
cf. *Neslia*	.	1	.	.	.	.	.	.	.	.	.
AN Brassicaceae-1	2	.	.	.	.	.	.	.	3	.	.
Brassicaceae indet.	.	.	.	.	.	.	.	.	.	.	.
Capparis	2	.	.	.	.	.	.	7	.	.	.
AN Caryophyllaceae-1	.	.	.	.	.	.	.	.	.	.	.
cf. *Chenopodium*	.	1	.	.	.	.	.	.	.	.	.
cf. *Salsola*	.	.	1	1	.	.	.	2	2	1	.
cf. *Suaeda*	.	.	.	.	.	.	.	2	.	.	.
Chenopodiaceae	.	.	.	.	.	.	.	.	.	.	.
cf. *Carex*	2	.	.	.	.	.	.	.	.	.	.
cf. *Scirpus*	2	.	.	.	.	.	.	.	.	.	.
AN Cyperaceae-1	.	.	.	.	.	.	.	.	.	.	.
AN Cyperaceae-2	.	.	.	.	.	.	.	.	.	.	.
Cyperaceae/*Polygonum*	.	.	.	.	.	.	.	.	.	.	.
Cyperaceae indet.	.	.	.	.	.	.	.	.	.	.	.
cf. *Alhagi*	.	.	.	.	.	.	.	.	.	.	.
Astragalus	.	1	.	.	.	.	.	1	.	.	.
Trifolium/Melilotus	.	.	.	.	.	.	.	1	.	.	.
Trigonella	.	.	.	.	.	.	.	3	10	1	.
AN Fabaceae-1	.	.	.	.	.	.	.	.	2	.	.
Fabaceae indet.	.	1	.	.	1	.	.	1	9	1	.
cf. *Ziziphora*	.	3	2	.	.	.	.	.	.	.	.

AN Lamiaceae-1	.	1	.	.	.	.	.	.	.	.	.
AN Lamiaceae-2	.	.	.	.	.	.	.	.	.	.	.
AN Lamiaceae-3	.	.	.	.	.	.	.	.	.	.	.
Lamiaceae indet.	.	.	.	.	.	.	.	.	.	.	.
AN cf. Liliaceae-1	.	.	.	.	.	.	.	.	.	.	.
AN Liliaceae-2	.	.	.	.	.	.	.	.	.	.	.
Aegilops	2	.	.	.	.	.	.	.	.	.	.
cf. *Bromus*	.	.	.	.	.	.	.	.	1	.	1
Eremopyrum	.	3	.	.	.	.	.	.	.	.	.
Hordeum murinum-type	2	1	.	.	.	.	.	.	.	.	.
Phleum/Eragrostis	.	.	.	.	.	.	.	.	.	.	.
cf. *Setaria*	.	.	.	.	.	.	.	.	.	.	.
AN Poaceae-1	283	1	.	.	.	4	.	3	45	.	.
AN Poaceae-2	.	1	.	.	.	.	.	.	.	.	.
AN Poaceae-3	.	.	.	.	.	.	.	1	.	.	.
AN Poaceae-4	.	.	.	.	.	1	.	.	.	.	.
AN Poaceae-5	4	.	.	.	.	.	.	.	.	.	.
AN Poaceae-6	.	.	.	.	.	.	.	.	.	.	.
AN Poaceae-7	.	.	.	.	.	.	.	.	.	.	.
Poaceae indet.	10	2	1	.	.	2	.	3	2	1	.
Fumaria	1	.	.	.	.	.	.	.	1	.	.
cf. *Portulaca*	.	.	.	.	.	.	.	.	.	.	.
Androsace	.	.	.	.	.	.	.	2	.	.	.
Adonis	1	1	.	.	.	.	.	.	.	.	1
Ceratocephalus	.	.	.	.	.	1	.	.	4	.	.
Galium	2	.	.	.	.	.	.	1	.	3	.
AN unknown-1	.	.	.	.	.	.	.	40	.	.	.
AN unknown-2	.	.	.	.	.	.	.	5	.	.	.
AN unknown-3	.	.	.	.	.	.	.	.	1	.	.
AN unknown-5	.	.	.	.	.	.	.	.	.	1	1
AN unknown-8	.	.	.	.	.	.	.	.	.	.	.
unknown	21	3	.	.	.	.	.	12	9	.	.
Plant parts											
Asteraceae capitulum	.	.	.	.	.	.	.	.	.	.	.
Euclidium	.	.	.	1	.	.	.	1	4	.	.
silique frag, AN Brassicaceae-1	.	.	.	.	.	.	.	.	.	.	.
Atriplex fruit	.	.	.	.	.	.	.	.	.	.	.
Alhagi pod segment	.	.	.	.	.	.	.	.	.	.	.
Hordeum vulgare var. *hexastichum* internode	6	1	.	.	.	2	8	38	6	15	5
Hordeum vulgare internode	3	.	.	.	1	.	.	48	5	6	4
Triticum internode	2	1	.	.	1	.	.	7	39	.	.
Aegilops glume base	5	.	.	.	.	.	.	8		3	1
Poaceae culm node	.	.	.	.	.	.	.	2	6	.	.
cf. *Phragmites* culm node	.	.	.	.	.	.	.	.	.	.	.
unknown	2	.	.	.	.	.	.	.	.	1	.
Uncharred											
Celtis	.	1	.	+	0.5	.	.	34	4	.	0.5
Lithospermum	.	.	.	.	.	.	.	.	.	.	.
mineralized seed	.	.	.	.	.	.	.	.	.	.	.

Table C.2, cont.

Layer	**6**	**6**	**6**	**8-upper**	**8-upper**	**8-lower**	**9**	**11**	**12**	**14**	**14**
Section	**AN.K**	**AN.K**	**AN.K**	**AN.L**	**AN.L**	**AN.L**	**AN.L**	**AN.L**	**AN.L**	**AN.M**	**AN.M**
Locus	**12**	**16**	**17**	**4**	**4**	**7**	**5.14.32**	**5.14.31**	**5.14.30**	**2**	**3**
Sample no.	**97.021**	**97.017**	**97.015**	**97.028**	**97.029**	**97.030**	**97.085**	**97.084**	**97.083**	**97.032**	**97.034**
volume (l)	8	10	7	9	11	6	4	4	7	7	8
charcoal (>2mm; g)	0.80	2.22	0.56	15.43	8.94	4.07	38.96	30.47	26.33	6.62	12.36
seed (>2mm; g)	.	0.01	+	+	0.03	+	+	.	0.02	0.09	0.06
misc (>2mm; g)	.	.	.	0.02	.	0.01	2.38	0.04	0.02	0.05	0.01
wild & weedy (#)	.	6	4	57	11	2	2	.	8	58	64
density	0.10	0.22	0.08	1.72	0.82	0.68	10.34	7.63	3.77	0.97	1.55
seed/charcoal	.	0.004	+	+	0.003	+	+	.	0.001	0.014	0.005
wild & weedy/charcoal	.	2.70	7.14	3.69	1.23	0.49	0.05	.	0.30	8.76	5.18
Food plants											
Hordeum	.	+	.	.	0.01	0.02	.	0.01	+	0.02	0.02
Triticum aestivum	.	+	.	.	0.01	.	.	+	.	0.02	0.01
Triticum sp.	.	.	.	.	.	.	.	.	.	.	.
Cereal	.	+	+	0.01	0.01	+	0.01	+	0.02	0.05	0.03
cf. *Prunus*/Rosac.	.	.	.	.	.	.	.	.	.	.	.
cf. *Vitis*	.	.	.	.	.	.	.	.	.	.	.
nutshell?	.	.	.	.	.	.	.	.	.	.	.
cf. pulse	.	.	.	.	.	.	.	.	.	.	.
Wild & weedy											
AN Apiaceae-1	.	.	.	.	1	.	.	.	.	.	.
cf. *Artemisia*	.	.	.	.	.	.	.	.	.	.	.
cf. *Taraxacum/Crepis*	.	.	.	.	.	.	.	.	.	.	.
AN Asteraceae-1	.	.	.	1	.	.	.	.	.	.	.
AN Asteraceae-2	.	.	.	.	.	.	.	.	.	1	2
Asteraceae indet.	.	.	.	.	.	.	.	.	.	.	1
Heliotropium-1	.	.	1	.	.	.	.	.	.	.	2
Heliotropium-2	.	.	.	.	.	.	.	.	.	.	.
cf. *Alyssum*	.	.	.	.	.	.	.	.	.	.	.
cf. *Neslia*	.	.	.	.	.	.	.	.	.	.	.
AN Brassicaceae-1	.	.	.	.	.	.	.	.	.	.	.
Brassicaceae indet.	.	.	.	.	.	.	.	.	.	.	.
Capparis	.	.	.	.	.	.	.	.	.	.	.
AN Caryophyllaceae-1	.	.	.	.	.	.	.	.	.	1	.
cf. *Chenopodium*	.	.	.	.	.	.	.	.	.	.	.
cf. *Salsola*	.	.	.	5	4	.	.	.	.	1	4
cf. *Suaeda*	.	.	1	1	.	.	.	.	.	.	.
Chenopodiaceae	.	.	.	.	.	.	.	.	.	.	.
cf. *Carex*	.	.	.	1	.	.	.	.	.	.	.
cf. *Scirpus*	.	.	.	1	.	.	.	.	.	.	.
AN Cyperaceae-1	.	.	.	.	.	.	.	.	.	.	.
AN Cyperaceae-2	.	.	.	.	.	.	.	.	.	1	.
Cyperaceae/*Polygonum*	.	.	.	.	.	.	.	.	.	.	.
Cyperaceae indet.	.	.	.	.	2	.	.	.	.	.	.
cf. *Alhagi*	.	.	.	2	.	.	.	.	.	.	.
Astragalus	.	.	.	.	.	.	.	.	1	.	.
Trifolium/Melilotus	.	.	.	.	.	.	.	.	.	1	.
Trigonella	.	1	.	2	2	.	2	.	.	6	11
AN Fabaceae-1	.	.	.	.	.	.	.	.	3	.	.
Fabaceae indet.	.	2	1	.	.	.	.	.	1	.	2
cf. *Ziziphora*	.	.	.	.	.	.	.	.	.	.	.

AN Lamiaceae-1	.	.	.	.	.	.	.	.	.	.	.
AN Lamiaceae-2	.	.	.	.	.	.	.	.	.	1	.
AN Lamiaceae-3	.	.	.	.	.	.	.	.	.	.	.
Lamiaceae indet.	.	.	.	.	.	.	.	.	.	.	.
AN cf. Liliaceae-1	.	.	.	.	.	.	.	.	.	.	.
AN Liliaceae-2	.	.	.	.	.	.	.	.	.	.	.
Aegilops	.	.	.	.	.	.	.	.	.	.	2
cf. *Bromus*	.	.	.	.	.	.	.	.	.	.	.
Eremopyrum	.	.	.	.	.	.	.	.	.	.	.
Hordeum murinum-type	.	.	.	.	.	.	.	.	.	.	.
Phleum/Eragrostis	.	.	.	.	.	.	.	.	.	1	1
cf. *Setaria*	.	.	.	.	.	.	.	.	.	.	1
AN Poaceae-1	.	3	1	37	.	2	.	.	1	29	37
AN Poaceae-2	.	.	.	.	.	.	.	.	.	.	.
AN Poaceae-3	.	.	.	.	.	.	.	.	.	.	.
AN Poaceae-4	.	.	.	.	.	.	.	.	.	.	.
AN Poaceae-5	.	.	.	1	.	.	.	.	.	.	.
AN Poaceae-6	.	.	.	.	.	.	.	.	.	.	.
AN Poaceae-7	.	.	.	.	.	.	.	.	.	.	1
Poaceae indet.	.	.	.	1	1	.	.	.	2	7	.
Fumaria	.	.	.	.	.	.	.	.	.	.	.
cf. *Portulaca*	.	.	.	.	.	.	.	.	.	.	.
Androsace	.	.	.	.	.	.	.	.	.	.	.
Adonis	.	.	.	.	.	.	.	.	.	.	.
Ceratocephalus	.	.	.	.	.	.	.	.	.	.	.
Galium	.	.	.	1	.	.	.	.	.	.	.
AN unknown-1	.	.	.	.	.	.	.	.	.	.	.
AN unknown-2	.	.	.	.	.	.	.	.	.	.	.
AN unknown-3	.	.	.	.	.	.	.	.	.	.	.
AN unknown-5	.	.	.	.	1	.	.	.	.	.	.
AN unknown-8	.	.	.	.	.	.	.	.	.	.	.
unknown	.	.	.	4	.	.	.	.	.	9	.
<u>Plant parts</u>											
Asteraceae capitulum	.	.	.	.	.	.	.	.	.	.	.
Euclidium	.	1	.	.	.	.	.	.	.	4	2
silique frag,											
AN Brassicaceae-1	.	.	.	.	.	.	.	.	.	.	.
Atriplex fruit	.	.	.	.	.	.	.	.	.	.	.
Alhagi pod segment	.	.	.	.	.	.	.	.	4	.	.
Hordeum vulgare											
var. *hexastichum* internode	.	1	.	.	.	5	.	.	2	45	5
Hordeum vulgare internode	.	.	.	.	.	1	1	.	.	10	4
Triticum internode	.	.	.	.	.	3	.	1	.	33	.
Aegilops glume base	.	.	.	.	.	.	.	.	.	2	1
Poaceae culm node	.	.	.	.	.	3	.	.	1	1	.
cf. *Phragmites* culm node	.	.	.	.	.	.	2	.	.	.	.
unknown	.	.	.	.	.	1	.	.	.	.	.
<u>Uncharred</u>											
Celtis	.	.	+	3	0.5	.	.	.	.	.	5
Lithospermum	.	.	.	.	1	.	.	.	.	.	.
mineralized seed	.	1	.	.	.	.	.	.	.	.	.

Table C.2, cont.

Layer	**14**	**14**	**14**	**14**	**14**	**16**	**17-lower**	**18**	**18**	**19**	**19**
Section	**AN.M**	**AN.M**	**AN.M**	**AN.M**	**AN.M**	**AN.N**	**AN.N**	**AN.N**	**AN.N**	**AN.N**	**AN.N**
Locus	**3**	**6**	**7**	**9**	**11**	**5.14.29**	**5.14.28**	**5.13.23**	**5.13.24**	**5.12.10**	**5.12.13**
Sample no.	**97.035**	**97.036**	**97.037**	**97.040**	**97.045**	**97.082**	**97.081**	**97.078**	**97.077**	**97.063**	**97.067**
volume (l)	12	8	5	2.7	8	8	8	5	4	1	4
charcoal (>2mm; g)	8.68	3.50	17.71	13.48	0.22	12.79	5.07	11.13	33.11	0.65	25.96
seed (>2mm; g)	0.04	0.05	0.03	.	0.06	0.04	0.02	2.51	+	0.12	0.16
misc (>2mm; g)	+	0.04	0.01	.	+	+	0.05	0.02	.	0.06	+
wild & weedy (#)	60	8	9	10	38	2	2	2399	1	158	16
density	0.73	0.45	3.55	4.99	0.04	1.60	0.64	2.73	8.28	0.83	6.53
seed/charcoal	0.005	0.014	0.002	+	0.273	0.003	0.004	0.225	+	0.185	0.006
wild & weedy/charcoal	6.91	2.29	0.51	0.74	172.73	0.16	0.39	215.54	0.03	243.08	0.62
Food plants											
Hordeum	0.03	0.02	0.02	.	+	0.02	0.01	2.14	.	0.05	0.07
Triticum aestivum	+	.	.	.	.	.	.	0.10	.	.	.
Triticum sp.	.	.	.	.	0.03	.	.	.	.	.	.
Cereal	0.01	0.04	0.01	0.01	+	0.01	0.01	0.82	0.02	0.03	0.19
cf. *Prunus*/Rosac.	.	.	.	.	.	.	.	.	.	.	.
cf. *Vitis*	.	.	.	.	.	.	.	.	.	.	.
nutshell?	+	.	.	.	.	.	.	.	.	.	.
cf. pulse	.	.	.	.	+	.	.	.	.	.	.
Wild & weedy											
AN Apiaceae-1	.	.	.	.	1	.	.	.	.	.	.
cf. *Artemisia*	.	.	.	.	.	.	.	15	.	.	.
cf. *Taraxacum/Crepis*	.	.	.	.	.	.	.	.	.	.	.
AN Asteraceae-1	.	.	.	.	.	.	.	.	.	.	.
AN Asteraceae-2	1	.	.	.	.	.	.	7	.	.	.
Asteraceae indet.	.	.	.	.	.	.	.	.	.	.	.
Heliotropium-1	1	.	.	.	9	.	1	5	.	1	1
Heliotropium-2	.	.	.	.	.	.	.	.	.	.	.
cf. *Alyssum*	.	.	.	.	.	.	.	1	.	.	.
cf. *Neslia*	.	.	.	.	.	.	.	.	.	.	.
AN Brassicaceae-1	.	.	2	.	.	.	.	14	.	.	.
Brassicaceae indet.	.	.	.	.	.	.	.	.	.	.	.
Capparis	.	.	.	.	.	.	.	35	.	.	.
AN Caryophyllaceae-1	.	.	.	.	.	.	.	.	.	.	.
cf. *Chenopodium*	.	.	.	.	.	.	.	.	.	.	.
cf. *Salsola*	.	.	2	10	.	.	.	3	.	.	.
cf. *Suaeda*	.	.	.	.	.	.	.	.	.	.	.
Chenopodiaceae	.	.	.	.	4	.	.	1	.	.	.
cf. *Carex*	.	.	.	.	.	.	.	.	.	1	.
cf. *Scirpus*	.	.	.	.	.	.	.	.	.	.	.
AN Cyperaceae-1	.	.	.	.	.	.	.	.	.	.	.
AN Cyperaceae-2	.	.	.	.	.	.	.	.	.	.	.
Cyperaceae/*Polygonum*	.	.	.	.	.	.	.	.	.	.	.
Cyperaceae indet.	.	.	.	.	1	.	.	.	.	.	.
cf. *Alhagi*	.	.	.	.	.	.	.	.	.	.	.
Astragalus	.	.	.	.	1	.	.	113	.	.	.
Trifolium/Melilotus	.	.	.	.	.	.	1	.	.	.	.
Trigonella	8	2	.	.	1	.	.	1438	.	.	5
AN Fabaceae-1	3	.	.	.	.	.	.	186	.	.	2
Fabaceae indet.	.	.	.	.	13	.	.	480	.	1	.
cf. *Ziziphora*	1	.	.	.	.	.	.	4	.	.	.

AN Lamiaceae-1	.	.	.	.	.	.	.	.	.	.	.
AN Lamiaceae-2	.	.	.	.	.	.	.	.	.	.	.
AN Lamiaceae-3	.	.	.	.	.	.	.	2	.	.	.
Lamiaceae indet.	.	.	.	.	.	.	.	.	.	.	.
AN cf. Liliaceae-1	.	.	.	.	1	.	.	.	.	.	.
AN Liliaceae-2	.	.	.	.	.	.	.	1	.	.	.
Aegilops	2	2	.	.	.	.	.	.	.	73	3
cf. *Bromus*	.	.	.	.	.	.	.	.	.	.	.
Eremopyrum	2	.	1	.	.	.	.	4	.	.	1
Hordeum murinum-type	.	.	.	.	.	.	.	4	.	2	.
Phleum/Eragrostis	.	.	.	.	.	.	.	3	.	.	.
cf. *Setaria*	.	.	.	.	.	.	.	.	.	.	.
AN Poaceae-1	36	.	2	.	4	.	.	30	.	.	.
AN Poaceae-2	.	.	.	.	.	.	.	.	.	.	.
AN Poaceae-3	.	.	.	.	.	.	.	.	.	.	.
AN Poaceae-4	.	.	.	.	.	.	.	.	.	.	.
AN Poaceae-5	.	.	.	.	.	.	.	.	.	.	.
AN Poaceae-6	.	.	.	.	.	.	.	.	.	.	.
AN Poaceae-7	.	.	.	.	.	.	.	.	.	.	.
Poaceae indet.	2	3	.	.	2	2	.	10	1	71	1
Fumaria	.	.	.	.	.	.	.	.	.	.	.
cf. *Portulaca*	.	.	.	.	.	.	.	.	.	.	.
Androsace	.	.	.	.	.	.	.	2	.	.	.
Adonis	1	.	.	.	.	.	.	.	.	.	.
Ceratocephalus	.	.	.	.	.	.	.	.	.	.	.
Galium	2	.	.	.	.	.	.	5	.	.	.
AN unknown-1	.	.	.	.	.	.	.	.	.	.	.
AN unknown-2	.	.	.	.	.	.	.	.	.	.	.
AN unknown-3	.	.	.	.	.	.	.	.	.	.	.
AN unknown-5	.	.	.	.	.	.	.	2	.	7	.
AN unknown-8	.	1	.	.	.	.	.	.	.	.	.
unknown	1	.	2	.	1	.	.	34	.	2	3
Plant parts											
Asteraceae capitulum	.	.	.	.	.	.	.	1	.	.	.
Euclidium	.	.	1	.	8	.	2	3	.	1	.
silique frag, AN Brassicaceae-1	.	.	.	1	.	.	.	.	.	.	.
Atriplex fruit	.	.	.	.	.	.	.	.	.	.	.
Alhagi pod segment	.	.	.	.	.	.	.	.	.	.	.
Hordeum vulgare var. *hexastichum* internode	3	4	.	.	.	4	1	5	.	53	.
Hordeum vulgare internode	4	4	.	3	1	.	.	6	.	35	1
Triticum internode	11	.	.	3	.	1	1	4	.	15	.
Aegilops glume base	1	1	.	.	1	.	.	.	.	36	3
Poaceae culm node	2	.	1	.	.	.	.	2	.	1	.
cf. *Phragmites* culm node	.	.	.	.	.	.	.	.	.	.	.
unknown	.	.	.	.	.	.	.	.	.	1	.
Uncharred											
Celtis	.	.	.	.	.	+	.	.	.	.	.
Lithospermum	.	.	7	.	.	.	.	.	.	.	.
mineralized seed	.	.	.	.	.	.	.	.	.	.	.

Table C.2, cont.

Layer	**19**	**19**	**19**	**19**	**19-lower**	**20-upper**	**20**	**20**	**"sterile"**
Section	**AN.N**	**AN.N**	**AN.N**	**AN.N**	**AN.N**	**AN.N**	**AN.N**	**AN.N**	**AN.N**
Locus	**5.13.17**	**5.13.18**	**5.13.19**	**5.13.21**	**5.13.18**	**5.12.07**	**5.12.02**	**5.12.27**	**5.12.01**
Sample no.	**97.072**	**97.073**	**97.074**	**97.075**	**97.064**	**97.060**	**97.057**	**97.066**	**97.056**
volume (l)	2	3	2	7	3	5	2	4	4
charcoal (>2mm; g)	0.24	14.56	27.58	32.67	14.32	15.98	27.17	25.13	4.85
seed (>2mm; g)	.	0.25	0.03	0.16	0.02	0.05	0.01	0.18	0.02
misc (>2mm; g)	.	0.02	0.03	0.02	0.03	0.04	.	0.02	.
wild & weedy (#)	.	134	6	107	95	167	45	253	.
density	0.12	4.94	13.82	4.69	4.79	3.21	13.59	6.33	1.22
seed/charcoal	.	0.017	0.001	0.005	0.001	0.003	+	0.007	0.004
wild & weedy/charcoal	.	9.20	0.22	3.28	6.63	10.45	1.66	10.07	.
<u>Food plants</u>									
Hordeum	.	0.13	0.03	0.08	0.01	0.03	.	0.07	0.01
Triticum aestivum	.	0.06	.	0.01	+	+	.	0.01	.
Triticum sp.	.	.	.	.	.	.	.	.	.
Cereal	.	0.08	.	0.06	0.01	0.02	+	0.05	+
cf. *Prunus*/Rosac.	.	.	.	.	.	.	.	.	.
cf. *Vitis*	.	.	.	.	.	.	.	.	.
nutshell?	.	.	.	.	.	.	.	.	.
cf. pulse	.	.	.	.	.	.	.	.	.
<u>Wild & weedy</u>									
AN Apiaceae-1	.	.	.	.	.	.	.	.	.
cf. *Artemisia*	.	.	.	2	.	.	1	.	.
cf. *Taraxacum/Crepis*	.	.	.	.	.	.	.	.	.
AN Asteraceae-1	.	.	.	.	.	.	.	.	.
AN Asteraceae-2	.	.	.	.	.	.	.	.	.
Asteraceae indet.	.	.	.	.	.	.	.	.	.
Heliotropium-1	.	2	1	6	4	33	3	48	.
Heliotropium-2	.	.	.	.	.	.	.	.	.
cf. *Alyssum*	.	.	.	.	.	.	.	.	.
cf. *Neslia*	.	.	.	.	.	.	.	.	.
AN Brassicaceae-1	.	.	.	.	.	.	.	.	.
Brassicaceae indet.	.	.	.	1	.	.	.	3	.
Capparis	.	13	1	.	1	.	.	.	.
AN Caryophyllaceae-1	.	2	.	.	.	4	10	1	.
cf. *Chenopodium*	.	.	.	.	.	.	.	.	.
cf. *Salsola*	.	4	1	.	.	1	3	.	.
cf. *Suaeda*	.	.	.	.	.	.	.	.	.
Chenopodiaceae	.	.	.	.	.	2	.	4	.
cf. *Carex*	.	.	.	.	.	3	.	.	.
cf. *Scirpus*	.	.	.	.	.	.	.	.	.
AN Cyperaceae-1	.	.	.	1	.	.	.	.	.
AN Cyperaceae-2	.	.	.	.	.	.	.	1	.
Cyperaceae/*Polygonum*	.	5	.	1	.	.	.	.	.
Cyperaceae indet.	.	.	.	.	.	.	.	.	.
cf. *Alhagi*	.	.	.	.	.	.	.	.	.
Astragalus	.	.	.	1	1	.	.	.	.
Trifolium/Melilotus	.	.	.	.	.	.	.	113	.
Trigonella	.	29	1	37	74	12	5	22	.
AN Fabaceae-1	.	.	.	.	.	.	.	.	.
Fabaceae indet.	.	8	.	6	5	67	.	2	.
cf. *Ziziphora*	.	.	.	.	.	.	.	.	.

AN Lamiaceae-1	.	.	.	.	.	.	.	.	.
AN Lamiaceae-2	.	1	.	.	.	.	.	.	.
AN Lamiaceae-3	.	.	.	.	.	.	.	.	.
Lamiaceae indet.	.	.	.	.	1	.	.	.	.
AN cf. Liliaceae-1	.	.	.	.	.	.	.	.	.
AN Liliaceae-2	.	.	.	.	.	.	.	.	.
Aegilops	.	4	.	5	.	5	1	5	.
cf. *Bromus*	.	.	.	.	.	.	.	.	.
Eremopyrum	.	.	.	.	.	.	.	.	.
Hordeum murinum-type	.	1	.	.	.	1	.	2	.
Phleum/Eragrostis	.	.	.	1	.	.	.	.	.
cf. *Setaria*	.	.	.	.	.	.	.	.	.
AN Poaceae-1	.	12	.	9	.	.	1	.	.
AN Poaceae-2	.	.	.	.	.	.	.	.	.
AN Poaceae-3	.	.	.	.	.	.	.	.	.
AN Poaceae-4	.	.	.	.	.	.	.	.	.
AN Poaceae-5	.	.	.	.	.	.	.	.	.
AN Poaceae-6	.	.	.	.	.	.	.	.	.
AN Poaceae-7	.	.	.	.	.	.	.	.	.
Poaceae indet.	.	6	1	16	4	12	1	15	.
Fumaria	.	.	.	.	.	.	.	.	.
cf. *Portulaca*	.	.	.	.	.	1	.	.	.
Androsace	.	.	.	.	.	.	.	.	.
Adonis	.	1	.	2	1	1	3	2	.
Ceratocephalus	.	.	.	.	.	.	1	.	.
Galium	.	2	.	2	.	1	.	.	.
AN unknown-1	.	.	.	.	.	.	.	.	.
AN unknown-2	.	.	.	.	.	.	.	.	.
AN unknown-3	.	.	.	.	.	.	.	.	.
AN unknown-5	.	4	1	2	.	.	.	1	.
AN unknown-8	.	.	.	.	.	.	.	.	.
unknown	.	40	.	15	4	24	16	34	.
<u>Plant parts</u>									
Asteraceae capitulum	.	8	1	3	1	14	.	5	.
Euclidium silique frag, AN Brassicaceae-1	.	.	.	.	.	.	.	.	.
Atriplex fruit	.	2	.	.	.	.	.	.	.
Alhagi pod segment	.	1	.	.	.	.	.	.	.
Hordeum vulgare var. *hexastichum* internode	.	5	3	21	4	14	1	17	.
Hordeum vulgare internode	.	.	1	6	.	8	.	2	.
Triticum internode	.	.	.	4	.	6	.	11	.
Aegilops glume base	.	2	.	4	5	3	.	8	.
Poaceae culm node	.	.	2	.	.	2	.	.	.
Cf. *Phragmites* culm node	.	.	.	.	2	.	.	.	.
unknown	.	.	.	.	.	.	.	.	.
<u>Uncharred</u>									
Celtis	2.5	.	5	0.5	.	0.5	.	.	.
Lithospermum	.	.	.	1	.	.	.	.	.
mineralized seed	.	.	.	.	.	.	.	.	.

Table C.3 Charcoal from Anau North Flotation Samples (weight, g)

Layer/Context		Sample 97.	tot. wt.	wt. a'lyzed	Juni-perus	coni-fer	"sak-saul"	"sazak"	Frax-inus	Populus Salix	Tam-arix	cf. Tam-arix	un-known
3	ANI 11	002	15.06	0.34	.	.	.	.	.	.	.	0.34	.
3	ANI 13	005	21.18	1.91	.	.	.	.	.	.	1.91	.	.
3	ANI 13	006	16.92	3.06	0.53	.	.	.	.	0.59	1.94	.	.
3	ANI 9	031	8.69	1.25	.	.	.	.	.	.	0.32	0.93	.
8	ANL 4	028	15.43	1.39	.	.	.	.	.	.	0.50	0.89	.
8	ANL 4	029	8.94	0.12	.	.	.	.	.	.	0.12	.	.
9	ANN 32	085	38.96	10.62	.	0.37	.	.	.	5.49	4.76	.	.
11	ANN 31	084	30.47	1.82	.	.	0.27	.	.	.	1.03	0.52	.
12	ANN 30	083	26.33	1.91	.	.	0.09	0.02	.	.	1.80	.	.
14	ANM 2	032	6.62	0.85	0.09	.	.	.	.	.	0.44	0.13	0.19
14	ANM 3	034	12.36	1.39	.	.	.	.	.	0.08	.	1.31	.
14	ANM 3	035	8.68	1.50	.	.	.	.	.	0.32	1.08	0.10	.
14	ANM 7	037	17.71	0.63	.	.	0.14	.	.	.	0.49	.	.
14	ANM 9	040	13.48	0.91	.	.	.	0.07	.	.	0.84	.	.
16	ANN 29	082	12.79	1.30	.	.	0.50	.	.	.	0.41	0.23	0.16
18	ANN 24	077	33.11	3.24	.	.	.	.	.	.	2.87	0.37	.
18	ANN 23	078	11.13	0.19	.	.	.	.	.	.	0.19	.	.
19	ANN 13	067	25.96	0.65	.	.	.	.	.	.	0.12	0.11	0.42
19	ANN 18	073	14.56	0.94	.	.	.	.	.	.	0.86	0.08	.
19	ANN 19	074	27.58	4.79	.	.	.	.	.	.	4.06	0.73	.
19	ANN 21	075	32.67	1.72	.	.	.	.	.	.	1.72	.	.
19	ANN 18	064	14.32	0.79	.	.	0.05	.	.	.	0.09	0.54	0.11
20	ANN 7	060	15.98	2.11	.	.	.	.	.	0.37	1.33	0.41	.
20	ANN 2	057	27.17	3.72	.	.	.	.	.	.	3.09	0.63	.
20	ANN 27	066	25.13	3.42	.	.	.	.	.	.	2.68	0.74	.
20	ANN 1	056	4.85	1.45	.	.	.	.	0.24	.	0.74	0.26	0.21

Table C.4 Charcoal from Anau North Flotation Samples (count)

Layer/Context		Sample 97.	no. a'lyzed	Juni-perus	coni-fer	"sak-saul"	"sazak"	Frax-inus	Populus Salix	Tam-arix	cf. Tam-arix	un-known
3	ANI 11	002	1	.	.	.	.	.	.	.	1	.
3	ANI 13	005	2	.	.	.	.	.	.	2	.	.
3	ANI 13	006	10	2	.	.	.	.	2	6	.	.
3	ANI 9	031	7	.	.	.	.	.	.	2	5	.
8	ANL 4	028	5	.	.	.	.	.	.	1	4	.
8	ANL 4	029	1	.	.	.	.	.	.	1	.	.
9	ANN 32	085	10	.	1	.	.	.	5	4	.	.
11	ANN 31	084	10	.	.	1	.	.	.	6	3	.
12	ANN 30	083	10	.	.	1	1	.	.	8	.	.
14	ANM 2	032	4	1	.	.	.	.	.	1	1	1
14	ANM 3	034	5	.	.	.	.	.	1	.	4	.
14	ANM 3	035	7	.	.	.	.	.	2	4	1	.
14	ANM 7	037	7	.	.	2	.	.	.	5	.	.
14	ANM 9	040	4	.	.	.	1	.	.	3	.	.
16	ANN 29	082	8	.	.	2	.	.	.	3	2	1
18	ANN 24	077	5	.	.	.	.	.	.	4	1	.
18	ANN 23	078	1	.	.	.	.	.	.	1	.	.
19	ANN 13	067	4	.	.	.	.	.	.	1	1	2
19	ANN 18	073	6	.	.	.	.	.	.	5	1	.
19	ANN 19	074	10	.	.	.	.	.	.	9	1	.
19	ANN 21	075	5	.	.	.	.	.	.	5	.	.
19	ANN 18	064	8	.	.	1	.	.	.	1	4	2
20	ANN 7	060	10	.	.	.	.	.	2	6	2	.
20	ANN 2	057	9	.	.	.	.	.	.	7	2	.
20	ANN 27	066	9	.	.	.	.	.	.	7	2	.
20	ANN 1	056	10	.	.	.	.	2	.	5	2	1

Table C.5 Summary of Anau North Flotation Samples

	Anau II layer 3	**Anau IB layers 5-18**	**Anau IA layers 19-20**
number of samples	5	11	26
total volume floated (liters)	38	197	37
total charcoal (>2 mm; g)	62.92	273.72	189.11
total seed (>2 mm; g)	0.25	3.30	1.00
total miscellaneous (>2 mm; g)	0.01	2.69	0.22
total wild & weedy (no.)	369	2940	981
average density (g/liter)	2.18	2.04	5.46
average seed/charcoal (g/g)	+	0.03	0.02
average wild & weedy/charcoal (no./g)	8	18	26

Table C.6 Summary of Plant Names, Characteristics

	form	life cycle	common name; other notes
Apiaceae	h		Queen Anne's lace family
Asteraceae			daisy, thistle family (Compositae)
cf. *Artemisia*	ss (h)	p (a)	wormwood
cf. *Taraxacum/Crepis*	h	p/p,a	dandelion/
Boraginaceae			borage family
Heliotropium	h	a, p	
Brassicaceae			mustard family (Cruciferae)
cf. *Alyssum*	h	a, p	
Euclidium syriacum	h	a	
cf. *Neslia*	h	a	
Capparidaceae			caper family
Capparis	s	p	caper
Caryophyllaceae	h		pink family
Chenopodiaceae			goosefoot family
Atriplex	h (s)	a (p)	
cf. *Chenopodium*	h	a, p	goosefoot
Haloxylon	s	p	saksaul
cf. *Salsola*	h, ss	a, p	grows in salty places
cf. *Suaeda*	h. s	a, p	grows in sandy, salty places
Cupressaceae			
Juniperus	t	p	juniper
Cyperaceae	h		sedge family
cf. *Carex*	h	p	grows in moist habitat
cf. *Scirpus*	h	p	grows in moist habitat
Fabaceae			pea/legume family (Leguminosae)
Alhagi	ss	p	camelthorn
Astragalus	s, h	a, p	
Trifolium/Melilotus	h	a	clover/melilot
Trigonella	h	a	trigonel
Lamiaceae			mint family (Labiatae)
cf. *Ziziphora*	h	a, p	
Pinaceae			
cf. *Pinus*	t	p	pine
Poaceae	h		grass family (Gramineae)
Aegilops	h	a	goat-face grass
cf. *Bromus*	h	a	brome
Phleum/Eragrostis	h	a	
Eremopyrum	h	a	
Hordeum murinum-type	h	a	wild barley
Hordeum vulgare var. *hexastichum*	h	a	6-row barley, cultivated
cf. *Setaria*	h	a	
Triticum aestivum	h	a	bread wheat, cultivated
Fumaricaceae			
Fumaria	h	a	fumitory
Portulacaceae			
cf. *Portulaca*	h	a	purslane; potherb
Primulaceae			
Androsace	h	a, p	
Ranunculaceae			buttercup family
Adonis	h	a, p	
Ceratocephalus	h	a	
Rubiaceae			bedstraw family
Galium	ss	a, p	bedstraw
Salicaceae			
Salix/Populus	t	p	willow/poplar, grows along watercourses
Tamaricaceae			
Tamarix	t	p	tamarisk, grows along watercourses, swales

form: h=herb, ss=small shrub, s=shrub, t=tree
life cycle: a=annual, p=perennial
parentheses indicate possible for the taxon, but less likely here

Table C.7 Barley Measurements from AN97.078 (Layer 18)

N=64	Length (mm)	Breadth (mm)	Thickness (mm)	L:B	T:B
min.	3.3	1.7	1.1	1.25	0.52
mean	4.2	2.7	2.1	1.59	0.75
max.	5.0	3.9	2.8	2.50	0.89
S.D.	0.50	0.55	0.48	0.28	0.07

Table C.8 Length:Breadth Ratios of Six-row Barley from Other Sites

	N (grains)	L:B	range
Anatolian plateau			
Erbaba (naked)	28	1.89	1.65-2.32
	100	1.78	1.50-2.17
	44	1.88	1.48-2.17
Mesopotamia			
Yarym-Tepe I (naked)	-	1.66	-
	-	1.30	-
	-	1.74	-
	-	1.37	-
Yarym-Tepe I (hulled)	-	2.14	-
	-	1.83	-
	-	2.27	-
	-	1.90	-
Yarym-Tepe II (naked)	-	1.97	-
	-	2.06	-
Yarym-Tepe II (hulled)	-	1.96	-
	-	1.79	-
	-	1.96	-
	-	1.96	-
Karana 3†	25	2.08	1.89-2.41
	5	1.97	1.78-2.15
	20	2.19	1.55-2.65
'Oueili (hulled)	50	1.73	1.53-2.06
Tell Madhhur	20	2.07	1.71-2.60
Ur (hulled)	10	2.06	1.79-2.48
Iranian plateau			
Gijlar (naked)	-	1.59	-
Hissar (naked)	10	1.68	1.58-1.94
	10	1.58	1.36-1.98
Pakistan			
Loebanr- 3 (Swat) (naked)	2	1.55	1.54-1.55

- : not reported
† : probably a contaminant in emmer crop; hulled?

Erbaba (van Zeist and Buitenhuis 1983), el 'Oueli (Neef 1991), Madhhur (Renfrew 1984), Ur (Ellison et al. 1978), Karana 3 (Costantini and Costantini Biasini 1993), Loebanr- 3 (Costantini 1987), Yarym-Tepe I

Table C.9 Fragments of Charred Animal Dung and Sheep/Goat Pellets larger than 2 mm

sample	provenience	level	amount, g	
97.002	ANI 11	3	0.01	
97.005	ANI 13	3	0.01	
97.006	ANI 13	5	0.02	
97.013	ANJ 6	5	0.76	1 whole (0.10 g) and fragments (0.66 g)
97.029	ANL 4	8	0.03	
97.031	ANI 9	3		[unmeasureable, but floating soil clumps looked dung-like]
97.032	ANM 2	14	0.21	1 whole (0.13 g) and fragments (0.08 g); also 2 whole, unburnt (0.32 g)
97.045	ANM 11	14		[laminar structure of soil clumps looked like stable litter]
97.078	ANN 23	18	3.43	3 whole (0.30 g) and fragments (3.13 g); one fragment with a seed embedded
97.073	ANN 18	19	1.37	[probably dung]
97.075	ANN 21	19	0.39	
97.064	ANN 18	19	0.12	
97.060	ANN 7	20	0.19	sheep goat pellet fragments (0.07 g), other fragments (0.12 g)
97.057	ANN 2	20	0.05	
97.066	ANN 27	20	0.30	also, uncharred sheep goat dung: 1 whole (0.04 g) and fragments (0.44 g)

Appendix D
A Basketry/Textile Impression from Anau North

J. M. Adovasio and J. S. Illingworth

Basketry as discussed here includes several distinct kinds of items, including rigid and semi-rigid containers or baskets proper, matting, and bags. Matting includes items which are essentially two dimensional or flat, whereas baskets are more clearly three-dimensional. Bags may be viewed as intermediate forms because they are more or less two dimensional when empty and three dimensional when filled. As Driver (1961:159) points out, these artifacts can be analyzed in a similar fashion because the over-all technique of manufacture is the same in all instances: all forms of basketry are manually woven without frame or loom. Since all basketry is woven, it is technically a class or variety of textile. In the present context, the term "textile" is restricted to fully or infinitely flexible materials such as cloth or fabric produced with the aid of a frame or loom.

There are three major subclasses of basket weaves that are usually viewed as mutually exclusive: twining, coiling, and plaiting. Twining denotes a subclass of basket weaves manufactured by passing moving (active) horizontal elements called wefts around stationary (passive) vertical elements called warps. Twining techniques may be employed to produce containers, mats, and bags as well as fish traps, cradles, hats, clothing, and other atypical basketry forms. Coiling denotes a subclass of basket weaves manufactured by sewing stationary horizontal elements (the foundation) with moving vertical elements (stitches). Coiling techniques are used almost exclusively in the production of containers, hats, and, rarely, bags. Mats and other forms are seldom, if ever, produced by coiling. Plaiting denotes a subclass of basket weaves in which all elements pass over and under each other without engagement. Plaiting may be used to make containers, bags, and mats, as well as a wide range of other non-standard forms.

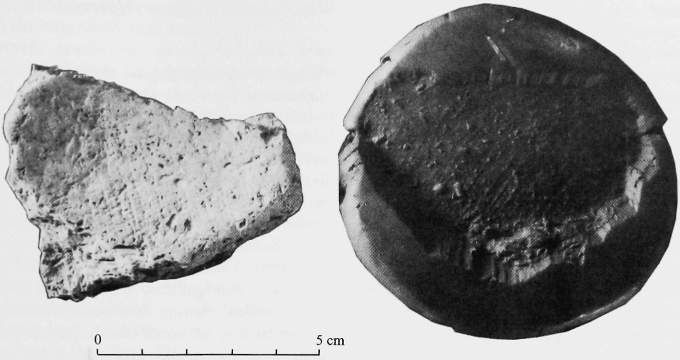
A single example of a single type of plaiting is the only basketry/textile represented at Anau North. It was found in Anau IB1 context (layer 14), on a tamped-earth surface within the village, near a circular storage structure (ANM 10). This sample sheds light on the abundant number of spindle whorls found in the Anau North deposits, as well as the phytolith evidence for the use of plant fibers throughout the Anau North sequence.

Analytical Procedures

The specimen was analyzed from a clay positive cast made of Crayola brand modeling compound at the R. L. Andrews Center for Perishables Analysis, Mercyhurst Archaeological Institute, Erie, PA. The impression was examined with a Leica Wild M10 variable-power stereoscopic microscope. All measurements were taken with a Helios needle nose dial caliper. These measurements were recorded and are presented in the metric system.

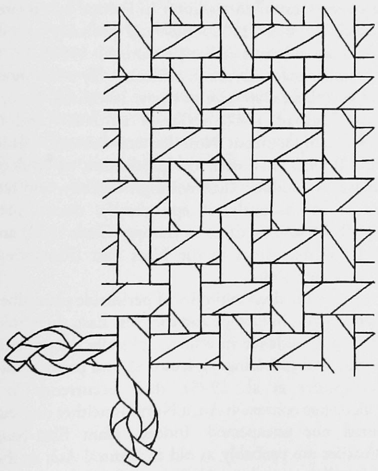
Criteria of Classification

The perishable artifact assemblage from Anau North currently includes only one specimen in the form of a negative impression on a ceramic sherd (Figure D.1). In basketry terminology (Adovasio 1977), the speci-



D.1 Textile-imprinted pottery.

men is assignable to plaiting, a subclass of basket weaves in which all elements pass over and under each other without any engagement. For this reason, plaited basketry is technically described as unsewn. Plaiting is normally used to make containers, bags, mats, and a wide variety of other nonstandard forms. The technical equivalent of plaiting in textile terminology (Emery 1966) is plain weave. Since the solitary Anau North specimen lacks selvages it is impossible to determine if it is a textile proper or fabric made with the aid of a loom or weaving frame or a basketry construction manually produced without an auxiliary device. The Anau North plaiting specimen was ascribed to a single numbered type based on the interval of element engagement. The plaited specimen was also analyzed for selvage treatment, shifts, method of preparation of elements, form, wear patterns, function, type and mechanics of mending, and decorative patterns and mechanics. All analysis and terminology follows that outlined in Adovasio (1977), Emery (1966), and Hurley (1979).



D.2 Schematic of textile.

Results

Type I: Simple Plaiting, 1/1 Interval (Figure D.2)

Technique and Comments: This specimen is impressed on the concave surface of a ceramic sherd (ANM 10). Two ply, Z-spun, S-twist cordage elements pass over and under each other in a 1/1 interval except for one instance where a two ply, S-spun, Z-twist cordage element is used. No accidental or intentional shifts are represented. The angle of crossing is ca. 90°. Both sets of elements are consistently the same diameter, producing the functional equivalent of balanced plain weave in textile terminology (see Emery 1966:76). No selvages or element splices are represented. The specimen is undecorated, unpitched, and not naturally watertight due to the tightness of the weave (there is a consistent gap between elements 0.45-0.50 mm wide). The specimen may be a portion of a bag, matting, or fabric of indeterminate configuration (see Internal Correlations: Form and Function).

Measurements:
Range in diameter of elements: 0.60–1.00 mm
Mean diameter of elements: 0.78 mm
Range and mean of angle of element crossing: 90°
Range in gap between elements: 0.45–0.50 mm
Mean in gap between elements: 0.47 mm
Range of elements per centimeter: 8–10
Mean of elements per centimeter 8.4

Technology

Despite the fact that only one basketry/textile impressed sherd has been recovered to date from Anau North, a number of observations may be made on perishable fiber artifact production and/or use at the site. First and most obviously, the solitary impressed specimen provides direct evidence for the manufacture of at least one structural type of one subclass of basketry/textile. While the production of this item, or, more accurately, the ceramic vessel upon which it is impressed may have been non-local, it is more parsimonious to conclude that both are local products.

Second, the overall regularity of the plaiting, the uniformity of the plaiting elements, and the use of a consistent element spacing gauge bespeak a mature perishable industry and not some primary essay in the craft (Figure D.2). This is scarcely surprising given the deep antiquity of perishable fiber artifact production in the Near East, specifically, and Eurasia, generally (see External Correlations).

Third, given the foregoing, it is virtually certain that a much wider variety of other presently undocumented fiber artifacts were produced and used at this site but the extent and range of such manufacture and/or use are obviously impossible to specify at present.

Form and Function

Without selvages, it is also impossible to determine whether this specimen is a fragment of basketry in the form of a flexible manually plaited mat or, less likely, a bag or part of a fabric produced on a non-heddle weaving frame or heddle loom. Whether the Anau North impression represents basketry or a portion of a continuous fabric, the overall configuration and dimensions of the original item cannot be determined. If the specimen is a portion of a fabric or textile proper, it could represent literally anything from a fragment of a shawl, sash, skirt, shirt, tunic, robe, or blanket.

Raw Material

Whatever its technological ascription or precise configuration, the Anau North specimen is sufficiently worn to preclude identification of the raw material employed in its production. According to Moore (personal communication 1999), possible fiber sources include potentially abundant animal fiber from sheep or, less commonly, goats, but the range of available plant-derived fiber sources is unknown. Moore suggests that flax (*Linum* sp.) is not a likely alternative but a number of other eminently usable local species may well have been available. Whatever the fiber source(s), the individual plaiting elements from the Anau North specimen are, as noted above, highly standardized, directly suggesting the existence of well-defined raw material processing protocols.

External Correlations

As of this writing, the Anau North basketry/textile impression is the oldest example of its genre from Turkmenistan, specifically, and this part of Central Asia, generally. It is not, of course, the oldest example of basketry or textiles in the contiguous Near East to the south, or for that matter, Europe to the west. Conclusive evidence now exists that plant fiber-based products like cordage, basketry, netting, and even bona fide textiles were being produced in the Pavlovian variant of the Gravettian tradition in Europe by no later than 23050 BC. (25000 BP.) and probably two or three thousand years earlier (Soffer et al. 1998).

Similar materials are in evidence only a few thousand years later elsewhere in Upper Paleolithic Europe (Leroi-Gourhan 1982, Soffer et al. 2000) and in penecontemporaneous Near Eastern contexts (Nadel et al. 1994). Thereafter, the production of cordage, cordage by-products (like netting), basketry, and textiles is continuously, if episodically, documented through Mesolithic times in Europe (Clark 1952) and Epi-Paleolithic times in the Near East (Rimantiene 1979, Schick 1986).

Given the deep antiquity of perishable plant fiber-based artifacts in Europe and the Near East, their ubiquity and abundance in ethnographically documented hunting and gathering, agricultural, and pastoral societies (Soffer et al. 1998), their occurrence in a Chalcolithic context at Anau North is neither unprecedented nor unexpected. Indeed, plant fiber-based industries are probably as old in Central Asia as they are in adjacent regions. Unfortunately, no evidence of earlier manifestations of these crafts is presently available from the immediate study area.

However, despite the paucity of data from Turkmenistan, relatively abundant evidence of plant fiber-based crafts is available from the contiguous Near East. As Barber (1991:127) notes, negative impressions of balanced plain weave and plain weave with doubled warps and wefts (i.e. basket weave) are reported from Jarmo at ca. 7000 BC (8950 BP) (Adovasio 1983:425). Jarmo also produced impressions of the oldest coiling and twill plaiting currently known from the entire eastern circum-Mediterranean. By ca. 6500–6000 BC (8950–7950 BP) actual basketry, textiles, cordage, and netting exist in both pre-ceramic contexts like Nahal Hemar in the Judean Desert (Schick 1986) and Neolithic Catal Hüyük in the Anatolian Plateau (Burnham 1965). Within the same time frame and shortly thereafter impressions of basketry and textiles are reported from southeastern Europe in early Neolithic contexts.

The documentation includes apparently numerous but incompletely described twill (?) plaited mat impressions from Phases IIB (ca. 6100 BC [8050 BP]), IIIa–IIIB (ca. 6000 BC [7950 BP]), and IVa–IVb (ca. 5900–5600 BC [7850–7550 BP]) at Achilleion in Thessaly (Gimbutas et al. 1989). Additionally, there is evidence of twill plaited mat impressions at Anza I (6100–5800 BC [8050–7750 BP]), Anza II (5800–5300 BC [7750–7250 BP]) (Gimbutas 1976), and suspected spindle whorls from Nea Nikomedia, also in early 7th millennium BC (9th millennium BP) contexts (Rodden 1962). Less than half a millennium later, twill plaiting, 2/2 interval basketry and "faced" plain weave textiles are reported from Sitagroi in east Macedonia (Barber 1991:177, Fig. 6.5).

While space precludes an extended discussion of any of these 7th or 6th millennium BC assemblages, it is significant that plain woven cloth exhibits a venerable antiquity in both early Neolithic and pre-Neolithic contexts. Interestingly, though twined textiles are represented very early in Europe and Near Eastern sites like Catal Hüyük and Nahal Hemar, no early twining has yet been reported from Central Asia.

Within the next thousand years, basketry manufacture and textile production are widely documented in the Near East. That it is tempting to interpret the appearance of basketry or textiles in Central Asia as a classic example of diffusion in this appealing scenario, the technology of simple plaited basketry or plain woven cloth is but one of the artifactual signatures of the imported package of Near Eastern domesticates and/or their makers. As satisfying as this view may still be to some researchers, we echo the comments made on similar materials from Sitagroi in Greece. Specifically, it is probably much more prudent to view the Anau North impression as a local expression of a very ancient and wholly indigenous weaving tradition rather than a phenomenon derived, together with wheat, barley, and sheep from the Near East.

Again, as with the Sitagroi impressions, we conclude by noting that whatever its ultimate ancestry or derivation, the impression from Anau North provides direct and incontrovertible evidence of fiber-based artifact manufacture in this part of Turkmenistan and also to paraphrase our colleague Olga Soffer's statement that this shows an all too often neglected aspect of Paleolithic and Neolithic economies, the presumed labor of women.

In retrospect, the salient aspects of the Anau North fiber artifact impressions are:

1. Simple plaited basketry or balanced plain weave textiles were produced and/or used at Anau North in Early Neolithic contexts.
2. The solitary subclass and type represented evidences a mature probably plant fiber-based industry, the scope and scale of which is presently unknown.
3. Based on comparative studies, the Anau North specimen probably represents a local perishable industry of ancient derivation.

Bibliography

Abdi, K.
2001 Malyan 1999. Iran 39:73–98.

Adikov, K. A., and V. M. Masson
1960 Drevnosti Tedzhen-Murgabskogo mezhdurech'ya (Antiquities of the Tedzhen-Murgab interfluvial). Izvestiya Akedemii Nauk Turkmenskoi SSR. Seriya Obshchestvennykh Nauk 2:58–66.

Adler, M.
1993 Why is a Kiva—New Interpretations of Prehistoric Social Integrative Architecture in the Northern Rio-Grande Region of New-Mexico. Journal of Anthropological Research 49:319–49.

Adovasio, J. M.
1977 Basketry Technology. Chicago: Aldine.
1983 Notes on the Textile and Basketry Impressions from Jarmo. *In* Prehistoric Archaeology Along the Zagros Flanks, Oriental Institute Publications, 15. R. J. Braidwood, L. S. Braidwood, C. A. Reed, and P. J. Watson, eds. Pp. 425-426 Chicago: University of Chicago Press.

Alekshin, V. A.
1973 Kamennie giri iz drevnezemledel'cheskikh poselenii Iuzhnoi Turkmenii (Stone weights from early agricultural settlements in Southern Turkmenia). Sovetskaya Arkheologiya 4:238–42.
1976 Nekotorie aspekti sotsiologicheskoi interpretatsii pogrebenii zemledel'tsev eneolita Iuzhnoi Turkmenii (Several aspects of sociological interpretation of burials of agriculturalists of the eneolithic period of South Turkmenia). Sovetskaya Arkheologii 2:5–14.
1986 Sotsial'naya struktura i pogrebal'nii obryad drevnezemled'cheskikh obshchestv (Social structure and burial rituals of early agricultural society). Leningrad: Nauka.

Amiet, P.
1985 La périod IV du tépé Sialk reconsidérée. *In* De l'Indus aux Balkans, recueil Jean Deshayes. J.-L. Hout, ed. Pp. 293–312. Paris: Editions Recherché sur les Civilisations.

Antonius, O.
1936 Zur Abstammung des Hauspferdes. Zeitschrift für Tierzüchtung 34:359–398.

Atagarriev, E., and O. K. Berdiev
1970 The Archaeological Exploration of Turkmenistan. In the Years of Soviet Power. East and West 20:285–306.

Aussavamas, D.
1999 Pottery Analysis from Phanom Wan, Muang District, Nakhon Ratchasima Province. Master's thesis, Silpakorn University, Bangkok, Thailand.

Bakhteyev, F. K., and Z. Y. Yanushevich
1980 Discoveries of Cultivated Plants in the Early Farming Settlements of Yarym-tepe I and Yarym-tepe II in Northern Iraq. Journal of Archaeological Science 7:167–78.

Barber, E. J. W.
1991 Prehistoric Textiles: The Development of Cloth in the Neolithic and Bronze Ages, with Special Reference to the Aegean. Princeton, NJ: Princeton University Press.

Bartol'd, V. V.
1966 [1907] Review of Explorations in Turkestan, Expedition of 1903. *In* Sochineniia: Raboty po Arkheologii, Numizmatike, Epigrafike i Etnografii, pp. 141–53. Moscow: Nauka.

Beale, T.
1986 Excavations at Tepe Yahya, Iran 1967–1975. Cambridge, MA: American School of Prehistoric Research.

Berberian, M., and R. S. Yeats
2001 Contribution of Archaeological Data to Studies of Earthquake History in the Iranian Plateau. Journal of Structural Geology 23:563–584.

Berdiev, O.
1963 Stratigrafia Bamiskogo poselenia (Stratigraphy of the Bami settlement). Sovetskaya Arkheologiya 4:188–194.

Berdiev, O.K.
1966 Chagylly-depe—novii pamyatnik neotich-eskoi Dzheitunskoi kul'turi (Chagylly-depe—A new site of the Djeitun neolithic culture). *In* Materialnaya kul'tura narodov Srednei Azii i Kazakstana. N. A. Kisliakov and M. G. Vorob′eva, eds. Pp. 3–28. Moscow: Akademiia Nauk.
1968 Chakmakli-depe—novii pamyatnik vremeni Anau Ia (Chakmakli-depe—New site of the Anau IA period. *In* Istoriya, Arkheologiya i Etnografiya Srednei Azii. V. M. Masson, ed. Pp. 26–34. Moscow: Nauka.
1969 Drevneishie zemledeltsi Iuzhnogo Turkmenistana (The most ancient Agriculturalists of Southern Turkmenistan). Ashgabat: Ylym.
1972a Chopan depe—pamyatnik neoliticheskoi Dzheitunskoi kul'tury (Chopan depe—a site of the neolithic Djeitun culture). Material'naya Kul'tura Turkmenistana 1:60–86.
1972b Monzhukli-depe—mnogosloinoe poselenie Neolita i rannego Eneolita v iuzhnom Turkmenistane (Mondjukli-depe—a stratified settlement of the Neolithic and early Eneolithic in southern Turkmenistan). Karakumskie Drevnosti 4:11–34.
1974 Keramika vremeni Anau IA (Ceramics of the Anau IA period). *In* Material'naya Kul'tura Turkmenistana, vol. 2. V. Masson, ed. Pp. 5—38. Ashgabat.
1976 Material'naya kul'tura Turkmenistana v period Neolita i rannego Eneolita (Material culture of Turkmenistan in the Neolithic and early Eneolithic). *In* Pervobitnii Turkmenistan. V. Masson, ed. Pp. 14–82. Ashgabat: Ylym.

Berezkin, Y. E.
1989 Eneolitichecheskie svyatilishcha Ilgynly-depe (Eneolithic shrines of Ilgynly-depe). Izvestiia Akademii Nauk Turkmenskoi SSR 6:20–24.
1992 Arkhitekturnii kompleks kak ob'ekt ritual'nogo rasrusheniya (Ilgynly-depe, period Namazga II)(Architectural complex investigated as ritual destruction (Ilgynly-depe, period Namazga II)). Izvestiia Akademii Nauk Turkmenistana: Gymanitarnie Nauka 1992:27–34.

Berezkin, Y. E., and N. F. Solov'eva
1998 Paradnie pomeshcheniya Ilgynly-depe (Ceremonial rooms at Ilgynly-depe.) Arkheologicheskie Vesti 5:86–123.

Binford, L.
1978 Nunamiut Ethnoarchaeology. New York: Academic Press.

Blackman, M. J.
1981 The Mineralogical and Chemical Analysis of Banesh Period Ceramics from Tal-e Malyan, Iran. *In* Scientific Studies in Ancient Ceramics. M. J. Hughes, ed. Pp. 7–20. London: British Museum.

Bottema, S.
1984 The Composition of Modern Charred Seed Assemblages. *In* Plants and Ancient Man. W. van Zeist and W. A. Casparie, eds. Pp. 207–212. Rotterdam: A.A. Balkema.

Braidwood, L. S., R. J. Braidwood, B. Howe, C. A. Reed, and P. J. Watson
1983 Prehistoric Archaeology along the Zagros Flanks. Oriental Institute Publications, 105. Chicago: University of Chicago Press.

Braidwood, R. J., and B. Howe
1960 Prehistoric Investigations in Iraqi Kurdistan. Studies in Ancient Oriental Civilization, 31. Chicago: University of Chicago Press.

Bregel', I.
1959 Etnocheskheskiya karta Iuzhnoi Turkmenii i Khorasana v XVII–XVIII (Ethnic map of Southern Turkmenistan and Khorasan in the 17th and 18th c. AD). Kratkie Soobshcheniya Instituta Etnografii 31:14–26.

Bukinich, D. D.
1924 Istoriya pervobitnogo oroshaemogo zemledeliya v Zakaspiiskoi oblasti v svyazi s voprosom o proiskhozhdenii zemledeliya i skotovodstva (History of primitive irrigation agriculture in the Transcaspian region and its connection with questions concerning the origin of agriculture and herding). Khlopkovoe Delo 3-4:92–135.

Burnham, H. B.
1965 Çatal Hüyük—The Textiles and Twined Fabrics. Anatolian Studies 15:169–74.

Carneiro, R.
1970 A Theory of the Origin of the State. Science 169:733–738.

Casal, J.-M.
1961 Fouilles de Mundigak. Mémoires de la Délégation Archéologique Francaise en Afghanistan 17. Paris: Klinksieck.

Champlin, M. D.
1994 Raphael Pumpelly: Gentleman Geologist of the Gilded Age. Tuscaloosa, AL: University of Alabama Press.

Charles, M., and G. Hillman
1992 Virashchivanie sel'skokhozyaistvennikh kul'tur v pustinnoi zone (po resul'tatam izuchniya karbonizirovannikh rastitel'nikh makroostatkov (Cultivation of domestic plants in the desert zone as seen from carbonized plant macroexamples). *In* Novie Issledovaniya na Poselenii Dzheitun, Materiali IuTAKE 4. V. Masson and D. Harris, eds. Pp. 83–93. Ashgabat: Ylym.

Childe, V. G.
1934 New Light on the Most Ancient East. London: K. Paul, Trench, Trubner and Co..
1953 New Light on the Most Ancient East. New York: Norton.

Clark, J. G. D.
1952 Prehistoric Europe: The Economic Basis. Stanford, CA: Stanford University Press.

Coles, J.
1973 Archaeology by Experiment. New York: Charles Scribner's Sons.

Coolidge, J.
2001 Southern Turkmenistan in the Neolithic: A Petrographic Case Study. Ph.D. dissertation, Oxford University.

Costantini, L.
1984 The Beginning of Agriculture in the Kachi Plain: The Evidence of Mehrgarh. *In* South Asian Archaeology 1981. B. Allchin, ed. Pp. 29–33. Cambridge: Cambridge University Press.

Costantini, L.
1987 Vegetal Remains. *In* Prehistoric and Protohistoric Swat, Pakistan (c. 3000–1400 B.C.). G. Stacul, ed. Pp. 155–165. Rome: IsMEO.

Costantini, L., and L. Biasini
1984 I resti vegetali dei saggi a Qal'eh Ismail Aqa e a Tappeh Gijlar. *In* Tra lo Zagros e l'Urmia. P. E. Pecorella and M. Salvini, eds. Pp. 397–402. Rome: Edizioni ell'Ateneo.

Costantini, L., and L. Costantini Biasini
1993 The Plant Remains. *In* Tell Karrana 3. G. Wilhelm and C. Zaccagnini, eds. Pp. 237–250. Mainz: Verlag Philipp von Zabern.

Costantini, L., and R. H. Dyson, Jr.
1990 The Ancient Agriculture of the Damghan Plain: The Archaeobotanical Evidence from Tepe Hesar. *In* Economy and Settlement in the Near East, Analyses of Ancient Sites and Materials. N. F. Miller, ed. Pp. 46–68. Philadelphia: MASCA.

Courty, M. A., P. Goldberg, and R. Macphail
1989 Soils and Micromorphology in Archaeology. Cambridge: Cambridge University Press.

Daniel, G.
1981 A Short History of Archaeology. London: Thames and Hudson.

De Cardi, B.
1965 Excavations and Reconnaissance in Kalat, West Pakistan: The Prehistoric Sequence in the Surab Region. Pakistan Archaeology 2:85–182.

De Cardi, B.
1970 Excavations at Bampur, a Third Millennium Settlement in Persian Baluchistan, 1966. Vol. 51. New York: Anthropological Papers of the American Museum of Natural History.

Deshayes, J.
1967 Céramiques peintes de Tureng tepe. Iran 5:123–131.

Dietler, M.
2001 Theorizing the Feast: Rituals of Consumption, Commensal Politics, and Power in African Contexts. *In* Feasts: Archaeological and Ethnographic Perspectives on Food, Politics, and Power. M. Dietler and B. Hayden, eds. Pp. 65–114. Washington, DC: Smithsonian Institution Press.

Dive, J., and V. Eisenmann
1991 Identification and Discrimination of First Phalanges from Pleistocene and Modern Equus, Wild and Domestic. *In* Equids in the Ancient World, Vol 2. R. H. Meadow and H.-P. Uerpmann, eds. Pp. 278–333. Wiesbaden: Ludwig Reichert Verlag.

Dolukhanov, P. M.
1981 The Ecological Prerequisites for Early Farming in Southern Turkmenia. *In* The Bronze Age Civilization of Central Asia: Recent Soviet Discoveries. P. L. Kohl, ed. Pp. 359–385. Armonk, NY: M. E. Sharpe.

Driver, H. E.
1961 Indians of North America. Chicago: University of Chicago Press.

Ducos, P.
1968 L'origine des Animaux Domestiques en Palestine. Bordeaux: Institute de Prehistoire de l'Université de Bordeaux.

Duerst, J. U.
1908 Animal Remains from the Excavation at Anau and the Horse of Anau in Its Relation to the History and to the Races of Domesticated Horses. *In* Explorations in Turkestan, Expedition of 1904. R. Pumpelly, ed. Pp. 341–442. Washington, DC: Carnegie Institution of Washington.

Dyson, Jr., R. H.
1965 Problems in the Relative Chronology of Iran 6000–2000 B.C. *In* Chronologies in Old World Archaeology. R. Ehrich, ed. Pp. 215–256. Chicago: University of Chicago Press.
1966 Excavations on the Acropolis at Susa and Problems of Susa A, B and C. Ph.D. dissertation, Harvard University.
1968 Early Work on the Acropolis at Susa. Expedition 10:21–34.
1985 Comments on the Hissar Painted Red Ware. *In* De l'Indus aux Balkans, Recueil Jean Deshayes. J.-L. Huot, ed. Pp. 337–345. Paris: Editions Recherché sur les Civilizations.
1987 The Relative and Absolute Chronology of Hissar II and the Proto-Elamite Horizon of Northern Iran. *In* Chronologies du Proche Orient/ Chronologies in the Near East: Relative Chronologies and Absolute Chronology, 16,000–4,00 B.P., vol. 379. O. Aurenche, J. Evin, and F. Hours, eds. Pp. 647–678. Oxford: BAR International.
n.d. A Preliminary Report of Painted Pottery in Northern Iran. Hasanlu Project Archives, University of Pennsylvania Museum of Archaeology and Anthropology.

Dzhurakulov, M. D., I. Kholiushkin, V. A. Kholiushkina, and B. Batyrov
1980 Samarkandskaya stoyanka i ee mesto v pozdnem paleolite Srednei Azii (The Samarkand site and its place in the late paleolithic of Central Asia). *In* Paleolit Srednei Azii i Vostochnoi Azii. Pp. 51-95. Novosibirsk: Nauka.

Ellison, R., J. Renfrew, D. Brothwell, and N. Seeley
1978 Some Food Offerings from Ur, Excavated by Sir Leonard Woolley, and Some Previously Unpublished. Journal of Archaeological Science 5:167–177.

Emery, I.
1966 The Primary Structure of Fabrics: An Illustrated Classification. Washington, DC: Textile Museum.

Ermolova, N. M.
1968 Kostie ostatki mlekopitaiushchikh iz poselenii epokhi Eneolita i Bronzi Iuzhnogo Turkmenistana (Bone remains of mammals from sites of the Eneolithic and Bronze age of Southern Turkmenistan). Karakumskie Drevnosti 1:48–53.
1983 Skotovodstvo i okhota v tsentralnoi Azii v epokhu Eneolita i Bronzi (po dannim paleozoologii) (Herding and hunting in Central Asia in the Eneolithic and Bronze age (on the basis of paleozoology)). *In* Arkheologiya Srednei Azii i Blizhnevo Vostoka: II Sovetsko-Amerikanskii sympozium, pp. 44–48. Tashkent: Fan.
1984 Paleozoologicheskie dannie o skotovodstve i okhote u drevnego naseleniya Turkmenii v epokhu zheleza (Paleozoological evidence concerning herding and hunting of the ancient populations of Turkmenistan in the Iron age). *In* Rannezhelez vek Sred Azii i Indii. V. M. Masson, ed. Pp. 46–49. Ashgabat: Ylym.
1985 Novie issledovaniya ostatkov mlekopitaiushchikh iz eneolithicheskovo poseleniya Anau (New studies of mammalian remains from the eneolithic settlement of Anau). Izvestiya Akademii Nauk Turkmenskoi SSR: Seriya Obshchectvennikh Nauk 1:85–87.

Ershov, S. A.
1956 Severnoi khlom Anau (The north mound of Anau). Trudi Institut Istorii, Arkheologii i Etnografii 2:24–36.

Fahn, A., E. Werker, and P. Baas
1985 Wood Anatomy and Identification of Trees and Shrubs from Israel and Adjancent Regions. Jerusalem: Israel Academy of Sciences and Humanities.

Fazeli, H., R. A. E. Coningham, and A. M. Pollard
2001 Chemical Characterization of Late Neolithic and Chalcolithic Pottery from the Tehran Plain, Iran. Iran 39:55–71.

Flannery, K. V.
2002 The Origins of the Village Revisited: From Nuclear to Extended Households. American Antiquity 63(3):417-433.

Forsten, A
2000 A Note on the Equid from Anau, Turkestan, "Equus caballus pumpellii" Duerst. *In* Archaeozoology of the Near East IVB. M. Mashkour, A. M. Choyke, H. Buitenhuis, and F. Poplin, eds. Pp. 153-155. Groningen: Centre for Archaeological Research and Consultancy

Foster, G.
1960 Life-expectancy of Utilitarian Pottery in Tzintzuntzan, Michoacan, Mexico. American Antiquity 25:606–608.

Francfort, H. P.
1979 Les Fortifications en Asie Centrale de l'Age du Bronze a l'Epoque Kouchane. Travaux de l'Unite de recherches archeologiques 10. Paris: CNRS.

Frankfort, H.
1924 Studies in Early Pottery of the Near East (part i). London: Royal Anthropological Institute of Great Britain and Ireland.

Ganyalin, A. F.
1953 Arkheologicheskie pamyatniki gornykh raionov Severo-zapadnogo Kopet Daga (Archaeological sites of the mountainous region of the northwest Kopet Dag). Izvestiya Akedemii Nauk Turkmenskoi SSR 5:14–20.
1956 K stratigrafii Namazga-depe (Toward a stratigraphy of Namazga-depe). Trudi Instituta Istorii, Arkheologii i Etnografii Turkmenskoi SSR 2:37–66.
1959 Khlom Ilgynli-depe (The mound of Ilgynli-depe). Trudi Instituta Istorii, Arkheologii i Etnografii Turkmenskoi SSR 5:15–29.

Gardin, J.–C.
1998 Description des Sites et Notes de Synthèse. Prospections Archéologiques en Bactriane Orientale (1974–1978). Paris: Editions Recherché sur les Civilisations.

Gerasimov, I. P.
1978 Ancient Rivers in the Deserts of Soviet Central Asia. *In* The Environmental History of the Near and Middle East Since the Last Ice Age. W. C. Brice, ed. Pp. 319–334. New York: Academic Press.

Ghirshman, R.
1938 Fouilles de Sialk près de Kashan 1933, 1934, 1937. Paris: Geuthner.

Gimbutas, M.
1976 Neolithic Macedonia as Reflected by Excavation at Anza, Southeast Yugoslavia. Monumenta Archaeologica 1. Los Angeles: Institute of Archaeology, University of California.

Gimbutas, M., S. Winn, and D. Shimabuku
1989 Achilleion. A Neolithic Settlement in Thessaly, Greece, 6400–5600 B.C. Los Angeles: Institute of Archaeology, UCLA.

Golyeva, A. A.
1995 An Experience in Using Phytolithic Analysis in Soil Science. Eurasian Soil Science 12:1498–1503.
1997 Biomorfnie analiz kak sostavnaya chast' genetiko-morfologicheskogo issledovaniya pochvi (Biomorph analysis as a component of the genetic and morphological study of soil). Pochvovedeniye 30:927–936.
1999 Rastitel'nie podstilki epokhi bronzi Kalmykii (Bronze age organic mats of Kalmykia). *In* Tekstil' epokhii Bronzi evraziiskikh stepei. N. Shishlina, ed. Pp. 185–203. Moscow: State Historic Museum.
2001 Fitolity i ikh informatsionnaya rol' v izuchenii prirodnyh i arkheologicheski ob'ektov (Phytoliths and their information role in natural and archaeological sites). Moscow: Syktyvkar.

Golyeva, A. A., A. L. Aleksandrovskii, and L. K. Tselishcheva
1995 Phytolithic Analysis of Holocene Paleosols. Eurasian Soil Science 12:46–56.

Gordon, D. H.
1953 Fire and Sword: The Technique of Destruction. Antiquity 27:149–153.

Grave, M. K.
1957 Severnaya podgornaya ravina Kopetdaga (The northern foothill plain of the Kopet Dag). Moscow: Nauka.

Gromova, V. I.
1940 Materiali k izuchenniu drevneishikh domashnikh zhivotnikh Srednei Azii (po raskopkam Kaunchi-tepi v 1937 g) (Contributions to the study of ancient domestic animals of Central Asia (on the basis of excavations of Kaunchi-tepe in 1937)). *In* Kaunchi-tepa. G. V. Grigor'ev, ed. Pp. 41–62. Tashkent: Fan.
1949 Istoriya loshadei (Roda Equus) v Starom Svete (History of the horse (Roda Equus) in perspective). Vol. 17. Moscow: Paleontologicheski Institut, Akademii Nauk SSSR.

Hakemi, A.
1997 Shahdad: Archaeological Excavations of a Bronze Age Center in Iran. Rome: IsMEO.

Harlan, J. R.
1968 On the Origin of Barley. *In* Barley: Origin, Botany, Culture, Winter Hardiness, Genetics, Utilization, Pests. G.A. Wiebe, ed. Pp. 9-31. Washington, DC: Agricultural Research Service.

Harris, D.
1997a First Farmers were Colonists After All. British Archaeology.. September:8–9.
1997b Jeitun and the Transition to Agriculture in Central Asia. Archaeology International 1:28–31.

Harris, D. R., and C. Gosden
1996 The Beginnings of Agriculture in Western Central Asia. *In* The Origins and Spread of Agriculture and Pastoralism in Eurasia. D. R. Harris, ed. Pp. 370–389. Washington, DC: Smithsonian Institution Press.

Harris, D. R., C. Gosden, and M. P. Charles
1996 Djeitun: Recent Excavations at an Early Neolithic Site in Southern Turkmenistan. Proceedings of the Prehistoric Society 62:423–442.

Harris, E.
1979 Principles of Archaeological Stratigraphy. New York: Academic Press.

Harrison, N., and N. F. Miller
1995 Preliminary Archhaeobotanical Findings from Anau, 1994 Excavations. In Progress Report: Harvard-IuTAKE Excavations at Anau South, Turkmenistan. F. Hiebert, ed. Pp. 28–35. Cambridge, MA: Harvard University Near East Archaeology Lab.

Hauser, W., J. M. Upton, and C. K. Wilkinson
1938 The Iranian Expedition, 1937: The Museum's Excavations at Nishapur. Bulletin of the Metropolitan Museum of Art 33, sect. 11:3–23.

Helbaek, H.
1969 Plant Collecting, Dry-farming, and Irrigation Agriculture in Prehistoric Deh Luran. *In* Prehistory and Human Ecology of the Deh Luran Plain. F. Hole, K. V. Flannery, and J. A. Neely, eds. Pp. 383–426. Ann Arbor, MI: University of Michigan Museum of Anthropology.

Hemphill, B., B. Christensen, and S. Mustafakulov
1997 Trade or Travel: An Assessment of Interpopulational Dynamics among Bronze Age Indo-Iranian Populations. *In* South Asian Archaeology 1995. B. Allchin, ed. Pp. 863-879. New Delhi: Oxford and IBH Publishing.

Heptner, V.G., A. A. Nasimovitch, and A. G. Bannikov
1961 Mammals of the USSR, Artiodactyl and Perissodactyla. Moscow: Vysshaya Shkola.

Hiebert, F.
1992 The Oasis and City of Merv (Turkmenistan). Archeologie Islamique 3:111–127.
1994 Origins of the Bronze Age Oasis Civilizations of Central Asia. Bulletin of the American School of Prehistoric Research 42. Cambridge, MA: Peabody Museum of Archaeology and Ethnology.
1999 In Search of Anau's Past. Expedition 41:4–5.
N.d. Five Seasons of Excavations at Anau South, Turkmenistan: 1994–2000. Iran 41.

Hiebert, F. Ed.
1995 Progress Report: Harvard—IuTAKE Excavations at Anau South, Turkmenistan. Cambridge, MA: Harvard University Near East Archaeology Lab.

Hiebert, F., and R. H. Dyson, Jr.
2002 Prehistoric Nishapur and the Frontier between Central Asia and Iran. Iranica Antiqua 37:111–147.

Hiebert, F., and K. M. Moore
1993 New Stratigraphic Excavations at Gonur Depe (North): Excavations of Spring 1989. Information Bulletin 19:78–95.

Hillman, G.
N.d. Criteria for Distinguishing Rachis Remains of Naked (i.e. Free-Threshing) 4x and 6x Wheats. Unpublished manuscript, MASCA, University of Pennsylvania Museum of Archaeology and Anthropology, Philadelphia.

Hilzheimer, M.
1935 The Evolution of the Domestic Horse. Antiquity 9:133-139.

Hole, F. Ed.
1987 The Archaeology of Western Iran. Washington, DC: Smithsonian Institution Press.

Horne, L.
1993 Occupational and Locational Instability in Arid Land Settlement. *In* Abandonment of Settlements and Regions: Ethnoarchaeological and Archaeological Approaches. C. M. Cameron and S. Tomka, eds. Pp. 43–53. Cambridge: Cambridge University Press.
1994 Village Spaces: Settlement and Society in Northeastern Iran. Washington, DC: Smithsonian Institution Press.

Huntington, E.
1919 The Pulse of Asia: A Journey in Central Asia Illustrating the Geographic Basis of History. New York: Houghton Mifflin.

Hurley, W. M.
1979 Prehistoric Cordage: Identification of Impressions on Pottery. Chicago: Aldine.

Jarrige, C., J.–F. Jarrige, R. Meadow, and G. Quivron. Editors
1995 Mehrgarh: Field Reports 1974-1985—From Neolithic Times to the Indus Civilization. Karachi: Government of Sindh, Department of Culture and Tourism.

Jones, R. L., and A. H. Beavers
1964 Aspects of Catenary and Depth Distribution of Opal Phytoliths in Illinois Soils. Soil Science Society of America Proceedings 28:413–416.

Jusopov, K., and A. A. Lyapin
1998 A. A. Marushchenko: arkhivnie materiali (A. A. Marushchenko: archival materials). *In* Kulturnie Tsennosti: 1996. R. Muradov, ed. Pp. 141–161. St. Petersburg: Evropeiskii Dom.

Kamakhina, G. L.
1994 Kopetdagh—Khorassan Flora: Regional Features of Central Kopetdagh. *In* Biogeography and Ecology of Turkmenistan. V. Fet and K. I. Atamuradov, ed. Pp. 129–148. Dordrecht: Kluwer.

Kamp, K. A.
1991 Waste Disposal in a Syrian Village. *In* The Ethnoarchaeology of Refuse Disposal, Anthropological Research Papers no. 42. E. Staski and L. D. Sutro, eds. Pp. 23–31. Tucson, AZ: Arizona State University.

Karmysheva, B. K.
1969 Bytovoi uklad naceleniya (Social structure of the population). *In* Etnograficheski Ocherki Uzbekskogo Sel'skogo Naseleniya. G. P. Vasil'eva and B. K. Karmysheva, eds. Pp. 114–192. Moscow: Nauka.

Kasparov, A. K.
1992 Kostnie ostatki poseleniya Dzheitun v Iuzhnom Turkmenistane (Bone remains from the site of Djeitun in Southern Turkmenistan). *In* Novie Issledovaniya na Poselenii Dzheitun. V. M. Masson and D. Harris, eds. Pp. 50–76. Ashgabat: Ylym.
1994a Environmental Conditions and Farming Strategy of the Protohistoric Inhabitants of South-Central Asia. Paléorient 20:143–149.
1994b Patterns in Caprine Exploitation at Ilgynli-depe, Turkmenistan. *In* New Archaeological Discoveries in Asiatic Russia and Central Asia. V. M. Masson, ed. Pp. 36–38. St. Petersburg: Russian Academy of Sciences.
2000 Zoomorphological Statuettes from Eneolithic Layers at Ilgynly Depe and Altyn Depe in Southern Turkmeniya. *In* Archaeozoology of the Near East IVB. M. Mashkour, A. M. Choyke, H. Buitenhuis, and F. Poplin, eds. Pp. 156–163. Groningen: Centre for Archaeological Research and Consultancy.

Khlopin, I. N.
1961 Dashlidzhi-depe i eneoliticheskie zemledel'tsi Iuzhnogo Turkmenistana (Dashlidzhi-depe and the Eneolithic agriculturalists of Southern Turkmenistan). Trudi IuTAKE 10:134–224.
1963a Pamyatniki rannego Eneolita Iuzhnoi Turkmenii (Sites of the Early Eneolithic of Southern Turkmenistan). SAI B 3-8. Moscow: Akademiia Nauk.
1963b Yalangach-depe—poselenii epokhi eneolita (Yalangach-depe—settlements of the Eneolithic period). Kratkie Soobshcheniya—Institut Arkheologii, Akademii Nauk SSSR 93:74–79.
1964 Geoksyurskaya gruppa poselenii epokhi Eneolita (Eneolithic Geoksyur group of settlements). Moscow: Akademiia Nauk SSSR.
1969 Pamyatniki razvitogo eneolita Iug-Vostochnoi Turkmenii (Sites of the developed Eneolithic of Southeast Turkmenia). SAI B3-8. Moscow: Akademiia Nauk SSSR.
1997 Eneolit Iugo-Zapadnogo Turkmenistana (The Eneolithic of Southwest Turkmenistan). St. Petersburg: Evropeiskii Dom.

Kircho, L. B.
1972 Stratigrafiya Altyn-depe i kolich estestvennii metod opredeleniya otnositelnoi khronologii (The stratigraphy of Altyn-depe and a quantitative scientific method of determining relative chronology). Karakumskie Drevnosti 4:172–176.
1999 K izucheniiuiu pozdnogo Eneolita Iuzhnogo Turkmenistan (Toward studies of the late Eneolithic in southern Turkmenistan). St. Petersburg: Rossiskaia Akademiia Nauk.

Kohl, P. L. Ed.
1981 The Bronze Age Civilization of Central Asia: Recent Soviet Discoveries. Armonk, NY: M. E. Sharpe.
1984a Central Asia: Paleolithic Beginnings to the Iron Age. Paris: Editions Recherche sur les Civilisations.
1984b Prehistoric Turan and Southern Turkmenia: The Problem of Cultural Diversity. *In*

Frontiers of the Indus Civilization: Sir Mortimer Wheeler Commemoration Volume. G. Lal and Asthana, eds. Pp. 321–331. New Delhi: Books & Books.
1989 The Use and Abuse of World Systems Theory: The Case of the Pristine West Asian State. *In* Archaeological Thought in America. C. C. Lamberg-Karlovsky, ed. Pp. 218–240. Cambridge: Cambridge University Press.
1992 Central Asia (Western Turkestan): Neolithic to the Early Iron Age. *In* Chronologies in Old World Archaeology. R. Ehrich, ed., 3rd edition. Chicago: University of Chicago Press, pp. (I) 179-195; (II) 154-162.

Komarov, A. V.
1900 Arkheologiya v Zakaspiskiiskoi krae (Archaeology in the Transcaspian region). Protokoli Turkestanskogo Kruzhka Liubitelei Arkheologii.
n.d. Otchet (Report). Arkhiv Petrogradskoi Arkheologicheskoi Komissii, delo 24, 47. St. Petersburg: Institute of Material Culture.

Korobkova, G. F.
1969 Orudiya Trudya i khozyaistvo Neoliticheskikh plemen Srednei Azii (Tool working and the economy of Neolithic tribes of Central Asia). MIA 158. Leningrad: Nauka.
1981 Ancient Reaping Tools and Their Productivity in the Light of Experimental Tracewear Analysis. *In* The Bronze Age Civilization of Central Asia: Recent Soviet Discoveries. P. L. Kohl, ed. Pp. 325–349. Armonk, NY: M. E. Sharpe.

Kramer, C.
1982 Village Ethnoarchaeology: Rural Iran in Archaeological Perspective. New York: Academic Press.

Kuftin, B. A.
1954 Raboti IuTAKE v 1952g. po izucheniiu kul'tur Anau (The work of IuTAKE in 1952 concerning the study of the Anau culture). Izvestiya Akademii Nauk Turkmenskoi SSR: Seriya Obshchestvennikh Nauk 1:21–25.
1956 Polevoi otchet: O rabote XIV otrade IuTAKE po izucheniiu kulturi pervobit-nooshchinikh osedlozemledelcheskikh poselenii epokhu medu i bronzi v 1952 g (Field report: On the work of the 14th brigade of IuTAKE concerning the study of primitive settled-agriculturalist settlement of the Copper and Bronze ages in 1952). *In* Trudi IuTAKE 2: 260–290. Ashgabat.

Kurbanov, D.
1994 Flora of Kopetdagh. *In* Biogeography and Ecology of Turkmenistan. V. Fet and K. I. Atamuradov, eds. Pp. 105–128. Dordrecht: Kluwer.

Kurbansakhatov, K.
1980 Raskopki severnogo khloma Anau (Excavations of Anau's northern mound). *In* Arkheologicheskie Otkritiya–1979 goda, pp. 464. Moscow: Akademiia Nauk.
1983 Stratigraficheskoe izuchenie verkhnikh sloev severnogo kholma Anau (Stratigraphic study of the upper layers of Anau's northern mound). Sovetskaya Arkheologiya 1:30–46.
1987 Eneolit Anau (Eneolithic Anau). Ashgabat: Ylym.

Kushnareva, K. K.
1997 The Southern Caucasus in Prehistory: Stages of Cultural and Socioeconomic Development from the Eighth to the Second Millennium BC. Philadelphia: University of Pennsylvania Museum of Archaeology and Anthropology.

Lamberg-Karlovsky, C. C.
1973 Prehistoric Central Asia: A Review. Antiquity 47:43–46.
1981 Afterword. *In* The Bronze Age Civilizations of Central Asia. P. Kohl, ed. Pp. 386–397. Armonk, NY: M. E. Sharpe.
1986 Note: Sequential Slab Construction. *In* Excavations at Tepe Yahya, Iran 1967–1975. C. C. Lamberg-Karlovsky, ed.. Cambridge, MA: American School of Prehistoric Research.
1989 Mesopotamia, Central Asia and the Indus Valley: So the Kings were Killed. *In* Archaeological Thought in America. C. C. Lamberg-Karlovsky, ed. Pp. 241–267. Cambridge: Cambridge University Press.

Lamberg-Karlovsky, C. C., and M. Tosi
1974 Shahr-i Sokhta and Tepe Yayha: Tracks on the Earliest History of the Iranian Plateau. East and West 23:21–53.

Legge, A. J.
1992 Soderzhanie ovets i koz na Dzheitune. *In* Novie Issledovaniya na Poselenii Djeitun. V. M. Masson, ed. Pp. 77–83. Ashgabat: Ylym.

Leroi-Gourhan, A.
1982 The Archaeology of Lascaux Cave. Scientific American 246:80–88.

Levina, V. A.
1952 Pozdnee gorodishche Anau (The late city-site of Anau). Trudi IuTAKE 2:344–378.

Lisitsyna, G. N.
1968 Rastitel'nost Iuzhnoi Turkmenii v VI–I t.l. do n.e. po dannim opredeleniy uglei (Vegetation of Southern Turkmenistan in the 6th–1st c. BC on the basis of charcoal identification). Karakumskie Drevnosti 2:51–57.
1978 Stanovlenie i Razvitie Oroshaemovo Zemledeliya v Iuzhnoi Turkmenii (Evolution and development of irrigation agriculture in Southern Turkmenistan). Moscow: Nauka.
1981 Stanovlenie selskokhozyaistvennovo proizvodstva v aridnikh raionakh SSSR (Evolution of agricultural production in arid regions of the USSR). *In* Stanovlenie Proizvidstva v Epokhu Eneolita i Bronzi. B. Kolchin and E. Saiko, eds. Pp. 49–71. Moscow: Nauka.

Lisitsyna, G. N., and K. P. Popov
1988 On the Woody Vegetation in the Lowlands of South Turkmenistan during the Neolithic, Aeneolithic, Bronze, and Early Iron Ages. Izvestiia Akademii Nauk Turkmenskoi SSR, Seriia Biologicheskikh Nauk 1:68–70.

Litvinskii, B. A.
1952 Namazga-depe po dannim raskopok 1949–1950 gg. (Namazga-depe on the basis of the results of excavations in 1949–1950). Sovetskaya Etnografiya:30–52.

Lollekova, O.
1988 Lokal'naya variabil'nost' v kul'ture i khozyaistve Dzheitunskikh plemen (Local variability in culture and production of the Djeitun tribes). Ashgabat: Ylym.

Ludholm, B.
1947 Abstammung und Domestikation des Hauspferdes. Zoologiska Birdrag från Uppsala 27:1–287.

Lyonnet, B.
1981 Etablissements Chalcolithiques dans le nord-est de l'Afghanistan: Leurs rapports avec les civilisations du bassin de l'Indus. Paléorient 7:57–74.
1997 Céramique et Peuplement du Chalcolithique à la Conquête Arabe. Prospections Archéologiques en Bactriane Orientale (1974–1978). Paris: Editions Recherche sur les Civilisations.

Majidzadeh, Y.
1981 Sialk III and the Pottery Sequence at Tepe Gabristan. Iran 19:141–146.

Marushchenko, A. A.
1939 Anau. Istoricheskaya spravka (Anau. Historical information). *In* Arkhitekturnie Pamyatniki Turkmenii, pp. 95–101. Moscow: Akademiia Arkhitekturi SSSR.

Marushchenko, A. A. 1956. Itogi polevikh arkheologicheskikh rabot 1953 g. (Results of field archaeological work in 1953). Trudi Institut Instori i Arkheologii 2:5–10.

Masson, M. E.
1953 IuTAKE 1947 g. (IuTAKE 1953). Trudi IuTAKE 2:7–72.
1955 Kratkaya khronika polevikh rabot IuTAKE za 1948-1952 gg. (Short chronicle of IuTAKE's field work 1948-1952). Trudi IuTAKE 5:197–249.

Masson, V. M.
1956 Raspisnaya keramika Iuzhnoi Turkmenii po raskopkam B.A.Kuftina (Painted pottery of Southern Turkmenistan on the basis of V. A. Kuftin's excavations). Trudi IuTAKE 7:291–373.
1959 Drevnezemledelcheskaya kultura Margiani (The ancient agricultural culture of Margiana). Materiali i Issledovaniya po Arkheologii SSSR, 73. Moscow: Nauka.
1961a Iuzhno-Turkmenistanskii tsentr rannezemledel'cheskikh kul'tur. Trudi IuTAKE 10:11–36.
1961b Kara-depe u Artika (Kara-depe at Artika). Trudi IuTAKE 10:319–463.
1962 Pamyatniki razvitogo Eneolita Iugo-Zapadnoi Turkmenii (Sites of the developed eneolithic of Southwestern Turkmenia). SAI B3-8. Moscow–Leningrad: Academiia Nauk.

1968 Urban Revolution in Southern Turkmenia. Antiquity 42:178–187.
1971 Poselenie Djeitun (The Djeitun settlement). Materiali i Issledovaniya po Arkheologii SSSR, 180. Moscow: Nauka.
1981 Altyn-depe. Trudi IuTAKE 18. Moscow: Nauka.
1982 Eneolit Srednei Azii (Eneolithic Central Asia). *In* Eneolit SSSR. V. Masson and N. Merpert, eds. Pp. 9–92. Moscow: Nauka.
1989 Pervie tsivilizatsii (First civilizations). Leningrad: Nauka.

Masson, V. M., Y. Berezkin, and N. F. Solovyeva
1994 Excavations of House and Sanctuaries at Ilgynly-depe, Chalcolithic Site, Turkmenistan. *In* New Archaeological Discoveries in Asiatic Russia and Central Asia. V. M. Masson, ed. Pp. 18–26. St. Petersburg: Russian Academy of Sciences.

Masson, V. M., and D. Harris, eds.
1992 Novie issledovaniya na poselenii Djeitun (New studies on the Djeitun settlement). Ashgabat: Ylym.

Masson, V. M., and V. I. Sarianidi
1972 Central Asia: Turkmenia Before the Achaemenids. New York: Praeger.

Matthews, W., C. French, T. Lawrence, D. Cutler, and M. Jones
1997 Microstratigraphic Traces of Site Formation Processes and Human Activities. World Archaeology 29(2):281–308.

McCown, D. E.
1942 The Comparative Stratigraphy of Early Iran. Studies in Ancient Civilization, 23. Chicago: University of Chicago Press.

Miller, N. F.
1984 The Use of Dung Fuel: An Ethnographic Model and an Archaeological Example. Paléorient 10:71–79.
1992 The Origins of Plant Cultivation in the Near East. *In* The Origins of Agriculture: An International Perspective. C. W. Cowan and P. J. Watson, eds. Pp. 39–58. Washington, DC: Smithsonian Institution Press.
1993 Preliminary Archaeobotanical Results from Gonur. Information Bulletin 19:149–163.
1996 Hacenebi Tepe 1993: Archaeobotanical Report. American Journal of Archaeology 100: 248–257.
1998 Farming and Herding along the Euphrates: Environmental Constraint and Cultural Choice (fourth to second millennia B.C.). *In* MASCA Research Papers in Science and Archaeology 14, pp. 123–132. Philadelphia: University of Pennsylvania Museum of Archaeology and Anthropology.
1999 Agricultural Development in Western Central Asia in the Chalcolithic and Bronze Ages. Vegetation History and Archaeobotany 8:13–19.

Mills, B.
1999 Ceramics and the Social Contexts of Food Consumption in the Northern Southwest. *In* Pottery and People. J. Skibo and G. Feinman, eds. Pp. 99–114. Salt Lake City, UT: University of Utah Press.

MITT
1938-39 Materiali po istorii Turkmen i Turkmenii (Materials concerning the history of Turkmen and Turkmenia). Moscow: Institut Vostokovedeniya.

Mollison, T.
1908 Description of Some Human Remains Found in the North Kurgan, Anau. *In* Explorations in Turkestan, Expedition of 1904: Origin, Growth and Influence of Environment. R. Pumpelly, ed. Pp. 449–468. Washington, DC: Carnegie Institution of Washington.

Montgomery, B.
1993 Ceramic Analysis as a Tool in Discovering Processes of Pueblo Abandonment. *In* Abandonment of Settlements and Regions: Ethnoarchaeological Approaches. C. M. Cameron and S. Tomka, eds. Pp. 157–164. Cambridge: Cambridge University Press.

Moore, K. M., N. Miller, F. Hiebert, and R. Meadow
1994 Agriculture and Herding in the Early Oasis Settlements of the Oxus Civilization. Antiquity 68:418–427.

Moore, P. D., J. A. Webb, and M. E. Collinson
1991 Pollen Analysis. Oxford: Blackwell.

Morgan, J.-J. de
1899 Fouilles à Suse 1897–1898. Revue Archéologique 34:15–36, 161–187.
1900 Travaux de l'hiver 1897–1898. Mémoires de la Délégation en Perse 1.
1909 Les Premieres Civilisations. Paris: Ernest Leroux.

Muhammad, M. A. Q.
1968 Preliminary Report on the Excavations Carried Out in the Temple of Luxor, Seasons 1958-1959 & 1959-1960. Annales du Service des Antiquites de l'Egypte 60:227–279.

Munchaev, R.
1975 Kavkaz na zare bronzovogo veka (The Caucasus at the dawn of the Bronze Age). Moscow: Nauka.

Munchaev, R., and N. Merpert
1981 Rannezemledel'skie poseleniya Mesopotamii (Early agricultural settlements in Mesopotamia). Moscow: Nauka.

Nadel, D., E. Daniin, E. Werker, T. Schick, M. E. Kislev, and K. Stewart
1994 19,000-year old Twisted Fibers from Ohalo II. Current Anthropology 35:451–457.

Neff, R.
1991 Plant Remains from Archaeological Sites in Lowland Iraq: Tell el'Oueili. *In* 'Oueili, Travaux de 1985. J.-L. Hout, ed. Pp. 321–329. Paris: Editions Recherché sur les Civilisations.

Nichols, I.
1990 The Proto-Elamite Settlement at TUV. Vol. I. Malyan Excavation Reports. Philadelphia: University of Pennsylvania Museum of Archaeology and Anthropology.

Norton, R.
1905 Report on Archaeological Remains in Turkestan. Supplementary Papers of the American School of Classical Studies in Rome 1:196–216.

O'Donovan, E.
1882 The Merv Oasis. Travels and Adventures East of the Caspian During the Years 1879–80–81, 1970 repr. ed. London: Smith, Elder and Co.

Orazov, A.
1975 O tipakh skotovodstva v Akhale v kontse 19–nachale 20 v. (Concerning the types of herders in the Akhal region at the end of 19th–beginning of 20th century). *In* Khozyaistvenno–Kul'turnie traditsii narodov Srednei Azii i Kazakhstana, pp. 206–219. Moscow: Nauka.

Orlovsky, N. S.
1994 Climate of Turkmenistan. *In* Biogeography and Ecology of Turkmenistan. V. Fet and K. I. Atamuradov, eds. Pp. 23–48. Dordrecht: Kluwer.

Payne, S., and G. Bull
1988 Components of Variation in Measurements of Pig Bones and Teeth, and the Use of Measurements to Distinguish Wild from Domestic Pig Remains. Archaeozoologia 2:27–65.

Peake, H., and H. Fleure
1927 Peasants and Potters. London: Oxford University Press.

Pearsall, D. M.
1989 Paleoethnobotany: A Handbook of Procedures. New York: Academic Press.

Petrie, W. M. F.
1911 The Revolutions of Civilization. London:Harper and Brothers.

Pilipko, V.
2000 Archaeological Sites of the Keltechinar River Valley (Southern Turkmenistan). Information Bulletin 22:163–187.

Piperno, D. R.
1988 Phytolith Analysis: An Archaeological and Geological Perspective. San Diego, CA: Academic Press.

Pittman, H.
1994a The Glazed Steatite Glyptic Style: The Structure and Function of an Image System. Berliner Beitrage zum Vorderen Orient 16. Berlin: Dietrich Reimer Verlag.
1994b Towards an Understanding of the Role of Glyptic Imagery in the Administrative Systems in Proto–literate Greater Mesopotamia. *In* Archives Before Writing. P.

Ferioli, E. Fiandra, G. G. Fissori, and M. Frangipane, eds. Pp. 177–203. Turin: Ministero per i beni culturali e ambientali.
1997 The Administrative Function of Glyptic Art in Proto-Elamite Iran. Res Orientales 10:133–153.
2001 Glyptic Art of Period IV. *In* Excavations at Tepe Yahya, Iran 1967–1975: The Third Millennium. C. C. Lamberg-Karlovsky, gen. ed. Pp. 231–268. Cambridge, MA: American School of Prehistoric Research.

Popov, K. P.
1994 Trees, Shrubs and Semi-shrubs in the Mountains of Turkmenistan. *In* Biogeography and Ecology of Turkmenistan. V. Fet and K. I. Atamuradov, eds. Pp. 173–186. Dordrecht: Kluwer.

Potts, D.
2001 Excavations at Tepe Yahya, Iran 1967–1975: The Third Millennium. Cambridge, MA: American School of Prehistoric Research.

Pugachenkova, G.
1985 Anaw. *In* Encyclopedia Iranica II/1. E. Yarshater, ed. Pp. 3–4. London: Routledge & Kegan Paul.

Pumpelly, R.
1902 Ancient Anau and the Oasis World. Grant application to the Carnegie Institution of Washington, Washington, DC.
1906 Interdependent Evolution of Oases and Civilizations. Geological Society of America Bulletin 17:637–670.
1918 My Reminiscences. New York: Henry Holt.

Pumpelly, R. Ed.
1905 Explorations in Turkestan, Expedition of 1903. Washington, DC: Carnegie Institution of Washington.
1908 Explorations in Turkestan, Expedition of 1904. Washington DC: Carnegie Institution of Washington.

Pumpelly, R. W.
1908 Physiography of Central Asian Deserts and Oases. *In* Explorations in Turkestan, Expedition of 1904. R. Pumpelly, ed. Pp. 243–337. Washington, DC: Carnegie Institution of Washington.

Raikes, R.
1965 The Ancient Gabarbands of Baluchistan. East and West 15:3–12.

Raikes, R., and R. H. Dyson, Jr.
1961 The Prehistoric Climate of Baluchistan and the Indus Valley. American Anthropologist 63:265–281.

Rempel', L. I.
1953 Novie materiali k izucheniiu drevnei skul'p-turi Iuzhnoi Turkmenii (New materials concerning the study of ancient sculpture of Southern Turkmenia). Trudi IuTAKE 2:169–192.

Renfrew, J.
1984 Cereals Cultivated in Ancient Iraq. Bulletin on Sumerian Agriculture 1:32–44.

Ricciardi, R. V.
1980 Archaeological Survey in the Upper Atrek Valley (Khorassan, Iran): Preliminary Report. Mesopotamia 15:51–72.

Rimantiene, R.
1979 Šventoji. Vilnius: Mokslas.

Rodden, R. J.
1962 Excavations at the Early Neolithic Site of Nea Nikomedeia, Greek Macedonia. Prehistoric Society: Proceedings 28:267–288.

Roller, E.
1889 Das Transkaspigebiet in archaologischer Beziehung. Petermanns Mitteilungen 35:158–163.

Rosen, A. M.
1986 Cities of Clay: the Geoarchaeology of Tells. Chicago: University of Chicago Press.
1992 Preliminary Identification of Silica Skeletons from Near Eastern Archaeological Sites: An Anatomical Approach. *In* Phytolith Systematics. G. Rapp, Jr., and S. C. Mulholland, eds. Pp. 129–147. New York: Plenum Press.
1994 Identifying Ancient Irrigation: A New Method using Opaline Phytoliths from Emmer Wheat. Journal of Archaeological Science 21:125–132.

Rothman, M.
2002 Tepe Gawra: The Evolution of a Small, Prehistoric Center in Northern Iraq. Philadelphia: University of Pennsylvania Musuem of Archaeology and Anthropology.

Saiko, E. V.
1982 Tekhnika i tekhnologiya keramichiskogo proizvodstva Srednei Azii v istoricheskom Razvitii (Techniques and the technology of ceramic production of Central Asia in historical perspective). Moscow: Nauka.

Sarianidi, V. I.
1961 Eneoliticheskoe poselenie Geoksyur (Eneolithic settlements of Geoksyur). Trudi IuTAKE 10:225–318.
1963 Keramicheskie gorni vostochnoanauskikh poselenii (Ceramic kilns of the eastern Anau settlements). Kratkie Soobshcheniya, Institut Arkheologii, Akademiia Nauk 93:80–85.
1965 Pamyatniki poznego Eneolita Iugo-vostochnoi Turkmenii (Sites of the late Eneolithic of Southeast Turkmenia). Svod Arkheologicheskikh Istochnikov 3-8. Moscow: Academiia Nauk SSSR.
1968 The Lapis-lazuli Route in the Ancient East. Archaeology 24:12–15.
1976 Issledovanie pamyatnikov Dashlinskogo Oazisa (The study of sites of the Dashli oasis). Drevnyaya Baktriya 1:21–86.
1983 The Pottery of Shahr–i Sokhta I and Its Southern Turkmenian Connections. *In* Prehistoric Sistan 1. M. Tosi, ed. Pp. 183–198. Rome: Istituto Italiano per il Medio ed Estremo Oriente.
1998 Margiana and Protozoroastrianism. Athens: Kapon.
2002 Murgash: Ancient Oriental Kingdom in the Old Delta of Murghab river. Ashgabat: Turkmendowlethabarlary.

Schellenberg, N. S.
1908 Wheat and Barley from the North Kurgan, Anau. *In* Explorations in Turkestan, Expedition of 1904. R. Pumpelly, ed. Pp. 471–474. Washington, DC: Carnegie Institution of Washington.

Schick, T.
1986 Perishable Remains from the Nahal Hemar Cave. Journal of the Israel Prehistoric Society 19:84–86.

Schiffer, M.
1975 Archaeology as Behavioral Science. American Anthropologist 77:836–848.
1976 Behavioral Archaeology. New York: Academic Press.
1987 Formation Processes of the Archaeological Record. Albuquerque, NM: University of New Mexico Press.

Schmidt, E. F.
1937 Excavations at Tepe Hissar Damghan. Philadelphia: University of Pennsylvania Museum of Archaeology and Anthropology.

Schmidt, H.
1908 Archaeological Excavations in Anau and Old Merv. *In* Explorations in Turkestan: Expedition of 1904. R. Pumpelly, ed. Pp. 83–216. Washington, DC: Carnegie Institution of Washington.

Schortman, E., and P. Urban
1994 Living on the Edge: Core/periphery Relations in Ancient Southeastern Mesoamerica. Current Anthropology 35:401–430.

Semenov, S. A.
1964 Prehistoric Technology. London: Cory, Adams, and MacKay.

Shaffer, J. G.
1992 The Indus Valley, Baluchistan, and Helmand Traditions, Neolithic through Bronze Age. *In* Chronologies in Old World Archaeology. R. W. Ehrich, ed. Pp. 1: 441–464, 2: 425–446. Chicago: University of Chicago Press.

Shahmirizade, S. M.
1977 Tepe Zagheh: A Sixth Millennium BC Village in the Qazvin Plain of the Central Iranian Plateau. Ph.D. dissertation: University of Pennsylvania.

Soffer, O., J. M. Adovasio, and D. C. Hyland
2000 The Venus Figurines: Textiles, Basketry, Gender and Status in the Upper Paleolithic. Current Anthropology 41:511–538.

Soffer, O., J. M. Adovasio, D. C. Hyland, B. Klíma, and J. Svoboda
1998 Perishable Technologies and the Genesis of the Eastern Gravettian. Anthropologie 36:43–68.

Stark, M.
1994 Pottery Exchange and the Regional System: A Dalupa Case Study. *In* Kalinga Ethnoarchaeology: Archaeological Method and Theory, vol. 169–198. W. Longacre and J. Skibo, eds. Washington, DC: Smithsonian Institution Press.

Stoltman, J.
1999 The Chaco-Chuska Connection: In Defense of Anna Shepard. *In* Pottery and People: A Dynamic Interaction. J. Skibo and G. Feinman, eds. Pp. 9–24. Salt Lake City, UT: University of Utah Press.

Struve, V. V.
1969 The Problem of the Genesis, Development and Disintegration of the Slave Societies in the Ancient Orient. *In* Ancient Mesopotamia, 1933 original edition. I. Diakanoff, ed. Pp. 17–69. Moscow: Nauka.

Suslov, S. P.
1961 Physical Geography of Asiatic Russia. San Francisco: W. H. Freeman.

Szabo, A., and T. Barfield.
1991 Afghanistan: An Atlas of Indigenous Domestic Architecture. Austin, TX: University of Texas Press.

Tosi, M.
1973 The Northeastern Frontier of the Ancient Near East. Mesopotamia 3-9:21–76.
1989 The Origins of Early Bactrian Civilization. *In* Bactria: An Ancient Oasis Civilization from the Sands of Afghanistan. G. Ligabue and S. Salvatori, eds. Pp. 41–66. Venice: Erizzo.

Tosi, M., S. M. Shahmirzadi, M. A. Joyenda, A. H. Dani, and V. M. Masson
1992 The Bronze Age in Iran and Afghanistan. *In* History of Civilizations of Central Asia, vol. I The Dawn of Civilization: Earliest Times to 700 B.C. Pp. 191–224. Paris: UNESCO.

Trifinov, V. Editor.
1997 Mezhdu Azei i Evropoi: Kavkaz v IV–I Tis. do N.E. (Between Asia and Europe: The Caucasus in the 4th–1st mill. B.C. St. Petersburg: Hermitage.

Tsalkin, V. I.
1970 Drevneishie domashnie zhvotnie Srednie Azii (The oldest domestic animals in Central Asia). Biulleten' Moskovskogo obshchestva ispitatelei prirodi (otdel' biologich.) 75:145–159.

van Zeist, W., and J. A. H. Bakker-Heeres
1985 Archaeobotanical Studies in the Levant 4. Bronze Age Sites on the North Syrian Euphrates. Palæohistoria 27:247–316.

van Zeist, W., and H. Buitenhuis
1983 A Palaeobotanical Study of Neolithic Erbaba. Anatolica 10:47–89.

van Zeist, W., and R. M. Palfenier-Vegter.
1981 Seeds and Fruits from the Swifterbant S3 Site. Palæohistoria 23:105–168.

Vandiver, P.
1986 The Production Technology of Earthenware Ceramics 4900–2800 BC, *In* Excavations at Tepe Yahya, Iran: 1967–1975, C. C. Lamberg-Karlovsky, ed. Cambridge, MA: American School of Prehistoric Research.

Varien, M., and J. Potter.
1997 Unpacking the Discard Equation: Simulating the Accumulation of Artifacts in the Archaeological Record. American Antiquity 62:194–213.

Vinogradov, A. V.
1979 Issledovaniya pamyatnikov kamennovo veka v severnom Afganistane (The study of sites of the Stone age in northern Afghanistan). Drevnyaya Baktriya 2:7–62.

Voigt, M., and R. H. Dyson, Jr.
1992 The Chronology of Iran, ca. 8000–2000 BC. *In* Chronologies in Old World Archaeology, R. Ehrich, ed.3rd edition. Chicago: University of Chicago Press, pp. (I) 122-176; (II) 125-153.

Voigt, M. M.
1983 Hajji Firuz Tepe, Iran: The Neolithic Settlement. Philadelphia: University of Pennsylvania Museum of Archaeology and Anthropology.

Warner, L.
1908 Stone Implements and Skeletons Excavated at Anau. *In* Explorations in Turkestan, Expedition of 1904. R. Pumpelly, pp. 477–494. Washington, DC: Carnegie Institution of Washington.

Watson, P. J.
1979 Archaeological Ethnography in Western Iran. Viking Fund Publications in Anthropology, 57. Tucson, AZ: University of Arizona Press.

Wilhausen, R. H.
1986 The Relationship between Abandonment Mode and Ritual Use in Pueblo I Anasazi Protokivas. Journal of Field Archaeology 13:245–254.

Wulff, H.
1966 The Traditional Crafts of Persia: Their Development, Technology and Influence on Eastern and Western Civilizations. Cambridge, MA: MIT Press.

Yaneshevich, Z. V.
1977 O nakhodke yamenya na poselenii Altyn-depe (Concerning findings of barley at the settlement of Altyn-depe). Karakumskie Drevnosti 5:162–169.

Zettler, R.
1992 The Ur III Temple of Inanna at Nippur: The Operation and Organization of Urban Religious Institutions in Mesopotamia in the Late Third Millenium B.C. Berlin: D. Reimer.

Zhukovskii, V. A.
1894 Razvalini starogo Merva (Ruins of Old Merv). St. Petersburg: Imperatorskaia Arkheologicheskaia Kommissiia.

Index

Afghanistan, northern, 172
Aina, 3
Ak, 3,19, 21
Akcha, 3, 22, 70, 74
Akhal region, 4, 18
Altyn, 3, 19, 20, 21, 71, 74
Anau IA, 68; ceramics, 163; ware, 77, 190
Anau North (map location), 3
animal, burrow, 187; domestication, 15, 28–30; remains, 25, 28, 35, 95, 154–159, 165
Anjira, 79
Arkash region, 4, 124
Atek, 77
Atrek Valley, 18, 19, 23

Baluchistan, 21
Bami, 3, 16, 18
Bampur, 79
barley, 34, 142, 164, 169; six row, 15, 130, 137; two row, 129
bead(s), 82–83, 85, 94, 120–121, 123–125, 192
Beurme, 3, 18
bin, pebble-lined, 40, 109, 113, 177; plaster-lined, 109; storage, 39
biomorphic analysis, 139–153
black painted floor, 146, 108, 112; walls, 106
BMAC (Bactria Margiana Archaeological Complex), 171
bone tool(s), 87–89
Braidwood, Robert, 13
brick(s): brick sizes, 35; proto-bricks, 15; brick, bench, 111; burned bricks 34
building horizon, 31
burial, 22, 26, 40, 82–83, 99, 114, 116–126, 162, 171, 175, 179, 181–190, 192

camel, 156
Carnegie Institution of Washington, D.C., 25, 26, 31
carnelian, 95, 121
Caspian region, 18;
cattle, 155–156
Central Asia, defined, 2
Chagylly, 3, 17, 91, 108 125, 169
Chakmakli, 18, 68, 77, 82, 114
chalcedony, 89
Chalcolithic, 6–7
Cheshmi Ali, 17, 169; ceramics, 77
Childe, V. Gordon, 13
Chingiz, 3, 19, 21
Chong, 3, 70
Chopan, 3, 15, 16, 17, 125
circular structure(s), 47, 50, 53, 99–101, 103, 108, 114, 136, 143, 170–171
climate change, 6
cooking pot(s), 43, 49, 69–70, 74, 77, 79, 179, 186
copper, 83, 120, 169
courtyard(s), 44, 45, 47, 50, 53, 105, 108–109, 111–113, 115, 146, 152
craft production, 21
curtain wall(s), 53, 101, 103

Dalma, 21, 60
Dashli, 3, 21
Dashlidzhi, 3, 63, 95, 97, 115, 167, 170; Period, 19
de Morgan, Jean-Jacques, 27
debitage, stone, 82, 162
detritus (biomorphic analysis), 140–141, 151
diatoms, 141–142
Djeitun, 3, 15–16, 20, 56, 85, 89, 91, 95, 108, 114, 155, 164, 167, 169
dog(s), 157, 165
Duerst, J. Ulrich, 28, 34, 154
dung used as fuel, 135–137

Early Village Period, defined, 1
east gallery, 27–28, 98, 114
East Mound (Anau), 9, 10
east pit, 11
Ekin, 3, 21
environment, environmental change, 1, 6
Erk depe (Manysh), 23
erosion, 161
Ershov, S. A., 28–31
Ershov's sounding, 11, 31, 54, 67, 68, 77, 95, 98–99, 104
Etek region, 4, 16, 18–20, 22
ethnographic analogy, 2
Eurasian steppe, 2
Excavation 1, 11, 31, 79, 109–111

figurine(s), 23, 44, 95, 97, 164, 169
floor(s), 45, 98–99, 103, 114–115, 152, 162, 163;

plastered, 149; floor, brick pavement, 148
fruit(s), 131–132

Gadym, 3, 89
Gara, 3
Gathar, 9
Gavych, 18, 68, 77
Geoksyur delta, 4
Geoksyr, 19, 20, 67, 101; type ceramics, 74, 79
Geoksyur 1 site, 3, 70, 97, 114
Geoksyur 5 site (Chong), 3, 170; ceramic type, 72
Geoksyur 6 site (Aina), 3, 70
Geoksyur, 7 site, 70
Gievdezhik, 21
Gijlar, 134
Godin, 21
gold, 22
Gonur depe, 132, 153, 159
Gooch, F. A., 28
ground stone tool(s), 93–94, 182, 189
Gryaznov, M. P., 28
Gurgan, 77
gyr (stone weight), 82, 93, 97

Hajinebi, 136
Hajji Firuz, 164
Hasanlu, 21
hearth(s), 44–45, 108, 111, 121, 125, 147, 162–163, 167, 171, 177, 179, 184
Hissar 6, 70, 78, 79, 87, 89, 93, 97, 134, 169, 172
horse (see onager), 157–159
human bones, 28
hunting, 154, 165
Huntington, Ellsworth, 5, 26

Ilgyli, 3, 12, 19, 21–23, 35, 70, 74, 94, 95, 97, 105, 115, 126 ,154, 159, 164, 167, 170–172
Indus Valley, 21
Institute of Archaeology, Leningrad (LOIA), 28, 30
interregional trade, 6
irrigation systems, 4, 164; liman, 4, 164, 169
Isidore of Charax, 9
IuTAKE (South Turkmenistan Archaeological Complex Expedition), 28, 30

Kara Kum desert, 2, 16
Kara, 3, 35, 53, 70, 78–79, 85, 87, 93, 95, 97, 109, 115–116, 125–126
Karantki-Tokai, 3, 19, 21
Kashut, 3, 18, 21, 68
Keltechinar River and Valley, 4–5, 17, 19, 23, 89, 128, 172
Kidder, Homer H., 26
Komarov, A. V., 12, 24
Komarov's trench, 12, 27, 30–31, 33–34, 174, 192
korchagi (defined), 63, 69, 78–79, 109, 115, 184, 186
Kuftin, B. A., 30
kulturni sloi (archaeological complex), 31
Kunlun mountains, 2
Kurbansakhatov's deep sounding, 27, 33, 75, 98–103, 114
Kurbansakhatov's main trench, 11, 33, 68, 79, 105–109, 111–112
Kyzyl Kum desert, 2

lapis lazuli, 19, 22, 94–95, 124, 172, 179
lead (implements), 120–121
leveling process, 39, 99–100, 102–103, 106, 109, 165–167, 170
liman irrigation, 4, 164, 169
lime plaster floor, 15

Malyan, 136, 167, 171
Manysh, 3, 18–19, 21, 23, 97, 171
Marushchenko, A. A., 28
Masson, M. E., 28
Masson, V. M, 30
matting, 39–40, 120, 162
Mehrgarh, 21, 60
Merv, 24–25
Meshed, 24
Mesopotamia, 21
metal(s), metal implements, 28, 82–83, 85, 89
methodology, 129–130, 161
migration, 1, 6
Mollison, Thomas, 125
Mondjukli, 3, 18, 68, 77, 82, 93, 95, 101, 114, 116, 124–125, 167, 169–170
mud brick sofa, 111
Mullali, 3, 21–22, 53, 70, 79, 101, 114, 170
Mundigak, 79

Namazga depe, 3, 13, 19–21, 30, 53, 60, 70, 78–79, 97, 116, 170
Namazga II type bichrome ceramics, 73–74
Nan Shan mountains, 2
Nisa, 24
Nishapur, 6, 23
Nishapur-P, 3, 21, 23, 79, 97, 172
north digging, 11, 28, 77, 98, 114
Norton, Richard, 5
Novisti, 25

oasis hypothesis, 1, 5
onager, 157–159
Ovadan, 3, 18–19, 21, 68, 77
oven, 105, 179–180

painted floor, 114–115, 145; painted wall, 104, 115
Pamir, 26
Parhkai II, 3, 19, 21, 70, 79, 116, 125

pattern-burnished gray ware, 78
pebble lined bin(s), 40, 109, 113, 177
Pessejik, 3, 17, 91, 108
Petermann's Mitteilungen, 25
phytoliths, 140, 151
pig, 156
pits, storage, 39; trash, 39
plant domestication, 15
plant remains, 28, 34, 64–65; macroscopic, 127–138; microscopic, 139–152
plaster, 15, 108; floor(s), 34, 98–99, 149; bin, 44, 109
pollen, 140, 151
prestige goods, 6, 21
proto-bricks, 15
Proto-Elamite, horizon, 172; materials, lack of, 79, 97, 172
pseudo-Ubaid type ceramics, 67, 72, 78
Pumpelly, Eliza, 26
Pumpelly, Raphael, 5, 12, 24–25, 27, 160

Qazvin, 77, 171
Quetta style ceramics, 79

racial diagnosis of skulls, impossible, 125–126
red-painted floor(s), 114
ritual space, 167; table, 95

Samarkand, 25
Sang-i Chakmaq, 16
Sarazm, 172
Schellenberg, H. C., 28
Schmidt, Hubert, 26, 27, 160
sector (defined), 33
Seh Gabi, 21, 60
Seistan, 26
Sekizyab River, 15
Semenov, A. A., 28
Sergi, Guiseppi, 28, 125
73 km site, 3, 18, 68, 77
Shah depe, 79
Shahdad, 79
Shahr-i Sokhta, 79, 172
sheep, 15, 156
Shirvan, 3
shrine(s), 46, 94, 104–106, 114–115, 167, 170
shtick (archaeological unit), 31
Sialk, 19, 79, 85, 89, 93, 169, 172
Silk Road, 9
sloi (layer), 31
social conflict, 6; hierarchy, 21
software ceramic horizon, 60, 78–79
South Mound (Anau), 9, 10, 26, 87, 126, 132, 173
South Turkmenistan Archaeological Complex Expedition (IuTAKE), 28
spicules, 141–2, 152
spindle whorl(s), 40, 44, 82, 85–87, 97, 120, 164, 169
State Historical Museum (Moscow), 28
stone tool(s), 44, 82–83, 89–93, 95, 97, 120
stone weight(s), 40, 44, 82, 93
storage bins, 39, 109; pits, 39
stroitel'nii gorizoni (building horizon), 31
Sumbar Valley, 19, 21, 78, 162
Susa, 19, 27

Taklamakan desert, 2
takyr, 3
Tedzhen River, 4, 20
Tehran Basin, 17, 171
Tepe Yahya, 6, 21, 60, 79
Tepe Yam, 3, 19, 23, 95
Terrace excavations 11, 27, 79, 112–113
threshold(s), 99, 102–103, 105, 111
Til'kin, 3, 21
Togolok, 3, 15–16
Troy, 13, 26
tugai vegetation, 128, 137–138
Turan, 167
Tureng tepe, 79
Turkestanskie Vedomosti, 25
turquoise, 19, 82, 120, 169

Ulug, 3, 19, 74

vegetation, modern Anau region, 127–129
Voevodskii, M. V., 28
volume of deposits, Anau, 81

walls, painting, 20; construction, 35, 108, 115
ware-based analysis (defined), 57
Warner, Langdon, 26, 116, 118; descriptions of burials, 119–124
weapons(s), 82, 85, 95
weed(s), weedy vegetation, 132–135
west digging, 11
west gallery, 27–28
wheat, 34, 129–131, 137, 142, 164, 169; einkorn, 15
wood charcoal, 129; fuel, 135–137, 152, 164–165

XA6 site, 3, 23, 95

Yalangach, 3, 21–22, 53, 89, 101, 114–115, 167, 170, 172 ; Period, 21; type ceramics, 74, 78–79
Yangshao, 13
Yarti-Gumbez, 3, 16–17, 169
Yarym-DG, 3
Yassi, 3, 19–20, 97, 104–105, 115

zakladka (brick pavement), 148
zero point (datum), 27, 161

ISBN 1-931707-50-2
9 781931 707503

ISBN 1-931707-50-2